PUNCTUATIONS AND DISPLACEMENTS IN POLICY DISCOURSE:

THE CLIMATE CHANGE ISSUE IN GERMANY 2007-2010

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Abstract

This paper assesses the impact of large events such as the financial crisis in 2008 and the Copenhagen meeting in 2009 on the public attention attributed to the climate change issue and to the related policy discourse in the German press. Based on a quantitative content analysis of the two largest German national quality newspapers, a quasi-experimental approach will be adopted, testing the propositions of "punctuated equilibrium theory" (Baumgartner & Jones 1993) in policy analysis. The paper will also use concepts and approaches in the area of discourse analysis – from qualitative methods to more formal quantitative approaches to the analysis of discourse structures and network relations (Janning et al 2009).

Large scale and focusing events such as the economic crisis or the Copenhagen meeting can trigger shifts and changes in the discourse on climate change. Preliminary analysis has shown that the economic crisis produced a kink in the issue-attention cycle, triggering a substantial decrease in public attention as public attention to the economic crisis soared. Moreover, the results indicate that actors have changed their discursive behavior in the light of the economic crisis, entailing changes in the actors' standing and the frames applied by them to the issue of climate change (Vogt 2009). As natural experiments run short of quantifying causal links between variables, the observed changes in public attention and discursive behavior can at least be explained by qualitative explanatory sketches in which the changes and shifts are traced and interrelated by visual descriptions at various levels.

1. Introduction

Climate change or 'global warming' has become the prime example for policy problems that are characterized by long time horizons, large uncertainty and high ambiguity (Schneider et al. forthcoming). In such a policy context problem, definitions get vague and instable, preferences become unclear, and the potential of social conflict is high (Zahariadis 2007). Under these circumstances, policy making heavily relies on public discourse in which issues and interest conflicts are collectively debated and shared "definitions of the situation" are constructed. For this reason, the issue of climate change has attracted high attention among policy researchers interested in discourse analysis since the early 1990s.

While many empirical studies focus on the rise and decline of discourse activities since the last decades of the 20th century, some critics have questioned the relevance of climate change discourses at all. For instance, even culturologists such as Heidbrink at al. 2007 call for a *"return from the world of discourses and systems back to the actions and strategies with which social beings try to manage their existence"*. Such a perspective implies that policy problems are seen as objectively given and self-evident, without any need to be collectively defined and represented. In an epistemological perspective, this is a naive version of realism (Bunge 1996). According to our perspective, however, public discourse is an essential part of policy-making, besides the interests, preferences and strategies of all involved actors and the institutional constraints in which policies are decided and implemented. Policy-controversies and debates are not just "surface phenomena" of political processes but are rather an integral part of power structures and exchange relations in policy-making. The analysis of public debates and policy

discourses – in a qualitative or quantitative manner – can therefore be seen as an important component of policy analysis (Schneider/Janning 2006).

In this paper we will apply a specific form of quantitative discourse analysis to the debate on global warming and related policy decisions. Since qualitative discourse analysis runs short in terms of transparency, comparability and replicability, we use various methods of structural analysis to specify the role of actors and their interrelations within the policy discourses on climate change (Janning et al. 2009). Recent methodological developments, namely the combination of category-based, computer-assisted, qualitative content analysis and social network analysis (Leifeld 2009, 2010; Leifeld/Haunss 2010), provide new possibilities to analyze discourse coalitions, actor constellations, conflict structures, and their dynamics at the level of discourses and policy debates.

The specific goal of our paper is to trace and interpret the evolution of German public discourse on climate change in terms of punctuated equilibrium theory (PE theory), which is a distinctive version of evolution theory in the natural science. It rejects gradualist assumptions and emphasizes discontinuities in processes at all levels which have been triggered by great and singular events (Gould/Eldredge). When applied to social developments, PE theory explains policy change as a result of major shifts in the public perception of a policy issue, which in turn is triggered by focal,and often "external" events (Baumgartner/Jones). These processes are intermediated by negative and positive feedback mechanisms that accelerate or slow down developments.

Our study will assess core propositions of PE theory with respect to the impact of the financial crisis on the German climate discourse between 2007 and 2010. Germany has been widely acknowledged to be a pacemaker in climate policy on the European and global level. A

commonly accepted explanation is that intense public participation and strong public consensus based on "ecological modernization" have contributed to this success. Even though this consensus has dominated the German discourse for over two decades, some scholars (Weingart et al. 2000; Weidner/Metz 2007) have issued concerns that it might prove to be unstable. Since its peak in 2007, public attention to the issue of climate change has been declining. Our data show that this down-swing seems to have been strongly amplified due to the financial and economic crisis in 2008 and 2009. In the context of this massive down turn, actors changed their discursive behavior, impacting actor positions and frame constellations.

Our paper proceeds in three steps. In the next section we will give a short outline of various theoretical perspectives in the analysis of policy discourse, emphasizing punctuated equilibrium theory. Our third section proposes a formal and quantitative approach to structural analysis of discourse configurations that are linked to actor networks. In the fourth section we will apply this approach to policy discourse in the domain of global warming in Germany under the influence of the recent economic crisis. In the conclusions we summarize our findings and raise some question for further analysis.

2. The complexity of policy discourse

In the study of public responses to social and environmental problems two opposing perspectives have dominated the academic debate: the objectivist (or naïve realist) and the social constructivist approaches. Objectivists define social problems as objectively given, self-evident, without any measurement problem. From this perspective, changes in the atmosphere and their consequences can be determined in an objective and definitive way. They also assume that rational and well informed actors can develop an optimal adaptation strategy (Stehr/von Storch

1995). Yet from a constructivist point of view, a social problem *"exists primarily in terms of how it is defined and conceived in society"* (Blumer 1971: 300). Thus, climate change only turns into a social problem when individuals or groups conceive it to be a threat to nature and society. The individual as well as the collective perception of risk are thereby influenced by social, cultural and political contexts (Spector/Kitsuse 1973; Stehr/von Storch 1995).

Over the last twenty years environmental issues have inspired discourse analysis within different sub-disciplines of social sciences, e.g. communication science, science and technology studies, as well as policy science. These studies share the conviction that the constructivist perspective is especially fertile with respect to issues that are characterized by long time frames, large uncertainty and high ambiguity. Climate change matches all these characteristics:

Long time frames. Significant changes within the atmosphere emerge "creepingly" over long periods that do not correspond to the time horizon of everyday life experience. Society thus depends on scientific research to detect, anticipate and communicate these risks. In that way, scientific facts only attract public interest and political concern if they can be linked to social threats and possible solutions (cf. Stehr/von Storch 1995, Schneider et al. 2010).

Uncertainty. While human influence on climate change is widely accepted in contemporary science, uncertainties remain about its future development and consequences (Lindzen, Rahmstorf 2008). Scientific forecasts vary along modeling techniques and measurement methods (Stehr/von Storch 1995). Uncertainty complicates risk assessment and communication. Under these conditions, objective cost-benefit analysis of precautionary measures turns into a "mission impossible".

Ambiguity. This property can be defined as a *"state of having many ways of thinking about the same circumstances or phenomena"* (Feldman 1989: 5). While uncertainty may be

reduced by further information, additional information does not reduce ambiguity. Even if there is a complete spread of scientific information, different people will have different perceptions of the problem. For instance, climate change can be understood as a risk to biodiversity, human health, economic development, social equity or political stability. These different problem definitions may not be reconcilable, and hence create vagueness, confusion and conflict (Zahariadis 2007).

Some social scientists concerned with climate change see their research on a "pragmatic middle ground" between objectivism and constructivism, denying neither that threats are objectively given nor that public perception is subject to significant variation. Especially risk communication researchers are concerned with how objective expert information can be effectively communicated to the public (Wiedemann 1991). However, as it is stressed by Stehr and von Storch (1995), these approaches fail to acknowledge the role of actors and their particular interests to influence public perception – from risks assessment to the reporting and public interpretation of these risks. The constructivist perspective highlights that actor relations and cultural contexts in science, culture and the public sphere are more relevant for the debate on climate change than is the quality of information (Stehr/von Storch 1995). Thus, public discourse has to be linked to actor constellations in the policy process. It is this relational dimension that differentiates our method of discourse analysis from traditional forms of discourse analysis within other sub-disciplines of social sciences.

Policy research has traditionally regarded policy making as a linear problem-solving process of a simple 'conceive-decide-implement' sequence, starting with problems that are defined in an objectivist perspective (Hajer 2003: 92). However, the growing complexity of policy problems nurtured skepticism about the rationality of such processes. Policy analysts now

increasingly acknowledge that distinct value orientations, specific information processing capacities, and subjective lines of argumentation and interpretation are influencing the policy process. In this perspective, public discourses have to be seen as essential components of policy making (Fischer 2003, Janning et al. 2009).

With respect to discourses on climate change, a number of studies have examined the rise and decline of issue attention in public arenas as well as the evolution of political agendas in this policy domain. Studies focused on changes of the public perception of climate change as a social problem as well as the role of different social sub-systems such as science, politics and the media during the successive stages of the issue's career (Weingart et al. 2000, Trumbo 1996, Vogt 2009). Some scholars tried to map problem perceptions and conflict lines to explore the possibilities of policy consensus (Dryzek 1997, Addams/Proops 2000). Malone (2009) used a network approach to map similarities between "families" of arguments. Analyzing narrative structures within environmental discourse, Hajer (1995) examined how actors build discourse coalitions around story lines that integrate situational factors, general problem interpretations and policy interests within a coherent narrative.

While all these studies have emphasized the need for communication and mediation in public debates, only some of them have conceptualized discourse as an integral part of the policy process. In addition, some of the studies display quite serious methodological deficiencies. For instance, interpretative "process tracing" and "case studies" often raise problems with respect to transparency, replicability and comparability (Schneider/Janning et al. 2006). Qualitative approaches inherently concentrate attention only to relatively few actors and relations, without taking into account the vast plurality and heterogeneity of actors, the multiplicity of linkages, and the complexity of discourse configurations.

For some time, there have been certain theories in policy analysis in which discourse elements such as ideas or beliefs were emphasized. One example is the the Advocacy Coalition Framework, which describes the policy process as a struggle between different coalitions that share similar belief systems and tries to establish these beliefs as the dominant policy interpretation within a policy subsystem (cf. Sabatier/Weible 2007). In the perspective of the Multiple Stream Approach, policy entrepreneurs use discursive tactics to link policy problems to their preferred policy solutions (Zaharidas 2007).

In the present paper we use Punctuated Equilibrium Theory (PE theory), which emphasizes the role of policy venues, policy images, and the impact of large singular events: Policy actors try to alter the institutional arena within which a given issue is negotiated (venue) to promote their values and policy beliefs (policy image). Actors attempt to transform the overall "issue culture" by persuading undecided participants or mobilizing hitherto uninvolved actors. In this content external and/or internal focal events can have a deep impact on policy development. Public attention to specific issues may suddenly rise or shift towards other issues, thereby attracting new policy actors and restructuring policy discourse. However, it depends on policy feedbacks whether this intrusion creates a serious challenge to the dominant policy image or the deep-rooted actor constellations. Positive feedbacks (e.g. bandwagon effects, social learning or political entrepreneurship) enhance policy change whereas negative feedbacks (e.g. access barriers or coalition building to sustain the present policy image) reinforce existing images or constellations (Baumgartner/Jones 1993, True et al. 1999, Repetto 2006, Baumgartner 2006).

In general, most analyses based on PE theory track policies over long periods to identify patterns of policy stasis and abrupt punctuations. Because our analysis is a pilot study and faces

time and resource constraints, it will concentrate on rather short intervals, starting one year before the financial crisis as a "punctuating event" and ending in the first quarter of 2010.

This study conceptualizes discourses as communication processes permitting "*policy issues and conflicts to be collectively understood and defined, (...), meanings to be shared and reconstructed, and arguments to be set forth, debated, and eventually institutionalized*" (Dayton 2000: 71). Such a view of policy discourse implicitly uses a network perspective of policy making in which decisions and programs are not merely structured by formal institutions and few governmental actors but rather by complex informal relations between multiple and heterogeneous policy actors (Kenis/Schneider 1991). Policy systems are functionally differentiated into various sub-systems evolving around specific policy issues, and are composed of actors who regularly seek to influence policy processes that are guided by beliefs and interests.

It is useful to distinguish among two types of policy discourse: *sub-system specific* and more *general public discourse*. Discourses take place in different forums or arenas in which individual or collective actors present their issue interpretation while the audience is observing and evaluating. Actors contribute to discourses in order to persuade others and the audience to adopt their issue perspective (Gerhards/Lindgens 1995, Schwab-Trapp 2006). According to PE theory, a high degree of consensus within sub-system specific discourses favors policy making in terms of routine procedures, and in most cases policies evolve in an incremental manner (True et al. 2007). If one or several sub-system members disagree with the dominant problem perception, they try to change the venue of discussion, i.e. they push the issue to the public arena where a broader and more heterogeneous audience can be addressed.

Based on different communication technologies, there are various kinds of public discourse arenas of which this study considers the mass media to have the largest impact on the policy debate. Although principally everybody can participate in the mass media forum (at least as a member of the audience), editors and journalists enjoy privileged positions since they exert some control with respect to who can say what, when and how. Thus, public arenas can be biased by power coalitions in which media actors play an important role as well. In contrast to discourses at the sub-system level, issues are discussed controversially in public discourses. Heterogeneous actors contribute to different problem definitions, and dominant or consensual policy images are established only by way of tedious debates.

Another facet of discourse arenas is their limited *carrying capacity*: only few problems can be addressed at once (Hilgartner/Bosk 1988). While the respective subsystems specialize on a given issue, in most cases a bunch of issues compete for attention. Their competitiveness depends on *novelty* and *dramatic value*. According to Downs (1972), public attention follows a cyclical pattern of rise and decline. Such issue cycles have been extensively discussed in the literature, wherein two points have been emphasized: Firstly, major external events catalyze issue attention because they create a sense of dramatic crisis that cannot be sustained in their absence (Ungar 1992, 1995). Secondly, claims-making activities alone cannot explain that one issue attracts more public attention than another (Lowe/Goyder 1983: 32), but they play an important role in connecting a specific event to the definition of a policy problem (McComas/Shanahan 1999).

This study distinguishes three stages of collective problem redefinition within public discourse (Jones/ Baumgartner 2005: 38 ff.):

Entry and exit. Individual and corporate actors (just like the discourse arena) have limited carrying capacities. Because of limitations in time, budget and personnel, they can only process few issues at a time (Hilgartner/Bosk 1988: 56). When there is extensive media coverage of an issue, some actors that were not interested in the issue prior to a media hype now become engaged in public discourse either because they realize the problem's importance or because they use it as an occasion for self-promotion or other policy strategies.

Framing. Problem definitions depend on framing, which is "*a way of selecting, organizing, interpreting, and making sense of a complex reality to provide guideposts for knowing, analyzing, persuading and acting*" (Rein/ Schön 1993: 146). Frames enable actors to get some understanding of complex situations and facilitate communication and action with regard to a perceived problem. The way an issue is framed impacts on whether people notice a problem, how they understand it and what viable solution they take into consideration. The framing of an issue is not necessarily constant – neither the individual nor the collective way of framing. Actors aim to get their frame recognized as the authoritative version of 'reality' (Gerhards/Lindgens 1995).

Salience. This concept describes how much a frame dominates the discourse (Rohmberg 2008: 109). A frame has a low salience if it is rarely used by few actors whereas its salience is high if it is used repeatedly by many actors. When attention to an issue rises or declines, shifts in actor constellations also generate changes in frame constellations. New actors contribute to new frames while old frames vanish when their supportive actors leave the discourse arena (Baumgartner/Jones 2005: 40).

Proposal and debate. Changes in the collective framing of an issue also changes influence debates on policy measures. Based on the multiple stream approach, proponents of PE theory

expect that political actors are sometimes more interested in making sure that "their" policy solutions are adopted than in what problem these solutions address (Jones/Baumgartner 2002: 41; Kingdon 1995). During phases of collective problem redefinition policy entrepreneurs promote their policy ideas as solutions for the problem under discussion. As these ideas do not derive rationally from problem perceptions, they are nevertheless expected to be compatible with different problem interpretations.

The full application of this approach to policy discourse would suggest that we have data on various discourse arenas and policy venues. Within the constraints of this pilot study we could only concentrate on the discourse at the mass media level. In this respect, our theory-based expectations are that the financial and economic crisis was a punctuating event with regard to actor and discourse dynamics. During and after the crisis we expect significant change in the actor constellation and in the structure of discourse. Both will be measured and described with some methods of social network analysis.

3. Discourse as Networks

In this study we use a formal and quantitative approach to discourse analysis. As exposed in the previous section, discourses consist of sets of individuals and organizational actors, groups of actors, and sets of concepts such as frames or positions. All of these refer to issues under discussion and emergent relations in terms of communication. Concepts do not float freely in the air or "hover above society" but are instead attached to concrete actors that use them within discourses to persuade others of their own problem interpretation. Discourse coalitions emerge among actors that are connected by similar issue positions and policy frames. Specific frames and problem definitions must not be mutually exclusive but differ with respect to their

reconcilability (Dryzek 1997). This study assumes that the same actor is able to consider a problem from different perspectives and to use different frames within a given discourse. An actor might do so out of conviction or with strategic motives. In any case, two concepts that are used by the same actor in the same way (in the case of positions, the actor supports both or opposes both positions) can be assumed to be reconcilable to a certain extent.

Discourse network analysis formalizes these multiple relations by means of graph theory: A graph G consists of nodes from the set of actors A={a1, a2,a3...am} and/or from the set of concepts C={c1, c2,c3...cn} and edges from the set of interrelations between nodes E={e1, e2, e3 ...el}. Based on these formal concepts several types of graphs can be created:

- an actor network
- a concept network (based on positions or frames)
- an affiliation network linking actors and concepts
- an actor group network aggregating actors into groups
- a positions-frames network aggregating positions into frames.

< insert Figure 1 about here: Discourse Networks >

These networks can be analyzed by conventional tools of social network analysis. This study is interested in the standing of actors as well as in the salience of concepts. Standing designates an actor's visibility in terms of how much he contributes to the public discourse. An actor's standing depends not only on his commitment but also on whether he succeeds in positioning his problem interpretation within the media arena. In terms of network analysis, standing designates the actor's centrality within the discourse. Salience designates how much a concept is incorporated in a collective problem definition, how often it is used and how central it is within the affiliation network. Issue coalitions, groups of actors that share similar policy ideas

are subgroups within the actor network in terms of network analysis. The reconcilability of issues is reflected by their interconnectedness within the issue network.

The sets of actors, concepts and edges change over time as actors enter or leave the discourse and change their respective problem interpretations. When one actor leaves the discourse, this reduces not only the set of actors but also the set of edges a) within the actor network by those edges that previously connected this actor to other actors, b) within the affiliation network by those edges that connected this actor to concepts and c) within the concept network by those edges that connected the different concepts which had been used by this actor. When an actor leaves the discourse using many different frames and comments several policy measures, significant structural changes can be observed in all networks.

4. Discourse networks on global warming in Germany

This study applies discourse network analysis to the German discourse on climate change, assessing key propositions of PE theory. The following section portrays the German case and explains data collection, analysis and interpretation of results.

Climate Policy in Germany: The Background

Previous studies concerned with climate change policy have discussed Germany as an extreme case because of its outstanding achievements in this policy area (Jaggard 2007). They found that public discourse has played an important role in this development. The dominant perception of climate change and climate policy has been considerably stable: Climate change is perceived as a problem that requires state intervention, whereby climate protection also bears economic opportunities. This perception has become known as "ecologic modernization"

paradigm. However, there are indications that the economic crisis might have threatened the 'German consensus' and changed the dominant perception of the climate issue as suggested by punctuated equilibrium theory. The financial crisis provides the opportunity to conduct such a natural experiment.

The issue of climate change entered the sphere of German public discourse and high politics for the first time during the mid-1980s (Weidner 2008). In 1986, a press release of the German Physical Society (DPG) and its subgroup, the Working Group on Energy (AKE), depicted climate change as an "impending catastrophe" requiring immediate political action and initiated an extensive coverage of the climate change topic within the mass media. Initially, the political sphere remained skeptical, doubting the scientific soundness of these warnings. However, it could not ignore increasing public concern and call for action. After the Chernobyl catastrophe in April 1986, Chancellor Helmut Kohl swiftly established the Ministry of Environment (June 5, 1986). Shortly after that, in March 1987, he declared the climate issue to be one of the world's most pressing environmental problems (cf. Weidner/Metz 2008). From this point on, Germany has emerged as a forerunner in domestic climate protection and as a pacemaker at the European as well as at the global level. A large range of policies for the reduction of greenhouse gas (GHG) emissions has been passed during the last two decades. Energy efficiency has been raised in all economic sectors (cf. Weidner/Metz 2008). By 2008 Germany had already reached its target of a 21% reduction by 2010 compared with 1990 and the recent government pursues a reduction target of 40% until 2020 (BMU 2010).

Scholars have largely attributed this success to the broad public participation and the consensual style of German policy making. This style has been enhanced by the integration of the Green movement into political institutions during the late 1980s, by federalism and by the

German electoral system of proportional representation (Weidner/Metz 2008: 359, Jaggard 2007: 19 ff.). Scholars and policy makers have pointed out that public support for the German government's initiatives is strongly based on the public perception that policy interventions in the field of environmental policy do not weaken but strengthen economic growth. This perception has its seeds in experiences made during the 1980s when demanding and costly measures with respect to another environmental issue, air pollution, did not hamper economic growth, but instead enhanced employment, technological innovation and the modernization of industries. The public perception of "ecological modernization" as a win-win-strategy in solving environmental problems has proven to be very stable, despite of an attention decline with respect to climate issues during the 1990s (Weidner/Metz 2007). However, Weidner and Metz (2007) observe that while the government and proponents of a strong global climate change policy have provided the public with considerable information about net positive benefits for the country as a whole, they have kept quiet about redistributional effects of current and planned domestic programs and international commitments. They issue the concern that reliance on "ecological modernizatio", combined with some kind of "distributional opaqueness", might turn out to be a drawback to German consensus. Furthermore, Weingart et al. (2000) note that the drive for consensus might backfire as soon as doubts enter the discourse with respect to the reliability of scientific findings on global warming. This could threaten the legitimacy of political decisions based on scientific knowledge.

The issue of climate change has passed through the issue-attention cycle for the first time in the second half of the 20th century (Trumbo 1996). Though it has never completely vanished from the public agenda, attention to climate change has been relatively low during the second half of the 1990s. According to Vogt (2009), a new attention-cycle started at the beginning of the

21st century and reached its peak in 2007 when the IPCC published its Fourth Assessment Report. Since 2007, attention to the issue of climate change has been falling again. The financial crisis seems to have intensified this down-swing since it had more dramatic value and a higher degree of novelty than the issue of climate change (Vogt 2009). Thus, when trade markets crashed in September 2008, this event drew media attention away from the climate problem, as predicted by the arena model of Hildegard and Bosk (1988). The application of discourse network analysis on the German climate discourse within this study allows taking a closer look at actor constellations and frame configurations.

Data selection, coding, and network analysis

This study is based on newspaper articles published in the Frankfurter Allgemeine Zeitung (FAZ) and the Süddeutsche Zeitung (SZ) within the first quarter of the years 2007 to the first quarter of 2010 which treated climate change as a main topic.1 Both newspapers were chosen as data sources due to their prestigious status and high circulation rates (about 2 million copies each). Both are regarded as important reference media by other journalists and are read most frequently by the members of the German Parliament (Deutscher Bundestag). Hence, they can be assumed to have an influence on the society as a whole as well as on decision makers. Furthermore, both newspapers cover the main political spectrum of German politics. The FAZ has a rather conservative profile, while the SZ is considered to be more social-liberal.

The articles were selected from the online archives of both papers, including the complete news coverage for all days of appearance and all news sections. Within a two-step selection

1 Most of the newspaper articles were selected and coded by Vogt (2009).

process, Vogt identified “Klimaschutz*”, “Klimawandel*” and “Globale* Erwärmung*” as the most valid and effective choice of key words (Vogt 2009: 35). Articles that contained at least one of these keywords in the headline and/or lead paragraph were copied to the JAVA based software *Discourse Network Analyzer* (DNA) programmed by Philip Leifeld (see *www.leifeld.de*). The data set was manually reviewed and articles that contained the keywords but were not really about meteorological climate change (e.g. “Klimawandel*” in the sense of working atmosphere) were excluded. Opinion columns were excluded as well because of low intracoding-reliability.

Statements were edited within DNA. The unit of analysis was a statement, a part of the text where an actor expresses his beliefs or solution concepts for a policy problem (Leifeld 2010: 4f.). In this study we look at two kinds of concepts: frames and positions. A first step of coding considered only frames. Tags were assigned to each statement that coded the individual speaker, the organization that he or she was affiliated with and the frame that he or she used. Thereby an actor was defined as an identifiable speaker that is not only mentioned in the article, but is given the opportunity to express his opinion by means of direct or indirect quote. Only those statements were coded that could clearly be attributed to a specific actor – an individual person or an organization. If an actor gave his opinion with regard to a specific policy measure within a statement (i.e. rejection or support for a specific measure), the statement was edited a second time. This time, positions were coded instead of frames. A dummy variable indicating agreement or disagreement with regard to a position was recorded.

This study uses a typology of *frames* which was inductively developed on the basis of a random sample of 10% of all articles sampled for the first quarter of 2008 and 2009. The coding is based on methods and procedures developed by Gerhards/Schäfer (2006). In this way,

different arguments of actors are grouped into interpretative patterns that are subject to several strategies of reduction. These in turn are assigned to several categories, following the idea that arguments and actors can be grouped according to the different rationality of societal sub-systems. Applied to our subject, actors can use political, economic, scientific, ethical, ecological, and policy arguments. Our study thus assumes that with respect to viable policy responses it is important to differentiate whether political responsibility is attributed to the local, national, European or international level. Accordingly, political arguments are grouped into these four sub-categories. For a list of frames see Table 1.

The next step of analysis refers to *positions* which are specific policy measures that an actor opposes or supports. The list of positions was inductively extended whenever an actor issued a policy measure not yet on the list. If a policy instrument was suggested several times but each time with respect to another sector (e.g. emission limits for the car industry or energy producers), these measures were categorized respectively.

From this data, several networks were generated with the help of *DNA* (Leifeld 2010) and *UCINET 6* (Borgatti et al. 2002). Analysis related to centrality positions and their visualizations were conducted by *visone* (Brandes/Wagner 2003).

Discourse network analysis: Findings and interpretations

Our analysis is based on a structural content analysis of 774 articles and 1459 statements. Table 2 gives an overview on how many articles were published on the issue of climate change during the first quarters of the years 2007 to 2010 within the FAZ and SZ. It also displays the dimensions of the discourse networks within the respective quarters, the number of statements, organizations and positions.

< *insert table 2 about here* >

These numbers may also be influenced and biased by global policy developments, since the first quarter of 2007 was marked by the release of the IPCC Fourth Assessment Report, while possible important events like the UN Climate Conferences Copenhagen took place during quarters of the other years that are not included in the data. Table 2 shows that the discourse networks strongly vary between the different years with respect to actor participation and conceptual affiliation. This has to be kept in mind when we interpret the following findings.

< *insert figure 2 about here* >

In Figure 2 the evolution of media attention is depicted in the context of the main economic indicators. It shows that the economic downturn started in September 2008 with a plunge at the stock exchange and reached the real economy in 2009. As recovery was quick, at least in Germany the crisis was over in the beginning of 2010.

Changing actor constellations and frame configurations

A first step of analysis relates to possible changes in actor constellations due to the economic crisis. In this respect we are interested, firstly, in the overall actor dynamics in the field of discourse, and secondly in the relative standing of the various actors and significant changes in these positions. Figures 3 and 4, and table 3 give an overview on the dynamics. The first figure depicts data on entry, exit, and discourse continuation during the four years. The overall picture suggests a dynamic and pluralist policy arena in which many new actors are entering and constellations are changing. Table 3 lists the standings of the 25 top policy actors that

participated in at least three years up to spring 2010. In order to control for variation in discursive activities, we normalized their figures with respect to the yearly total numbers and depicted them as percentages. The second diagram correlates the four columns of the table (activity profiles) and shows interesting results. While the correlation between the actors' standings between 2007 and 2008 is rather high, the correlations dropped to .47 and 39 in the following years during the economic crisis. The pre-crisis actor configurations differ greatly from within- and post-crisis constellations.

< insert figure 3 about here >

< insert table 3 about here >

< insert figure 4 about here >

A further key question is how the economic crises affected frame configurations. If Maslow's hierarchy of needs also applies to policy discourse we can assume that economic frames gain importance and possibly crowed out non-economic frames. Figures 5-8 can give a partial answer to that question. They show which organization is utilizing certain frames within the discourse on climate change during the respective quarters. The thickness of links between actors and frames corresponds to the frequency that an actor uses the respective frame. The size and arrangement of frames indicate indegree centrality of frames which equals the relative frequency that a frame is cited by all actors. Thus, the frame with the biggest node area and the most central position within the circular arrangement is used the most often within the respective time period.

< insert figures 5-8 about here >

Between 2007 and 2009, shifts in the frame constellation can be observed from year to year. Each year, another frame occupies the most central position within the discourse. Thereby,

the first quarter of 2009 differs from the other periods of observation in two respects: Firstly, while a politics and policy frame dominates the discourse in all other quarters, the macroeconomic frame is the most central one in the first quarter of 2009. Secondly, while the discourse is evolving around few frames in 2007, 2008 and 2010, it is characterized by a much more heterogeneous frames distribution in 2009. The first observation seems to support the proposition that the financial crisis had a direct impact on the individual perception of climate change in so far that it highlights economic aspects of the problem. But, taking into consideration the low degree of overall centralization, the domination of the macroeconomic frame in 2009 is not very strong. It is only short-lived. In addition, this frame is mainly connected to actors from the business sector or foreign political actors, but less to domestic political actors who largely use the national policy frame in 2009. In all other years, the macroeconomic frame is used by a more heterogeneous set of actors. Over all time periods the macroeconomic frame has the most stable position and is always among the three most central frames. Its shift to the center in 2009 is a result of the overall fragmentation of the discourse. In the other years, as the thickness of links shows, governmental actors push forward the respective central frame. In 2007, the Federal Ministry for Environment (BMU) promotes the national policy and politics frame, in 2008, the DG Environment of the European Commission pushes forward the European policy and politics frame and in 2010, different federal ministries promote the two politics and policy frame at the center. Such a strong political commitment is lacking in 2009.

A further step is the depiction of various organizations and their policy positions. Figures 9 and 10 show which actors have a position towards policy measures and whether they support (light links) or oppose (dark, dashed links) the relative measure or are undecided (dark

continuous line). The size of the nodes reflects *indegree centrality* of the respective policy proposition which equals the relative frequency that a proposition is commented.

< insert figures 9 and 10 about here>

Only in 2007 and 2008 do actors controversially discuss different measures. Again, few governmental actors – especially the BMU – hereby take a central position. The networks are decomposed into several components in 2009 and 2010. We can see that there is a consensus on the promotion of regenerative energy. It might be that - as political conflicts on how to tackle the financial crisis intensified - actors became less inclined to settle political conflicts in the area of climate policy.

With respect to frame analysis, Figure 11 shows the co-occurrence of frames in 2008. The width and darkness of links visualizes the strength of interconnection in terms of how many organizations use both interconnected frames.

< insert figure 11 about here >

Comparing the connections between frames within the different periods of observation, it can be stated that the macroeconomic frame is the frame, which is best connected to other frames, especially in 2008. The connection between the macroeconomic frame and the national politics and policy frame is especially strong in all years. Apart from that, the macroeconomic frame is always strongly connected to the relative dominating frame, which could explain the success of the "ecological modernization" paradigm. The financial crisis does not reduce the interconnectedness of the macroeconomic frame. The actors who hold up this interconnection are the insurance company Munich Re, the green party (Bündnis 90/Die Grünen) and the social democratic party (SPD). It seems that advocates of strong climate protection in the light of the

financial crisis adopt economic frames to link the climate issue to the crisis and mobilize against the decline of attention to climate change.

A further analytical step refers to the frame-position network. In this respect, Figure 12 shows the co-occurrences of and conflicts between frames and positions in 2008. The width and darkness of links correspond to the number of actors that use the frame and the position that the relative link connects in the same way (continuous link) or in opposing ways (dashed link).

< *insert figure 12 about here* >

The network is quite dense; it is not possible to infer the position from the frame or the other way round. The same observation can be made during the other periods of observation. This finding supports Baumgartner and Jones' (2005: 41) proposition that the linkage between problems and solutions at the collective level is not straight forward.

5. Conclusion

While previous studies have often examined climate discourses from a perspective of functional social sub-systems and have conceptualized discourses primarily as a means to overcome difficulties of risk communication, this study conceptualized discourses as an essential part of modern policy making which is characterized by high interdependence and connectedness between societal subsystems. This perspective shifts the focus from differences in communication to the mobilization of actors within an integrative policy process. Public action is not primarily constrained by difficulties of communication on different problem perceptions and policy preferences, but by the limited capacity of actors to process many problems at once. Furthermore, different actors pursue different individual interests and strategically use public discourses to influence the structure of participation within a policy-subsystem. Punctuated

Equilibrium Theory suggests that a big focal event may attract high public attention and thereby provides an opportunity to change the public perception of a policy issue and to restructure the policy arena.

Our paper has shown that the financial crisis amplified the decrease of public attention to the issue of climate change in Germany. Analyzing the media discourse on climate change between 2007 and 2010 by means of network analysis we could show that actors are strongly involved in cross-sectoral communication and that specific policy positions cannot be directly derived from perceptions of climate change. This may facilitate co-operation in managing global warming across societal subsystems. Our analysis also demonstrates that a sincere debate on different policy measures is only possible when specific governmental actors claim political responsibility. In the aftermath of the financial crisis, when issue attention towards climate change declined, political commitment weakened as well, and the discourse became more fragmented. This fragmentation of the public discourse may impede policy innovation and hinder the management of climate change, especially if it is reflected in the subsystem specific discourse. However, the principle of "economic modernization" associated with the success of past German climate policy seems to have sustained after the financial crisis.

So far little is known about the relation of general public discourses and sub-system and policy specific discourses. Further research is necessary to gain a better understanding of how policy making is shaped by discourses at various levels and subsystems. Therefore, discourse network analysis proves to be a promising tool to grasp the complexity of discourse dynamics which are influenced by structural constraints as well as by strategic actor behavior. Other than qualitative frame analyses, it links actor and frame constellations in a specific and transparent way. This allows for case sensitive modeling but also for replicability and comparability.

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TABLES

Table 1: Frames

Frame		Description
Cultural frames		
1	Individual lifestyle	statements about practices of individual and community living, consumption patterns, private insurances covering for damages resulting from impacts of climate change, etc.
2	Popular culture	references to information campaigns aiming to raise public awareness of the issue of climate change, books and films, etc.
Ecological/meteorological frame		references to ecological and meteorological impacts of climate change that are already observable, e.g. rising sea levels, melting ice, heat waves, disease, issues of biodiversity etc.
Economic frames		
1	Microeconomic considerations	statements on business aspects of climate change, e.g. economic costs imposed on companies by climate change mitigation policies or business opportunities for companies arising from green technologies
2	Macroeconomic considerations	considerations regarding national location attractiveness, competition between German and foreign companies, creation of jobs, or economic growth
Ethical and social frames		
1	Sharing responsibility between industrialized and developing world	discussion on how much commitments industrialized countries can demand from developing countries or on whether they have to compensate poor countries for increased climate risks and damages
2	Moral feeling of responsibility to mitigate climate change	moral feeling of obligation to mitigate climate change, e.g. in the sense of intergenerational responsibility
3	Financial burden imposed on population	discussion on who should bear the cost of climate change mitigation measures – i.e. the state, major polluters or the population – and what cost the population can be expected to pay for climate change mitigation
4	Social impacts of climate change	considerations regarding social impacts such as migration and civil commotions
Politics and policy frames		debates on (potential) climate change mitigation or adaptation measures and on responsibilities of different actors in the policy arena
1	Local level	local governments take action/are called into account
2	National level	national governments take action/are called into account
3	European level	European institutions take action/are called into account
4	International level	International government actors take action/are called into

		account
Scientific frames		local governments take action/are called into account
1	Causes of climate change	ideas or beliefs about the geophysical causes of climate change (e.g. the role of human-produced greenhouse gases)
2	Consequences of climate change	predictions on the ecological consequences of climate change, e.g. changes in Atlantic circulation
3	Effects of climate change mitigation measures	discussions on the potential effectiveness of mitigation measures and on whether anthropogenic climate change can still be maintained at a non-critical level at all
4	Technology and applied scienc	statements on new technologies (developed by scientists of research institutes and private companies) and applied science that may be employed to mitigate or adapt to climate change
5	Validity of scientific data and methods	discussion on the proceedings of scientific research and the soundness of scientific pronouncements

Table 2: Media coverage of the climate issue (FAZ and SZ), first quarters 2007-2010

	Articles	Statements	Actors	Position Categories	Positions	Positions/ Statements
2007 Q1	380	774	194	40	268	0,35
2008 Q1	187	303	110	20	59	0,19
2009 Q1	112	206	87	13	39	0,19
2010 Q1	95	176	78	14	44	0,25
Sum	774	1459	469		410	0,28

Table 3: Top25-Actors' statements

	# of statements				Participation Profiles				Normalized statements			
Name	2007	2008	2009	2010	07	08	09	10	2007	2008	2009	2010
BMU	76	18	4	10	1	1	1	1	9,82	5,94	1,95	5,81
Umweltbundesamt	6	6	3	9	1	1	1	1	0,78	1,98	1,46	5,23
IPCC	22	4	6	5	1	1	1	1	2,84	1,32	2,93	2,91
PIK	10	7	2	5	1	1	1	1	1,29	2,31	0,98	2,91
US Government	17	3	7	3	1	1	1	1	2,20	0,99	3,41	1,74
UN	7	1	2	3	1	1	1	1	0,90	0,33	0,98	1,74
Greenpeace	15	2	1	2	1	1	1	1	1,94	0,66	0,49	1,16
NN Economy	9	1	1	2	1	1	1	1	1,16	0,33	0,49	1,16
COM DG Environment	29	4	10	1	1	1	1	1	3,75	1,32	4,88	0,58
CDU	24	1	4	1	1	1	1	1	3,10	0,33	1,95	0,58
Buendnis 90 Gruene	17	6	6	1	1	1	1	1	2,20	1,98	2,93	0,58
Oeko-Institut	1	2	2	1	1	1	1	1	0,13	0,66	0,98	0,58
Munich Re	7	0	6	8	1	0	1	1	0,90	-	2,93	4,65
BMF	4	0	1	6	1	0	1	1	0,52	-	0,49	3,49
Chinese Government	6	0	1	5	1	0	1	1	0,78	-	0,49	2,91
vzbv	3	3	0	5	1	1	0	1	0,39	0,99	-	2,91
UNFCCC	9	0	2	4	1	0	1	1	1,16	-	0,98	2,33
WWF	9	5	0	3	1	1	0	1	1,16	1,65	-	1,74
US Democrats	2	0	1	3	1	0	1	1	0,26	-	0,49	1,74
EPA	0	1	2	3	0	1	1	1	-	0,33	0,98	1,74
French Government	7	1	0	2	1	1	0	1	0,90	0,33	-	1,16
EP	6	2	0	1	1	1	0	1	0,78	0,66	-	0,58
Danish Government	2	0	2	1	1	0	1	1	0,26	-	0,98	0,58
EP-SPD	2	1	0	1	1	1	0	1	0,26	0,33	-	0,58
German Federal Government	1	1	0	1	1	1	0	1	0,13	0,33	-	0,58

Table 3

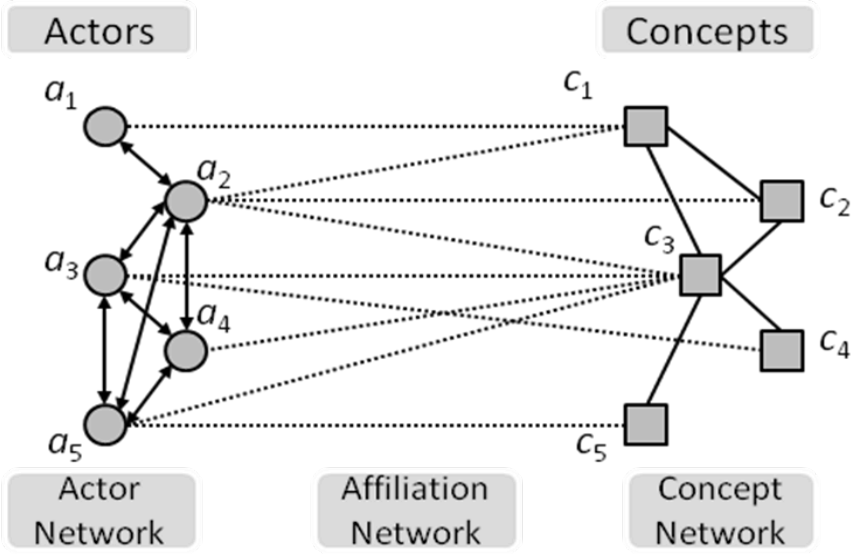
Standing of Actor Groups in Discourse Networks

	Business		Civil Society		Politics		Science		IPCC	
	OD	OD (%)	OD	OD (%)	OD	OD (%)	OD	OD (%)	OD	OD (%)
2007	175	22,61	79	10,21	417	**53,88**	74	9,56	22	2,84
2008	67	22,11	41	**13,53**	114	47,52	47	15,51	4	1,32
2009	53	**25,73**	20	9,71	79	38,35	48	**23,3**	6	**2,91**
2010	29	16,48	14	7,95	99	**65,25**	28	15,91	5	2,84

OD = Outdegree

FIGURES

Figure 1: Discourses as Networks



Source: Janning et al. (2009, 71)

Figure 2: Articles on Climate Change and Economic Indicators

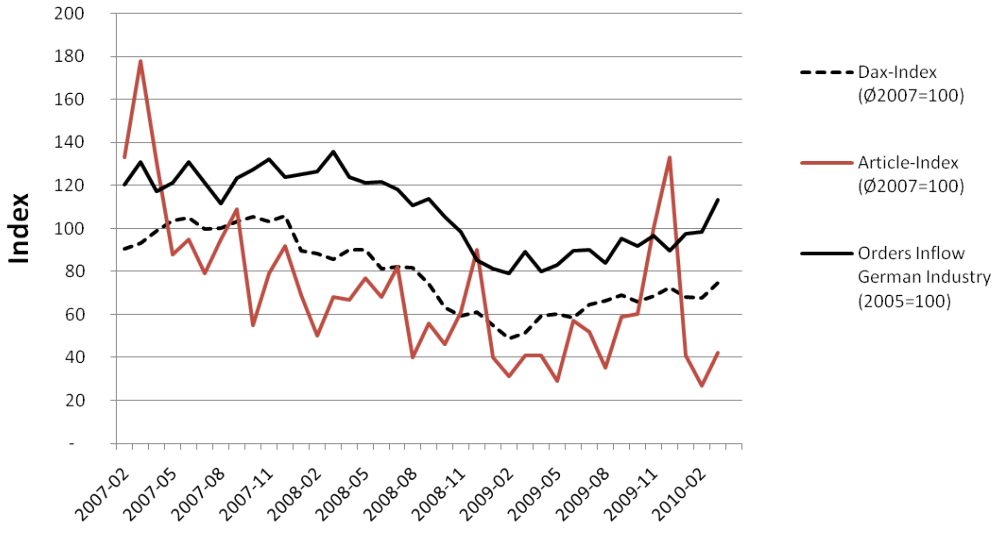


Figure 3: Participation Profiles

2007	2008	2009	2010	Freq.	Sum
1	1	1	1	12	
1	1	1	0	15	
1	1	0	1	6	
1	1	0	0	16	
1	0	1	1	6	**192**
1	0	1	0	14	
1	0	0	1	7	
1	0	0	0	116	
0	1	1	1	1	
0	1	1	0	7	
0	1	0	1	2	**61**
0	1	0	0	51	
0	0	1	1	2	
0	0	1	0	29	**31**
0	0	0	1	41	**41**
					325

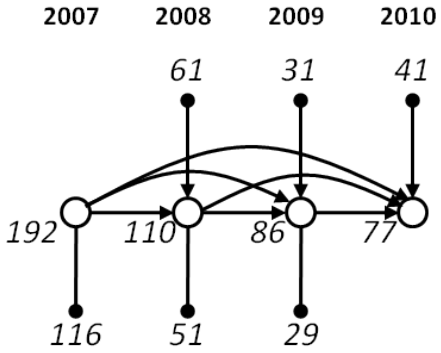


Figure 4: Correlations of 25 top actor's participation profiles in climate change discourse

Figure 5: Affiliation Network Organizations-Frames 2007

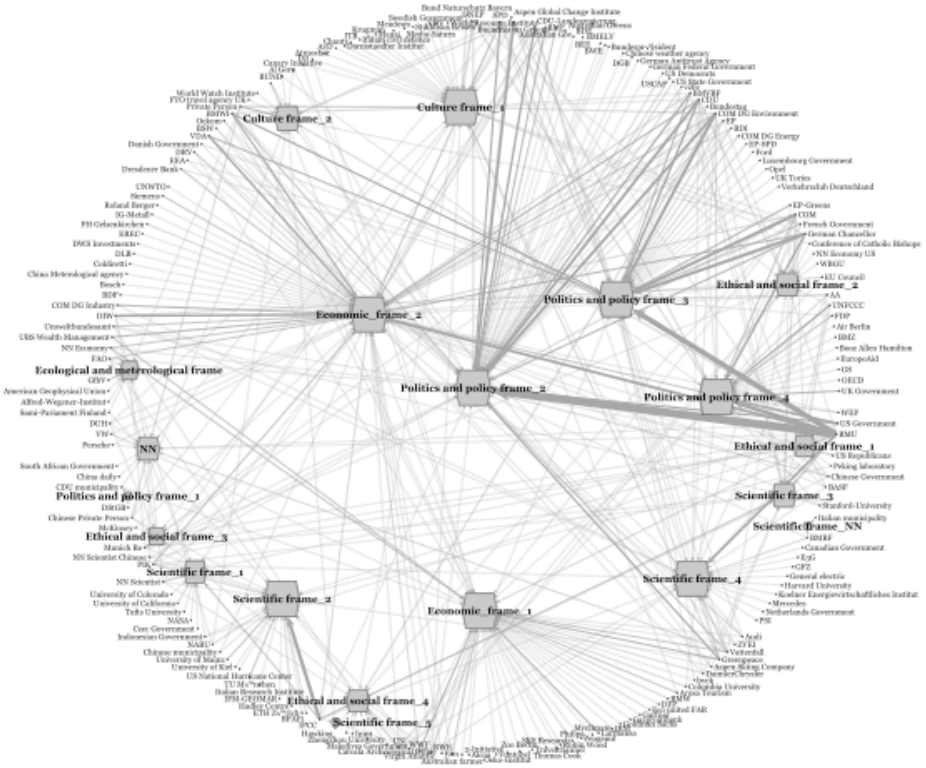


Figure 6: Affiliation Network Organizations-Frames 2008

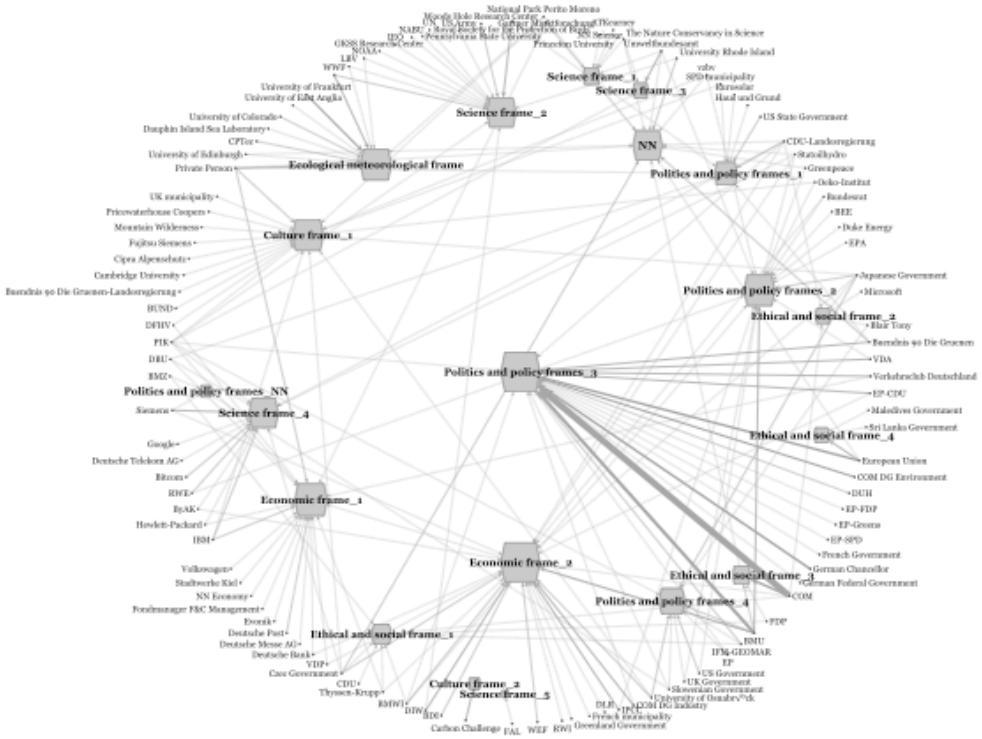


Figure 7: Affiliation Network Organizations-Frames 2009

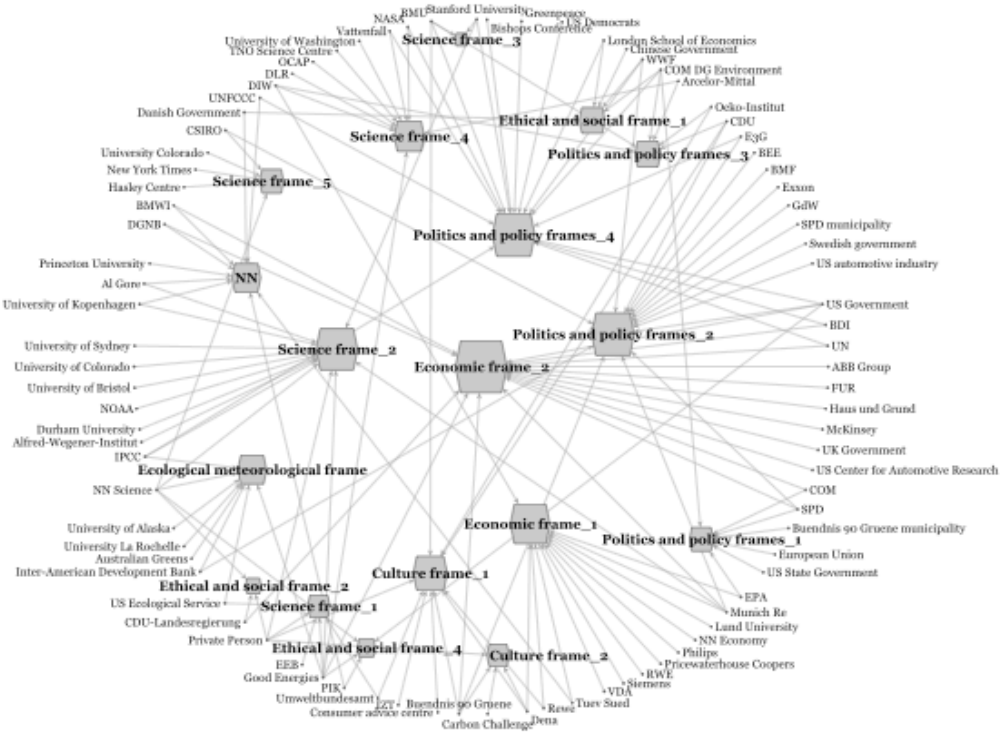


Figure 8: Affiliation Network Organizations-Frames 2010

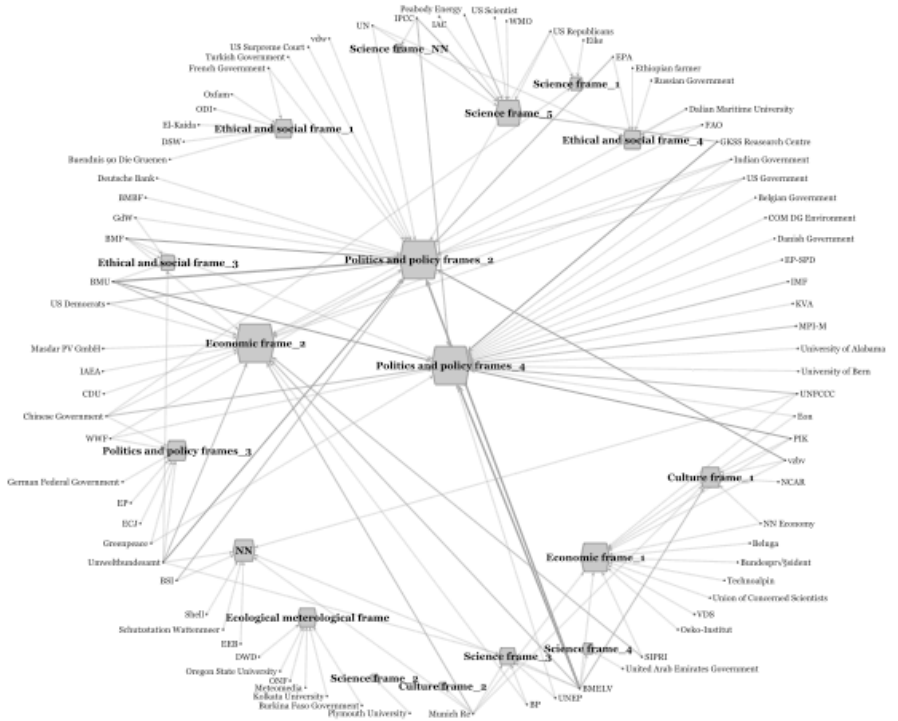


Figure 9: Affiliation Network Organizations-Positions 2007

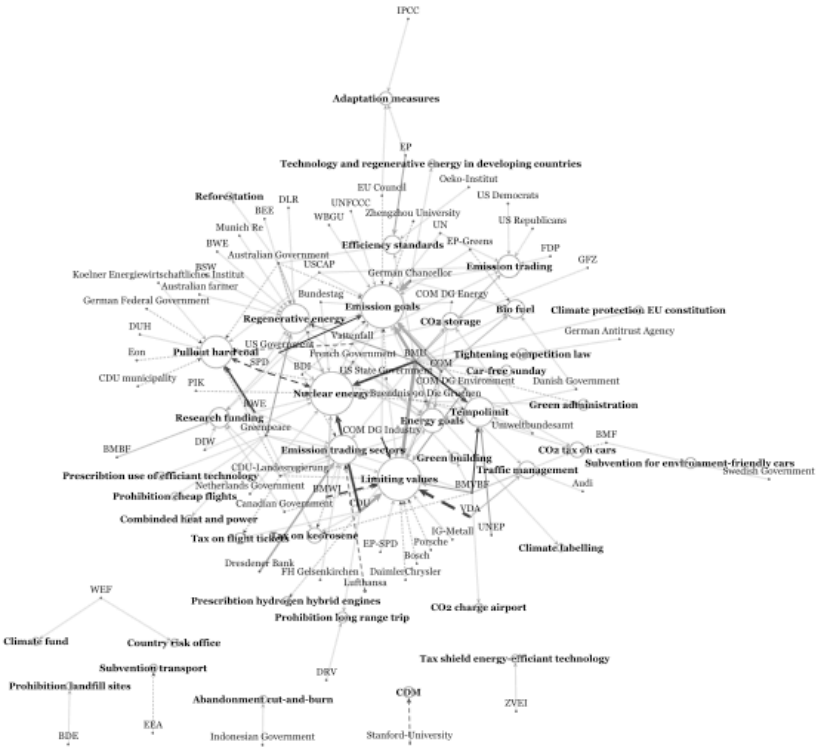


Figure 10: Affiliation Network Organizations-Positions 2009

Figure 11: Co-occurrence Network Frames 2008

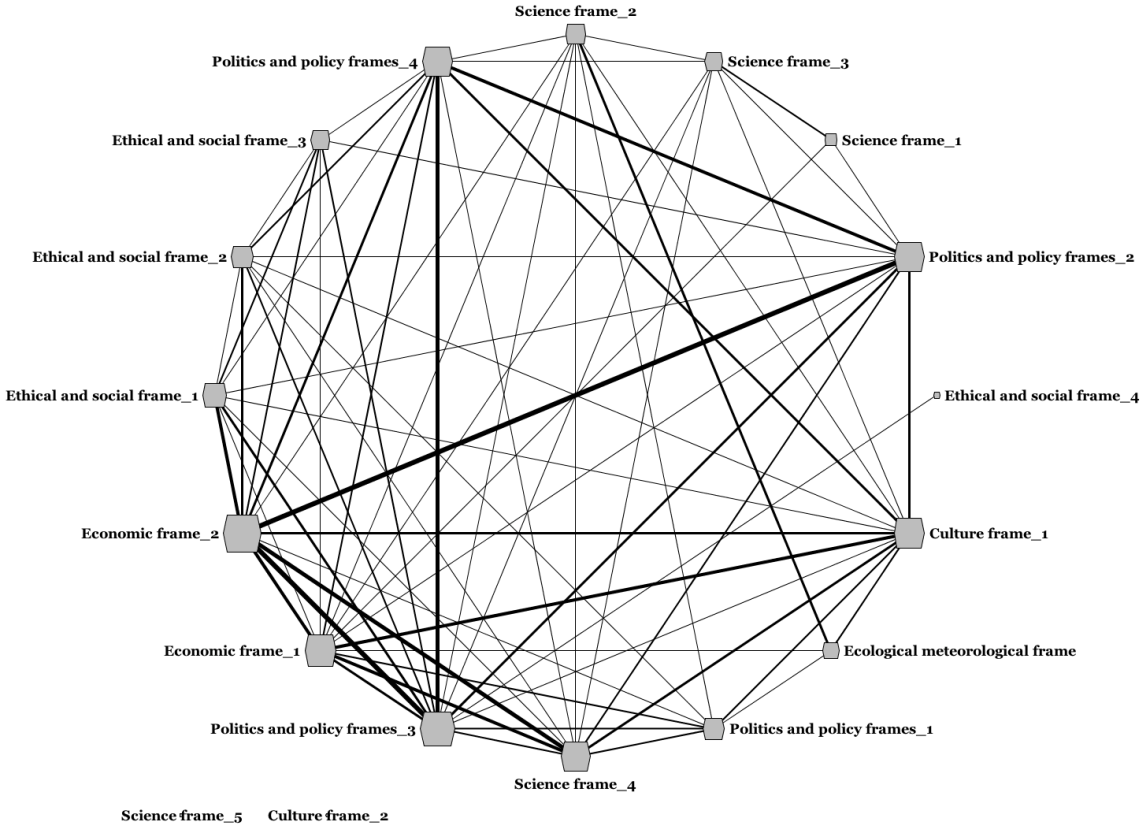


Figure 12: Affiliation-Network Frames-Positions 2008