

# Research on the Evolution and Dynamics of Issue Attention on China's Climate Change

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**Research on the Evolution and Dynamics of  
Issue Attention on China's Climate Change**

Legal and Political Studies

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## **Abstract**

In public policy process, how attention characterized by scarcity is allocated? What's the evolution process of issue attention? And what factors affect the issue attention dynamics? In order to answer the questions above, my study focuses on China's climate change issue and analyzes the evolving process of China's climate change issue attention. Based on the theory and observation on China's climate change policy process, a dynamic model for climate change is proposed and tested empirically.

Climate change issue emerged on China's policy agenda ever since 1980s and evolved constantly. In this process, climate change issue attention shifted, evolved and developed, which exhibits fluctuation and change of issue attention in terms of attention level and structure. The studies on China's climate change policy process have mainly focused on policy making and policy implementation for a long time, but how climate change issue entered China's policy agenda and how climate change issue grabbed attention as well as how climate change issue attention evolved are paid meager attention. With this being said, my study attempts to answer these questions through innovations on research design and methodology.

The content analysis toolbox is employed in my research. My study utilizes the official and authoritative newspaper, the People's Daily, as data resource. More than 5500 texts relating to climate change are retrieved and downloaded from 1947 to 2013. In my research, natural language process technology is used. Through computer coding and human coding, climate change issue attention is extracted and analyzed ranging from 1950s to 2010s. The research results show climate change used to be understood as the weather change with huge time and space scale. In addition, my research finds that climate change issued attention had been dominated by agriculture dimension, environment and ecology dimension, and economy development and international governance dimension respectively. Meanwhile, the correlation between climate change attention and other attentions in climate change issue attention space has been becoming more and more complex. My research also reveals the process in which climate change issue attention has been becoming more complex and dispersed but the relative proportion of climate change issue attention is declining, which implies the marginal attention of climate change is ascending.

Based on the understanding on the climate change issue attention evolution, my

research constructs an explanatory dynamic model of climate change issue attention. By way of Autoregressive Integrated Moving Average Model with Exogenous Variable (ARIMAX) analysis, my research illustrates that in short periods, the focusing effects of important global agendas of climate change and international pressure exerted significant influence on climate change issue attention. When the time step in time-series analysis becomes longer, the international pressure and the crowd-in effect resulted from issues correlation significantly affect the climate change issue attention. My study contends that climate change issue attention dynamic pattern in China is the response to politics and pressure rather than to problem itself. In addition, the findings of empirical research provide insights on agenda setting theory through expanding issue attention dynamic model by synthesizing international factors and trans-subsystem effects into agenda setting theory. My study is also expected to shed light on the understanding of climate change policy process in China.

**Keywords:** climate change; issue attention; attention evolution; attention dynamics

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# Chapter 1 Introduction

## 1.1 Theory Background

### 1.1.1 Focus on the Beginning Stages of Policy Process

Where do policies come from? This query must become the “original sin” of many confusing issues in public policy. On the one hand, we seemingly know where those policies originate from since numerous glorious names and their achievements in the history of public policy research have already unravel such mystery. Harold D. Lasswell’s Theory of Policy Cycle, John Kingdon’s Streams Theory, and Thomas Dye’s Top-down Policymaking Theory, could all lead us to the “roadmap” towards the origin of policy. On the other hand, sometimes we feel confused about these theories because new policy issues keep arising, which will incur criticism to these exquisite and imaginative theories and push them down from the altar. Then we return to the endless circle of optimizing or rebuilding theories. Hence, the query of “Where do policies come from” is both often asked and answered, and the answers are frequently updated. Public policy is not the product of rational designing, and, of course, we are not able to be perfectly rational during policy making either. Herbert A. Simon’s notion of bounded rationality provides the context for many policy scholar’s conception of the policy process: first, individuals lack the ability to pay attention to every dimension of a problem at once; second, decision-makers lack perfect information about their choices; third, individuals face uncertainty about how their decisions will play out in the future; finally, and perhaps as a function of the other limitations, individuals may not have access to complete knowledge of their own preferences (Pump, 2011; Simon, 1990). Charles Lindblom claimed that decision makers tend to prefer conservative policies, so public policy would be just like a way of *Muddling through* (Lindblom, 1959). However, incrementalism remains far from the destination of our discussion, because in reality public polices sometimes muddle through but sometimes suddenly change. The rigorous logic of rationalism and incrementalism seems fragile and vulnerable in front of these practical problems. Faced with such confusion, Frank Baumgartner and Bryan D. Jones brought up the punctuated-equilibrium model, originated from biological evolution research, which together with Kingdon’s streams theory become the most well-known contributions to public policy research. Is

this still not sufficient to answer the “where do policies come from” query? Actually reality remains more rich and dramatic than theories. This query seems to open the Pandora’s box and result in lots of confusion; existing and newly arising unknown things always challenge the connection between theory and reality. It’s fortunate that previous research results provide the hope in Pandora’s box. With some limitations, though, those creative theories could still help provide new starting point in answering the question of where policies originate from, which will save us from seeking after the answer from the very beginning every time.

In *The Future of Political Science*, Lasswell introduced his model of Policy Circle Theory, which he divided into seven main phases, including the intelligence phase, the promoting or recommending phase, the prescribing phase, the invoking phase, the application phase, the appraisal phase and the terminating phase(Lasswell, 1963). Policy Circle Theory has been always involved but inevitably criticized in the research of policy process. Due to the huge significance of this model in modeling the complex policy-making process, this theory could never be ignored while studying policy process. However, for it over simplified and linearized policy process, the complexity and chaos of policy making can hardly be explained by it. Yet no matter how many criticisms it receives, there is no doubt that public policy is a kind of process or procedure over time. No matter whether there exists crisscross, repetition, or circulation, researchers could generally divide the policy process into policy-making phase and policy-implementation phase. The former phase could be further subdivided into issue framing, agenda setting and alternatives selecting. In terms of policy research, a better idea is to get to the root and origin to find out the causes of policy confusion, because the hidden risks of poor implementation may be planted at the phase of issue establishment, and the poor performance may result from deviation in agenda-setting . However, the biggest embarrassment in policy research lies in the fact that the nearer the researchers reach the beginning phase of policy process, the harder for them to access the information. It’s like a “black box” for the outsiders. So sometimes they have to speculate how policy is made merely relying on the fragmented and incoherent information, which challenges the theorization of the beginning phase in policy process (Sabatier, 1991). Doubtlessly, each policy researcher has the insuppressible impulse to uncover the black box in policy-making process. Though it is destined to be a tough journey, it’s of great significance and value for policy research (Kingdon, 1995).

### 1.1.2 Focus on the “Scarcity” in Decision Making Process

Kingdon is a renowned political scientist, known for his book *Agendas, Alternatives and Public Policies*. At the beginning chapter of his book, he described a puzzle put by a one well-informed individual high in the federal executive branch:

It’s a fascinating question that you’re dealing with. Why do decision makers pay attention to one thing rather than another? I’ve seen situations in which the Secretary has been dealing with absolute junk when he should be working on some really significant issue. I’ve always wondered why.

Policymakers will encounter various problems every day; some are step-by-step routine problems, while some sudden accidents also happen. When doing research we are often curious about, among all the numerous files stacked on the desks of policymakers, which document will first gain the attention of policymakers and then occupy its own position in their busy agenda, while which document fails to attract the interests and then would be neglected. Although decision-makers can hire more assistants and rely on think tanks in order to improve their abilities to solve problems, they could never totally get rid of “scarcity” -- the scarcity of effective information concerning decision-making and the scarcity of attention.

During the process of decision making, it’s common that effective information is scarce. The unknown we often mention in policy process includes not only the known unknown, but also the unknown unknown (Knight Frank, 1921), and even the unknowable unknown (Chua Chow&Sarin, 2002). As for decision making, it’s not that easy to collect reliable, accurate and complete information. Then policymakers must constantly cognize and judge the information, and choose to accept it or ignore it. Despite that decision makers in the top of bureaucratic pyramid are surrounded by abundant information, the overload of information increase the costs of identifying and processing it. Hence, it seems that the shortage and the redundancy of information exist at the same time (戴维&毕瑟姆, 2005). Invariably, decision makers have to allocate his attention which is also scarce to the difference pieces of information. Attention refers to “processes or conditions within the organism that determine how effective a particular stimulus will be”(Berlyne, 1974), so it has always been synonymous with selectivity (Jones, 1994). One limitation to decision making is such an attention “bottleneck”, which is rooted in

the surprisingly small information capacity of human beings. So humans have to process information serially (Simon, 1985). The attention of an organization is also formed by humans' attention. Though the factors influencing attention of an organization are more complicated, the scarcity of attention remains universal.

Under the circumstance of information and attention scarcity, policy making becomes a process of allocating attention and screening information. Thus, compared with the policy itself, it's more critical whether the policy makers would pay attention to the issue.

### 1.1.3 Proposing Theoretical Questions

The beginning of policy process remains full of mystery due to the lack of information, but there is no doubt that this seemingly blurred process starts the whole story. During this process, the interactions between screening information and allocating attention form the basic mechanism of agenda dynamics. Therefore, we wonder what kind of visible or invisible "hands" control the basic rules of such dynamics mechanism; how the distribution of attention get affected by information; how attention exert influence in turn on information flows; and how the factors and interactions above finally affect the product of policy. To examine these questions would be much valuable and beneficial to improve the understandings of policy process.

Table 1-1 Types of political research and policy research

	Applied	Recreational
Non-empirical	Normative philosophy	Formal theory
Empirical	Engineering research	Theory-oriented research

Philips W. Shively divided research into four types which are normative philosophy, formal theory, engineering research and theory-oriented research, based on different combinations of two dimensions: the uses for which research is designed (applied versus basic research), and extent to which it seeks to provide new factual information (empirical versus non-empirical), as shown in Table 1-1 (Shively, 2010). This thesis does not intend to reconstruct or improve the policy process theories through theoretical deduction and thought experiments, since there are already abundant existing researches on theorizing policy process. Thus, further study should focus more on dragging closer the logical



distance between theories and reality. Therefore, this thesis will follow the research paradigm of empirical analysis, even though this thesis start with bringing up some theoretical questions. Nevertheless, this thesis also differs from policy-oriented research which is designed for fixing specific policy problems and dilemmas in real life. Overall, this thesis is devoted to answering the theoretical questions proposed above about how issue attention is influenced by other factors through combining the existing theories of policy process and the real case of climate change issue in China.

## 1.2 Policy Background

### 1.2.1 Climate Change: An Unconventional Policy Issue

Actually it is difficult to find a research case that exactly fits the four types of research shown in table 1-1. Generally it's more like a mixture of those types (Shively, 2010). To answer the theoretical questions needs a medium, which plays the role of linking policy theories and the reality. This thesis mainly focuses on the policy issue of "climate change", which differs significantly from other policy issues concerned by policy researchers in the past. Anthropogenic climate change is a global risk which is believed to pose serious threats to human development and even livelihood with high confidence (Stocker et al., 2013). Climate change is a complex issue because it's not only fraught with scientific uncertainties but also plagued with social complexities. An unstructured policy problem or a diabolical policy problem epitomize the degree of complexity and difficulty in understanding and tackling climate change (Garnaut, 2008; Klink&Renn, 2002). The reason to study climate change issue is that climate change characterized by complexity and uncertainty may trigger an unconventional behavior of policy system, which provides us a fabulous opportunity to reconsider "where does policy come from". In addition, as a global issue, climate change would be a very good example to examine the emerging pattern of policy process under the circumstance of globalization.

Climate change was first noticed in humans' history by Jean-Baptiste Joseph Fourier<sup>①</sup>, who was known for his research on heat conduction and the earth's surface temperature. His research paper, publish in 1824, stated the critical importance of atmospheric layer to earth climate. Around 30% energy from the sun is reflected back to

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① Jean-Baptiste Joseph Fourier (1768.3.21~1830.5.16) was a French mathematician and physicist born in Auxerre and best known for initiating the investigation of Fourier series and their applications to problems of heat transfer and vibrations.

space by clouds, ice and deserts, while the left 70% heat as long wave radiation is captured by atmospheric layer to warm the earth<sup>①</sup>. John Tyndall, an Irish scientist working at Royal Society in London, continued to study climate issues and found that the water vapor is playing the biggest role in the endothermic process, “water vapor acts like blankets for British plants, the importance of which goes beyond what clothes mean to human”(Christian Arthur et al, 2010) Now human has realized that many gases contribute to “greenhouse effect”, including CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs, PFCs, and SF<sub>6</sub>, as listed in Kyoto Protocol<sup>②</sup>.

Similar to many other serious environmental problems, it takes long time before public policy decision makers pay attention to the issue of climate change. In the early 1960s, climate change receives almost no attention from the public or the governments. It's not until 1970s when energy policies were heatedly debated that climate change gained slight attention (Dessler&Parson, 2010). On August 8, 1975, Wallace S. Broecker, from Columbia University, published *Climatic Change: Are We on the Brink of a Pronounced Global Warming?* on *Science*, stating that if there was no restriction to emission of CO<sub>2</sub>, then “the proportion of CO<sub>2</sub> in atmosphere will cause the average temperatures to rise, higher than any other time in the previous 1000 years”(Broecker, 1975). In 1979, the declaration of first World Climate Conference attended mainly by scientists pointed out: if the CO<sub>2</sub> continued to increase, then at the end of 20<sup>th</sup> century the temperature would rise to high level which could be measured, and in the middle of 21<sup>st</sup> century the rise would become remarkable (Torrance, 2006). Villach Conference, 1985 in Austria, was regarded as a scientific discussion with “catalyst” effect, co-held by International Council of Science Union (ICSU), World Meteorological Organization (WMO), and United Nations Environment Programme. This conference discussed and assessed the global environment problems of climate warming and ozone depletion (Mitchell et al., 2006). The conference confirmed that it is an urgent task to assess future climate changes, “if in atmosphere the concentration of greenhouse gases, CO<sub>2</sub> included, continues to increase at the current speed, the CO<sub>2</sub> in 2030s will double the amount of that in pre-industrial days; the double concentration of CO<sub>2</sub> in the atmosphere will raise the global average temperature by 1.5 to 4.5 Celsius degrees and the sea level by 0.2 to 1.4 meters” (Torrance, 2006). Toronto Conference, 1988 in Canada, pointed out that the

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① Some also asserted that 40% of solar energy is reflected back to the universe, while 60% remains in atmosphere.

② See Appendix A of Kyoto Protocol <http://unfccc.int/resource/docs/convkp/kpchinese.pdf>

rapid changes that Earth's climate was undergoing would severely threaten world economic development and human health. And it called upon world's attention to climate issues and to take collective action to protect the atmospheric environment. In the summer of 1988, North America suffered attack of extreme heat wave, causing the most severe drought since 1930s. Then the media started to pay great attention to climate issues, with extensive reports on the relation between climate changes and extreme weather. The focusing effect produced by media was usually called the "weather hooks" (Schneider, 1989). By the late 1980s, with the increase of scientific evidence, scientific cognition about global warming became more "mature", and there were more reliable research conclusions about the close relation between global warming and greenhouse gas emission (Mitchell et al., 2006). The problems of climate changes began to move beyond scientific discussion, and entered some special international agencies such as the United Nations (UN) and United Nations General Assembly. Many countries also started to pay attention to climate change, and the attention from international media grew rapidly as well in 1987 and 1988 and reached its peak in 1990 (Clark, 2001).

Climate changes have brought a huge challenge to policy making, due to the tremendous uncertainty, the long-lasting period, the global scale, and the diverse goals. Granger Morgan pointed out that conventional analytical tools would fail for the assumptions upon which conventional tool are based begin to break down when dealing with global climate change (as shown in Figure 1-1) (Morgan et al., 1999)<sup>①</sup>. Meanwhile, climate change issue characterized by uncertainty, complexity and ambiguity, becomes an unstructured problem (Klinke&Renn, 2002)<sup>②</sup>. Thus, Ross Garnaut named climate change problem as a "Diabolical Policy Problem", and once human society fail to tackle it, it will "haunt human beings forever" (Garnaut, 2008).

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① The basic assumptions proposed by Professor Granger Morgan for conventional policy analysis are (1) there is a single public-sector decision maker who faces a single problem in the context of a single polity; (2) the impacts involved are of manageable size and can be valued at the margin; (3) the assumption that values that are known, static and exogenously determined, and that the decision maker should select a policy by maximizing expected utility; (4) time preference is accurately described by conventional exponential discounting of future costs and benefits; (5) the assumption that uncertainty is modest and manageable; (6) for most questions of interest, the system under study can reasonably be treated as linear.

② Uncertainty refers to a lack of clarity or quality of the scientific or technical data; complexity refers to difficulties in identifying and quantifying causal links between a multitude of potential causal agents and specific observed effects; ambiguity results from divergent or contested perspectives on the justification, severity or wider meanings associated with a given threat.

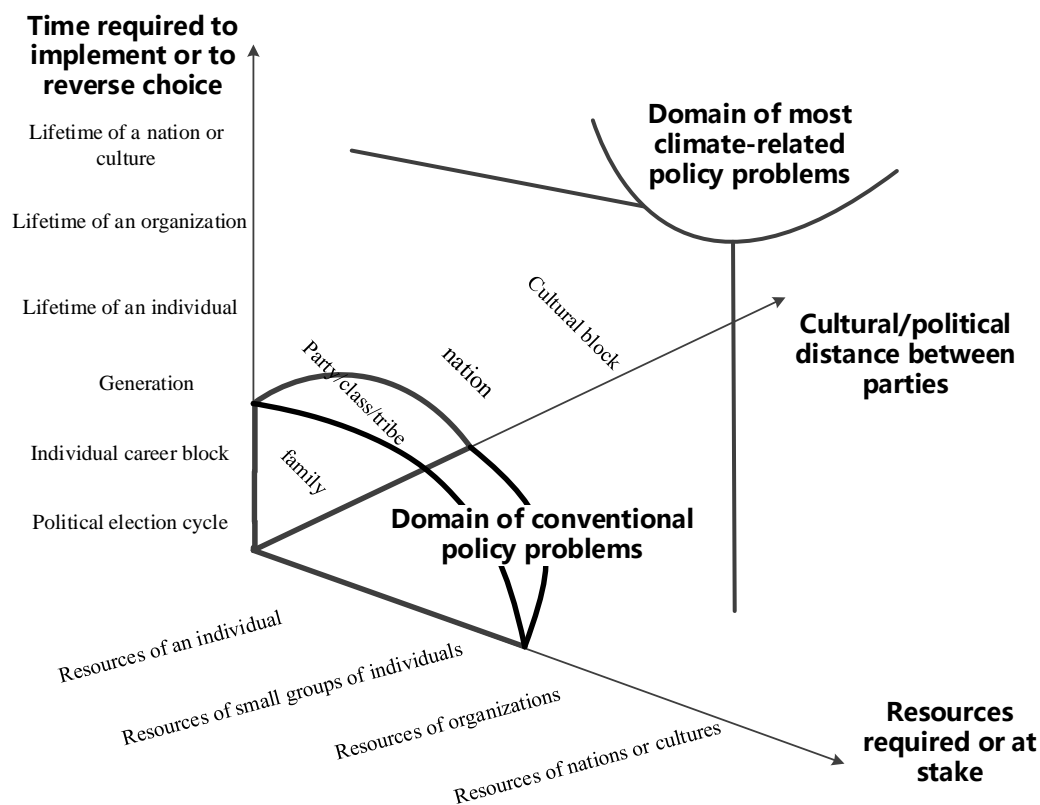


Figure 1-1 Challenge of climate change issue for conventional policy analysis assumptions

As climate change has increasingly become a global concern, more and more people join in the actions dealing with it. Then information from various channels intertwines and collides in the process of decision making, and mutually exerts impact on issue framing and agenda setting. Therefore, the particularity of climate change offers a window for researchers to re-examine decision-making process. And through the perspective of climate change issue, they can have a better understanding of the dynamics of policy process.

### 1.2.2 The Background of Climate Change in China

Climate change problem has long attracted the attention of China's policy makers, and China is also one of the earliest countries to sign and ratify *the UN Framework Convention on Climate Changes*. Due to the fast development of China's economy, the emission of greenhouse gas in China increases rapidly and now China has been the world's largest greenhouse gas emitter. Meanwhile, since China's one of the largest economy, global society expects more contributions from China in governing such a

global issue.

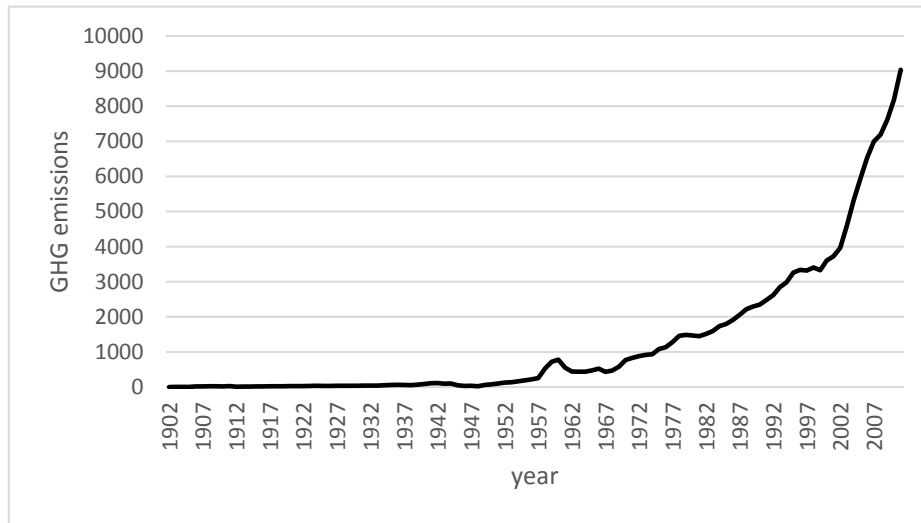


Figure 1-2 Greenhouse Gas Emission in China(MtCO<sub>2</sub>)

Admittedly, as a new rising international scientific problem, the process of climate change turning into a policy issue in China wasn't accomplished overnight. This process witnessed the cognitive change of policy makers, which was affected by both internal and external factors. Generally speaking, in addressing climate change, China has experienced changes in the following aspects. First, the institutions and policy systems to tackle climate changes have changed. China's original policy goal about "climate change" aimed at solving energy predicament in economic development and so relevant policies were mainly supported and carried forward by sectors of economy and energy, while the National Meteorological Administration shouldered the responsibility of coping with affairs pertaining to climate change. As this problem became increasingly a highly focused policy issue, China established the National Climate Change Coordination Group, and later the National Leading Committee on Climate Change, in order to strengthen coordination when coping with climate change. On June 3, 2007, the National Development and Reform Commission issued *the National Climate Change Program*, as guidance in addressing climate changes. The institutions of coping with climate change transformed from separate ones into a united one, and relevant policies for coping with climate change also get increased and improved step by step. Second, the policy goals of coping with climate change have changed. In the 1980s, at a stage of rapid economic development, China's energy demand grew and the imbalance between supply and demand also escalated. Although the "bonus" for saving energy and improving energy

efficiency would help reduce the greenhouse gas emissions per unit of GDP, these policies were not targeted directly on mitigating climate change. Thus, coping with climate change had not been prioritized in government's policy agenda. After China signed *the United Nations Framework Convention on Climate Change* and *the Kyoto Protocol*, the international regime began to exert significant impact on China's policies on climate change (于宏源, 2005). "Coping with climate change" and "reducing greenhouse gas emissions" frequently iterated in various policy documents both became important policy goals. The 21<sup>st</sup> chapter of 6<sup>th</sup> part of *Twelfth Five-year Plan for National Economic and Social Development* planned to "respond proactively to global climate change" through "controlling greenhouse gas emissions", "enhancing the ability to adapt to climate change", and "carrying out extensive international cooperation". This is the first time that the policy goals of coping with climate change were presented explicitly in national plan. Third, the main actors on coping with climate change have also changed. Climate change was originally a scientific issue, and in China the National Meteorological Administration was the first institution involved. Then in 1990, the National Climate Change Coordination Group was set up within the National Meteorological Administration. Along with the international negotiations about climate change and the advancement of energy conservation and pollutants reduction (CO<sub>2</sub> was not included at first) in China, the National Leading Committee on Climate Change led by Premier Wen Jiabao was established in 2007. The next year the National Development and Reform Commission set up the Climate Change Department. Since then, the governmental agencies involved in coping with "climate change" began to include the departments relating to economic development, foreign affairs, social construction, etc. In the Eleventh Five-year Plan, the obligatory indicator system for local governments was set up to facilitate conserving energy and reducing pollutants. In 2011, carbon trading launched a pilot project, marking that the market mechanism had been introduced into the policy portfolio to mitigate climate change, which would more effectively stimulate industrial enterprises to curtail greenhouse gas emissions. Moreover, China also embarked on advocating citizens to save energy and lead a low-carbon life. China began to realize that coping with climate change was the common responsibility for all the citizens, and attempt to mobilize the whole society to participate in this campaign.

Judging preliminarily from the brief history of China's climate policy, China's policy agenda on climate change has gone through the process from low level to high level, from

science to politics, and from fragmentation to integration, which could be reflected, understood and explained by the issue attention, the essence of agenda setting.

### 1.2.3 The Value of the Research for Climate Policy

Climate change has become one of the most important issues in global policy agenda. As the largest emitter of greenhouse gases, and as a country most exposed to natural and social economic risks caused by climate change, China should realize the severity and significance of climate change. Addressing climate change will take a long time, since the time for response of natural system would exceed normal policy circle a lot, which means the cost of addressing climate change would not be rewarded soon. According to the report of Intergovernmental Panel on Climate Change (IPCC), CO<sub>2</sub> would stay in atmosphere for a very long time, even up to 100 years. Thus ineffective actions could further accumulate more greenhouse gases in atmosphere, leaving a series of negative impacts for the future (Stocker et al., 2013). Besides, the increase of temperature and the influence of global warming would not just stop or disappear the moment greenhouse gases stop increasing. The inertial effect will still increase the global temperature in the next decades, thus there exists a huge time lag between the costs of mitigating climate change and potential profits (Steffen, 2011). This will definitely undermine the incentives of taking action at present. Dealing with climate change, therefore, needs the decision-making system to keep a constant focus on it. Only with high level and stable policy agendas for addressing climate change, would it have sufficient efforts to invest to cope with such an unprecedented global risk.

However, such requirement remains a huge challenge for policy makers and policy system. A series of studies concerning issue cycle and issue attention, as represented by Downs here, show that the attention for a policy issue could not last for a long time; and any issue which even has been concerned a lot by decision makers, mass media or public, it would inevitably go into recession phase (Downs, 1972). What's more, the issue of climate change will suffer from the crowd-out effect caused by other issues, so it has to compete with other issues for scarce attention and crowded agenda (Djerf-Pierre, 2012a). A worthy question is, therefore, what factors would drive or lower the issue attention of climate change and how do the dynamic mechanisms work behind the fluctuation of attention to climate change? Addressing climate change hinges on the better understandings of the answers for the questions above, because gaining issue attention is

the prerequisite for decision making, especially for China. China will still face the challenge of balancing developing economy and coping with climate change, while as a large power and the largest GHG emitter, China is also requested to play a more proactive role in addressing climate change. Thus, to understand the history of climate change politics in China, and to demystify the dynamic mechanisms of issue attention on climate change under the institutional background of China, are of great value to both China and the global governance.

### 1.3 Research Framework

#### 1.3.1 Main Research Idea

This research will focus on the evolution and dynamics of issue attention on climate change in China, based on the relative theories about issue framing and agenda setting from political science and policy science. This study will move beyond the qualitative methodology which is prevailing in policy process research. Instead, it will attempt to quantify the policy process so as to corroborate and extend existing theories. In the first part, this thesis intends to clarify different dimensions of climate change attention in complicated policy discourse, and further present the panorama of attention evolution of climate change in China in the last few decades. In terms of dynamics study of issue attention, this research will explain with empirical evidence the dynamic mechanism of China's issue attention to climate change.

#### 1.3.2 Research Method

This thesis will mainly adopt the quantitative method. However, some qualitative data such policy files, government documents, meeting records and news report will also be used in order to better understand the major climate change policies. In addition, so as to have a deeper understanding of policy process, a few interviews to some decision makers, experts, and NGO officials in the field of climate change have been made.

This thesis will try to apply quantitative research method to examine climate policy issue in China. At this age of "big data", there are plenty and various kinds of data which could be used in policy process study. It is no longer a mission impossible to carry out relatively complex longitudinal dynamics research (Neuman et al., 2014). Nevertheless, in the research of policy process, it's a huge challenge to transform qualitative data into



quantitative data. Thus, this paper will employ content analysis, a method widely accepted by modern social science research, together with a series of techniques including Natural Language Processing to transform the data. Then statistical analysis method will be used to test the hypotheses.

### 1.3.3 Thesis Structure

Chapter one is introduction, briefly introducing research questions and methods. chapter two is literature review, comparing and analyzing the previous theories about policy issue framing and policy agenda setting. Chapter three will illustrate the evolution process of climate change issue and agenda setting in China. Chapter four will explain the methodology, mainly presenting how the issue attention to climate change is measured. Chapter five will analyze the evolution of attention to climate change in China. Chapter six will examine the dynamics of issue attention on climate change, including the framework, the dynamics models, the measurement of all indicators, and the final analysis results. Chapter seven will summarize the research and provide the conclusions and discussions.

## Chapter 2 Literature Review

Policy agenda setting is a persistent research topic of public policy and political science. It has drawn long-term attention from both domestic and overseas scholars of policy study. A reservoir of theoretical studies has been established, which in turn greatly pushed forward public policy research. In general, to study policy agenda, the academic community has taken three perspectives over the past years, namely the perspective of process, system and behavior. All the three perspectives are based on in-depth observations of political and policy process. Theories in multiple areas, such as behavior science, politics, management, system theory, organization and communication have been incorporated into studies on agenda setting, which generates various explanatory models. This chapter will examine the theoretical foundations, logics, explanatory power and limitations of these models or frameworks from the three aforementioned perspectives. Apart from them, the constructionist perspective as an emerging paradigm in policy study is also analyzed. Finally, this paper will review the research perspectives for climate change policy process of China in the past.

### 2.1 Process Perspective

#### 2.1.1 Theoretical Bases

Process Perspective, by definition, takes the process of policy making as the research objective. Policy process is seen, from this perspective, as an activity in which all relevant elements or factors interact and function to produce public policy.

The theoretical foundations for the process perspective have a long history. It came into being since the birth of modern policy science theories, and has become a starting point and cornerstone for the development of policy science. The modern policy science theories were considered to be established since the publication of *The Policy Science: Recent Development in Scope and Method*, written by Harold Lasswell and Daniel Lerner, two American scholars. In this book, Lasswell described policy science as the culmination of efforts to define a discipline for producing and applying “societally relevant knowledge” (Lasswell&Lerner, 1951). Ever since modern policy science originated, rationality began to take root in the studies on policy process. Lasswell, as one

of the founding fathers for modern policy science, put forward a “7-Stage” model in his later works, which clearly framed the policy making as a kind of “process” in policy science studies (Lasswell, 1963). His contribution was regarded as a landmark for policy process studies. It enables researchers to divide a rather complicated policy process into the sequence of units, which is in line with the cognitive habits of humans. The “5-Stage” model for policy created by Anderson later was also influenced by him (Anderson, 1975). Ideally, policy process should be a rational activity according to such process theories. However, when dealing with the issues being open to various factors, decision-makers usually lack the ability and time to achieve complete rationality (Simon, 1957). As a result, scholars of incrementalism came up with a less demanding policy model, in which policy is in fact a matter of “muddling through” (Lindblom, 1959). There is rarely the time, resource or inclination to conduct comprehensive research, and decision makers are entirely pragmatic, aiming to ensure that government can function, cope with pressure group demands and deal with crises as they arise. Although rationalism and incrementalism are in dispute, the two schools agree that functions such as knowledge, information and participants do matter for pushing the process of decision making forward. This then could be regarded as the basic ideas for process perspective.

## 2.1.2 Explanatory Frameworks and Models

### 2.1.2.1 Agenda Building and Issue Cycle

From the Process Perspective, the study on policy issues and policy agendas concentrates on the transitions of different stages, during which policy actors accompanied by other relevant factors shape the dynamics of agenda.

In policy issue studies, much attention has been paid to how a social problem becomes a policy issue. Cobb and Elder proposed four approaches: first, it could be initiated by one or more groups, some of them feeling that they have been treated unfairly; second, issues could also be initiated by an individual or group for the purpose of protecting their own interests; third, issues could also be triggered by accidents; fourth, some people initiated issues because they intended to seek mental comfort or commonweal (Cobb&Elder, 1972). Issue formation also needs the triggering mechanisms, which could be either from internal or external. If the event takes place within national border, it is called an internal triggering mechanism; otherwise it is the external triggering mechanism (Cobb&Elder, 1972). In their theory, the role of triggering mechanism,

especially the time when it occur, is critical for issue framing and agenda building.

According to Downs, no policy issue, even if it is very important, could have long-lasting attention in a public agenda. In his classic essay *Up and Down with Ecology*, Downs brought up the concept of issue-attention cycle to describe the rise and fall of public attention to domestic political issues (Downs, 1972). Issue-attention cycle is comprised of five stages, which are the pre-problem stage, alarmed discovery and euphoric enthusiasm, realizing the cost of significant progress, gradual decline of intense public interest and the post-problem stage (Downs, 1972). Downs believes that social problems which would go through the issue-attention cycle generally possess some characteristics: the majority of persons in society are not suffering from the problem nearly as much as some minority; the sufferings caused by the problem are generated by social arrangements that provide significant benefits to a majority or a powerful minority of the population; the problem has no intrinsically exciting qualities; and the problem must be dramatic and exciting to maintain public interest. Downs' description deals almost exclusively with trends in public opinion, although he includes the suggestion that policy makers are affected by the public (Soroka, 1999). Factors like technological change or the perception of a crisis are important dynamics in the increased public prominence of an issue, while the realization of cost for policy solutions are dynamics explaining the decline of public interest. However, prior to the decline new institutions, programs and policies may be created and then persist even after public attention faded, which implies that policy agenda may not be in line with issue-attention cycle (Baumgartner&Jones, 2010; Peters&Hogwood, 1985; Stone et al., 2001).

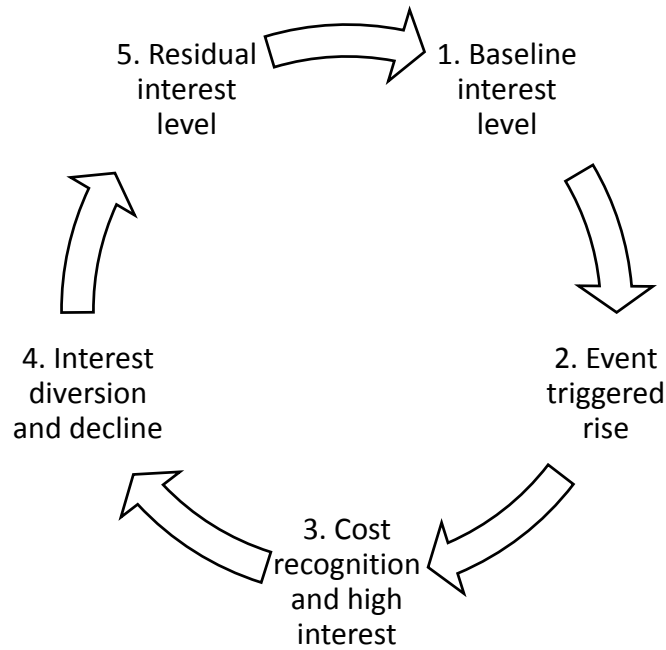


Figure 2-1 The cyclical issue-attention cycle model<sup>①</sup>

Downs’s issue-attention cycle theory leaves more space for future discussions. A more important kind of issues are those which can directly influence the majority, can be easily comprehended and resolved, and can trigger long-lasting public attention on media. Whether they follow the rules implied in issue-attention cycle theory still needs to be further investigated (Howlett, 1997; Howlett, 1998). However, since most environmental issues conform to the characteristics Downs had proposed, it is generally accepted that environmental issues would follow issue-attention cycle. Despite its imperfection, this theory is still widely adopted and referred to in policy issue and agenda studies (As is shown in Figure 2-1). Its influence is not restricted to political science and policy science, but also extends to journalism and communication. As more and more digital information about media and public opinion can be accessible , more scholars have been attracted to do empirical studies on issue-attention cycle (Djerf-Pierre, 2013; Holt&Barkemeyer, 2012; Howlett, 1997; Howlett, 1998).

#### 2.1.2.2 Bounded Rationality and Garbage Can Model

The Policy Stage Theory Model of Lasswell is an idealized rational policy-making model. In reality, however, the information for decision making and the attention of

<sup>①</sup> Based on the issue attention cycle in (Holt&Barkemeyer, 2012). This model has made some improving modifications on Downs’s issue attention cycle model.

policymakers are scarce and limited, so policy-making process cannot be of perfect rationality, but only bounded rationality (Simon, 1965). The policy stages theory is often criticized for its failure in explaining the ubiquitous disorder and anarchy in policy process. Apart from rational Policy Process Model, the aforementioned Lindblom's Incremental Adjustment Theory and Amitai Etzioni's Mixed Scanning Model were brought forward to respond and adjust the rational policy-making models (Etzioni, 1967; Lindblom, 1959). However, the incrementalism seems to overcorrect the rationalism, for it has not clarified how a policy comes up exactly.

In 1972, Michael Cohen, James March and John Olsen proposed a new theoretical model: the garbage can model of organizational choice, which was a great leap and milestone for policy research. Since then, the debate over rationality and irrationality has been deemphasized in the discussion of policy process theories. To start with, they proposed a concept "organized anarchies", which is characterized by the problematic preference, unclear technology and fluid participation (Cohen et al., 1972). Problematic preference, as was stated by Simon, means that people don't have the clear knowledge of their preferences, and more often than not, people within a group also don't have a unified preference (Simon, 1990). Unclear technology denotes that the organization usually follow the trial-and-error approach or experience. Fluid participation is the result of a fluid and blurred boundary of organization, many participants keep flowing in and out all the time (Cohen et al., 1972). Therefore, there are four streams that run through the decision-making process: problems, solutions, participants and choice opportunities, which have their own lives, largely unrelated to each other. The outcomes, then are a function of the mix of garbage (problems, solutions, participants, and participants' resources) in the can and how it is processed. It's worth noting that this process mentioned above does not look like comprehensive, rational decision making. Solutions and problems have equal status as separate streams in the system; moreover, people do not necessarily go through a prescribed logical routine.

The garbage can model of organizational choice greatly integrated past policy process theories and improved them at the same time. We should notice that this model is more like an agenda-setting model than a decision-making model, because it actually explains where and how a decision come up in a organization. It paved the way for developing issue framing and agenda setting theories for the coming studies (Kingdon, 1995).

### 2.1.2.3 The Three Streams Theory and Agenda Setting

John Kingdon's Three Streams Theory took a monumental place in the history of agenda setting. One can say without exaggeration that almost all the studies on policy issue and agenda would inevitably invoke his theory. This theory stems from the garbage can model, which actually inspired Kingdon to revise and improve it. His modification greatly simplified the theory model without losing its strong explanatory power, to which the popularity of the model can be ascribed (Kingdon, 1995).

Kingdon used the U.S.'s federal government as an example to point out that there existed three independent streams in policy-making: (1) problem recognition, (2) the formation and refining of policy proposals, and (3) politics. Each stream has its own features and trajectories. The agenda would have a chance to change the moment these three streams converge at an appropriate point (Kingdon, 1995).

Problem stream is the series of problems that decision-makers or policy systems are concerned with. Decision-makers need to allocate their attention to these problems. Those problems can exist for a long time, but can also be the indices that decision-makers monitor on a daily basis, such as unemployment rate, CPI, disease mortality, greenhouse gas emission, annual average temperature, etc. (Carter&Jacobs, 2014; Xinsheng Liu et al., 2011). Index is the characteristic value of a specific aspects that decision-makers care about. A change of the index can lead to the change of their evaluation on the operation of a certain system. Their attention may consequently be aroused and the policy agenda may be triggered (Kingdon, 1995; Schäfer et al., 2014; Xinsheng Liu et al., 2011). Although index is the parameter of a system that decision makers pay attention to, it is not a direct presentation and identification of facts. There exist gaps between facts and indices, as well as gaps between indices and problems. The two gaps is the chance or opportunity for policy actors to frame a issue by simplifying it with indices. As a result, indices of absolute objectivity and accuracy do not exist, which is particularly significant when it comes to environmental and climate issues that feature uncertainty and complexity in multiple aspects (Dryzek, 1997; Hajer, 2002).

Problem stream can also be sensational focusing events, crisis and symbols. Focus events can gather attention and trigger concerns for issues within a short period of time. They can even attract influential participants to accelerate the policy change (Schattschneider, 1975). As is pointed out by Kingdon, focusing events can strengthen people's pre-existing perception towards a certain issue, as well as alert people and arouse

universal attention to certain risks. If those events coincide with or follow similar events, they can also serve to define policy issues (Kingdon, 1995). Birkland pointed out that news events possess “bowling effect” that can guild people to discover problems in current policies. Birkland thus redefined focus events as “an event that is sudden; relatively uncommon; can be reasonably defined as harmful or revealing the possibility of potentially greater future harms; has harms that are concentrated in a particular geographical area or community of interest; and that is know to policy makers and the public simultaneously” (Birkland, 1997; Birkland, 1998). Baumgartner and Jones also noticed in the punctured equilibrium theory that focusing events trigger negative attention, give birth to political debates and eventually impel policies to change (Baumgartner&Jones, 2010). Given the special role focusing events play in agenda-setting, it even have given rise to disaster politics, a new branch that specialized in studying the relationship between disaster occurrence and policy change (Albright, 2011; Birkland, 1997; Birkland, 1998; Birkland, 2006; Kapucu&Liou, 2014).

Another dimension of the problem stream is feedback. In Kingdon’s Three Streams Theory, feedback refers to the feedback information about operation of existing programs. It can be the feedback officials receive through informal channels, or problems that occur to them in their daily work (Kingdon, 1995). Kingdon defined feedback information as the discrepancy between a narrow sense of expectation and the reality. Such a discrepancy will make decision-makers re-examine and rethink problems to which policies are directed. However, in reality, feedback information in decision-making not only takes the form of evaluation, but can also be information expanding decision-makers knowledge about the problem itself. For example, the knowledge output from scientific community proves itself valuable in the face of extreme uncertain issues (Walker, 1977; Xinsheng Liu et al., 2011).

Policy stream refers to the different sorts of thoughts and solutions brought up by a policy community comprised of professionals. Those thoughts and solutions float around the policy-making process. They will confront and influence each other before some of them are improved. Some thoughts and plans that meet certain standards—such as technical feasibility and value acceptability—can finally survive, wait for opportunities to fit in the policy agenda, and eventually become policy output (Kingdon, 1995). Kingdon adopted Aaron Wildavsky’s concept of policy community to describe the formation, division and impact of policy stream (Wildavsky, 1974). It can be viewed as



both a recognition of the impact that system variables in policy process have on policy output from a meso-to-macro perspective, as well as an affirmation of the impact that participants' behavior—that of policy entrepreneurs, for example—has on policy output from a meso-to-micro perspective. The former is theoretically coherent with the system perspective, and the latter is possible to engage with bureaucrat and elite studies from the behavior perspective. As a matter of fact, policy stream attracts various explanations by many policy process theories. Some theoretical perspectives actually provided deeper insights than Kingdon, such as Paul A. Sabatier's advocacy coalition framework. This framework explains how a stable policy coalition leads to stable policy status, from a meso-perspective. Sabatier argues that the reason this coalition remains stable is that policy participants' multiple layers of belief remain stable in a long period (萨巴蒂尔 et al., 2011). As a result, thoughts that are related to policy-making is not floating in a normal sense. It is anchored in the specific beliefs that specific participants hold, which makes the change more difficult than as is described by Kingdon (Henry, 2011; 萨巴蒂尔 et al., 2011).

The political stream is independent from problem stream. Kingdon believes that political stream mainly includes national mood, organized political forces and events within government itself such as administrations change, turnover of key personnel (Kingdon, 1995). In his three streams theory, political stream does not directly affect decision-maker's attention or policy's content. Compared to other two streams, political stream is an environmental variable. In most cases, it is generated outside the policy process. Political stream is important for it provides a momentum for the initiation of a policy agenda. This momentum increases the possibility to attract policymakers' attention to certain issues or policy thoughts and plans. In the institutional arrangements of western democracies, responding to national mood is a vital approach to gain popular support and reconsolidate its legitimacy. This process can help to cram some issues into the policy agendas. Meanwhile, the handover of power also indicates change of power-holders' preferences, which in turn changes the political stream. When an issue is against the political stream, bringing it into policy agenda will have to encounter more resistance.

Kingdon believed that problem, policy and political streams flow in a relatively independent manner in governmental departments. Once policy windows open, they will converge and bring policy issue into the policy agenda. That is how policy is made. In this process, influence on the agenda comes more from problem stream and politics

stream. **The policy window opens essentially because a new problem aroused decision-makers' concern and attention** (Kingdon, 1995). Kingdon claimed that the main reason that policy window opens is the change in political stream, including the handover of administrative power. However, Kingdon has ignored decision-makers' learning abilities, which means that even if power structure remains the same, the flow and impact of information can raise their attention just as well. Moreover, decision-maker's preferences are also flexible and changeable.

### 2.1.3 Explanatory Power and limitations

Process Perspective studies process activities. It concentrates on how to reasonably theorize policy process and abstract key elements from the process. It also explains how to administer issues, how to allocate attention and how to set policy agendas by analyzing relevant factors' features and functions of policy process. Among aforementioned explanatory models, some place extra emphasis on the description and construction of process, such as Downs's issue attention cycle. Such theories are influential for they reasonably divide the attention process into periods and conduct horizontal segmentation over time. Models like these can cover the coherence between different stages and their propelling factors. Some of the models presented above don't intentionally focus on dividing the process into stages, but rather segmenting the process vertically, and further explaining the interactions of different factors in policy process, which illustrates the allocation of policy attention and the setting of policy agenda. The garbage can model of organizational choice and the three streams model of agenda setting are the most representative ones. The process perspective which is fundamentally based on the theorization and abstraction of complex policy process plays an important role in studies on policy issues and agenda setting. It is both descriptive and explanatory. For long, the process perspective represented by the three streams model have been widely popular in issues and agenda studies. The exact reason is that it can be easily understood and extended, and also it possesses strong explanatory power.

However, process perspective also has some limitations in issue and agenda studies. To start with, it inevitably linearize and flatten policy processes. Although the benefits of theory simplification is evident, it has compromised the existing non-linear features in actual policy process. For example, Kingdon's three streams model claims that problem stream, policy stream and political stream are independent from each other. But later

researchers have discovered that relationship between them is much more complicated. In reality, there have been cases where the political stream seek to “stick” its own preferred alternatives to popular policy agendas, as well as cases where policy stream seek assistance from or take advantage of problem stream(Boscarino, 2009). Those cases clarified that the three streams are not in parallel or independent. Their relationship is very intricate. Besides, the process perspective sometimes may find itself unable to explain the impact caused by interactions between different policy issues and policy subsystems. Furthermore, it is not powerful enough to explain how exactly policy attention is allocated (Jochim&May, 2010).

## 2.2 System Perspective

### 2.2.1 Theoretical Bases

The system perspective is a very important paradigm in political science and policy process study. It has deeply influenced issue and agenda studies. It views information as a basic dynamical element for political process and policy process, this policy-making process is in nature a process of collecting, assembling, explaining and prioritizing information (Jones&Baumgartner, 2005b). David Easton’s book, *A Systems Analysis of Political Life* is a classic example of applying system theory from engineering in political and policy studies. Easton modeled political activity as the integration of system and environment. He explained political life with input, output, feedback and system dynamics (as can be seen in Figure 2-2) (Easton, 1965). In policy process theories, some researches also drew ideas from policy stage theories and system theories to come up with multivariate model of policy process. Those models were used to illustrate how information from various sources are processed in policy making process (as can be seen in Figure 2-3) (Mazmanian&Sabatier, 1980; Sabatier, 1991).

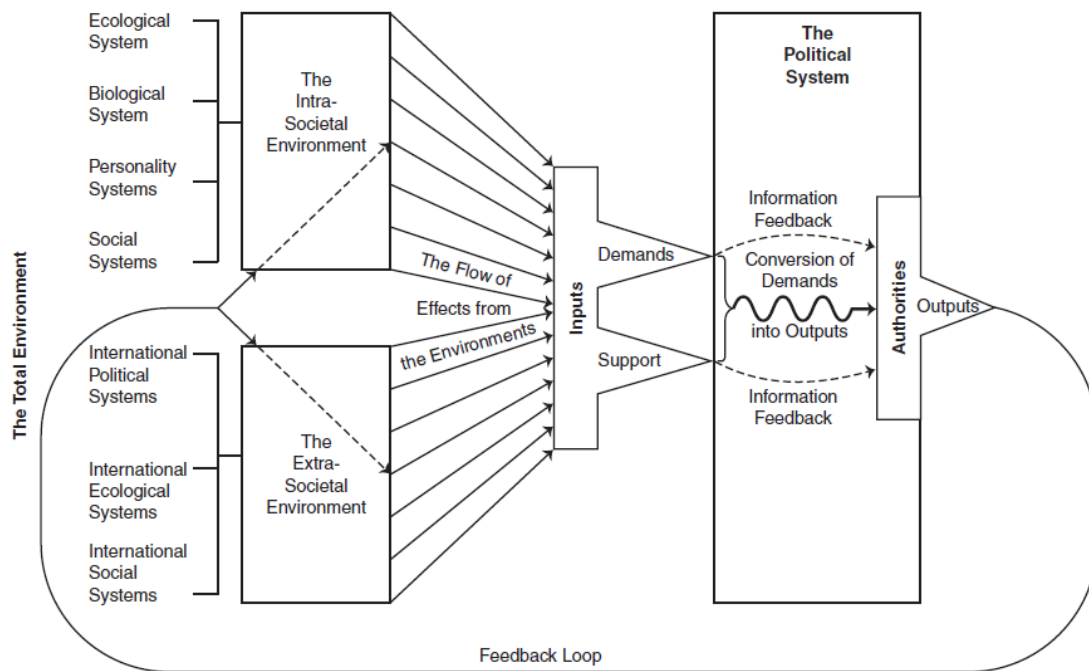


Figure 2-2 A dynamic response model of a political system

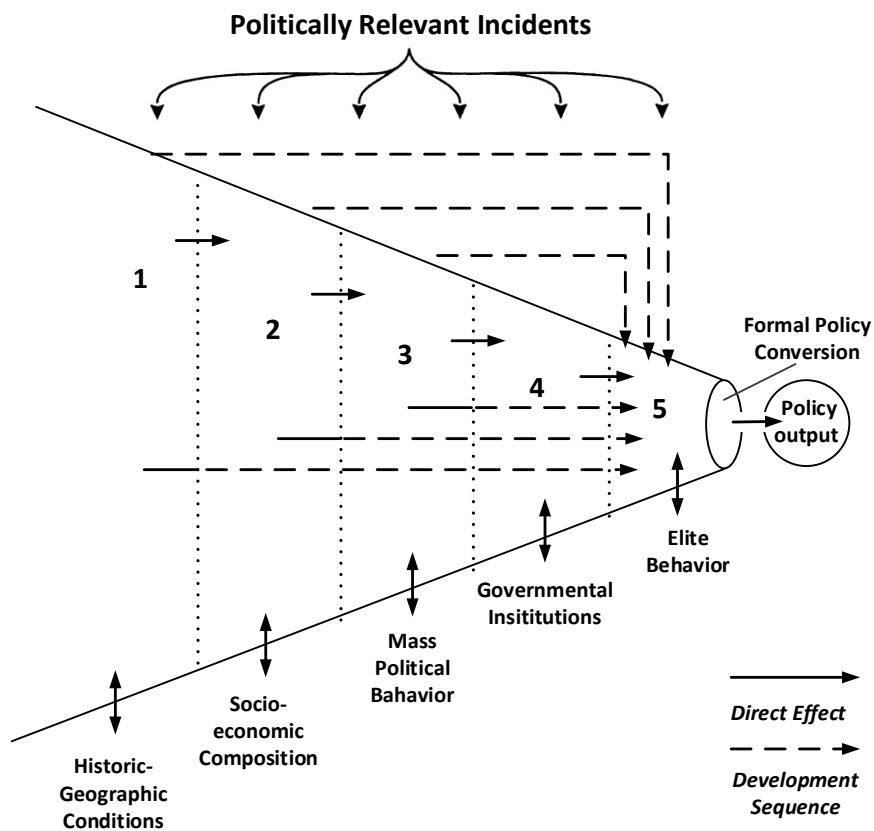


Figure 2-3 Hofferbert's model for comparative study of policy formation

Information process theories are largely based on some theories in behavior sciences, which emphasize on the importance of attention, emotions and habits in individual decision-making and bounded rationality (Simon, 1965; Simon, 1990). In the decision making process, due to decision-makers' and organizations' limited attention and universal overload of information, decision-makers have to screen and prioritize information. As a result, agenda setting and agenda definition become crucial to the decision-making process (Jones&Baumgartner, 2005b; Workman et al., 2009). Simon pointed out the two different mechanisms of information process: one is parallel process and another is serial process. Parallel process refers to organizations' ability to deal with and process many different problems simultaneously. However, when attention is very high, parallel process will be switched to serial one-at-a-time mode (Simon, 1990). Parallel process implies stability, incremental adjustment and bargaining, while serial process would amplify attention and policy change for a given issue on policy agenda and dampen attention where other issues are concerned (Workman et al., 2009).

Another theoretical support for the system perspective is system theory. According to it, a system's output is not only affected by system input, but also its system parameters. A system's input and output is not in a linear relation. Influenced by system's feedback, it may present non-linear characteristics. Negative feedback is a homeostatic rectifying mechanism. An increase (decrease) of output leads to a decrease (increase) on input. Positive feedback is a self-reinforcing amplifying mechanism. An increase (decrease) of output will further lead to an increase (decrease) on input(Baumgartner&Jones, 2002). In real political life, the two feedback mechanisms co-exist. Policy evaluation is a negative feedback mechanism. When policy's performance is contrary to the originally designed purpose, policymakers need to implement some policy tools to make adjustments. Some other studies showed that public opinion is also a type of negative feedback—when policy becomes too radical, public opinion would grow conservative, and when policy become conservative, public opinion would become radical (Wlezien, 1995).

There are generally two types of positive feedback effects. The first is mimicking, which is a go-with-winner strategy. Another is attention shift, which is the concentration of attention triggered by the shift from parallel process to serial process explained by Simon (Baumgartner&Jones, 2002). Since positive feedback and negative feedback coexist, when the negative and positive mechanisms take turns to dominate, stability and punctuations will take turns to appear (Baumgartner&Jones, 2010).

## 2.2.2 Explanatory Frameworks and Models

### 2.2.2.1 Information, preference and attention

Information and preference are the essential explanatory variables in studying policy issues and agendas from the system perspective. These two variables, along with attention, become three pillars for understanding policy dynamics. Brian Jones claimed that the relatively stable preferences, volatile attention and disturbance of input information would lead to issue attention shift and policy agenda variation (Jones, 1994). Preference, in comparison to attention, is relatively stable. In a policy process, all participants have a need to optimize their own utility. This cognition on utility or preference won't be altered easily. From a more general perspective, institution can also be viewed as an anchored preference. Even public preference sometime is allegedly perplexing, there have been studies proving its relative stability (Stimson, 1999). Compared to preference, attention can change rapidly. The process of attaining and processing information is in nature the consumption of a limited amount of attention (Jones, 1994; Simon, 1990). As a result, although stable preference can usually only result in stable or gradual results, if a problem can thus sway the public opinion and gain attention from the top-level decision-makers, it can engender a change in policy outcomes without changing the preference. And the more it gives rise to shift of attention, the more likely it will achieve this goal. Jones drew conclusion from his researches that the constant shift of attention focus led to changes in policy, which has been testified by the study of President Bush's drug policies (Jones, 1994).

Information input would substantially influence a policy process. Information has multiple roles, on one hand, information can incubate a new issue, on the other hand, it can also bring in a new attribute for the existing issue (Jones&Baumgartner, 2005b). Besides, another role usually being ignored is its ability to frame an issue (Jones, 1994). On the individual level, there are researches proving that information can increase attention and concerns, or even produce "punctuation" in issue definition by individual s through time (Wood&Vedlitz, 2007). On the bureaucratic level, according to studies on political attention and public opinions, the latter as information input can pose both short-term and long-term effect on the former. At the same time, political attention can be reset and stabilized under a negative feedback system, which proves that preferences in decision-making process are actually relatively stable (Jennings&John, 2009).

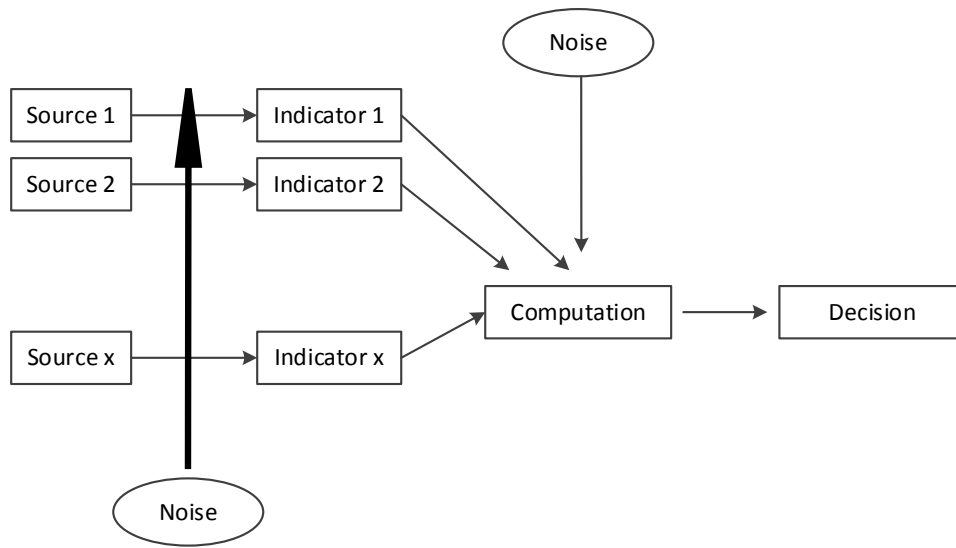


Figure 2-4 Information processing in decision-making process

In recent years, studies on the information processing within policy process focus more on the friction that information encounters within the process. The decision cost caused by the friction will give rise to disproportionate information-processing mode. When information keeps accumulating and finally surpasses the threshold, policy process will have to undergo “punctuation” (Givel, 2010; Jones&Baumgartner, 2005b; Pump, 2011).

#### 2.2.2.2 Positive Feedback, Negative Feedback and System Response

There are two feedback mechanisms in political systems. One is the negative feedback that stabilizes the system, and another is the positive feedback that destabilizes the system. The combination of the two provides a basic logic that is used to explain the stability and “jump” that happen to an agenda. The core of punctuated-equilibrium proposed by Baumgartner and Johns corresponds with fundamental principles of the aforementioned system theories. They have observed that most political agendas in America were generally stable with incremental changes, but in some occasions agendas would change dramatically. As a result, changes on policy agendas would be of distribution will a fat tail. Bearing such a research question in mind, they took the positive/negative feedback mechanisms from system theory as the essential logic of their theory. They concentrated on how the two mechanisms work under the American political

background. They believed that interaction between “policy image”<sup>①</sup> and “policy venue”<sup>②</sup> engendered a self-reinforcing mechanism that featured positive feedback, which further led agendas from equilibrium to punctation (Baumgartner&Jones, 2010). In this process, the expansion of policy issues portrayed by Downs would give rise to an increasing issue attention, which would be followed by institution establishment and policy formation. On the contrary, mobilization described by Schattschneider would lead to outbursts of conflicts and policy collapse (Downs, 1972; Schattschneider, 1975). Then how would policy image change? Baumgartner and Jones took the case of nuclear power development to illustrate how Three Mile Island Accident, as a focus event, took an important role in altering policy image. They also used the case of pesticide regulations to exemplify how Rachel Carson’s *Silent Spring*, a knowledge-disseminating and awareness-provoking popular scientific work, and media’s magnifying effects changed policy image (Baumgartner&Jones, 2010).

Baumgartner and Jones’s punctured equilibrium theory is regarded as a milestone in American political science. Well established as it was, the two scholars have been seeking to improve and extend it. By introducing in his theories on disproportionate information processing and decision-making costs, Baumgartner and Johns have succeeded in synthesizing punctured equilibrium with incrementalism theories (as is shown in Figure 2-4) (Jones&Baumgartner, 2005a; Jones&Baumgartner, 2005b). In *Policy Dynamics*, a book edited by the two, many more examples were employed to enrich and extend punctured equilibrium theory. The most distinctive theoretical innovation is the multi-dimensional nature of policy issues—including multi-dimensional goals, multi-dimensional attributes and multi-dimensional focuses, which would further bring about more uncertainties to issues and agendas (Feeley, 2002; Hardin, 2002; Hunt, 2002; Macleod, 2002).

Besides, researchers have also realized that punctured equilibrium as agenda politics doesn’t exclusively take place in America, but is also discovered in case studies in many other countries. This phenomenon to some extent indicates that a universal information processing model that prevails in public policy-making institutions other than American political system may be the real cause of punctured equilibrium. Through a comparative

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① Policy image refers to how policy is understood and discussed, including two components: an empirical and an evaluative.

② Baumgartner and Jones believe that policy venue is institutions or organizations that possess authority to make decisions on certain issues, while the author regard it as the institutional structure for decision-making.



case study on America, Belgium and Denmark, it was found that punctured equilibrium existed in all of them. Moreover, the higher the decision-making costs were, the more significant the punctuation would be (Baumgartner et al., 2009). After his research on budgeting process in France, Baumgartner discovered that punctured equilibrium existed in France's budgeting politics (Baumgartner et al., 2006a). In their study of Spanish media attention, Bonafont and Baumgartner noticed that media usually focused only on a few issues, and their attention was constantly shifting from one to another (Bonafont&Baumgartner, 2013). It is obvious that research on punctured equilibrium theory is not held back by the sensational success of the book *Agendas and Instability in American Politics*. Scholars are still trying to dig into common causes for this phenomenon.

### 2.2.2.3 Interactions between systems

Apart from the angles aforementioned, some other researches didn't intentionally focus on how information is processed in decision-making or the relationship between system parameters and system response. Instead, they largely focused on the connections between agendas or between different subsystems that make up a policy system. Researches of this sort have mainly answered the following questions.

The first strand of questions is how policy subsystems or sub-coalitions influence issue definition, agenda setting and policy change. The relevant theories include Advocacy Coalition Framework and its derivative theories. Advocacy Coalition Framework exerted much effort in analyzing why some policies remain stable for decades. The explanation they came up with was that a relatively stable belief system dominated the whole policy agenda in substance. Exogenous events spurred policy learning between coalitions and would trigger policy agendas. These changes would reshape advocacy coalitions, which finally caused policy change (萨巴蒂尔 et al., 2011). Advocacy Coalition Framework explained policy stability very well, but it's criticized for the deficit in interpreting policy change. Meanwhile, since it didn't attach enough importance to the role of information in framing issues, Hajer created the Discourse Coalition Framework on the basis of the paradigms of Advocacy Coalition Framework and Constructionism. This new framework stressed the significance of discourse construction and policy learning in triggering policy agendas and policy change (Hajer, 1993; Hajer, 1995; Hajer, 2002). Different from positive feedback, policy learning was regarded as a mechanism

that can bring about a sudden change to policy agendas, so it could be viewed as a supplement to the original system dynamics of policy process (Workman et al., 2009).

The second strand of questions concerns the connection between public agenda, media agenda and policy agenda. It has been observed that the studies around this topic feature a multidisciplinary combination of political science and communication. Political science studies tend to pay more attention to how the public and media influence policy agenda, while communication focus on the role of mass media during this process. The studies aforementioned have already investigated in depth how public agenda and media agenda played their role in policy agenda. Baumgartner and Jones used a whole chapter in *Agendas and Instability in American Politics* to analyze the dynamics of media attention, in order to explain the effectiveness of mass media in changing policy images (Baumgartner&Jones, 2010). It was discovered that media not only could play a role as positive feedback, but also as brake and negative feedback. Michelle Wolfe verified this argument by studying the congressional agenda and media in America(Wolfe, 2012). Besides, studies of communication also dealt with public attention, public opinion, risk perception and policy attitudes. They strived to portray the correlation between public agenda and media agenda, and how this correlation would influence policy agendas (Neuman et al., 2014; Zhao et al., 2011).

### 2.2.3 Explanatory power and limitations.

The perspective of system is based on the fundamental principles of system theories and control theories. It has become a significant branch of research for policy issues and agendas. Since system theories constructed non-linear behavior mechanisms by way of positive and negative feedbacks, the biggest merit that the system perspective, compared to the process perspective, is that it is capable of explaining a multitude of non-linear phenomena in political process and policy process. From the process perspective, information is one of the most important variables. Supported by behavior theories, which were best illustrated by Simon, the perspective of system has been now equipped with a supportive mechanism that includes how information is gathered, processed and handled in individual's decision making process. Therefore, system perspective has synthesized theories about individual, organizational and political decision-making, which makes it very effective in explaining the change of policy agenda.

Although non-linear theoretical logic brings up explanations that conforms more to

reality, it also increases the complexity of theories. After all, it is so different from the accustomed linear cognitive habits of human beings. Among the cases that Baumgartner and Jones selected, the majority of them were seemingly dominated by either one of the two feedback mechanisms. The conclusions they drew seem very inevitable then. And it would be much more difficult to determine the nature and magnitude of feedback, when the results remained unknown (Baumgartner&Jones, 2010). At the same time, when there are so many feedback mechanisms that have cross-effects on each other, building a reasonable model becomes very difficult. Even if there exists only one pair of positive/negative feedback mechanisms, it is still very difficult to answer which one would be more dominant and what influence they would exert on the final state of the system. When system perspective becomes less convenient and convincing in providing reasonable explanations, linear theories of process perspective become more favorable.

## 2.3 Behavior Perspective

### 2.3.1 Theoretical Bases

The behavior perspective studies the behaviors of policy participants, such as bureaucrats and experts involved in policy issue construction and agenda setting, focusing on their roles and functions in policy process. The behavior perspective and the process perspective overlap with each other in many aspects. Some researches from the behavior perspective can actually be regarded as a micro mechanism of the process perspective. However, studies from behavior perspective do not seek to establish integral theories for issue framing and agenda setting.

There are extensive theoretical foundations for policy issue and policy agenda studies from behavior perspective. The garbage can model for organizational choices and the three streams model for agenda setting and other policy process theories provide lots of insights to examine the behaviors of policy participants. These theories have remained some interesting issues to be further elaborated, such as the roles of professional communities and policy entrepreneurs in the three stream model (Cohen et al., 1972; Kingdon, 1995). Many theories about organization and institution are also theoretical bases for the behavior perspective; individual motives and resources together with the institutional incentives are the important factors in shaping behaviors of policy actors (Scott, 2008; Simon, 1985; Simon, 1990). Studies on bureaucratic politics claimed that

participants of policy process are not homogeneous, as they are concerned with different issues and make their decisions according to their diversified values and interests, in a “pulling and hauling” manner (Allison&Halperin, 1972). Thus, questions such as how bureaucratic behaviors influence policy agendas and what functions they have in policy agenda setting are very worthy of studying. Besides, theories related to the utilization of knowledge also provide opportunities to have dialogues with studies from behavior perspective. The school of knowledge utilization believes that gradual accumulation of knowledge related to policies can alter decision-makers’ cognition (Sundquist, 1978). As a result, different participants in policy process, such as consulting committees, policy entrepreneurs, professionals in governmental sectors, mass medias, interest groups and issue networks, are vital to agenda setting and policy change (Weiss, 1991).

### 2.3.2 Explanatory Frameworks and Models

In traditional studies on policy issues and policy agendas from behavior perspective, attention is mainly focused on the behaviors and roles of policy participants such as bureaucrats and experts.

Bureaucratic organizations are directly involved in decision-making process, so they play a key part in agenda politics. The way they handle information has significant impact on the progress of agenda that they are concerned with (Workman et al., 2009). By studying America’s emergency preparedness policies, researchers have found that influential sectors of bureaucratic organizations would amplify policy signals from their principals and attract high level policy attention, which would generate crowd-out effect on other issues (May et al., 2008). Different from previous findings, Peter May and her colleagues also found that the “disruption” of agendas created by exogenous impacts were smaller than normally imagined, which could be attributed to buffers between policy subsystems comprised of different bureaucratic organizations. The buffering effect would weaken spillover effect between issues (May et al., 2009a; May et al., 2009b). By studying the agenda setting in local decision-making institutions, researchers have found that influence from bureaucrats and interest groups was much larger than the public, experts and media; and that influence of budget constraints and other feedbacks was larger than objective indices of problems and focusing events (Liu et al., 2010). In addition, Bruno Takahashi et al. have studied the roles of legislators and advisors, and found that they relied more on news reports and online information when there is no sufficient

information (Takahashi&Meisner, 2013).

The role of experts in policy agenda is also a focus in policy process studies. In China's climate change policy process, experts can exert their influence in agenda setting through media and by providing decision-makers with policy advices (Wübbecke, 2010; Wübbecke, 2013). Zhu Xufeng, through his investigation on Chinese think tanks in policy process, discovered that Chinese think tanks were deeply affected by knowledge, administrative networks and social networks. Scholars in think tanks have double roles: they can exert influence on policy agendas as either advisors or advocates (Zhu, 2011; Zhu, 2009). Besides, he also found that policy change in China could in turn affect the modes and ways by which experts influence agenda setting (Zhu, 2013).

The behavior perspective not only pays attention to the roles of different participants in issue framing and agenda setting, but also investigates the different patterns of agenda setting according to the behaviors of policy actors. Peter May thus defined four modes for agenda setting, according to the initiator of debate and the nature of public support. They are outside initiation (initiator of debate : societal actors; nature of public support: high), inside initiation (initiator of debate: societal actors; nature of public support: low), consolidation (initiator of debate: state; nature of public support: high ), and mobilization(initiator of debate : state; nature of public support: low) (Howlett et al., 1995; May, 1991). Among agenda setting researches in China, Wang Shaoguang's work was famous for proposing six agenda setting models in China. These models, closed door model, inside access model, outside access model, mobilization model, reach-out model and popular pressure model, were different over two dimensions: degree of public participation and initiators of agenda (王绍光, 2006). In nature, Wang's categorization is a kind of extension and application of agenda setting model aforementioned to China. Although their models differed from each other, they all focused on policy participants and their roles.

### 2.3.3 Explanatory Power and Limitations

Compared to the linear logic of the process perspective and nonlinear logic of the system perspective, studies from behavior perspective focus on the "marginal" effect in agenda setting, which means that they do not attempt to build a integral theory to explain issue framing or agenda setting, but try to study policy actors together with their roles in policy process. Existing studies from behavior perspective show that the can more

precisely depict and illustrate the characteristics of actors such as bureaucrats and experts. Under the logic of behavior perspective, the previous nonlinear policy process would approximate to linear process. Consequently, it is easier to validate models with empirical studies and researchers thus can better explain the roles policy participants have. Studies from behavior perspective can be seen as a valuable and important supplement, support and improvement for both process perspective and system perspective.

A coin has two sides, the same is true with studies from behavior perspective. Although behavior perspective can better explain and verify the functions and roles of different actors in policy process, it is unable to reveal the dynamics of policy issues and policy agenda. It is also incapable of describing the non-linear characteristics of policy process. Besides, researches from behavior perspective are still unable to construct an integral theory about agenda setting, largely owing to its underlying logic of linear approximation. To regain the dynamic theories requires scholars to understand the dynamic mechanisms between policy actors involved in policy process, which the real puzzle lie in.

## 2.4 Emerging paradigm: constructionist perspective

### 2.4.1 Theoretical bases

For a long time, the conception of policy-making as an objective and linear process predominated policy analysis. Essentially, the process is portrayed as proceeding in a series of steps from facts to analysis, which is usually regarded as the ‘rational model’ (Fischer, 2003; Scrase&Ockwell, 2010). However, along with contemporary globalization and emerging of highly technical issues, traditional linear, objective view of policy process fails to adequately explain policy process (Haas, 2004; Scrase&Ockwell, 2010). This is because not only do decisions have to be made in the face of scientific uncertainty, they are also colored by people’s values and knowledge, which are shaped by social discourse. Therefore, scholars begin to attach significance to value, idea and discourse in understanding public policy, and ‘postpositivism’ or ‘postempiricism’ gradually become the important paradigm in policy studies (Fischer, 2003).

As opposed to the ‘positivist’ or ‘neopositivist’ epistemological doctrines, postempiricist scholars seek to overcome the objective-subjective dualism by stressing the subjective foundations of social reality (Fischer, 2003). Vivien Schmidt summarized

the commonalities among the wide range of scholars who use ideas and discourse to explain public policy as a new analytic framework ‘discursive institutionalism’ (Schmidt, 2010). Idea is defined as ‘claims about descriptions of the world, causal relationships, or the normative legitimacy of certain actions’ (Parsons, 2002). Furthermore, some scholars differentiated between cognitive ideas justified in terms of interest-based logics and necessity, and normative ideas legitimated through appeal to values and appropriateness (Schmidt, 2001; Schmidt, 2010; Schmidt&Radaelli, 2004). Discourse is defined by Hajer as ‘a specific ensemble of ideas, concepts and categorizations, that are produced, reproduced and transformed in a particular set of practices and through which meaning is given to physical and social realities’ (Hajer, 1995). In Schmidt’s approach, discourse is the interactive process of conveying ideas, which serves as the mechanism that translate problems into policy issues (Fischer, 2003; Schmidt, 2008). In this discursive institutionalists, some focus primarily on the idea side of the framework, while others emphasize the discourse side of it. Both of them provide much insight to the understanding of policy process, especially to issue framing and agenda setting.

## 2.4.2 Explanatory frameworks and models

### 2.4.2.1 Idea and ideational process

Traditional perspectives such as historical institutionalism are prevailing paradigms in policy process studies. Historical institutionalists tend to treat institutions as major constraints and opportunities that affect the behavior of policy actors (Beland, 2009). Due to the emphasis on enduring weight of existing policy or institutional legacies, this approach performs better in explaining the continuity than change of policy (Schmidt, 2010). Moreover, the change has been mainly attributed to the exogenous shocks, which engender massive, path departing institutional transformations (Beland, 2009; Schmidt, 2010; Thelen, 2004). The older-institutionalisms including historical institutionalism, rational choice institutionalism and sociological institutionalism, as Schmidt has pointed out, could not adequately explain the endogenous policy or institutional change originated from inside rather than outside (Schmidt, 2010). Even though these approaches shed much light on the conditions of policy change, some questions relating to agenda setting and proposal formulation remain unanswered (Beland, 2009).

In policy process, especially in the face of uncertainty, ideas serve as guides to behaviors (Fischer, 2003). Ideas participate in the construction of the issues and problems

that enter the policy agenda through facilitating actors narrowing down the list of issues (Beland, 2009). In addition, ideas can take the form of basic economic and social assumptions which are termed as policy paradigm by Hall, and legitimize or challenge existing institutions and policies (Hall, 1993).

Ideas affect policy change through a mechanism, namely ideational processes that influence the ways policy actors perceive their interests and the environment where they mobilize (Beland, 2009). Ideational process, as Beland shows, encompasses the effects of framing and value amplification (Beland, 2009). Drawing support from ‘symbols and concepts with which to frame solutions to policy problems in normatively acceptable terms through transposition and bricolage’ (Campbell, 1998), the mobilizing potency of framing process would be augmented (Beland, 2009). Moreover, the value amplification, defined as the ‘identification, idealization and elevation of one or more values presumed basic to prospective constituent but which have not inspired collective action for any number of reasons’ (Campbell, 1998), policy framers can actively promote a specific value so as to justify the actions in its name (Beland, 2009). By interactions with powerful institutional forces and political actors, especially influential policy entrepreneurs, ideas could help to shape the goals, identities and perceived interests of political actors, and furthermore, facilitate the agenda-setting of policy (Bakir, 2009; Hansen&King, 2001; Kingdon, 1995; Mintrom&Norman, 2009).

#### 2.4.2.2 Discourse and discourse coalitions

The other side of the discursive institutionalism highlights the functions of discourse which is more versatile and overarching than ideas (Schmidt, 2008; Schmidt, 2010). As Schmidt argues, discourse can exert a causal influence on political change through a variety of ways ‘including conceptual reframing of interests in ways that permit consensual agreement or through the reframing of institutional rules and cultural norms governing the play of power’ (Fischer, 2003). Discourse may serve to represent multiple levels of ideas (storylines, vocabularies, or epistemic figures) (Hajer, 2003), and encompass different dimensions (ideational and interactive) (Schmidt, 2010). The interactive dimension of discourse is attached to different institutions and actors who carry out functions as ‘coordinative’ in policy sphere about policy construction, and ‘communicative’ in political sphere about the necessity and appropriateness of policies (Schmidt, 2008; Schmidt, 2010). Whether discourse could promote change of policy or



institution largely depends on the content of discourse (relevance to the issues at hand, adequacy, applicability, appropriateness and resonance), the interactive process of discourse (arguing or bargaining) and the formal institutional context (simple polity or compound polity) (Schmidt, 2008).

From a constructivist perspective, policy making is a ‘constant discursive struggle over the definitions of problems, the boundaries of categories used to describe them, the criteria for their classification and assessment, and the meanings of ideals that guide particular actions’ (Fischer, 2003). Moreover, agenda is ‘established out the history, traditions, attitudes, and beliefs of a people encapsulated and codified in the terms of its political discourse’ (Howlett et al., 1995). From this perspective, discourse can be used to show why a particular understanding of policy problem gains dominance and authority while others not (Hajer, 2002). Hajer provided a framework of discourse coalition which could compensate for the weakness in explaining policy change of advocacy coalition framework (ACF) proposed by Sabatier and Jenkins-Smith (Fischer, 2003; Hajer, 2002). Hajer found that multi-interpretable storylines, rather than shared knowledge or beliefs were the glue of coalitions. Interdependencies within the coalition are not based only on power or material gain but include legitimacy, knowledge, meaning and argument (Bulkeley, 2000; Hajer, 2002). The policy process is conceived in Hajer’s argumentative approach as a ‘struggle for discursive hegemony in which actors try to secure support for their definitions of reality’ (Hajer, 2002). In ACF, policy learning is limited within the scientific approach of cognition, which neglects the social and political aspects of learning (Fischer, 2003). However, in discourse coalition framework, emphasis is placed on the role of credibility, acceptability and trust as on empirical evidence, which highlights the socially constructed foundations of expertise and moves beyond a technocratic conception of policy learning (Fischer, 2003).

#### 2.4.3 Explanatory power and limitations

From the constructionist perspective, political life under investigation is embedded in a web of social meanings produced and reproduced through discursive practices (Fischer, 2003). It endeavors to move beyond the empiricist, rationalistic and technocratic policy definition and orientation which has dominated policy research for decades. Moreover, it also gets down to establishing a causal logic to explain the endogenized change of policy and institution besides exogenous shocks. This is significant for the age

of modernization in which many issues are fraught with uncertainties and complexities, and the interplay of politicians, experts, and public is much more complicated than ever. Idea and discourse, both of them do matter for research from constructionist perspective because they provide a more dynamic approach to change of policy or institution than older theories. Furthermore, constructionist perspective sheds much light on the agenda setting process through stressing the framing effects by ideas and discourse in policy process.

However, empirical studies to verify the hypotheses derived from constructionist perspective have not flourished yet. This is partly due to the difficulties in operationalize the key variables of constructive theories. Meanwhile, as policy studies have long been dominated by rational and linear models, the potency of constructionist perspective has not drawn enough attention yet.

## 2.5 Research review of studies on climate change policy process in China

With the increase of concern on climate change, studies on climate change policy process is gaining momentum. Climate change as a unconventional issue is greatly different from past issues on the various aspects, such as policy cycle, knowledge complexity, etc. Thus, the studies on climate change provide a fabulous opportunity enrich the theories of public policy process. For example, the complexity of climate change and the diversity of participating actors provide an excellent case for policy network analysis, a heated topic in the policy process theories. Karin Ingold's study on the climate change policy process of Switzerland revealed the influence of network structure of advocacy coalition on policy outcome (Ingold, 2011). Apart from this, Ingold and Manuel Fischer's study of Swiss climate change policy spanning fifteen years also demonstrated the importance of common beliefs and formal authority structure, and their key effects on network dynamics in the process of policy-making (Ingold&Fischer, 2013). Besides, the team led by Bulkeley also studied the climate-change policy process in the UK and Australia respectively (Bulkeley, 2000; Lovell et al., 2009). Their work shed much light on the theory of policy-making concerning climate change.

Compared with the intensive attention on climate change policy process studies from European and American scholars, Chinese climate change policy process studies gained somewhat less and later interest from academia. Only until recently when climate change becomes a heated topic and the focus shifts from international level policy-making to

national level policy formation and implementation have studies on climate change issue in China begun to increase. The study on Chinese climate change policy process is mainly from the following perspectives.

### 2.5.1 A Politics-Bureaucracy Perspective of policy-making

The Politics-Bureaucracy Perspective mainly focused on politics and bureaucracy in order to unravel the influence of international politics on domestic policy-making. In general, early analyses of Chinese policy-making was from the political perspective, while later studies emphasized on both influences of politics and the role of bureaucrats. Elizabeth Economy is one of the first scholars paying attention to China's climate change policy process. She focused on the interplay of international-domestic factors in environmental politics, especially how domestic policies were affected and shaped by international forces when environmental issues were internationalized and politicalized (Economy&Schreurs, 1997). Elizabeth was almost the first scholar to adopt the politics-bureaucracy perspective to study Chinese climatic policies. Based on her analyses on the scientific debate, energy debate and political debate in Chinese climate change policy-making process, she revealed the interactive process of different bureaucrats with different preferences over climatic issues. She even explained the logic behind Chinese delegation's attitudes in global negotiations through an analysis on factors of international and Chinese domestic politics (Economy, 1994; Economy, 1997).

Since the start of the 21st century, studies on Chinese climate change policy process from a politics-bureaucracy perspective increased. Zhang Zhizhong put forward in his study that the three motives behind Chinese climate change policies were interests, sovereignty and national image (Zhang, 2003). Michael Hatch claimed that international pressure was the main stress for China to participate more actively in issues concerning climate change. He argued that actions of cross-border activists and international organizations forced its domestic political process to respond to global agendas (Hatch, 2003). Yu Hongyuan integrated regime theory with the bureaucratic behavior perspective, forming another interests-based explanation to Chinese climatic policies (Yu, 2004). Paul Harris et al. explained China's responses to climate issues from the view of "environmental sovereignty," preferences of economic development and China's self-identification as a leading role in the developing world. They also pointed out the dual effects from international politics and domestic bureaucrats did matter in understanding

China's climate change policy-making (Harris&Yu \*, 2005). Later on, more studies combined politics and bureaucracy to explain Chinese climate change policy-making. To better explain this topic, Heggelund connected political rationality from macro-level with bureaucratic organization perspective from medium-level to explain why CDM policies were partially well-implemented under the overall background of no commitment climate politics (Heggelund, 2007). Li Hechao claimed that the Chinese climate policies evolved with domestic macro strategies, and he mainly analyzed the logic of Chinese domestic and foreign climatic policies from the political rationality perspective (He, 2010).

### 2.5.2 An Organization-Behavior Perspective of Policy Implementation

Another important perspective in climate change policy studies is the organization behavior perspective, and they mainly concentrated on the implementation of climate change policies. Qi Ye et al. from Climate change policy Initiative at Tsinghua University have serialized studies on the climate change policy implementation in China. Qi and his colleagues proposed a MPC-IC behavior explanatory model during their research on local government's response to climate change issues. MPC-IC is short for "motivation, power, capability—incentive and constraint". They pointed out that local governments' policies to climate change is the administrative reactions to central government, responses to their own policy demands and to market incentives (Ye Qi et al., 2008). Ma Li claimed that the diversity of dealing with climate change, building low-carbon city, conserving energy could be largely attributed to the degree of incentive-constraint from the central government and whether local government could be paid off through implementing these related policies (马丽, 2012). Besides, Climate change policy Initiative at Tsinghua University released *Annual Review of Low-Carbon Development in China (2013): Policy Implementation and Institution Innovation*. This report focused on the implementation process of low-carbon policies, especially analyzed the Energy Conservation Target Responsibility System (节能目标责任制) adopted during the 11<sup>th</sup> Five-Year Plan. They focused on the logic behind behaviors of organizations such as local governments and enterprises (齐晔, 2013).

## 2.6 Summary of Literature Review and Room for Further Study

Issue attention is indispensable for understanding policy issue framing and policy agenda setting in policy process studies. Issue attention is firmly connected to the

individual information processing mechanism, which should be regarded as the micro-level basis for theorizing agenda setting. By revisiting and reviewing the history of policy issue and policy agenda studies, this paper divided previous studies into process, system and behavior perspectives. They respectively belonged to linear, non-linear and marginal theoretical domains, and all explained and described how issues and agendas had been formed and developed. They also explained how and why issue and agenda transition appeared to be non-linear process and how actors in policy process influenced policy issues and agendas.

Although attention has been repeatedly mentioned in the studies from all above perspectives, few of them did take issue attention seriously. Within the logics of those three perspectives, attention has been usually preinstalled as an operationalized concept, and it has taken on roles of either independent variable or dependent variable, depending on the need of studies. Although the existing studies have sporadically discussed about questions concerning issue attention, such as where on earth issue attention comes from and why it changes, have not been discussed deeply and thoroughly. As a result, previous studies on policy issue and agenda have left a significant topic, issue attention, to be examined further.. If we wish to complete the theories about policy issue and agenda, issue attention deserves more attention.

When it comes to studies on China's climate change policy process, this paper has reviewed previous studies of politics-bureaucracy perspective of policy-making and organization-behavior perspective of policy implementation. Apparently, the integral structure of theories concerning climate policy in China has not been completed. Although previously we have encountered descriptive studies on climate change policy issues and agenda setting in China, but in general explanatory and empirical studies on them are still very rare. Moreover, studies on the core of agenda, namely the attention to climate change issue almost do not exist. Although the evolution of China's climate change issue over time is a fundamental question for academia, what's worse in reality is that so far there are no precise answers given yet. Compared to agenda setting itself, the evolution and dynamics of attention to climate change seem more closer to the front and core of policy process. Answering this question will shed light on climate change policy studies, and maybe further improve the understanding about the general policy process theories.

Finally, since previous policy process studies have suffered from temporal and

spatial limitations, the conventional analytical methods are helpless when dealing with complicated policy issues, such as climate change (Morgan et al., 1999). Therefore, we also need to exert great efforts in innovating research methodology. Only in this way can we conduct systematic studies on policy issues such as climate change from broader temporal, spatial and theoretical perspectives. Thus, it's worthwhile to conduct such a study on issue attention of climate change in China to bridge the gaps in theories and methods.

## Chapter 3 The Issue and the Agenda of China's Climate Change

### 3.1 Pre-Climate Change Issue: Emergence of Environmental Issues

Although modern industrial civilization has tremendously improved the living quality of human, it also causes huge black holes of resources and serious environmental pollution. London fog, marked as one by-product of modern civilization, presents as the inevitable sarcastic stain in industrial civilization. *Silent Spring*, written by Rachel Carson in 1962, demonstrates many severe environmental problems that human are facing, triggering the surging environmental protection movements and enlightenment of ecologism later. In 1972 at Stockholm, Sweden, the UN held the Human Environment Conference, participated by 113 countries, which remains the first remarkably top conference about protecting global environment in human history. This conference mainly published *the Declaration of the United Nations Conference on the Human Environment*, trying to appeal to more human efforts in global protection.

Chinese delegation took part in the conference, and Tang Ke, the vice minister of Ministry Fuel Chemical Industry at that time, delivered a speech stating the significant environmental hazards “result from the development of capitalism into imperialism, especially due to plundering policy, aggressive policy and war policy carried out by superpowers”. China presented a “defensive” attitude, reflecting a distinct style of ideological confrontation then (Chmutina et al., 2012).

In 1973, China's first National Environmental Protection Conference was held in Beijing, participated by directors of Planning and City Construction in all provinces, autonomous regions and municipalities, the head of related departments in the State Council, and some representatives invited from industrial enterprises as well as colleges and universities. In this meeting, a guideline of “comprehensive planning, reasonable arranging, comprehensive utilizing, turning harms into benefits, relying on the public, acting by everybody, protecting the environment, and benefiting the people” was established. Besides, it also discussed and passed *Several Provisions on the Protection and Improvement of the Environment (Trial Draft)*, and drew up *Opinions on Strengthening the Environmental Monitoring Work* as well as *The Interim Regulations on*

### *Natural Reserve Areas*<sup>①</sup>.

With its huge importance, firstly, this conference admitted that though as a socialist country, China still faced relatively severe environmental problems and required intensive governance. Moreover, some guidelines and policies formulated in this conference had unified the idea of solving environmental problems in China, and set clear the key objectives and major tasks. The National Environmental Protection in 1973 played a role of landmark, marking the formal beginning of environmental policy issue entering policy agenda and environmental protection included within the responsibilities of the government.

Since 1978, China has begun the reform and open up, and focused on its economic development. It's worth mentioning that the issue of environmental protection has aroused increasing attention from high level policymakers. In that year, when endorsing the report on the work of State Council's Leading Group of Environmental Protection, the Central Committee of the Communist Party of China pointed out that "to eliminate pollution and protect the environment plays an important part in socialist construction and realizing the four types of modernization. We must not pollute first and govern later." Such declaration of high level policymakers, with its great importance, for the first time in the history China's ruling Party has made important instructions on environmental protection in the name of the central committee. Still in the same year, the Constitution of the People's Republic of China for the first time included the environmental protection. The article 11 of the general principles of the Constitution stipulated that "the State protects the environment and the natural resources, and prevents pollution and other public hazards", besides prescribing State's responsibilities of promoting and developing productivity.

The first conference on environment protection in 1973 only formally put environmental protection onto China's policy agenda, and the second one in 1983 marked the rising of status and priority of environment protection policy on policy agenda. In 1983, the second National Conference on Environment Protection was held in Beijing, in which Li Peng proclaimed that "environment protection is one strategic mission of

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① See the introduction to China's first conference on environment protection(August 5 to 20, 1973)  
[http://www.zhb.gov.cn/ztbd/gzhy/diqicibdh/ljhbh/201112/t20111221\\_221578.htm](http://www.zhb.gov.cn/ztbd/gzhy/diqicibdh/ljhbh/201112/t20111221_221578.htm)



China's modernization construction, and one basic state policy.”<sup>①②</sup> What are basic state policies? Though there aren't any accurate definitions of such a concept in academia and governments, yet it's commonly agreed that basic state policies are significant and influential strategic policies with urgency, persistence, broad impacts, and significance. To recognize the environment protection as one basic state policy shows that China's top decision makers have already realized the seriousness of environmental problems and meanwhile the arduousness of implementing the policy of environmental protection. So it's necessary to attach importance to environment protection and regard it as “a national fundamental policy”. Also, in the aspect of deservedness, the value of environment has been an important part of China's public policy principles, which ought to be a great awareness of top decision makers in terms of environmental protection. In order to fully implement such a state policy of environment protection, the second National Conference on Environment Protection also set out the guideline of “synchronized planning, implementation as well as development in both urban and rural economy and environment construction, in order to realize a unified benefits of economy, society, and environment”, and proposed policies of “prevention first, combined with treatment”, “whoever pollutes takes responsibility for governance”, and “strengthening environmental management”.<sup>③</sup> Later in 1984, the State Council decided to set up the Environmental Protection Administration, for the purpose of “research, decision- making, management and coordination”, which acted as the mainly responsible institution in coping with environmental and related issues in China.<sup>④</sup>

### 3.2 Climate Change: From Science to Policy

In the 1980s, since the reality and potential results of climate change have formed a certain consensus in the scientific community, climate change issue began to enter the international agenda. In 1988, the World Meteorological Organization (WMO) and

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① See the introduction to the Second National Conference on Environment Protection(December 31 1983 to January 7 1984) [http://www.zhb.gov.cn/zxbd/gzhy/diqicibbdh/ljhbhdh/201112/t20111221\\_221579.htm](http://www.zhb.gov.cn/zxbd/gzhy/diqicibbdh/ljhbhdh/201112/t20111221_221579.htm)

② In 1990, the State Decision on Further Strengthening Environment Protection stipulated that protecting and improving environment and ecology as well as preventing evolution is a state basic policy. In 1991, the Eighth Five-year plan stipulated that protecting farmlands, family planning and protecting environment were state basic policies.

③ See the introduction to the Second National Conference on Environment Protection(December 31 1983 to January 7 1984) [http://www.zhb.gov.cn/zxbd/gzhy/diqicibbdh/ljhbhdh/201112/t20111221\\_221579.htm](http://www.zhb.gov.cn/zxbd/gzhy/diqicibbdh/ljhbhdh/201112/t20111221_221579.htm)

④ For the purpose of strengthening the leadership of environment protection, the State Council decided to establish State Environment Protection Committee with the commissions of planning, leading and organizing the works in environmental governance.

United Nations Environment Program (UNEP) has jointly set up the Intergovernmental Panel on Climate Change (IPCC), in order to assess the climate change and further help make decisions of tackling climate change. In fact, before the IPCC was established, the WMO and the UNEP, as well as the International Council of Scientific Unions (ICSU), had already begun to organize scientists from different countries to discuss the issue of climate change, but there still weren't any unified platforms for work and cooperation. In addition to the research in paleoclimatology, China did a comparatively weak job in studying climate change. In terms of the level of climate database, and the hardware support of climate research, China still fell far behind other developed countries (Economy, 1997). Then, the problem of climate change worldwide still focused on its scientific cognition, especially the cognition of uncertainties. The lack of strong scientific support doubtlessly will deprive a country of communication with international academia and relevant international organizations. On this condition, on Feb. 5<sup>th</sup> of 1987, the State Scientific and Technological Commission set up the National Climate Committee, subordinated to the State Meteorological Administration, and responsible for organizing and coordinating the related work about climate under the leadership of the State Scientific and Technological Commission. <sup>①</sup> According to the regulations of the National Climate Committee, it mainly centered on scientific researches on climate change and coordinating the international cooperation of many departments in China. In 1988, in order to prepare for scientific dialogues about climate change issue driven by the UN in the framework of IPCC, the State Scientific and Technological Commission, the State Environmental Protection Committee, the State Meteorological Administration and the Ministry of Foreign Affairs jointly took great endeavors to climate research, among which the State Meteorological Commission worked on scientific research on climate change, the State Environmental Protection Committee on possible impacts of climate change, the State Scientific and Technological Commission on the scheme of operation and response, and the Ministry of Foreign Affairs mainly on negotiating strategies (Economy, 1997). The policy process at this stage indicated that all the great efforts by related governmental institutions were for purpose of advancing and deepening the scientific cognitions of

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① National Climate Committee was comprised of four sub-committees including climate documents, climate researches, climate applications and climate influences. The major tasks of National Climate Committee included organizing compiling China's climate plan and implementing plan; organizing and coordinating researches on climate; coordinating scientific cooperation with foreign organizations; organizing and coordinating works for world's climate plans; and counselling state departments and agencies. National Climate Committee had organized compiling *Climate Blue Book* and *China's National Climate Plan Outline for 1991-2000*. Information Resource: China's Encyclopedia for Resource Science(I), page530.

climate change issue. Thus at that time, climate change issue was more like a scientific and diplomatic issue in the background of globalization. Later in 1989, the State Scientific and Technological Commission and the State Development Planning Commission joined to establish a research program centering on global climate change, in order to further illustrate the reasons of China's climate change and to assess the impacts of such climate change on China as well as responding policies and technological strategies afterwards. This program contained almost 40 subprojects, participated by 20 ministries and commissions and over 500 experts in related researches (Economy, 1997).

Due to the lack of fund in climate change research, China's experts tried to seek help from communities abroad in the form of international cooperation, which killed two birds with one stone: on the one hand, China could get the necessary financial aids from the World Bank, the Asian Development Bank, the United Nations Environment Programme and the United Nations Development Programme; on the other hand, such international cooperation also relieved the shortage of technology and data in China at that moment, and promoted its fundamental researches on climate change.

In 1990, the IPCC released its first assessment report, clarifying that in the last century, the average surface air temperature of the globe had aroused 0.3~0.6 Celsius degree. At the same year, China's Environment Protection Administration passed and issued *China's Principled Stand in Terms of Global Environmental Problems*, demonstrating the main principles of China on those important world environmental problems, and setting the basic principles including to correctly handle the relation between environmental protection and economic development, to clearly define the main responsibilities of environmental problems, to safeguard the sovereignties of each nation, and to reinforce the international legislation. Also it mentioned the climate change issue and its huge uncertainties. And it doubted the influence of the first report by the IPCC, since the report merely reflected the views and standpoints of developed countries. It also emphasized the historical responsibility of greenhouse gas emissions, and the necessity and right of average low emission and economic advancement in developing countries, so China was not supposed to commit any promises. Later, the "National Coordination Committee for Climate Change" was set up under the State Environmental Protection Commission, Song Jian (a State Councilor) as the head, responsible for coordinating the cross- department work about climate change policies and formulating negotiating strategies. Its office was located at the State Meteorological Administration, and the

Ministry of Energy and the State Development Planning Commission also played a role in this coordinating team.

In 1991, the UN established the Intergovernmental Negotiation Committee (INC) with regard to climate change issue, mainly negotiating the coping framework under the UN framework, in which there were two critical issues: first, whether there is need for a convention regulate the specific emission-reduction goal and schedule; second, at what level developing countries are supposed to get involved in such convention and take corresponding responsibilities (Economy, 1994). In the negotiations of INC, China explicitly objected the setting of any specific emission- reduction goals and timetables, but supported a framework convention without any stipulations of particular responsibilities. Together with other developing countries, China also appealed to developed countries to undertake the historical responsibilities first, and only joined the negotiation concerning climate change when not required to take any substantive promises about emission (Harris, 2003). During the negotiation of convention of climate change, China insisted: climate change still had huge scientific uncertainties; coping with climate change should not interfere with state sovereignty, and the primary task of developing countries remained to be the development, rather than at the cost of it; industrialized countries ought to first shoulder historical responsibilities; developed countries ought to transfer technology and fund to developing countries in order to tackle climate change (Hatch, 2003). The appeal of China and other developing countries were reflected to a certain extent in the *UN Framework Convention on Climate Change*, in which the principles of “common but differentiated responsibilities” and “respective capabilities”, regulated in the first section of the Article III, were important achievements negotiated by developing countries in climate change issue, as well as the main standpoint of later negotiation and starting point of policies.

### 3.3 Gradual Advancement in Stabilization: From Rio Summit to Kyoto Protocol

The year of 1992 starts the global collective action to climate change. In this very year the UNCED was held in Rio de Janeiro, Brazil, signing the programmatic framework document for global response to climate change -- the United Nations Framework Convention on Climate Change (UNFCCC), laying the foundation for all later global actions towards climate change. This framework settled the principle of taking global

actions so as to control greenhouse gas concentrations under a level that would prevent dangerous anthropogenic interference with the climate system. It called on the international cooperation on sharing information on GHG emissions, policies, and practices as well as preparing for adaptation to the negative impacts of climate change (Liguang, 2011). As illustrated above, the principles of “common but differentiated responsibilities” and “respective capabilities” also were persisted by China in coping with climate change in international actions. Then Prime Minister of the State Council, Li Peng, attended the Rio Summit with China’s delegation, putting forward China’s propositions on climate change issue, including that economic development must coordinate with environmental protection; developed countries shall take corresponding responsibilities first; international cooperation must be based on respect of state sovereignty, etc.(Zhang, 2003). The UNFCCC came into effect on March 21<sup>st</sup> of 1994, and issued a series of important documents with binding force, containing *the Activities Implemented Jointly* (AIJ).

China also experienced its turning point of reform and development in 1992. Deng Xiaoping’s South Inspection Speech determined the overall orientation of China’s further reform and opening-up, and launched China’s new economic reform. After, 14<sup>th</sup> National Congress of CPC determined the reform goals of building socialist market economy, with the market playing a more important role in resource allocation. In 1990s, China’s economy began to grow rapidly, yet along with a surge of energy consumption and the deterioration of environmental problems (Economy, 1997), which to a certain degree, aroused the status of environmental problems including climate change within the policy agenda. After the Agenda 21 was passed by the UNCED in Rio, China’s Agenda 21 was also approved by the executive meeting of the State Council on March 25<sup>th</sup>, 1994. It settled the strategic planning to support China’s sustainable development. Without, though, direct policy goals and measures according to climate change, in a broad sense China had brought climate change issue into the framework of sustainable development (Chmutina et al., 2012). In 1995, the Law of Electric Power of People’s Republic of China, first law to cope with the issue of energy resources in China, was enacted. It reiterated the essence of sustainable development of Agenda 21 that to protect environment and to encourage and support the usage of renewable energy sources and clean energy, which remained the important principles in electric power construction and development. Later on Nov. 1<sup>st</sup>, 1997, the Standing Committee of the National People’s Congress enacted the

Law of the People's Republic of China on Conserving Energy to regulate energy conservation as a statutory duty in the form of law, fully indicating the urgency of current China's energy problems. Although relevant laws and bill hadn't proposed the goals of tackling climate change, yet in fact it did slow down the pace of climate change. At this period, climate change had not yet become an independent policy issue, but it was more attached to related environment and energy issues (Zhou&Mori, 2008). The institution of China's Agenda 21 was set under the State Scientific and Technological Commission but got marginalized soon after entering 21<sup>st</sup> century.

At this stage, the National Climate Change Coordination Committee was divided into four teams according to the division of labor in IPCC, respectively a scientific assessment team led by the State Meteorological Administration and Chinese Academy of Sciences, an impact & responsive strategy team led by the State Scientific and Technological Commission and the State Environmental Protection Administration, an economic analysis team led by the State Development Planning Commission and the Ministry of Electric Power, and a negotiating team led by the Ministry of Foreign Affairs and the State Scientific and Technological Commission. Though it was the State Meteorological Administration who was in charge of the coordination of climate change issue, the expanding tendency of climate issue and the relative weak position of Meteorological Administration among administrative organizations caused the increasingly weakening in authority and coordinating ability. China's mechanism in adjusting agendas to cope with climate change also encountered an opportunity as well as great pressure to change.

The first Conference of the Parties (COP1) was held in Berlin, Germany on March. 28<sup>th</sup> of 1995, in which representatives of different countries began to discuss the schedule of greenhouse gas reduction in industrialized countries. After three year's tough negotiation, the Kyoto Protocol, with its binding force of law, was eventually agreed in COP 3 in Kyoto, Japan. It stipulated countries in attachment I to reduce 5.2 % of the emissions of major six greenhouse gases at the level of 1990, and prescribed three mechanisms to lower the emission of greenhouse gases: the International Emission Trading, the Joint Implementation, and the Clean Development Mechanism. Under the general framework of the UNFCCC, the Kyoto Protocol guided the particular collective actions to tackle climate change. The Kyoto Protocol didn't demand an absolute binding emission reduction goal for Group 77 and China, and meanwhile the Group 77 and China

also objected the link between the Joint Implementation Mechanism and technology or fund transfer. Actually it showed their worries and doubts about the coping mechanism including the Joint Implementation and the Emission Trading Mechanism (Liguang, 2011; Zhang, 2003). China has always been cautious when seeking a balance between coping with global climate change as well as maintaining its development benefit and sovereignty independence under the framework of UNFCCC. For one thing China kept a prudent attitude towards mechanisms in the Kyoto Protocol, but at the same time China also began to promote the Activities Implemented Jointly with both Japan and Norway even before the Clean Development Mechanism. <sup>①</sup>

The Clean Development Mechanism (CDM) progressed dramatically in China. As a firstly doubted cooperation project and later a most important way for China to participate in the Kyoto Protocol, it witnessed the whole process of redefinition of issue and adjustment to agenda of climate change in China. At the very beginning, China held a negative view of CDM, believing that CDM only helped developed countries to shirk their responsibilities of emission reduction. Such an attitude, however, changed after the COP7 and now CDM gets the positive support in China and China possesses the most CDM programs among all developing countries (Heggelund, 2007). The agenda transforming of CDM programs could be attributed to the adjustment in the overall structure of China's climate change agenda. After the Kyoto Protocol, the issue of climate change had been more integrated into China's agenda of energy sources and economic development. In 1998, a restructuring of government administration took place in China, in which the institutions of the State Council were reduced from 40 to 29, and many departments, including the State Development Planning Commission, the State Environmental Protection Commission, had been renamed and reorganized. Later on, the National Climate Change Coordination Committee made some reform according to current situation. This committee, set under the State Meteorological Commission, was renamed as National Climate Change Coping and Coordinating Committee, and was subordinated to National Development and Planning Commission. It became a cross-department discussing and coordinating institution for climate change issue, participated by the Ministry of Science and Technology, Foreign Affairs, Meteorology, Environmental Protection. Such institutional change also led to the structural transforming of agenda setting on climate change issue. Climate change issue was separated from the leading of

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<sup>①</sup> For more information: <http://www.ccchina.gov.cn/>

meteorological or scientific departments, but started to be included in the policy agenda of economic and energy resources.

### 3.4 Outburst of Issue Attention: the Kyoto Protocol and Post-Kyoto-Protocol Stage

After the endorsement of the Kyoto Protocol, the meeting point between China's action to climate change and international response lies in the Clean Development Mechanism, in which the programs about renewable energy resources take a dominant place in particular (Heggelund, 2007). After entering 21<sup>st</sup> century, China's economy boosts at a high speed, and the increasing speed of energy consumption even overtops the speed of economic development. As a consequent, from 2001 to 2005, the emission of greenhouse gases in China took up 19.5% of global emission, arising from 12%, almost reaching the emission level of the USA. The high-speed advancement of economy also brought out certain negative effects, for instance, the problems about energy resources, environment, and social justice, which could risk the social stability of China (Wiener, 2008). In 2005, the fourth plenary session of the 16<sup>th</sup> National Congress of P.R.C raised the concept of building a harmonious society, and then the overall plan of national development began to adjust, from previous focusing on rapid growth of economy towards balancing economic development, sustainable development as well as social equity, and also including the issues of people's livelihood and environment into higher policy agenda. Along with the changes in national overall development strategies, the climate change issue also gets restructured and redefined that it no longer only plays a role in environmental protection, but also turns into a constitutive part of economic structural adjustment (He, 2010). The issue dimension of climate change grows to be more abundant and diverse, gradually transforming from a complex natural phenomenon to a political symbol that reflects significant policy concerns.

The rising process of issue attention to climate change could be traced by China's Five-year Plans. Actually, climate change appeared firstly in the eighth Five-year Plan (1991-1995), when climate change was listed as a privileged direction of national scientific research, yet more or less showing its scientific attribute at the moment (Harris&Yu \*, 2005). In the program outline of tenth Five-year Plan, climate change was also mentioned as "actively involving in global environment and development affairs, complying with the obligations, and implementing policies that mitigate global climate



change” in the second section “Protecting and Governing Environment” of Chapter 15. It seemed that climate change was included as an issue of global environmental problem within the environment governance and protection, judging from the location and the way of its content. The eleventh Five-year Plan didn't mention much about climate change, and it only appeared in the chapter of “reasonably utilizing marine and climatic resources”. It's generally accepted, however, that the binding goal of reducing 20% of the energy consumption per unit of GDP suggested in this Five-year Plan would effectively slow down the effects of climate change, although literally such a goal merely aimed at increasing the resource using efficiency. It's in the twelfth Five-year Plan that climate change really became an important issue, in which the first chapter of the sixth section “Green Development, Building a Resource-saving and Environmental Friendly Society” was named as “Responding Proactively to Global Climate Change”, and it also proposed projects to control emissions of greenhouse gases, to strengthen adaptation to climate change, and to carry out broader international cooperation in order to cope with climate change. Thus, in the perspective of Five-year Plans, the agenda leap of climate change occurred during the 11<sup>th</sup> Five-year Plan.

The sudden boost of climate change issue connects closely with the fact of constant increase of China's carbon dioxide emissions. Although China didn't admit that it became the world's largest emitter of greenhouse gases and carbon dioxide until 2010, the research data shows that China had exceeded the USA in the year of 2006 (Wang&Watson, 2008). Yet at that time, though the Kyoto Protocol just began to come into effect, the discussion about global action towards climate change had already expanded in a large scale. Soon after, there came the policy window for global climate policies at this “post-Kyoto Protocol stage”. There existed tremendous tensions between China's internal need to keep high-speed economic development and global urgency to fight against climate change, which compelled China to incorporate climate change issue into a higher-level policy agenda (He, 2010). In 2007, the State Council established the National Leading Group on Climate Change, Energy-Saving and Emission-Reduction. Wen Jiabao, the Prime Minister, served as the group leader, and Li Keqiang, the vice Prime Minister, as well as Dai Bingguo, the State Councilor, worked as the vice leaders. The National Development and Reform Commission were in charge of the specific affairs. Eventually China had formed a high-level joint mechanism for decision making and coordinating on climate change. Since then, climate change had entered the policy venue of national

decision making.

The Copenhagen Conference in 2009, known as “the last chance” to save the earth, had attracted heated attentions from every country, media, intellectual elites, and non-government organizations. On Sep. 22nd, 2009, President Hu Jintao attended the UN Climate Change Summit and addressed the opening ceremony, raising a development theory to respond to climate change. He stressed that China would attach importance to climate change problems, but the primary tasks still remained to develop economy, eliminate poverty and improve people’s livelihood. This was for the first time that China’s head of state had specially expressed China’s policy attitude on climate change issue. At the same year, after climate change issue had been subordinated to environment and energy policy agenda for so many years, China for the first time announced to set out reduction goal for carbon emissions in April of 2009. On Nov. 25<sup>th</sup>, before the Chinese delegation set off for COP 15 in Copenhagen, the executive meeting of the State Council had gone through a resolution that the government of China decided to reduce 40% to 45% of the emission of carbon dioxide per unit of GDP by 2020 compared to that of 2005, to incorporate the binding target into medium-term and long-term planning for national economy and social development, and to enact corresponding statistics, supervision and evaluation to put it into practice.<sup>①</sup> China’s policy-making body, according to its own dominant policy goals, creatively constructs its “carbon intensity” agenda, on the circumstances of booming climate change issues as well as increasing pressure.

At the post-Copenhagen stage, China struggled to both commit potent promises to international community and maintain a higher rate of economic growth. The absolute emission reduction in the climate change issue may bring negative impacts to China’s economy, but the climate change issue has great synergy effects with other issues. As a global policy issue with enormous world attention, the significance of climate change issue would enable China to more proactively to restructure economy, reduce energy consumption, and lessen environmental pollution. Though in a short period, China’s climate change agenda will still focus on reconciling different policy goals, yet it’s widely recognized that climate change has already occupied a more important position in China’s major policy agenda.

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① See China’s Top Ten Domestic News in 2009 [http://www.gov.cn/jrzq/2009-12/31/content\\_1500461.htm](http://www.gov.cn/jrzq/2009-12/31/content_1500461.htm)

## Chapter 4 Issue Attention: Index, Method and Measurement

Issue attention is the main focus of this thesis. To do so, it is necessary to start with reasonable index for issue attention and to choose the correct method to measure it. Although the study on the measurement of issue attention is one of the essentials among related studies on policy issues and agenda setting, no fixed pattern has been set. Meanwhile, due to the different focuses of research throughout the world, the study on issue attention has similar yet not identical rules to follow. Therefore, this chapter would concentrate on the logic, the methods and the procedures of the measurement, centering on the index of issue attention.

### 4.1 Research Design and Research Method

#### 4.1.1 Former Designs and Methods

Issue attention is the widely concerned research topic among political science, policy process and communication science. To those concrete research fields like election politics, policy issue and agenda setting, it weighs more. In chapter 2, this thesis has already covered the review, comparison and analysis on the theory basis, explanation framework and model, explanatory power and limitation of the related theory of policy issue and agenda setting. This chapter would focus on the research designs and research methods which these studies have employed so as to support the measurement on the key variable for this study through the analysis on the former research process.

##### 4.1.1.1 Comparative Study and Longitudinal Study

As Baumgartner and Jones mentioned, the first challenge of agenda setting study lies on the methodology (Baumgartner&Jones, 2010). For long, researches on methods of issue and agenda never stop, the difficulty of which attracts time and effort of many scholars of politics and policy, so actually this research topic stimulates the innovation in methodology.

For different research goals of policy issue and policy agenda, two methodology can be used. One is comparative study on different issues and the other is longitudinal study on a single issue. Each has its own merits and defects. Literatures of policy typology

based on comparative study mainly try to answer two kinds of questions: one is seeking for divergence, asking why some issues could earn the attention of decision-makers and enter into policy agenda while others being put aside; the other is for consistency, discovering similar patterns under different scenarios through comparing various issues and leading to theoretical conclusion. These two research designs are commonly used in case studies (Gerring, 2004).

Of the studies seeking divergence, some consider the content of the issue as the critical factor for it could determine the involvement of the public and voters, which would decide whether it could become an important political issue or not (Baumgartner&Jones, 2010; Lowi, 1964; Wilson, 1974). Wilson's study is comparing distinctions between centralized and decentralized benefit-cost which would affect the involvement of the public. Additionally, how much the issue conflicts and how complicated it is would also be the determinant factors. Issues with low conflict but high complexity could hardly remain in policy agenda (Gormley, 1983). These issue typology studies above are divided by the content of issues. Through the method of seeking divergence, they make it clear that various properties of issues would have different impacts on the attention on the issues and the agenda settings.

In studies seeking for consistency, researchers usually regard issues as identical in terms of their properties. The assumption implied here is that the decision-making sectors deal with issues in a relatively fixed pattern, and the research aims to reveal this pattern. After analyzing 5 issues including SUPPLY-SIDE ECONOMICS, GREENHOUSE EFFECT, CHILD ABUSE, DRUNK DRIVING AND COMPARABLE WORTH, Millward and LairD discovered that factors affecting agenda setting include issue COUPLING, A POLICY COMMUNITY, POLICY ENTREPRENEUR, POLICY WINDOWS, EVENTS, SPONSORS, STRATEGY, AGENDA CHARACTERISTICS, ISSUE CHARACTERISTICS AND MEDIA CHARACTERISTICS. The interaction among all these factors determine the success of agenda (Brinton&LairD, 1996). Research in Kingdon's book, *Agendas, Alternatives, and Public Policies*, is also seeking conformity between different issues. Issues from health and transportation fields supported Kingdon's theory—though Kingdon found the distinction between issues, the consistency of both lies on the streams theory of agenda setting (Kingdon, 1995). Both research designs—for divergence and for consistency—are also commonly presented in the studies on the participants in setting agendas. For example, in studies on behaviors

and functions of policy elites or policy communities, cross-sector and cross-issue comparative studies were also commonly utilized to increase reliability of theory models (Edelman, 1988; Edelman, 1985).

Longitudinal study is for tracing the trend of issues evolution so as to answer questions like what the dynamic mechanics are in policy agenda. Downs observed the ups and downs of environmental issues in ecology study, and invented the concept of issue-attention cycle (Downs, 1972). Nelsons had traced and observed child abuse case for more than 20 years. He explained how an issue has come into political agenda from a marginalized place out of government's attention, and pointed out that the mobilization of voters played an important role in pushing agenda setting in American democratic politics (Nelson, 1986). Many longitudinal studies often focused on single case. Besides the studies mentioned above, there are also other studies analyzing the fluctuation and evolution of policy issues in policy agenda by using single case method. For example, Weart analyzed the image evolution of American nuclear power with the history over 80 years and unraveled the relationship between the issue image and policy agenda (WEART, 1989); Hither and some others have done research on the merging process of Britain's climate change and energy policy agenda (Lovell et al., 2009). Chinese scholars, too, did the same. Like Chen Ling, she traced the development of China's semiconductor industry, and did research on how policy elites and institutions affected policy agenda setting (陈玲, 2011).

Besides, some studies combined comparative and longitudinal methods to enrich policy agenda theories. Kingdon (Kingdon, 1995) utilized the both strategies in his study on agenda setting. He interviewed 247 decision-makers in Washington from 1976 to 1979. His case study covered even longer time range, which formed longitudinal comparison. Baumgartner and Jones' study centered on America's agenda politics and explained the dynamic mechanics of 9 public policy issues, everyone of which was analyzed through longitudinal comparison. All 9 issues together, using the consistency-seeking method, made the punctuated equilibrium theory more reliable (Baumgartner&Jones, 2010; Jones, 1994). In study on policy issue and agenda setting, Baumgartner and Jones' contribution was also known in their efforts in driving the development of this research field. In 1993,

they launched policy agenda project,<sup>①</sup> which systematically coded America's policy issue files from 1946 till now. This project is open to public, which is helpful for scholars of related field to break through the lack of data. Based on this database, many high quality cross issue and long time range studies on issue attention and agenda setting could be carried out (Baumgartner et al., 2009; Baumgartner et al., 2006b; Baumgartner&Jones, 2002; Feeley, 2002; Hardin, 2002; Hunt, 2002; Jennings&John, 2009; Jones&Baumgartner, 2005a; Macleod, 2002).

Actually, comparative study and longitudinal study cannot be completely divided in policy issue and agenda setting research, for decision-making process is a dynamic process and a time function. Even comparative studies would lie on the observations on policy cycles. According to the actual experience, the most distinctive difference between those two methods is reflected in the research purpose: the longitudinal study focuses on the dynamic mechanics of issues and agendas. My thesis is a longitudinal study, focusing on the dynamic evolution of a single issue—climate change—from a long time scale.

#### 4.1.1.2 Data Acquisition and Variable Measurement

When research purpose is set, choosing a method for measurement becomes a important issue, because issue attention is not a dominant direct index, but a rather complicated state. Even decision-makers could not provide his own preferences or tell where his attention lies (Simon, 1957; Simon, 1965; Simon, 1985). Therefore, the measurement for these research objects actually becomes the process of the index construction by researchers.

To construct index, the first step is to acquire data related to policy issue, policy attention and policy agenda. For study on policy process, data acquisition is not an easy job, and even harder when getting closer to the decision-making front-end. The ways of data acquisition and variable measurement can be divided in two dimensions—one is whether to obstruct the research objects, and the other is whether to acquire data through experiments.

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① The project provides the researchers of public policy with free database (<http://www.policyagendas.org/>), which includes the systematical classification and coding of important files and information of U.S. Congress, the Supreme Court, the public opinion, interest group, news media and federal budget. With high credibility and scientificity, academic productions based on it could be seen on top periodicals of political science and public administration.

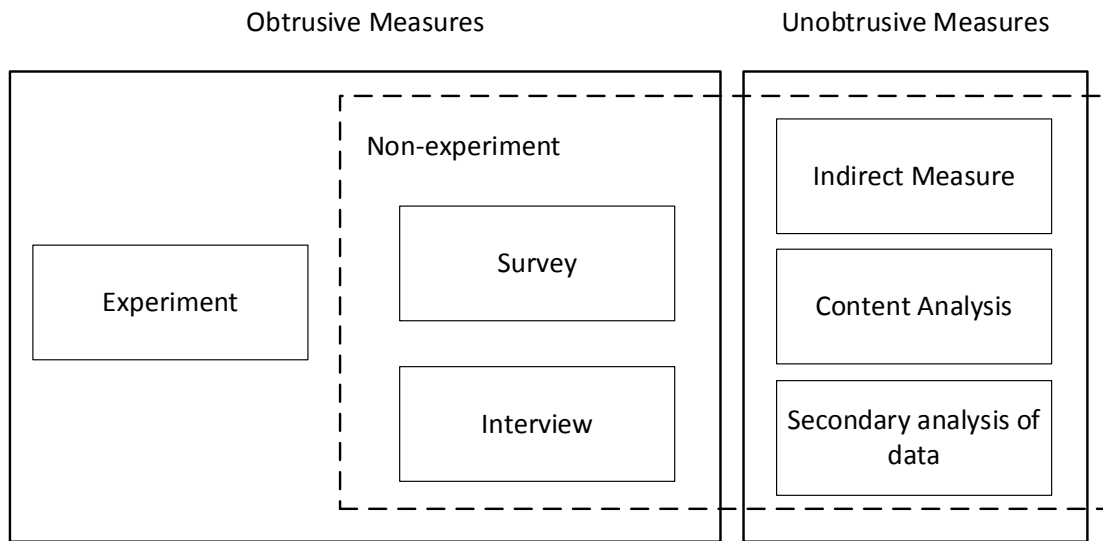


Figure 4-1 Approaches for collecting data and measuring variables

Experiment is one way to collect data, though in political science studies, it is very difficult. However, it is also possible to conduct experiments to prove the effect from information intrusion on decision-makers' attention distribution in studies on individual perception and attention. Researchers randomly give interviewees more information and measure their attention and definition on issues. They found out that interviewees' understanding and attention distribution of issue would change significantly when they received strong enough information to show they had different issue attention comparing with the social trends (Wood&Vedlitz, 2007).

During the research on actual problems, real experiments might be too difficult to conduct, so more often, researchers would choose unreal experiments like natural experiment to do comparative study. There are two ways of data acquisition of unreal experiment, obtrusive measures and unobtrusive measures. Obtrusive measure acquires necessary data through intervening in research objects (Webb, 2000); survey, interview and participant observation are commonly used. In research of issue attention and agenda setting, survey and interview are often used for data acquisition; for example, to know the level of knowledge use in agenda setting of local governors through questionnaire (朱旭峰&田君, 2008), or to acquire the effect on issue definition and information processing of individuals through random telephone survey (Wood&Vedlitz, 2007). Survey is usually used in analyzing information processing of decision-making on a micro scale, considering every interviewee as one data sample point. Interview is more widely used

with less limitation. For examples, Kingdon interviewed 247 decision-makers in his research (Kingdon, 1995), and a lot of studies on agenda setting use interview as the main method of data acquisition (Liu et al., 2010; Takahashi&Meisner, 2013). The advantage of using obtrusive data acquisition or measure is the convenience to get the data. Researcher could directly communicate with actors in policy making process for clear purposes to get the necessary information, but its defect is also obvious. No direct communication with research objects means no data to be collected. For most of the time, the accessibility cannot controlled by researchers, and they might also face the selection bias brought by accessibility, which would lead to biased information and conclusion. The most severe criticism on obtrusive is about its accuracy, because interviewees might change their behaviors or hide genuine thoughts when they know they are in a research project, or give different answers depending on mood, place, payment or even the sequence of interviewer's questions (Trochim&Donnelly, 2008). Furthermore, some subjective questions would bring about the problem that Bayesian Theory points out—interviewees would infer that the causes are good according to their good perception on the consequence or performance, which would give rise to measure errors.

Unobtrusive measure means during the measure process, researchers and information sources would not affect each other (Webb, 2000). It includes direct observation, indirect measure, content analysis, and secondhand data analysis. Direct observation is rather controversy because when observation starts to affect interviewees, it is no longer unobtrusive but obtrusive measure. Indirect measure means that measure happens secretly and naturally without effect on research objects. In the study on public appeal and city environment treatment, Zheng Siqi and others used Google trend as the index to measure public attention. Although doubts remained on the use of such index, it avoided the inconvenience in large scale public survey and measurement interference to interviewees (郑思齐 et al., 2013).

Content analysis is to conduct systematical research on texts (Krippendorff, 2012). Analysis on texts can be either qualitative or quantitative, or both (Trochim&Donnelly, 2008). Content analysis is the research method to mine information, which is useful in studies of issue and agenda. In the former part, this thesis mentioned that the policy agenda project launched by Baumgartner and Jones used content analysis to code large numbers of texts of various themes, formats and contents. This realized the homogeneity on texts and could be used in accurate quantitative research. Researches using content



analysis on issue and agenda study are commonly seen, not only in political science but also in communication studies (Bonafont&Baumgartner, 2013; Jennings&John, 2009; Koopmans&Vliegthart, 2011; Neuman et al., 2014; Wolfe, 2012; Xinsheng Liu et al., 2011; Zhao et al., 2011).

Secondhand data analysis is to use existing data to conduct research, usually on quantitative data, like various statistical data or data used in existing periodical literature, not including researches on text data (Trochim&Donnelly, 2008).

From analysis above, it is obvious that all kinds of measurement methods have their own use in issue and agenda studies. However, with the development of digitization of information these years, more and more researches begin to focus on dynamic mechanics of issue and agenda, so content analysis becomes more popular in academia. It could ensure the accessibility of data under most circumstances, which avoids the communication inconvenience between researchers and interviewees as well as the problem of confidential information processing. And text information also guarantees data continuity for the convenience of long-term research. The content analysis method employed in this thesis will be elaborated in the second part of this chapter.

#### 4.1.2 Challenge for collecting data

Compared with the flourishing situation of studies on policy issue and policy agenda in western political science, especially in U.S., Chinese researchers seem to have little interest in this field. According to the statistics from literature, studies on agenda setting in China mainly belongs to journalism and communication field, but rather small proportion in public policy field.

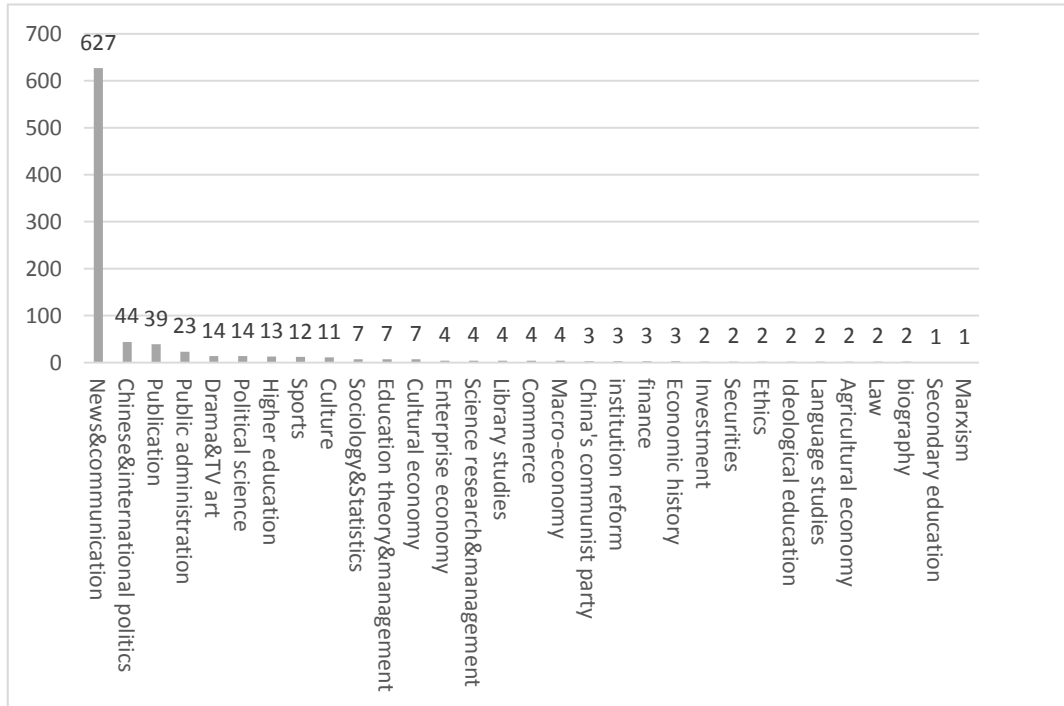


Figure 4-2 CSSCI(Social Science Citation Index in China, from CNKI database) academic articles with the keywords “agenda setting” (collected by topics)

From Figure 4-2, it is clear that China’s academic papers which use agenda setting as keyword exceed 800 these years, but mainly belong to journalism, much less to politics, public administration or management. Almost no papers use decision-making attention, political attention or policy attention as keywords. Within these studies, most researches focus on phenomenon description and points making. Few of them are empirical studies. The reason might be that the complicated policy-making process and the chaos in policy implementation of China’s bureaucracy attract Chinese scholars to focus their attention on these problems. On the other hand, the great difficulty in data acquisition and information collection, especially in the field of issues and agenda study in national level impedes scholars to invest their efforts. Hence, under these limitations, empirical studies on issue and agenda dynamics seem meager but precious. To conduct such a study, two problems mentioned above have to be solved, or one actually—how to measure issue attention.

In prior studies, we could see that there are plenty of methods to measure issue attention and agenda setting. One of them is to take advantage of questionnaire, but it is restricted within micro level of decision-makers’ issue attention. Moreover, longitudinal study is impossible by survey, which fails the dynamics study on issue attention. Another

one is obtrusive observation or interview, but it requires large numbers of interview to decision-makers who are involved in policy process. And if dynamic mechanic study is in need as well, this would requires follow-up study, but it is only feasible within short time period, and complete and accurate restoring former scenarios is not so easy. A third way is content analysis. Actually, because of the possibility to ensure accessibility and continuity of data and to conduct long-term analysis, most studies on issue and agenda dynamics opted to employ content analysis method. Question comes along, however—decision-making information in China is not so transparent, so how to collect information to measure policy issue attention?

If we refer to the policy agenda project launched by Baumgartner and Jones, it is easy to find that they traced policy agenda by collecting important official documents and coding them to get relative information. For example, they coded acts and hearings of the Congress, administrative orders and speeches of the president to measure the status of issue attention and agenda setting of U.S. decision-makers. Texts being analyzed are all from the official texts of high level decision-makers, and the total coded samples own stable periodicity, so it is easy to know what are being discussed and considered by decision-makers in certain time period. Furthermore, a study on attention dynamics of U.K. politics measured decision-makers' political attention through coding the New Year speeches of the Queen. The speeches are actually from the Cabinet, so they show magnificent representativeness of U.K.'s legislation process and policy output (Jennings&John, 2009). Notably, studies mentioned above took big issue categories as their research objects, and these categories own historical chronicity, such as macro economy, health, agriculture, etc. Provided that we conduct study in similar ways in China, coding government's work reports released every year, we would find that climate change appeared only after 2008's work report. From a point of view of research analysis, it is too difficult to run more accurate dynamical analysis on issue attention. Moreover, setting the measure index of issue attention as the occurrence in government's work report is beyond strict, which is apparently irrational to claim the zero attention on climate change before 2008. For a rather new and more micro policy issue, it is necessarily important to find a more reasonable method to measure issue attention.

Table 4-1 The descriptions of “climate change” in the government’s work reports<sup>①</sup>

Year	Frequency	Description
2013	1	1. We have been actively dealing with international cooperation on global issues like international financial crisis and climate change. Solving international and regional heated issues would help creating beneficial global environment for our nation’s reform and development, which also significantly contributed to world peace and prosperity.
2012	2	1. We shall strengthen the ability of the prevention and reduction of natural disasters, and to deal with climate change, especially the extreme weather events. 2. We shall insist on common but different principles of responsibility and justice, and push the process of international negotiation on climate change constructively.
2011	3	1. We shall advance on resource saving and environment protection. It is necessary to actively cope with climate change, enhance the ability of resource saving and management, promote on cultivated land protection, environment protection, construction of eco-system, prevention and reduction system of natural disasters and sustainable development. 2. We shall promote on energy saving, environment protection and construction of eco-system to actively deal with climate change. It is necessary to focus on the energy saving in industry, construction, transportation, public facility and etc. 3. We shall promote on pilot project of low-carbon city, to enhance the ability to adapt to climate change, especially to extreme weather events, and complete the monitoring system of greenhouse gas emission, energy conservation and emission reduction.
2010	9	1. We shall actively carry out works on climate change under the expected goals and policies on greenhouse gas emission control. It is necessary to enhance on weather forecasting and early warning to increase the ability of disaster prevention. 2. The international environment is unstable with uncertainties and global issues such as climate change, food security, energy and resources problems and etc. 3. Fourth, we should actively respond to climate change.

① The links for government’s work report: <http://news.takungpao.com/special/liniangongzuobaogao/>

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		<ol style="list-style-type: none"> <li>4. We shall enhance the ability of adapting and ease climate change.</li> <li>5. We shall focus on construction of low-carbon oriented industrial system and consumption pattern, to actively respond to international cooperation on climate change and make new process on it.</li> <li>6. We shall focus on construction of low-carbon oriented industrial system and consumption pattern, to actively respond to international cooperation on climate change and make new process on it.</li> <li>7. We shall proactively deploy the research of basis and cutting-edge technology in fields like biology, Nano meter, quantum manipulation, information network, climate change, oceanography and etc.</li> <li>8. China has been actively responding to global cooperation on financial crisis and climate change, and contributing constructively in series of multilateral meetings.</li> <li>9. We shall make progress on external works like response to climate change and cooperation in energy and resources field, and contribute constructively on heated and global issues.</li> </ol>
2009	3	<ol style="list-style-type: none"> <li>1. China has published a white paper named <i>Policies and Actions of China on Climate Change</i>.</li> <li>2. Sixth, we shall make national act to respond to climate change.</li> <li>3. We shall increase the ability to respond to climate change.</li> </ol>
2008	3	<ol style="list-style-type: none"> <li>1. We have set index system, monitoring system, assessment system and responsibility system of energy conservation and emission reduction, and issued national act on climate change.</li> <li>2. Eighth, we shall carry out national acts in response to <b>climate change</b> and enhance the ability to adapt to climate change.</li> <li>3. Eighth, we shall carry out national acts in response to climate change and enhance the ability to adapt to <b>climate change</b>.</li> </ol>
Before 2008	0	None

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#### 4.1.3 Data Source of Research

Based on the analysis of confusions in former studies and methods of data acquisition, if conducting research on issue attention on China's climate change, it is

necessary to bring in innovative research ideas, and the data resource should be located in the first step. In former studies of political science and communication on issue attention, media coverage was an essential variable, and there has been relatively systematical methodology for measuring it (Djerf-Pierre, 2012a; Green-Pedersen&Mortensen, 2010; Neuman et al., 2014; Schmidt et al., 2013; Zhao et al., 2011). In western democracies, news media is free from government's control. The media is regarded as a part of the so-called pluralism model, the network node in policy issue without direct connections with politics and administration (Hecllo, 1978). Therefore, the issue attention of media cannot equal to that of policy under such so called democratic regime. However, in China, news media has its own uniqueness—the dual properties. It can do as the western counterpart, and also fulfill the function as propaganda machine. To those with official background, the latter one values more. Hence, the trends of politics and policy can be perceived indirectly from China's important official media. The discourse of them can be considered as the issues in domain, and the information hidden beneath will not only represent the construction modes of China's policy issue, but also exhibit the issue attention of China's decision-making system.

In former studies, literatures using official media as research objects in order to discuss politics and policy issue are usually seen, but mainly in journalism and communication research field. Only few studies focused attention on official media from the perspective of political science and public management. For example, Zhong Kaibin described the conceptual origin and transformation of emergency through the analysis of People's Daily; some others analyzed the construction of service-oriented government through focusing on leading editorials of People's Daily (李文军&朱稳根, 2012; 钟开斌, 2012). However, these studies have limited depth and numbers of text on the issue, which makes it hard to show more on the process of evolution through large quantity of data investigation. However, they have brought inspiration on China's policy issue study and we should value the function and role of official media's data more in China's institutional background.

Based on feasibility of research and unique background of China's institutional structure, this thesis chose People's Daily as the main source of issue information. First of all, People's Daily is the official newspaper of Chinese Communist Party Central Committee; the newspaper office is ministerial level; it propagandizes the theory and policy of CCP, publicizes essential decisions and policies of the central government

domestically and overseas with high authority. As the propaganda machine of national highest decision-making institution, the information it gives could reflect the discourse or the issue domains, so it has the comparability with and can be analogous to the policy issue data source in the western policy research. Secondly, as a paper media with continuity, the data of People's Daily is accessible, which enables the long-term tracing research. Hence, this thesis will build the corpus on the content of People's Daily, and will create index to measure China's issue attention on climate change.

## 4.2 Content Analysis: A Method for Information Mining

### 4.2.1 Framework of Content Analysis

In the former part, this thesis mentioned the importance of content analysis in researches on policy issue and agenda setting. It is necessary to design a reasonable technological process of content analysis for the accuracy of analysis on texts information, for content analysis is the core method of this research. The history of using content analysis has been over 60 years. The most authoritative dictionary in the U.S., the Webster Dictionary contained this phrase since 1961, defining it as "analysis of the manifest and latent content of a body of communicated material through a classification, tabulation and evaluation of its key symbols and themes in order to ascertain its meaning and probable effect". After long time of development and improvement, the present content analysis has become an empirically grounded method. It is more than the symbolized way of thinking as the former one that focuses only on "who says what in which channel to whom with what effect" (Lasswell, 1960); it has become the essential method for theoretical study and expansion in various fields (Krippendorff, 2012). With the rapid development of information digitalization, more and more researchers start to pay attention to content analysis and make it a set of scientific methodology. As the quantity of information of content analysis is growing, computer technology would play a more important role in processing large amount of data in this age of big data.

The usage of content analysis could cover so many fields. Stone and others claimed that although the historical origins of content analysis lies in journalism and mass communication, content analysis is also applicable in studies of psychiatry, psychology, history, anthropology, education, philosophy and linguistics (STONE et al., 1966). Berelson pointed out 17 uses of content analysis including describing trends in

communication, and tracing the development of scholarship etc. (Berelson, 1971); Krippendorff categorized 6 uses of content analysis including extrapolations, standards, indices and symptoms, linguistic re-representations, conversations, and institutional processes (Krippendorff, 2012). Although content analysis has a wide breadth of applications, the basic research framework is almost the same. Krippendorff concluded the basic process of content analysis including (Krippendorff, 2012):

- A body of text, the data that a content analyst has available to begin an analytical effort;
- A research question that the analyst seeks to answer by examining the body of text;
- A context of the analyst's choice within which to make sense of the body of text;
- An analytical construct that operationalizes what the analyst knows about the context of the body of text;
- Inferences that are intended to answer the research question, which constitute the basic accomplishment of the content analysis;
- Validating evidence, which is the ultimate justification of the content analysis.

In content analysis, researchers usually expect to transform qualitative texts into quantitative data in order to test the hypothesis by toolbox of statistic analysis. The transformation process is to judge and categorize qualitative data and assign meaningful numerical values (Trochim&Donnelly, 2008). This process is actually the third and fourth steps of Krippendorff's framework—the process to simplify, standardize and operationalize the complicated and chaotic text content (as shown in Figure 4-3).

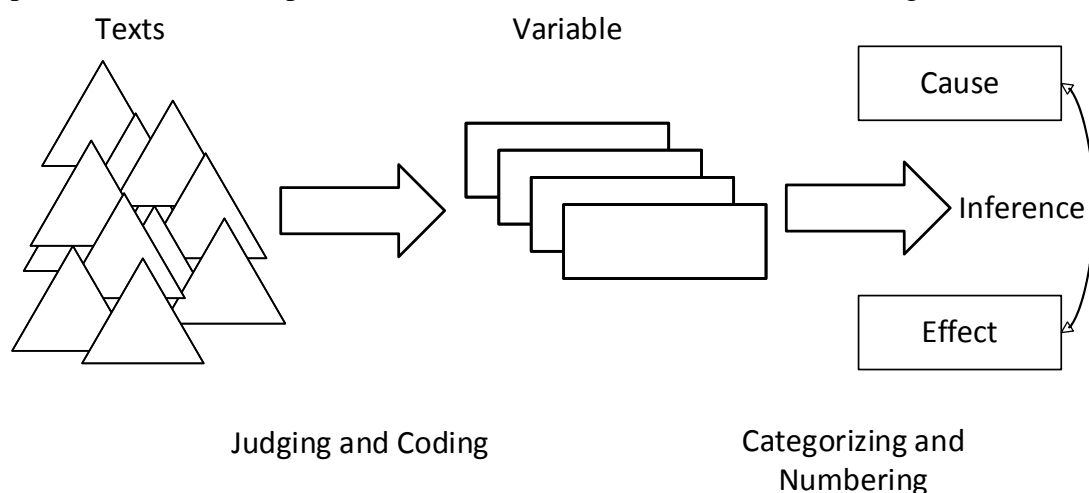


Figure 4-3 Basic logic of content analysis



In the process of content analysis, to structuralize chaotic text information is the basis for further analysis, and the instruction of this process is coding frame or coding scheme, which consists of main categories specifying relevant aspects and of subcategories for each main category specifying relevant meanings concerning this aspect (Früh, 2007; Holsti, 1969). Traditional coding frame usually requires unidimensionality, mutual exclusiveness, exhaustiveness and saturation (Schreier, 2012), which would guarantee the reliability of coding scheme in logic as well as the sound coding results.

Table 4-2 Major Coding Differences Among Three Approaches to Content Analysis

Type of content analysis	Study starts with	Timing of defining codes or keywords	Source of codes or keywords
Conventional content analysis	Observation	Codes are defined during data analysis	Codes are derived from data
Directed content analysis	theory	codes are defined before and during data analysis	codes are derived from theory or relevant research findings
Summative content analysis	Keywords	Keywords are identified before and during data analysis	Keywords are derived from interest of researchers or review of literature

Developing a reasonable coding frame is the essential part of content analysis. Coding frame could be formed in three ways as shown in Table 4-2(Hsieh&Shannon, 2005). In conventional content analysis, coding frame is developed in the process of data analysis, the source of which is the results of analyzed data. With a directed content analysis, the researcher uses existing theory or prior research to develop the initial coding frame prior to beginning to analyze data. As analysis proceeds, the initial coding frame is revised and refined. With respect to summative approach to content analysis, the text is often approached as single words or in relation to particular content. Keywords which are identified iteratively before and during the analysis, are derived from researchers' interest and relative theories. Coding scheme is the most important tool to structuralize the complicated texts. With the improvement of content analysis methodology, coding methods also flourish as well. The coding method in this thesis is developed from summative content analysis, the details of which will be given in the following part.

#### 4.2.2 The Choice of Technique Approach

The study of content analysis is always confronted with a dilemma—when text content is not very large, trained coders can code text more accurately, but the limitation of sample size will undermine the representativeness and the reliability of analysis. In order to make up for this flaw, it is necessary to enlarge the text amount, but it will lead to the growth of time and cost for research. In addition, the accuracy would possibly decline due to increasing workload. With higher accessibility of literatures, content analysis would process larger and larger text amount, and manual coding would fail in the age of big data.

Content analysis is widely used in political science, especially in the study on policy issue and policy agenda, which take advantage of content analysis to measure the variable. During the research on the two issues mentioned above, it is necessary to use topic coding on text content to measure the distribution of issue attention. The U.S. Policy Agendas Project and Congress Acts Project both employ topic coding method which relies on well-trained coders. Except the cost of human coding mentioned above, however, its validity and reliability would also be the part being doubted and challenged. Hence, more and more researches start to use computer technology to deal with large workload of content analysis. For example, in the study on international relationship, event data coding has already benefited from Kansas Event Data System. Policy Agendas Project researches also use supervised learning to improve human coding (Hillard et al., 2007; Hillard et al., 2008).

Table 4-3 A Summary of Common Assumptions and Relative Costs Across Different Methods of Discrete Text Categorization

A. Assumptions	Method				
	Reading	Human Coding	Dictionaries	Supervised Learning	Topic Model
Categories are known	No	Yes	Yes	Yes	No
Category nesting, if any, is known	No	Yes	Yes	Yes	No
Relevant text features are known	No	No	Yes	Yes	Yes
Mapping is known	No	No	Yes	No	No
Coding can be	No	No	Yes	Yes	Yes

automated

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B. Costs					
<b>Preanalysis Costs</b>					
Person-hours spent conceptualizing	Low	High	High	High	Low
Level of substantive knowledge	Moderate/High	High	High	High	Low
<b>Analysis Costs</b>					
Person hours spent per text	High	High	Low	Low	Low
Level of substantive knowledge	Moderate/High	Moderate	Low	Low	Low
<b>Postanalysis Costs</b>					
Person-hours spent interpreting	High	Low	Low	Low	Moderate
Level of substantive knowledge	High	High	High	High	High

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If human coding can be replaced by reliable content analysis technology, it will increase the credibility of content research (King&Lowe, 2003). Table 4-3 shows several ways to code based on topics, and compares the research assumptions and costs required (Quinn et al., 2010). Every method has its own merits and defects. Reading is a method for content analysis, which requires the fewest provided assumptions but the highest costs. Human coding is frequently used in social science, but it requires high cost in early and middle stage, for it largely relies on coding framework and the understanding of the connections between categories. Dictionary-based coding decreases the process cost but requires highly on the provided assumptions—large amount of knowledge, and usually it is necessary to improve the coding dictionary by trial and error. The idea of supervised learning is to take a part of texts from the total corpus as a training data and another part as evaluation data. Machine-learning algorithms is then used to infer the mapping relation from text features to hand-coded categories in the training set. Success is evaluated by applying the inferred mapping to the test data and calculating summaries of out-of-sample predictive accuracy. However, supervised learning requires certain amount of manual coding (because larger amount of training data will theoretically provide higher accuracy), so cost of early stage is high as well. For this problem, professor Kevin and others from UC Berkeley developed a topic model (Quinn et al., 2010). This model is actually a way of unsupervised learning, which significantly decreases cost before and during the

analysis. The theory of the topic model is to consider texts as the vectors of words. The words accompanied with their own frequencies of occurrence and the amount of texts can be stacked together in a matrix. Finally, the Bayesian Inference method will be used to cluster the texts.

The number of target texts in this thesis reaches 5667. Traditional human coding cannot guarantee the accuracy of analysis in dealing with such large amount of texts. In the meantime, the research on issue evolution is a discovering process, so it is not possible to set a coding framework in advance. Hence, it is unable to use supervised learning method to analyze texts, because the training data cannot ensure all the knowledge in texts could be learnt. Therefore, this research has to redesign an unsupervised learning approach based on the above analyzing paths.

The subject of this research is the issue attention of climate change with the main focus on the attention level and dimensions. The numeric feature is to measure the level of issue attention and constitutive feature is to measure the dimensions of issue attention. As for methods of content analysis, the subject is text data formed by natural languages, and the basic units of natural language are words with certain meanings. Dictionary-based content analysis, supervised learning and topic model, all of them establish their calculating model using words as basic operative objects. Hence, this research will continue along this idea for content analysis to design the method.

#### 4.2.3 Techniques for measurement

After choosing the technique approach, the specific techniques for measurement should be identified. As explained above, words are the basic units for computer to do content analysis. Keywords, on the other hand, is the essential variables which need to be identified in the analysis. In this study, the level and dimensions of issue attention can be extracted through measuring keywords in the text. As is told by Jones and Baumgartner, policy space is made up by policy alternatives and attributes of policy; and policy attributes are the interpretations on issue, including heuristic simplification (Jones&Baumgartner, 2005b). The final presence of simplification is the keywords in policy discourses, so it is possible to trace attributes of policy issue through keywords. Hence, the goal of measurement of issue attention should begin with extracting keywords from texts.

Keywords extraction includes supervised methods and unsupervised methods; for

the supervised methods, it is necessary to manually decide whether a word is the keyword, so this process is not only very time-consuming, but also makes it easier for human coders to make mistakes without the global knowledge about corpus. Therefore, this research chooses unsupervised method. As for this approach, methods based on word frequency and on graphics are usually used.

The basic logic of method based on word frequency is that the more frequently a word appears in one text, the more important it is and the more likely it would be a keyword. A famous method is term frequency-inverse document frequency (TF IDF for short). In TF IDF, the importance of a word grows with the frequency of occurrence in the text, but declines with its frequency of occurrence in the overall corpus. This is because when a word appears more in the corpus, its representativeness of heterogeneity of texts becomes worse.

$$\text{TFIDF} = \text{tf}(t, d) \times \text{idf}(t, d) = f(t, d) \times \log \frac{N}{|\{d \in D: t \in d\}|}$$

The equation above is the basic calculation of TF IDF. The first term of it indicates the frequency of occurrence of the word  $t$  in a text  $d$ ; it could be absolute frequency, or defined by research objective. The second term is the logarithm of the quotient of total number of texts and the frequency of occurrence of  $t$  in the overall corpus. One can calculate the TF IDF for all the words in corpus, and sort them according to TF IDF. Then some words with high TF IDF would be selected as keywords. Although TF IDF is a relatively convenient unsupervised method, it deliberately breaks the connections between the words in texts, and deal with all the texts homogeneously. As a result, it ignores the internal logic that natural language is a tool for communication, so it would bring about large errors. Another even more serious problem is that TF IDF relies too much on the total corpus; when the total texts change significantly, so does the IDF, and keywords of texts would also change. This is obviously contrary to the common logic that keywords should only depend on their use within the text.

In the field of information retrieval, the founding fathers of Google, Page and Brin, have come up with an idea to sort webpages. They think that the importance of a webpage is determined by the importance of the webpages that have linkages with it, which means the more and the more important the webpages could link another to be evaluated, the more important this webpage would be (Page et al., 1999). PageRank's big success in web search has inspired researchers of natural language processing. In 2004, from the

basic ideas of PageRank, Mihalcea and Tarau have come up with a graph-based calculation method for texts keywords extraction, TextRank (Mihalcea&Tarau, 2004).

The basic idea of TextRank is to consider texts as the network formed by words, and the linkage between nodes is the semantic relation between words. Like PageRank, TextRank thinks that the importance of a word is determined by the importance of words that could link this word (Mihalcea&Tarau, 2004). Hence, the basic procedures of TextRank are: 1. identify text units that best define the task at hand, and add them as vertices in the graph; 2. identify relations that connect such text units, and use these relations to draw edges between vertices in the graph; 3. iterate the graph-based ranking algorithm until convergence; 4. Sort vertices based on their final score. Use the values attached to each vertex for ranking/selection decisions.

We are using a co-occurrence relation, controlled by the distance between word occurrences: two vertices are connected if their corresponding lexical units co-occur within a window of maximum N words, where N can be set anywhere from 2 to 10 words. The words' score could be calculated by the equation below (Mihalcea&Tarau, 2004; Page et al., 1999).

$$WS(V_i) = (1 - d) + d \times \sum_{V_j \in In(V_i)} \frac{w_{ji}}{\sum_{V_k \in Out(V_j)} w_{jk}} WS(V_j)$$

where  $In(V_i)$  is the set of vertices that point to  $V_i$  (predecessors), and  $Out(V_j)$  is the set of vertices that vertex  $V_j$  points to (successors). The  $w_{ji}$  indicates the “strength” of the connection between the two vertices. The  $d$  is a damping factor that can be set between 0 to 1, which has the role of integrating into the model the probability of jumping from a given vertex to another random vertex in the graph; the factor  $d$  is usually set to 0.85. This model is a iterative model. After the vertex graph is set, each vertex is given the same initial score and the weighed score for each can be obtained after the convergence of iteration. The importance of keywords could be indicated by the weighted score.

The graph-based keywords extraction method of TextRank performs better than the former supervised calculation and TF IDF. Compared with TF IDF, TextRank takes the internal connection of natural languages within texts into account, and the extraction results of keywords only lie on the text itself with nothing to do with the total corpus, which ensures the stability of keywords extraction. Graph-based model has become the

mainstream of unsupervised keywords extraction methods. Lots of studies based on TextRank employ more knowledge to help filter and rank keywords, for example, to consider the role of texts' titles in identifying keywords (Li et al., 2010).

### 4.3 Process of Measurement

After the data source and technique approach has been chosen, it is necessary to link them together reasonably according to research goal in order to realize the rational measurement on policy issue attention. This part will mainly present the process for measuring issue attention of China's climate change.

#### 4.3.1 Database Building

In 4.1.3 Data Source of Research, this thesis analyzed the possibilities of the data sources for the issue attention of China's climate change, and finally People's Daily, the official newspaper of the national highest decision-making institution, is chosen as the data source; this guarantees both the accessibility and continuity of data for longitudinal analysis. The research object of this thesis is issue on China's climate change, so first it is necessary to retrieve literatures related to climate change in the database. In studies of issues on climate change, there are two strategies to determine the retrieval keywords for research data collection—broad and narrow. The narrow retrieval method is to only take keywords closely related to climate change into consideration, like some researches that only use climate change, global warming and greenhouse gas as their keywords (Ahchong&Dodds, 2012; Grundmann&Scott, 2012; Takahashi&Meisner, 2012; Xinsheng Liu et al., 2011). The broad method would not only use the directly relevant retrieval keywords, but also consider keywords with close or similar meanings, like some researches that use the Boolean Search as follows (Schäfer et al., 2014; Schmidt et al., 2013):

```
(climat! W/5 (chang! OR catastroph! OR disaster! OR transform!  
OR adjust! OR trend! OR warm! OR heat! OR cool! OR variab!)) OR  
(greenhouse! W/3 effect!) OR  
((global! OR earth! OR world! OR international! OR hemisphere!)  
W/5 (warm! OR heat! OR cool! OR chill!)) OR  
((temperature! W/5 (global! OR earth! OR world! OR international!
```

OR hemisphere!) W/8 (increas! OR rising! OR rise! OR decreas!))

The retrieval method above considers not only keywords that have the same meaning with “climate change” like “global warming”, but also words with internal connections, weather related words like “disaster”, “change”, “trend”, and temperature related words like “increase”, “rise”, and “decrease”. Relatively narrow retrieval plan would have higher rate on verbal consistency while broad one could enlarge the capacity of corpus with semantic consistency, which would ensure those texts that refer to but indirectly mention climate change to be included in the corpus.

For the sake of better accuracy of retrieval keywords, this research first use three retrieval keywords—climate change, global warming and greenhouse gas, narrow but with no confusing meanings, to do full-text search in the databases of China National Knowledge Infrastructure (CNKI). The system of CNKI will recommend a series of alternative keywords according to the consistency between retrieval keywords and the database keywords collection. After screening, comparing and confirming the alternative keywords, the final retrieval plan is as followed:

FT=(气候变化+气候变暖+温室效应+温室气体+全球变暖+地球温度+气候变迁+气候变动+气候转变+全球环境变化+气候环境变化+年平均气温) and LY=人民日报

According to this retrieval plan, in CNKI newspaper database<sup>①</sup>, texts with any of the keywords which appear in text have been searched out. In CNKI newspaper database, there is only the digital source of People’s Daily between 2000 and 2013, so the data before 2000 need to be searched in People’s Daily graphic version (Green Apple) database<sup>②</sup>. The retrieval results are 5667 texts. The database does not provide batch downloading service, it is the only way to manually download every text one by one to construct the data collection. It is an extremely heavy and tedious preparation work. After the downloading work is done, the corpus for unsupervised learning content analysis is ready.

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① CNKI newspaper database: <http://epub.cnki.net/kns/brief/result.aspx?dbprefix=CCND>

② People’s Daily graphic version (Green Apple) database is co-built by People’s Daily information center and Green Apple data center, and published by Central Party Literature Press. Link: <http://rmrb.lib.tsinghua.edu.cn:918/WEB/INDEX.html>



### 4.3.2 Keywords Extraction and Design for Weighting Scores

Although keywords extraction through TextRank is the core technique of content analysis, it is also necessary to connect the development of issue attention with realistic background and researchers' judgments so as to reduce errors in unsupervised learning process. This part will mainly present the procedures of conducting content analysis.

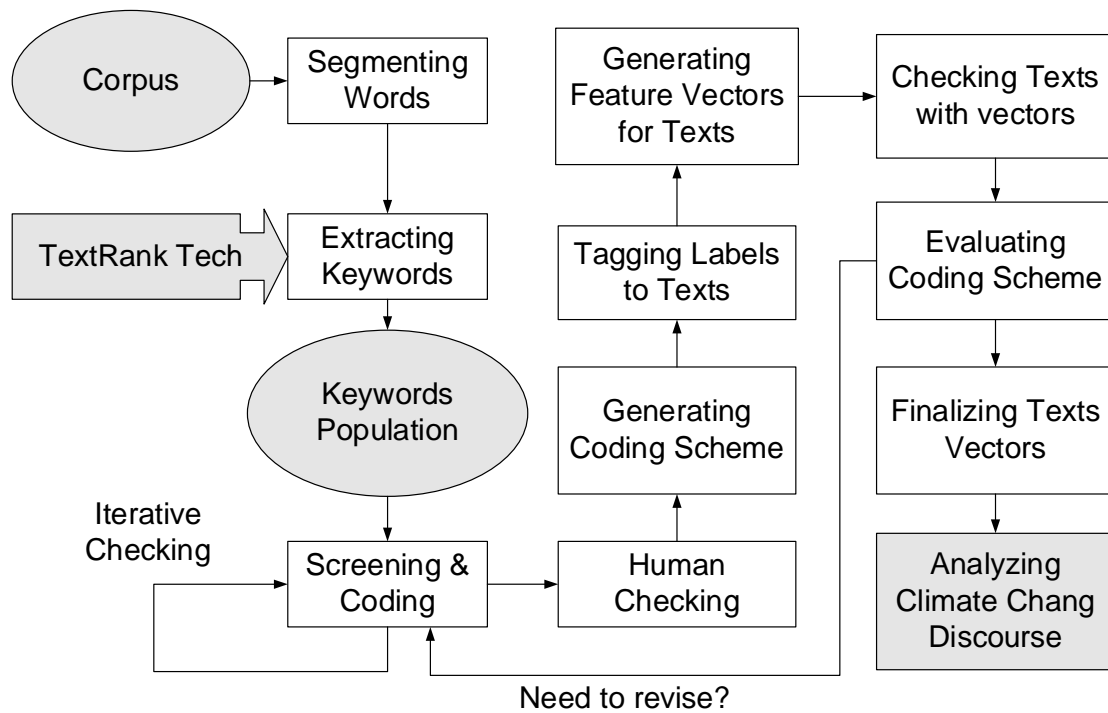


Figure 4-4 Procedure and framework of content analysis in this thesis

#### 4.3.2.1 Chinese Segmentation and Keywords Extraction

It is very different to conduct content analysis on Chinese texts compared with English. For Chinese, the first challenge is the segmentation of language. Since there is no space between words, segmentation becomes the most important step before keywords extraction. The method of segmentation of Chinese is an essential research question in natural language processing. Existing methods include dictionary matching, context matching, and marking-based segmentation; dictionary matching method uses dictionary as the learning collection to segment Chinese sentences; context matching means that it is more likely to be a word if the co-occurrence of characters in the context is frequent; marking-based segmentation is to do sequence labeling on text content, and segment sentences by maximum entropy model (Xue, 2003) or conditional random fields model (Peng et al., 2004), the advantage of which is to significantly improve the recognition

performance on ambiguous and new words. This thesis used natural language processing tool for Chinese from Fudan University to conduct Chinese word segmentation.<sup>①</sup>

Keywords extraction from all texts would be done after the word segmentation. This research uses graph-based TextRank technology to extract keywords from 5667 texts of the corpus. To make sure that the words with key information can be extracted from the texts, this research increased the numbers of extracted keywords to 50. It ensures that there are still enough keywords with meaningful information remained after removing the possibly existing noises, which increases the total accuracy of keywords extraction. With TextRank technology, all the keywords and the weighted scores that indicate their importance have been outputted into files and keywords vectors of texts are then generated. The maximum weighted score for every text is standardized to 100.

#### 4.3.2.2 Relative Importance Weighting Factors

Keywords extracted through TextRank can represent the key information embedded in context. Yet, texts published on People's Daily vary on their importance. For it is an extremely political newspaper, the most important articles would be placed at front page, while the less important would be at behind and trivial be in the back. Therefore, the weight of pages should also be taken into consideration to show the difference of importance of texts. For media attention, in the former analysis, some would only care whether the text is on the front page, and assign the texts of front page twice the weight as other pages. This dichotomy of weight assignment is commonly seen in research (Koopmans&Vliegthart, 2011; Vliegthart&Boomgaarden, 2007). However, the accuracy of distinction on the importance of pages is not realized by this dichotomy. For such a newspaper showing the sequence of political importance, homogenizing the second page with pages behind is not reasonable. Except for simple dichotomy, it is also possible to consider linear diminishing or reciprocal diminishing to differentiate importance; the problem of the former one lies on how to decide the speed of attenuation while the idea that the importance drops with the sequence does not reflect in the weight; the latter one's problem is that the speed of reciprocal attenuation is too fast. Hence, it is necessary to determine a weighting function that reflects the importance of the front page, and simultaneously shows that the gradual decreasing of the importance as well as the speed of the decreasing.

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① FudanNLP: <https://code.google.com/p/fudannlp/>

In information retrieval, it is commonly seen to use DCG (Discounted cumulative gain) to measure the quality of sequence. It is used to measure the usefulness, or gain, of the information based on its position in the result list. The basic assumption of DCG measurement is that texts with higher ranks are more useful and more important. Normally, CG (Cumulative Gain) can be measured by  $CG_p = \sum_{i=1}^p rel_i$ , in which  $rel_i$  is the graded relevance of the result at position  $i$ . This equation reflects the idea of accumulation, yet not takes the assumptions of DCG measurement into account. After considering the marginal diminishing effect, DCG could assign weight through the calculation below:

$$DCG_p = rel_1 + \sum_{i=2}^p rel_i / \log_2^{(i)}$$

In the equation above, the feature of marginal diminishing of accumulation effect is presented by the reciprocal of logarithm. Based on this, this research uses the equation below as weight value of the importance of pages, where  $W_{page}$  is the weight of a page and  $page$  is the number of a page.

$$W_{page} = \frac{1}{\log_2(page + 1)}$$

Besides pages, the length of a text is also an index of importance, for the pages and capacity of newspaper is limited, which means that the more words a single text has, the more attention it occupies. However, the marginal change caused by length of texts in increasing effective information should decrease progressively (Koopmans&Vliegenthart, 2011). Hence, this research uses logarithm of text length as the weight of the importance in newspaper affected by text length.

$$W_{length} = \ln(length)$$

In the equation above, the  $W_{length}$  is weight of text length, and  $length$  is measured by the number of words of the text.

Finally, the importance of the keywords is the product of the weighting score calculated from NLP and their relative importance between texts.

### 4.3.3 Setting Coding Scheme and Coding Process

#### 4.3.3.1 Keywords Extraction

After extracting keywords, all the keywords of texts form a keywords population

which is the basis for screening and coding in this research. 22861 keywords have been extracted from all these texts. To code all the keywords would give rise to extremely heavy workload, meanwhile excessive information would bring about too many noises, so it is necessary to code and screen the most important keywords. This research believes that the relative importance of a keyword in the keywords population can be indicated by the sum of its scores. The most important keywords for the corpus could be selected after ranking the keywords by adding up the total scores. The ranking result is shown in Figure 4-5.

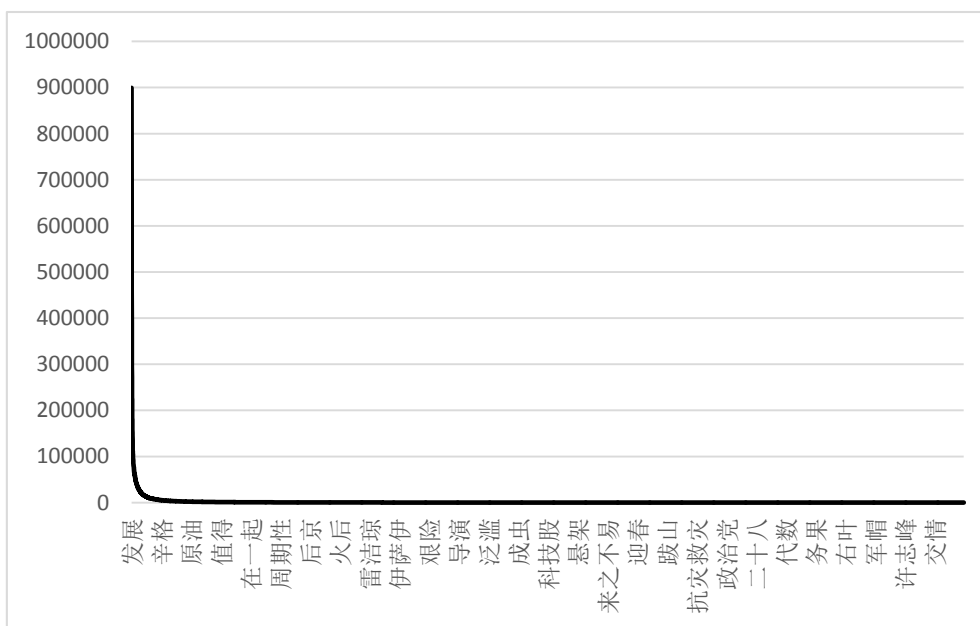


Figure 4-5 Exponential declining trend of scores for keywords

From the figure above, it is obvious that the scores of keywords diminish very fast after considering the weight on pages and length of texts. This actually brings benefit to this research; it means that the process could be simplified through removing keywords with lower score, which would only account for a small percentage of the total scores. In this research, the top 1000 keywords are selected and their scores account for 0.7857 of the total, which means most information has been remained after removing other keywords. Considering that after assigning weight on pages, scores of those keywords that appears in the back pages have been reduced, so scores of the top 1000 keywords without taking location weight into consideration take up 0.7686 of the total. It is obvious that weight on pages would not significantly affect the diminishing trend of scores for keywords.

Moreover, this study conducted calculation on the remained 1000 keywords of coding scheme in two ways—with and without weight on pages, in order to ensure the validity of research method. The result shows that there are only less than 5% of differences in coding scheme, which would not have significant impact on coding results. To further reduce the differences, this research have chosen a subsection weighting method and selected 1000 keywords for coding scheme.

#### 4.3.3.2 Coding

Natural language processing technique greatly simplifies coding, but for the reason that actual extracted keywords are separated from their original context, it is a challenging work to classify and code the ambiguous keywords during the coding process. This research followed a relatively conservative strategy for coding, because during the unsupervised keywords production, the actual meanings of certain words need to be confirmed with context. Hence, those ambiguous or highly context-depending keywords should be wiped out from the candidate lists to ensure the accuracy of the meaning. This method runs the risk of filtering out the possible important information. Yet, considering the costs of trial and error that the ambiguity and the uncertainty would bring about, this research determines to wipe them out.

The process of coding is to understand, analyze and classify the keywords. The goal of this process is to cluster the key points with consistency from the issue discourse system, in order to generate knowledge at macro level based on the judgments on micro elements. This process requires researchers with relevant knowledge about climate change to make judgments more consistent with the connotation of this issue. The principle of keywords coding and clustering is to discover both the main discourse features of climate change issue and the dimension features of it. In this research, issue dimension is analyzed through topics related to and embedded in climate change issue. This process is the process of iteration with repeated check and confirmation in which coding scheme would emerge. To avoid the individual bias during the research process, crosscheck method is used to increase the accuracy and validity.

#### 4.3.3.3 Construction of Text Vectors and Text Library Matrix

The coding scheme makes it possible to transform the chaotic text keywords vectors into feature vectors for texts with limited dimensions. As for the whole text library, it has

been transformed into a matrix that describes discourse features of climate change issue with limited dimensions through the idea of clustering. To achieve such transformation, this research put corresponding tags of each keyword on each text, and assigned each tag a score that comes from the weighted scores of the same tag from every text. By marking every text, transforming all the texts into a matrix within limited dimensions as mentioned above is achieved, which enables analysis and calculation.

One effective way of preliminary evaluation on coding scheme is to test the off-target rate, which means to check whether it treats too many texts as noises by mistake due to a too narrow tag selection range. It is examined by the ratio of the number of texts with no tag compared with the total texts. After examination, there are only 6 texts without tags, accounting for only 0.001 of the total texts, which means only 0.1% of the total texts would be eliminated. So it has proved that the present keywords extraction number (50 keywords per text) and the coding scheme are effective in content analysis and dimension integration on texts. Of course there is tradeoff—with the increasing of the number of keywords extracted, the noises would increase as well and this would bring about side effect on research; when keywords are not enough, the system errors and the random errors of the calculation could not be diluted effectively, which would also cause huge errors on analysis. Therefore, the number of keywords to be extracted cannot be too large or too small.

The sections above are all about the ideas, paths and methods of measuring issue attention on climate change. The difference between this methodology and it in past research is that it standardizes and systematizes heterogeneous and complicated texts by extracting the keywords and transforms them into vectors which can represent the essential meaning and characteristics of texts. As the this process is inductive in substance, it may produce more interesting discoveries than expected.

## Chapter 5 Analysis on Attention Evolution of Climate Change Issue in China

### 5.1 A Macroscopic Description on Issue Attention on Climate Change Issue

#### 5.1.1 Conceptual Framework of Issue Attention

Issue attention means the attention paid to one certain issue among all the issues in decision-making system. The research on attention remains one important branch of behavior science and decision-making process, because the acquisition and distribution of attention start the first step of behaviors. D. E. Berlyne defined attention as “the process or condition that determines the effectiveness of a particular stimulus in organisms(Berlyne, 1974). Moray pointed out the seven usages of attention, including mental concentration, vigilance, selective attention, etc.(Moray, 1970). Therefore, from the point of behaviors, attention invariably associates with selectivity. Due to the limited cognitive ability of human (Simon, 1965), and the influence of new information on human cognition from new information, the relation between limited cognitive processing abilities and selectivity of attention becomes one of the focuses in decision-making process (Alan, 1989). In the perspective of policy process, each step of decision making involves distribution of attention, which would make some dimensions get attended to and others get ignored (Jones, 1994).

In choice model, the production of policy choice will go through four stages (Jones&Baumgartner, 2005b), as shown in Figure 5-1. The first one is recognition (individual level) and agenda setting (system level) stage when policy makers keep an eye on some possible problems around, try to understand the problems presented by environment, prioritize them, and determine which will be addressed and which can be ignored. The second stage is characterization or definition stage in which decision makers construct a “problem space” to identify the possible dimension and attributes of issues, and to determine the distribution of focus and attention. The third stage alternative or proposal and debate stage provides potentially useful alternatives from previous solutions or new plans according to the series of attributes given by the second stage, in order to construct the “solution space”. The fourth one is choice stage when policy makers select and then implement the final decision. During this whole process, policy makers have to

go through three spaces, namely “problem space”, “attribute space”, and “solution space”. Thus, because of the serious bottleneck of attention, agenda setting is simply the process by which that scarce attention gets allocated (Jones&Baumgartner, 2005b). Also due to the different weights put on various dimensions or attributes, the same social problem could bring out different policy choices.

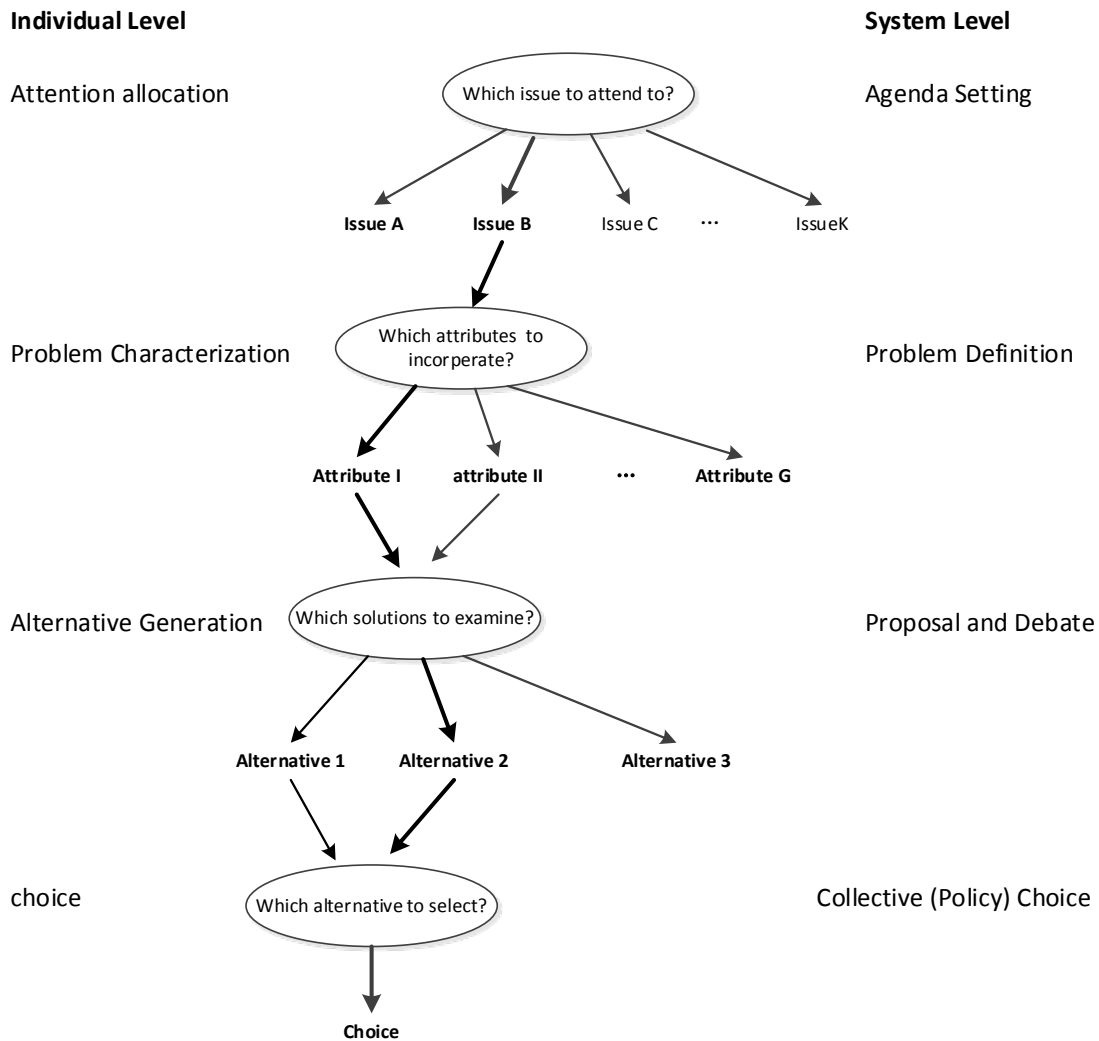


Figure 5-1 Logic of decision making in behavior science

Through an empirical study, this research will focus on the attention distribution of issue space and attribute space, which is the dynamic mechanism of policy attention in the beginning part of the policy process. In chapter 4, this study divided the focal point of attention into numerical and structural attributes. In Jones and Baumgartner’s research,



they indicated that policy characterization synthesized a series of attributes and the weights distributed to them, so actually this study inherits dimensional concepts of issue attention from their research (Jones&Baumgartner, 2005b). Dynamics attaches importance to the complex characteristics of a system, reflected in feedback, inventory, stocks and flows, and nonlinearity. Those characteristics are presented at time dimension, thus researches on dynamics require longitudinal analysis, only with which could the intrinsic mechanism be reconstructed and studied. This chapter will be analyzed based on the above thought.

### 5.1.2 An Macroscopic Description of China’s Climate Change Issues

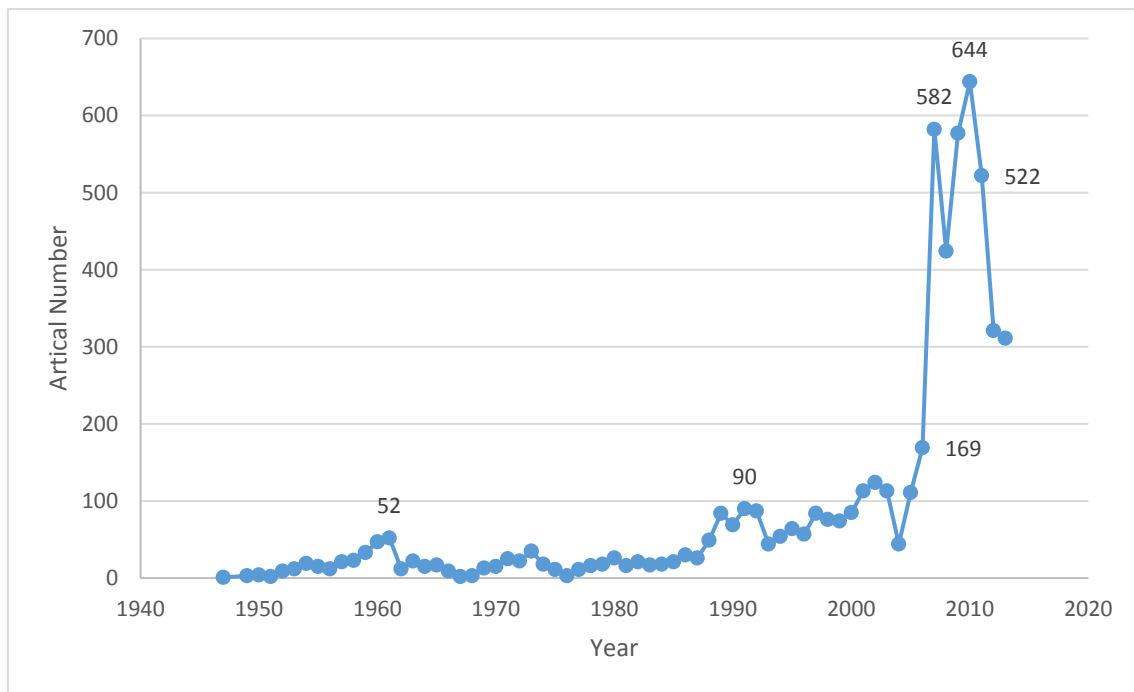


Figure 5-2 Annual number of articles relating to climate change

In Figure 5-2, based on data sample extracted from the *People’s Daily*, the annual number of climate change related articles present gently stable first, then rocket to the peak in a sudden, and finally go downhill, which in a long term, resembles the trend of issue attention cycle proposed by Downs (Downs, 1972). According to the issue attention of climate change calculated through content analysis, the concern on climate change issue remained at a low level before the end of 1980s, and a slight peak appeared around 1960s. In the late 1980s, the overall attention to climate change issues greatly soared, directly associated with the widespread of attention in the science community and the

transfer of climate change from a scientific problem to a policy issue (Chmutina et al., 2012; Liguang, 2011). The attention to climate change surged in and after 2006, mainly due to the combined influence of many factors, including the increase of China's greenhouse gas emissions, the urgency of international agenda of coping with climate change, etc. After slightly dropping down, this issue attention reached its peak in 2009 and 2010, which shows not only China's great pressure of being world's biggest greenhouse gas emitter, but also the push of a series of international agendas, the Copenhagen Climate Change Conference included, to climate change attention since the year of 2009. Yet since then, the number of related texts of climate change has declined because it does not belong to the core agenda. It's no wonder that the attention could not help but fall down when the driving factors are weakened.

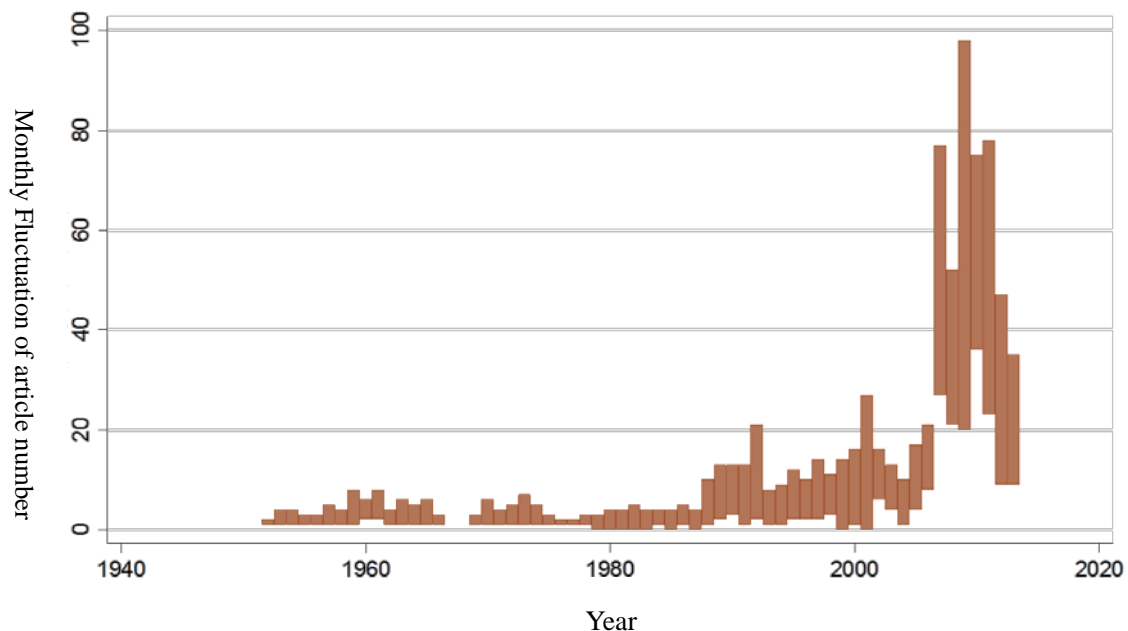


Figure 5-3 Monthly fluctuation of article number relating to climate change

Texts relating to climate change reveal not only changes of different years but also fluctuation in different months of a year. So is the case in the higher attention years (as shown in Figure 5-3). Thus it's necessary to focus on the dynamics of issue attention both in the short term and long term, which makes best use of the related information about issue attention extracted through content analysis.

## 5.2 From 1947 to 1977: “Climate Change” in the Perspective of Meteorology

### 5.2.1 Component analysis on dimensions of attention on climate change

In today’s context, the issue “Climate Change” has already become a terminology, which denotes the change of climate due to human activities in the light of the United Nations Framework Convention on Climate Change.<sup>①</sup> Through content analysis, however, it’s found that “Climate Change” had appeared before 1980s when scientific communities and decision makers noticed the global warming resulting from greenhouse gas emissions. Originally, it had already existed in the issue spaces. Among all the texts, the very first modern meaning of climate change, as defined by UNFCCC, appeared in the article *Discussion on the World’s Climate Change* published on People’s Daily, in which for the first time the scientists mentioned the impact of “warming effect” to earth climate caused by human activities (张家诚, 1977). But previously, “climate change” was referred to as weather changes in long time or on large scale, rather than greenhouse effect caused by human activities. Therefore, the attention shift of this issue began with the transformation of connotation of climate change since late 1970s. However, in previous studies, it’s simply taken for granted that climate change is equivalent to global warming, which may result in some biased understanding of issue evolution of climate change.

Figure 5-4, Figure 5-5, and Figure 5-6 compare the absolute values of attention dimensions of climate change issue, in which each sub-figure includes the climate change dimension itself as benchmark, and other dimensions are compared just based on it. In the upper Figure 5-4, among all the dimensions of issue attention to climate change, the climate change itself (as mentioned above, here it means weather changes in long time or large scale) took the dominant position. Other dimensions, including safety, urban policy, innovation, and development occupied comparatively small absolute value in terms of attention weights, among which the dimension of development ranked higher and vibrated more. According to figure, there exists some similarities between the fluctuation of climate change dimension and development dimension; the relation of the two could be proved in later analysis on correlations of attention dimensions. In the middle Figure 5-4, two dimensions including climate change and engineering construction were assigned more considerable weight compared with other dimensions. In the lower Figure

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① UNFCCC defined climate change as a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.

5-4, the environment & ecology dimension and education & research dimension almost equaled the climate change dimension, among which the environment & ecology held a higher value.

Through the upper Figure 5-5, we could see that dimensions of economy and military occupied bigger weight. The important reason lied in the climate change's direct impact on agricultural production and economic development, especially in this agriculture-dominated economic era. And why military became an important concern attributes to the fact that military issues remained a significant agenda and concern at that historical period. The relation with climate change was mainly reflected through strengthening military training and military struggle to improve the ability of fighting against climate change (extreme weather events). In the middle Figure 5-5, one dimension, agriculture & forestry, occupied a much bigger weight than any other dimensions, even the climate change itself included, which proves the close correlation between the weather change of large scale and for long time and agricultural production. As for the correlation of components in issue attention, climate change and agriculture & forestry could turn into a mutual attention dimension for each other, which proves, again, the huge importance of agriculture & forestry to climate change. Besides, it's worth noting that the dimension of agriculture & forestry peaked around the year 1960, due to the natural disasters and famines wide-spread in China at that time and causing sharp decrease of crop production. Thus when this dimension, agriculture & forestry, among all the other dimensions, reached a peak value, it then became a significant policy issue. The results of our analysis corresponded to the historical facts, which to certain extent verified the reliability of our research method. The lower Figure 5-5 revealed the high correlation between climate change dimension and meteorology dimension, which conformed to common sense for sure, since climate change, no matter as weather changes in long time or on large scale, or as global warming, represented a terminology and symbol of meteorology in the first place. So the close correlation makes sense. Among all the dimensions of issue attention to climate change shown in Figure 5-6, the dimension of natural disasters presented a similar fluctuated curve and similar magnitude of attention value to climate change. The peak value of both appeared around 1960, which also reflected the facts of frequent natural disasters in 1960s.

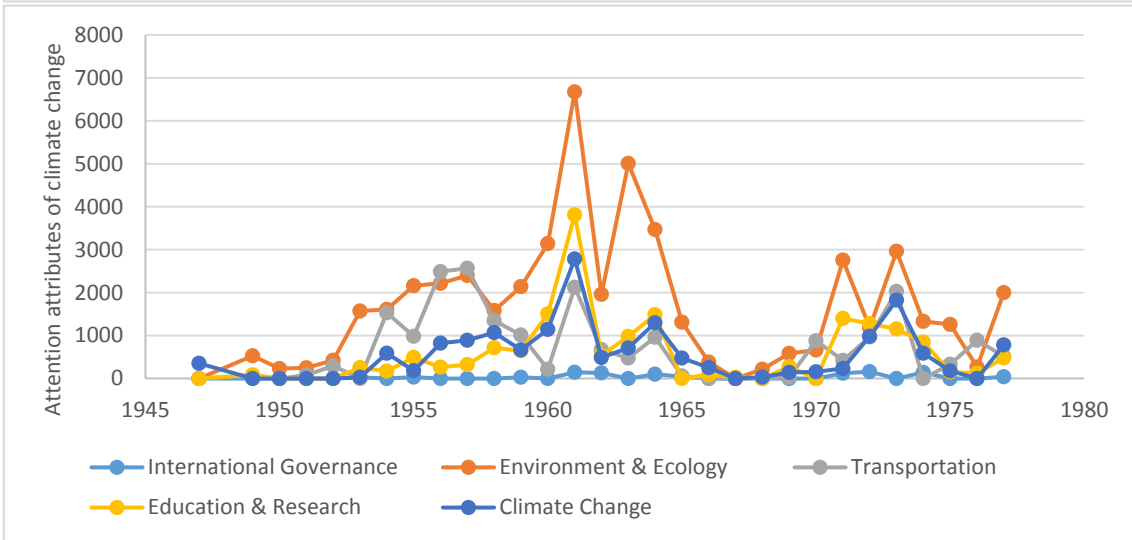
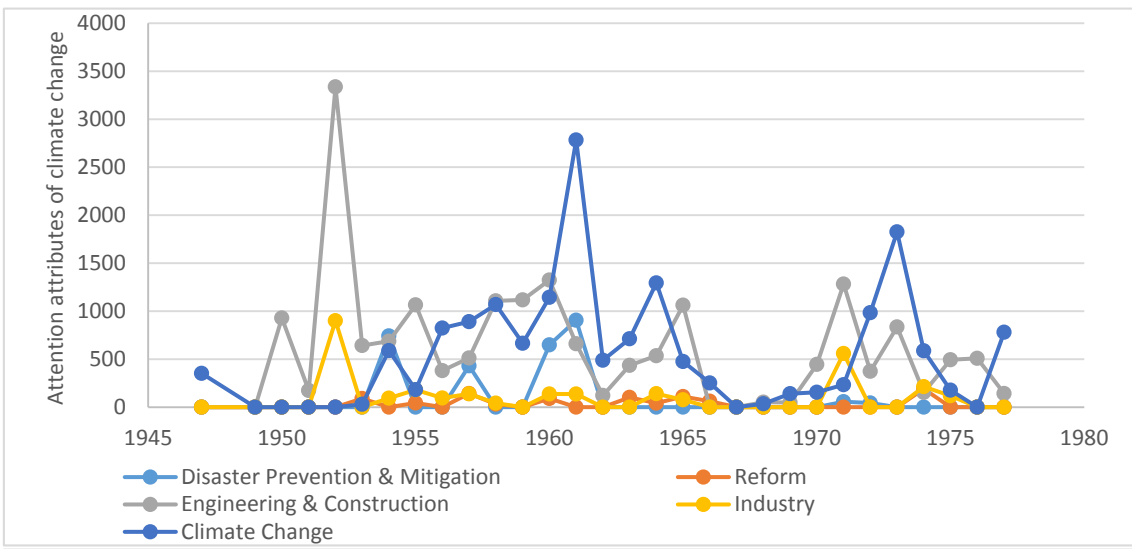
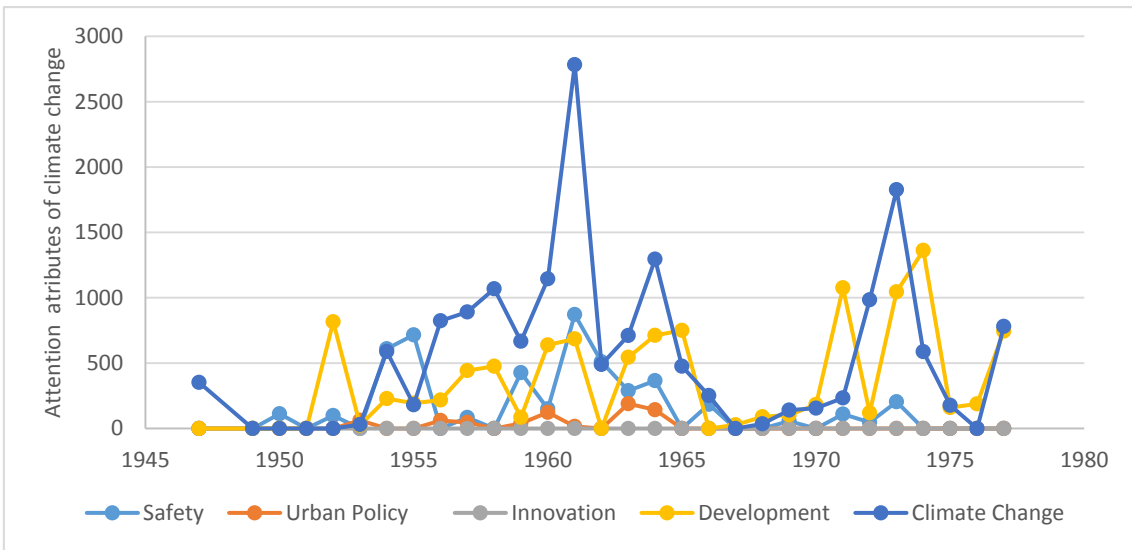


Figure 5-4 1947-1977 Comparative analysis on attention attributes of climate change (I)

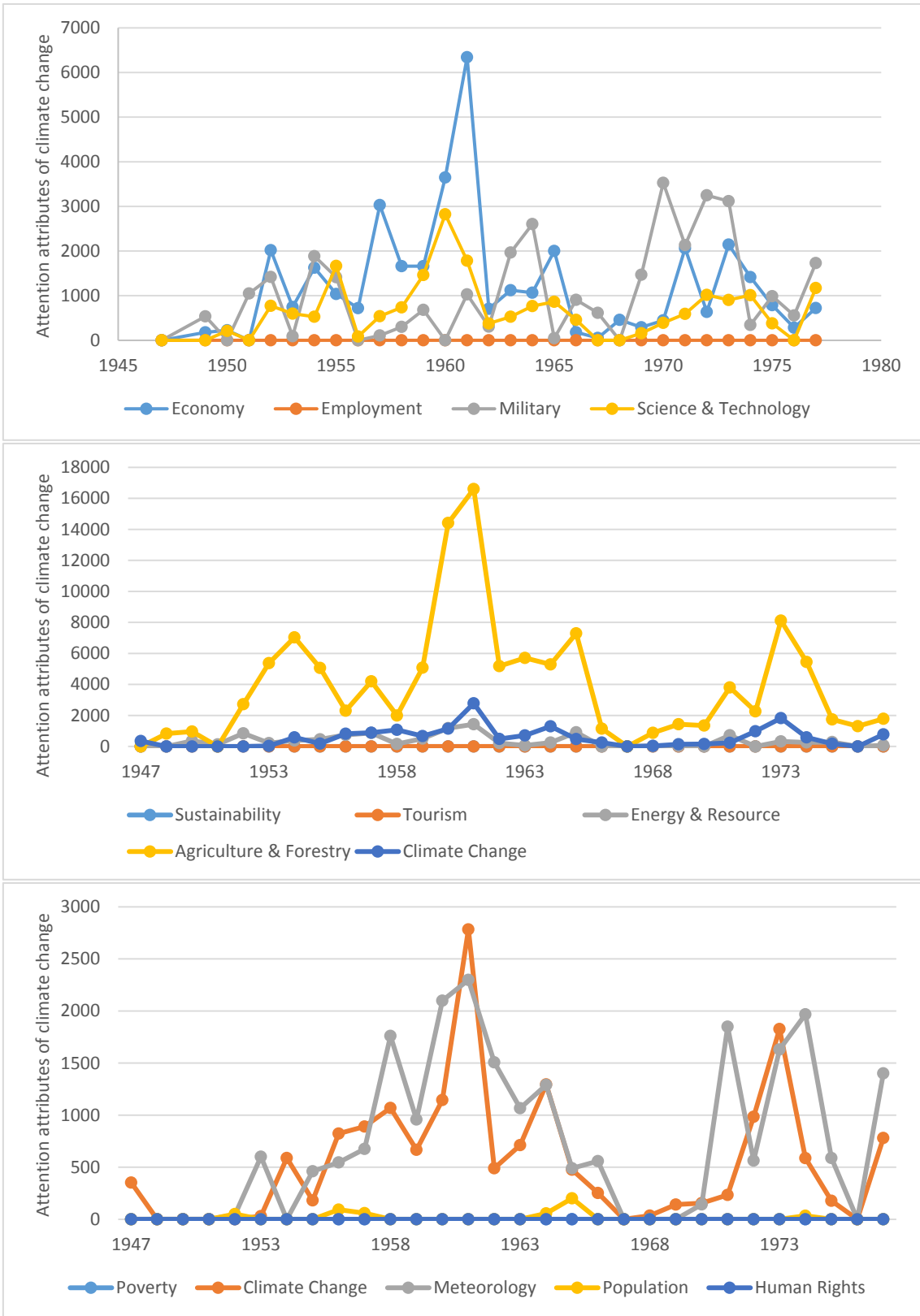


Figure 5-5 1947-1977 Comparative analysis on attention dimensions of climate change (II)

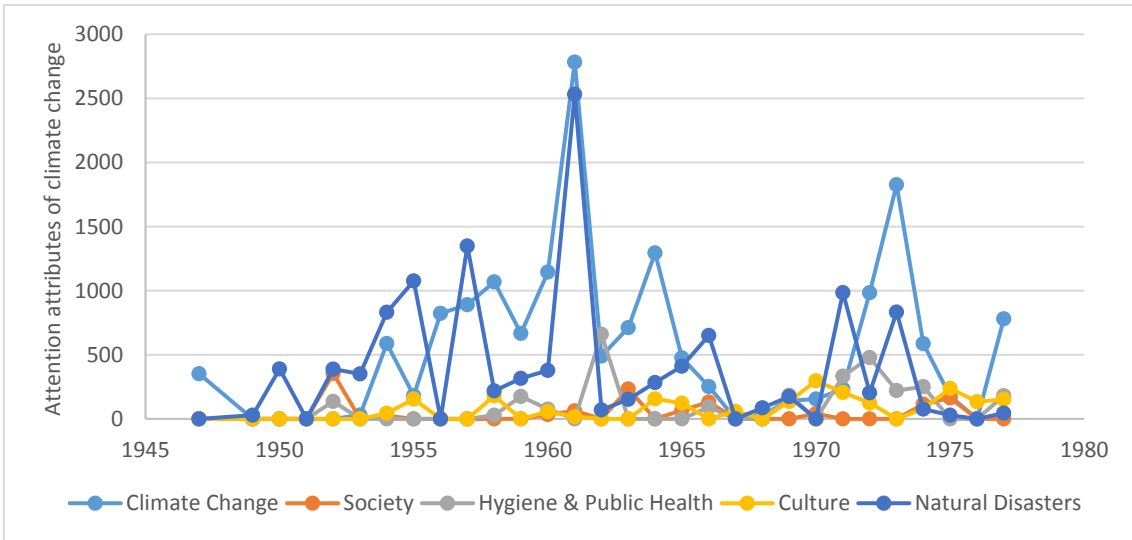


Figure 5-6 1947-1977 Comparative analysis on attention dimensions of climate change (III)

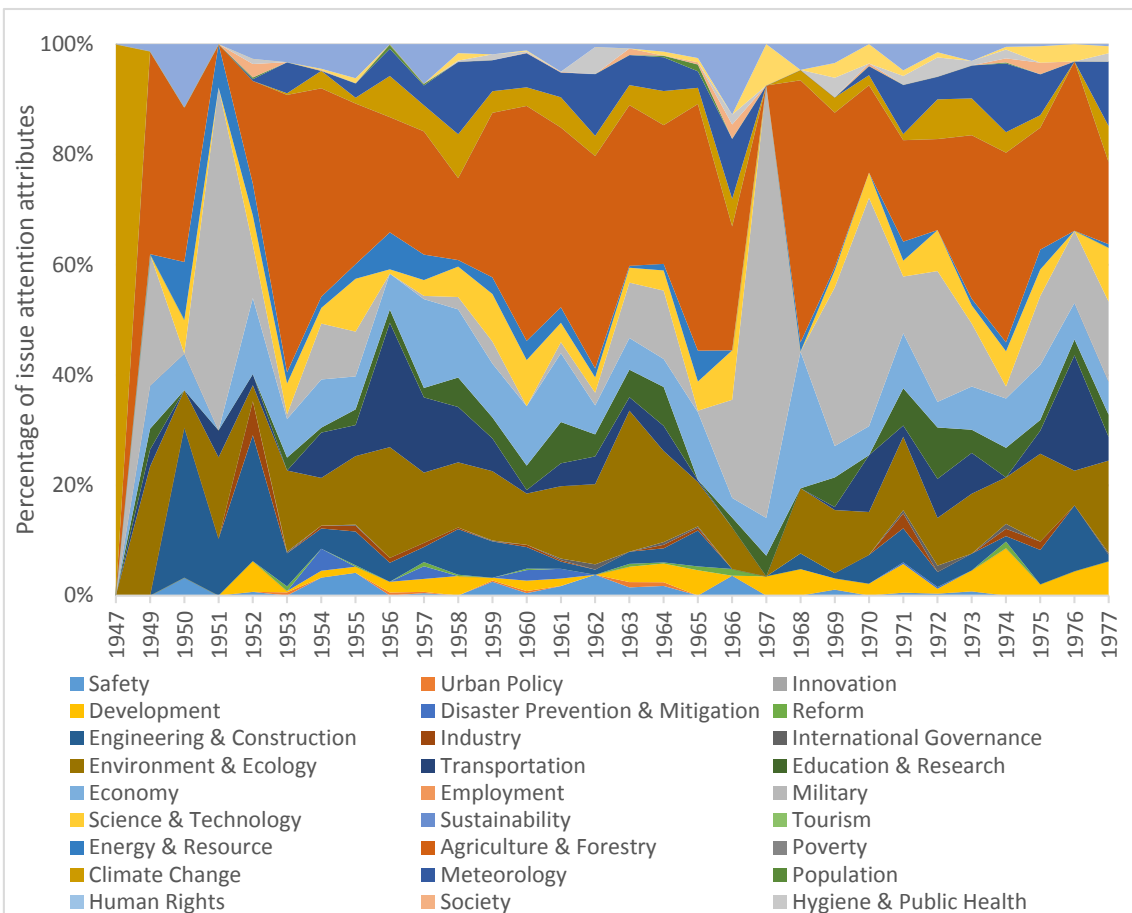


Figure 5-7 1947-1977 Accumulative percentage area diagram of climate change attention dimensions

Yet merely comparing the absolute values of each dimension of issue attention to climate change could not enable us to fully grasp the correlation, so it's essential to focus on the relative weights of different dimensions when analyzing these different dimensions. As shown in the accumulative percentage area diagram in Figure 5-7, wholly speaking, agriculture & forestry took up the majority among all those dimensions of issue attention, because policy makers paid more attention to impacts of climate change on agricultural production during such agriculture-dominated policy agenda. Except for extreme values in several specific years, agriculture & forestry dimension almost ranked a highest weight all throughout this period. In two exceptional years, 1951 and 1967, only two texts respectively relate to climate change, all in the theme of military due to the particular military-dominated situation in both two years. In addition, the attention dimension of environment & ecology also maintains a relatively high level of weight, for instance in 1963, there are many climate change- related texts mainly discussing issues about forests, water and soil.

### 5.2.2 Correlation analysis on dimensions of attention on climate change

Last section discussed the component characteristics of attention dimensions, with reference to the possible inner fluctuation between climate change and other dimensions. Accordant fluctuation indicated a relatively close correlation between climate change dimension and other dimensions in the issue of climate change. By contrast to understanding the constitution of attention dimensions of climate issue in the perspective of absolute and relative values, actually the correlation characteristics of attention dimensions in the timeline could reflect the long-term relation among issue dimensions. Therefore, this section will focus on correlation characteristics of attention dimensions in time scale to analyze issue attention of this stage.

In order to operationalize the relation among dimensions in the timeline, this research will apply cross-correlation to measure and analyze the data. Cross-correlation is an index used to measure the similarity between the fluctuations of two time series, and the coefficients of cross-correlation at level  $K$  will be calculated as follows:

$$r_{xy}(k) = \frac{C_{xy}(k)}{S_x S_y}$$

In which,

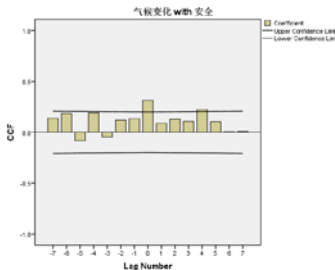
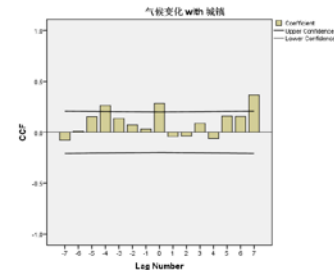


$$C_{xy}(k) = \begin{cases} \frac{1}{n} \sum_{t=1}^{n-k} (x_t - \bar{x})(y_{t+k} - \bar{y}), & k = 0, 1, 2, \dots \\ \frac{1}{n} \sum_{t=1}^{n+k} (y_t - \bar{y})(x_{t-k} - \bar{x}), & k = -1, -2, \dots \end{cases}$$

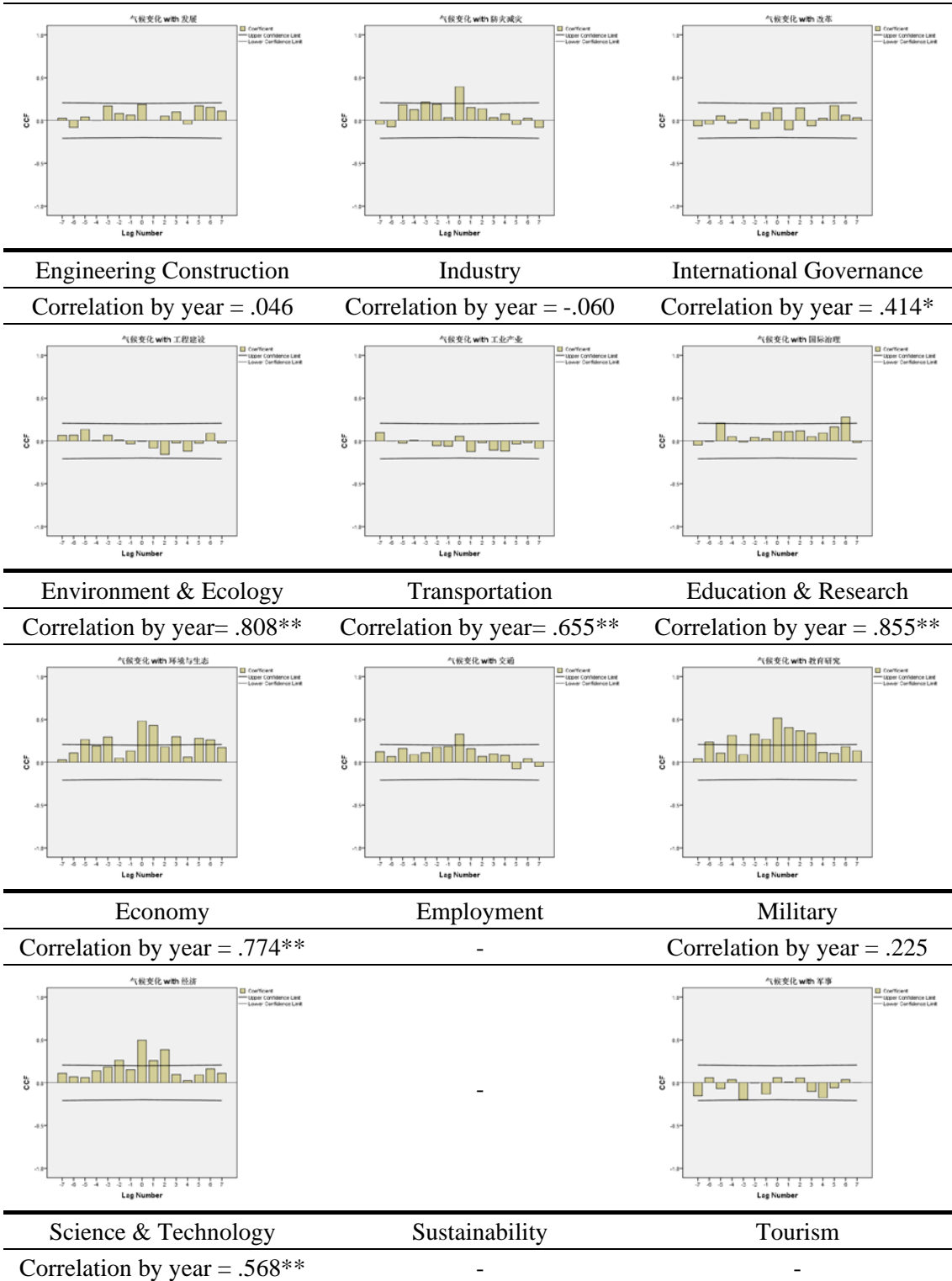
$$S_x = \sqrt{\frac{1}{n} \sum_{t=1}^n (x_t - \bar{x})^2} \quad S_y = \sqrt{\frac{1}{n} \sum_{t=1}^n (y_t - \bar{y})^2}$$

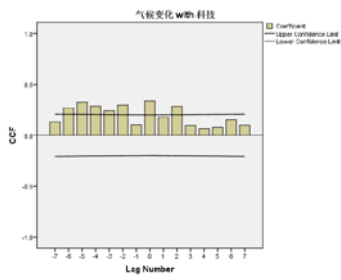
As shown above, cross-correlation coefficients could estimate not only current correlation characteristics but also lagged relevance of two time series. Therefore it can become a good indicator to estimate correlation of time series. In order to avoid the disturbance of noises due to too short time cycle setting, this study attempts to analyze the cross-correlation among dimensions in terms of years and quarters, and draw a cross-correlation diagram of climate dimension and other dimensions in climate change issue through SPSS. Considering the little significance of correlation generated by lagged term with bigger levels among issue dimensions, here we only analyze the correlation of lagged level 0 in terms of years, and of lagged level  $\pm 1$  in terms of quarters.

Table 5-1 1947-1977 Cross Correlations between attention on climate change and other dimensions (By year and quarter)<sup>①</sup>

Safety	Urban Policy	Innovation
Correlation by year=0.500**	Correlation by year = 0.278	-
		-
Development	Disaster Prevention & Mitigation	Reform
Correlation by year =0.468**	Correlation by year = .579**	Correlation by year = .083

① \*\*. Correlation is significant at the 0.01 level (2-tailed). \*. Correlation is significant at the 0.05 level (2-tailed).





Energy & Resource

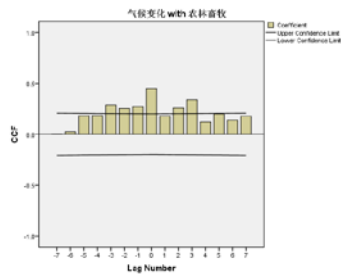
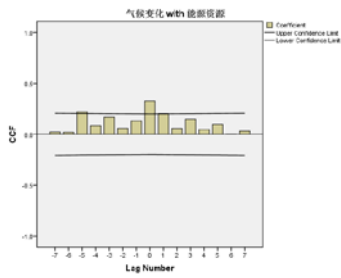
Correlation by year = .518\*\*

Agriculture & Forestry

Correlation by year = .747\*\*

Poverty

-



-

Meteorology

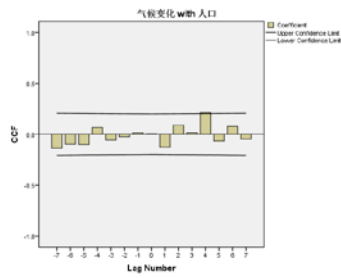
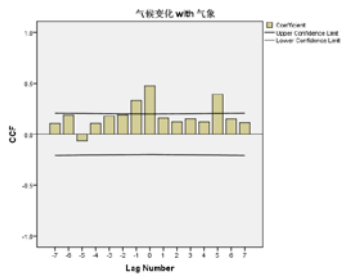
Correlation by year = .719\*\*

Population

Correlation by year = .056

Human Rights

-



-

Society

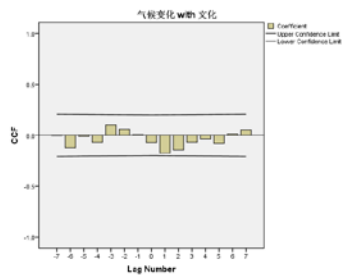
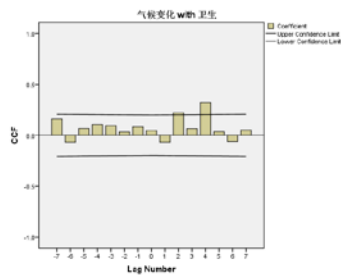
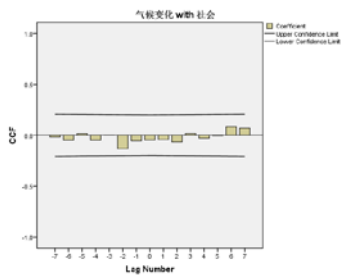
Correlation by year = -.080

Hygiene & Public Health

Correlation by year = .097

Culture

Correlation by year = -.084



Natural Disasters

Correlation by year = .622\*\*

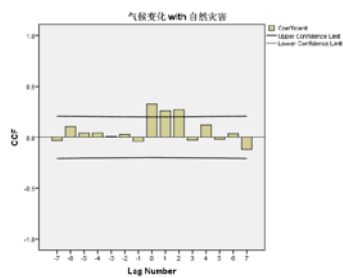


Table 5-1 calculates the correlation coefficients (lag 0) of annual values and quarter values of climate change dimension and other dimensions. Considering the possible interference due to data similarity in research, we will affirm correlation in time series only when cross correlation in year at lag 0 and in quarters at low lags (lag  $\pm 1$ ) become significant. Through the cross validation in Table 5-1, we could identify certain dimensions which have significant correlation with climate change: safety, disaster prevention & mitigation, environment & ecology, transportation, education & research, economy, science & technology, energy & resource, agriculture & forestry, meteorology, and natural disasters. Referred as weather changes in long time or on large scale before, climate change was often associated with possible negative effects caused by certain dimensions on the relatively fragile ecosystem and the social economy system, such as the significant relation between climate change and natural disasters as well as disaster prevention & mitigation. Meanwhile, due to the intrinsic importance of agriculture in policy agenda, and considerable negative effects of natural disasters on agricultural production, the dimension of climate change also links remarkably with agriculture & forestry and economy. It's worthwhile to mention that dimension of climate change has a prominent association with environment & ecology as well as energy resources, which reveals the strong tendency of climate change issue towards environment and energy resources in terms of issue dimensions from the very beginning. And it's predicable that this correlation will be strengthened along with the transformation of climate change's connotation. Moreover, the correlation between climate change and meteorology, education & research, and science & technology was mainly embedded in the complex intrinsic characteristics of meteorological problems. As for the safety dimension, analysis on the Pearson correlation coefficient between security dimension and other dimensions leads to a conclusion that safety relates to climate change, natural disasters, and disaster prevention & mitigation. Therefore, here the safety dimension mainly referred to negative impacts of disasters due to climate changes, and in fact it should also be viewed as the

subtopic of natural disasters and disaster prevention & mitigation.

### 5.3 From 1977 to 1992: From Scientific Agenda to Policy Agenda

#### 5.3.1 Component analysis on dimensions of attention on climate change

Since 1977, for the first time the climate change, caused by greenhouse effect due to human activities, had aroused widespread attention, which implies the meaning of climate change issue was transforming to global warming. This transformation began with intellectual elites' attention in China to research this hot topic of climate change worldwide. Since 1980s, there have been increasing attention and probe into climate change problems in scientific perspectives. "Climate change" gradually became a phenomenal symbol with its specific connotation. This was not, for sure, an overnight process, in which some texts with the previous connotation (weather changes in long time or on large scale) also co-existed, contributing to a mixed process of two different issue connotations of climate change. This researching period ended by 1992, with the UNCED in Rio that year and the signing of UNFCCC, when the climate change issue officially became one important issue for policy agenda. The analysis of this period mainly concentrates on analyzing the issue connotation and focus transforming and the component and correlation characteristics of attention dimensions in this agenda transformation process.

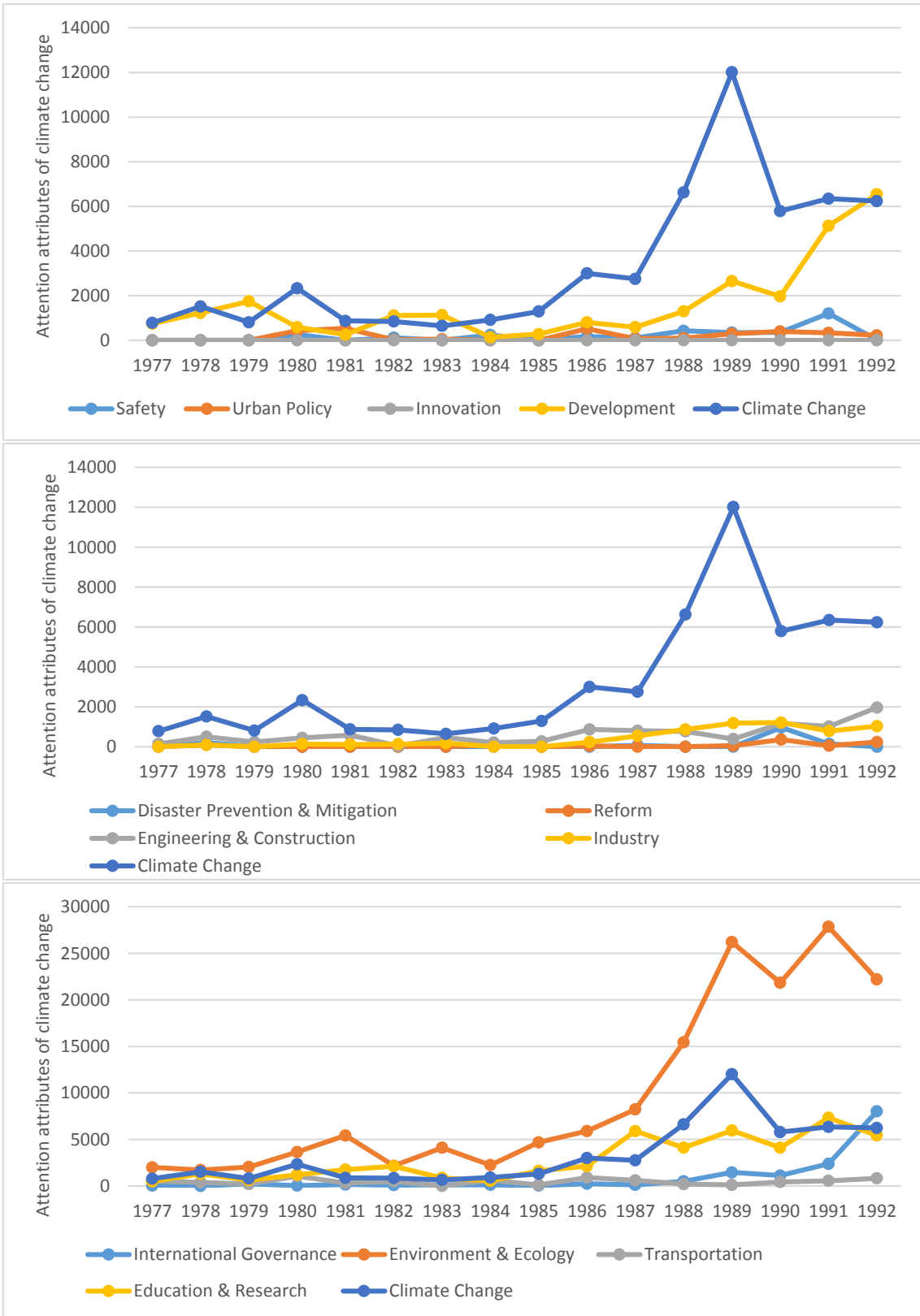


Figure 5-8 1977-1992 Comparative analysis on attention dimensions of climate change (I)

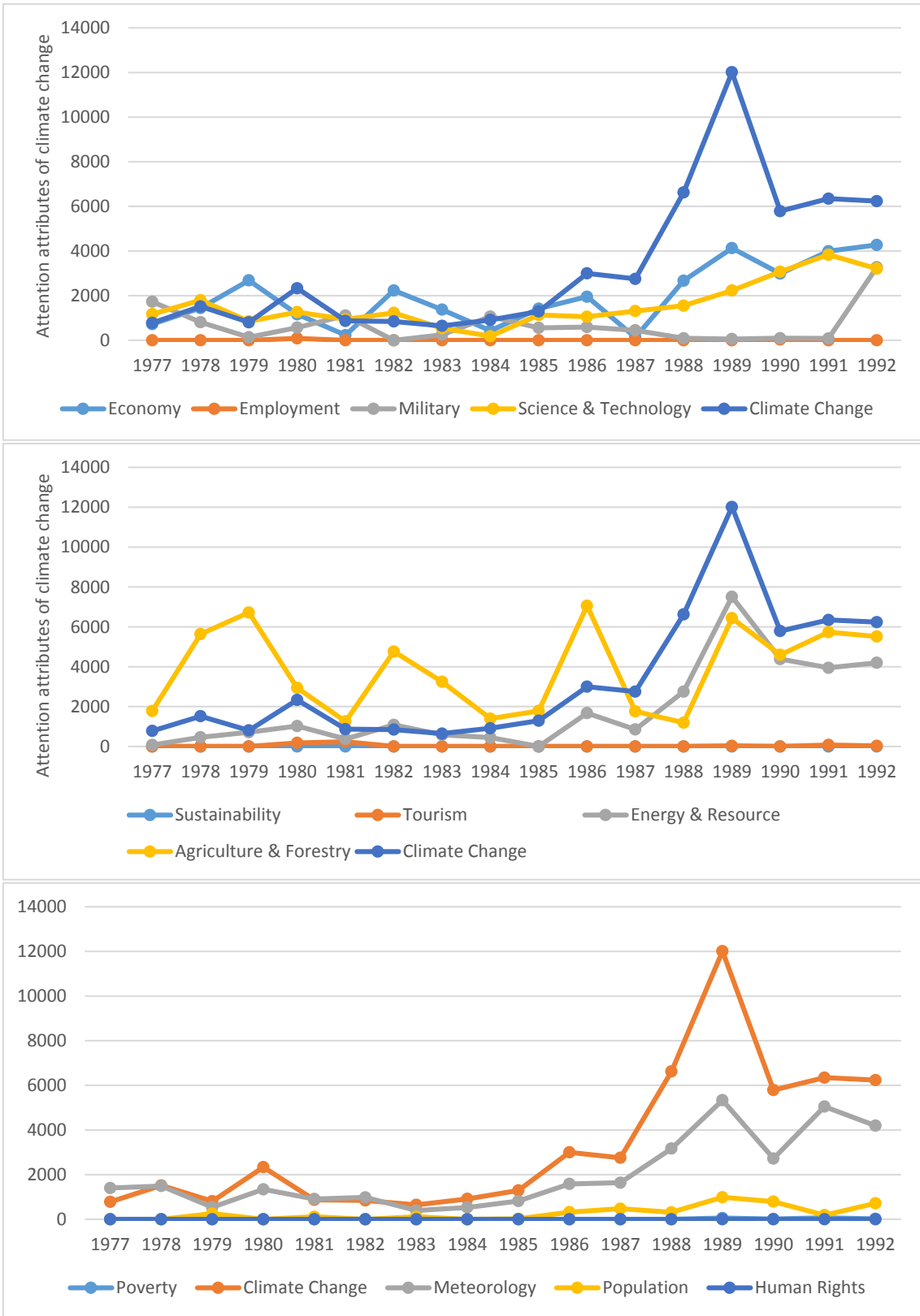


Figure 5-9 1977-1992 Comparative analysis on attention dimensions of climate change (II)

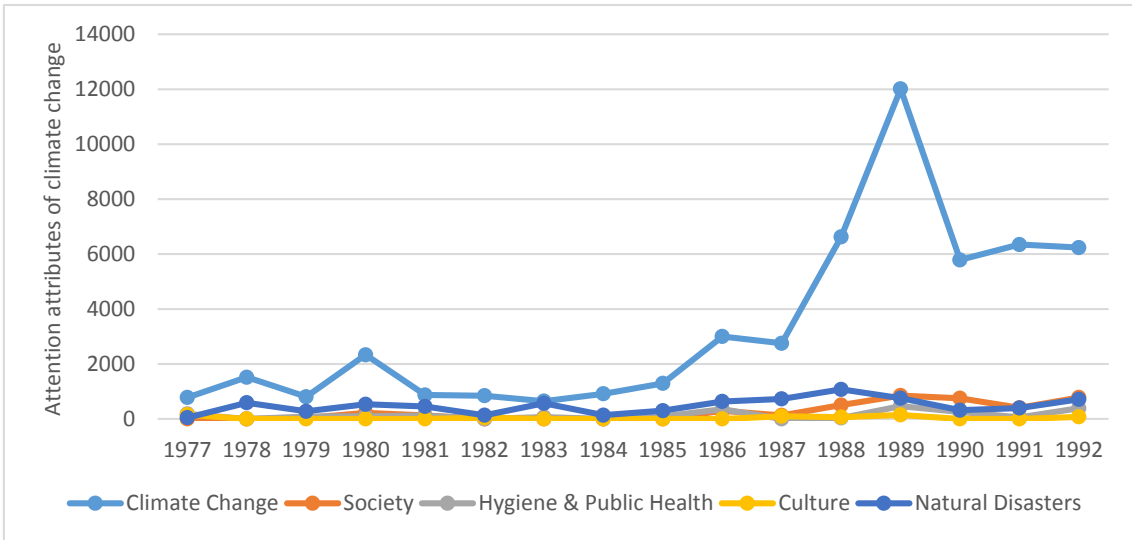


Figure 5-10 1977-1992 Comparative analysis on attention dimensions of climate change (III)

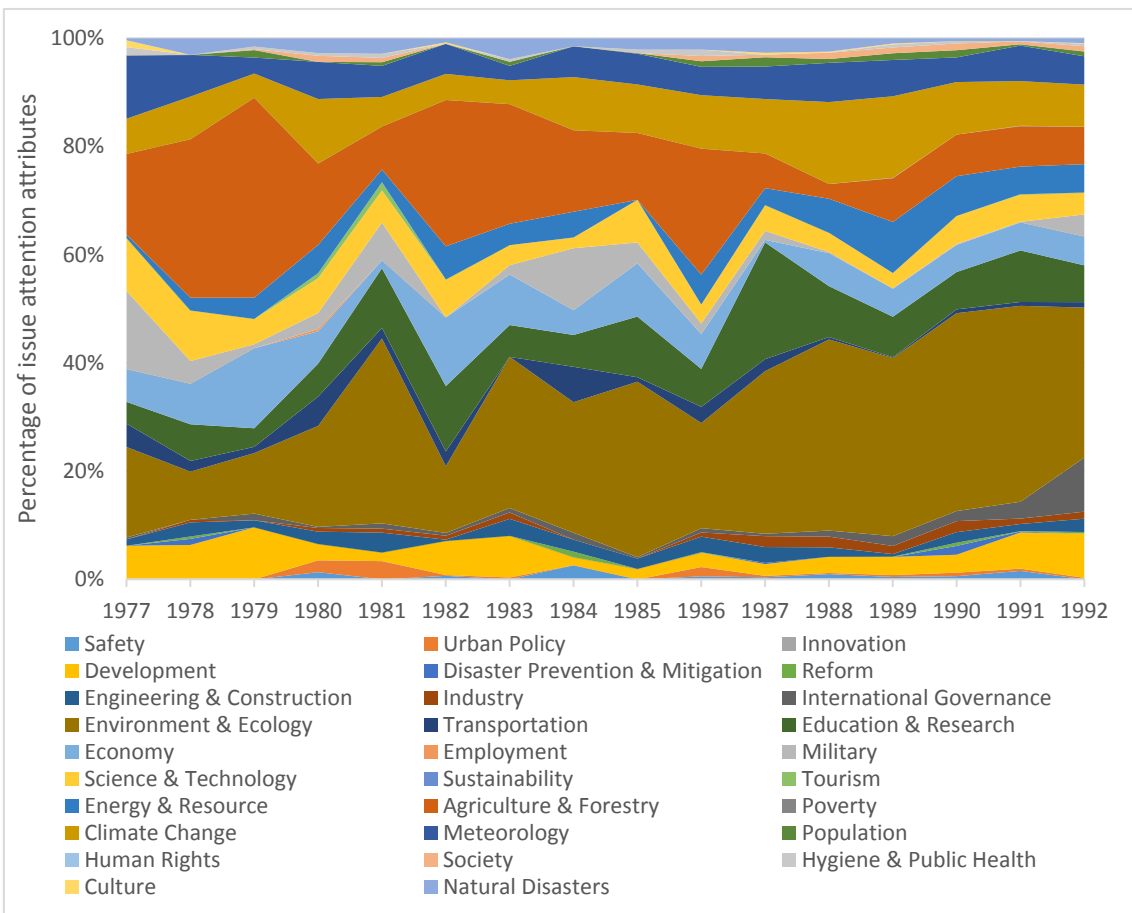


Figure 5-11 1977-1992 Accumulative percentage area diagram of climate change attention dimensions



Figure 5-8, Figure 5-9, and Figure 5-10 demonstrate the evolution process of absolute values of attention dimensions to climate change issue from 1977 to 1992. In the upper Figure 5-8, compared with several other dimensions, climate change dimension occupied greater weight, generally in a rising trend. In 1989, the dimension of climate change itself reached the peak of this period, due to the peak of frequent international scientific explorations and communications of climate change in the late 1980s.<sup>①</sup> The dimension of development came out by and by, and reached almost at high level as climate change, while the rest dimensions still were at a much lower level of attention. In the middle Figure 5-8, the weight of disaster prevention & mitigation, reform, engineering & construction, and industries were way lower than the dimension of climate change. Compared with similar levels of those dimensions at last stage, at this stage the attention of climate change enjoyed a considerable advantage. In the lower Figure 5-8, among all dimensions of climate change issue, environment & ecology occupied a dominant weight, far bigger than any other dimensions, even including climate change itself. Also this dimension shows a rising trend, which, on the one hand, revealed that climate change issue of this period was more framed by the perspective of environment & ecology; on the other hand, it shows environment & ecology attracted more attention from the social, political and economic environment. There was also a rise in the dimension of education & research and international governance, the latter of which resulted from amplifying effects by UNCED in Rio in 1992.

In the upper Figure 5-9, the dimension of economy and science & technology both had a gradual ascending tendency. In mid 1980s, both maintained accordant attention level as climate change dimension; while later the climate change attention climbed up, leaving the economy dimension and science & technology dimension behind. Besides, compared with last stage, the dimension of military at this stage became much smaller. The middle Figure 5-9 shows that the dimensions of agriculture & forestry and energy & resource received similar attention with climate change dimension, in which the volatile dimension of agriculture & forestry takes a dominant place in mid 1980s but later replaced by greatly increasing climate change dimension. The dimension of energy & resource remained slightly smaller weight than climate, but both have similar curves, whose correlation could be further verified by correlation analysis later. In the lower Figure 5-9,

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① Villach Conference, 1985 in Austria, was regarded as a scientific discussion with “catalyst” effect, co-held by International Council of Science Union (ICSU), World Meteorological Organization (WMO), and United Nations Environment Programme.

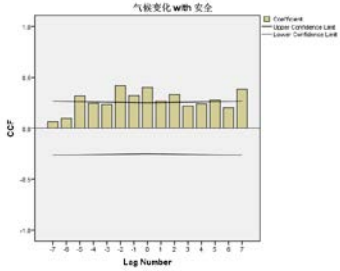
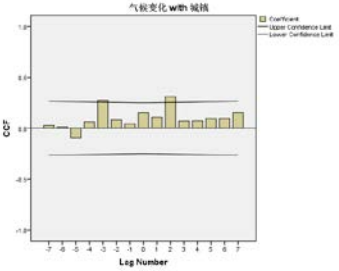
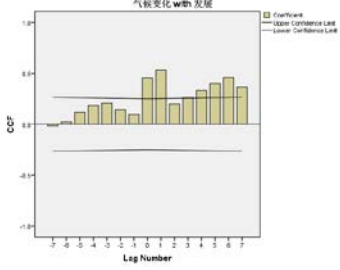
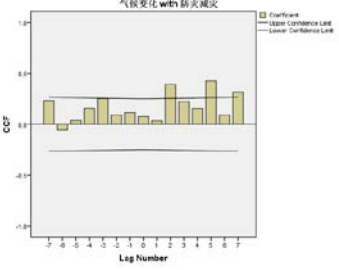
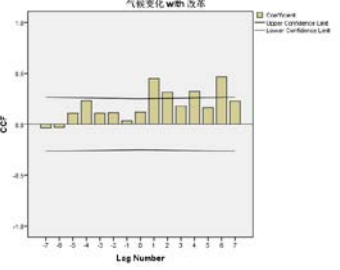
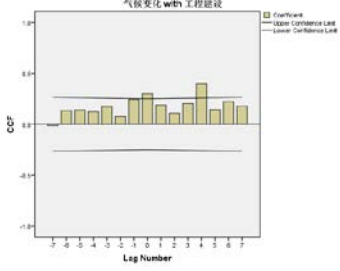
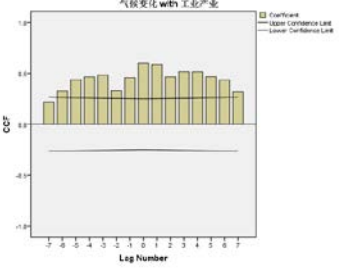
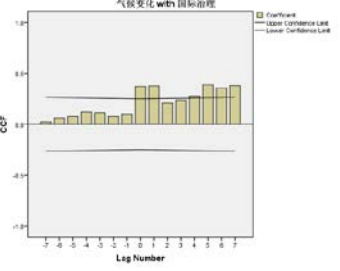
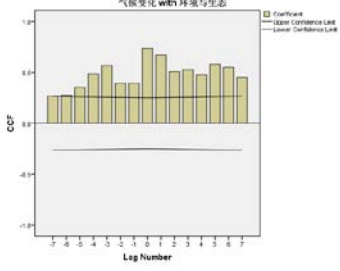
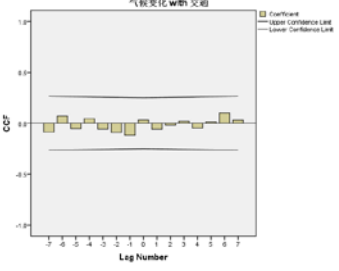
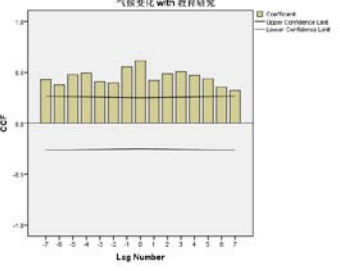
except for dimensions of climate change and meteorology, the attention of other dimensions stayed at a very low level. And the resemblance of meteorology and climate change dimension explains, again, the real fact that climate change was as one meteorological phenomenon. In Figure 5-10, in addition to climate change, other attention dimensions were at low level. It's worth noting that at last stage the dimension of natural disasters could compete with climate change, while in this period it fell far behind and became less significant.

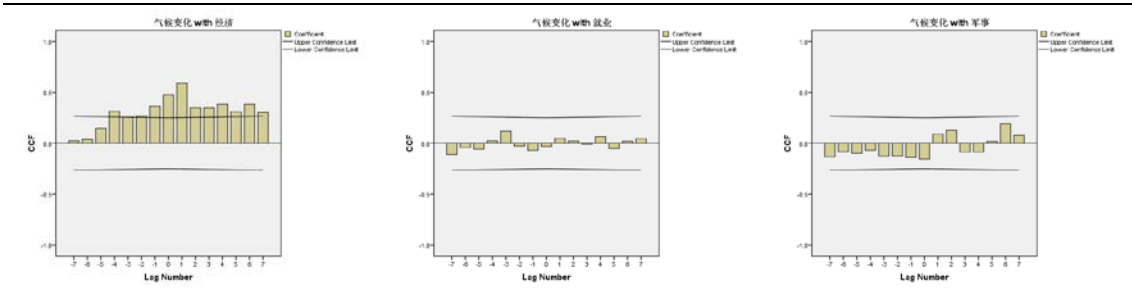
After analyzing the absolute values of issue attention to climate change, now it comes to its relative comparison, as shown in Figure 5-11. During 1977 to 1992, the dimension of environment & ecology dominated the attention, and climate change, agriculture & forestry, and education & research dimensions were secondarily dominant. Among them, the relative proportion of environment & ecology presented an ascending trend, reflecting environmental essence of climate change issue. In this period, climate change featured the significant environment dimension. Compared with last stage, another difference lied in the gradual decline of agriculture & forestry attention, since after overcoming step by step the obstacles of agricultural production, climate change exerted limited impacts on this dimension and then gradually agriculture & forestry lost its dominant position. Moreover, the economy dimension still held a comparatively stable level, but not at a dominant position. In the late 1980s, the attention of education & research reached a high spot, associated with exploding scientific cognition of climate change worldwide. The relevance of climate change dimension and other dimensions in climate change issue will be further analyzed in next part of correlation characteristics of attention dimensions.

### 5.3.2 Correlation analysis on dimensions of attention on climate change

This section will follow the method in 5.2.2 to estimate the cross-correlation among different dimensions of climate change dimension. For the same reason of avoiding the estimation deviation due to occasional similarity of data, this process will respectively analyze the correlation of lag 0 in terms of years, and of lags  $\pm 1$  in terms of quarters. When both two present a significant correlation, we will claim that there exists cross-correlation between two time series.

Table 5-2 1977-1992 Cross Correlations between attention on climate change and other dimensions (By year and quarter)

Safety	Urban Policy	Innovation
Correlation by year = .527*	Correlation by year = .351	-
		-
Development	Disaster Prevention & Mitigation	Reform
Correlation by year = .582*	Correlation by year = .206	Correlation by year = .365
		
Engineering Construction	Industry	International Governance
Correlation by year = .468	Correlation by year = .904**	Correlation by year = .471
		
Environment & Ecology	Transportation	Education & Research
Correlation by year = .903**	Correlation by year = -.068	Correlation by year = .796**
		
Economy	Employment	Military
Correlation by year = .763**	Correlation by year = .001	Correlation by year = -.078



Science & Technology

Sustainability

Tourism

Correlation by year = .681\*\*

-

Correlation by year = -.042



Energy & Resource

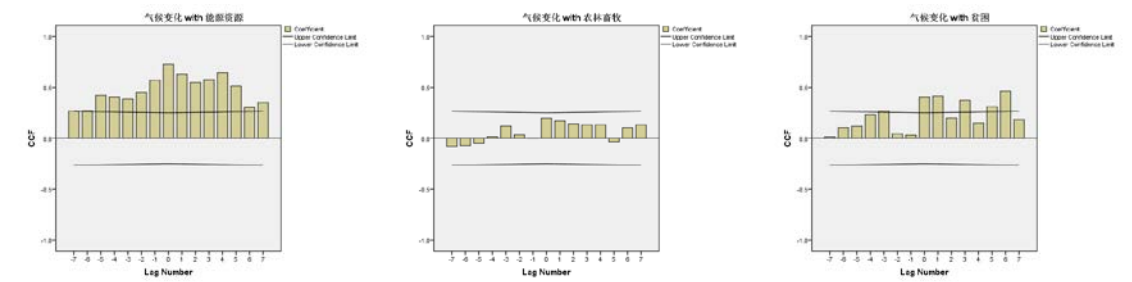
Agriculture & Forestry

Poverty

Correlation by year = .966\*\*

Correlation by year = .360

Correlation by year = .736\*\*



Meteorology

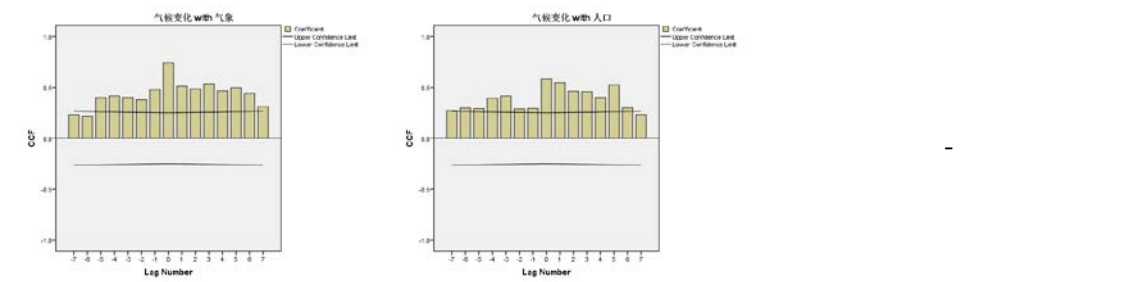
Population

Human Rights

Correlation by year = .851\*\*

Correlation by year = .455

-



Society

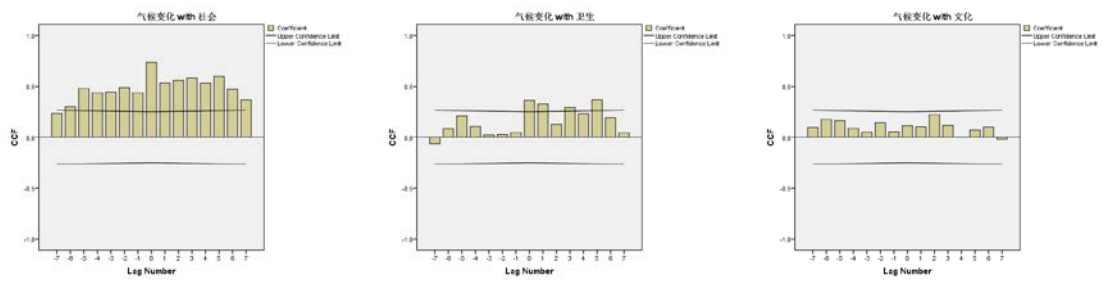
Hygiene & Public Health

Culture

Correlation by year = .573\*

Correlation by year = .365

Correlation by year = .206



Natural Disasters

Correlation by year = .131



Table 5-2 shows the cross-correlations among climate change and other dimensions. According to the settled standard of both yearly and quarterly significance, during the year of 1977 to 1992, all eleven correlated dimensions to climate change including safety, development, industry, environment & ecology, education & research, economy, science & technology, energy resource, poverty, meteorology, and society. Among eleven dimensions, energy & resource and environment & ecology were the most highly correlated and most significant dimensions, indicating the connotation transformation of climate change from weather changes in long time or on large scale to global warming and the remarkable primary dimension of environment issue. Along with the increasing attention to climate change, the energy consumption surely gained more attention, which contributed to the highly significant correlation between climate change and energy & resource dimensions. Combined with the variation of absolute values of environment & ecology and energy resources in 5.3.1, we could conclude that the connotation of global warming due to greenhouse effect had already taken a lead in this period. As for the dimension of industry, its significant correlation with climate change resulted from the fact that industry had become one important issue in policy agenda after reform and open, and at the same time it connected closely with energy & resource, and environment & ecology (industry had significant correlation with energy & resource, and environment & ecology both in year and quarter correlation analysis). Climate change dimension also

had great correlation with economy, originated from the effects of industry and energy & resource, rather than the agriculture & forestry at the first stage. Considering the link between climate change and economy, the correlation between climate change and society dimension had more to do with social and economic system. What's more, the correlation between poverty and climate change should be ruled out, since there were too many zero values in this dimension and only during 1989 to 1992 some nonzero values existed. Thus here we may have overestimated its correlation with climate change, so we should not take poverty dimension into account.

## 5.4 From 1992 to 2013: Climate Change as an Important Policy Agenda

### 5.4.1 Component analysis on dimensions of attention on climate change

Starting in 1980s, the scientific issue discussion on climate changes brought the climate change issue into the policy agenda of global action. On May 22, 1992, the UN's Intergovernmental Panel on Climate Change (IPCC) released the United Nations Framework Convention on Climate Change (NFCCC) in order to fully reduce the emissions of greenhouse gases and cope with the negative impacts of climate change on human societies. As one of the contracting parties, China also joined in this framework fighting against climate change, leading climate change issue into the top policy agenda of China. Also as a developing country, China didn't take specific responsibilities after signing the FCCC and later the Kyoto Protocol. However, as China gradually became a big emitter of greenhouse gases and meanwhile people got more in-depth understanding of climate change, the dimensions of climate change issue also changed a lot. Especially after entering the 21<sup>st</sup> century, the uncertainty and complexity of climate change issue made it a challenge to define this issue. Since the definition and reconstruction of this issue has become an important step before making policies on climate. Therefore, it's of great significance to analyze the component characteristics of climate change issue in this period.

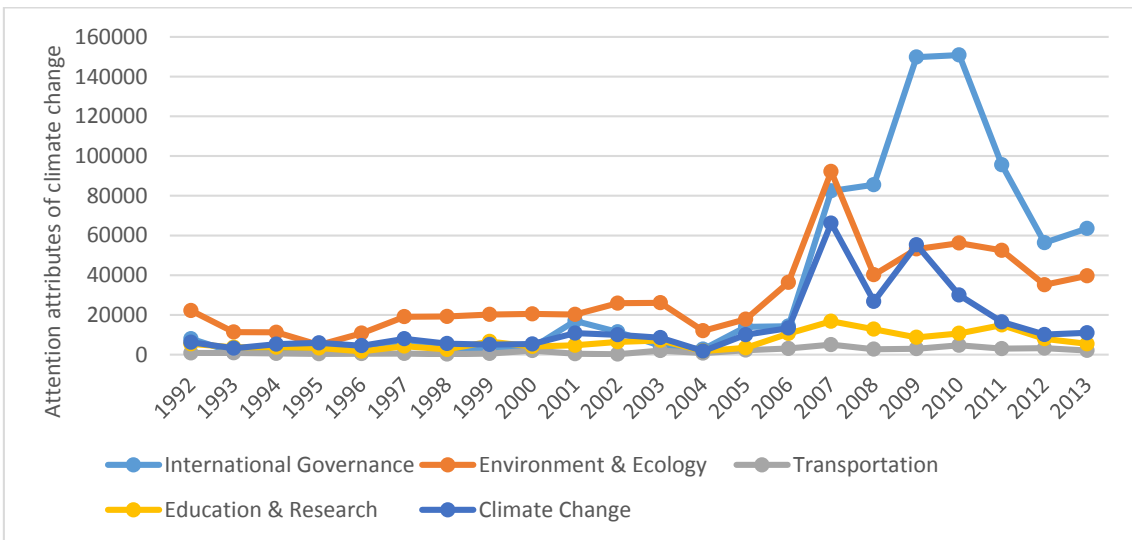
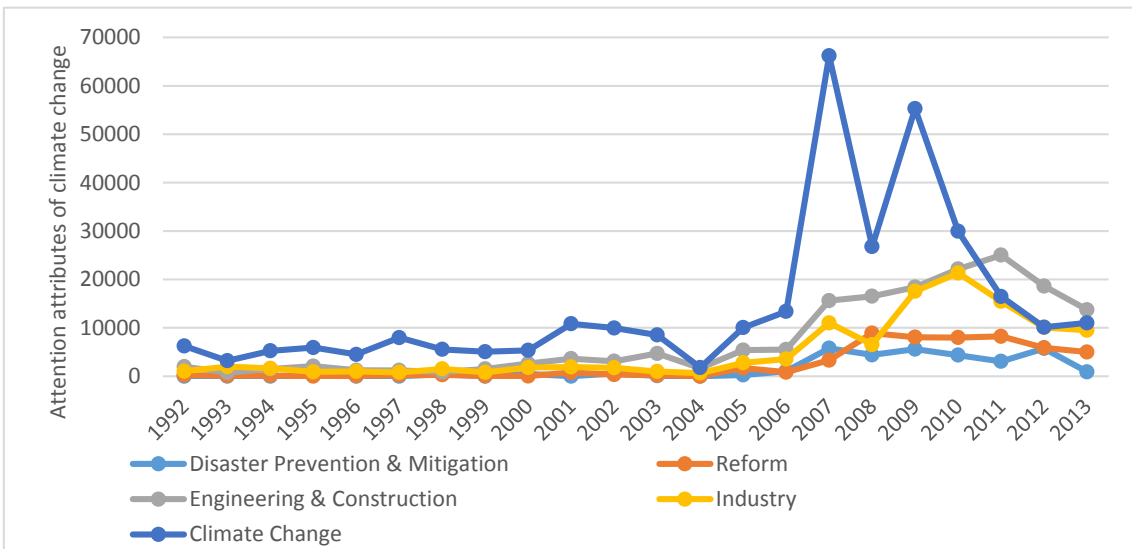
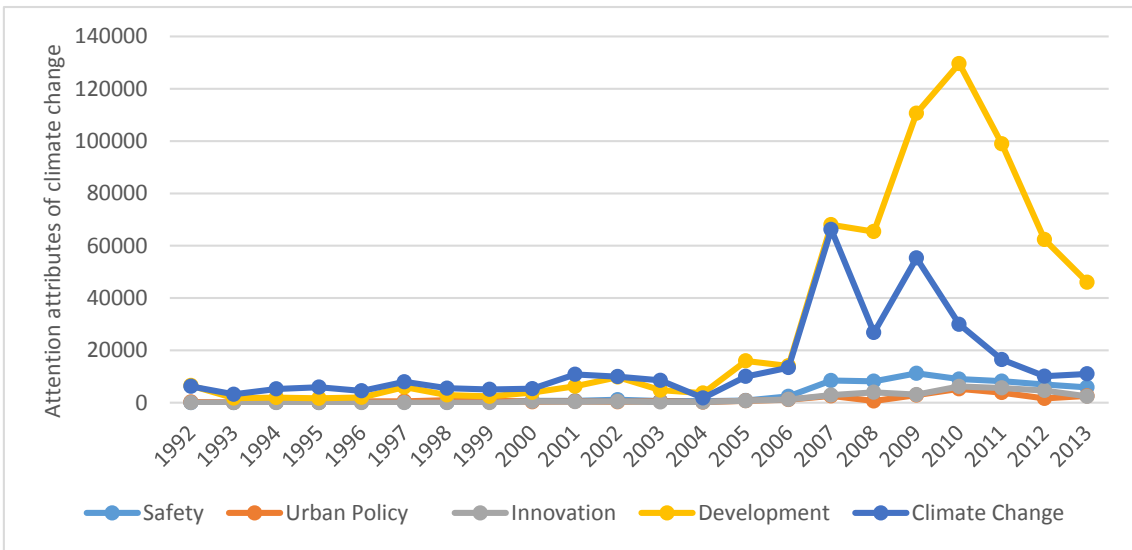


Figure 5-12 Comparative analysis on attention dimensions of climate change (I)

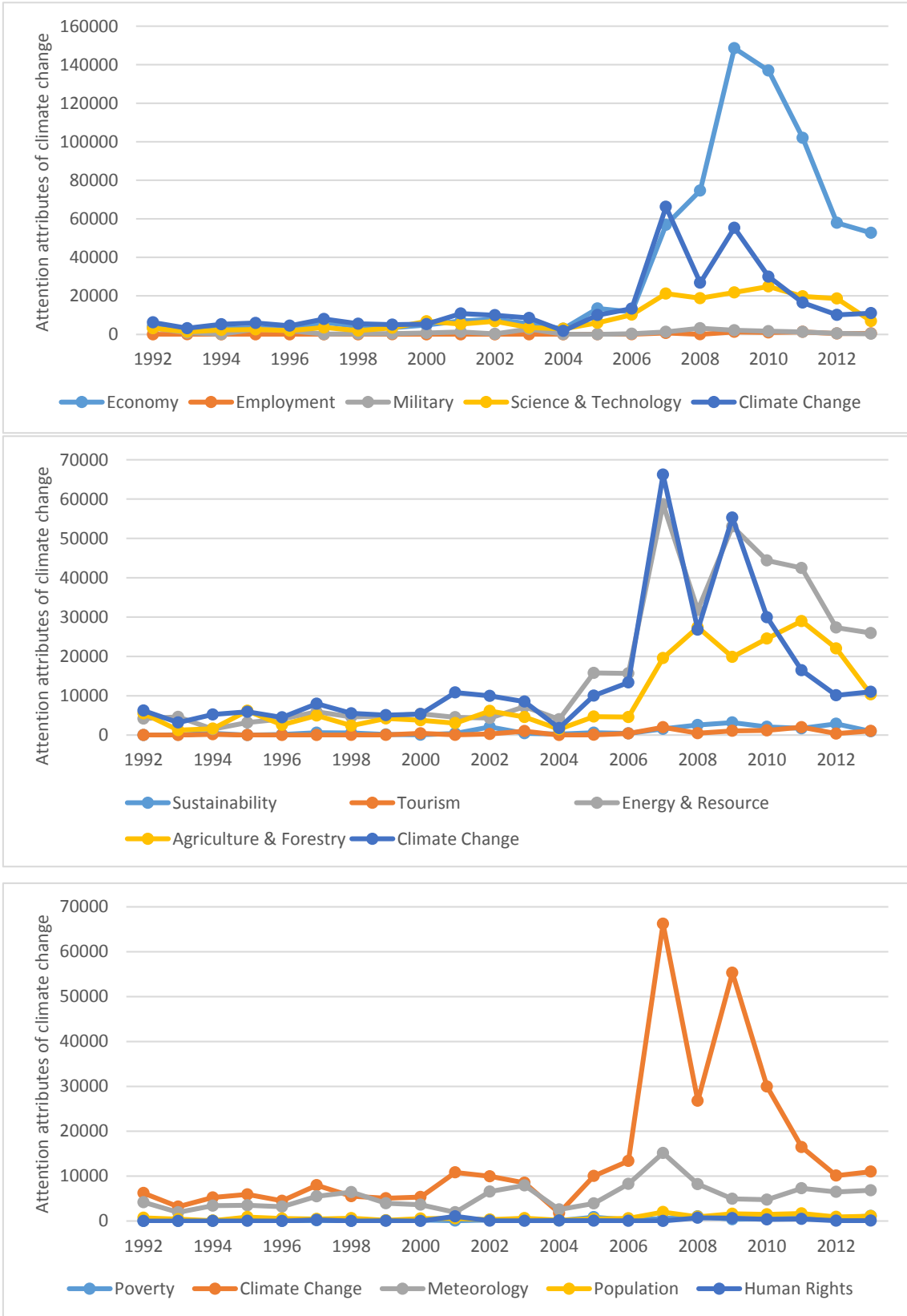


Figure 5-13 Comparative analysis on attention dimensions of climate change (II)



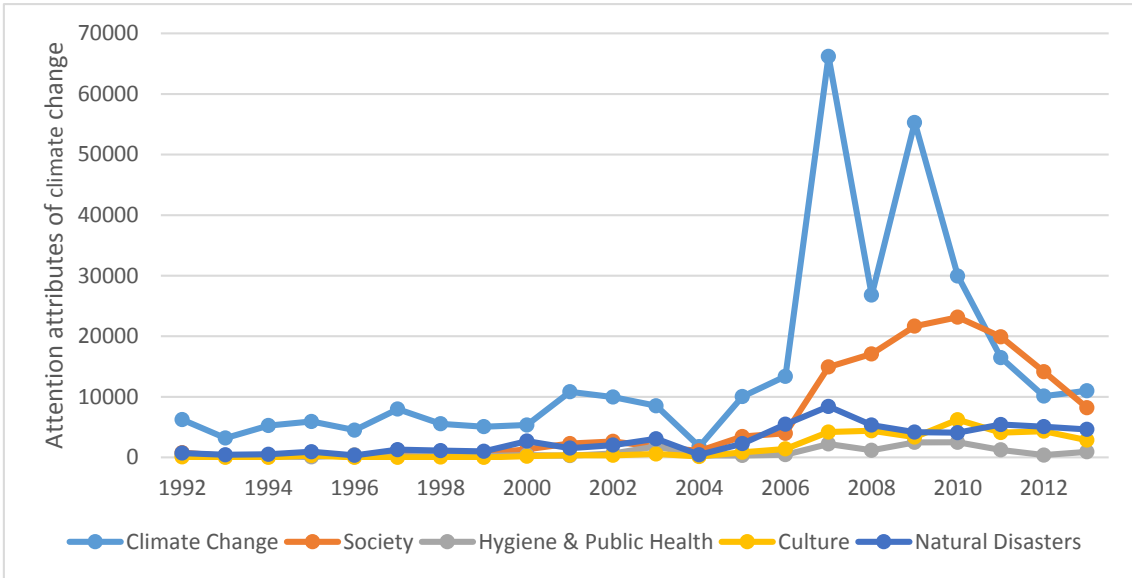


Figure 5-14 Comparative analysis on attention dimensions of climate change (III)

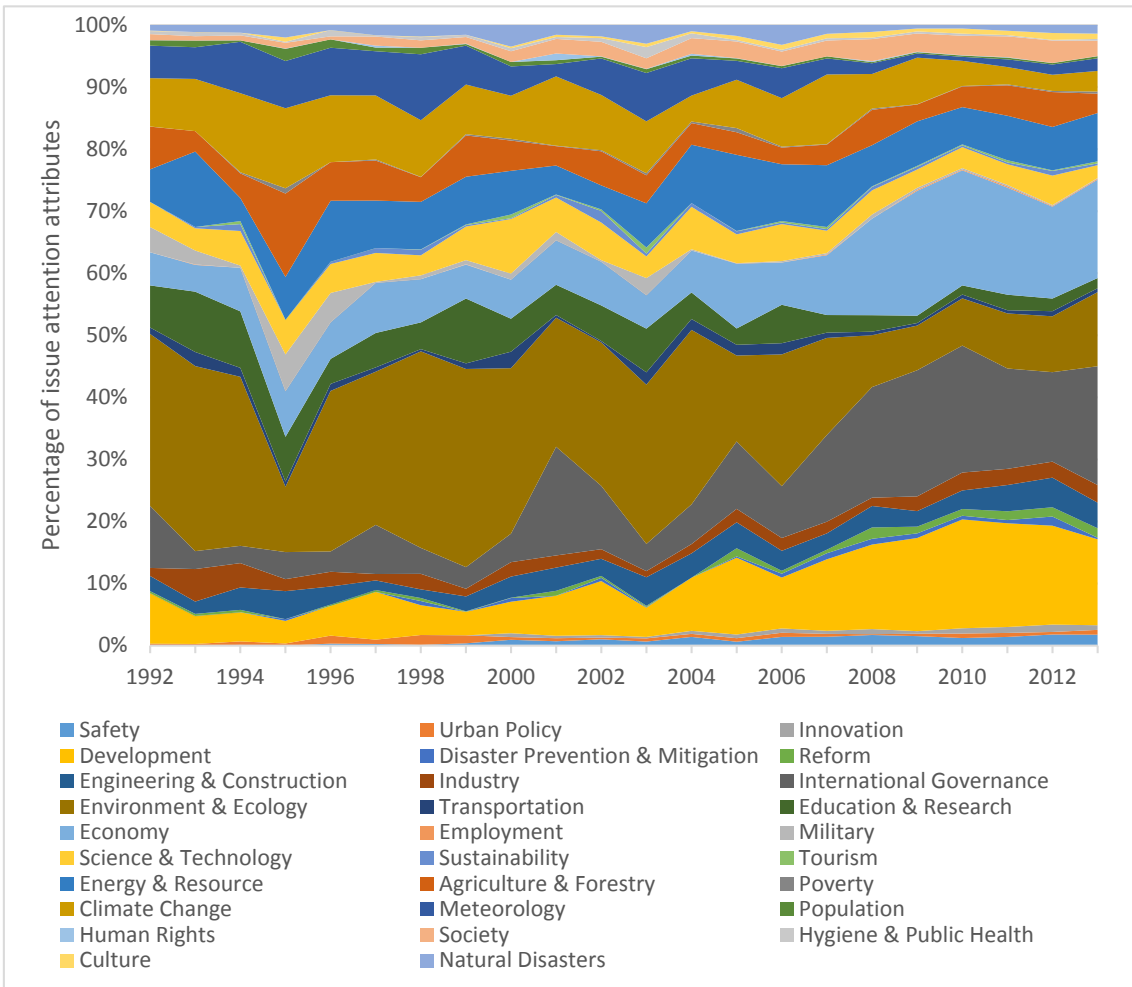


Figure 5-15 1992-2013 Accumulative percentage area diagram of climate change attention dimensions

Figure 5-12, Figure 5-13, and Figure 5-14 demonstrate the evolution process of absolute values of attention dimensions to climate change issue from 1992 to 2013. In the upper Figure 5-12, all attention dimensions of climate change issue maintained a comparatively stable state before 2004, with climate change dimension higher than the others. After 2005, however, there was sharp increase in every dimension, especially the dimension of development exceeded climate change after 2007 and peaked in 2010, leaving all the other absolute values of dimensions far behind. Apparently, huge changes happened to the dimension space of China's climate change issue and then it faced a process of reconstruction. In the middle Figure 5-12, all dimensions rose when climate change reached its peak. The dimensions of engineering construction and industry resembled fluctuation of climate change to a certain degree. The dimension of disaster prevention & mitigation also rose but stayed at a lower level than other dimensions. In the lower Figure 5-12, environment & ecology remained an important dimension along this time, swiftly climbing up in 2006, and afterwards decreasing with fluctuation. It's worth noting that after 2004, the dimension of international governance (diplomacy) sharply increased and took the dominant position, which exactly corresponded to politicization and internationalization of climate change issue. The main feature of upper Figure 5-13 lies in the rocketing dimension of economy. In spite of the descending tendency of economy in 2007 and 2008, the dimension economy still kept an increasing value, peaked in 2009, and fell down with the decrease of overall attention. This shows that the attention of social economic system obtained more weight among all issues dimensions of climate change. And the climate change issue has permeated into other space outside the issue itself. In the middle Figure 5-13, the dimension of energy & resource highly complied with the climate change, particularly after the year 2004, when two wave crests almost overlapped, proving the intimate relation between two agenda. In addition, compared with the drastic fluctuation of last stage, agriculture & forestry had less fluctuation before 2004, and afterwards maintained an undulating cycle similar as climate change. When climate change dimension got more attention, the weight of agriculture & forestry also reached two peaks. In the lower Figure 5-13, compared with climate change, the dimension of meteorology remained the only dimension with visible fluctuation, and reached its peak when the climate change reached its first peak. In Figure 5-14, during the rising process of climate change, the dimension value of society also went up. Although current research method could not find out the specific reason behind

that, its rise also shows the permeation of climate change issue in social economic system. Though the dimension of natural disasters had a bigger weight than the left two dimensions and resembled the fluctuation of climate change, its weight still cannot compete with climate change or take a leading position. In the next section we will discuss the correlation characteristics of dimensions of issue attention.

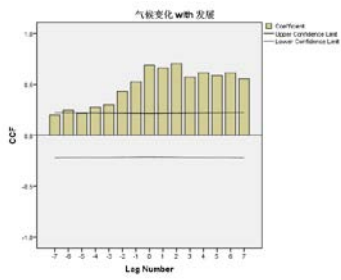
The evolution of relative values of dimensions of issue attention could more clearly present the transition of climate change’s component characteristics, as shown in Figure 5-15. An evident transition feature shows the gradual decline of environment & ecology dimension, while the dimensions of development, international governance, and economy ascended constantly and finally took the dominance. Other dimensions, such as energy & resource, still kept its relatively stable proportion. In this perspective, we could see the weakening of environmental and ecological dimension and the strengthening of political, and social economic dimension in this dimension space of climate change issue. From then on, climate change issue began to more display features of politics.

#### 5.4.2 Correlation analysis on dimensions of attention on climate change

This section will analyze the correlation characteristics of issue attention to climate change. Following the previous analyzing method, this part will determine the correlation between attention of climate change and other dimensions in climate change issue, through validation of annual correlation coefficients and quarterly coefficients with low lags. The specific results of analysis are shown in Table 5-3.

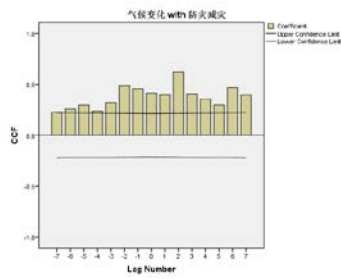
Table 5-3 1977-1992 Cross Correlations between attention on climate change and other dimensions (By year and quarter)

Safety	Urban Policy	Innovation
Correlation by year = .794**	Correlation by year = .595**	Correlation by year = .549**
Development	Disaster Prevention & Mitigation	Reform
Correlation by year = .718**	Correlation by year = .808**	Correlation by year = .596**



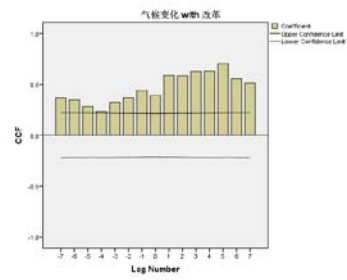
Engineering Construction

Correlation by year = .640\*\*



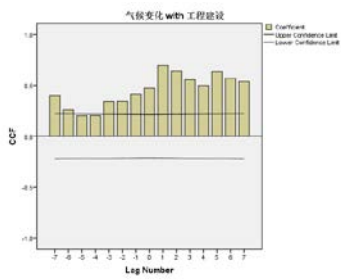
Industry

Correlation by year = .693\*\*



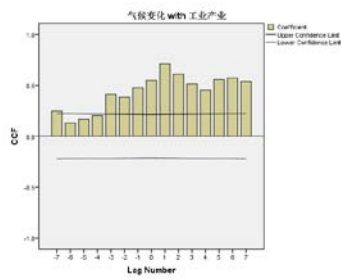
International Governance

Correlation by year = .770\*\*



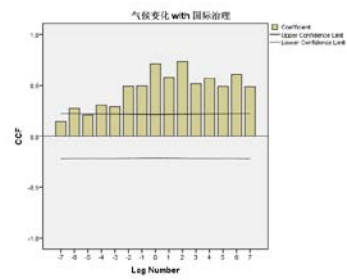
Environment & Ecology

Correlation by year = .884\*\*



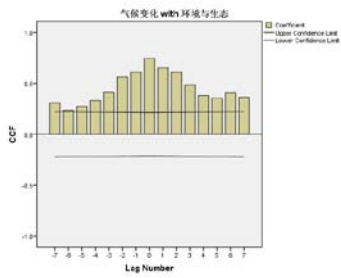
Transportation

Correlation by year = .736\*\*



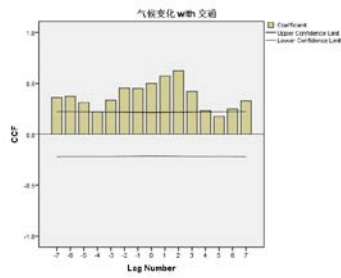
Education & Research

Correlation by year = .728\*\*



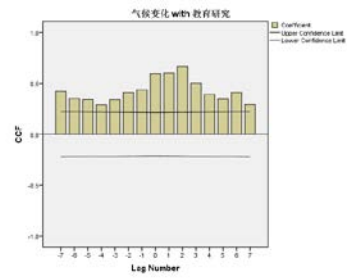
Economy

Correlation by year = .711\*\*



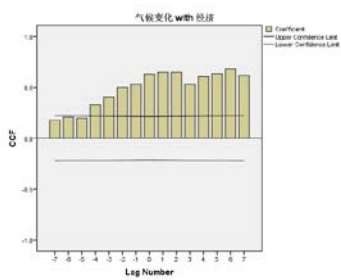
Employment

Correlation by year = .688\*\*



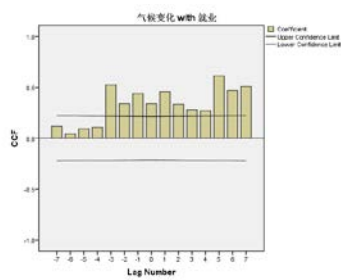
Military

Correlation by year = .258



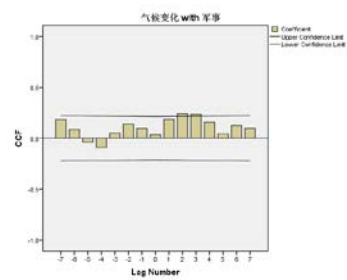
Science & Technology

Correlation by year = .780\*\*



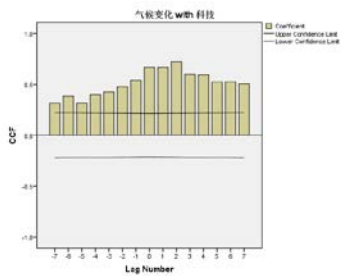
Sustainability

Correlation by year = .642\*\*



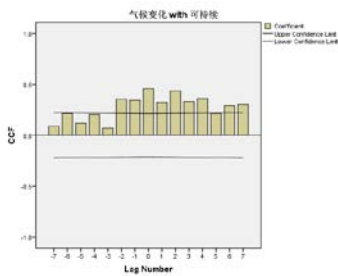
Tourism

Correlation by year = .704\*\*



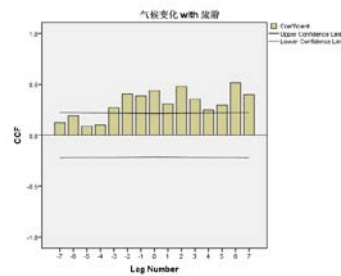
Energy & Resource

Correlation by year = .885\*\*



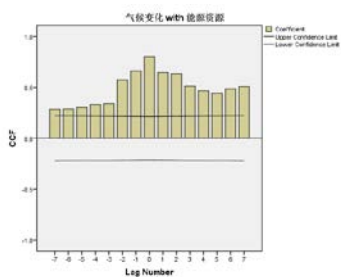
Agriculture & Forestry

Correlation by year = .638\*\*



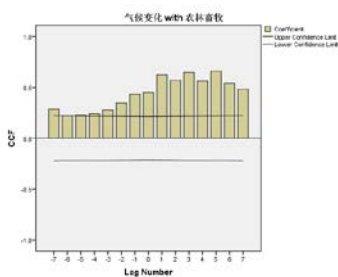
Poverty

Correlation by year = .353



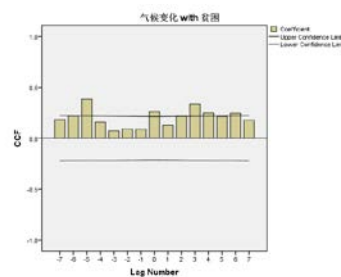
Meteorology

Correlation by year = .648\*\*



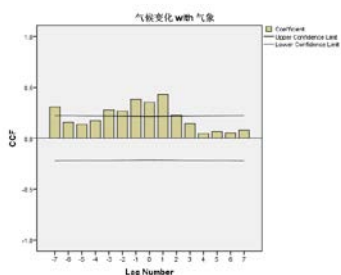
Population

Correlation by year = .814\*\*



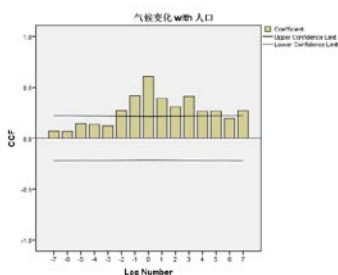
Human Rights

Correlation by year = .336



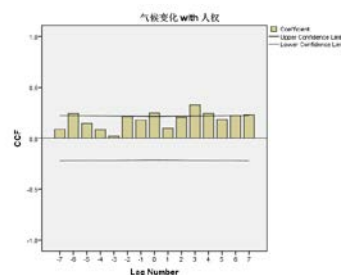
Society

Correlation by year = .739\*\*



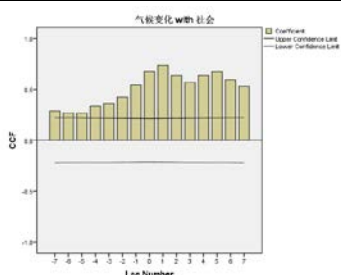
Hygiene & Public Health

Correlation by year = .820\*\*



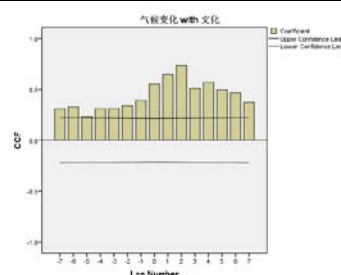
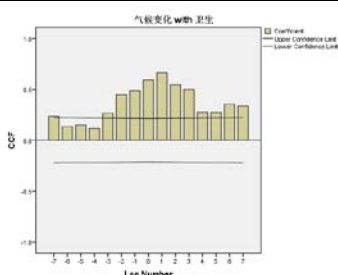
Culture

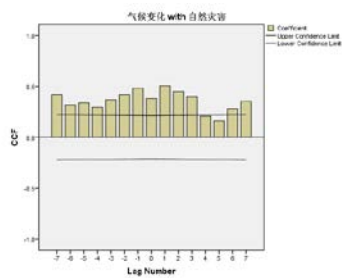
Correlation by year = .672\*\*



Natural Disasters

Correlation by year = .733\*\*





From Table 5-3, apart from non-significant dimensions of military, poverty, and human rights that were irrelevant to climate change dimension, other dimensions of climate change issue all enjoy significant correlations with climate change. The correlation coefficients of energy resources, environment & ecology both reach above 0.8, while some less prominent dimensions, in terms of absolute values, such as disaster prevention & mitigation still have high correlations with climate change. The prevalent significant correlation of climate change dimension with other dimensions displays that along with the increasing attention of climate change issue, it permeated through many other dimensions. Climate change remained no longer an environmental or meteorological problem, but involved issues of economy, development, energy resources, disaster, agriculture and many other aspects. And such close correlations, in return, arouse increasing overall attention to climate change.

## 5.5 Summary and Discussion

### 5.5.1 Evolution of Attention Dimensions of Climate Change Issue

According to the analyses above, the evolution of issue attention is the structural change of issue meaning, focus, and dimensions. At earlier time, as a non-specific term, climate change meant to weather changes in long time or on large scale, so the dimension of agriculture & forestry occupies the leading position, and climate change merely had correlation with directly connected dimensions, such as meteorology, natural disasters, agriculture & forestry, etc. Later on, along with the scientific discovery of human activities' impacts on climate change, the connotation of climate change issue changed into an issue symbol of greenhouse effects. During this period, the proportion of agriculture & forestry declined sharply, but the dimension of environment & ecology rose greatly, reflecting the essence of climate change as an issue of environment and ecology.

With the rising awareness on climate change issue, it turned from a scientific issue to a policy issue in political agenda, and the attention dimensions of climate change issue also changed. Among all the dimensions of climate change issue, the dimensions of economic and social development and international politics gradually became the mainstream, replacing the dominance of environment & ecology dimension. This shows the shift of the essence of climate change issue, turning into an issue of social economy and development, and international politics. In addition, in terms of correlations of dimensions of issue attention, at the first two stages, climate change only partly had correlations with its direct related issue dimensions, yet at the third stage when as an important policy issue, the dimension of climate change had significant correlations with many dimensions, indicating the multidimensional feature and permeability of climate change issue in policy agenda. The structural evolution of dimensions of climate change attention is shown in the comparison Table 5-4.

Table 5-4 Evolution of issue attention on climate change in China<sup>①</sup>

1947 to 1977	1977 to 1992	1992 to 2013
Environment & Ecology**	Energy & Resource **	Energy & Resource**
Education & Research**	Industry **	Environment & Ecology**
Agriculture & Forestry**	Environment & Ecology **	Hygiene & Public Health**
Meteorology**	Meteorology **	Population**
Transportation**	Education & Research **	Disaster Prevention & Mitigation**
Natural Disasters**	Economy **	Safety**
Disaster Prevention & Mitigation **	Science & Technology **	Science & Technology**
Science & Technology**	Development *	International Governance **
Energy & Resource**	Society *	Society**
Safety **	Safety *	Transportation**
Urban Policy	Urban Policy	Natural Disasters**
Innovation	Innovation	Education & Research**
Development	Disaster Prevention & Mitigation	Development **
Reform	Reform	Economy **
Engineering Construction	Engineering Construction	Tourism**
Industry	International Governance	Industry**

① \*\*. Correlation is significant at the 0.01 level (2-tailed); \*. Correlation is significant at the 0.05 level (2-tailed) Shadows indicate the dominance of the attention dimensions; sorted by correlation between climate change and other dimensions.

International Governance	Transportation	Employment**
Economy	Employment	Culture**
Employment	Military	Meteorology**
Military	Sustainability	Sustainability**
Sustainability	Tourism	Engineering Construction**
Tourism	Agriculture & Forestry	Agriculture & Forestry**
Poverty	Poverty	Reform**
Population	Population	Urban Policy**
Human Rights	Human rights	Innovation**
Society	Hygiene & Public Health	Military
Hygiene & Public Health	Culture	Poverty
Culture	Natural Disasters	Human rights

### 5.5.2 Trend Analysis of Attention on Climate Change

The research conclusion above shows that during the evolvement of climate change issue, there are increasing dimensions of significant correlation with climate change dimension, suggesting the multidimensional feature of climate change issue. In the issue space and dimension space, however, climate change can not only use other dimensions as the characteristics of its own dimension, but also offer to be the characteristic of other dimensions. Thus, in order to further figure out the component relation of climate change dimension with other dimensions in the dimension space of climate change issue attention. Here we define:

$$\text{rate} = \text{score}(\text{climate change}) / \text{score}(\text{total dimensions})$$

The rate could reflect the relative attention weight of climate change itself, and estimate the proportion of climate change dimension among all attention dimensions at different time and its changing pattern over time.



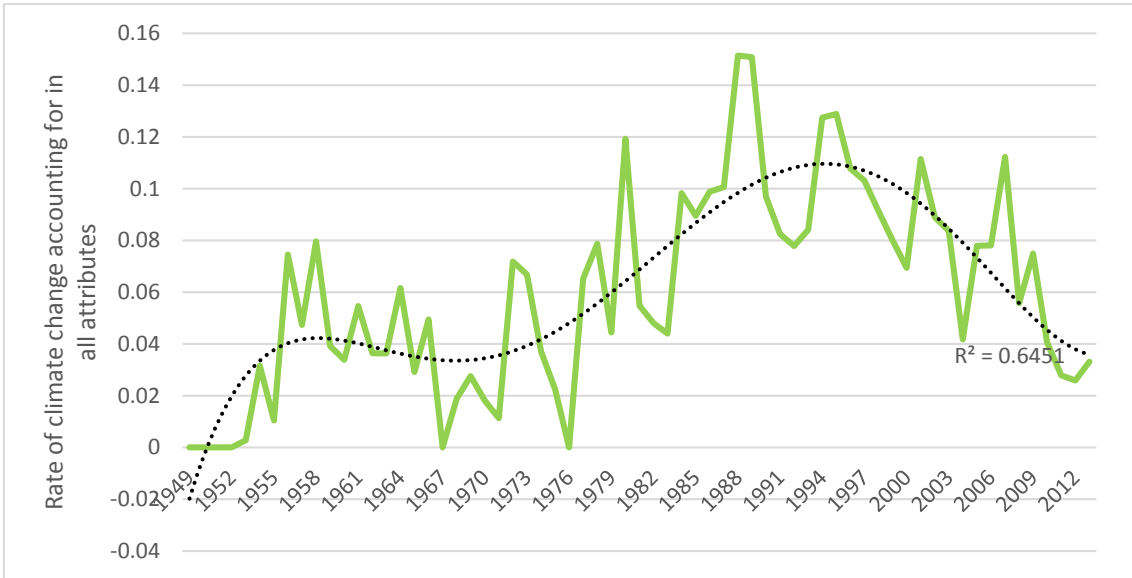


Figure 5-16 Changing rate of attention on climate change

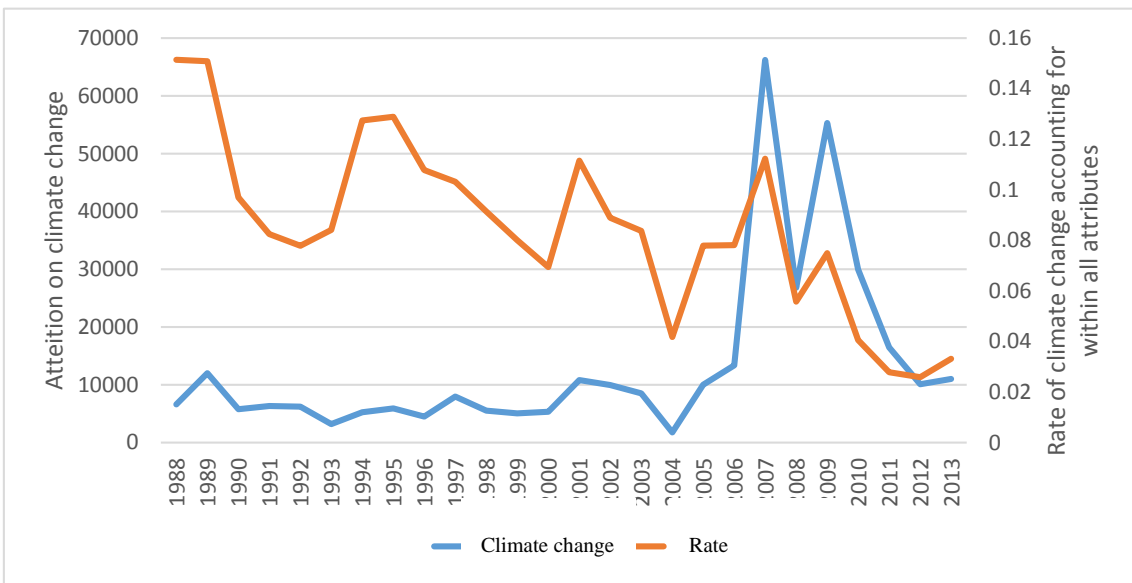


Figure 5-17 Trends of attention on climate change after 1988

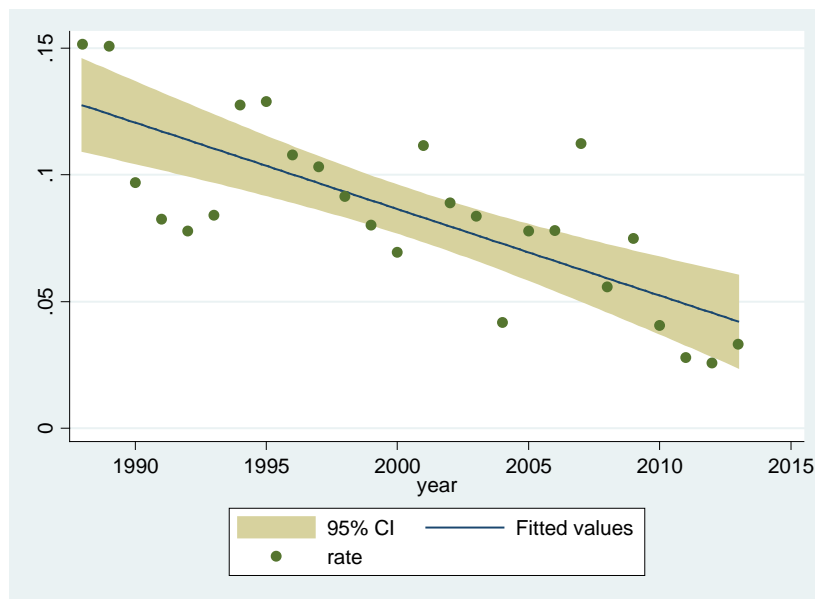


Figure 5-18 Rate of climate change accounting for within all dimensions after 1988

Figure 5-16 shows the constant fluctuation of relative proportion of climate change attention in the overall attention of climate change issue. According to its changing features, we use polynomial to fit the rate and only to find that in the long term, the fluctuation of climate change rose up and fell down repeatedly, rather than stabilized at one certain value. From 1976 on, the relative values of climate change attention firstly rose up with undulation, and reached its peak in 1988, indicating that among all those attention dimensions of climate change issue in this period, the climate change dimension gradually became the focus of attention. Yet after the peak in 1988, the relative weight of climate change dimension started to decline with vibration.

In the Figure 5-17, though the absolute value of climate change dimension reached two peaks after 2007, actually its relative proportion tended to decline, which meant the rising tendency of other dimensions is greater than climate change dimension among all the dimensions of climate change issue. Further results in Figure 5-18 shows the remarkable linear downtrend of climate change dimension. The majority of scatter points fall within the 95% of confidence interval descending trend line, revealing that the dimension of climate change is being dispersed and diluted by other dimensions, especially when climate change has become a salient issue, other issues tended to take advantage of climate change as their own attention dimension in order to enhance their abilities to attract more attention.

### 5.5.3 Dispersion Analysis of Issue Attention on Climate Change

As the analysis in last part shows the evolution of issue attention to climate change, this issue involves the natural ecosystem and social economic system. It contains diverse attention dimensions, reflecting the complexity of climate change issue. The process of analysis above, however, has not estimated the diversity of climate change issue dimensions, so in this section we will apply the method of entropy to study the diversity and dispersion of attention dimensions. In previous researches of policy agenda, entropy has also been used to estimate the dispersion of agenda, often seen in related literature in communication study (Chaffee&Wilson, 1977; Culbertson, 1992; MCCOMBS&ZHU, 1995). The computing method displays as follows:

$$E = - \sum_{i=1}^t p_i \log_2(p_i)$$

$p_i$  means the weight of attention dimension of one certain issue. The bigger the entropy value is, the more disperse the attention dimensions are, vice versa. Considering the disperse tendency of issue dimension after the year of 1977, we calculate the entropy diagram, as shown in Figure 5-19. The overall trend of curve graph reveals the vibrating rising trend of attention dimensions to climate change issue. To verify this trend, we fit the values of entropy to find that all scatter points fall into the 90 % of confidence interval of rising trend as shown in Figure 5-20. Judging from this, we could conclude that the attention dimensions of climate change issue tend to be more diverse and disperse during the evolvement of this issue, and has not ever possessed an overwhelming advantage. Therefore, the evolution of attention dimensions of climate change issue tends to be more disperse with increasing entropy values. The latest sharp decrease in entropy values happened between 2009 and 2010, when there appeared a short-term centralized tendency and consensus. In 2009, China's President Hu Jintao addressed the opening in the UN Climate Change Summit, mentioning the development view of China about how to cope with climate change. Later, the dimension of development increased rapidly, as well as the dimension of economy. In addition, before and after the Copenhagen Conference in 2009, the dimension of international governance also climbed up quickly. The increase of all these dimensions helped reduce the diversity trend of attention dimensions of the climate change issue.

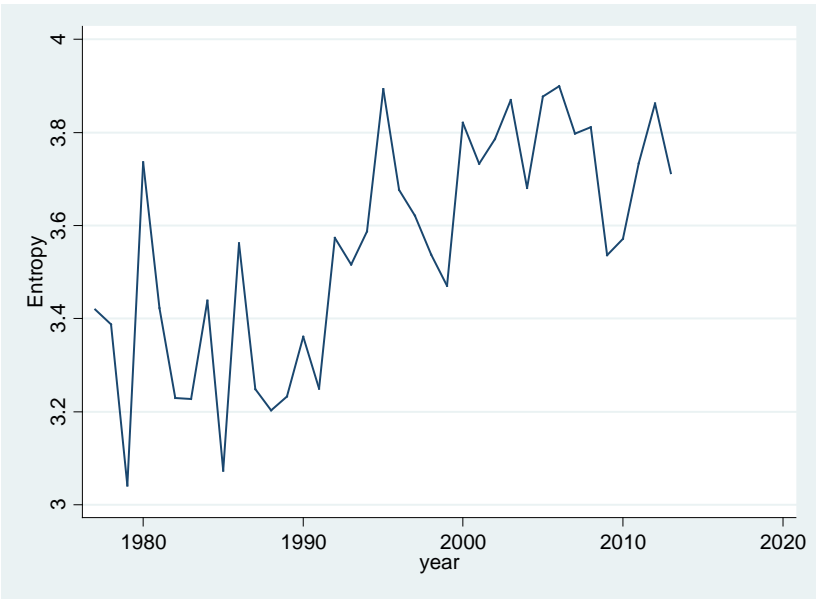


Figure 5-19 Entropy of issue attention on climate change after 1977

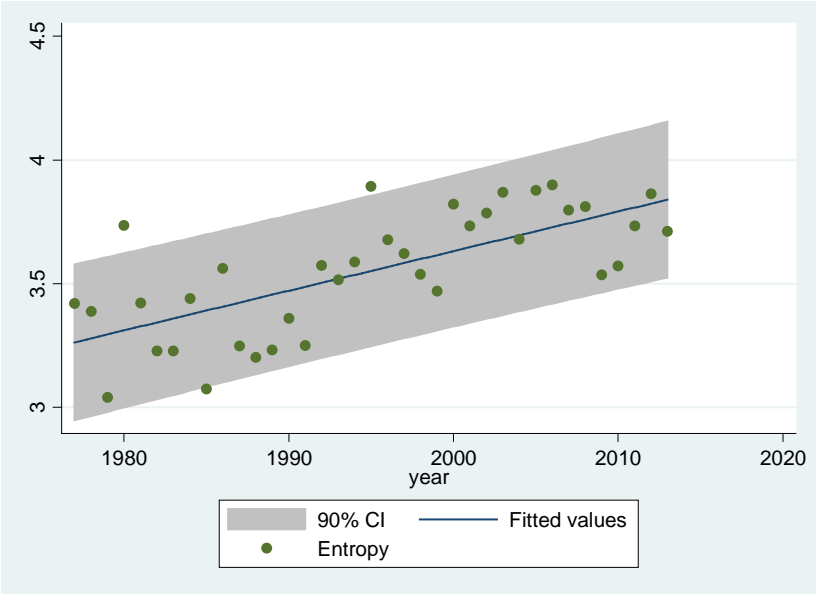


Figure 5-20 Linear trend of entropy of issue attention on climate change after 1977

## Chapter 6 Research on Issue Attention Dynamics of Climate Change in China

Chapter 4 has built up a set of methods which were utilized to measure the issue attention of climate change in China. Based on the methods of content analysis, Chapter 5 presented a evolution panorama of climate change issue attention in China. This chapter will scrutinize the dynamic mechanism of climate change issue attention and propose a explanatory model based on theories and observations on climate change policy process. Finally, the hypotheses derived from the dynamic model will be tested through time-series analysis.

### 6.1 Conventional perspectives on explaining issue attention

Why some issues have been listed on policy agenda while others have not? This question has always been discussed in previous policy process studies. For a issue “floating” on the issue space, whether it could be considered by decision makers and listed on the policy agenda is subject to the prerequisite that if it could get issue attention(Baumgartner&Jones, 2010; Cobb&Elder, 1972; Cohen, 1993; Kingdon, 1995). In order to understand this question, we need to know which factors determine the allocation of issue attention. In prior studies, political conflicts(Schattschneider, 1975), issue attention cycle (Downs, 1972), and the social salience of the issue were thought to be associated with issue attention(Cobb&Elder, 1972). Vertzberger thought that issue attention was subject to the interests of political elites and political ideology (Vertzberger, 1990). Moreover, issue-framing effects which refer to how policy issue was framed and constructed would affect the issue attention(Fiske&Taylor, 2013; Hilgartner&Bosk, 1988; Iyengar, 1990). In this section, I will analyze the influences that problem indicator, focusing events and feedback would exert on the issue attention based on agenda setting theories which were reviewed in Chapter 2.

#### 6.1.1 Problem indicator and issue attention

Problem indicator was thought to be critical in agenda setting both in Kingdon’s streams theory and Jones & Baumgartner’s punctuated-equilibrium theory. In Kingdon’s theory, problem indicator refers to a series of objective indicators of social problem such

as the economic indices of economic issues, or the GHG emissions and extreme meteorological events(Kingdon, 1995). In punctuated-equilibrium theory, policy image is regarded as the mixture of empirical information which is affected by objective problem indicators, and emotive appeals (Baumgartner&Jones, 2010). Problem indicators which could be derived from multiple sources are usually presented to public and policy elites in an abstract, index-type to indicate the severity of problems(Xinsheng Liu et al., 2011). As an issue of environment in substance, climate change could be indicated by several problem indicators such as GHG emissions, extreme meteorological disasters, arctic ice sheet melting, sea level rising etc. Problem indicators could increase issue attention. For example, Keeling Curve which plotted the rising trend of carbon dioxide from 1958 was thought to play the role of problem indicator in increasing the attention on global warming<sup>①</sup>; Liu's study also proved that Keeling Curve has a significant effect in promoting the attention on climate change (Xinsheng Liu et al., 2011). Moreover, it's also been validated that extreme weathers in short period would focus people's attention on climate change (Shanahan&Good, 2000).

### 6.1.2 Focusing events and issue attention

Focusing events which are also referred to as triggering events are thought to be one of the crucial factors in highlighting some certain issue among issues by various theories (Kingdon, 1995). Birkland defines a focusing event as an event that is “sudden; relatively rare, can be reasonably defined as harmful or revealing the possibility of potential greater future harms; has harms that are concentrated in a particular geographical area or community of interest; and that is known to policy makers and the public simultaneously” (Birkland, 1997; Birkland, 1998; Birkland, 2006). In previous studies, focusing events are usually associated with disasters or emergencies with negative consequences. For example, Three Mile Island event (Baumgartner&Jones, 2010), 9.11 Terrorist Attack (Birkland, 2004) and Hurricane Katrina(Liu et al., 2008) were used to be focal points in agenda setting studies. These studies illustrated that focusing events could make hidden issues emerge (Kingdon, 1995), bring new issue dimensions and policy alternatives into policy debate (Baumgartner&Jones, 2010; Jones&Baumgartner, 2005b), or mobilize interests groups so as to change the structure for decision making (Baumgartner&Jones, 2010; Birkland, 2004). Despite the consensus that focusing events could increase issue

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① Source: <http://news.bbc.co.uk/2/hi/science/nature/7120770.stm>

attention, focusing events are usually regarded as negative events. However, some studies also demonstrated that some events even without harmful consequences, such as important conference or scientific discovery, would also serve to focus attention on certain issue (Xinsheng Liu et al., 2011).

### 6.1.3 Information feedback and issue attention

Information feedback refers to the information about the operation of policy or program (Kingdon, 1995). Information feedback sometimes comes to officials in the form of systematic monitoring and evaluation studies, or informal sources, such as citizen's complaints, the pressure of interests group, etc. The information feedback would increase and expand the issue influence so that the issue could gain more attention. Moreover, policy cycle would also bring about feedback effect. In a policy cycle, setting policy goal and evaluating the performance of it would affect the attention on policy issue.

## 6.2 The possible extension of theoretical perspectives on climate change issue attention

Based on Kingdon's multiple streams theory and Baumgartner & Jones's punctuated-equilibrium theory, problem indicators, focusing events and information feedbacks are identified as critical factors affecting issue attention. In fact, however, there are other factors which could be synthesized into issue attention dynamic model may exert influence in issue attention dynamics. Therefore, my study will take policy knowledge, issue relevance and international agenda into account in building issue attention dynamic model, which would extend the current understandings on policy agendas.

### 6.2.1 Policy knowledge and attention

Policy issues relating to environment and climate change in particular are fraught with uncertainties. The increasing and reducing of risks largely depend on the advance of science and technology (Michaels, 2009). Judgment, experience and in certain circumstances, predictive scientific information can contribute to forward looking decision making (Sarewitz et al., 2000). Therefore, in climate change policy issues, policy knowledge plays a crucial role. In previous studies, the role of policy knowledge has been underlined in making choices among different alternatives, but the relationship between

policy knowledge and issue attention was paid meager attention.

Knowledge is often considered an “input” into environmental policy-making. It can inform the problem; clarify goals and objectives; identify and evaluate alternatives; support courses of action; prescribe rules, guidelines, or actions for management; determine which rules ought to be applied; and evaluate progress (Ascher et al., 2010). Knowledge spans the biophysical data and science relevant to the behavior of ecosystems as well as the impacts on human health, ecosystem health, and natural resources (Ascher et al., 2010). Figure 6-1 displays the flows and functions of knowledge in policy process. Knowledge would exert influence on focusing attention and setting agendas, which is realized by policy elites and experts through discovering potential risks, generating new knowledge, or advocating, manipulating and pushing policy issues (Michaels, 2009). Therefore, knowledge should be integrated into issue attention model.



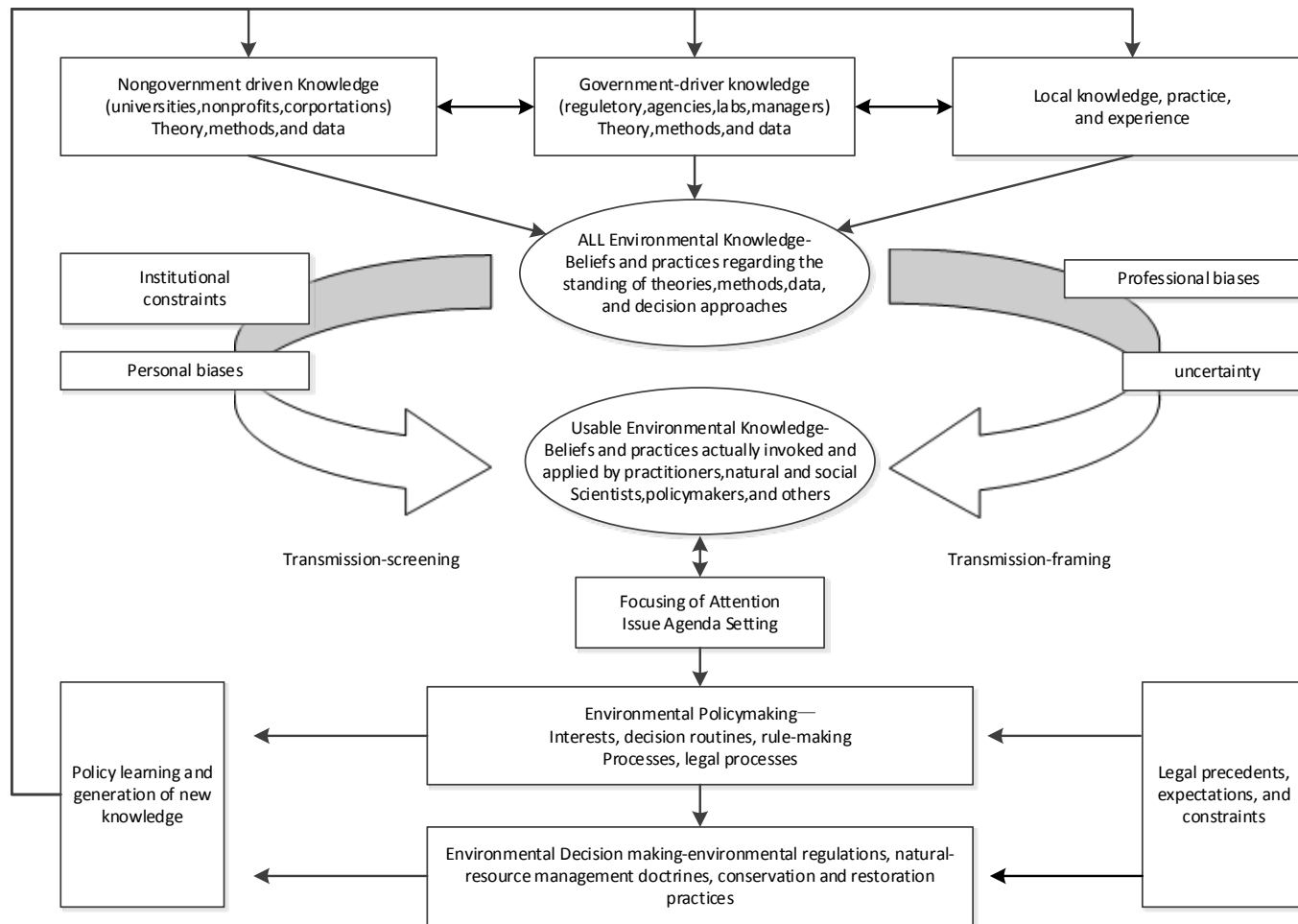


Figure 6-1 Generation, transmission, and use of environmental knowledge

### 6.2.2 Crowding effects and issue attention

Previous studies mostly focused their attention on single issue or isolated policy subsystem, while the relevance or the interactions between policy subsystems have not gained enough attention. Compared with other conventional policy issues, climate change exhibits more complexities which is shown in Chapter 5. The increasing information and ascending salience of climate change would generate new policy subsystems, which would give rise to ripple effect and spillover effect between policy subsystems (Jochim&May, 2010; Jones&Jenkins-Smith, 2009).

Besides ripple effect and spillover effect caused by connections between policy subsystems, crowd-out effect and crowd-in effect which to a large degree result from the scarcity of attention resource should also be taken into account. While one issue attracted large amount of attention, and if competition and conflict exist between it with other issues, the attention on other issues will be crowded out (Djerf-Pierre, 2012a; Green-Pedersen&Mortensen, 2010). However, if there are inherent connections between different issues, such as climate change and other environmental issues, the interactions between them would probably bring about crowd-in effect, which implies that issue attentions would reinforce each other (Djerf-Pierre, 2012b). The crowd-in effect of issue attentions is possibly attributed to the reason that salient issue is prone to be taken advantage of by other issues for the purpose of increasing their capability to attract attention (Boscarino, 2009). Moreover, similar issues such as environmental issues, may be promoted by each other through increase on the awareness of environment and ecology.

### 6.2.3 International agenda and issue attention

In the dynamics of issue attention, international agenda is found to be more and more significant in affecting domestic agendas. The relationship between international politics and domestic policies is always a focus in political science. Milner takes double level game model which integrates interests, institutions and information to investigate how global politics shape domestic policies (Milner, 1997). Keck and Sikkink focus on transnational advocacy networks which are regarded to play a role of transforming international pressure to change domestic policies (Keck&Sikkink, 1998).

As climate change is a global issue, national climate change issue attention is embedded in international issue attention. As a result, international policy agenda is

expected to affect domestic attention on climate change. In previous studies on issue attention in other countries, international agendas which serve as focusing events have been empirically proved to be effective in promoting issue attention and policy agenda (Schäfer et al., 2014; Xinsheng Liu et al., 2011). Hence, international agendas, as focusing events or outside pressures, should be taken into account in building up explanatory model on climate change issue attention.

### 6.3 Construction of Interpretation Model and Measurement on Related Variables

Based on the theoretical analysis on agenda setting and issue attention above, this section will provide the interpretation model of the issue attention on China's climate change, and the second part will elaborate on the measurement method of each variable.

### 6.3.1 Dynamics Model and Research Hypotheses of Climate Change Issue Attention

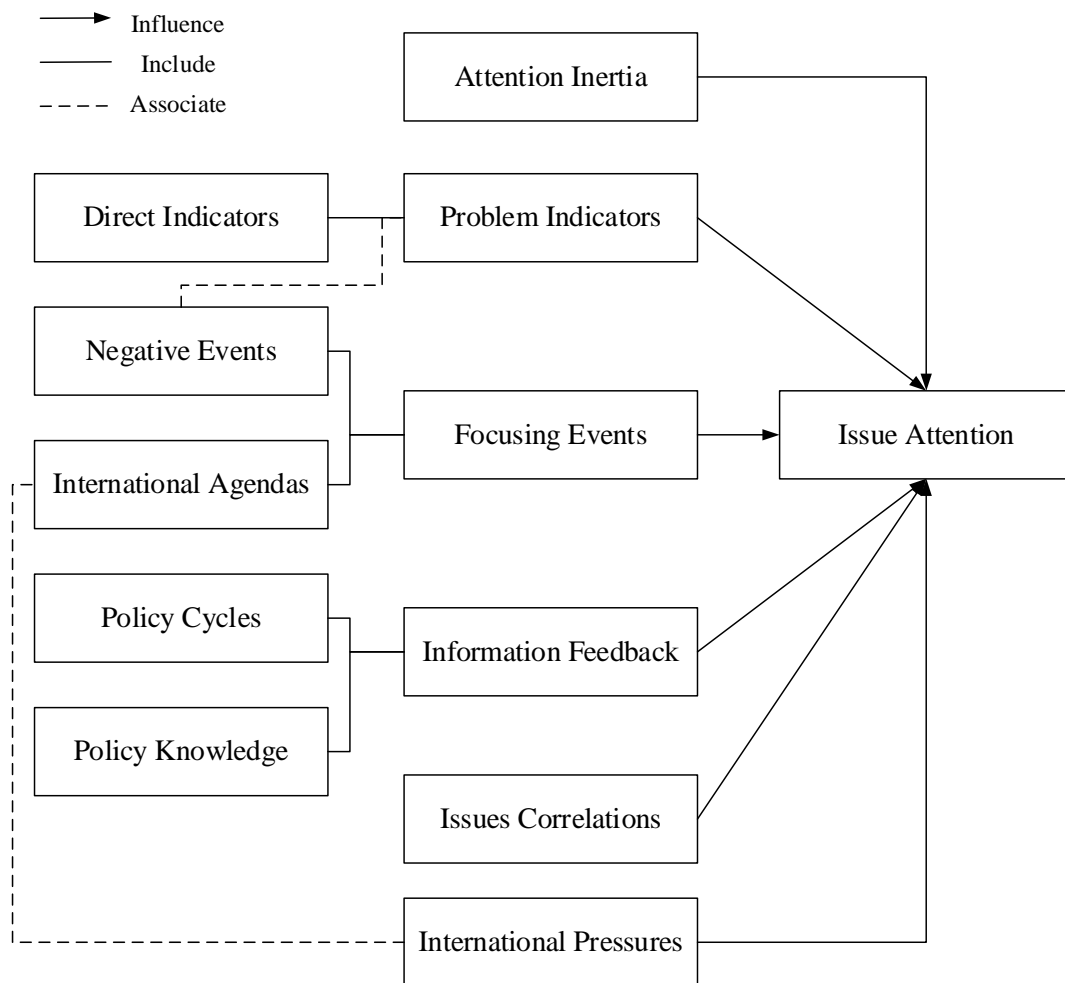


Figure 6-2 Explanatory framework for issue attention dynamics on climate change

According to the theoretical basis of issue attention dynamics and the characteristics of climate change, this study proposed the explanatory framework as shown in Figure 6-2. Six factors including attention inertia, problem indicators, focusing events, information feedback, issues correlations and international pressures are to be tested to check whether the fluctuation of issue attention can be better explained by them. Focusing events will examine the effects of negative events and international agendas; information feedback will examine the effects of policy cycles and policy knowledge. In addition, due to the fact that negative events of climate change, like meteorological disaster, are also the problem indicator of climate change, negative events are playing double roles in this framework. So is the international pressure, which is also firmly connected to the

international agendas. The following sections will examine the effects of attention inertia, direct indicators, negative events, international agendas, policy cycles, policy knowledge, issues correlations and international pressures.

**Hypotheses of this research:**

**H1a: (Attention inertia proposition):** Issue attention of climate change is affected by the past attention level.

**H1b: (Attention inertia proposition):** Issue attention of climate change is affected by the variance of past attention level.

**H2: (Problem indicator proposition):** Issue attention of climate change is positively affected by direct indicators of climate change.

**H3a: (Focusing events proposition):** Issue attention of climate change is positively affected by negative events associated with climate change.

**H3b: (Focusing events proposition):** Issue attention of climate change is positively influenced by international agendas.

**H4a: (Information feedback proposition):** Issue attention of climate change is positively associated with policy cycles relating to climate change.

**H4b (Information feedback proposition):** Issue attention of climate change is positively associated with the amount of policy knowledge regarding climate change.

**H5: (Issues correlations proposition):** Issue attention of climate change is positively influenced by issues relating to climate change.

**H6: (International pressure proposition):** Issue attention of climate change is positively influenced by international pressures.

### 6.3.2 Measurement of Variables

Based on the dynamic model of attention, this part will operationalize variables in order to measure them by real indicators and conduct empirical test on the propositions proposed above.

#### 6.3.2.1 Dependent Variable: Issue Attention on Climate Change

The dependent variable of this study is issue attention on climate change. In chapter 5, through content analysis, this research analyzed each dimension of issue attention of

climate change and the evolution of attention structure. Among the dimensions, climate change dimension with the specific focus on climate change is extracted. This dimension has taken topic significance of climate change and the effects of the text length and text location into consideration, so it is the reasonable estimation of issue attention on climate change.

#### 6.3.2.2 Independent Variable: Attention Inertia

Attention inertia is the essential reason for the fact that issue attention is nonlinear in substance. Because of the effect of attention inertia, attention and agenda has presented complicated systematic behaviors. Therefore, attention inertia is the core variable to explain the nonlinearity of issue attention (Baumgartner&Jones, 2010; Cairney, 2012; Jones, 1994). In this research, the effect of attention inertia will be shown by the auto-regression term and moving average term of ARIMA (Autoregressive integrated moving average model).

#### 6.3.2.3 Independent Variable: Problem Indicator

In this research, problem indicator includes direct indicator and negative events. Direct indicator is the direct indices to indicate the severity of problem, and this research chooses emission of carbon dioxide as the direct indicator. Because the carbon dioxide emission is annually reported, the monthly and season average emissions are used in this study. Meanwhile, this research believes that the increment of carbon dioxide emission would be more important in indicating severity of problem, so the first difference of carbon dioxide emission is set as the direct indicator of climate change issue. The data source of carbon dioxide emission is the climate database CAIT2.0<sup>①</sup> of World Resource Institute, which provides authoritative historical data regarding climate change.

#### 6.3.2.4 Independent Variable: Focusing Events

##### **Negative Events**

Negative events is considered to have the function to trigger issue attention; the negative impact brought by climate change is extreme meteorological disaster (Stocker et al., 2013). Therefore, this research selects extreme meteorological disaster as the indicator of negative events. It is difficult to measure the extreme meteorological events

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① Database is provided by World Resource Institute. Address: <http://cait2.wri.org/wri>

caused by climate change, for the impacts of climate disasters are multidimensional, including magnitude, damage and casualty. Therefore, comparing meteorological disasters from a single dimension requires an unified indicator which could synthesize different factors. In past studies, to measure the severity of extreme weathers in US have usually employed Climate Extreme Indicator provided by National Climatic Data Center (Brulle et al., 2012; Xinsheng Liu et al., 2011). The Climate Extreme Indicator is an authoritative indicator for extreme weather, combining multi-variables and multi-dimensions(Gleason et al., 2008).<sup>①</sup> Now in China, there exists no such indicator officially provided, so in this research, we need to construct a indicator to represent negative events.

The historical data of China's meteorological disasters from EM-DAT has been gathered. This database is established by a non-profitable institution, Center for Research on the Epidemiology of Disasters of Public Health Department of Université Catholique de Louvain (UCL) located in Brussels, Belgium. All the historical data of meteorological disasters that happened in China since 20<sup>th</sup> century is used to establish the indicator to evaluate the severity of meteorological extreme events. Considering the multidimensional characteristics of negative impacts caused by meteorological disasters, this research takes advantage of the formula below:

$$\text{Disaster Extrem Index} = \ln(\text{Mortality} \times \text{Total Affected} \times \text{Total Damage} )$$

This indicator synthesizes mortality, the total affected people and total damage by multiplying them according to the commonsense on disasters severity, because the perceptions on the severity of natural disasters usually positively correlates with these 3 factors. To take the logarithm of the product of the three factors implies marginal diminishing effect of negative perception caused by disasters. For the number of mortality might be 0 which would render the fault of logarithm, only none-zero factors would be multiplied.

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<sup>①</sup> National Climatic Data Center belongs to National Oceanic and Atmospheric Administration, which provide national and regional data of America's extreme climate indicator. Address: <http://www.ncdc.noaa.gov/extremes/cei/> .

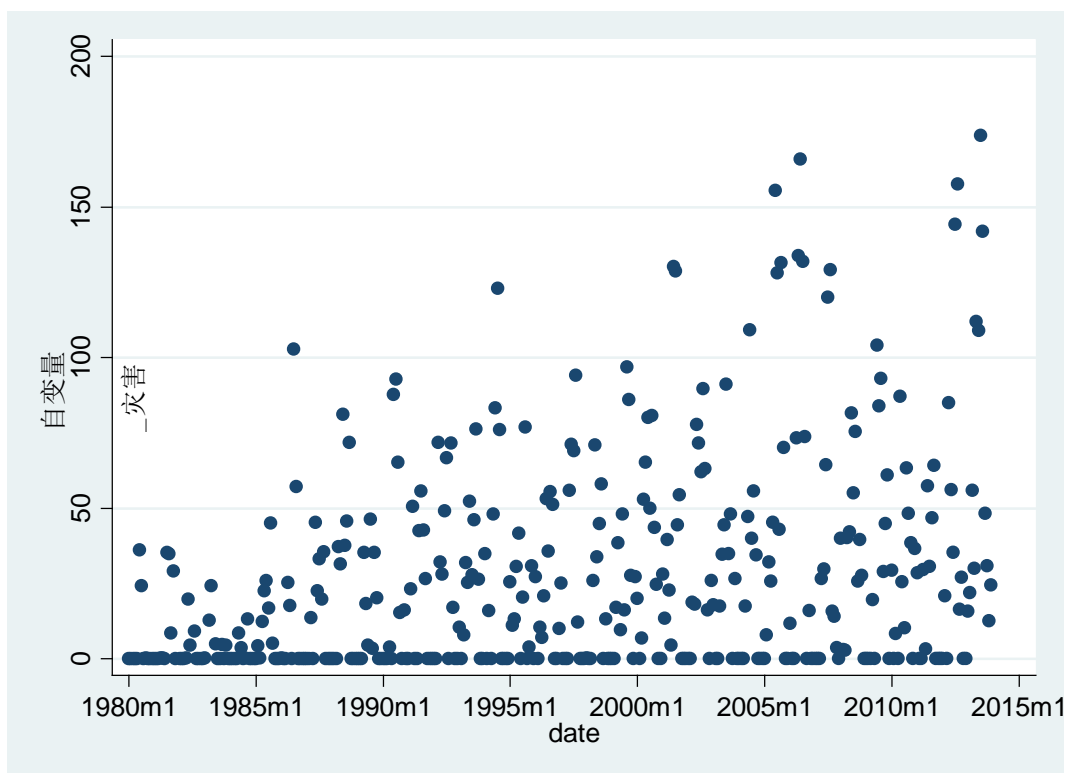


Figure 6-3 Disaster extreme index scatter graphic

### International Agendas

In order to operationalize international agendas of climate change issue, we need to integrate the occurrence and duration of the multilateral conferences relating to climate change to set the variable value. The important international agendas of climate change with focusing effects selected in this study contain 5 types of conferences such as COP(Conference of the parties of UNFCCC); the time when IPCC issued evaluation reports have also been included into the international agendas as focusing events as shown in Table 6-1.

Table 6-1 Important International Agendas

International Agendas	Descriptions
COP	Conferences of parties of UNFCCC, 20 in total (1995-2013)
Rio+	United Nations Conference on Sustainable Development, 3 in total
APP	Asia Pacific Partnership on Clean Development and Climate



	Summit, 10 in total
G20	G20 summits, 19 in total (1999-2013)
BRICS	BRICS summits, 10 in total (2008-2013)
IPCC	Releasing IPCC reports

### 6.3.2.5 Independent Variable: Information Feedback

#### **Policy Cycle**

The policy cycle variable refers to the 11<sup>th</sup> and 12<sup>th</sup> five-year plan of China, for in 11<sup>th</sup> five-year plan. China for the first time set energy saving as a binding indicator into the policy goals, claiming that by 2010, energy consumption per unit of GDP could be cut by 20%. In 12<sup>th</sup> five-year plan, there was the similar policy goal that is energy consumption and carbon dioxide per unit of GDP would decrease 16% and 17% respectively. During a policy cycle, setting policy goal and evaluating policy performance is regarded to trigger issue attention. Therefore, this research sets a dummy variable—the first and last year of a five-year plan are set to be 1, other years during the policy cycle are 0. The effect of policy cycle is to be examined by checking the significance of triggering effects on attention to climate change at the first and last year of five year plans.

#### **Policy Knowledge**

This research measures policy knowledge with statistics on Chinese academic papers. In database of CNKI, this research uses the keywords below to conduct retrieving:

气候变化+气候变暖+温室效应+温室气体+全球变暖+地球温度+气候变迁+气候变动+气候转变+全球环境变化+气候环境变化+年平均气温

All academic papers with keywords shown above published on SCI, EI, CSSCI and Chinese core journals are retrieved and analyzed. It is used to illustrate the level of activity of policy knowledge. The monthly statistics of academic articles relating to climate change are shown in Figure 6-4.

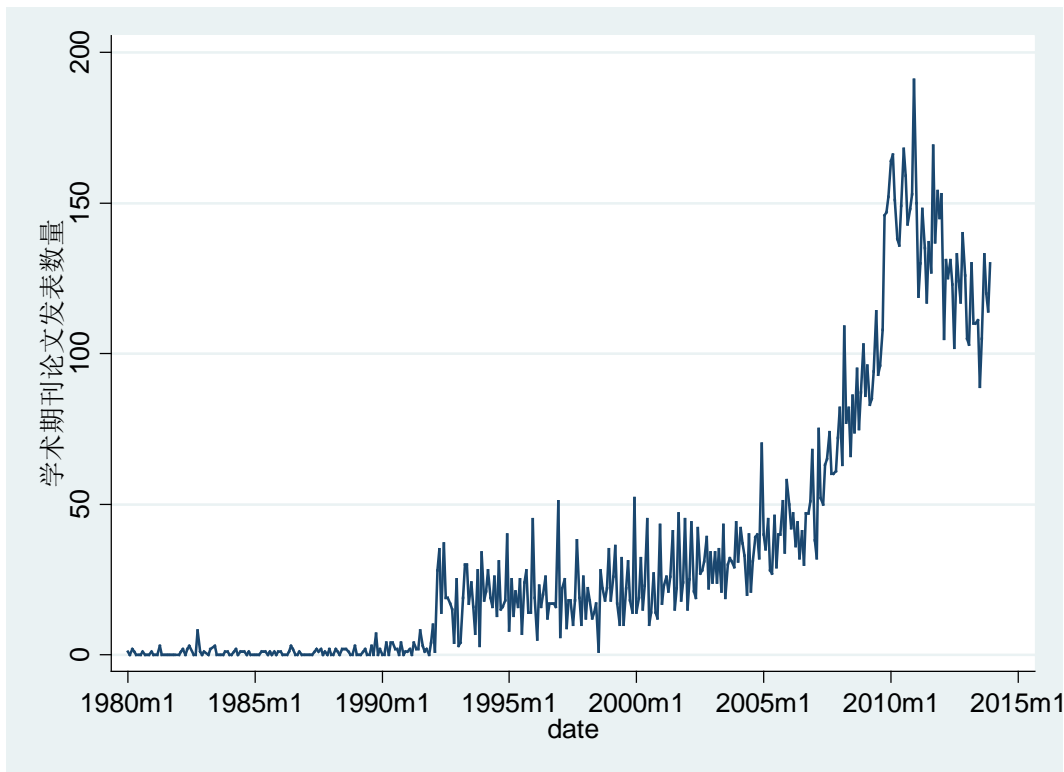


Figure 6-4 Monthly curve of numbers for academic articles concerning climate change

### 6.3.2.6 Independent Variable: Issues Correlations

We hypothesized that the correlations caused by synergy effect between climate change and environment issues may promote issue attention of climate change when attention on environmental issues are rising up. In order to test this hypothesis, we retrieved all the articles from People’s Daily according to the string below:

(FT=(环境污染+环境保护+环境质量+空气质量+空气污染+大气污染+大气质量)-气候变化-全球变暖) AND LY=人民日报

By following the retrieval plan above, all the articles in relation to environment issues are collected. To avoid the endogeneity that the same texts appear in both dependent and independent variables, texts with “climate change” and “global warming” are eliminated. The defect of adopting this method is that when attention on climate change issue and environmental issues is relatively high simultaneously, the competition between the them would be magnified, but the significance of mutual promotion caused by issue association would be weakened.

### 6.3.2.7 Independent Variable: International Pressure

The international pressure is to measure the attention on China's climate change from the rest of the world and to check the function it might have in promoting the attention on China's climate change. Global pressure is a perceptible variable, so it has to be constructed. This research believes that the international pressure on China grows with the attention on China's climate change from the important participating countries in addressing climate change issue. To simplify the measurement, New York Times is selected as an indicator of attention of US. All the articles in line with the searching string below would be retrieved from LexisNexis database. When the articles mentioned climate change and China at the same time, it would be marked as one stimulus of pressure. The Boolean Search string is as below:

```
BODY((climat! W/5 (chang! OR catastroph! OR disaster! OR transform!  
OR adjust! OR trend! OR warm! OR heat! OR cool! OR  
variab!)) OR  
(greenhouse! W/3 effect!) OR  
((global! OR earth! OR world! OR international! OR hemisphere!)  
W/5 (warm! OR heat! OR cool! OR chill!)) OR  
((temperature! W/5 (global! OR earth! OR world! OR international!  
OR hemisphere!) W/8 (increas! OR rising! OR rise! OR  
decreas!)) OR  
UNFCCC OR  
Tokyo Protocol) AND  
BODY(China OR Chinese)
```

Through the method above, we could approximate the international pressure variable.

### 6.3.3 Empirical Research Approach

This research would use time-series analysis toolbox to examine the dynamics model of issue attention. More specifically, Autoregressive Integrated Moving Average Model with Exogenous Variables (ARIMAX) is employed. It is a dynamic regression model, often used to analyze time series with autocorrelation. The attention inertia necessitates this model to deal with autocorrelation. During the analysis, robust standard errors are

used in ARIMA model so as to address the heteroscedasticity of the residuals. The procedures of analyzing time series are: test for stationarity on variables; add autoregressive and moving average terms and determine complete ARIMA (p,I,q) model; add explanatory variables and establish appropriate lag length; finally, test whether there are significant influence from the explanatory variables and explain the results.

## 6.4 Issue Attention Dynamics Analysis with Month as Time Unit

This part will conduct issue attention dynamics analysis with month as time unit. The time unit of month is relatively short, which is suitable to explain the short-term fluctuations of issue attention. In order to reduce the influence from missing data and focus on the period when climate change was framed as global warming, the time range for analysis spans from January, 1985, to December, 2013.

### 6.4.1 Test on Time Series

#### 6.4.1.1 Stationary Test on Issue Attention

First, test for the stationarity on monthly data. As shown in Figure 6-5, there is no obvious ascending or descending trend for the monthly fluctuations of issue attention on climate change. Yet, the fluctuation became no longer stationary as before after 2007. Therefore, it can be inferred that serious heteroscedasticity may exist in issue attention of climate change, which would cause estimation errors. Usually under such circumstance, it is possible to conduct logarithm on variables to eliminate the heteroscedasticity, but zero values would render fault of logarithm. Thus, this research uses cube root of issue attention as a new dependent variable in place of the original variable.

The ADF (Augmented Dickey–Fuller unit-root test) is used to conduct unit root test on dependent variable. The result is shown in Table 6-2. The examination result of ADF is -10.620, much smaller than 1% critical value, -3.452, so it is possible to reject the null hypothesis that data is not stationary and accept the alternative hypothesis that the monthly data of issue attention on climate change is stationary.

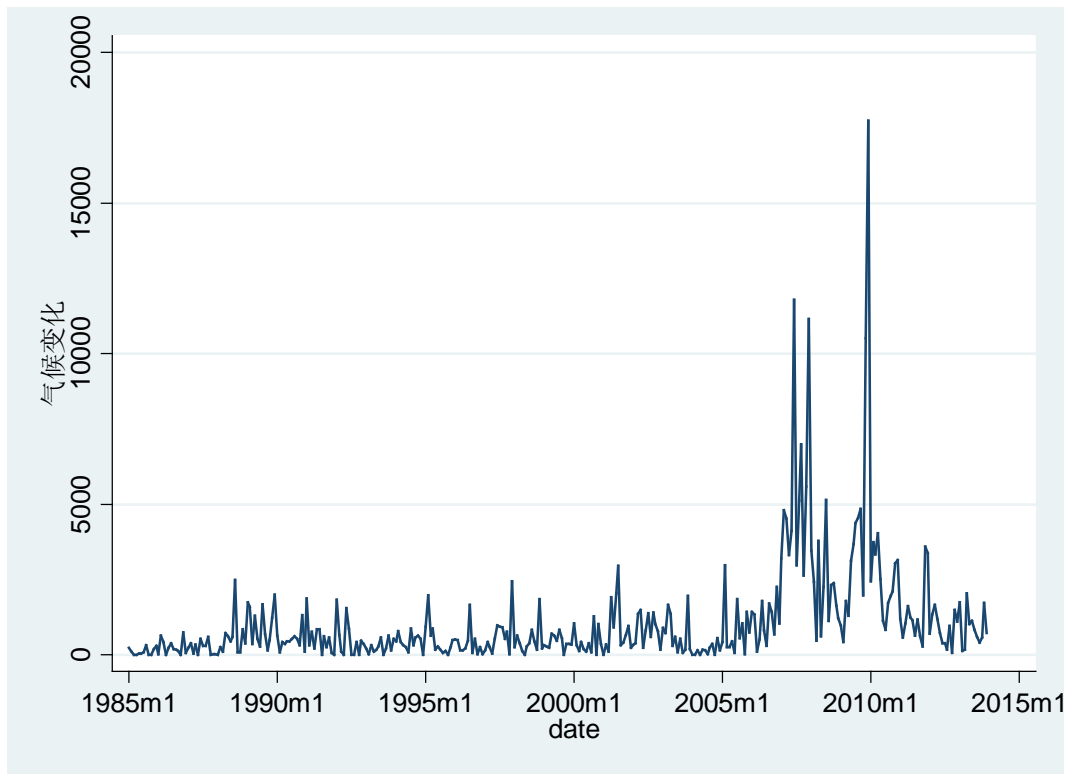


Figure 6-5 Monthly curve of issue attention on climate change in China

Table 6-2 Stationarity test results of monthly issue attention

Dickey-Fuller test for unit root				Number of obs=348
	Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	-10.620	-3.452	-2.876	-2.570
MacKinnon approximate p-value for Z(t) = 0.0000				

#### 6.4.1.2 Autocorrelation test on Attention

After obtaining the stationary time series, the next step is to determine the autoregressive (AR), and moving average (MA) terms, which can be deduced through the patterns of the autocorrelation functions and partial correlations.

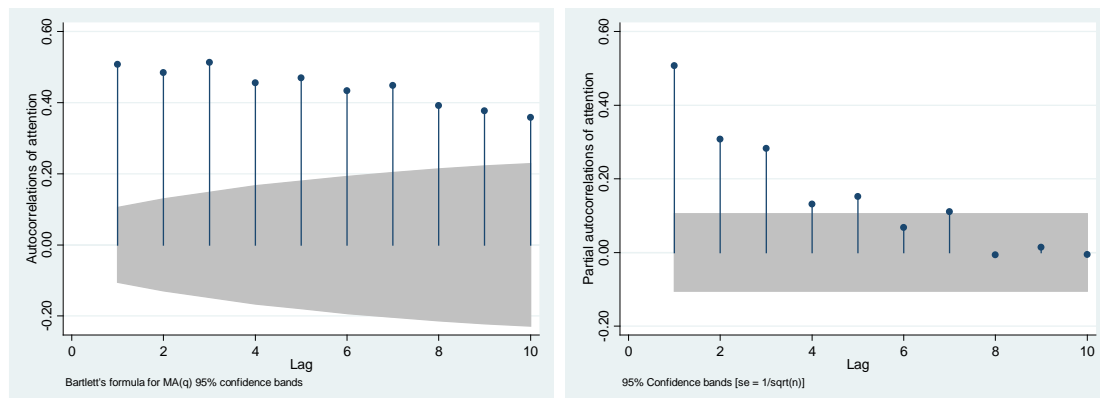


Figure 6-6 Autocorrelogram (left) and partial correlogram (right) for monthly issue attention

As shown in Figure 6-6, it is obvious that autocorrelogram exhibits the trends of declining pattern and partial correlogram exhibits the pattern of truncation. Hence, the intuition here is that the AR term and MA term of monthly attention data are both of low order (as shown in Table 6-3). Considering the simplification of model, this research would have AR (1) and MA (1) included into ARIMA model.

Table 6-3 ARIMA regression results for monthly issue attention dynamics model

attention	_cons	7.945 (5.95)**
ARMA	L.ar	0.971 (60.75)**
	L.ma	-0.770 (18.01)**
sigma	_cons	3.254 (26.06)**
<i>N</i>		348

\*  $p < 0.05$ ; \*\*  $p < 0.01$

Then examine the autocorrelation and heteroscedasticity of the residuals to diagnose whether model settings above is reasonable. Test the residuals with Q statistics which is 46.0894,  $\text{Prob} > \chi^2(40) = 0.2349$ , so the null hypothesis can be rejected and the residuals could be regarded as white noise which implies there is no autocorrelation anymore. Then do LM test on residuals. The chi-square statistics is 3.223, and the statistics of  $\text{Prob} > \chi^2$  is 0.0726, which means null hypothesis that dependent variable have no heteroscedasticity is acceptable. In addition, the influence brought by heteroscedasticity

could be further reduced by robust standard errors.

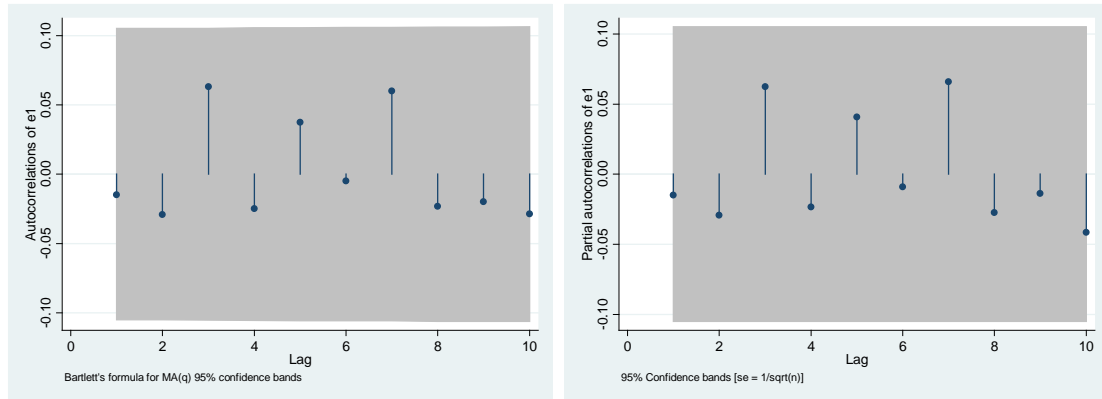


Figure 6-7 Autocorrelogram and partial correlogram for monthly issue attention with AR and MA

#### 6.4.1.3 Stationarity test on Independent Variables

Independent variables including policy knowledge could be nonstationarity, so we use Dickey-Fuller (ADF) test to check the stationarity of variables. The nonstationary series could be transformed to stationary series by taking the logarithm or square root to them. Finally every independent variable is ensured to be stationary under the confidence level of 95% (as shown in Table 6-4).

Table 6-4 Stationarity test results and methods of data transforming for explanatory variables

Explanatory variables	Variable name	ADF test	Transforming method	ADF test
Direct indicator	Carbon	Z(t) = -1.000 p-value = 0.7533	Logarithm	Z(t) = 0.0274 p-value= 0.0274
Negative events	Disaster	Z(t) = -10.363 p-value = 0.0000		
International agendas	Cop	Z(t) = -17.694 p-value = 0.0000		
International agendas	App	Z(t) = -19.037 p-value = 0.0000		
International agendas	Rio	Z(t) = -18.696 p-value = 0.0000		
International agendas	Brics	Z(t) = -19.134 p-value = 0.0000		

International agendas	G20	Z(t) = -19.658 p-value = 0.0000		
International agendas	IPCC	Z(t) = -17.187 p-value = 0.0000		
Policy cycle	Cycle_11	Z(t) = -3.185 p-value = 0.0209		
Policy cycle	Cycle_12	Z(t) = -3.074 p-value = 0.0285		
Policy knowledge	Knowledge	Z(t) = -2.807 p-value = 0.0572	Square root	Z(t) = -3.580 p-value = 0.0061
Issues correlations	Envi	Z(t) = -8.367 p-value = 0.0000		
International pressure	Pressure	Z(t) = -8.367 p-value = 0.0000		

#### 6.4.2 Empirical Result of Time Series Analysis

The result of ARIMAX dynamics model of monthly issue attention on climate change is shown in the Table 6-5. Model I is ARIMA model, without any exogenous variables. From model II, independent variables would be added to the model one set by another. Model IX includes all the independent variables to run the time series test, while model X only has significant variables from model II to VIII integrated into analysis. The monthly issue attention of climate change is ARIMAX (1,0,1) model. In all the models, AR (1) and MA (1) are both significant under the confidence level of 99%;  $0 < \text{AR} (1) < 1$ , which means issue attention of climate change has significant inertia, and attention in the past would affect that in the latter time, but this effect of inertia is convergent rather than divergent in long term. It is worth noting that value of AR (1) is always above 0.9, which means that attention would adjust finely while maintaining the general level as the former time. In all models,  $-1 < \text{MA} (1) < 0$ , which means the variation of attention will converge to the counter direction on the basis of former variation and it would keep the general status of issue attention of climate change stationary and convergent.

In model II, as the problem indicator, the increment of carbon dioxide emission is not significant in model. In model III, neither the disaster nor its the first-order lag has



significant effect on triggering issue attention of climate change, which is not consistent with common belief. Although the confidence of the scientific deduction that climate change will cause more meteorological disasters is increasing, meteorological disasters cannot significantly increase issue attention of climate change. To some degree, this is because it is a macro and statistical phenomenon that climate change would bring about more extreme meteorological disasters, but in short term the causal relation between meteorological disasters and climate change is more ambiguous. Therefore, meteorological disasters do not exhibit focusing effects in promoting issue attention. Actually, based on the model IV, COPs and Rio+ Global Environment Summit serves as focusing events; the former have positively affected issue attention under 99% confidence level and the latter have done so under 90%. Except these two kinds of events, other events have no significant contribution in explaining the dynamics of issue attention. In model V, the impact of policy cycles are not significant, which to some degree argues that policy goals related but not directly connected to climate change cannot increase issue attention significantly. In model VI, lagged policy knowledge is significantly associated with attention of climate change under confidence level of 95%. Model VII shows that lagged environment attention is positively associated with attention on climate change under 90% confidence level, proving to some extent that the attention on climate change have been reinforced by the attention on environment issues. The fact that current crowd-in effect is not significant is corresponding to the scarcity of attention, which implies that issues would compete for attention. Model VIII shows that international pressures have significant impact on issue attention of climate change. In this framework, international pressures are associated with international agendas, so more strictly it is necessary to exclude other factors that can affect both international pressure and international agendas. However, the result also lends much credence to the proposition that China's issue attention of climate change is significantly affected by international pressures and agendas. After adding all variables into model IX, it is found that COP, Rio+ Summit of focusing events and international pressure are significant factors in explaining the dynamics of issue attention on climate change, while factors including policy knowledge and issues correlations are not significant anymore. After removing insignificant variables from model II to VIII, model X has also yielded the same result as model IX.

Table 6-5 ARIMAX regression results of MONTHLY issue attention dynamics models

		Model I	Model II	Model III	Model IV	Model V	Model VI	Model VII	Model VIII	Model IX	Model X
attention	_cons	7.945 (6.33)***	7.811 (4.85)***	7.881 (5.79)***	7.731 (6.23)***	7.867 (6.71)***	6.061 (4.93)***	6.249 (4.67)***	5.990 (8.28)***	5.025 (3.97)***	5.109 (5.24)***
ARMA	L.ar	0.971 (60.62)***	0.971 (59.09)***	0.972 (59.24)***	0.970 (62.19)***	0.969 (46.88)***	0.948 (34.85)***	0.964 (48.62)***	0.939 (34.35)***	0.925 (22.62)***	0.937 (35.56)***
	L.ma	-0.770 (18.43)***	-0.771 (18.45)***	-0.770 (18.49)***	-0.755 (18.16)***	-0.773 (17.03)***	-0.755 (17.67)***	-0.771 (17.56)***	-0.767 (18.84)***	-0.754 (14.66)***	-0.750 (17.16)***
attention	carbon		0.026 (0.12)							-0.020 (0.11)	
attention	disaster			-0.001 (0.19)						0.002 (0.31)	
	L.disaster			0.001 (0.19)						0.002 (0.39)	
attention	cop				0.318 (4.82)***					0.251 (4.17)***	0.258 (4.34)***
	rio				0.354 (1.94)*					0.329 (2.09)**	0.337 (2.18)**
	app				-0.638 (1.57)					-0.616 (1.54)	
	g20				-0.375 (1.05)					-0.386 (1.08)	
	brics				0.550 (0.65)					1.198 (1.25)	
	ipcc				0.508 (1.20)					0.168 (0.51)	
attention	cycle_11					0.959				1.823	

						(0.55)			(1.13)		
	cycle_12					0.218			-0.363		
						(0.13)			(0.26)		
attention	knowledge						0.054		-0.154		
							(0.38)		(1.17)		
	L.knowledge						0.322		0.153	0.153	
							(2.01)**		(1.22)	(1.24)	
attention	envi							0.017	0.010		
								(1.34)	(0.81)		
	L.envi							0.018	0.014	0.014	
								(1.66)*	(1.43)	(1.52)	
attention	pressure								0.035	0.025	
									(1.08)	(0.75)	
	L.pressure								0.169	0.133	0.123
									(4.34)***	(3.45)***	(3.29)***
sigma	_cons	3.254	3.254	3.255	3.101	3.252	3.239	3.232	3.129	3.001	3.040
		(25.16)***	(25.15)***	(25.23)***	(25.60)***	(25.08)***	(24.84)***	(24.94)***	(26.76)***	(25.76)***	(25.75)***
Ll		-904.86	-904.85	-902.39	-888.13	-904.61	-900.45	-899.89	-888.42	-873.88	-878.46
AIC		1817.725	1819.709	1816.782	1796.251	1821.216	1812.908	1811.781	1788.833	1789.77	1774.914
BIC		1833.133	1838.97	1839.878	1834.773	1844.329	1836.004	1834.877	1811.929	1870.606	1809.558
N		348	348	347	348	348	347	347	347	347	347

\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

## 6.5 Issue Attention Dynamics Analysis with Quarter as Time Unit

In the above section, issue attention dynamics with month as time unit is examined, which has presented the short-term fluctuation pattern of issue attention. In fact, issue attention is usually disturbed by various factors, which may give rise to many noises and conceal the factors taking effect in long term. Therefore, this part will analyze attention dynamics with quarter (three months) as time unit.

### 6.5.1 Test on Time Series

#### 6.5.1.1 Stationarity Test on Issue Attention

First test stationarity on quarterly data. As shown in Figure 6-8, the quarterly data of attention on climate change does not exhibit obvious ascending or descending trend, so basically we could infer that no trend term exist in quarterly data.

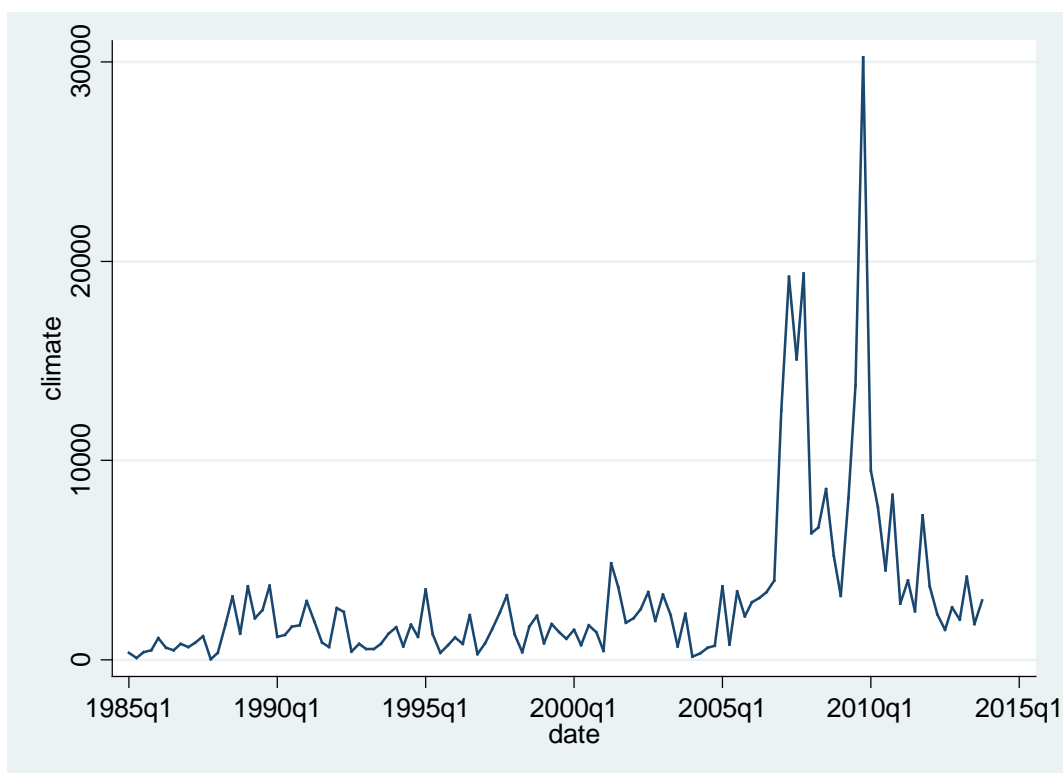


Figure 6-8 Quarterly curve of issue attention on climate change in China

However, from Figure 6-8, it is obvious that quarterly curve of issue attention kept stationary before 2005, but violent fluctuation appeared thereafter, so it implicates that

heteroscedasticity exists in quarterly series. Considering that 0 value would render fault for logarithm method, a new variable as the square root of the original quarterly data is used to reduce heteroscedasticity.

The ADF (Augmented Dickey–Fuller unit-root test) is used to conduct unit root test on dependent variable. The result shows that the test statistic value is always below the critical value under 1% level, no matter whether the trend term exist or not. Hence, the null hypothesis could be rejected and the quarterly data of issue attention could be considered as stationary series. However, in the following tests, it is found that some independent variables cannot be transformed into stationary series, so it is necessary to take differences and continue the model building process with the differenced series. The stationary test result of differenced dependent variable is shown in Table 6-6; dependent variables is stationary after transforming.

Table 6-6 Stationarity test results of monthly issue attention

Dickey-Fuller test for unit root				Number of obs=115
	Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	-14.636	-3.505	-2.889	-2.579
MacKinnon approximate p-value for Z(t) = 0.0000				

#### 6.5.1.2 Autocorrelation test on Attention

After obtaining the stationary time series, the next step is to determine the autoregressive (AR), and moving average (MA) terms, which can be deduced through the patterns of the autocorrelation functions and partial correlations.

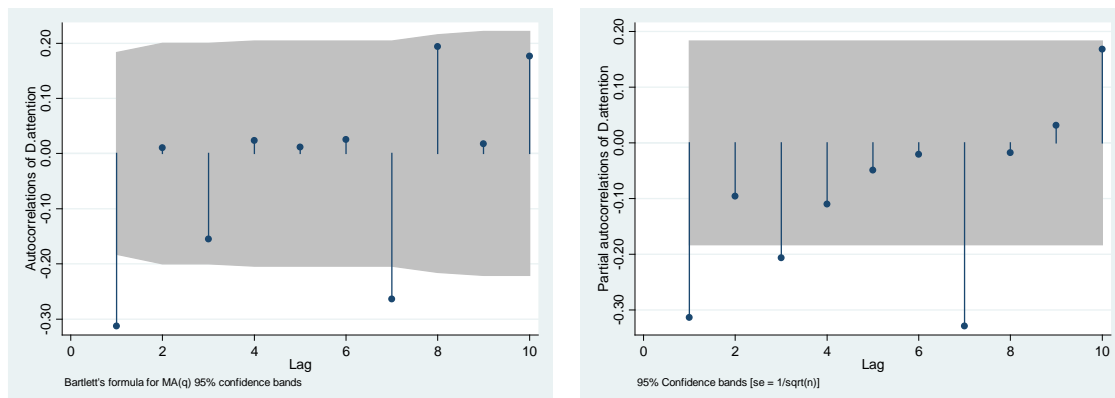


Figure 6-9 Autocorrelogram (left) and partial correlogram (right) for quarterly issue attention

As is shown in Figure 6-9, the autocorrelogram exhibits the declining trend and truncating pattern, so it could be inferred that AR and MA each have one order lag, three order lag, and seven order lag as shown in Table 6-7. It could be found that regression coefficients of AR(3), AR(7), MA(1) and MA(7) are significant, so the differenced model with AR(3 7) and MA(1 7) is set to do the following analysis.

The residuals of quarterly data model are tested with Q statistics which is 32.2611,  $\text{Prob} > \chi^2(40) = 0.8030$ , which implies the null hypothesis cannot be rejected, and the residuals have no serial correlation. Then do LM test on residuals, the chi-square statistics is 11.196, with the p value 0.0008, which means the null hypothesis that residual has heteroscedasticity has to be rejected. Yet in order to simplify the model, the method of robust standard errors is employed to reduce the heteroscedasticity in the model.

Table 6-7 ARIMA regression results for quarterly issue attention dynamics model

attention	_cons	0.274 (0.31)
ARMA	L3.ar	-0.187 (1.99)**
	L7.ar	-0.479 (3.80)***
	L.ma	-0.418 (3.64)***
	L7.ma	0.301 (2.40)**
sigma	_cons	17.561 (13.04)***
<i>N</i>		115

\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

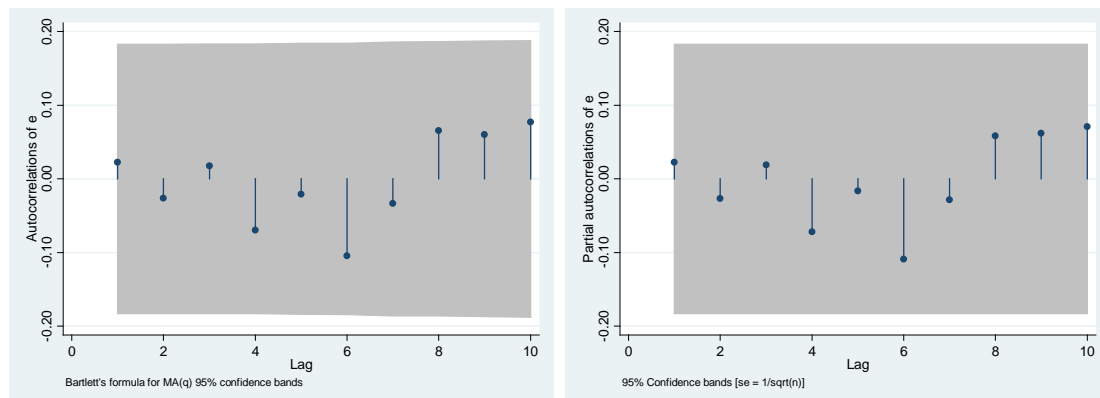


Figure 6-10 Autocorrelogram and partial correlogram for quarterly issue attention with AR and MA

### 6.5.1.3 Stationarity test on Independent Variables

Independent variables such as policy knowledge might be nonstationary, so ADF test should be done to each of them. The results show that series cannot become stationary even after transforming of logarithm or square root, so dependent and independent variables are differenced ( $\Delta = Y_t - Y_{t-1}$ ). After doing this transforming, stationarity has to be examined again, and result is shown in Table 6-8.

Table 6-8 Stationarity test results and methods of data transforming for explanatory variables

Explanatory variables	Variable name	ADF test	Transforming method	ADF test
Direct indicator	Carbon	Z(t) = -1.000 p-value = 0.7533	Logarithm/difference	Z(t) = -10.585 p-value = 0.0000
Negative events	Disaster	Z(t) = -9.499 p-value = 0.0000		
International agendas	Cop	Z(t) = -11.941 p-value = 0.0000		
International agendas	App	Z(t) = -10.044 p-value = 0.0000		
International agendas	Rio	Z(t) = -10.844 p-value = 0.0000		
International agendas	Brics	Z(t) = -7.962 p-value = 0.0000		

International agendas	G20	Z(t) = -10.916 p-value = 0.0000		
International agendas	IPCC	Z(t) = -9.992 p-value = 0.0000		
Policy cycle	Cycle_11	Z(t) = -2.497 p-value = 0.1162	Difference	Z(t) = -10.583 p-value = 0.0000
Policy cycle	Cycle_12	Z(t) = -1.960 p-value = 0.3043	Difference	Z(t) = -10.604 p-value = 0.0000
Policy knowledge	Knowledge	Z(t) = -0.486 p-value = 0.8948	Square root/difference	Z(t) = -14.948 p-value = 0.0000
Issues correlations	Envi	Z(t) = -2.856 p-value = 0.0507	Square root/difference	Z(t) = -13.846 p-value = 0.0000
International pressure	Pressure	Z(t) = -2.253 p-value = 0.1875	Square root/difference	Z(t) = -17.447 p-value = 0.0000

### 6.5.2 Empirical Result of Time Series Analysis

The analysis result of ARIMAX dynamics model of quarterly issue attention of climate change is shown in the Table 6-9. Model I is ARIMA model, without any explanatory variables being added. From model II, independent variables would be added to the model one set by another. Model IX includes all the independent variables to run the time series test, while model X only has significant variables from model II to VIII integrated into analysis. After the variables being differenced, autoregressive terms and moving average terms become more complicated. AR(3) of all models are significant on the confidence level above 90% or 95%, and AR(7) are all significant under the confidence level of 99%. Moreover, AR (3) is around -0.2, and AR (7) around -0.5, which implies that the difference of dependent variable or the change of issue attention always tend to fluctuate toward the counter direction with smaller increment based on the prior level. It also demonstrates that issue attention features stationarity and convergence in substance. MA (1) is around -0.4 and keeps significant in all models under confidence level of 99%, which means the second order of issue attention tends to converge in the long run as well. Although MA(7) functions in the opposite direction, it cannot counteract the effect of MA (1).



The results of model II and III agree with the result of monthly dynamic model analysis; the problem indicator and negative focusing events of climate change cannot significantly affect issue attention of climate change. In model IV, COPs play a significant role in promoting issue attention. However, the variable of G20 has negative effect under the confidence level of 90%. The possible explanation for this unusual situation is that G20 summits usually focus on economy so they triggered the attention of other issues, which compete with climate change for issue attention and crowd it out to a certain degree. In model V, the impact of policy cycles is also trivial. In model VI, it is found that the impact of policy knowledge as well as its lag become insignificant. Combined with the result of monthly analysis, it is possible to deduct that incremental policy knowledge plays a important part in short run instead of long run. This implication fails to agree with the theory given by knowledge utilization school that the accumulation of knowledge rather than increment of knowledge should have affected policy process. However in our case concerning issue attention on climate change, knowledge increment seems more effective than knowledge accumulation. In model VII, attention on climate change would be significantly affected by attention of environment issues under confidence level of 99%, which again confirms the crowd-in effect between issues. Compared to the analysis on monthly model, crowd-in effect of attention between climate change and environment issues is more significant in the model with long time unit. Model VIII's result agrees with the monthly model that international pressures keep positive effect on attention of China's climate change issue. Model IV adds all the explanatory variables into model and it is found that effect of focusing events became trivial, but the positive effect of issues correlations, international agendas and international pressures are still significant. After removing all the insignificant variables of models from II to VIII, the result of model X is consistent with that of IX. When the time unit for analysis of issue attention is lengthened, the focusing effect of focusing events will be attenuated or diluted, which shows that the focusing effects would not last for a long time. Issue correlations and international pressures are able to better explain the dynamics of issue attention from a long term perspective.

Table 6-9 ARIMAX regression results of QUARTERLY issue attention dynamics models

		Model I	Model II	Model III	Model IV	Model V	Model VI	Model VII	Model VIII	Model IX	Model X
attention	_cons	0.274 (0.31)	0.280 (0.32)	0.220 (0.24)	0.234 (0.27)	0.285 (0.34)	0.337 (0.42)	0.131 (0.15)	-0.324 (0.48)	-0.436 (0.67)	-0.287 (0.42)
ARMA	L3.ar	-0.187 (1.99)**	-0.189 (1.93)*	-0.194 (2.11)**	-0.202 (1.94)*	-0.222 (2.03)**	-0.169 (1.61)	-0.190 (2.06)**	-0.183 (1.91)*	-0.268 (2.14)**	-0.195 (1.93)*
	L7.ar	-0.479 (3.80)***	-0.478 (3.79)***	-0.503 (3.97)***	-0.482 (3.81)***	-0.456 (3.46)***	-0.501 (4.29)***	-0.548 (4.84)***	-0.363 (2.74)***	-0.453 (4.40)***	-0.461 (4.56)***
	L.ma	-0.418 (3.64)***	-0.416 (3.50)***	-0.408 (3.59)***	-0.397 (2.93)***	-0.457 (3.22)***	-0.431 (4.15)***	-0.448 (4.11)***	-0.437 (3.22)***	-0.525 (3.76)***	-0.458 (3.67)***
	L7.ma	0.301 (2.40)**	0.303 (2.34)**	0.322 (2.54)**	0.316 (2.38)**	0.305 (2.38)**	0.282 (2.23)**	0.361 (3.07)***	0.147 (1.27)	0.288 (2.80)***	0.250 (2.70)***
attention	D.carbon		-0.227 (0.15)							-0.410 (0.32)	
attention	D.disaster			0.006 (0.40)						0.026 (1.63)	
	LD.disaster			0.025 (1.33)						-0.001 (0.06)	
attention	D.cop				1.006 (2.73)***					0.594 (1.40)	0.415 (0.98)
	D.rio				0.947 (1.22)					-0.898 (1.03)	
	D.app				-0.904 (0.24)					-2.959 (0.86)	
	D.g20				-4.121 (1.71)*					-1.065 (0.42)	-0.964 (0.38)

	D.brics				-0.512					1.228	
					(0.10)					(0.23)	
	D.ipcc				1.712					0.080	
					(0.81)					(0.04)	
attention	D.cycle_11				14.324					18.045	
					(0.76)					(1.20)	
	D.cycle_12				-4.284					-3.681	
					(0.26)					(0.26)	
attention	D.knowledge						2.022			0.700	
							(1.03)			(0.44)	
	LD.knowledge						-2.293			-0.883	
							(1.28)			(0.74)	
attention	D.envi						3.426			2.687	2.414
							(2.92)***			(2.19)**	(2.41)**
	LD.envi						-0.794			0.256	
							(0.85)			(0.21)	
attention	D.pressure							9.176		7.614	7.453
								(5.08)***		(3.64)***	(3.78)***
	LD.pressure							1.184		1.434	
								(0.81)		(0.88)	
sigma	_cons	17.561	17.558	17.448	16.738	17.387	17.333	17.002	15.516	14.563	15.091
		(13.04)***	(13.05)***	(13.02)***	(13.46)***	(12.52)***	(12.92)***	(12.52)***	(14.31)***	(14.70)***	(13.87)***
LI		-493.25	-493.23	-488.28	-487.72	-492.17	-487.54	-485.51	-474.76	-467.91	-475.88
AIC		998.4902	1000.467	992.5577	999.4489	1000.336	991.0871	987.0107	965.5101	981.8205	971.7551
BIC		1014.96	1019.682	1014.447	1032.388	1022.296	1012.977	1008.9	987.3997	1044.753	999.2044
N		115	115	114	115	115	114	114	114	114	115

\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

## 6.6 Conclusion and Discussion

Based on the existing theoretical perspectives about agenda setting and the observation to the policy process of climate change issue in China, this research constructed an explanatory model for issue attention dynamics of climate change in China. Then an empirical analysis is conducted to test the hypotheses derived from the framework. More specifically, autoregressive integrated moving average model with exogenous (ARIMAX) is employed to examine the models.

### 6.6.1 Comparison of Results

The empirical results of short time unit (monthly) and long time unit (quarterly) are shown in Table 6-10. When the time unit in analysis is a month, the hypotheses of H1a/b, H3b and H6 have all been validated; when the time unit is set to a quarter, H1a/b, H5 and H6 have been corroborated.

Table 6-10 Summary of regression results

	Monthly analysis results	Quarterly analysis results
Time series model	ARIMAX(1,0,1)	ARIMAX AR(3) AR(7) MA(1) MA(7) integration(1)
Highly significant	<ul style="list-style-type: none"> <li>Focusing events-international agendas: COP、APP</li> <li>International pressures</li> </ul>	<ul style="list-style-type: none"> <li>Issues correlations</li> <li>International pressures</li> </ul>
Relevant	<ul style="list-style-type: none"> <li>Policy knowledge</li> <li>Issues correlations</li> </ul>	<ul style="list-style-type: none"> <li>Focusing events-international agendas: COP</li> </ul>
No effect	<ul style="list-style-type: none"> <li>Problem indicators</li> <li>Focusing events-negative events</li> </ul>	<ul style="list-style-type: none"> <li>Problem indicators</li> <li>Focusing events-negative events</li> <li>Policy knowledge</li> </ul>

## 6.6.2 Discussion about Issue Attention Dynamics of Climate Change in China

### 6.6.2.1 The Limitation of the Traditional Perspectives

In the framework for explaining the attention dynamics in this thesis, problem indicators, focusing events and information feedback have not significantly affected issue attention, which implies that traditional theories and prevailing perspectives in agenda setting failed to perfectly explain our case of issue attention of China's climate change. It is noteworthy that factors from traditional perspectives are all firmly and directly connected with climate change. The fact that these direct indicators can hardly stimulate the issue attention epitomizes the complexity of the climate change issue, and also illustrates that the policy system may have been sensitive to other factors instead of the climate change itself. According to the results, it can be revealed that policy system responds to politics more enthusiastically than to problem itself. The factors triggering political response like focusing events and international pressure of international agendas are the reflection of background and characteristics of the internationalization and globalization of climate change issue. The policy agenda of China in addressing climate change is embedded in the global agendas which bring about multiple and complex effects to China's policy agenda.

Why did not the emission of greenhouse gas significantly affect issue attention? This conclusion seems to contrast with common sense. Generally, past studies usually believed that the increasing of greenhouse gas emission is the crucial factor in triggering China's attention to climate change issue. Yet through analysis on previous studies and interviews to some important actors involved in decision making, we found that the causal mechanism between greenhouse gas emission and China's issue attention on climate change hinges on international pressures. As a result, the issue attention of China's climate change was actually sensitive to the pressures caused by greenhouse gas before. Extreme meteorological disasters have not been able to effectively trigger issue attention to climate change. As has been mentioned before, the fact that extreme meteorological disasters have increased and intensified more than ever is a general and macro trend caused by climate change, but it is very hard to blame climate change for a specific meteorological disaster. Hence, the theory that the vulnerability of climate system accompanied by the serious disasters would trigger the attention and agenda to address climate change cannot be supported by this empirical analysis. As information feedback,

policy cycles did not significantly affect issue attention to climate change, which means that the time when policy goals were set or the policy performances were evaluated did not open the opportunity to promote policy attention. The reason for this might be that climate change was subordinate to other policy goals which are not oriented towards addressing climate change.

#### 6.6.2.2 The Feasibility and Discussion of Extended Theory

This research extended theory about agenda setting based on the traditional perspectives, and constructed dynamic models to explain the change of issue attention on climate change in China. The results supported the hypotheses derived from the theoretical models. This study tried to move beyond the conventional perspective that is usually focused on a single or an isolated policy subsystem, and integrate trans-subsystem ideas into policy agenda theory to improve the understanding on complicated issues spanning multiple areas such as climate change, which is in line with the appeal to construct boundary-spanning policy regime (Jochim&May, 2010). Empirical results demonstrate the crowd-in effects of attention between policy issues. It is found that the attention on environmental problems had significant effect on promoting issue attention of climate change. Although it has been already noticed that climate change agenda is associated with environment agenda in some aspects, their associations and interactions have not been deeply examined with empirical evidence. This study has made an attempt to bridge this gap, which could be expected to improve the understandings about policy agenda setting especially for emerging complex issues such as climate change. Crowd-in effect is a mutual interaction and influence between and policy subsystems, which may results from various causes. First of all, this effect could come from the preference change of policy system. For example, the increase of the focus on the environment problems may be caused by the preference shift to environment within certain period of time, and this shift would generate spillover effect which would enable other related issues to gain more attention. Additionally, there exists synergy effect between addressing environmental pollution and climate change, for they encompass similar and overlapping governance mechanism and policy tools. Hence, the increase of the attention on environment issues will stimulate the increase of issue attention of climate change. Furthermore, there might also be the case that the they may take advantage of each other to enhance the possibility to gain attention—when the attention is focused on the

environment problems, the advocates of climate change issue will borrow the salience of environment issues to increase the issue attention of climate change. Of course, answering these questions is not included in the research framework of this thesis, yet the insight given by the empirical evidence in this thesis makes it more worthwhile to further discuss these questions.

This research took the international pressures into account in modeling attention dynamics of climate change in China, which has extended the model of agenda setting in terms of the spatial boundary. The empirical result shows that the international pressures has significant positive effect on China's issue attention of climate change. In the former studies on China's policy process of climate change, the influence of international politics was a persistent topic. However, most of them tried to explain the attitude of China's government in climate change issue from the perspective of political rationality, rare empirical evidence being provided to illuminate the influence of global politics and agendas in framing domestic issue attention and agendas. Yet, this research contends that climate change, as a boundary-spanning issue, its issue attention and agenda setting have been promoted and affected by the international pressures. On one hand, this demonstrates the pressure-response pattern of China's issue attention on climate change. On the other hand, it worth noting that in studying policy process of climate change, we should invest more on establishing a more comprehensive model by synthesizing global politics and international agendas. With the globalization of the environment for policy making, research on the interactions between international politics and domestic policies should move beyond the perspective of international relations and synthesize it with the conventional public administration and policy process theories to address the challenge of boundary-spanning issues.

In this research, policy knowledge, as information feedback, did not have the significant effect in triggering issue attention of climate change in China. It's worth noting that it does not underplay the critical role of policy knowledge in policy process, especially with regard to complex issues such as climate change. For the objective of this research is the issue attention of climate change, the results only indicated that policy knowledge have not played an important role as expected in policy agenda setting which is the front step of policy process. Climate change is extremely complex, so there is no doubt that policy knowledge plays a very crucial role in decision making. But based on the empirical study of climate change case in China, its role of focusing issue attention

and framing policy agenda could not be supported.



## Chapter 7 Conclusion and Discussion

This thesis focused on China's climate change issue, mainly analyzing both the evolution and dynamics of attention from the perspectives of "issue space" and "attribute space", and explaining the history of climate change issue in China in terms of dimensional structure of issue attention. This paper adopted the method of content analysis which was used to extract and measure issue attention to climate change, and illustrated how the issue attention to climate change in China developed and evolved. In addition, on the basis of theories and observations, this thesis proposed a dynamics model of China's issue attention to climate change. Through solid evidence, it furthermore analyzed the factors that exert significant impacts on China's issue attention to climate change in short term and long term. This chapter, as the discussion and conclusion of this thesis, first will summarize main conclusion of this thesis, then analyze its innovation points, and finally bring up its weaknesses and prospects.

### 7.1 Research Conclusions and Discussions

#### 7.1.1 The Main Conclusions of Research

Conclusion I: This thesis studied the evolution of issue attention to climate change, analyzing the dimensions and attributes of issue attention to climate change at different stages.

Stage I: "Climate Change" in the perspective of meteorology in 1947-1977. Now "Climate Change" has already been symbolized as the greenhouse effect caused by human activities on global climate and has become a specific term for this global issue arising in 1980s. Nevertheless, in China's policy discourse, climate change still contained the connotation of weather change in long time or on large scale, which remained dominant before global warming issue came into being. Through analysis on the climate change issue before the advent of global warming issue in 1977, it's found that in this period, the dimension of agriculture takes a dominant place among all attention dimensions of climate change issue. This is due to the close connection at this period between agriculture which the livelihood of people rested on, and weather changes on large scale or in long time. And climate change has had greatly affected the activities and

output of agricultural production. At this stage, the attention of climate change in climate change issue has higher correlation with dimensions of meteorology, agriculture & forestry, environment & ecology, and natural disasters, etc. Combined with the constitutive characteristics of issue attention to climate change, we could find that those characteristics mainly are attributed to the negative impacts of natural disasters caused by climate change in perspective of meteorology on agricultural production, which could be reflected in the dominance of agriculture & forestry dimension. The characteristics of issue attention to climate change became particularly significant around the year 1960 when China faced a wide range of natural disasters and very poor harvest, so at this stage climate change was more framed as negative consequences of “natural phenomenon”.

Stage II: from scientific agenda to policy agenda in 1977-1992. Since 1977, the issue focus of climate change started changing, entering a transitional period in late 1980s and early 1990s when the connotation was transforming from weather changes in long time or on large scale to global warming issue. Meanwhile, the issue of climate change also began to transfer from a scientific research agenda to a policy making agenda. Besides, remarkable changes also happened to issue dimensions of climate change, compared with last stage, the dimension of environment & ecology gradually took place of the dominance of agriculture & forestry, indicating the emerging of environmental attribute of climate change issue. The increasing environmental awareness also led to more attention to climate change issue, verified by dynamics of climate change attention. The correlated dimensions of issue attention to climate change dimension had experienced a substantial change as well, displaying the disappearing of significant correlations between climate change dimension and dimensions of natural disasters and agriculture & forestry, which were substituted by the high correlations with environment & ecology, energy resource, economy, and industry, etc. Considering the dominant attention dimensions of climate change could help demonstrate the environmental and ecological attributes of climate change issue during this period. What’s more, at this stage more attention was paid to the reason behind climate change as “a result of human activities”.

Stage III: Climate change as an important policy agenda in 1992-2013. The signing of United Nations Framework Convention on Climate Change (UNFCCC) in 1992 marked the beginning of climate change issue as a formal policy issue. Before 2005, the structure of attention dimensions of climate change issue basically kept the environment & ecology dominant tendency as the former stage, and the level of issue attention to

climate change also stayed stable. After 2005, however, a huge change occurred to issue attention of climate change, with sudden increase and outburst of climate change attention. In terms of the structure of attention, the dimensions of development, economy, energy & resource, and international governance replaced the dimension of environment & ecology, taking the leading role in issue attention to climate change, which showed the issue attributes of climate change transferred from environment to economic development and international governance. Along with the diversifying process of dimensions of climate change issue, climate change dimension's correlations with other dimensions also became more significant, indicating that the coupling and embedding of climate change issue and other issues were strengthening. Based on the above results, climate change has already turned into an international governance issue concerning both environment & ecology, energy resources and economic development.

Conclusion II: Based on the analysis of evolvement of issue attention to climate change, this thesis further illustrated the structure transformation of climate change issue, and reached the important conclusions as follows.

We have found the gradual descending tendency of climate change dimension's proportion among all dimensions of issue attention to climate change. Thus it means that climate change now became more often the constitutive dimension of other issue attention, and other issues were taking advantage of the salience of climate change. With the method of entropy, this research also noticed the rising tendency of dispersion of issue attention to climate change, demonstrating that the dimensions of issue attention to climate change in its evolvement became increasingly dispersive and diverse. On the one hand, it showed that promoting addressing climate change problems made the issue attention to climate change produce more and more spillover effects, under the circumstances of gradual strengthening of coupling between climate change issue and other policy issues. On the other hand, when climate change issue grew to be a policy issue receiving widespread attention, other policy issues also would love to draw support from attention of climate change in order to promote its own capability to gain policy attention.

Conclusion III: On the basis of previous theories and observations to policy process as well as the interviews to policy makers and experts, this thesis put forward a dynamics model of China's issue attention to climate change. Through the method of time-series analysis, it furthermore tested this dynamics model of issue attention to climate change by month and quarter time unit respectively.

The empirical tests showed that in the monthly short-term dynamics model, issue attention to climate change had a significant inertia, and the international agendas such as Conference of the Parties of UNFCCC played important roles in focusing issue attention to climate change. Meanwhile, the attention to environment issue exerted crowd-in effect to attention to climate change issue. Also, international pressures impacted on China's issue attention to climate change enormously. Moreover, policy knowledge only had a trivial impact on issue attention to climate change, and problem indicators, negative events and policy cycles all had no significant impacts on such issue attention.

The empirical tests also revealed that in the quarterly dynamics model, issue attention to climate change also got affected by previous issue attention and its fluctuation, indicating the inertia of issue attention. Same as above, the attention to environment issue exerted crowd-in effect to attention of climate change issue significantly, and international pressure also impacted greatly on climate change issue. In this quarterly dynamics model of attention, however, international agendas, such as Conference of the Parties, left small or even trivial focusing effects to issue attention, showing its short duration and influence as a focusing event, though. Besides, policy knowledge did not cause significant impact on issue attention, and neither the problem indicators nor the negative events exerted crucial impact on such issue attention.

### 7.1.2 Discussions on Research Conclusions

Although this research focused on issue attention which is in beginning step of agenda setting and policy process, it offered us conclusions and inspirations with universal meaning and value for policy process theories. Different from previous research perspectives and methods in policy process, this study on issue attention has promising prospects and potential to further the understandings of public policy.

First of all, attention of policy issue encompasses the focus, the level, the structure of attention as well as the complex relations with other policy issues, which implies that issue attention is a complicated variable. Issue attention which usually matters particularly at the beginning of policy process forms the policy pressure and influences the policy agenda. Issue attention is the mediator of policy process. As the core of agenda setting, issue attention is the prerequisite of producing final policies. For a long time researches on policy and politics process merely centered on interest-related or resource-

related factors (Jones&Baumgartner, 2005b), while importance of organization and institution in processing information in policy process has not yet become prominent, resulting in troubles when explaining the complexity of policy process. At the same time, researches focusing on the cause-effect relations between environmental variables and policy output are always criticized for the logic flaws of underplaying the roles of policy process, since agenda setting is the necessary but not sufficient condition for policy output. Studies on issue attention in policy process intend to bridge this gap. It enables us to establish a policy process framework with more dynamic features to integrate attention, information processing, policy process and system theory together. This attempt can also offer an opportunity to develop the theories of policy process so as to make the micro, meso and macro perspectives of policy process studies share the consistent theoretical foundations and logic. So studies on issue attention could greatly enrich the understandings of agenda setting.

Secondly, the empirical study provided some different results in comparison with the general opinions, which would help us understand the policy process of climate change, and even the general theories of policy process. An unexpected finding shows that the policy problems or incidents themselves do not necessarily trigger policy agenda. Especially when the attention of such problem gets distracted or transferred to other policy domains, it's difficult to have a formal policy agenda established. Besides, in the background of globalization, policy process would no longer maintain the simple "problem- response" pattern which is free of external influence. As an important driving factor of issue attention, international pressures would exert significant impacts on policy agenda setting. The scarcity of policy issue attention leads to competition and even dilution of attention, but it also should be noted that issues would also reinforce each other in agenda setting due to the similarity and the synergy effects between issues or the strategies of policy advocates and policy entrepreneurs. This demonstrates that the interactions between policy subsystems significantly affect the agenda setting. It can be predicted that the seemingly abnormal implications and two improvements on the theories, as have explained above, might not be occasional phenomena, but would even possibly become the new normal situation for the policy process of emerging issues. The paper studies the case of climate change issue, one typical representative of the most complicated and uncertain risk issues in modern society. But we have to also notice its general characteristics as a modern policy issue despite its own uniqueness. In previous

studies of policy process, we tended to take it for granted that there would be an inevitable connection between the social problems and the policy response, but the research on issue attention to China's climate change has questioned such conventional perception. It illustrated that the policy processes do not have to fit in a linear model, or even have significant correlations with its corresponding social problems. Although, in the short term, this could be explained by the difficulty in identifying the exact causal relation between the social problem and the results, such as the controversy about the relation between global warming and some natural disasters, yet for a long time if policies still could not respond systematically to the problems, we need to further reconsider the values of public policy. Accordingly, the changes of policy arena are increasingly embodied in the policy process. The trend to "globalization" of policy process cannot be underestimated, especially when it comes to the management of global public resources and public goods, the impacts of globalization on policy process become more significant. The mechanisms by which globalization influence policy process are multiple and complex. The issue attention to climate change in this research gets affected by both the global agendas and international pressures. This kind of globalization may affect not only global policy issues, but also the issue attention of regional or local issues and further change their policy agendas. For example, some boundary-spanning factors have shaped the policy agenda about air pollution in Beijing-Tianjin-Hebei district, this process may be much more complicated than imagined. Finally, the interactions between policy subsystems also deserve more discussions in future. Public policies in modern society not only need the technical feasibility and value acceptance as Kingdom had proposed, but also highly require policy compatibility (Eissler et al., 2014). Therefore, the interactions between policy subsystems will be more frequent and important. Such interactions may appear as Crowd-in or Crowd-out Effects as presented in this research, but the reasons, mechanisms and behaviors behind the effects may be complicated, which needs further investigation in future. The attention to the correlations between policy subsystems may bring about constructive and beneficial discussions with the fragmented theories which to some extent prevail in policy process research. Therefore, future studies would possibly provide more insights to policy process theories by focusing on the interactions among policy subsystems and the influence of them on policy agenda setting as well as policy change.

In addition, based on the discussion above, we find out that different participants in

policy process would pay attention to different focal points of an issue, which may be quite common with regard to those risk issues with huge complexities. As for the climate change issue, there exists tension between the scientific rationality held by experts and intellectual elites and the political rationality held by policy makers or political elites. The former pay much and constant attention to risk itself from the perspective of technical rationality; yet the latter usually focus merely on the short-term social impacts and reacts in accordance with political rationality, without investing too much on mitigating risks exceedingly way longer than political cycle, especially in the cases with huge time lag between investing costs and obtaining profits. The research findings indicate that under such circumstance, though problems and knowledge exerted limited impacts on the setting of policy agenda, the political environment and influence triggered by problems and knowledge would play an essential role in policy process. In this research, international agendas and pressures acted on triggering attention of policy issues so that the political response pattern came into being. For the purpose of coping with the creeping risks in future, such pattern of policy agenda may be confronted with some challenges, such as deviating from the perfect technical solutions due to the tension between technical and political rationality, or missing the appropriate opportunities to respond to the risks. Therefore, in order to cope with global risks, in studying policies, designing institutions and regulating risks, we should think over how to combine the attention of different participants into joint forces, how to stimulate positive interactions between international agendas and domestic agendas, how to urge policy makers to actively attach importance to those creeping risks, and how to reconcile the conflicts among policy goals and tools on the basis of both technical rationality and political rationality.

Last but not the least, modern society is plagued by so many complex risk issues. Under the circumstance that the process of decision making is becoming more scientific, democratic and transparent in China, various factors including public agenda, scientific agenda, media agenda and international agenda would exert more significant and complicated impacts on policy agenda. Thus the researches on public policies, especially those focused on issue attention and agenda setting, will have more theoretical values and practical significance. This study has only made an attempt to examine the policy agenda setting of climate change in China. Based on the research framework and methodology of this study, much more insights could be provided through conducting comparative studies on difference issues in different polities and by moving beyond the isolated or

fragmented perspectives in studying boundary-spanning risk issues.

## 7.2 Innovations and contributions of Research

### 7.2.1 Innovations of Perspectives

First, this study focuses on the beginning stage of policy process, policy issue framing and policy agenda setting. As mentioned in chapter 1, when studying the policy process, the closer to reach the beginning stage of decision making, the harder to observe and get information. However, for policy process research, it means a lot to delve into policy issues and policy agenda, since framing issues and setting agendas starts a whole policy process. What's more, the reasons of deficits or even the failures of policies usually root in agenda setting. That's why researches on policy issues and agendas remain indispensable topics when studying policy process. Nevertheless, due to all kinds of limitations, previous studies on policy issues and agendas were usually afflicted with the lack empirical evidence. This study has made an attempt to bridge this gap.

Second, climate change requires long- term dynamic research for it is a chronic and boundary-spanning issue. Issue attention is influenced greatly by many factors because of its scarcity in policy process, which actually makes the policy process dynamic and nonlinear. Therefore, this research centers on the evolution and dynamics of issue attention to climate change, which could make some contributions towards bridging the gap between policy theories and practical evidence. In addition, this research provides beneficial experiences for researching dynamic changes of China's policy agenda.

### 7.2.2 Innovations of Methods

Invariably, it's of big challenge to seek for the perfect methods to research on policy issues and agenda, because the focus of study locates in the beginning stage of a policy process, making it harder to observe and estimate. Besides, researchers also feel puzzled about the longitudinal research on issues and agenda and how to trace and measure them. In order to balance feasibility and reasonability during research, this thesis mainly adopted content analysis instead of questionnaire survey. The research process could reflect the highly praised "big data" idea through the way of data collection and method application. The research method and framework designed and used in this study could be applied to study other similar topics in future.



As for the operation of research method, here we employ one important technique of natural language processing from IT research, and process data mining on research data set. It's still not very common to apply IT and big data mining to study policy process. Hence, the exploration of this research might be regarded as a practical attempt in this background of big data research, which proves it feasible to integrate engineering techniques with public policy research.

### 7.2.3 Contributions of Research

First, this study provided longitudinal data on issue attention on climate change in China over 60 years, thereby going beyond short period case studies which dominated the research field. It presented a whole panorama of issue attention evolution, which illuminate the diffusing process of climate change into the policy subsystems in China.

In light of the empirical results, my research contended that climate change issue attention dynamic pattern in China is the result of responding to politics and pressure. The findings provided insights into agenda setting theory through expanding issue attention dynamic model by synthesizing international factors and trans-subsystem effects into agenda setting theory. My study also shed light on the understanding of climate change policy process in China.

### 7.3 Possible Improvements and Prospects for Research

This thesis yet still has some weaknesses, and needs further supplement and improvement by subsequent studies.

Firstly, this paper extracted and measured policy issue attention by taking advantage of the data from China's most authoritative official paper media. Although such research design could overcome the barriers for longitudinal study in terms of the accessibility and continuity of research data, the very premise of such research relies on its consistency with the attention of China's policy making system, namely a good mapping relation between policy subsystem and People's Daily. However, in reality, even the most authoritative official media could never perfectly or fully represent the attention of policy-making system, especially when those two have nonlinear interactions. Yet considering the feasibility of research, this possible inconsistency between official media and policy-making system has been neglected in this thesis, which to some extent might cause certain systematic errors. Thus in future studies, the research framework and method need to be

reconsidered about if there is a better index to estimate issue attention, and how to better deal with the measurement errors.

Secondly, this research paid much attention to content analysis, and relied heavily on the quantitative indices derived from official media, which risks ignoring the reality in policy process. It is a rooted and traditional idea in policy process study that policy process is actually the collective action participated by multiple actors. Therefore, research on policy process through quantitative approach requires that numbers or indices should reasonably reflect the reality of social life. Although this study has made use of content analysis on texts, interviews to policy elites, and other data to present the evolvement of climate change issue and agenda, the statistical analysis and research on behaviors of participants could be better integrated in future.

Thirdly, in order to provide much more solid supports for conclusions of this research, some mid-level studies on policy process about climate change in China should be conducted. As a matter of fact, as a “big” issue, climate change contains many sub-topics and micro issues concerning multiple policy subsystems. This study does not intend to scrutinize and explore all the other specific policy issues or their agenda settings. But apparently, the understandings about policy process of climate change in China will be further improved if more efforts are invested in delving into these specific issues in relation to climate change. Moreover, this study can be also furthered by doing comparative studies on different issues in different polities.

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