

**LEGITIMIZING CLIMATE POLICY: THE “RISK CON-
STRUCT” OF GLOBAL CLIMATE CHANGE IN THE
GERMAN MASS MEDIA**

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Abstract

For at least a decade, global climate change has been a very important topic in German mass media coverage. Theories of media effects such as “cultivation” and “agenda setting” lead us to expect that climate change reporting will have an impact on the risk perception of the media audience. Furthermore, because of the medialization of politics, media reporting of climate change may be assumed to have political effects. Based on a content analysis of about 1200 media stories, the “risk construct” of global climate change in the German mass media is analysed and its potential functions for the ways in which society copes with climate change are discussed. The empirical analysis finds that the media construct of climate change closely mirrors the position of the scientific community as documented in the IPCC reports. The article discusses likely effects of climate change coverage on individual behaviour and on policy. It concludes that the key effect is the legitimization of climate politics as a political field.

Key words

global climate change, mass media, legitimization, coping with risk

1. Introduction

For more than two decades, the issue of global climate change and its possible consequences have played an integral role in German public communication. The development of the climate change issue reached a temporary culmination in the media reactions to the publication of the Stern report by the UK Treasury in October 2006 (Stern 2007), the first volume of the fourth IPCC report in February 2007 (IPCC 2007) and the further volumes in the course of 2007. These reports place the scientific findings on global climate change in a political context. Despite existing uncertainty regarding the details, these reports state that climate change is undoubtedly a risk which calls for radical political measures. At the same time, they raise hopes that it is still possible to mitigate the progress of climate change and to prevent the worst consequences.

"Our Planet Is Dying!" – this was the headline of "Bild", the German tabloid with the highest circulation not known for particularly favouring "green" issues, on 3 February 2007, which was the day after the publication of the fourth volume of the IPCC report. The German news magazine "Stern" coloured its usually red logo "green" for the first time in its history and reassured its readers by announcing: "This Is How We Can Save the Climate and Still Enjoy Life." The TV science programme "Galileo" broadcast by the German commercial channel Pro7 started a "CO₂NTRA" campaign with tips for viewers on how to reduce CO₂ emissions. Isolated voices in the media scene who criticized the "climate hysteria" and qualified the risks of global climate change (e.g. the cover story of the influential political German magazine "Spiegel" on 7 May 2007) could not change the predominantly alarming and mobilizing tone of the media response to the message from climate research.

However, the new wave of climate coverage only brought to a head a pattern that had been developing over a number of years (Weingart, Engels and Pansegrau 2002). We found the essential characteristics of this pattern in the media coverage of the climate change risks and consequences for the German North Sea Coast in the years 2001 to 2003, which are analysed in this article.¹ Surveys show that for almost 10 years, the German public has considered the threat posed by climate change to be one of the most important risks (Kuckartz and Rheingans-Heintze 2006; Grunenberg and Kuckartz 2003; Zwick 2001). In Germany, the transformation of scientific findings into a social and political problem had already taken place in 2002.

Changes of the physical environment remain without consequences for societal behaviour as long as they do not represent a problem within the social system. These "percep-

¹ The findings presented here are taken from the media analysis performed in the subproject on "Climate Change in the Public Sphere" of the interdisciplinary collaborative project "Climate Change and Preventative Risk and Coastal Protection Management at the German North Sea Coast" (KRIM) (Peters and Heinrichs 2005). For information on the collaborative project as a whole, see the website <http://www.krim.uni-bremen.de> and also Schuchardt und Schirmer (2007). The collaborative project is funded by the German Federal Ministry of Education and Science (BMBF) as part of the German Climate Research Programme (DEKLIM) (see <http://www.deklim.de>).

tions", "social representations" or "social constructs" then become social facts themselves. In their model of the relations between the socioeconomic system and climate, Hans von Storch and Nico Stehr justifiably point to the central role of "interpretative systems", in which a social construct of climate is created that in turn guides the reactions of society (Stehr and von Storch 1995; von Storch and Stehr 1997; Stehr 1999). The analysis of how society might be able to master the challenges of global climate change therefore requires insights into the processes by means of which the findings of climate research are integrated into already existing structures of social meaning and possibly changes these.

Insisting in sociological terms on the fact that social constructs of environmental changes and not the environmental changes themselves have social effects is relevant and explosive because social constructs are relative. This means that these constructs are not directly and unambiguously derived from physical phenomena, but rather they emerge from interpretative processes of meaning construction, in which, above all, the mass media, science, politics, NGOs and industry are involved.

Two significant consequences follow from the fact that social constructs are the basis of social reactions. (1) In order to understand social reactions to global climate change, the social constructs (and their individual internalizations) must be known. (2) Attempts to specifically influence global climate change (mitigation) or to adjust to it (adaptation) must consider the public problem construct in order to have any prospect of success.

In this article, the public risk construct, and the interpretative processes in which it is created, reproduced and modified, is considered primarily from the perspective of the "media society" and the "knowledge society". This means that we are interested above all in public communications in and about the mass media as well as in the journalistic recourse to scientific experts as sources of information about the investigated issues of climate change and storm tide risks for the North Sea coast.

The theoretical framework of our analysis assumes the central function of *media* constructs in the "media society". They form an important point of reference for social subsystems and actors: first of all, for the production of "output", if media response serves as a criterion of success, and secondly as "input" because they provide information about the social connectability of activities (Kohring 2005) and they enforce the consideration of specific issues, actors, processes or insights through agenda setting and relevance attribution. The increasing media orientation of social subsystems is currently discussed using the concepts of "medialization" or "mediatization" for both politics (e.g. Sarcinelli 1989; Imhof 2006) and science (Weingart 2001).

With regard to the political opinion forming of the media audience, mass media in a "media society" create an important "symbolic environment" (Gerbner et al. 1994; Bandura 1994). This symbolic environment, and not the physical one, shapes our life space as social beings. In particular, in the case of environmental changes experienced only indirectly through science, the public's opinions and attitudes are to a large extent the result of their cognitive and affective reactions to the corresponding content of their symbolic envi-

ronment. In cases where environmental changes are experienced subjectively, their attribution to the anthropogenically enhanced greenhouse effect depends on media interpretations. Through journalistic coverage, fictional contents and the dissemination of marketing messages from commercial or non-profit organizations, the media contribute to creating and changing individual world views. In our media analysis, we limit ourselves to the journalistic contents of the media, although fictional contents (e.g. the film "The Day After Tomorrow") and advertising also shape the relevant symbolic environment of each specific issue.

Global climate change is an example of a risk which at first only received attention through the application of scientific methods. Therefore, numerous content analyses of the media coverage show that scientific sources have an exceptionally high status when it comes to the issue of climate change (e.g. Wilkins 1993; Bell 1994; Trumbo 1996; Henderson-Sellers 1998; McComas and Shanahan 1999; Weingart, Engels and Pansegrau 2002). Scientific experts appear predominantly as warning voices in the media (Rothman 1992; Peters and Sippel 1998), although sometimes climate experts sceptical of climate change also find their way into the coverage (Weingart, Engels and Pansegrau 2002: 127ff.).

2. Method

Our media analysis investigates the public construct of the risks of climate change, in particular, with regard to the storm tide risk on the German North Sea coast. Unlike for example Weingart, Engels and Pansegrau (2002), we do not consider the media as an arena in which public discourse takes place. Nor do we pursue a media-centred perspective by asking, for example, about the quality of media coverage as in Bell (1994), or by comparing different media with each other. Instead, we investigate media coverage as an essential part of the symbolic environment which is relevant for climate change and as a basis both for policy and also for individual opinion-forming. The only constant media-relevant differentiation in the analysis is that between national and regional/local media, because coastal protection is understandably above all a regional or local topic on the coast.

2.1 Sampling of media stories investigated

The basic idea in selecting the media stories was to construct a sample of the relevant part of the media information environment of the population in the North German coastal region. This was intended to portray as "representatively" as possible what the general media audience learns about climate change and its consequences, in particular with respect to the coastal region, in the regional and national newspapers, magazines, and radio or television programmes.

For the media analysis, we selected a wide range of general (non-specialized) journalistic media, i.e. newspapers, magazines, radio and television programmes. Our sample initially contains almost all relevant *regional newspapers, radio and television programmes* of the region investigated: 8 regional daily newspapers, 5 regional radio programmes and 3 regional television programmes. We complemented the regional media by selected major *national*

newspapers, magazines, radio and television programmes: 6 daily newspapers, 1 weekly newspaper, 3 magazines, 1 radio programme and 8 television programmes. From these media, we selected for the analysis all the stories that were concerned with the topic of climate change, coastal protection or with both topics.²

With the exception of the radio and television news, where we constructed a random sample, for the 18-month period from 1 September 2001 to 28 February 2003 we completely covered all the media listed (although in some cases restricted to certain parts of the programmes) using various search strategies. We assume that, due to the broad selection of information media included and the combination of various selection strategies, our sample was able to provide sufficiently "representative" coverage of the information environment of the coastal population on the relevant topic. Table 1 shows the composition of our media sample broken down according to thematic focus and media type. Our sample consisted of a total of 1176 stories and programmes.

Table 1: Sample composition by media type and thematic focus

		Thematic focus			Total
		Climate change	Coastal protection	Both	
National Media	Print	415	5	12	432
	Radio	100	3	2	105
	TV	61	7	1	69
Regional Media	Print	285	205	18	508
	Radio	10	10	12	32
	TV	11	8	11	30
Total		882	238	56	1,176

In spite of the considerable efforts made in observing the electronic media, 85 % of the media stories in our random sample originated from newspapers and magazines. The distribution of topics shows a clear preponderance of the topic of "climate change" in comparison to "coastal protection". In the national media, only about 5 % of the stories in our sample are concerned with coastal protection whereas this is about 46 % in the regional media. This makes it clear that in Germany coastal protection is a regional issue which receives little attention on the national level.

² For more detailed information on the selection procedure and the media involved see Peters and Heinrichs (2005: 14-19).

2.2 Content Analysis

The analysis of the media stories was performed by a quantitative content analysis (cf. e.g. Früh 1991; Krippendorff 1981), which aimed to identify semantic elements (e.g. topics, statements, source of information, evaluations) predefined in a codebook. The individual media stories were taken as the basic coding units, within which the various modules of the codebook refer to semantically differentiated sections of the stories (e.g. statements about a certain possibility of damage). Radio and television programmes were first transcribed. We decided not to analyse the visual information in the television programmes so that it was possible to analyse the various media genres (print, radio and TV) by the same content analytical procedure.

In accordance with the issue investigated, the codebook mainly focused on the differentiated categorization of statements on climate and coastal risks and how to cope with them. The codebook has a modular structure; it includes a number of topic modules that were to be applied whenever (more than once, if necessary) the media stories contained relevant information:³

1. *General module*

This module records the formal features of the story, the main topic and any other topics arising in it. Furthermore, the coder evaluates the alarming or reassuring tone of the stories as well as, if applicable, the headline with respect to climate and coastal risk. (One general module per story.)

2. *Actor module*

The actor module serves to characterize the actors mentioned in the story. (Maximum of 10 actor modules per story.)

3. “Characteristics of risk” module

This module records statements about the possibility of damage (e.g. climate change, rise in sea level, flooding and storm tides). Amongst other aspects, the type, level, geographical and temporal context of the risk are coded. (Maximum of 10 “characteristics of risk” modules per story.)

4. “Causes of risk” module

The “causes of risk” module refers to the causes of the possible damage represented in the story. Apart from other aspects, the cause and effect relations mentioned in the story are coded and whether these relations are confirmed or denied. (Maximum of 10 “causes of risk” modules per story.)

³ The codebooks with details of the categories employed are fully documented in the appendix to Peters and Heinrichs (2005).

5. *“Acceptance of risk” module*
This module covers statements on the acceptability/inevitability or unacceptability of risk. (Maximum of 3 “acceptance of risk” modules per story.)
6. *“Responsibility for risk” module*
This module records who is held responsible for a certain risk. (Maximum of 3 “responsibility for risk” modules per story.)
7. *“Coping with risk” module*
This module refers to measures for coping with risk (e.g. measures for climate protection, measures for adaptation to climate change and disaster control). Coding includes what measures are mentioned and how these measures are evaluated. (Maximum of 5 “coping with risk” modules per story.)

Students of the social sciences from various universities were recruited as coders for the media analysis and trained thoroughly. The codebooks were optimized in two pre-tests in order to increase intercoder reliability. A random sample of approx. 10 % of the media stories was double-coded in the main study for the final reliability check (n=112). The double coding was used to calculate intercoder reliability which turned out to be moderate, yet sufficient, and comparable with that achieved in previous studies of risk coverage.⁴

3. *Characterization of climate and coastal risks*

We analyse two risk fields in this story: risks related to global climate change (“climate risks”) and risks of storm tides on the North Sea coast (“coastal risks”). In the case of the regional media 46 % of the stories deal with the topic of coastal risks but only 4 % of the stories in the national media. The discussion of coastal protection is therefore largely of regional interest.

The two risk fields are potentially linked since global climate change will probably lead to a rise in sea level and possibly, although this is currently still a matter of controversy, to an increase in the frequency and intensity of storms. Due to this relationship there are media stories that combine the two issue areas (Table 1). However, the intersection of the topics is very small since overall only about 6 % of the media stories we investigated dealt with both risks. Roughly every fifth *regional story* on coastal risks dealt at the same time

⁴ To determine intercoder reliability, we used Cohen's kappa (•) (Cohen 1960) or the CR coefficient after Fröh (191: 168-175) in cases where the category systems permitted multiple responses. The reliability is comparable to that achieved by Singer and Endreny (1993: 19) in their analysis of risk reporting. The values were predominantly in the average range around • = 0.50. Landis and Koch (1977: 165) describe values between 0.41 and 0.60 as “moderate”. All in all, we consider the results of the reliability test to be acceptable. Firstly, Cohen's kappa is a very rigid measure of reliability since it corrects the calculated agreement on the basis of the marginal distributions of both coders for the agreement to be expected randomly. Secondly, by a random allocation of coding units to coders and also by a random series of coding units we ensured that any possible systematic differences in coding were randomized.

with climate change and thus made a semantic connection between the two risk areas.

The description framework developed by us for the public risk construct consisted of six dimensions covering a broad range of risk-related statements and cognitions. This does not only include the description of risk in the sense of level of damage and probability of occurrence, that is to say risk in the scientific and technological sense. The description framework also covers, in particular, the social risk context, i.e. issues of responsibility, acceptance and the evaluation of measures for coping with risks.

1. *Characteristics of risk*: Existence, type and level of risks
2. *Causes of risk*: Cause and effect relations with respect to risks
3. *Acceptance of risk*: Acceptance or nonacceptance of risks
4. *Responsibility for risk*: Assigning responsibility for risks – both for the origin of risks and also for risk management
5. *Coping with risk*: Measures for coping with risks by avoiding, minimizing, eliminating or compensating for damage
6. *Trust in risk actors*: Confidence in actors and experts who play a part in analysing and coping with risk. Every mentioning of an actor (individuals, organizations, sub-systems like politics) was coded as a case of this category – even if there was no explicit mentioning of their credibility.

These six dimensions of the risk construct also serve as a scheme for structuring the following discussion. Apart from the “trust in risk actors”-category most media statements refer to the type and level of the risks, to the problem of coping with these risks and to the question of the causes (Table 2).

Table 2: Number of statements on six 'risk dimensions'

	Number of statements
Characteristics of risk	1,111
Causes of risk	649
Acceptance of risk	31
Responsibility for risk	97
Coping with risk	889
Trust in risk actors	5,703
Total	8,480

3.1 Type and level of climate and coastal risks

Risks are expectations of possible damage. Our analysis is concerned with establishing what possible damage is represented in the reporting and whether this possible damage is characterized as more or less or alarming. We determined the representation of the risks with respect to global climate change (“climate risks”) and the risks for the North Sea coast (“coastal risks”) by two procedures. Firstly, in a general way the alarming or reassuring tone of the overall article or programme was identified, and, secondly, more specifically, risk-related statements in the media stories were identified and classified. Coastal risks and coastal protection were almost exclusively discussed by regional media at the German North Sea coast, whereas regional and also national media reported on the risks of global climate change.

In order to record the alarming or reassuring tone in general of media coverage of climate change or coastal protection, we classified the titles or headlines of the media stories and the text of the stories according to whether they tended to represent the risks of climate change and coastal protection as “alarming/warning” or “nonalarming/reassuring”. As can be seen from Figure 1, the majority of stories in the media have an alarming tone and warn against risks. The preponderance of warning in comparison to reassuring voices is less marked in coverage of (regional) coastal protection. In a number of reports, attention is drawn here to the adequate protection provided by the dykes in the local area.

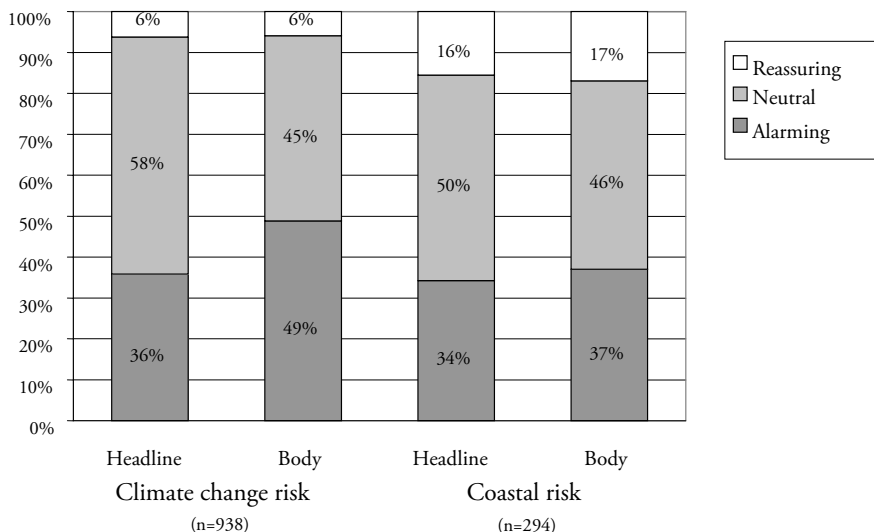


Figure 1: Alarming vs. reassuring tone of media stories on climate change and coastal protection

In the detailed analysis of statements on risks, the coders first identified the possibilities of climate- or coast-related damage mentioned in the story. Statements in which the existence, level or probability of occurrence of climate change and storm tide risks was identified, asserted or denied were regarded as relevant instances. The statements made in the article on the type and level of the possible damage thus determined were then coded. Attention was focused on assessing the associated risk as “high” or “low”. Furthermore, the primary source of these risk-related statements was identified, i.e. the person or institution cited in these statements or whose statements had been reported.

Table 3: Characterization of climate and coastal risks in the media coverage by damage category

	Statements about characteristics of risk		Proportion of statements emphasizing or denying/downplaying the risk	
	Number [n]	Proportion [%]	Emphasizing [%]	Denying/downplaying [%]
Climate change / greenhouse effect	214	19.3	39.7	2.8
Melting ice cap and glaciers	82	7.4	61.0	4.9
Sea level rise	68	6.1	54.4	4.4
Extreme weather events	143	12.9	76.2	2.1
Storm tide disasters (coast)	96	8.6	76.0	4.2
Flood disasters (inland)	113	10.2	74.3	2.7
Natural disasters in general	19	1.7	57.9	5.3
Flooding of islands (Tuvalu)	14	1.3	71.4	0.0
Shifting of vegetation zones	65	5.9	38.5	1.5
Material damage / agricultural production	121	10.9	73.6	0.8
Fatalities / injuries / diseases / hardship	79	7.1	73.4	0.0
Damage to ecosystems / biodiversity	81	7.3	65.4	1.2
Other damage / damage in general	16	1.4	56.3	18.8
Total	1,111	100.0	62.4	2.7

The media report on a broad range of climate- and coast-related damage possibilities (Table 3). This possible damage is defined on various levels. In some cases, climate change itself is regarded as “damage” and in other cases specific possible consequences are mentioned such as the rise in sea level or the melting of the ice sheets. The same is true of storm tides. In some cases, storm tides are themselves regarded as “damage” while in other

cases the story is concerned with specific damage as a result of the storm tides, such as casualties or economic damage. There are in part causal relations (one possibility of damage is the cause of another) between the damage possibilities listed in the category system. During coding, reference was made to the possible damage mentioned in the media story itself. Some stories may contain several of these statements on the existence of (various) risk possibilities, whereas in others there are no statements of this type. In the 1176 media stories in our random sample a total of 1111 statements relating to possible damage were identified.

National and regional media differ with respect to the spectrum of risks taken into consideration. Since problems associated with the coast are largely restricted to the regional media, the proportion of climate-related damage possibilities is considerably greater in the national media than in the regional media, whereas storm tide disasters and the resulting damage occur much more frequently in the regional media.

With respect to all the possibilities of damage, the media mainly publish statements that confirm the risk and tend to rate the risk as serious (Table 3). The second place is occupied by statements that do not present a clear evaluation of the risk as high or low, and less than 3 % of all statements dispute or qualify the existence of a risk linked to any of the damage possibilities. In agreement with the general trend of the stories described above (cf. Figure 1), the data show that the media represent all the climate and coastal risks they mention as threatening. There are relatively few reassuring statements and although voices that doubt the threat posed by climate change can be found in German media coverage they are an exception.

3.2 Causes of climate and coastal risks

The identification of statements presented in the medial coverage concerning causal relationships between possible damage and the factors leading to it was a challenge for our coders. Such statements postulating or casting doubt on causal relationships can be phrased in a variety of ways. The causal connection is frequently only hinted at.

On the basis of an exploratory preliminary study of media coverage and systematic considerations, we produced a diagram as the basis for the coding work linking the possible causes and effects by arrows (Figure 2 next page). Each impact to the left of an arrow is a possible cause and each impact to the right of an arrow is a possible effect. The impacts on the far left of the diagram were therefore only to be coded as causes while those on the far right were only effects. All other impacts could be coded either as causes or as effects. There are therefore 16 possible causes and 14 possible effects. In theory, it was possible to code $16 \times 14 = 224$ different cause and effect relations. However, many of these combinations are not meaningful while others hardly occur in the media.

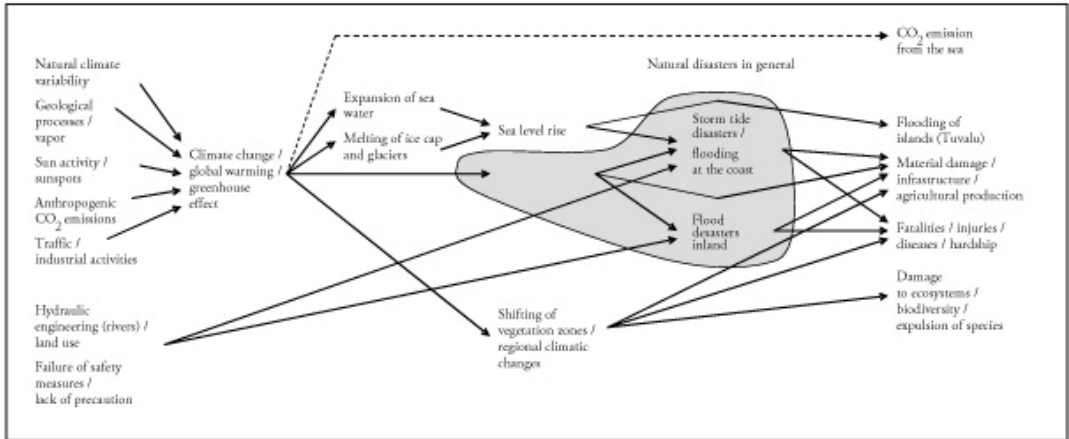


Figure 2: Diagram of cause-effect relationships for the analysis of media coverage

Apart from the combination of cause and effect, coding also had to include whether the statement in question represented the causal connection as given or whether it disputed the relationship. In spite of the complexity of the coding task, intercoder reliability for identifying statements on cause and effect relations was quite satisfactory.

Altogether in the 1176 media stories, our coders identified 649 statements on cause and effect relations with respect to climate and coastal risks. Table 4 (see next page) shows the cause and effect relations that occurred at least 15 times. More than half of all the statements on causes of risks were accounted for by these eight most frequently mentioned relations.

By far the most frequently mentioned cause and effect relationship concerned anthropogenic CO₂ emissions as the cause of the greenhouse effect. This cause was mentioned in one out of ten media stories and was confirmed in 80 % of the cases. Only in 5 % of the 116 relevant statements was doubt cast upon anthropogenic CO₂ emissions as the cause of the greenhouse effect. Also as confirmation of the theory of the anthropogenic greenhouse effect, “traffic/industry” was mentioned 22 times when providing greater detail on the cause of “anthropogenic CO₂ emissions”. Only natural geological processes were put forward as a competing cause of the greenhouse effect, but they were mentioned much more rarely than anthropogenic CO₂ emissions.

The greenhouse effect was linked to a whole series of negative impacts by cause and effect statements: to extreme weather events (storms, drought, heavy rain), damage to the ecosystems, melting of the ice sheets and the shift in vegetation zones. In turn, melting of the ice sheets was represented as the cause of the rise in sea level.

Table 4: Depiction of cause-effect relationships in the media coverage about climate change and coastal protection

	Statements about cause-effect relationships		Proportion of statements affirming or denying the relationship	
	Number	Proportion [%]	Affirming [%]	Denying [%]
Anthropogenic CO ₂ → climate change	116	17.9	81.9	5.2
Traffic/industry → climate change	22	3.4	95.5	0.0
Geological processes → climate change	15	2.3	80.0	0.0
Climate change → extreme weather	61	9.3	85.2	3.3
Climate change → ecosystems	47	7.2	89.4	0.0
Climate change → melting ice sheet	44	6.8	72.7	4.5
Climate change → vegetation zones	21	3.2	76.2	0.0
Melting ice sheet → sea level rise	24	3.7	83.3	4.2
Other cause-effect relationships*	299	46.1		
Total	649	100.0		

* Aggregation of cause-effect relationships mentioned less than 15 times.

3.3 Risk acceptance and responsibilities

Perceived risks can give rise to matter-of-factly cost-benefit considerations – for example, the cost of avoiding risks versus the damage to be expected – or they can lead to outrage about the risks. According to the findings of risk perception research, the latter is the case whenever risks are imposed and above all whenever the party responsible for the risk, or the risk manager who takes no action, profits from his risk-producing behaviour (cf. Schütz and Peters 2002). An unemotional consideration of risk acceptance (or fatalistic or cynical acceptance) is characteristic of risks for which people are themselves responsible and whose minimization depends on their own behaviour.

The perceived social context of the origin of the risk and its regulation is therefore decisive for the acceptance of the risks of “climate change” and “storm tides” by the general public and the public’s attitude to measures aimed at minimizing these risks. Is an external party responsible for the climate risks who can become the object of outrage and against whom people can demonstrate and demand remedial measures? Or is climate change the consequence of our industrial society and our lifestyle, in which we are all involved so that we ultimately cause the risk ourselves?

The two dimensions of “risk acceptance” and “risk responsibility” in our risk construct are hardly represented at all in the media discussion. That is to say, there is hardly any explicit discussion of the question of which risks are to be accepted and which are not. Furthermore, the question of social responsibility for the causes (assigning blame) or risk management (assigning responsibility) of climate change and its consequences, which are after all represented as being anthropogenic, is only touched upon marginally.

Of only 31 statements on the acceptance of climate and coastal risks, 18 put forward the unacceptability of the risks and 9 state that people must come to terms with these risks. The remaining 4 statements are not clearly formulated.

81 of the total of only 97 statements on responsibility refer to the greenhouse effect. In these statements, above all the industrialized countries and their population are held responsible for the greenhouse effect. The industrialized countries in general and politicians/authorities in particular are regarded as being responsible for solving the problem.

In view of the small number of statements on acceptance and responsibility, there are reservations with respect to the findings. Furthermore, the intercoder reliability is extremely low, which indicates that the corresponding statements are not explicit but rather largely depend on subjective interpretation on the part of the coder as to whether and where such statements can be identified. The remarkable result of our analysis of media reporting with respect to the two dimensions of “risk acceptance” and “risk responsibility” is that they are hardly represented at all in the media discussion of the climate problem.

3.4 Measures for coping with risks

Apart from the type and level of climate and coastal risks, measures for coping with these risks represent an important topic in the media. 889 statements on this topic were identified and coded in the media analysis. The measures for coping with risk analysed by us refer to climate change and its consequences and to the protection of the coast against storm tides (irrespective of whether an explicit connection with climate change is established). The measures mentioned in connection with climate change serve either to prevent or mitigate climate change by means of so-called climate protection measures, above all by reducing the emission of greenhouse gases by efficient energy use and by the increased application of nonfossil energy sources (“mitigation”). In addition, measures are discussed for coping with climate change that are intended to adapt society to this change (“adaptation”). Measures for coastal protection can be regarded as adaptation measures if they are planned and implemented with respect to the rise in sea level intensified by climate change.

A great deal of space in the media is devoted to the discussion of measures for coping with climate change. Most of the measures discussed relate to the reduction of the greenhouse effect (67 %), preventing or coping with storm tides on the coast (16 %) and inland flooding (8 %).

The five measures that were each mentioned more than 30 times in the random sample of the media will be briefly characterized in the following.

1. *International agreements on climate protection (mentioned 251 times)*
International agreements on climate protection were mentioned in connection with the mitigation of climate change by reducing anthropogenic emissions of greenhouse gases. In 45 % of cases, the international agreements were mentioned in a positive light and in 20 % a critical attitude was taken. This most frequently mentioned measure therefore has the weakest relative agreement (ratio of positive to critical statements) of the five measures discussed here in detail.
2. *Technological innovations (mentioned 144 times)*
“Technological innovations” – for example, increasing the efficiency of energy use and the application of renewable sources of energy – are presented very positively as measures for climate protection (72 %) and are hardly criticized at all (7 %). Apart from the necessity and effectiveness of these measures, the media mention above all the cost and the ecological and socioeconomic consequences in connection with this measure.
3. *Raising, strengthening and maintaining the dykes (mentioned 126 times)*
Improving the dykes as protection against storm tides was mentioned almost exclusively in the regional media. This measure enjoys a high level of approval (67 %) and is hardly criticized in the media (4 %). Raising and strengthening the dykes is the only one of the five most frequently mentioned measures that relates to the adaptation of the technical infrastructure to the consequences of global climate change rather than to mitigating this change.
4. *National political measures (mentioned 125 times)*
The “national political measures” mentioned in the media for coping with the risks in the field of climate and coastal protection relate almost exclusively to the mitigation of the expected climate change and not to adaptation measures. In the same way as with international agreements on climate protection, approval is somewhat lower (46 %) and rejection somewhat higher (14 %) than with the other measures.
5. *Social innovations, e.g. Agenda 21 (mentioned 32 times)*
Social innovations as measures for coping with climate and coastal risks, for example the Agenda 21 movement, are mentioned much less frequently than the four above-mentioned measures (just 32 times). Approval of social innovations is very high (78 %) and criticism is rarely expressed (9 %).

The content analysis shows that in the media measures for mitigating climate change are predominant in comparison to the measures for adapting to climate change. In our media sample, 62 % of the relevant statements relate to mitigation measures while only 23 % concern adaptation. (The remaining statements are of a general nature.) The only discussion on adaptation is that concerning raising the dykes to prevent coastal flooding in case

of storm tides – which is a purely regional measure. If attention is exclusively given to the national media, then the predominance of the mitigation discussion is even greater: mitigation is mentioned in 79 % of the statements but adaptation in only 7 %.

3.5 *Trust in actors*

Sociological risk research assumes that trust in risk producers and managers is an important factor influencing risk perception and risk acceptance (cf. for example, Siegrist and Cvetkovich 2000; Hornig Priest et al. 2003; Peters et al. 2007). In the case of climate risks, it is not external third parties – for instance, industry – that are regarded as risk producers but rather industrial society as a whole. The general public therefore assign themselves a large share of the responsibility for the problem. The risk of storm tides can be considered to be a “natural hazard”, for which third parties cannot be held responsible. In our context, trust can only refer to confidence in those institutions responsible for identifying and coping with the above-mentioned risks – starting with science, industry and politics up to and including regional authorities and those responsible for the dykes. Although these – in the broadest sense – “risk managers” are not the originators of the risks their action or inaction in managing the risks implicitly determines the level of the “residual risk” that the public has to live with.

With respect to coping with climate change, Zwick (2001: 31) finds a credibility and confidence gap between, on the one hand, the assignment of responsibility to politics and industry and also the expectations of citizens with respect to competence in solving the problem and, on the other hand, the perceived ability of these institutions to cope. In a survey, respondents mentioned above all industry, government and science as the institutions mainly responsible for the control and reduction of risks, but expressed little confidence in the ability of industry and politics to solve the problems. Only science fared somewhat better (Zwick 2002: 24-25).

In the 1176 media stories on climate and coastal protection problems that we analysed, we identified a number of individuals and institutions that had been mentioned either as “discourse actors” or as “decision-makers” in the media coverage.

- *Discourse actors* are individuals or institutions cited or referred to directly or indirectly in the stories, whose knowledge and opinions are also taken up in the public discussion (n=3064)
- *Decision-makers* are individuals or institutions that are represented in the stories as active participants who make or influence decisions of significance for the climate problem or coastal protection (n=2639).

In the following, we analyse the evaluation of individuals and institutions responsible for the identification, analysis and reduction of risks – especially politics, science and industry. For the discourse actors, we coded two evaluations in each case: the evaluation of the dis-

course actors themselves and also the evaluation of the statements and opinions attributed to them. In the case of the decision-makers, only their direct evaluation was coded.

The results of this analysis are to be regarded as providing a picture of the actors public image. Are those involved in the discussion on climate and coastal risks, or those responsible as actors for coping with risks, implicitly represented in the media as competent and trustworthy, or do they tend to be criticized?

In order to present the results clearly we calculated the mean evaluation as the evaluation index, with positive evaluations being coded by +1, negative by -1, and ambivalent or neutral/missing evaluations by 0. The index varied theoretically between -1 and 1 (if only negative or only positive evaluations are found). However, due to the large number of occasions when discourse actors and decision-makers were mentioned without any explicit evaluation, the index values are found in a much narrower interval around 0. Index values of +/-0.05 therefore indicate a significant preponderance of positive or negative evaluations.

Table 5: Trust in risk actors: Evaluation of decision-makers, discourse actors and their statements by actor group

	Decision-makers			Discourse actors			
	Number [n]	Proportion [%]	Evaluation [index*]	Number [n]	Proportion [%]	Evaluation of actors [index]*	Evaluation of statements [index*]
Politics / administration	1,314	49.8	-0.06	1,172	38.3	0.01	0.04
Economy	238	9.0	0.02	157	5.1	0.01	0.04
NGOs	59	2.2	0.03	217	7.1	0.05	0.13
Science / technology	360	13.6	0.13	1,185	38.7	0.08	0.14
Other	668	25.3	0.00	333	10.9	0.06	0.06
Total	2,639	100.0	-0.01	3,064	100.0	0.05	0.09

* Evaluation index: difference between number of positive and number of negative evaluations divided by the total number of evaluations; positive index values indicate a positive evaluation, negative values a negative evaluation on average.

The media do not present the discourse actors and decision-makers in a predominantly negative light in the coverage (Table 5). Indeed, the discourse actors are without exception assessed positively – both as a whole and also in all the main categories (politics/administration, industry, environmental organizations and science). Negative index values are only found for the decision-makers in the field of politics/administration. A close examination of the subcategories in the field of politics/administration shows that

close examination of the subcategories in the field of politics/administration shows that the negative overall evaluation there can mainly be attributed to the negative evaluation of the subareas of “policy by foreign governments/administration” and “politics in general”. The reason for the critical evaluation of foreign actors is, for example, criticism of the USA’s climate policy. German politics on a national and regional level, and above all the German administration, is assessed quite positively in the media.

By far the most positive evaluations for all three evaluation indicators are found in the field of “science and technology”. The German media are therefore very favourably disposed towards the involvement of science in the discussion about global climate change and its consequences.

Table 6: Sources of statements about different risk dimensions by actor group

	Characteristics of risk [%]	Cause-effect relationships [%]	Coping with risk [%]
Politics / administration	12.8	7.1	34.0
Economy	0.8	0.9	4.5
NGOs	2.7	2.5	7.4
Science / technology	44.9	65.6	19.3
Other sources	3.3	1.4	3.1
Multiple sources	2.9	3.1	13.2
No source mentioned	32.6	19.4	18.4
Total	100.0 (n=1,111)	100.0 (n=649)	100.0 (n=889)

In order to answer the question of the influence exercised by the various discourse actors on the media risk construct we identified the originators of the risk statements. Table 6 (see page before) shows the sources of statements about the dimensions of the risk construct according to actor group.

About two thirds of the statements concerning the type and level of the risks can be assigned to specific discourse actors. By far the most important sources of these statements are scientists and scientific institutions, followed in second place by sources of information from politics and administration. Industry and environmental associations play a subordinate role in the representation of risks. All the discourse actors express statements emphasizing the risk much more frequently than statements that refute or qualify the risk.

Almost all statements on cause and effect relations for which a primary source is given originate from the science sector. The dominance of science as a provider of information to the media is even greater in the case of statements about causes than for the statements described in the preceding section on the type and level of climate and coastal risks.

The discussion about measures is primarily characterized by statements from the political sector. Scientific sources take second place followed by environmental associations and industry. Due to the different structure of the topics, the relative proportion of discourse actors from the political and administrative sector is higher in the regional media and those from the science sector are lower than in the national media.

4. Discussion and conclusions

Since at least 2002, the German mass media have characterized global climate change as a serious threat caused by mankind. Furthermore, the numerous media stories that deal with measures for reducing greenhouse gases present these measures as a promising coping strategy and implicitly assume the anthropogenic origin of greenhouse gases. The symbolic environment created by journalists in Germany is distinguished by a great consonance in characterizing the risks of global climate change. Isolated dissenting voices in the media that qualify the risks of climate change and dispute its anthropogenic origin hardly lead to widespread confusion amongst the media public but are rather rejected as implausible (Peters and Heinrichs 2005: 58).

In accordance with earlier German and international studies (e.g. Weingart, Engels and Pansegrau 2002; Bell 1994; Trumbo 1996; Wilkins 1993), our media analysis also shows that science is a central protagonist and makes a decisive contribution to the public risk construct concerning climate change. The high proportion of scientific sources is proof of the scientization of the political and social debate on risk topics, especially climate change. The distribution of the primary sources on the different aspects of media coverage reflects, although not quite so selectively, the social differentiation of functions according to which science is responsible for the “truth” and the diagnosis of problems, whereas politics and administration are responsible for making binding decisions and implementing them. The origins and the level of the climate change risk are largely represented in the media in accordance with the basic tone of the IPCC reports. As shown by representative surveys of the population, this characterization of the risks of climate change put forward by those climate scientists in the public eye and disseminated by the media is shared by the general public. According to Grunenberg and Kuckartz (2003: 169-177), in 2002 about 77 % of the German population was convinced that climate change was in progress and 62 % believed that it was hazardous for them and their families. The proportion of those who were convinced that climate change was in progress rose to 85 % by 2004 (Kuckartz and Rheingans-Heintze 2006: 156).

At the time of our analysis (2001-2003), the discussion of the measures necessary for coping with climate change focused almost exclusively on mitigation strategies. In the same way, the German population was also relatively optimistic about the avoidability of climate change. In 2002, 50 % of the population believed that climate change could still be prevented by suitable measures (Grunenberg and Kuckartz 2003: 172). However, according to the current state of climatological knowledge mitigation of climate change can no longer be regarded as sufficient since it is probably no longer possible to prevent an increase in the mean temperature. Greater attention should therefore be paid to adaptation –

that is to say, adaptation to a rise in sea level, more frequent extreme weather events (storms, rain) and also higher average temperatures. With respect to the ability to adapt, the general public is relatively pessimistic since, in 2006, 62 % did not believe that Germany would be able to cope with the problems resulting from climate change (Kuckartz, Rädiker and Rheingans-Heintze 2006: 25).

The scientifically interesting and practically relevant issue is now whether the media construct of climate change described above will lead to corresponding problem-solving processes in society. This question can be made more specific in two respects: (1) Will media coverage lead to a (voluntary) change in behaviour on the part of the public which will be of service to climate protection? (2) Will the coverage encourage political activities for climate protection or for adaptation to climate change?

Theories of media impact such as agenda setting and cultivation lead one to expect that with consistent media coverage, as in the case of climate change, the media construct of reality will in the course of time characterize the subjective reality of the media public. As mentioned above, the general public's opinion on climate change does, by and large, actually correspond to the tone of the media coverage.

However, it is doubtful whether knowledge about climate change, its origins and its consequences will inform individual behaviour. It can certainly be assumed that "climate change" will be *one* criterion influencing the refurbishment of houses or consumer decisions, but probably only to the extent that it does not involve any significant economic disadvantages and no subjective restrictions on use. Since energy savings are often beneficial from an economic point of view, more intensive coverage of climate protection in the media may draw attention to decisions which are more sensible from a subjective economic consideration than would be the case if this aspect were not considered.

However, for someone to change their behaviour *voluntarily with the aim of protecting the climate because they recognize the necessity of doing so, even if it is not in their individual economic interests from the cost-benefit perspective*, and, for example, if without any (economic) necessity they chose a smaller car than the one they really want, book a seaside holiday in Germany travelling by train rather than a long-distance flight to an exotic destination, or as "political consumers" make a conscious decision to purchase products from companies involved in climate protection, this may be the case for a small group of individuals who are environmentally aware, but cannot be expected as routine behaviour by the vast majority of the population. Barriers to voluntary changes in behaviour are that the benefits of this change in behaviour are, in contrast to their "cost", not exclusive (the free-rider problem), that in contrast to accidents and illnesses the impacts of climate change are not conceptualized as individual but as social risks, and that effective changes in behaviour in the sense of climate protection would mean a severe cutback in personal lifestyle preferences (above all with respect to mobility).

Social adaptation to climate change cannot therefore be primarily achieved by voluntary changes in individual behaviour. It rather requires a change in social routines by modifying

the incentive and opportunity structure for the actions of consumers and producers. There are two ways of doing this: technological innovations and political regulation. Technological innovations basically permit existing consumer and mobility preferences to be maintained in a manner that does not have a negative impact on climate (e.g. by reducing the fuel consumption of cars or developing renewable energy carriers).

Political regulation by means of economic incentives or legal standards can, firstly, accelerate the implementation of such technical innovations and, secondly, may set limits to the satisfaction of consumer and mobility preferences or make them dependent on certain conditions.

In view of the medialization of politics discussed in the introduction, that is to say the orientation of politics to the media, the media construct of climate change puts pressure upon German politics to take some action – or to put it positively – it turns climate policy into a legitimate field for political action. Ignoring the climate problem as a relevant societal risk would set politics against science and would lead to a legitimization crisis. Political attitudes and decisions are measured against the media construct of climate change. Politicians and political institutions thus find a receptive field for appropriate initiatives. The public construct of climate risks is therefore currently a significant legitimization factor for climate policy – on both a national and a local level.

However, public legitimization as a political field of action is only a important prerequisite but not sufficient for an effective policy coping with global climate change. There are a number of difficulties in implementing effective mitigation and adaptation policy: (1) the lobbying of politically influential actors who have an interest in maintaining the status quo (e.g. energy utilities and the automobile industry), (2) the global dimension of the climate problem that leads to a free-rider problem between competing national economies and manifests as a problem of distortion of competition due to different burdens resulting from national climate policy strategies, (3) the unresolved issue of whether, and to what extent, voters would respond positively to a policy of climate protection and anticipatory adaptation to the consequences of climate change that is associated with burdens and restrictions for the public – not only verbally in surveys (cf. Kuckartz, Rädiker and Rheingans-Heintze 2006: 25) but also at the ballot box.

An obvious resolution of the political dilemma resulting from the combination of public pressure to act combined with high barriers to implementation would be, from the point of view of politics, the development of a symbolic climate policy, which would primarily attempt to cope in rhetorical terms with climate change as a political problem. This ultimately calls upon the actors involved – politicians, experts, NGOs, investigative journalists and critical citizens – to shape the political opportunities for action opened up by media coverage of the topic in the sense of dealing with the problem rationally and of preventing merely symbolic climate policy.

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