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The impact of periodic air pollution peaks in Beijing on air quality governance in China

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Abstract

During the month of January 2013, Beijing suffered air pollution of unprecedented intensity. This event, which was named “airpocalypse” in international media, was followed by vibrant media reporting and public discussion on the topic and prompted the central government to issue unusually ambitious measures to contain air pollution more effectively. This paper explores the impact of the airpocalypse on China’s air quality governance by conducting a qualitative analysis of pollution control policies that followed the airpocalypse and concludes that this event of heavy air pollution was indeed impactful in causing the issuance of stricter national targets for pollution control as well as increased public awareness. In combination with the newly amended environmental protection law, these aspects put local governments under intense pressure to address air pollution more effectively. However, the changes caused by the airpocalypse were not revolutionary in a sense that it led to major structural reforms of government institutions and their interrelationships. The case of the airpocalypse demonstrates that single disruptive events of heavy pollution can cause a recalibration of policy priorities. In this context, the role of “disruptive events” may be worthwhile of more systematic research in order to understand their potential impact on institutional environments.

Zusammenfassung

Im Januar 2013 erlebte Peking die bis dato stärkste Luftverschmutzung der Stadtgeschichte. Dieses Ereignis, welches internationale Medien als „Airpocalypse“ bezeichneten, wurde von einer intensiven Medienberichterstattung und öffentlicher Diskussion zu diesem Thema begleitet und bewegte die chinesische Regierung dazu, ungewöhnlich ambitionierte Maßnahmen zur Eindämmung der Luftverschmutzung zu ergreifen. Dieses Paper analysiert die möglichen Auswirkungen der *Airpocalypse* auf die institutionellen Strukturen zum Schutz der Luftqualität in China mittels einer qualitativen Analyse der Maßnahmen, welche im Anschluss an die *Airpocalypse* erlassen wurden. Die Analyse kommt zu dem Ergebnis, dass die außergewöhnlich starke Luftverschmutzung im Januar 2013 tatsächlich relevant für die Anordnung bestimmter Maßnahmen – wie Feinstaub-Reduktionsziele – war und zudem eine stärkere Sensibilisierung der Öffentlichkeit für dieses Problem bewirkte. In Kombination mit dem erneuerten Umweltschutzgesetz setzt diese Entwicklung die Regierungen auf lokaler Ebene unter Druck, die Luftverschmutzung effektiver zu bekämpfen. Dennoch hat die *Airpocalypse* zu keiner fundamentalen strukturellen Veränderung hinsichtlich der Regierungsinstitutionen und deren wechselseitigem Zusammenspiel bewirkt. Die Fallstudie der *Airpocalypse* demonstriert, dass plötzliche, disruptive Ereignisse eine Neukalibrierung der Prioritäten einer Regierung bewirken können. In diesem Kontext wäre die weitere systematische Analyse der Rolle „disruptiver Ereignisse“ und deren Auswirkungen auf institutionelle Strukturen ein lohnenswerter Forschungsansatz.

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1. Introduction

China's rapid economic development since the 1980s lifted large parts of the population out of poverty, but it also led to serious environmental degradation. The most visible environmental hazard is severe air pollution which causes an estimated annual damage of 100 billion to over 300 billion US\$ in health care costs and lost labor (World Bank et al. 2014: 25). The north China plain, consisting of the provinces Hebei, Henan, Shandong, Shanxi as well as the cities of Beijing and Tianjin, is particularly affected by air pollution, which is mainly due to the region's strong reliance on energy consuming heavy industries and growing vehicle numbers (Ma et al. 2014: 25). Discussion on air pollution in China commonly refers to the concentration of particulate matter with less than 2.5 micrometers in diameter (PM_{2.5}), which is identified as particularly unhealthy for the human body (WHO 2013: 6ff.). Suspended PM_{2.5} can be traced back to primary industrial and vehicle exhaust as well as atmospheric photochemical reactions from emitted polluting gases like ozone, sulfites and nitrates (Yu et al. 2013: 574, 581). Average PM_{2.5} concentrations in the Beijing/Tianjin/Hebei region in 2013 reached 106 µg/m³ (MEP 2014), far above the annual average of 10 µg/m³ which the World Health Organization recommends as a safe level (WHO 2006: 10).

Chinese government authorities have long hesitated to openly acknowledge the seriousness of the problem. Government priority on economic growth, employment and the expansion of affordable infrastructure trumped considerations of environmental protection and resource efficiency (Ran 2013: 34f.). As a result, policies, laws and regulations regarding air pollution control have suffered under notoriously weak enforcement. However, anecdotal evidence suggests that a specific event of particularly heavy air pollution in Beijing in January 2013 may have changed the way how the central government perceives the challenge of air pollution. Following this event, which international media referred to as "*airpocalypse*" (and hereinafter will be referred to with the same denomination), the general public and Chinese media discussed air pollution with unprecedented intensity. The central government reacted by issuing an unusually ambitious action plan for reducing PM_{2.5} concentration with potentially wide implications for central and local government actions regarding air pollution control.

This paper explores if and how the event of the January 2013 *airpocalypse* in Beijing has caused a recalibration of China's development priorities and an alteration of the institutional setup in China's management of air quality. For this study, *Williamson's* concept of New Institutional Economics serves as an analytic framework to examine subsequent government actions related to air quality management. In more general terms, the paper examines the effects of specific regional climate parameters on the evolution of local and national policies and institutions. Therefore, from the perspective of a geographer, the paper specifically draws upon the disciplines of climate- and political geography.

To estimate the relevance of policies related to air quality management and their correlation with the event of the *airpocalypse*, empirical evidence was gathered from eleven in-depth interviews with representatives of Chinese and international academia, government bodies and non-governmental organizations which were conducted in 2014. Semi-structured interviews were the method of choice for this explorative study, as the authors aimed to gather in-depth opinions from various perspectives. This aim called for a non-standardized interview design which could be customized to the background and expertise of the respective interviewee. To ensure a certain degree of comparability between interviewee statements, interviews were led around a set of guiding questions:

- Which, if any, government actions related to air quality management were either influenced or triggered by the *airpocalypse*?
- What is the significance of these government actions on the effectiveness of air quality protection?
- What is the role of public and media discussion in the process?

Supplementing these interviews, quantitative empirical data on public discussion on air pollution were obtained through keyword counts on the Chinese social media platform Weibo and the search engine Baidu.

This paper aims to expand the understanding of the significance and disruptive potential of extreme events for the evolution of governance institutions, using the severe air pollution of January 2013 in Beijing as a case.

2. Conceptual framework

2.1 New Institutional Economics

For the analysis of this paper, the concept of New Institutional Economics (NIE), first formulated by *Williamson* (1975), is used as a framework. NIE puts the institutions that govern and manage a society at the center of analysis. Based on *Williamson* 2000 and *Richter* 2005, the main legitimacy of NIE comes from highlighting the importance of values, formal governance structures and actual policy implementation in order to understand 1) decision making of organizations and individuals, 2) drivers and constraints for institutional change and 3) trajectories for future developments (*Williamson* 2000: 595f.; *Richter* 2005: 5ff.).

“Institutions” are thereby defined according to *North* 1990 as “the rules of the game in a society or, more formally, [...] the humanly devised constraints that shape human interaction” (*North* 1990: 3). Based on this definition, institutions provide the framework of formal and informal rules according to which individuals and organizations interact with each other. Consequently, “institutions” are to be distinguished from “organizations” which also provide a frame for human interaction, but, unlike institutions, in the form of political, social, economic and educational bodies that allocate individuals around a common purpose (*North* 1990: 4).

By putting institutions at its core, NIE provides a framework that complements and goes beyond the quantitative and predictive approach of neoclassical theories, which do not grasp the complexity of formal and informal institutions as potential drivers or constraints of change (*Richter* 2005: 7). The concept of institutional change is commonly applied in anthropogeography to analyze variations of development across regions (*North* 1991: 98ff.; *Rafiqi* 2009: 335).

Within NIE, it is argued, institutions constrain socio-economic and political development and therefore are key in determining future development paths of societies (*Andrews-Speed* 2010: 7). Institutional change (whether societal, political or economic) is thereby considered to generally happen in an evolutionary, incremental way through constant adaption on different levels – and not as a sudden, erratic event (*Rafiqi* 2009: 341; *North* 1991: 97). *North* explicates that “changes at the margin can be a consequence of changes in rules, informal constraints and in kinds and effectiveness of enforcement” (*North* 1990: 6). In other words, insti-

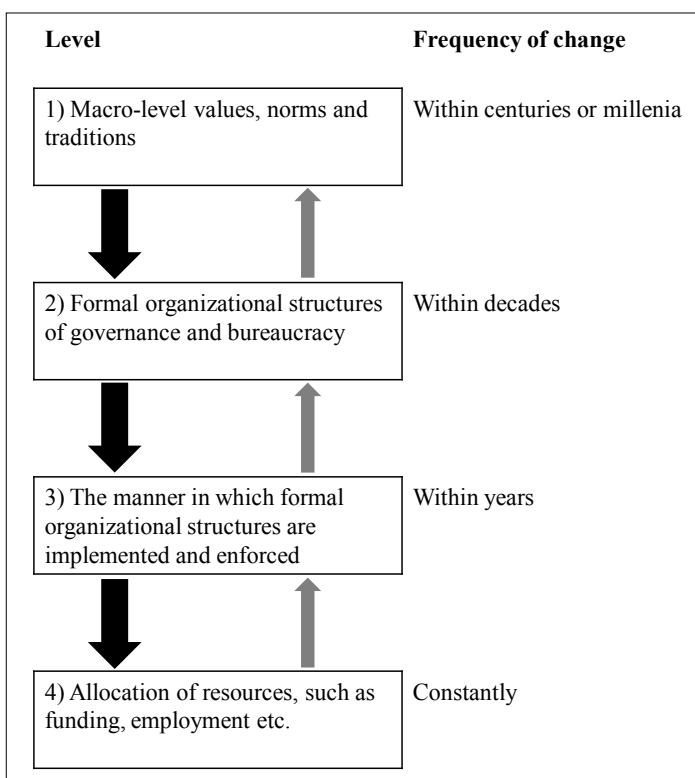


Fig. 1 Four institutional levels (thick arrow indicates greater influence). Source: *Williamson* 2000: 597

tutional change is generally constrained by preexisting structures that define a certain development path from which an entity is usually unable to completely deviate in a sudden or “revolutionary” manner.

Relating to this school of thought, *Williamson* drew four levels of analysis that form a linear hierarchy within which the level above constraints the level below, indicating that the upper level exerts greater influence in shaping the lower level than vice-versa (*Williamson* 2000: 596, see Fig. 1).

Level one stands for the macro-level values, norms and traditions which broadly define interaction patterns in a society and directly shape its institutional structures (level two). Parameters of level one change slowly, within a matter of millennia or centuries (*Williamson* 2000: 596).

Level two defines the formal organizational structures of governance and bureaucracy such as laws and regulations, to which *Williamson* refers to as “the rules of the game”. Changes in these structures can be forced, e.g. through revolution or civil war, or in an evolving manner such as through reforms or renewed contractual relationships (*Williamson* 2000: 598).

Level three addresses the manner in which formal organizational structures are implemented and enforced and is referred to by *Williamson* as the “play of the game”. Interactions on this level take formal as well as informal structures and unwritten rules into account which shape the actual patterns of how organizations and individuals interact with each other (*Williamson* 2000: 599).

Finally, the **fourth level** addresses individual behavior and continuously changing resource allocations based on surrounding conditions shaped by the upper levels. These include employment, pricing decisions, allocation of individual tasks etc. and can be subject to neoclassical analysis (*Williamson* 2000: 600).

While *Williamson* acknowledges that in reality all levels are at least somewhat intertwined with blurry borders, this framework provides a useful context for analyzing the effects of the *airpocalypse* on different categories of Chinese air quality governance.

2.2 China's governance institutions

Based on the concept of NIE, the institutional levels of China's governance can be characterized as follows:

Regarding overarching norms (level one), the Chinese society is traditionally hierarchical, prioritizing conformity over individual development. Interactions between individuals and organizations tend to be shaped by personal relationships (“*guanxi*”) rather than formalized regulations (*Andrews-Speed* 2010: 17). *Guanxi* is the predominant pattern that shapes interaction and tends to be more complex than what would be commonly understood under the term “friendship” or “relationship”. The underlying motivation of individuals of maintaining *guanxi* to peers, subordinates and superiors include self-interest, ceremonial and moral obligations, as well as emotional bonding. These dimensions of *guanxi* tend to be strongly intertwined and serve the purposes of gaining advantage through the exchange of favors and of establishing harmonious relationships (*Guo* 2001: 71).

Besides the emphasis on *guanxi*, another important notion is the prevailing tension of central authority vs. local autonomy. Traditionally China has shown little tolerance for diverse centers of power beside the central government (or respectively the imperial court). On the other hand, due to the size of the country, the central level has always been forced to leave

local affairs to be dealt with by local representatives, creating a potential field of tension between central- and local-level governance (*Andrews-Speed* 2010: 17).

On level two, formal institutions of the Chinese state appear fragmented, with diffused structures of decision making and authority (*Howell* 2006: 291). The county level of governance has obtained a high degree of influence in policy implementation. Vertical and horizontal relationships between state bodies tend to be a result of negotiations and have rarely been defined by law (*Andrews-Speed* 2010: 17). Besides government bodies on different levels, state-owned enterprises (SOEs) have emerged as powerful actors which can shape policy making. SOEs exercise a high degree of control in strategic sectors of the Chinese economy and, on the top management level, are strongly intertwined with government bodies (*Andrews-Speed* 2010: 26; *Downs* 2008: 1). According to *Andrews-Speed*, the Chinese Communist Party appears as the unifying force within this fragmented environment of powerful stakeholders, as structures of government bodies and SOEs are echoed by parallel structures of the party, ensuring the influence of the communist party towards any stakeholder involved in shaping governance in China (*Andrews-Speed* 2010: 26f.).

In this environment, the central level leadership's role is to provide broad development guidelines, while details of implementation are left to local authorities. Specific policy initiatives are formulated by the central level only in rare events. Division among stakeholders, unclear guidelines and the perception that a central level policy initiative may not be of high priority lead to widespread non-compliance of central government guidelines on the local level (*Andrews-Speed* 2010: 29f.).

The individual behaviors, allocations of budget and other resources as well as determination of prices (level four) are a result of the environment constituted by the upper levels and subject to constant adjustment. Regarding governance in China, this means that local governments have a high degree of autonomy in terms of how they allocate and determine budget, personnel and local-level incentive policies. These allocations by local governments are determined by upper-level incentives and personal interrelationships on the local level (*Howell* 2006: 283f.).

Analysis of institutional change are mainly concerned with levels two and three (the formal institutional setup

and the manner of implementation; *Williamson 2000: 596*), which are also relevant for this paper. Levels one and four will therefore be neglected in the following.

2.3 “Extreme events” and other drivers and inhibitors of policy change

New Institutional Economics provides a framework that can help identifying determinants which either inhibit or accelerate policy change. These factors can be embedded in the institutional environment itself, such as strong vested interests among key decision makers (which could inhibit change) or an obvious failure of previous policies, conflicting interests as well as incompatibility and friction between institutions (which could favor change). An exogenous force for policy change can be constituted by a disruptive event (*Andrews-Speed 2010: 10*). As *Andrews-Speed* explicates: “Events, trends or other changes may provide the necessary rational or impetus to persuade a government to enforce a long-contemplated change. [...] These events, trends or changes may be political, economic, social or even physical in nature, and may be domestic or foreign” (*Andrews-Speed 2010: 10*).

To further frame the event of the *airpocalypse*, this paper borrows from two definitions provided by *Wilson et al. 2010* and *Birkland 1997* respectively: In a study about organizational strategic decision making amidst “extreme events”, *Wilson et al.* defined such events as “determined within organizational context; characteristically unprecedented or unplanned occurrences that impact upon business as usual through the disruption or destruction of key resources” (*Wilson 2010: 15*). *Birkland* provides a useful supplement to this notion when describing what he called a “focusing event” as a sudden, rare and harmful occasion that is known to policy makers and the general public simultaneously and affects a large number of people (*Birkland 1997: 2*). The consequences of such events include immediate and intense media coverage that peaks within weeks after the event as well as long-term reactions by policy makers (*Birkland 1997: 29ff.*).

The potential of such an event to instill a change in the policy agenda is due to the sudden and intense generation of media and public interest in a certain issue, which in turn pressures policy makers to re-examine their priorities. This logic contrasts the concept of institutional change within which sudden disruptions are uncommon.

This study explores the possibility of the *airpocalypse* being a disruptive event that may have triggered institutional change with respect to the formal setup as well as the implementation of China’s policies related to air pollution control. The institutional setup of China’s air quality governance is briefly outlined in the following.

3. Institutional setup of China’s air quality management

3.1 Level two: formal institutions

Like most other domestic policy areas, the legal framework and the five-year plan cycle respectively define the boundaries and overall development direction of China’s air quality management. As air pollution is an issue for a variety of industries and concerns economic development, environmental protection and climate change, the number of stakeholders involved in managing air pollution is high and the system of governing air quality is generally fragmented.

Laws relevant to air quality emerged since the end of the 1980s, with the Environmental Protection Law (环境保护法) and the Air Pollution Prevention and Control Law (大气污染防治法), which have been in force since 1989 and 1995 respectively. These laws call for the establishment of pollution discharge standards and fees, environmental impact assessments for large projects as well as pollution monitoring based on standardized procedures. Also, fines for unlawful pollution are introduced and polluting actors are declared legally liable for submitting emission data reports. Competencies and obligations have been somewhat defined in the Air Pollution Prevention and Control Law, which tasks the State Council to incorporate atmospheric protection into the national five-year plans and puts the Ministry of Environmental Protection in charge of specifying environmental regulations, while local governments are responsible for enforcement (The Central People’s Government of the People’s Republic of China 2012; *Lin and Elder 2014: 13ff.*).

Five-year plans (FYP) set the overall agenda for China’s development over their respective period. These plans specify targets for economic and social development that are broken down by region and sector in complementary plans. Air quality related targets have been published since the 9th FYP (1996 to 2000). The successive FYPs mainly targeted emissions of specific in-

dustrial pollutants by formulating emission reduction goals (Xue et al. 2013: 273f.). Targets directly related to urban air quality were initially set in the 10th and 11th five-year plans (SEPA n.d.; The State Council 2008: 6). The 12th five-year plan (2011 to 2015) for the first time introduced quantitative targets for the reduction of PM10 and PM2.5 concentration, which was to be reduced by 10 % and, depending on the region, by 5 % to 15 % respectively. Another novelty of the 12th FYP is the prioritization of major regions for air pollution control, namely Beijing/Tianjin/Hebei, the Yangtze River Delta and the Pearl River Delta (MEP 2012: 23).

The key tool of the central government to align local government policies with FYP priorities is a list of **key performance indicators** (KPI) which link the achievement of targets to the promotion (or penalty) of local government officials. Targets featured in these KPIs are distinguished as “binding” high priority targets, or “ordinary” targets which are desirable but of lower priority. The specified binding targets are the essential orientation based on which local governments lay out their policies (Van Aken and Lewis 2014: 22f.). Over the periods of the 10th and 11th FYP, this system has been strongly biased towards GDP growth, for which a set of binding targets were specified, while goals for environmental protection were defined as non-binding, causing local governments to prioritize the latter and go so far as to cover unlawful pollution within their premise in order to fulfill economic development goals (Ran 2013: 7ff.).

Central government bodies dealing with air quality issues mainly include the State Council, the National Development and Reform Commission (NDRC) and the Ministry of Environmental Protection (MEP): The State Council, headed by the prime minister, is the highest ranking body for policy implementation in China and determines high level development priorities. It approves the national five-year plans and occasionally issues high-level plans and targets (Williams 2009: 20f.). The NDRC is responsible for developing the five-year plans and as such formulates targets and policy measures related to environmental protection and air quality improvement. The MEP issues environmental regulations and standards for industry, transport and other sectors and is in charge of overseeing their implementation (MEP 2008; Williams 2009: 21f.). Besides these major stakeholders, several ministries are at least indirectly involved in China’s air quality governance by influencing energy and resource management, including the Ministry of

Industry and Information Technology, the Ministry of Housing and Urban-Rural Development and others (Lin and Elder 2014: 25ff.).

Local governments are generally tasked with implementing FYP targets within their area of jurisdiction and local Environmental Protection Bureaus (EPB) are responsible for overseeing and ensuring compliance with environmental regulations and penalize offenders if necessary. Local EPBs are branches of the Ministry of Environmental Protection and report to their upper level peers, however, they depend on the respective local government in terms of funding, promotions, staffing and resource allocations, creating a conflict of interest between the cause of environmental protection and local government priority to maximize economic development (Lin and Elder 2014: 23ff.).

3.2 Level three: policy implementation

While the legal framework on environmental protection in terms of regulations and standards has been developed to a certain extent, Beyer points out that “China’s law regime has not been able to control the further deterioration of the environment” (Beyer 2006: 209). Law enforcement has traditionally been weak and the central government has not been able to fully enforce environmental regulations on a local level (Beyer 2006: 207). Due to their dependency on local governments in terms of budget and personnel, EPBs oftentimes find themselves incapable of enforcing environmental regulations without counteracting the local government priority of pursuing GDP growth (Williams 2009: 22). In addition, before the newly amended environmental protection law came into force in 2015, fines for environmental pollution were limited to a one-time payment of RMB 10,000 (equivalent to about EUR 1,200) – far too low for incentivizing industries to comply, since expenses for installing and operating pollution control systems are much higher (Tiezzi 2014). Consequently, industrial enterprises would rather pay the fine instead of investing in pollution control. The provision of false emission data to indicate compliance is another symptom of weak legal implementation and enforcement mechanisms (Ran 2013: 25).

The system of key performance indicators itself is implemented inconsistently, depending on geography and personal relationship of an evaluated cadre with his or her supervisor. As Van Aken points out, performance evaluation only distinguishes between passing or failing, regardless of how a specific goal has been

achieved. The KPIs are usually easy to pass for an official and afterwards promotion mainly depends on personal relationships (Van Aken 2013: 127f.). Easy achievement of binding targets is due to a reporting system that lacks independent control: Local and provincial officials are usually involved in the process of specifying their own targets, and the actual achievement of quantitative targets is evaluated based on statistics which are produced under the supervision of the very officials that are being examined. False reporting and modification of statistics emerged as a resulting practice to ensure that binding targets would be achieved with a passing score (Ran 2013: 25; see Fig. 2).

The core reason of the shortcomings in environmental policy implementation lies in the low priority that environmental protection has been given compared to economic growth. Below we will explore the impact of the *airpocalypse* on the institutional environment outlined. The government responses to this event and their potential impact are described in the following section.

4. Evolvement of government targets and the legal framework following the *airpocalypse* in 2013 and 2014

4.1 The *airpocalypse*

The problem of air pollution in Beijing has been known internationally at least since the 2008 Olympic games, but reporting on air pollution in China has been suppressed, with little discussion about the subject taking place in the media (Mol 2010: 521f.). This apparently changed after the *airpocalypse* happened in January 2013, which featured a historically severe level of air pollution in Beijing and its surrounding region. PM_{2.5} concentrations on January 12 averaged 569 µg/m³, which lies even beyond the air quality index classification of “hazardous” and is almost 24 times higher than the daily average concentration of 25 µg/m³, as recommended by the World Health Organization (WHO 2006: 5; Embassy of the United States to China n.d.). This heavy air pollution persisted during most of January, making this the most polluted month in recorded history to date, based on daily average PM_{2.5} concentration (ibid). This event evidently triggered widespread media reporting and public discussion: Compared with the months preceding the *airpocalypse*, messages on the Chinese social media platform Weibo which contained the word “air pollution” (空气污染) rose by a factor of more than 240 by January 13 (own analysis

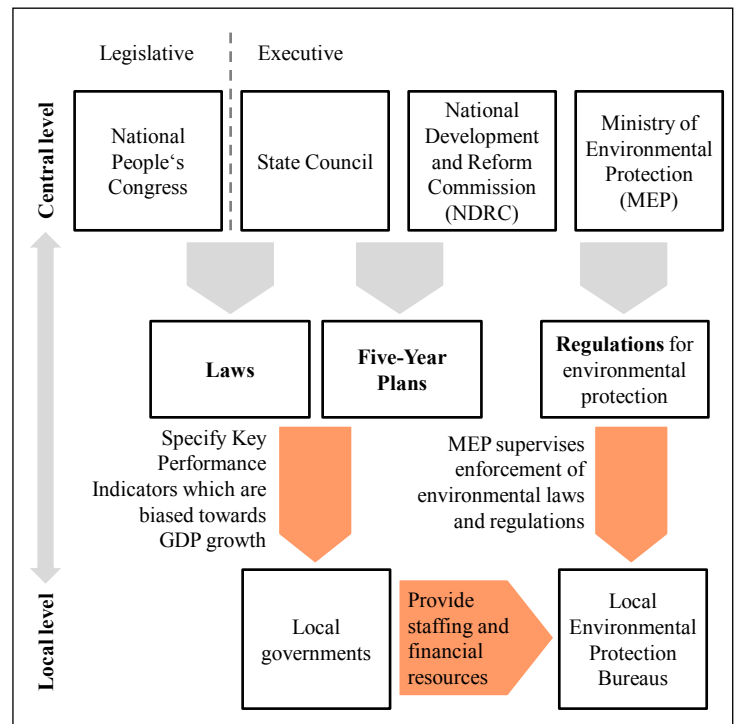


Fig. 2 Institutions of China's air quality management at the time of the *airpocalypse* (red arrows indicate conflict of interest). Source: own adaption based on IGES 2014: 21ff.

based on Weibo's advanced search function). The event made it into headline articles of international media, and the daily output of online articles of the Chinese news agency Xinhua featuring the words “air pollution” in their headline peaked at over 60 on January 14, more than six times higher than the daily average during 2012 (own analysis based on Baidu News's advanced search function). The social media discussions caused by the *airpocalypse* was not only more vivid than during previous events of severe air pollution but, for the first time, this event was extensively covered in national media (Kay et al. 2014: 5). Evidently, the government needed to react. An interview partner who formerly worked as a policy consultant on transport sector emissions summarized the disruptive nature of the *airpocalypse* as follows: “The January 2013 *airpocalypse* was huge. It was transformative. You can really not overstate how it changed China's priorities. If there is one tipping point that changed the government's attitude, it would be the *airpocalypse*. This could be a shift towards longer-term more sustainable solutions.” Another conversation partner from the domain of city planning confirmed this view: “Of course, it was the government coming to a point where it just couldn't not do anything anymore. It [the *airpocalypse*] was a public pressure situation. It was a transition.”

4.2 Government response to the *airpocalypse*

Government reactions caused by this event can be distinguished between short-term actionism and adjustments of mid-term air quality targets: Shortly after the days of the *airpocalypse*, the central government and the city of Beijing reacted by issuing numerous announcements, most of which were related to standards for vehicle emissions and other technical regulations for pollution prevention. Also, statements about the reasons of the current severe air pollution and calls for action by high-ranking politicians were published, including a Statement of *Li Keqiang* (vice premier at the time), saying that solving the air pollution problem is a long-term process, but action must be taken (*Wagner* 2013; MEP 2013). A policy consultant commented on these responses that “the immediate regulatory reaction [to the *airpocalypse*] are things that the government just had not quite pushed enough on the top level that it now could push over the finish line”. A call of the state council for the implementation of cleaner fuel and diesel emission standards is an example of this (ICCT 2014).

In September 2013, eight months after the *airpocalypse*, the State Council issued the “Action Plan on Air Pollution Prevention and Control” (in the following referred to as the “Action Plan”) and published significantly stronger targets compared to those outlined within the 12th five-year plan framework: For the three prioritized major regions, Beijing/Tianjin/Hebei, Yangtze River Delta and Pearl River Delta, annual average PM_{2.5} concentrations are to be reduced by 25 %, 20 % and 15 % respectively until 2017, based on 2012 levels. This plan reemphasized some of the strategies which the government already followed before, such as industrial restructuring and transformation of the energy mix. Other guidelines included the installation of pollution monitoring systems, development of regional cooperation mechanisms and an improvement of the legal framework (State Council 2013).

This nationwide adjustment of air quality targets was preceded by an air pollution reduction plan for Beijing which was issued on September 2, 2013. It is the most detailed plan to date to outline the city’s air pollution reduction efforts from 2013 to 2017: The city specified a binding target for average PM_{2.5} concentration to reach 60 µg/m³ by 2017 (Beijing Municipal Government 2013). This amounts to an almost 33 % reduction compared to the officially reported PM_{2.5} concentration of 89 µg/m³ in 2013 (Beijing EPB 2014). Consid-

ering the stagnant PM_{2.5} concentration levels during the five years preceding 2014 (which ranged between 91 µg/m³ and 105 µg/m³ according to U.S. Embassy data), this target seems extremely ambitious. The plan announced 85 specific measures to reduce pollution, addressing the transport sector, the public heating system, replacement of coal-fired power plants as well as supposedly minor items like street barbecues. For each of these measures the plan specified the department and even the person responsible for implementation (Beijing Municipal Government 2013). Following up on this plan, in January 2014, the Beijing Municipal People’s Congress approved a law that makes measures for reducing environmental pollution for the first time legally binding and increases fines for non-compliance with environmental standards (NPC 2014).

Beijing’s plan is unmatched regarding the ambition of the air quality target and the level of detail it provides. The true significance, however, lies within the verifiability: In earlier years, the government of Beijing was suspected of artificially lowering its average air pollution index data in order to meet air quality targets of the 11th FYP by selectively excluding values from stations in heavily polluted central areas (*Andrews* 2011). The combination of publicly accessible data of the U.S. Embassy as an independent source and the binding PM_{2.5} concentration target for 2017 will make it impossible to manipulate data to artificially meet targets. This in turn creates significant pressure on the Beijing municipal government to take effective action.

The timing of issuing these plans suggests that they have in fact been a response specifically to the *airpocalypse* and may not have been published the same way had there not been this degree of pollution and discussion in January 2013. The Chinese governments on all levels usually center their actions around five-year plan cycles and the 12th Five-Year Plan on Pollution Prevention and Control in Major Regions was only released to the public in December 2012, one month before the *airpocalypse* ran its course. It is unusual for the government to publish yet another plan that refers to the very same kind of targets within a timeline that to a large part overlaps with the period of the valid five-year plan. Interview partners confirmed this view and highlighted that the Beijing municipal government has been put under particular pressure by the central government: “A lot of the environmental drivers had been in the five-year plans. But what happened in September is like a mutated five-year plan which goes until 2017 and is all about PM_{2.5}. [...]”

Beijing only wanted a relative target, which is more 'gameable', but the State Council made Beijing commit to a PM_{2.5} of 60 µg/m³. Now it is very difficult for the government to hide if they miss the target" (interview with a government consultant). A conversation partner from the Chinese academic sector stated that the central government particularly pressures governments of the Beijing/Tianjin/Hebei region to control air pollution, while the other key regions (Pearl River Delta and Yangtze River Delta) are under less scrutiny. *Jeremy Schreifels*, independent consultant on air pollution reduction policies associated with the Tsinghua University, confirmed the causality of the *airpocalypse* and the adjustment of government targets when asked the question: "Short answer: Yes. However, it is more complicated. I think the political pressure was brewing for several years and the *airpocalypse* was the event that caused everything to boil over. Much of the analysis for the plan had been done in 2012, but the *airpocalypse* opened the door for getting the necessary political approvals to implement the plan". This view is in line with other interview comments which suggested that the *airpocalypse* enabled certain policies to be "pushed through" against vested interests.

The Action Plan on Air Pollution Prevention and Control was complemented by an update of official key performance indicators towards a stronger emphasis of environmental protection. In June 2014, the State Council for the first time published a list of criteria which are to be included into provincial and city-level official KPIs of the Beijing/Tianjin/Hebei region, the Yangtze River Delta, the Pearl River Delta and several other provinces. This KPI update heavily emphasizes PM_{2.5} reduction and features a list of measures like eliminating industrial overcapacity, removing high polluting vehicles, promoting industrial energy efficiency and eliminating redundant production as measures by which officials will be evaluated (State Council 2014a).

4.3 Amendment of the Environmental Protection Law

In March 2014, the Chinese environmental law was revised for the first time in its existence since 1989. This amendment was not a direct response to the *airpocalypse*, as it had been under discussion for several years. However, according to an interview comment from a representative of a non-government organization consulting the Chinese government on legal matters, several aspects of the amended law, e.g. on information disclosure and regional coordination, may have

been included as a consequence of the event. In order to understand the significance of the aforementioned Action Plan, the most relevant amendments shall be briefly introduced. Generally, the updates attempt to correct some of the major weaknesses regarding official accountability, data disclosure and pollution fines as described above. Some of the most significant changes include:

- 1) The amended law requires environment protection to be incorporated in the local cadre evaluation system as "key criteria" and the public disclosure of evaluation results.
- 2) Officials are personally accountable and may be removed from their post for acts such as covering up illegal activities, approving construction projects without proper environmental impact assessment, failing to act upon unlawful pollution, or falsifying data.
- 3) Registered non-governmental organizations are explicitly entitled to file lawsuits against unlawful polluters for public interest.
- 4) Entities which violate environmental regulations can be fined on an ongoing daily basis as long as the violation persists (State Council 2014).

Several scholars on environmental law see these amendments as a potential milestone for the stricter enforcement of environmental protection. *Finamore* calls these updates a "game changer", that would provide the Ministry of Environmental Protection with greater authority to exercise punitive measures for non-compliance with environmental standards (*Finamore* 2014). The amended law on environmental protection was approved by the National People's Congress in May 2014 and has been in force as of January 1st, 2015 (State Council 2014). The impact of this law will however depend on its effective implementation.

5. Impacts of the *airpocalypse* on China's institutional framework in air quality management

Relating back to the analytical framework outlined above, the question remains how the *airpocalypse* may have directly or indirectly led to an alteration of China's institutional setup regarding air quality management. Was the *airpocalypse* after all a disruptive event that triggered institutional transformation within a governance system that otherwise is

reluctant to change? And what are possible mid-term implications of this?

First of all, it can be concluded that the *airpocalypse* did qualify as an “extreme event” or “focusing event” by the criteria defined respectively by *Wilson et al. 2010* and *Birkland 1997*:

- 1) It was inarguably a sudden and harmful occasion which affected a large number of people;
- 2) it was followed by intense media reporting and increased public scrutiny on the issue;
- 3) the central government evidently determined that this event needed to be directly and strongly responded to;
- 4) the event was unplanned and unprecedented regarding the duration of heavy air pollution and intensity of public discussion;
- 5) it did interrupt business as usual, as it forced the government to respond to an increasingly concerned public (besides numerous hospitalizations, the *airpocalypse* did not lead to a physical disruption or destruction of resources in its traditional sense, however).

Discussing the changes through the lens of the New Institutional Economics, the evidence outlined in this analysis indicates that the *airpocalypse* either directly or indirectly caused transformations in the formal institutional setup (level two – the “rules of the game” (*Williamson 2000: 597*) as well as the way how stakeholders implement policies (level three, the “play of the game” (*ibid*)). From this perspective, the role of the Action Plan for Air Pollution Prevention and Control, which is arguably the most impactful reaction caused by the *airpocalypse*, is evaluated for both institutional levels.

5.1 Impact on level two: formal institutions

The main implication of the “Action Plan” on China’s formal institutional structure governing air quality is that it mandates governments on all levels to readjust their development priority in a way they might not have foreseen prior to the *airpocalypse*: The increased PM2.5 reduction targets were accompanied by a more comprehensive set of goals such as the control of coal use, the reduction of steel production capacity and the accelerated adoption of renewable power genera-

tion etc. (State Council 2013). These central government targets issued by the State Council trickle down to province and local level governments as well as central government ministries which are prompted to comply with the new set of goals. China’s regions are affected by this to varying degrees, with the region of Beijing, Tianjin and Hebei being under highest pressure of adjustment. This overall notion is likely to be reinforced by the updated key performance indicators and the amended environmental protection law. Depending on its enforcement, the amended law can increase accountability and elevate the observing role of the civil society and thus significantly add pressure to local governments towards stronger compliance. In addition, with the authority to impose fines on a daily basis, local EPBs will be equipped with stronger leverage to discourage industries from breaching pollution discharge standards.

These alterations in the institutional framework are impactful insofar as they can build the necessary pressure and incentive to accelerate environmental protection across all relevant stakeholders. However, some core issues of the institutional setup are likely to remain challenges in the future: These include fragmented responsibilities and conflicting interests between pollution reduction on the one hand and avoiding impacts on local industries, employment and tax revenue on the other hand. Local environmental protection bureaus remain dependent on governments of their respective municipality, and the weighting of the published set of environmental KPIs against KPIs related to economic development remains unclear for the time being. A representative of an environmental technology company summed up: “Some targets were accelerated. Now they do retrofits a bit earlier and they shut down [steel and cement] overcapacity a bit earlier and try to control corruption more tightly. But there has not been a tectonic shift in policy.”

5.2 Impact on level three: policy implementation

The potential influence of the *airpocalypse* on the way how policies are implemented (level three of NIE) is linked to the aforementioned institutional changes. Generally speaking, all actors will likely be prompted to stronger prioritize air pollution control within their daily operations. Non-compliance with environmental regulations and achievement of FYP targets based on falsified data could be increasingly difficult for local governments and industries.

The direct impact of the *airpocalypse* in this regard is that it elevated attention of the State Council as well as the general public to the problem, pressuring local governments from both sides to more effectively address pollution. Kay et al. (2015: 3) point out that there is a strategic aspect to the central government delegating responsibility to lower government levels, which allow the central level to reduce attacking points for public discontent. The improvement of air quality in the three key regions outlined in the Action Plan, and in the Beijing/Tianjin/Hebei region in particular, has arguably become a priority for the central-level leadership. In other words, on the top, there now seems to be a stronger will to address pollution more effectively and it seems that the tolerance for neglecting environmental regulations in favor of economic growth is diminishing. The same may be true for the general public: Social media discussion patterns indicate that during the period between 2012 and 2014 public concern about air pollution in Beijing was elevated to a point that the government had to respond to in order to ensure social stability. Facing increased pressure to address the inter-regional problem of air pollution, a conversation partner from an international non-governmental organization stated that regional coordination efforts were intensified as a result of the *airpocalypse*, with governments from the Beijing/Tianjin/Hebei region having formed a joint committee to coordinate strategies for pollution reduction.

The addition in KPIs could be a significant correction towards implementing pollution reduction at the local level, but the unclear weighting towards economic targets makes it hard to evaluate their potential impact. The new KPIs put a heavy emphasis on PM_{2.5} reduction and could therefore incentivize local officials to stronger prioritize this area. As an interviewee from international academia pointed out: “[This KPIs update is] significant insofar as it makes implementation more likely by providing specific steps. This scorecard is important insofar as it solidifies and gives a roadmap for the implementation of wider pollution reduction goals – but it depends on the strictness with which it is implemented.” However, the risk of minimum KPI requirement being overly easy to achieve remains, possibly weakening the impact of this update.

The combination of the Action Plan, amended environmental protection law and updated KPIs could be a powerful mixture of incentive and pressure

towards local governments for stronger compliance in environmental protection. But the changes were not revolutionary insofar as they did not visibly lead to major alterations in the governance structure, but rather to a shift in priorities within the existing institutional structures. Judging by interviewee comments, the timing of the *airpocalypse* played a crucial role in its impact, since those measures that the *airpocalypse* caused to be approved during the cause of 2013, were already under discussion before the event. It appears likely that the degree of public discussion and media reporting on the issue as well as the progress of discussion among the political leadership at that time were factors that enabled the *airpocalypse* to be impactful.

6. Conclusion

This paper explored the disruptive potential of the *airpocalypse* on China's institutional environment in air pollution control, using *Williamson's* New Institutional Economics as a framework. It can be concluded that the *airpocalypse* was indeed impactful in terms of triggering the issuance of significantly more ambitious targets related to air pollution control as well as increasing pressure on local-level governments in effectively addressing the issue on the ground. However, the event did not visibly lead to more fundamental changes with regards to the allocation of responsibilities in air quality management or the mechanisms of policy implementation.

The case of the *airpocalypse* underscores the disruptive nature which events can play in terms of shaping the governance of a sector. This paper concludes with the hypothesis that events play a significant role in the evolution of China's governance institutions which, given certain preconditions, can trigger recalibrations in central government priorities, the interrelationship of different government levels and the relationship of different government levels with the general public. Given the significance of events in this regard, this subject seems worthwhile for further systematic research. The theoretical framework of New Institutional Economics can thereby be meaningfully extended by adding vertical categories to the horizontal set of institutional levels, which define drivers of institutional change (one of which being disruptive events), providing a framework for systematically analyzing the significance of different disruptive forces on each institutional level.

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