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## **Risks of communication: discourses on climate change in science, politics, and the mass media**

Peter Weingart, Anita Engels, and Petra Pansegrau

This paper summarizes the results of a research project analyzing communication about global warming among those in the fields of science, politics, and the media in Germany between 1975 and 1995. The methodology of discourse analysis has been applied to investigate the changing perceptions of climate change over time and the ways in which it became an important issue on Germany's political agenda. The first part of the paper will briefly introduce the underlying theoretical assumptions and explain the multiple steps by which data covering a period of two decades have been collected and analyzed. In the second part, the paper will provide the reader with the main research results, indicating the usefulness of distinguishing among the separate discourses on climate change in science, politics, and the mass media. The results suggest that there are specific discourse dynamics common to each of the three spheres, as well as some important disparities among them. These findings will be illustrated by a selection of examples typical of the samples analyzed. Finally, the third part of the paper will discuss the broader theoretical and practical implications of these results, which suggest that modern societies must cope not only with environmental risks but also with the risks inherent in communication.

### **1. Introduction**

For more than three decades, concerned scientists have sounded the alarm about global warming becoming an environmental threat that might seriously alter human life on earth. Governments worldwide have reacted to this warning, some by developing national policies to reduce domestic CO<sub>2</sub> emissions, others mainly by joining international negotiations about global emissions reduction. The mass media have influenced national policy responses. Their extensive coverage of global warming and related issues since the end of the 1980s has created public concern and a call for political commitment. At first sight, this seems like an excellent example of successful communication of a serious environmental risk. Human societies appear capable of anticipating the unintended consequences of their own actions and of undertaking major efforts to prevent life-threatening outcomes.

However, scientists, policy makers, and journalists have all experienced the problems and complexities resulting from this “success” story. Communications about climate change have abounded in mutual accusations of downplaying or exaggerating risk, of sensationalism, “bad” science, inciting public hysteria, and even conspiracy.<sup>1</sup> In many cases, the media have been accused of exaggerating scientific claims for the sake of the story. In Germany, the picture of the half-submerged Cologne cathedral has become the icon of the threat of global climate change, and similar catastrophic visions have been dramatized in TV docudramas: one depicting the scorched earth of the dried-up Rhine Valley, another portraying a huge chunk of

the Greenland ice cap breaking off and creating an immense tidal wave, which buries large portions of the North German plains.

While some skeptics claimed that they had proof that climate change was no more than media hype, climate scientists themselves were accused of publishing exaggerated predictions to attract public attention and thereby facilitate the acquisition of research funds. There is some evidence that the skeptics' counter-movement against the global warming alarm has been much stronger in the U.S. than in Germany.<sup>2</sup> In the U.S., this backlash has had serious repercussions and heated the climate change debate further. Accusations about self-interested climate scientists were countered by news stories about "skeptical" scientists paid directly by the oil industry to call into question the credibility of the global warming hypothesis.<sup>3</sup> Finally, scientists from all over the world who were involved in writing and reviewing reports for the Intergovernmental Panel on Climate Change (IPCC) experienced the vagaries of all these scientific assessments in a highly politicized field.<sup>4</sup> It is evident that neither the seriousness of the issue nor its global scope caused its communication among science, politics, and the media to be unproblematic and unequivocal. Instead, it appears that the problem is perceived, and these perceptions are communicated, with great variance in the three spheres. This variance, as we will discuss later, leads to specific risks of communication.

## 2. Communication of environmental risks

Many people who are concerned about environmental risks implicitly refer to a naive model of communication of these risks so that societies can react to prevent damage.<sup>5</sup> This rationalist-instrumental model of communication can be depicted as follows: scientific research helps to discover an environmental problem; it identifies options for the problem's potential solution; scientists inform politicians of these findings; and, as political decision making can always be expected to suffer from some inertia or be distorted by interests that run counter to environmental concerns, scientists can also try to create public awareness to foment political pressure. Thus, the model's basic idea is that of information flow among these spheres (science, politics, public), and it assumes that, ideally, the content of the information passes on unchanged and initiates political action almost automatically, following the "rational logic" of the information obtained. If the information fails to engender action, this model assumes *misrepresentations* of scientific information by the media, the ignorance of policy makers, etc.<sup>6</sup> According to this model, the solution to the problem of unsuccessful communication of environmental risks involves more and better information and cognitive learning processes for all the parties involved.

In this paper, we employ a broader concept of communication, which goes beyond flows of information, and includes notions of credibility, legitimacy, authority, entertainment, newness, etc. We also assume that the character of environmental risk communication is essentially different in each of the distinct spheres that are the focus of our research, and that *disturbances of communication* among these spheres are hence the rule rather than the exception.<sup>7</sup>

What does communicating about environmental problems like climate change mean in the sphere of *science*? The issue is global and complex, and encompasses a wide range of research activities in many fields. Many methodological problems and open questions are inherent in the issue of climate change; producing a systematic, scientific assessment of its global scope, as well as of its internal dynamics and global impacts, is highly problematic and must be met with more research. Climate change science also requires worldwide, long-term observation and collection of crucial data. It is the nature of science that many initial findings are preliminary, uncertain, and often hypothetical. Given the complexity and magnitude of the climate problem, the scientific uncertainties are exacerbated.

In the sphere of *politics*, communicating complex environmental problems is approached differently.<sup>8</sup> Political decision making requires a complex agenda-setting process, and before an issue becomes subject to political regulation, it must be framed as a problem that can be solved by political decision making. The complexities of the climate change issue, as well as the scientific uncertainties involved, do not encourage immediate political decision making. In the case of climate change, a common political strategy is to keep the decision suspended by referring it back to science and calling for "more research." This approach changes if the urgency of the environmental threat develops into a crisis of political legitimacy, which may mean that the threat acquires relevance within one legislative period and cannot be postponed to the next. It is then necessary to reduce the uncertainty inherent in the scientific communication to a level that can legitimately be ignored.

Finally, the *mass media* have their own rules for determining if and how a given issue is covered.<sup>9</sup> The media, therefore, must identify climate change as a newsworthy issue, or it is not communicated at all. Scientific information, as such, is relatively unattractive for media coverage. But its newsworthiness increases if identifiable events can be linked to a scientific issue or if a threat to human life is involved. In these contexts, scientific uncertainties are seen by media in primarily two ways: they are either obstacles to extensive news coverage or they are seen as interesting in themselves. Beyond that, the media's primary task of presenting newsworthy items necessitates creating immediacy for short-term events as well as for long-term issues.

This theoretical framework (specific rules of selectivity and specific time horizons for research, policy making, and news coverage) led us to assume that the issue of climate change has been treated quite differently in the three spheres in question, especially regarding the timing, the amount of attention paid to the issue, and how it is framed as a problem. Thus, separate discourses on climate change can be observed in science, politics, and the mass media.

### 3. Discourse analysis

The following study is based on texts produced in discourses in science, politics, and the media (i.e., scientific publications, minutes of parliament and parliamentary committee meetings, and media reports). The analysis covers a time period of twenty years (1975–1995), as it was in this period that the three spheres of discourse attained their greatest development in Germany. This study's main methodological problems arose from the diversity of the discourses and the variety of their sources and products, as well as from the difficulty identifying the dominant discourse. Specific procedures had to be developed to identify the main events and the pertinent publications representing the dominant discourse. The procedures chosen were necessarily different for each discourse:

The scientific discourse takes place in an immense number of conferences and journal publications. As it is hardly possible to represent a quantitatively adequate picture of this, we focused on a few central publications that have influenced the German discourse. The database of this part of the analysis is a sample of 23 scientific publications from 1975 to 1995. The publications were selected for reasons of centrality of author(s) to the German scientific debate and high citation rates. However, some publications, such as those taken from the newsletter of the German Physical Society and important papers from relevant research institutions, were included in the sample because they were particularly influential in Germany's climate change debate. In addition to this publications sample, we carried out extensive interviews with leading German climate researchers.

It was easier for us to delineate and collect the material for the political discourse. Here, the primary question was how parliamentary and governmental decision-making processes

dealt with the issue. The database of this discourse analysis draws mainly from two sources. Most important are the verbatim minutes of plenary sessions of the German Bundestag (1975–1995). In addition, we analyzed minutes of working sessions of the parliamentary commission on “Environment, Nature Conservation and Nuclear Safety” (1987–1994). Documents, such as ministerial resolutions, reports of the Enquête Commission on Preventive Measures to Protect the Atmosphere, or legislative bills were also included in the database.

In the case of the media discourse, the main problem was the enormous variability of the mass media and the programmatic differences in their reporting. Our first decision was to focus on the print media, as the inclusion of audiovisual media would have required an entirely different type of analysis. The German newsmagazine, *Der Spiegel*, was chosen as a reference point, and on that basis other important German media were added for selected time periods. The media discourse is based on 478 articles published between 1975 and 1995. Our most important sources for the media sphere were the complete coverage of anthropogenic causes of climate change from the leading German newsmagazine, *Der Spiegel* (242 articles), complete coverage of six selected years of the supra-regional daily, *Die Frankfurter Allgemeine Zeitung* (FAZ; 219 articles), and a special series of 17 articles from the national daily paper *Süddeutsche Zeitung* (SZ).<sup>10</sup>

The collected material was analyzed in three steps for each of the three discourses. In the first step, the development of “attention” to the topic of climate change was traced in quantitative terms only. To this end, quantitative indicators had to be developed that could adequately represent the course of “attention” over the long time period (1975–1995). We subsumed these indicators as “attention to global climate change” (Figure 1). The “attention” paid to climate change in the political discourse is represented by the number of plenary sessions of the German parliament (Bundestag) in which climate change was on the agenda, relative to the total number of sessions per year. The media discourse on climate change is represented by the number of issues of the leading German newsmagazine, *Der Spiegel*, that contained articles on climate change relative to the total number of issues per year. In the case of the scientific discourse, we faced the problem that our selectivity did not allow for the formulation of any conclusions about the quantitative development of “attention,” as we did not know the entire volume of climate change-related publications. We therefore collected additional material to get an estimate; we looked at the number of newsletter issues of the German Science Foundation (DFG), the Max Planck Society (MPG), and of the German Physical Society (DPG) dealing with climate change, relative to all issues of these newsletters in the period covered. We hoped this approach would permit us to quantify scientific reporting about climate change in the foremost German research organizations and, thus, to represent the scientific discourse.

The second part of our analysis is devoted to the issues and the issue linkages, i.e., the thematic contexts in which climate change was discussed. Preliminary analysis of the material revealed that climate change was discussed in various contexts and was linked to various issues. This is true for all three discourses, though particularly so for the political and media discourses. A set of categories was formulated to permit identification of different contextualizations of climate change and thematic shifts over time. (The results of this part of the analysis will be published elsewhere.)

The main part of the study (the third step) is the discourse analysis in the narrower sense of the term. In this step, all the material was subjected to a qualitative text analysis guided by three questions: (1) who are the addressees of the respective communication, and how are contexts of meaning related? (2) how is credibility established? and (3) how is climate change established as an arena of political decision making? The third question represents the core of the entire study, as it leads to the identification of “discourse profiles.” The results of this elaborate qualitative analysis are the core of what is presented below.

#### 4. Dynamics of the discourses

Figure 1 shows the quantitative development of “attention” in each of the three discourse spheres. Although the figure must be interpreted with caution, given the limited comparability of the data, it does permit interpretation of the dynamics of each discourse.

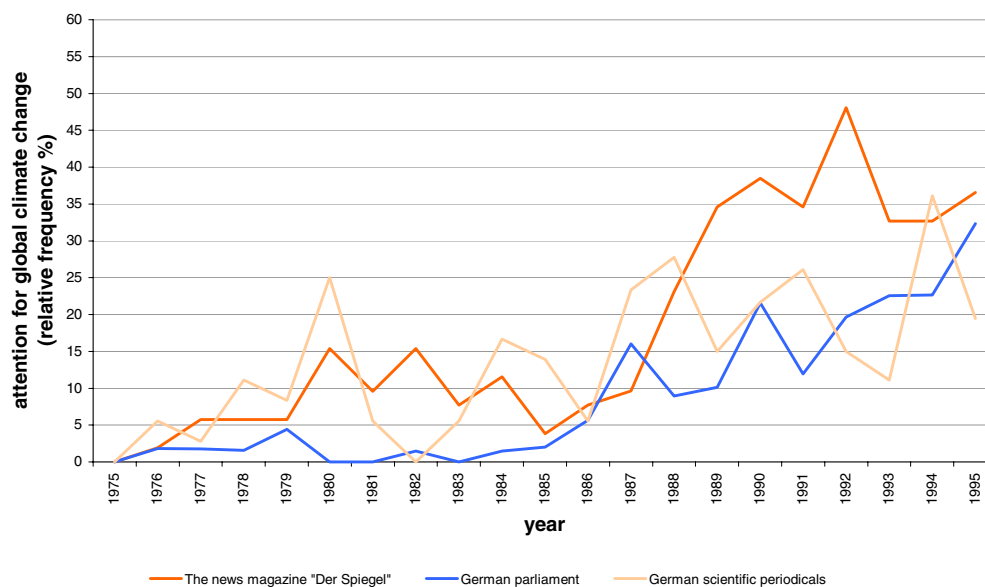


Figure 1. Global climate change in science, politics, and mass media.

The line indicating “German scientific periodicals” reveals a fairly constant level of attention, the only exception being an early peak in 1980, which has no correlation in the other discourses. The development of (scientific) attention supports the observation that the discourse on anthropogenic causes of climate change began in the context of science. The political discourse had barely begun before 1986, when first indications of attention appear. From 1987 onwards, the political “attention” increased continuously and reached its peak in 1995, the year of the First Conference of the Parties (to the UN Framework Conference on Climate Change [UNFCCC]) in Berlin. The distinction between the pre- and post-conference phases is even more pronounced in the media discourse. Between 1975 and 1987, media attention to climate change remained at a relatively low level. Beginning in 1988, reporting on the issue stabilized at a markedly higher level, until it reached its peak in 1992. In spite of a small decline afterwards, media attention to climate change remained on this rather high level until the end of the observation period.

The qualitative analysis of the discourses will show that 1986 marks a turning point in all three discourses.

#### 5. Discourse on climate change in science

In Germany, the issue of global climate change was first brought up in the scientific discourse.<sup>11</sup> The scientific discourse emphasized the policy relevance of initial research findings. As time went on, nonscientific publications addressed a wider public, warning of the negative impacts of climate change and calling for political action. Until the mid-1980s, this emphasis on the

potential political relevance of climate change research legitimized demands for more funding of research into climate change science and related fields.

The discourse on climate change can be divided into several phases, although these demarcations are admittedly artificial and not absolutely distinct. The first phase could be characterized by the discovery of the anthropogenic impact on the climate, which was accompanied by a rising concern among many scientists. The second phase brought about a new level of politicization of the climate change hypothesis and led to the closure of the scientific debate. A dramatic warning by German physicists in 1986 immediately garnered public attention and turned the scientific hypothesis into a major political issue. The scientific debate's consequent closure was solidified by an Enquete Commission, which was established to give scientific advice to the German Bundestag. The third, current, phase is characterized by an institutionalization and diversification of scientific advice in the field of climate change.

In the following sections, we will briefly introduce these three phases, mainly to highlight two aspects of the climate change debate. First, that a politicization of climate change research occurred *within* the scientific discourse—an observation that is not meant to support conspiracy theorists but rather to suggest the particular communication risks arising in this and similar cases. Second, to show a peculiarity of the German case, in which climate change has been framed as the future *climate catastrophe*.

#### *First phase: man-made climate change? The discovery of anthropogenic impacts on the climate*

During the early scientific debates on climate change, the discovery of anthropogenic influences on climate aroused alarm and concern. Important indicators of this concern could be found in the choice of research questions addressed and the way in which research relevance was demonstrated. Many scientific articles on climate change at this time were not confined to a discussion of physical or chemical aspects of the carbon cycle, but concluded by suggesting the potentially dramatic effects of a future climate change.

The significance of these results can best be evaluated by referring to the papers by Bryson and Schneider, which indicate that a surface temperature change on the order of 0.5 K may be sufficient to alter substantially some important climatic variables (rainfall and ice cover) in at least part of the globe. (V. Ramanathan, "Greenhouse Effect Due To Chlorofluorocarbons: Climatic Implications," *Science* 190 (30 October 1975): 50–52, on p. 51.)<sup>12</sup>

Observations of long-term changes in cloud forcing can be used directly to provide confirmation of previously untestable ideas. . . and climate model results. . . regarding climate change. For example, results from some GCMs [global climate models] suggest that severe drying of the mid-continental regions in North America and Europe could result from a doubling of CO<sub>2</sub> concentrations. (V. Ramanathan et al., "Cloud-Radiative Forcing and Climate Change: Results From the Earth Radiation Budget Experiment," *Science* 243 (6 January 1989): 57–63, on p. 62.)

The perception of climate *change* as something dangerous that must be avoided is established in the scientific discourse. On the one hand, authors like Wilfrid Bach (one of the prominent spokesmen in the German climate debate in early years) recognized that

(T)he climate of the earth has changed in the past, and it is reasonable to assume that it will continue to change in the future. (Wilfrid Bach 1976, "Global Air Pollution and Climatic Change," *Reviews of Geophysics and Space Physics*, 429–474, on p. 429.)



On the other hand (and in this case in one and the same publication), scientists evoked the image of a balanced system that only human influence could change. And if change is something man-made and to a certain degree unnatural, it is only reasonable to assume that people should actively work to mitigate the human-created risk of climate change.

In the past, climatic changes were entirely due to natural forces. However, since the industrial revolution, CO<sub>2</sub> and aerosol content of the atmosphere and waste heat emission have increased substantially. This has led to the conviction that mankind can also influence the climate. . . . This, in turn, leads to the critical question, what is man's contribution relative to that of nature? *And, how much impact can be permitted before the balance of nature is seriously upset?* (Wilfrid Bach 1976, "Global Air Pollution and Climatic Change," *Reviews of Geophysics and Space Physics*, 429–474, on p. 454; emphasis added.)

Thus, the need for preventive action is already implicit in the formulation of the scientific discourse, in particular with respect to the possibility of political regulation. The following scientific argument led to this initial politicization of the issue: There are several trace gases whose influences are discussed in the context of atmospheric chemistry. These trace gases are then separated by source as either natural or anthropogenic. The human sources are discussed in isolation and are linked to certain human activities (industrial production, energy consumption, agricultural practices, etc.). In the next step, the world regions, groups of nations, or individuals associated with these activities are identified. Quantification is the last step in this chain: it leads from a discussion of causal factors to a naming of parties responsible for the possible change and to an order of severity. This has led, for example, to the recurring debate about the degree to which the north and the south, i.e., the developed or developing nations, are responsible for greenhouse gas emissions:

The notion that more than 90% of the major pollutants originate from industrial operations in the northern hemisphere. . . has to be revised. Some observations and measurements seem to indicate that tropical grass land fires are much greater contributors to global emission totals than had been hitherto believed. (Wilfrid Bach 1976, "Global Air Pollution and Climatic Change," *Reviews of Geophysics and Space Physics*, 429–474, on p. 431.)

I conclude that the changes of forests in developed countries at present do not represent a significant net flux of carbon to or from the atmosphere. . . . In view of the rapidly increasing population in developing countries, it is likely that cutting of wood for fuel has increased appreciably during the last decades and that the present use exceeds the growth of new trees and bushes in these areas. There may be a net input to the atmosphere of 0.2 to 0.4 × 10<sup>9</sup> tons of carbon annually, because of inadequate forest growth for renewal of fuel wood in the developing countries." (Bert Bolin 1977, "Changes of Land Biota and Their Importance For the Carbon Cycle," *Science* 196, no. 4290 (6 May 1977): 614–615.)

Only later did this discussion of anthropogenic trace gas sources refer to the quantification of *national* emissions. As one author in the field recalls:

Beginning in the late 1980s, as national governments began to recognize the importance of global warming as a policy problem, the need for comprehensive inventories with reference to political borders became apparent. (Susan Subak, "The Science and Politics of National Greenhouse Gas Inventories," in Tim O'Riordan and Jill Jäger [eds.], *Politics of Climate Change: A European Perspective* (London/New York: Routledge, 1996), 51–64, on p. 52.)



This reference to anthropogenic sources finally leads to the question of the possible consequences of climate change for human societies.

Thus we see that from its inception, the first phase of scientific discourse contributed greatly to the identification of climate change as a political problem that could be subject to regulatory policy. The discourse identified causes and effects, and translated them into responsibilities by quantifying them and referring them to geopolitical units.

### *Second phase: politicization and scientific closure*

To understand the specific dynamics of the discourses on climate change in Germany, one has to take into account an arena of communication other than the scientific debate proper. The German Physical Society (DPG) played a particularly important role in this context. The newsletter of the society, the *Deutsche Physikalische Blätter*, had been a journal in which scientists commented on the issue of climate change more openly, with rather direct hints at its political relevance and more explicit advocacy than would have been possible in a peer-reviewed journal. One example is the writings of meteorologist Hermann Flohn:<sup>13</sup>

In any case, the problem must be taken seriously: it threatens the earth's population as a whole, and in the course of the coming century it will threaten the generation of our children and grandchildren. . . . It is not a matter of arguments for an election in the short-lived time scale of politics, the fates of our children and grandchildren on the whole earth are at stake. (Hermann Flohn, *Physikalische Blätter* 37, no. 7 (1981): 184, 190.)

A subgroup of the Physical Society, the Working Group on Energy, took particular advantage of the ongoing scientific debate on climate change. Although not all members of the group were experts in climatology, the group's members were concerned with the future of nuclear energy in Germany. The policy option of relying on nuclear power as a major source of energy had come under severe criticism in an extremely polarized public debate.<sup>14</sup> In this context, the group regarded what it termed the "CO<sub>2</sub> problem" as an important argument against coal as the primary fuel. The working group tried several times to go public with a warning that people should take the risk of climate change seriously and invest in nuclear energy to avoid this risk.<sup>15</sup> In 1986, the group's warning took on a very dramatic tone, "Warning of an impending climate catastrophe":

In order to avoid the threatening climate catastrophe, it is imperative to start to drastically curb the emission of the so-called trace gases immediately and effectively. (AKE, *Warnung vor der drohenden Klimakatastrophe*, press release, 1986).

This dramatic plea by concerned scientists drew an extreme picture of the possible effects of climate change, one that diverged from the scenarios under discussion at the time. In addition to a rise of the global mean temperature of up to 8 °C near the poles, the scientists claimed:

The possible melting of the West Antarctic shelf ice, presumably within a period of several hundred years, could cause a rise of the sea level by five to ten meters, thus flooding the lower coastal areas such as in the Netherlands and Northern Germany. (AKE, *Warnung vor der drohenden Klimakatastrophe*, press release, 1986).

To the surprise of many, the group's claims received instant media attention, which triggered the political debate.<sup>16</sup> The term "climate catastrophe" implied potentially great damage and the urgent need for immediate action. Many climate researchers felt uneasy with this increased attention because it overly dramatized their scientific claims and clearly transgressed the boundaries of scientists' traditional role. Thus, some months later, the German Meteorological

Society (DMG) lent its scientific authority to a joint warning that was more moderate in the predicted effects of climate change and replaced the term “climate catastrophe” with the less dramatic notion of “climate changes.”<sup>17</sup> Nevertheless, from the time the Working Group issued its original statement, future climate change was labeled a *catastrophe*, and the term never disappeared from the climate change discourses in the mass media or in politics. As one leading German climate researcher recalls, the scientists made many attempts to revoke the term “catastrophe,” but once it was out in public, it assumed a momentum of its own.

In direct response to increased attention to climate change, the Enquete Commission “Vorsorge zum Schutz der Erdatmosphäre” was created by the German Bundestag in November 1987. The commission, made up equally of scientists and politicians, produced three reports in the years that followed.<sup>18</sup> The commission’s major impact on both the scientific and the political debates was to bring together an assessment of the state of the art in climate research, an assessment of the threat of climate change itself, as well as suggestions for a clear emissions reduction target. The commission considered a 30 percent reduction target feasible for Germany. This scientific assessment was supposed to feed directly into the policy-making process, and was produced with the help of many additional reports, which represented a wide range of the German scientific community. The commission’s reports thus commanded a high scientific consensus. The only question on which the commission could not achieve unanimity was that of how to implement its emissions reduction target. The role that should or should not be played by nuclear energy remained especially controversial.<sup>19</sup> On the whole, the commission achieved closure of the scientific debate in a field that had become politicized in many ways, and it strengthened the perception of climate change as a future risk that necessitated serious consideration by politicians and that called for political action. In these ways, the Enquête Commission contributed substantially to the formulation of an emissions reduction target.

### *Third phase (1991–1995): institutionalization and diversification of scientific advice*

In the beginning of the 1990s, the issue of climate change was widely recognized in Germany, and became institutionalized. This period saw the creation of two new, important research institutes: the Potsdam Institute for Climate Impact Research (PIK) in 1992 and the Wuppertal Institute for Climate, Environment, and Energy in 1991. It was widely expected that both these institutes would provide continued policy advice, albeit in completely different directions. Whereas the PIK conducted major research into the question of regionally identifiable impacts of climate change,<sup>20</sup> the Wuppertal Institute strove to embed climate change into the debate about sustainable development.<sup>21</sup> Another innovation was the establishment of the interdisciplinary Scientific Advisory Body for Global Environmental Change (WBGU), which aimed to produce one major advisory publication each year.<sup>22</sup> The other long-established advisory committee in the environmental area, the Expert Panel for Questions on the Environment (SRU), also dedicated an important part of its biennial report to the likelihood of implementing and reaching the CO<sub>2</sub> emissions reduction target using fiscal and other market-oriented approaches.<sup>23</sup> A second Enquête Commission on the protection of the earth’s atmosphere followed the successful first commission, and focused on questions of implementation of climate change policies in the transport and agricultural sectors.<sup>24</sup> These are only a few examples of a general diversification of scientific expertise on climate change during this period, which saw a broad range of institutes and committees that addressed policy-relevant research questions. In general, they concentrated on implementing the political targets and choosing among available policy options.

One last important argument, which emerged in the scientific discourse and drew important political attention to the issue, deserves mention. The argument holds that as long as climate

change remains a hypothetical risk and there is no scientific *evidence* of a discernible human impact on the global climate, the scientific warning is largely dependent on the assigned credibility of science in general and climate research in particular—an easy target for skeptics in the absence of ultimate proof. Furthermore, many authors have emphasized that it will take another decade or two before scientific evidence of human-induced climate change is available.<sup>25</sup> The search for such evidence has tempted more than one scientist to claim that actual weather anomalies or an observed rise in global mean temperature were already signs of the anthropogenic effect, in some cases as early as 1988.<sup>26</sup> In Germany, a similar claim was made several years later, with backing from the international scientific community, represented by the IPCC. Researchers from the Max-Planck-Institute for Meteorology in Hamburg published results that were later expressed as a 95 percent probability that the observed climate change was due to an anthropogenic influence.<sup>27</sup>

It has been shown how the choice of research questions and the contextualization of research results with reference to human actions and geopolitical regions contributed to a politicization of the issue of climate change in the realm of science. The perception of the global climate system has been transformed from a strictly physical, chemical, and biological one into a system that is affected by human action, has potential dangers for society, and is therefore of relevance to political decision making. We will now show how this discursive move catalyzed discussions of the issue in the mass media and the political system in Germany.

## 6. Discourse on climate change in politics

This section focuses on the sphere of politics. In three different phases between 1975 and 1995, the political discourse reacted in different ways to the issue of climate change. Many political scientists claimed that global climate change poses a problem of such scope for political systems that they have to undergo fundamental transformations and give up some of their routine procedures.<sup>28</sup> We will try to show how, in the political discourse, climate change was first constructed as humankind's all-embracing meta-problem and, in a later phase, was reconstructed and transformed into a problem of normal political regulation and routine.

Several discursive phases are discernible in the political arena. The first phase (1975–1985) can be characterized by skepticism and vigilance. In contrast, in the second phase (1986–1992), the issue of climate change enters the political debate and is perceived as the future “climate catastrophe.” In the final phase (1992–1995), a discursive transformation of this “catastrophe” into an object of routine political regulation can be observed.

### *First phase (1975–1985): skepticism, vigilance*

The issue of man-made climate change appeared on the *political* horizon in Germany in the late 1970s, by which time the potential negative impacts of future climate change as a consequence of rising CO<sub>2</sub> concentrations in the atmosphere had been the subject of scientific publications and conferences for several years. Parliament lent its attention to the issue mainly to determine whether measurable negative impacts on the German territory were to be expected in the short term. Questions typically assumed the format represented by the following:

(MoP, SPD): From the standpoint of both medical science and the work of salubrious spas in health resorts, which significance does the Federal Government accord to climate research and what knowledge does exist in the responsible departments of the Federal Government on the effects of the climate on the human organism? (8. LP, 126. S, 15.12.1978, p. 9873.)<sup>29</sup>

In most of these—rare—cases, the answer was the denial of any direct threat. The main reaction was to keep climatic developments under surveillance and to shift them to the domain of scientific observation. Consequently, in 1984, the Ministry for Science and Technology launched a national climate research program. The fact that the research program had been planned in the aftermath of the first World Climate Conference in 1979, but was not actually put into practice until some years later, reinforces the conclusion that in the political arena there was no sense of urgency.

*Second phase (1986–1992): catastrophism*

The year 1986 marks an important turning point in the political discourse on climate change. The memorandum written by the Working Group on Energy of the German Physical Society (see above) was immediately taken up by members of the Bundestag to address the credibility of the claims made in the Group's report, as well as its implications for government action. At first, the government spokesperson could still refer to more moderate scientific claims made by other groups, so the initial reaction was to play down the threats—which were, in fact, exaggerated.

(Dr. Schulte, Parliamentary State Secretary): The opinion of the Working Group on Energy of the German Physical Society is known to the Federal Government. . . . Among geoscientists the statements of the paper of the German Physical Society are at present considered speculative. Continuing intense research is required to establish precise facts. (10. LP, 197. S, 19.2.1986, p. 15216.)

(Dr. Probst, Parliamentary State Secretary): The Federal Government is not to rely on these statements [by the Working Group on Energy] alone. The calculations are not precise and there are other estimates and sources contradicting them. . . . The situation is assessed entirely differently by the *National Research Council of the United States*, namely extraordinarily cautiously, and this is a highly esteemed institute in the United States of America. (10. LP, 204. S, 13.3.1986, p. 15675/76; emphasis added.)

The last quotation in particular reveals how in 1986, when scientific knowledge claims were contradictory and no obvious knowledge base was available, the German government referred to the reputation and traditional credibility of scientific institutions to legitimize its own political position. Only a few months later, after extensive media coverage, was there a discursive closure to the parliamentary debate. Doubting the scientific credibility of the physicists' warning was no longer a legitimate option. Whereas in the following year German scientists tried to revoke the term "climate catastrophe" and to advance the less dramatic "climatic changes," the term *catastrophe* had gained an incredible momentum in the political discourse and was used from then on, whether speakers were members of the government or of the opposition parties.

At the time of the well-known 1990 commitment of the German government to a 25 percent reduction of CO<sub>2</sub> emissions,<sup>30</sup> the possibility of a future climate change was depicted with most drastic language:

(MoP): I do not intend at all to paint a horror scenario here. But to address the committed skeptics, who obviously do exist in this house also, I must say the following. Firstly, if there is a climate catastrophe it will not only be terrible, it will be apocalyptic. (11. LP, 200. S, 8.3.1990, p. 15489.)

It is important to note that this marks a very selective perception and use of the scientific discourse on climate change. The term *catastrophe*, coined at a specific time by a particular

subgroup of the scientific community, served as a common frame for the problem both for government and opposition parties. If the climate problem is framed as a future *catastrophe*, it means that immediate action is required to prevent the catastrophe or alleviate its impacts. The voluntary commitment to high emissions cuts fits very well into this frame.

This perception of future climate change was further legitimized by the stereotyped use of scientific facts and figures. The complex issue of anthropogenic inputs to climate change and their prediction was simplified and at the same time translated into a field of political action by very few discursive elements: a rise of global mean temperature of 1.5–4.5 °C, a rising frequency of extreme weather events, a set of responsible greenhouse gases to be reduced, etc. Hence, in the phase of problem formulation and target setting, ritualistic references to scientific findings were employed to legitimize political action. In this case, the Bundestag's perception of the scientific discourse focused on mainstream climate research that provided a consensual assessment of the actual state of knowledge.

(MoP): All scientific conferences on climate confirm that we are heading for a climate catastrophe. (11. LP, 94. S, 22.9.1988, p. 6446.)

(The Federal Minister for Research): But there is a general consensus that the number of scientists who believe that the greenhouse effect will come has grown rapidly in recent years. (11. LP, 200. S, 8.3.1990, p. 15486.)

The report of the Enquete Commission on "Preventive Measures to Protect the Atmosphere" played an important role in this process.<sup>31</sup> Unlike discussions of other political issues, the parliamentary debates were not a forum at which scientific outsiders and climate change skeptics could express their opinions. It was acknowledged that important scientific uncertainties remained, but this fact did not diminish the credibility of the scientific warning. Doubts regarding the reality of the threat posed by future climate change were virtually excluded from the political debate; the German Bundestag officially *believed* in the scientific hypotheses about climate change.

### *Third phase (1992–1995): transformation of the climate catastrophe into an object of routine political regulation*

By the mid-1990s, the very concept of "climate" had undergone an important transformation in the political discourse. Whereas earlier it had been considered a natural phenomenon to which humankind was more or less passively exposed, now it was perceived as a system with which humankind had actively interfered; further, a system that should be brought back into balance by purposeful human action. This shift from a natural to a man-made phenomenon (which had been foreshadowed in the scientific discourse) also had implications for the perception of extreme weather events, such as high precipitation levels, that repeatedly caused floods in several important German river basins. When the Minister of the Environment reported in the parliamentary commission on "Environment, Nature Conservation and Nuclear Safety" on possible causes of the severe floods that occurred in early 1988, he took unusually heavy rainfall as proof of the *natural* character of the event.

In the Rhine area, the precipitation of March 1988 was the highest in the last 100 years, *a fact proving the natural cause of this dramatic flood development*. . . . One cannot direct one's attention to one spectacular flooding only, *as no one can do anything about precipitation* . . . (Report of Töpfer in the committee on causes of the flood catastrophe in the areas of Rhine, Main and Danube; 4.5.88; protocol: 25/8; 25/14; 11. LP; emphasis added.)

Some years later, this pattern of reasoning was questioned and no longer considered legitimate. The debates about possible causes of the extraordinary floods in 1995 show this clearly:

(MoP): We discussed the effects of the flood catastrophe here in the Bundestag just a few weeks ago. We reached a relative consensus that climatic changes were playing a considerable role in it. (13. LP, 30. S, 29.3.1995; p. 2257.)

In the short time between the UNCED in Rio de Janeiro in 1992, where the Framework Convention on Climate Change was signed, and the First Conference of the Parties in Berlin in 1995, the issue of climate change received the highest degree of political attention. Claims from the scientific community still played an important role in keeping climate change high on the agenda. Of particular use in the debates was a publication by leading German climatologists that claimed a 95 percent probability that an anthropogenic influence on the climate was already discernible.

(The Federal Minister for the Environment): In the past decades a rise in temperature by approx. 0.7 °C has been observed. Professor Hasselmann has proven in simulations that with a probability of 95 percent this increase in temperature is man-made. (13. LP, 27. S, 16.3.1995, p. 1860.)

Obviously, numeric claims like that of a 95 percent probability easily attracted the attention of those engaged in the political discourse, as they could be used to suggest a quasi-certainty while ignoring the complex theoretical conditions that qualify such numbers in the scientific context.

On the other hand, this was the phase of political discourse that focused on the question of how to implement the ambitious CO<sub>2</sub> reduction target.<sup>32</sup> The debate concentrated on whether or not nuclear energy should be an integral part of the German climate protection policy. On this question, no compromise was possible. Likewise, the unanimity of scientific expertise fell apart. Some studies showed that the CO<sub>2</sub> reduction target was achievable without nuclear energy, others claimed that it could be implemented only by extending the use of nuclear energy. The perceived urgency of the threat served both government and opposition parties to position themselves by proposing contradictory measures. Because of the particular constellation of political parties in the Bundestag, and because of the need to bring national- and EU-level legislation into line, the instrument central to the government's strategy, namely a CO<sub>2</sub>/energy tax, was not politically feasible. While it was possible to demonstrate a successful reduction of 14 percent in emissions in 1994, it soon became obvious that this reduction was due mainly to a certain degree of de-industrialization in the former German Democratic Republic, and the reduction target of 25 percent would not be achieved without major political changes.<sup>33</sup>

Thus, the way climate change had entered the political discourse as an important issue, specifically as a future catastrophe that necessitated urgent action, began to pose a threat to the political legitimacy of the German government. The particular problem frame had been a joint production by all parties, and now major political options for reacting to the problem proved to be unavailable. Consequently, whereas the contributions of the opposition party remained within the discursive frame of urgency and catastrophe, the German government changed its strategy. In the aftermath of the UN conference in Rio, the government's statements began to show signs of a re-interpretation of climate change. When climate change entered the political agenda it was perceived as a problem of unknown scope, as a kind of *meta*-problem for all environmental crises on earth. Now it was increasingly perceived in less dramatic terms, namely as *part* of a broader problem called sustainable development.

(Dr. Töpfer, Federal Minister for the Environment): Both the Law of Cyclical Economy and Waste currently under discussion and its effects on responsibility



for new products in the entire waste sector, from packaging to cars, are the direct consequence of a conference that made sustainable development... its central focus. I just want to make this clear, *so as not to narrow everything down to the climate situation, as important as its consideration may be.* (12. LP, 147. S, 12.3.1993, p. 12648/49; emphasis added.)

(Dr. Töpfer, Federal Minister for the Environment): Let me say something concerning the motion of the SPD. *It is somewhat disappointing that it deals almost exclusively with the climate question. Our follow-up is considerably more comprehensive.* Our follow-up, which has just been given, has something to do with development and environmental issues and thus with Agenda 21, dealing with the question of how we can overcome poverty without putting a strain on the environment. Hence we should be aware of the fact that *we have to do more than to consider the climate, ... as important as this undoubtedly is.* (12. LP, 152. S, 22.4.1993, p. 13014; emphasis added.)

At the same time, the issue of climate change had diffused into several policy domains other than environmental policy. Whereas in the late 1970s, research policy was most important, in the mid-1990s this gave way to the domains of energy, transport, foreign affairs, development cooperation, and, to a certain degree, agriculture. In them the issue was translated into a multitude of small-scale measures, some of which had been planned long before and others of which would be easy to implement in the future. Consequently, the all-embracing meta-problem of mankind was transformed into a problem of normal political regulation and routine.

To conclude, these findings show the relative autonomy of discursive dynamics in the political realm. There were many examples of the *selective* perception and use of scientific knowledge. In some cases, it was obviously the symbolic value of a certain figure or the credibility of a scientific source, rather than the pure information they communicated, that made the respective piece of "science" relevant for the political discourse. With the backing of consensual science, the political discourse brought about a specific problem frame that transformed the scientific hypothesis into a political problem that called for urgent action. At the end of the time analyzed, this problem frame became a threat to the political legitimacy of the German government.

## 7. Discourse on climate change in the mass media

The primary interest of the media is (and has to be) to capture the attention of targeted publics. When reporting on science, the media are aware that the vagaries and uncertainty of scholarly hypotheses do not lend themselves to interesting "news." The media accordingly tend to translate hypotheses into certainties. Theoretical and empirical studies show the patterns of how themes become news and map particular discourses in the media in quantitative terms.<sup>34</sup> For example, numerous studies on news value theory have described news factors that increase the probability that an event or an action is reported.<sup>35</sup> Up-to-dateness, sensationalism, and unequivocal clearness, to name just the most important, are among journalists' implicit criteria for determining the news value of an item. In the following section we will show how scientific hypotheses about climate change were transformed into the certainty of an impending "catastrophe." The analysis focuses on the specific mechanisms characteristic of the German media discourse.

Looking at the quantitative side of the media discourse on climate change, two phases can be distinguished. The first (1975–1987) reveals the media's low but continuous level of attention to anthropogenic causes of climate change. Early scientific warnings, although



characterized by many uncertainties, were taken seriously and translated into sensationalized scenarios. Article headlines during these first years show that the media had already transmitted the image of an impending catastrophe: “Tod im Treibhaus” (“Death in the Greenhouse”) (*Der Spiegel* 9/1979); “In 50 Jahren vorbei” (“All Over In 50 Years”) (*Der Spiegel* 11/1980); “Auf dem Weg in die Katastrophe” (“Heading For the Catastrophe”) (*Der Spiegel* 21/1981); “Die Dürre wird kommen” (“The drought will come”) (*Der Spiegel* 10/1983).

During this phase, various aspects of climate change research were prominently referred to, both those pertaining to climatologists’ construction of certainty and the need to appropriate additional funding for climate research.

Climatologists and chemical engineers... predicted ‘unimaginable effects on climate and the economy,’ when the greenhouse effect, caused by the CO<sub>2</sub>, would make ‘the Arctic Ocean devoid of ice by the middle of the next century...’ (*Der Spiegel* 35/1977, 141)

For the first time ever, scientists around the world are starting to agree: that a development has begun which may jeopardize humanity not only in thousands or millions of years, but in a foreseeable timeframe: the earth’s climate is about to change.” (ibid.:144)

According to American scientists, the greater part of [climate change] is to be attributed to global warming and the expansion of the water masses caused by [it]; ... if the predictions on global warming, caused by the increasing carbon dioxide content in the atmosphere, are correct, a further rise of the sea level by 20 to 30 centimeters within the next 70 years must be expected. (*FAZ* 14.4.1982, 33)

The government... spends an annual amount of \$150 million on short-term weather forecasts, but only a minimum on climate research. Only a few academic centers train specialists in this area at all. (*Der Spiegel* 7/1977: 81)

Reporting on climate change gained focus in 1986. In response to the first statement of the German Physical Society, *Der Spiegel* published the report “Death in the Greenhouse” (4/1986) in which the term *climate catastrophe* appeared for the first time.<sup>36</sup> From that time up to the end of the period investigated, this expression permeated the media discourse. The term enabled the media to focus their reporting—based on sensationalism, negativity, and unequivocal clearness—on one term and one reference point. From that point on, the media stressed the perceived scientific consensus regarding the problem; in the face of the threatening (and seemingly inevitable) climate catastrophe, the many continuing uncertainties were concealed, and the supposed certainty of the experts was emphasized.

The catastrophe has not come as a surprise. Scientists have warned in time. ... The disaster, the global climate catastrophe, cannot be prevented. ... [There will be] damage, leading to a disastrous climate catastrophe. (*Der Spiegel* 33/1986: 122/23.)

... would dramatically accelerate the climate catastrophe.” (*Der Spiegel* 28/1988: 159.)

... is a frequently asked question in view of the now threatening climate catastrophe. To give up would be lethal, would ultimately lead to the downfall of humankind. (*SZ*, 30./31.7.1988: 86.)

Clear signals for the impending climate catastrophe abound.” (*Der Spiegel*: 29/1989: 114.)

The discussion about an anthropogenic global climate change is increasing in intensity. . . . Even scientists are highly disturbed, some appeal directly to the public and warn of an impending climate catastrophe. (FAZ, 29.3.1995: N3.)

The second phase of media discourse shows a definite increase in media attention from 1988 onward. The peak of attention was reached in 1992, the year of the UNCED conference in Rio de Janeiro.<sup>37</sup> Until 1995, media attention remained at a relatively high level, small fluctuations notwithstanding. Important national and international political decisions occurred in this period. The media continued to speak of an impending climate *catastrophe*, a terminology use which by then had been discounted by science, and to demand concrete strategies to be followed by political institutions. It is noteworthy, however, that the Berlin conference in 1995, which according to media theory should have captured media attention as a national event, did not actually get the same level of attention as the Rio conference that preceded it. This may indicate the beginning of a waning media interest in anthropogenic causes of climate change. Further analyses of the period after 1995, which is not part of this study, suggest a backlash. The German media now express a certain skepticism toward their own initial position. It is mere speculation, however, whether or not this change in the German media was influenced by the American media's increasingly skeptical stance toward climate change. In any case, one may see the effects of an "issue career," i.e., the limited time span during which a particular issue captures attention: "The media are fickle. Unfortunately their attention and concern rise and fall without much relationship to changes in the physical state of the world."<sup>38</sup>

In the following section, we will look at the central mechanisms constituting the German media discourse on climate change over the whole period of study from 1975 to 1995, and determine its course. These mechanisms can largely be explained by the findings of media theory. In the case of *climate change*, the media sensationalized the scientific hypothesis to make it into a certain catastrophic event. This transformation was achieved in two ways. Climate change as analyzed by climatologists, (although perceived dramatically), is gradual and hidden beneath seasonal and yearly fluctuations. Thus, the communication of the scientific discourse about anthropogenic effects on the climate must be translated into a format that is accessible to the public. The media achieve this by translating climate change into a *sequence of events*, and into *concrete and relevant everyday experiences*.

#### *Translation of climate change into a sequence of events*

Communicating scientific findings through the mass media requires a format of reporting tailored to the receiving habits of the audience. One way to do this is to translate abstract scientific findings into a sequence of events. In the case of climate change, this means the transformation of the climate discourses in science and politics into *past*, *current*, and *future* events.<sup>39</sup> The media facilitate the representation of the highly complex and abstract interrelationships of the anthropogenic influence on climate by differentiating distinct points in time and reducing them to spontaneous events. The recipients are thus permitted to perceive a coherent development. Two central events from the past figure prominently in the media discourse: the 1986 appeal of the German Physical Society and the consensus expressed therein by the experts (the scientific event), and the Conference on the Environment in Rio de Janeiro in 1992 (the political event).

Almost all of the articles after 1986 refer to the agreed findings of the experts, and after 1992 to the large-scale political event of the Rio conference of that year:

In a statement summarizing the current state of research the 'Working Group on

Energy of the German Physical Society' early this year warned of a 'global climate catastrophe.' (*Der Spiegel*: 33/1986: 124.)

Three years after the global summit of Rio, politicians, climate researchers and environmentalists...argue about the conclusions to be drawn from the scientific findings. (*FAZ*, 27.3.1995: 15.)

The German media proceeded on the assumption that humanity is on its way to impending climate catastrophe. From the media's viewpoint, there exist cogent indications of inevitable climate catastrophe. It is not only in media discourse that this judgment has been reached. The German media published a series of interviews with climate scientists who drew the same conclusion; in the late 1980s, this was widely discussed in the U.S. as the Hansen effect, named after NASA scientist James E. Hansen. The pattern of eventfulness was reproduced by identifying particularly extreme weather conditions and environmental catastrophes as present events foreshadowing the climate catastrophe.

The year 1988 broke all heat records on the climatologists' measuring scales.... Since last summer the weather has been going crazy like never before in living memory. ... In the meantime an increasing number of experts admit to the conviction that the most recent weather pranks are early harbingers of the dreaded climate shock. (*Der Spiegel*, 29/1989: 114.)

The frequent occurrence of floods is the work of man. (*Der Spiegel*, 5/1995: 18.)

The event-related nature of the discourse in the mass media was oriented toward climate catastrophe, the coming central event. The term "climate catastrophe" entered conventional everyday language (i.e., it no longer required explanation), and its continual reference guaranteed the coherence of the reports. The climate catastrophe and all it implied for the future thus represented a strong point of reference for news coverage.

At the economic summit in Paris environmental problems and the climate catastrophe had for the first time entered the agenda. (*Der Spiegel* 29/1989: 112.)

And is it already too late for measures against the climate catastrophe? (*Der Spiegel* 38/1992: 222.)

By identifying and describing events, the media represented to the audience the highly complex and abstract interrelationships of anthropogenic climate change and the difficult political processes of decision making in an intelligible and graphic way.

#### *Translation of climate change into concrete and relevant everyday experiences*

The mass media must adapt the news to the scope of awareness of their audience, i.e., the audience must be made aware of why a piece of news is relevant. In the case of such material as complex as anthropogenic causes of climate change, this is achieved with various patterns via a connection to the recipients' everyday experiences and perceptions.

*Concrete perceptibility.* In the media discourse, the long intervals during which climate systems respond to external interference, which even experts can only roughly define, were cut down to time periods relevant to everyday life. The formation of media time horizons is usually based on time periods between a generation change and a human lifetime. It was in this way that the extent of the menace caused by possible climate change became directly relevant to the audience:

Our grandchildren will curse us. . . . (*Der Spiegel* 29/1989: 112.)

If mankind continues to keep house as before, a climate change will have come about in about 25 years, one which exceeds the bearable scope. (*FAZ* 1.11.1995: 1.)

The absence of actual experience of climate change, a significant problem for media coverage, was overcome by a differentiated description of regional climate effects. Weather extremes were not the only occurrences declared to be perceptible effects; changes in alpine glaciers and snow lines (affecting ski tourism), as well as the desertification of large parts of Africa were also predicted.

Many regions will turn into deserts, the subtropics will become tropical, the poles will have a mild climate, alas with the severe effect that the ice on the polar ice caps will melt and the sea level will rise. Nothing much will be left of the low-lying regions. Hamburg will disappear, so will Berlin and Cologne, Frankfurt will become a lake city, but Munich will be spared. (*FAZ*, 21.5.1982: 25.)

Melting glaciers, the absence of snow, thawing temperatures on the Grossglockner mountain—climate researchers predict the end of winter sports in the Alps. (*Der Spiegel*: 47/1991: 340)

The warming of the earth's climate would have dangerous effects on the Swiss community of Saas Balen. The danger is that the glacier would melt rapidly, forming lakes in the process of withdrawal, lakes which could rush down over the village. (*Der Spiegel*, 42/1995: 196.)

Media also adapted climate research coverage to everyday life by linking it to individual patterns of behavior, such as power consumption in modern societies (e.g., the energy consumed in transportation, home heating, and other forms of behavior, such as worldwide travel and tourism). The audience was made aware of the relevance to climate change of its own behavior, as well as of the immediacy of climate change as a global environmental problem.

*Translation into concrete action.* Analysis of the scientific and political strands of discourse has already brought to light various ways the scientific problem of anthropogenic causes of climate change have been transformed into a political field of action. This transformation can also be shown in the media.

Very early on, the mass media warned that scientists were not sufficiently heeded, above all by the political decision-making bodies. The media held that early scientific warnings, which they had picked up in the late 1970s, had been ignored by politicians for too long and had only led to more comprehensive measures with the preparations for the Rio conference. From the media's viewpoint, valuable time for limiting the damage had been squandered. Everything, as they would have it, pointed to the fact that people had already damaged the atmosphere to such an extent that climate changes in the future were unavoidable. The media's demands for political action were thus aimed at *limiting damage*. The manifold scientific uncertainties and methodological problems remained almost completely ignored. The media instead concentrated on establishing the certainty of the threat and identifying those at fault.

A confirmation of this warming is supplied by the widespread, only temporarily interrupted, receding of the earth's mountain glaciers. . . . The global rise of the sea level points in the same direction. (*SZ*, 6.7.1988: 28.)

The alarm signals of the threatening collapse of the global climate are clear. Do long overdue countermeasures come too late? (*Der Spiegel*: 45/1990: 324.)

The climate will change. This is something the scientific world seems to agree on. It no longer deals with the question of 'whether,' but only with the question of 'how' the climate will change. (FAZ: 1.6.1994: N3.)

The only thing that remains as the governing principle is catastrophe management. . . . Now we have to learn how to fly while in flight in order to ultimately provide this climate machine earth with a soft landing. (*Der Spiegel* 12/1995: 191.)

From the point of view of the German mass media, a rapid and responsible course of action, as recommended by the early scientific warnings, could have had a positive impact on the feared consequences. The media accused politicians of having concealed the many scientific certainties and of having insisted on the uncertainties for too long. In this way, the politicians themselves hindered routes to an effective course of action. The contextualizations that took place in the media discourse, describing climate changes already perceptible due to weather extremes, were complemented by various descriptions of predictable damage. This applied both to public expense incurred for correcting previous damage and to the impact on the ecological and social environment:

Germany—a future summer dream? This will come true when the world will become the stage for the greatest climate shift in many millennia. Numerous warnings have already been given. There are more and more indications of climate change: greenhouse gases increase, the atmosphere's radiation behavior changes. . . . But no matter, whether the weather in Germany will become warmer or colder, a global climate change is very likely to entail catastrophes. (FAZ 27.3.1995: 15.)

What looks like the script for a catastrophe thriller is a by all means realistic possible consequence of the greenhouse effect. (*Der Spiegel*, 12/1995: 188.)

The media we analyzed expressed the opinion that evidence has long existed that climate change caused by man can no longer be completely checked. Courses of action suggested to politicians primarily concerned measures limiting damage; in particular, rethinking the concept of the mobile society, and thus traffic and energy policies were open to discussion. From the media's point of view, the solution could not be individual change of travel behavior. It became clear that the politicians had to support changing priorities. The modified social concepts should reflect new values:

Engineers and committed citizens are developing a new lifestyle, which shows the way out of the climate collapse: affluence light. (*Der Spiegel*, 13/1995: 188.)

Under the 'veneer of the official compulsion to accelerate' Loske (co-author of the study 'Zukunftsfähiges Deutschland', t.a.) distinctly feels the 'subversive desire' for more tardiness. (*Der Spiegel* 43/1995: 216.)

Faced with the acute threat of climate catastrophe, the media began to ignore the numerous scientific uncertainties, even in the early years of the period examined. Climate catastrophe is the central point of reference in media communication. This supports the observation that sensationalism and simplicity give "bad" news a high news value. From the media's standpoint, stressing certainties and describing in detail past or impending climate effects make it increasingly difficult for politicians to respond adequately, especially as appropriate reactions should have come much earlier.

The certainty provided by the media can ultimately lead only to measures that serve to fend off the catastrophe. It therefore does not come as a surprise that, from the media's point of view, politicians intervened too late and too "half-heartedly." There is every indication that the

development of increasingly numerous and concrete scenarios of doom lead to the danger of loss of credibility. The conjecture prevalent from 1995 onward that a new phase of reporting, in the sense of a “backlash,” is about to begin, must be interpreted in this context. A new development in the discourse prevents “attention” loss; now the position opposite to the one taken before, namely skepticism about the theory of climate catastrophe, is attention-relevant.

## 8. Conclusion

We hope we have demonstrated convincingly in the foregoing analysis what we claimed at the outset: whatever the ecological risk of climate change may be, the communication about it differs among science, politics, and the media (i.e., the way the risk of climate change is perceived or, as some would have it, socially constructed and communicated differs among the three sectors of society). The differences between these three sectors are not random but systematic, given the specific risks each of them faces. For the sake of brevity and simplification, it may be said that in the German discourse on climate change, scientists politicized the issue, politicians reduced the scientific complexities and uncertainties to CO<sub>2</sub> emissions reduction targets, and the media ignored the uncertainties and transformed them into a sequence of events leading to catastrophe and requiring immediate action. What we called the *interference of discourses* is characterized by the specific selectivities (both in the sense of *inclusions* and *exclusions*) occurring as the issue of climate change was communicated. There is no “one true” or “appropriate” definition of the issue. Rather, it is to be assumed that the differences in perception are irreducible.

The problem of these *interferences of discourses* arises in modern societies that are characterized by a much closer relationship among science, politics, and the media than has hitherto been the case. The problem arises primarily when science makes pronouncements on issues that potentially concern the safety and well-being of the population at large, and are thus of immediate political relevance and have a high news value for the media. Such pronouncements are bound to attract public attention and lead to engaged debates over what is correct and what measures are appropriate. Although science still holds the ultimate authority for judging scientific truth or falsity, the scientific community itself may be divided over the truth of certain hypotheses, in light of scientific uncertainty. Thus, the assumption that scientific knowledge is communicated unequivocally to the rest of society and is transformed into actions according to a one-dimensional rationality is no longer tenable (if it ever was). Faced with uncertainties that are potentially threatening their legitimate claim to power, politicians have to select options that, however simplistic they may be, allow them to make decisions. The media, in turn, will report what seems worth reporting, given the profession’s limits of space and time, and the media audience’s limited capacity to comprehend complex scientific problems. In other words, the disparate forms of communication among science, politics, and the media are inherent in modern mass democracies. They entail *risks of communication* hitherto unknown. For science, its credibility as an institution producing reliable knowledge is jeopardized. In the case of politics, legitimacy is at stake. Finally, though they seem to be affected least, the media are threatened by the loss of market share.

What are the lessons to be drawn from this? It is evidently futile for science to invest much hope in the enlightenment of the media or political decision makers (although such efforts are not harmful and must be attempted). Instead, the patterns of communication disturbances must be brought into the open and acknowledged on all sides. An acknowledgement of the systematic nature of differences in perception and communication can introduce a much needed reflexivity into the closely coupled communication between science, politics, and the media.

Turning once more to the discourse on climate change in Germany, it has been shown



that, in contrast to the discourse in the United States, until now there has been a remarkable consensus. Insight into the communication disturbances, as in the above analysis, shows that this consensus may prove to be unstable. Doubts raised concerning scientific pronouncements about climate change may easily throw their credibility into question, and, likewise, may threaten the legitimacy of political decisions based on them. To the media, such shifts in the ruling opinion will just be the latest news.

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### References

- 1 It is interesting to note that the term “global warming” seems to prevail in the U.S. debate, whereas “climate change” (or, later, climate catastrophe) was more frequently used in the German debate.
- 2 C. Trumbo, “Constructing climate change: claims and frames in U.S. news coverage of an environmental issue,” *Public Understanding of Science* 5 (1996): 269–283.
- 3 Cf. John H. Cushman Jr., “Industrial group plans to battle climate treaty,” *The New York Times*, April 26, 1998: 1, 17.
- 4 A. Kerr, “A fickle sun could be altering Earth’s climate after all,” *Science* 269 (1995): 633; A. Kerr, “U.S. climate tilts toward the greenhouse,” *Science* 268 (April 21, 1995): 363–364; R. Stone, “Environmental toxicants under scrutiny at Baltimore meeting,” *Science* 267 (1995): 1770–1771.
- 5 This holds true for scientists and policy makers alike. See Sh. Jasanoff, *The Fifth Branch* (Cambridge, MA: Harvard University Press, 1990), 230f.
- 6 P. Weingart, “Science and the media,” *Research Policy* 27 (1998): 869–879.
- 7 N. Luhmann, *Ecological Communication* (Cambridge, UK: Polity Press, 1989); N. Luhmann, *Risk: A Sociological Theory* (Berlin/New York: de Gruyter, 1993).
- 8 See chapter on the political system in N. Luhmann, *Ecological Communication* (Cambridge, UK: Polity Press, 1989); also the chapter on the early U.S. policy making on greenhouse gases in J. Morone and E.J. Woodhouse, *Averting Catastrophe* (Berkeley: University of California Press, 1986).
- 9 F. Marcinkowski, *Publizistik als autopoietisches System. Politik und Massenmedien. Eine systemtheoretische Analyse* (Opladen: Westdeutscher Verlag, 1993); N. Luhmann, *Die Realität der Massenmedien* (Opladen: Westdeutscher Verlag, 1996).
- 10 A special analysis focused on “skeptical communication” (backlash) in media reporting about anthropogenic contributions to climate change. It corroborated the previously identified picture of the dominant discourse. See T. Hornschuh, *Skepsis als Schema? Zur Bedeutung des “Backlash” in der Berichterstattung über anthropogenen Klimawandel in deutschen Printmedien* (Bielefeld: Diplomarbeit University of Bielefeld, 1999).
- 11 An in-depth report on the analysis of the scientific discourse on climate change in Germany can be found in: A. Engels, P. Pansegrau, and P. Weingart, *DFG-Projekt “Kommunikation über Klimawandel zwischen Wissenschaft, Politik und Massenmedien, Zwischenbericht Phase I”* (University of Bielefeld: IWT Paper 13, 1996).
- 12 References and footnotes given in the original text are excluded in the following quotations for better readability, unless they are central to the understanding of the quotation.
- 13 Flohn had already published in the 1940s about the issue of man-made climate change; see H. Flohn, “Die Tätigkeit des Menschen als Klimafaktor,” *Zeitschrift für Erdkunde* 9 (1941): 13–22.
- 14 The fight against nuclear energy was one of the dominant characteristics of the German ecological movement. Cf. D. Rucht, *Von Wyhl nach Gorleben. Bürger gegen Atomprogramm und nukleare Entsorgung* (München: Beck, 1985).
- 15 Arbeitskreis Energie (AKE), “Stellungnahme des Arbeitskreises Energie der DPG zum Kohlendioxidproblem,” *Physikalische Blätter* 39, no. 9 (1983): 320–323.
- 16 The complete text of the warning was printed in the *Frankfurter Rundschau*, no. 217, September 19, 1986.
- 17 Deutsche Physikalische Gesellschaft (DPG) and Deutsche Meteorologische Gesellschaft (DMG), “Warnung vor drohenden weltweiten Klimaänderungen durch den Menschen,” *Physikalische Blätter* 43, no. 8 (1987): 347–349.



- 18 J. Cavender and J. Jäger, "The history of Germany's response to climate change," *International Environmental Affairs* 5 (1993): 3–18.
- 19 A. Vierecke, *Die Beratung der Technologie- und Umweltpolitik durch Enquête-Kommissionen beim Deutschen Bundestag. Ziele–Praxis–Perspektiven* (München: tuduv-Verl.-Ges., 1994); M. T. Hatch, "The politics of global warming in Germany," *Environmental Politics* 4, no. 3 (1995): 415–440.
- 20 Potsdam-Institut für Klimafolgenforschung (PIK), "Extremer Nordsommer 1992," in *PIK Reports* 2 (Potsdam: PIK, 1994); PIK, *Zweijahresbericht 1994 & 1995* (Potsdam: PIK, 1996); PIK, *Mögliche Auswirkungen von Klimaänderungen auf das Land Brandenburg* (Potsdam: PIK, 1996).
- 21 Bund für Umwelt- und Naturschutz Deutschland (BUND) and Misereor, eds., *Zukunftsfähiges Deutschland: Ein Beitrag zu einer global nachhaltigen Entwicklung. Studie des Wuppertal Instituts für Klima, Umwelt, Energie* (Basel: Birkhäuser, 1996).
- 22 Wissenschaftlicher Beirat der Bundesregierung Globale Umweltveränderungen (WBGU), *Welt im Wandel. Wege zur Lösung globaler Umweltprobleme. Jahresgutachten 1995* (Berlin: Economica, 1996).
- 23 Rat von Sachverständigen für Umweltfragen (SRU), *Umweltgutachten 1996* (Stuttgart: Metzler-Poeschel, 1996).
- 24 A. Vierecke, *Die Beratung der Technologie- und Umweltpolitik durch Enquête-Kommissionen beim Deutschen Bundestag. Ziele–Praxis–Perspektiven*.
- 25 St. J. Cohen, "Climate change and climate impacts: please don't confuse the two!" *Global Environmental Change* 3, no. 1 (1993): 2–6.
- 26 P. D. Jones, et al., "Evidence for global warming in the past decade," *Nature* 332 (1988): 790; R. A. Kerr, "Hansen vs. the world on the greenhouse threat," *Science* 244 (1989): 1041–1043.
- 27 Intergovernmental Panel on Climate Change (IPCC), *Second Assessment Report* (Cambridge, UK: Cambridge University Press, 1996); R. A. Kerr, "Studies say—tentatively—that greenhouse warming is here," *Science* 268 (1995): 1567–1568; K. Hasselmann, "Are we seeing global warming?" *Science* 276 (1997): 914–915.
- 28 M. Jänicke and H. Weidner, eds., *National Environmental Policies* (Berlin: Springer, 1997).
- 29 Information given in brackets refers to: number of legislative periods, number of session of the ongoing legislative period, date of the session, page in the verbatim minutes.
- 30 M. T. Hatch, "The politics of global warming in Germany," *Environmental Politics* 4, no. 3 (1995): 415–440.
- 31 Enquête-Kommission, "Vorsorge zum Schutz der Erdatmosphäre," *Schutz der Erde. Bericht der Enquête-Kommission "Vorsorge zum Schutz der Erdatmosphäre" des 11. Deutschen Bundestages* (Berlin: Economica, 1991).
- 32 M. Huber, "Leadership and unification: climate change policies in Germany," in *Cases in Climate Change Policy: Political Reality in the European Union*, ed. U. Collier and R. E. Löfstedt (London: Earthscan, 1997), 65–86.
- 33 W. Bach, "Coal policy and climate protection. Can the tough German CO<sub>2</sub> reduction target be met by 2005?" *Energy Policy* 23 (1995): 85–91; SRU, *Umweltgutachten 1996* (Stuttgart 1996), 192.
- 34 Cf. A. Mazur, "Global environmental change in the news. 1987–90 vs. 1992–96," *International Sociology* 13, no. 4 (1998): 457–472.
- 35 W. Lippmann, *Public Opinion* (New York: Harcourt/Brace, 1922); J. Galtung and M. Ruge, "The structure of foreign news. The presentation of the Congo, Cuba and Cyprus crises in four Norwegian newspapers," *Journal of International Peace Research* 2, no. 1 (1965); J. F. Staab, *Nachrichtenwert-Theorie. Formale Struktur und empirischer Gehalt* (Freiburg, München: Verlag Karl Alber, 1990); Ch. Eilders, *The Role of News Factors in Media Use, FS III 96–104* (Berlin: WZB, 1996).
- 36 An article of the same title was published as early as 1979.
- 37 In 1996, Trumbo produced a similar result with respect to the development of media coverage in the U.S.; C. Trumbo, "Constructing climate change."
- 38 A. Mazur, "Global environmental change in the news," 470.
- 39 On the event orientation of the media, cf. S. Friedman, K. Villamil, R. A. Suriano, and B.P. Egolf, "Alar and apples: newspapers, risk and media responsibility," *Public Understanding of Science* 5 (1996): 1–20. In the example, the media perform a particular "construction" of a series of events that are supposed to "represent" the diffuse phenomenon of climate change.

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