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Barriers to the Implementation of Climate Change Adaptation Policies: the Case of Switzerland[1]

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Abstract:

The implementation of policies for adaptation to climate change is a rare occurrence in developed countries. This article examines the extent to which the perceptions of political actors may hinder the development of adaptation policies. We examine the case of Switzerland with the help of computer-aided textual analysis. Our research findings show that adaptation is still not perceived as an important aspect of climate change policy. Decision-makers fail to see any links between adaptation, the Swiss economy and the country's energy supply. Adaptation is mainly considered as an issue for developing countries and not as a means of reducing the impacts of climate change in Switzerland. Right-wing parties tend to consider adaptation as a secondary issue and are more likely to object to the formulation or implementation of public measures for adaptation to climate change than their counterparts on the left.

Keywords :

Barriers to adaptation, climate change, climate policy, public policy, computer-aided textual analysis (CATA)

1. Introduction: the implementation deficit in relation to adaptation policy[2]

A number of scientific studies reach the conclusion that anthropomorphic climate change and its various effects pose a significant threat to human societies. The increasing scarcity of drinking water and staple foods, the re-emergence of tropical diseases, the disappearance of fragile ecosystems and the rise in sea level are but few of the striking examples of the risks arising from the warming of our planet (Schneider, Semenov et al., 2007).

The majority of scientists agree on the fact that developing countries and small isolated states are most vulnerable to climate change (Tol, 2009). However, developed states are not immune to its effects either. In the context of Europe, the southern and Alpine regions and coastal zones risk being severely affected in particular (Parry, 2000; IPCC, 2001; Stern, Peters et al., 2006; Alcamo, Moreno et al., 2007; OCDE, 2007; European Environmental Agency, 2009). Hence, climate change is likely to trigger significant imbalances in these areas, in particular in the sectors of activity most exposed to its impacts, for example agriculture and winter tourism.

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The United Nations Framework Convention on Climate Change (UNFCCC) of 1992 refers to two types of political response to the impacts of climate change. First, *mitigation*, that is: "strategies to reduce greenhouse gas sources and emissions and enhance greenhouse gas sinks" and, second, *adaptation*: "the initiatives and measures taken to reduce the vulnerability of natural and human systems against actual or expected climate change effects." (IPCC, 2007).

Hence, mitigation and adaptation differ considerably. The aim of mitigation policies is to stabilise and then reduce the concentration of greenhouse gases (GHG) in the atmosphere and they generally rely on the taxation of fossil fuels, the CO_2 emissions trading systems and voluntary measures on the part of private sector companies to achieve this. Adaptation, in contrast, involves a range of extremely diverse measures which aim to prevent, reduce and improve the distribution of the current and future damage caused by climate change (Smit, Burton et al., 2000). The measures implemented under the heading of adaptation range from the construction of dams and dykes to the adoption of specific insurance systems and, in the most extreme cases, migration or the outright abandonment of very high risk areas.

From a purely rational perspective, based on their complementarity, adaptation and mitigation should be considered as *two sides of the one coin* (Stehr, von Storch, 2008). In effect, however, the inertia of the climate system is such that the unfolding of the various disastrous effects of climate warming will be inevitable throughout the entire 21st century (Meehl, Stocker et al., 2007). Hence, mitigation policies will have absolutely no influence on climate risks in the short and medium term. Moreover, the evolution of global GHG emissions over the past ten years would prompt the fear that the most pessimistic impact scenarios are likely to materialise in the future (Rogelj, Nabel et al., 2010). In addition, the international institutions (UNFCCC, 2007), the European Union (Commission des Communautés Européennes, 2009) and an increasing number of scientists have highlighted the need for the implementation of additional adaptation measures so as to limit the negative impacts of climate change (Adger, Agrawala et al., 2007; Stehr, von Storch, 2008).

Despite the fact that adaptation has become one of the most prominent topics on the political agendas of the past ten years, few real changes can be observed in the conduct of public policy in the majority of OECD countries. Thus, a comparative study carried out in 2006 showed that, apart from providing funding for research programmes, the vast majority of OECD countries (with the exception of Holland, the United States, New Zealand, Austria and Great Britain) had not yet implemented any adaptation measures (Gagnon-Lebrun, Agrawala, 2006). Since then, spurred on by the European Union, several EU Member States have adapted "national adaptation strategies to climate change" (Commission des Communautés Européennes, 2009). However, a recent comparative study showed that these programmes propose practically no changes to the existing legislative frameworks or the implementation of any concrete policy actions (Swart, Biesbroek et al., 2009). Hence, these adaptation policies would appear to little more than "empty shells".

The current situation suggests that adaptation suffers from the classical problem of the *implementation deficit* as theorised by Bardach (1977) and Sabatier (1986), among others: the legal provisions of the UNFCCC,[3] the framework programmes of the European Union and the discourse among scientists highlight the necessity of preventive action against the future risks posed by climate change. However, beyond the appearance of adaptation on the political agendas, the actual implementation of additional measures remains rare.

The factors that would explain the problems surrounding the implementation of adaptation in OECD countries have been little investigated by research. In effect, up to the publication of the third report of the IPCC[4] in 2001, the literature on climate change was largely dominated by the

[3] See article 4 in particular.
[4] Intergovernmental Panel on Climate Change

sciences and the process of adaptation was conceived of in a positivist manner. In addition, the capacity of states to develop adaptation strategies was essentially described using the concept of adaptive capacity, that is "The whole of capabilities, resources and institutions of a country or region to implement effective adaptation measures" (IPCC, 2001). Hence adaptive capacity was essentially measured using indicators such as per capita GDP or literacy rates, that is criteria which are strongly related to the level of economic development (Smit, Pilifosova et al., 2001). Hence, it was suggested that industrialised countries which have a relatively high adaptive capacity would adapt almost naturally to climate change. As a result, adaptation was viewed above all as a challenge facing developing countries (Gagnon-Lebrun, Agrawala, 2006).

This hypothesis of a causal link between the existence of capacities and the implementation of adaptation measures was later criticised and dismissed. O'Brien et al., in particular, demonstrated in the case of Norway that strong adaptive capacity would scarcely be sufficient to guarantee that concrete action will be taken in highly vulnerable areas (O'Brien, Sygna et al., 2004). More recently, a large number of studies have examined the various obstacles that may stand in the way of adaptive capacity. The main *barriers to adaptation*, to use the expression adopted in the last IPCC report (cf. : Adger, Agrawala et al., 2007), are: the uncertainty of the available scientific knowledge which could be significant enough to cause embarrassment to the decision-makers (Schneider, Lane, 2006; Dessai, van de Sluijs, 2007); the unavailability of suitable technologies which makes adaptation impossible in certain cases (Hulme, 2005); the cost-benefit ratio of adaptation measures which is not always favourable to public action (ECA, 2009); the lack of economic resources (Global Environmental Facility (GEF), 2010); and, finally, the weakness of state institutions (Yohe, Malone et al., 2006).

Although these factors can explain the implementation deficits observed in OECD countries to varying degrees, it surprising to note the extent to which political and institutional factors have been neglected by the research up to now (Biesbroek, Kabat et al., 2009). Little or no interest has been shown in the decision-making processes associated with adaptation and the role of actors involved in them[5] (Dovers, Hezri, 2010). This is surprising, however, as the integration of adapation into the conduct of public policy is necessarily a social process that is likely to generate different forms of conflict between the main policy actors. In effect, all political problems result from strategic interations between actors whose preferences vary, particularly on the basis of the resources at their disposal, their interests, values or beliefs (cf. : Sabatier, 1991; Scharpf, 1997; Knoepfel, Larrue et al., 2007). Hence, the decision-making process is the product of a balance of power between actors that can support or, conversely, hinder the development of a specific policy; indeed, certain actors may even have a power of veto at their disposal (Tsebelis, 2002).

This article aims, therefore, to explore some of the obstacles to the development and implementation of climate change adaptation policies by examining the role of the perceptions of climate change among decision-makers. Through an exploratory process, we studied the discourse[6] of the actors involved in the development of climate policy. We analysed the role of adaptation in this discourse and, therefore, its importance in relation to other topics such as mitigation. We also examined whether an evolution may be perceived in the discourse over the course of time and whether the left-right political division influences the perception of adaptation.

We adopted Switzerland as a case study that appears to be particularly suited to elucidating the problem of the implementation deficit in relation to adaptation. Switzerland is affected by adaptation to climate change as its Alpine character renders it particularly sensitive and exposed

5 In general, sociology and the political and administrative sciences do not yet feature very prominently in the study of climate change (cf. Goodall, 2008; Stehr, von Storch, 2009; Dovers, Hezri, 2010).

6 In accordance with Zellig Harris, discourse is defined in simple terms here as "a string of linguistic forms arranged in successive sentences" (Harris, 1952).

to the phenomenon (OcCC, 2007, 2008). With its Energy2000 programme, which was established in 1990, Switzerland was one of the first countries in the world, along with Norway, to decide to implement national measures aimed at reducing CO_2 emissions (mitigation). However, over 20 years later, unlike most European Union countries, Switzerland still does not have a national climate change adaptation policy.[7] The National Council, the lower house of the Swiss Federal Assembly, recently refused to add an article dealing specifically with adaptation (31.05.2010) to the revised version of the CO_2 Act; the article in question would have given the federal state the power to act in this area.[8] Formal adaptation policies do not exist at cantonal level either. Of course, Switzerland has natural hazard management policies, however these do not involve adaptation in the strict sense as, in reality, the natural hazard management policies only cover extreme climate events and not the long-term impacts of changes in climate conditions. Moreover, natural hazard management policy has not yet been modified with a view to taking the emergence of new climate risks into account. Hence, Switzerland corresponds typically to a case with very high adaptive capacity as measured by macro-indicators (Yohe, Malone et al., 2006) but which also displays significant difficulties in terms of the adaptation policy development process. In this context, the analysis of the perceptions of actors involved in the decision-making process may help to explain the reasons why resistance to the implementation of adaptation measures emerges.

We basically used two types of data to carry out our analysis: first, Federal Council dispatches in relation to climate change issued between 1987 and 2009, that is a period ranging from the emergence of this problem on the political agenda up to the current debates; and, second, the responses of the main political parties and interest groups provided as part of the consultation procedure on the revision of climate policy in 2009. These two sets of data allowed us to carry out a diachronic analysis of the executive's discourse on climate change and to examine at the same time the differences in the discourses of the main political forces in Switzerland.

The data are analysed using a method akin to content analysis and based on the use of textual analysis tools. The main topics that feature in the discourse about climate change are first identified using a qualitative analysis and the importance of these topics and the relations between them are then explored using different statistical tools and presented in the form of "conceptual maps" which facilitate the interpretation of the data. Hence what is essentially involved here is an exploratory research study,[9] which aims to generate hypotheses on the reasons why the decision-making process in the area of climate change adaptation in Switzerland appears to encounter significant obstacles.

This article is organised as follows: the first theoretical section discusses the role played by perceptions in the decision-making process and presents our working hypotheses on the factors likely to influence the decision-makers' perception of climate change adaptation (Chapter 2). We then describe our data and the analysis method used (Chapter 3). This is followed by a presentation of our findings (Chapter 4) and, finally, a discussion of their significance (Chapter 5).

2. Theoretical elements and hypotheses

The purpose of this chapter is to explore the concept of "barriers to adaptation", as proposed by the IPCC, in the decision-making context. We present in brief a model that describes how the

7 A climate change adaptation strategy is under development and should be finalised by the end of 2011.
8 At the time of writing, the Council of States was due to pronounce on this question.
9 According to Brier, it is, however, possible to use textual statistical procedures for confirmatory ends (Brier, Hopp, 2011) or to use them in conjunction with other confirmatory statistical methods.

perceptions of decision-making actors can block the policy development process and then present our working hypotheses regarding the ways in which the decision-makers perceive adaptation.

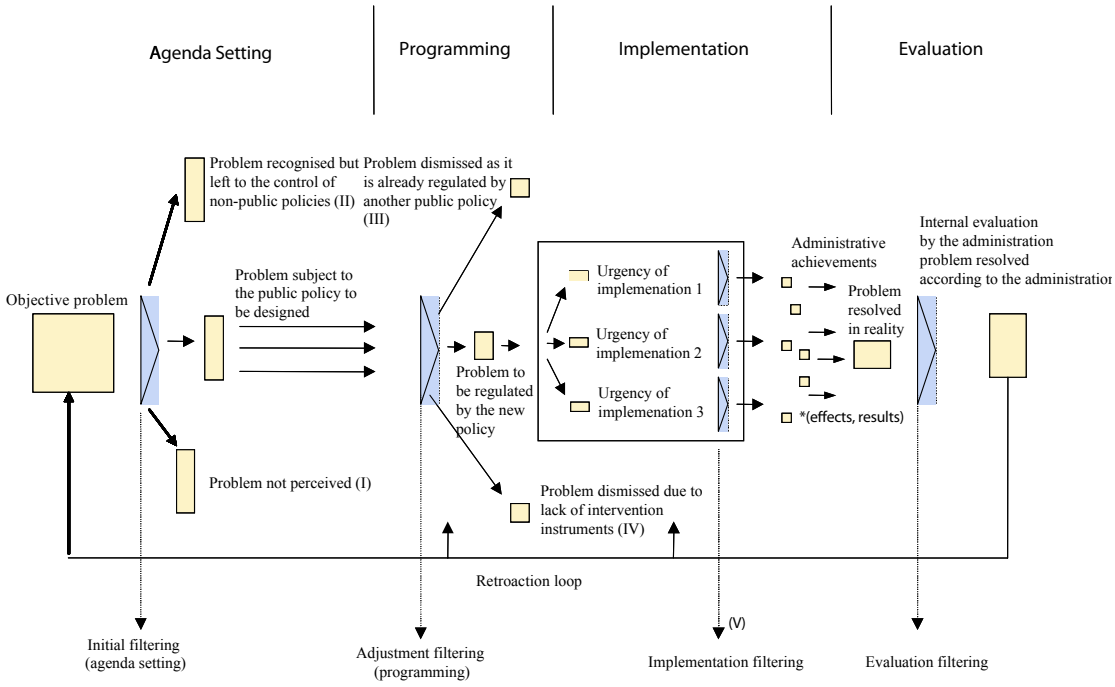
Filtering mechanisms in the policy development process

Knoepfel, Larrue et al. consider that the main aim of public policies is to resolve social problems, that is real social conditions that are considered problematic (Knoepfel, Larrue et al., 2001). However, as stressed by the majority of the studies on agenda-setting carried out in the political sciences, the objective existence of a social problem does not necessarily lead to the implementation of measures. Hence the State does not respond to all problematic situations by modifying existing policies or creating new ones.

Thus, many authors have developed – in part contradictory – models to explain the origin of policy change (for a review of the literature, see, in particular: Sabatier, 1991; Howlett, Cashore, 2007). In Sabatier's (1988) view, in order for a change in policy to arise, coalitions of dominant actors within the decision-making process must perceive the need for the change and work towards this change within decision-making arenas. As a result, the decision-makers' perception of the importance of a social problem and of the need for public action plays a fundamental role in the explanation of the end products of public action.

Hence, depending on the perceptions of the dominant actors in the decision-making process, various "filtering mechanisms" may result in a problem never being tackled through the implementation of additional public measures (cf. Figure 1). At the end of the policy agenda-setting phase, the very existence of the problem may be denied by the dominant coalitions (I); or the latter may recognise the existence of the problem but decide that state intervention is not necessary or that the resolution of the problem is a matter of individual responsibility (II). In addition, in the course of the programming phase of a policy response, the actors may consider that the problem will be regulated by an existing public policy (III) or that the State cannot do anything to improve the situation (IV). Finally, even if a political programme is established, effective implementation is not yet guaranteed. Policy programmes always leave a certain scope for manoeuvre to the actors responsible for the implementation of the policy in question. Hence, the latter can slow down or block the implementation of measures in the case of policies that they do not consider urgent or which they assess as being incompatible with the local policy agenda (V).

Figure 1: Filtering mechanisms in the policy development process



Source : (Knoepfel, Nahrath et al., 2010)

In the case of climate change, the fact that a mitigation strategy has been implemented but an adaptation policy has not suggests that, for reasons that remain to be explored, the relevant decision-makers doe not perceive the local impacts of climate change as an urgent problem. Adopting the literature on agenda-setting as a basis, we present certain theoretical elements below that could explain why climate change adaptation does not appear to be perceived as being as important an issue as mitigation.[10]

Hypothesis no.1: Global impacts vs. local impacts

One of the conditions necessary for the inclusion of given object in the policy agenda is its expression and adoption by social groups (Gusfield, 1984). Hence, Sabatier stressed the need for organised coalitions of actors to put pressure on the State to propose a response to a problematic situation (Sabatier, 1988).

The studies carried out on the perception of the problem of climate change indicate that the general public and the media are aware of the risks posed by climate change to the extent that their discourses sometimes borrow from the discursive repertoire of catastrophism (Ereaut, Segnit, 2006). However, according to Weber, the threat has not yet been perceived sufficiently strongly for it to trigger the necessary action or real mobilisation within civil society (Weber, 2006).

[10] Given the number of factors that may potentially influence the perceptions of decision-makers, we cannot make any claim to exhaustiveness here. Hence, scientific incertitude and cost-benefit calculations were not taken into account in the context of this study.

In addition, the studies carried out by Leiserowitz on the American public show that, even when people fear climate change, they are convinced that its negative consequences can only arise elsewhere (Leiserowitz, 2006). Hence, the general public appears to assign a lower priority to the problem of climate change than to other more local environmental problems, for example, water pollution (Leiserowitz, 2007).

Although all social problems are reformulated by the decision-makers on the basis of their own interests and perceptions (Dery, 1984) and, as a result, the political definition of a social problem is relatively divorced from its formulation within the public arena (Elder, Cobb, 1983), it is entirely possible that the decision-makers also believe that the risks posed by climate change at local level are negligible (*Hypothesis 1*). This would explain, in part, why the principle of a national adaptation policy is still contested in Switzerland while a national mitigation policy has already being implemented.

Hypothesis no. 2: Adaptation and partisan affiliation

Given that all social problems are reinterpreted and reformulated by decision-makers, the latter's political preferences affect their perception of the urgency of a social problem and the priority to be given to its resolution (cf. : Jacobs, 2009).

The theory of "post-materialism" advanced by Inglehart (1977) suggests that the defence of the environment is one of the new aspirations adopted by the citizens of developed countries, whose purely "materialistic" needs have already been satisfied. These new post-materialist values would be frequently – although not exclusively – associated with a left-wing electorate of affluent social origins (Inglehart, 1985). According to several studies carried out on Switzerland, environmental topics mainly feature in the political programmes of the Social Democratic Party and the Green Party (Sciarini, Finger, 1991; Finger, Hug, 1992; Hug, Schulz, 2007). Therefore, it may legitimately be postulated that membership of these parties or a more general affiliation with the left implies a greater awareness of the importance of the problem of climate change; this has been confirmed, moreover, by the studies carried out by Karin Ingold on the actor coalitions at work in the Swiss climate policy development process (Ingold, 2008, 2010).

From a theoretical point of view, it is less easy to determine how political preferences could push decision-makers to prioritise adaptation over mitigation or vice versa. This is a topic that has not yet been dealt with in the literature. Downs's concept of the strategic behaviour of political parties can however enlighten us in this regard (Downs, 1957). According to this author, political parties mobilise the topics that they believe to have most appeal on the political scene so as to attract the maximum possible number of voters (median voter theorem). Climate change mitigation, that is the reduction of greenhouse gas (GHG) emissions, has the advantage of being a political topic that can be mobilised by rather wide-ranging social forces, irrespective of their position on the left-right spectrum. In effect, for some, the battle against greenhouse gas emissions can only be won through the complete reorganisation of the capitalist consumer system while, for others, the growth and development of technology are the best guarantors of an economic development that generates low CO_2 emissions. In this respect, the debate surrounding mitigation arises in similar terms to the debate on "sustainable development" (Sathaye, Najam et al., 2007). The reduction of GHG emissions may, therefore, be equally well defined by parties of a liberal orientation and by movements on the extreme left. Moreover, because the reduction of the GHG emissions of Western countries represents a major challenge in relation to North-South equity (see in particular: Grubb, 1995), mitigation policies are often justified in terms of the West's "climate debt" towards less developed countries and are hence supported by actors from the development cooperation and missions sectors. As opposed to this, adaptation is based on conceptions of the environment that are directly inspired by Holling's political ecology (Barnett, 2001). The definition of preventive adaptation strategies by the State is philosophically based on

the application of the precautionary principle which is habitually defended by the environmental protection associations and reflects a certain ideological position. The adoption of preventive adaptation measures by the State also assumes a planning and centralising character, elements which right-wing parties tend to oppose. Hence, in developed countries with a liberal tradition, adaptation has frequently been considered as the duty of private individuals and not as a task that should be assumed by the State (Smit, Pilifosova et al., 2001). Therefore, the defence of the implementation of anticipatory adaptation strategies implies the support of the values of political ecology and the acceptance of the interventionism of the State, which is likely to render this topic less appealing to the political scene than mitigation which is less ideologically loaded. We would suggest, therefore, (*Hypothesis 2*) that the importance given to adaptation varies according to the political preferences of decision-makers and that the problem of the local impacts of climate change is probably highlighted by the Socialist Democratic Party and the Greens, the political parties in Switzerland that are most open to ecologist theories (Sciarini, Finger, 1991; Hug, Schulz, 2007).

Hypothesis no 3: Adaptation and external influences

According to Sabatier, external socio-economic dynamics and the decisions taken in other political systems are among the main factors that explain political change in a given unit of analysis (Sabatier, 1991). Hence, from the perspective of the evolution of the international political framework in relation to adaptation over the past ten years, it is likely that Swiss decision-makers currently perceive adaptation as a more important topic than when it emerged on the international political agendas in the 1990s.

In effect, the UNFCCC of 1992 and the Kyoto Protocol of 1997 mainly concern the mitigation of climate change and adaptation plays a relatively secondary role in these treaties (Klein, Huq et al., 2007). The definition of national GHG emissions reduction targets in the context of the Kyoto protocol forced Western countries to create mitigation policies. In contrast, clear targets in relation to adaptation have not been defined at international level and this has contributed, without doubt, to the dely in the development of adaptation policies in developed countries.

However, adaptation has occupied a growing place on the international political agendas since the late 1990s when countries that are very vulnerable to the effects of climate change (in particular small coastal states) began to exert pressure to ensure that adaptation be dealt with as a matter of priority (Oberthür, Ott, 1999). Since then, adaptation has become one of the most important and most openly discussed topics in the negotiations between the UNFCCC parties (Schipper, 2006), and the provisions in relation to adaptation have gained significantly in importance since the agreements reached under the Marrakech Accords in 2001. As already mentioned in the introduction, this new dynamic surrounding adaptation can also be observed in European Union countries. With regard to the scientific world, the research on adaptation also increased exponentially between 1991 and 2005 (Dessai, van de Sluijs, 2007). The knowledge of the associated risks has improved considerably thanks to the proliferation of studies on vulnerability and the emergence of accurate climate forecasting models at regional level. Hence, it is possible to refer to the existence of an *international epistemic community* (Haas, 1989, 1992) which is generating pressure for the development of a public solution in the area of adaptation.

It is likely that the Swiss political actors are being influenced by the growing significance of adaptation in both scientific arenas and the policy field of the European Union through the phenomena of the *diffusion* (Simmons, Elkins, 2004) or *internationalisation* of public policies (Fischer, 2006), and through the opening up of what Kingdon refers to as a large *policy stream* (Kingdon, 1984). Therefore, we would suggest that adaptation has undoubtedly gained in importance over time in the views of climate change held by Swiss policy actors (*Hypothesis 3*).

3. Method, lexical dimensions and data

In the following sections we will describe our method of analysis, the lexical dimensions we deployed for the analysis and the data used.

Computer-aided textual analysis

Computer-aided textual analysis is based on the same presuppositions as content analysis. The words in a text are viewed as having an objective meaning. Therefore, it is possible to identify words, expressions or sentences relating to a particular sense or topic in the text being analysed without necessarily knowing the social context of their production.

Based on this, there are several ways of carrying out statistical analysis of a text. The most simple and traditional procedure probably consists in counting the number of occurrences of a specific topic in the discourse. The frequency of occurrence of a word or topic is considered as an indicator of its importance (Lacity, Janson, 1994). This type of methodology was used, for example, by Agrawala and Gagnon-Lebrun to determine the importance of adaptation in the reports submitted by OECD countries to the secretariat of the UNFCCC (Gagnon-Lebrun, Agrawala, 2006). Exploratory techniques such as multiple correspondence analysis can also be used in this context. These procedures enable the comparison of discourses while also calculating the profile of the texts based on the frequency of occurrence of certain topics. The results are produced in visual form and the differences between the texts are represented in terms of distance. Hence, the possibilities for visualisation offered by analysis of the content greatly facilitate the task of interpreting the data.

However, if counting occurrences has the advantage of being a very simple and fast way of analysing large corpuses of data and of identifying key topics, the measurement of the importance of a topic on the sole basis of its frequency of occurrence is problematic in several respects. First, this type of method suffers from a problem inherent to language, that is that the distribution of words is far from "standard". In effect, it follows Zipf's law which essentially explains that, in the majority of languages, the ten most frequent words (in English: the, be, of, and, to, a, in, have, that and it) may constitute up to a quarter of the words in a text (Lowe, 2003). Therefore, the frequency of occurrence of a topic in a text always depends, in part, on the banality of the use of the words used to measure it, a problem that can only be controlled for in part by selecting terms whose frequency of distribution in the language is comparable. Second, the postulated equivalence between the frequency of occurrence of a word or topic in a discourse and its importance is, of course, a rather naive presupposition. By taking the word or lexical field as the main unit of analysis and ignoring the social context of the production of the discourse, this type of analysis does not enable the consideration of the dynamics that underlie the language and choice of words used. (Lacity, Janson, 1994). It is practically impossible to take lying, omission or strategic behaviour into account if the researcher has no idea of the power games, in the context of which the discourse is produced or the strategic objectives of its author or authors.

More complex methods have been developed in response to these criticisms. Instead of calculating the frequency of occurrence of certain topics, it is now possible to measure their degree of association. This approach is based on linguistic theories which consider that the words and concepts whose meanings are associated tend to appear in clusters which display a certain proximity in texts (Brier, Hopp, 2009). Hence, it is possible to calculate the probability with which a topic or word will trigger the appearance of another in a close context and this provides information about the associations of ideas made by the author of the discourse. This kind of analysis is less sensitive to Zipf's law as the degree of association between two terms is dissociated, in part, from their respective frequency of occurrence. Moreover, this method is less positivistic as the study of the associations of ideas in a text enables the measurement of the forms

of linguistic habitus that reflect the subjective construction of the object under examination by the author (Reinert, 2003).

The implementation of this method is of interest in political science research when the objective is to identify the meanings or values that the actors associate with a particular word, expression or topic. Hence, using such methods, Judith Bara and Albert Weale showed that during the parliamentary debate of 1966 on abortion in England, the vocabulary of the opponents of the liberalisation of abortion was essentially associated with moral arguments while the discourse of the supporters of liberalisation was far more focused on substantive arguments of a medical, social or legal nature (Bara, Weale et al., 2007). Compared to approaches based on qualitative textual analysis, the advantage of this method lies in the fact that it enables the analysis of large corpuses and provides the researcher with a means of assessing the results obtained. Although what is involved here are essentially exploratory tools, certain textual analysis procedures may be used for confirmatory ends or, at least, provide a basis for confirmatory statistical analyses (Brier, Hopp, 2011).

Computer-aided textual analyses can be carried out in two ways. The first involves completely quantitative and virtually automatic methods using software programs such as *Alceste*, which identify the lexical dimensions of the discourse without the intervention of the researcher and based on a purely inductive logic. The disadvantage of this approach is that the dimensions identified are often of little relevance to the meaning of the text, and this sometimes prevents the researcher from interpreting the data in a very relevant way (Brier, Hopp, 2011). The second involves mixed and semi-automatic methods based on a more hypothetical-deductive logic, in which the theory along with preliminary qualitative analysis guide the constitution of the different lexical dimensions of the analysis by the researcher. The weakness of this approach lies in the fact that the reliability of the method depends to a great extent on the researcher's knowledge and the quality of the lexis he or she produces. The researcher must ensure that the words he or she uses to capture a specific topic do not reflect his or her own views. What is involved here is the classical problem of intercoder reliability which necessitates, as a result, that the coding of the proposed topics be checked by at least two people and that sufficient consensus is attained (cf. : Neuendorf, 2002). On the other hand, as the constitution of the lexis is guided by a research question, the heuristic value of the analysis is often significantly higher.

The authors of the present study opted for a semi-automatic procedure and the topics and lexical dimensions of the analysis were constructed by one author on the basis of a reading of the main publications on Swiss climate policy (Sager, 2006; Thalmann, Baranzini, 2006; Ingold, 2008) and followed by a qualitative analysis of the corpus of texts. The proposed lexes were then presented to the second author for revision. The intercoder reliability of the lexes was then evaluated using the Holsti coefficient which yielded a score of 0.95; this corresponds to a high level of agreement between the two coders and should ensure sufficient reliability of the lexis (cf. Neuendorf, 2002).

We used two types of measurements in our analyses. First, the importance of the topics in the discourse was evaluated on the basis of their frequency of occurrence. We also implemented a multiple correspondence analysis[11] which facilitates the interpretation of the data and enables the attribution of the variance between the texts to precise variables. Second, we measured the degree of association between the topics with the help of the software program *Hamlet III* so as to study the associations of ideas in greater detail. *Hamlet III* begins by dividing the text into units of 120 words;[12] the probability with which the presence of a topic in a textual unit involves another is then calculated for all of the texts with the help of the standardised JACCARD coefficient of similarity, in accordance with the formula:

[11] Produced using Hamlet III's "multiple correspondence analysis" procedure.
[12] This is the size usually used in psycho-sociological studies (Brier, Hopp, 2008).

$$E(s_{ij}) = \frac{f_i f_j}{t(f_i + f_j) - f_i f_j}$$

where f_i and f_j correspond to the frequency of the occurrence of the topic $_i$ and of the topic $_j$, $f_i f_j$ to the frequency of the combined occurrences of the two topics and t to the total number of textual units.

This measurement of the degree of association may be expressed visually using the multidimensional scaling procedure.[13] In addition, the connection between the topics may be analysed simultaneously in several texts by producing an "average" image of the relations between them.[14] In contrast to multiple correspondence analysis, the disadvantage of this method is that the dimensional space in which the associations are expressed is generated in a completely arbitrary manner and cannot easily be interpreted or related to explanatory variables (cf.: Kriesi, Grande et al., 2006).

Lexical dimensions of the discourse on climate change

We identified seven main topics in the discourses on climate change.

The phenomenon of climate change and its institutions. When actors refer to climate change they use a group of relatively neutral terms which describe the phenomenon in purely physical terms, i.e. "climate system", "global warming", "mean increase in temperatures" etc., or the institutions that characterise it at international level, i.e. "Kyoto protocol", "United Nations Framework Convention on Climate Change". This lexical field constitutes a referent, with which the decision-makers associate various other topics.

Mitigation. A significant part of the debate on climate protection in Switzerland is focused on the selection of instruments to be used in the reduction of CO_2 emissions. This debate rapidly mobilised, on the one hand, economic circles, which fought for the emissions reductions to be carried out on a voluntary basis, and an ecologist coalition, on the other, which demanded the levying of a mandatory tax on fossil fuels (Ingold, 2008). The debate also concerned the places in which the reduction in CO_2 emissions should be concentrated. The coalition that was closely aligned with economic circles proposed the compensation of emissions abroad while the ecological circles demand that efforts be made to reduce emissions in Switzerland.

Adaptation. The decision-makers also refer to the need to adapt to the inevitable impacts of climate change. The terms vulnerability, sensitivity and exposure are used to qualify the fact that the impacts of climate change constitute a threat to certain sectors of activity and certain geographical areas.

The *impacts in Switzerland.* Concern about the specific risks posed by climate change for Switzerland is perceptible in the texts. The consequences of climate warming for, among other things, soil stability, snow mass, winter tourism, agricultural production and the risk of flooding, are mentioned. Fears of extreme weather events such as Storm Lothar are also referred to.

North-South equity. Decision-makers also refer to the problems associated with climate change in the countries of the southern hemisphere. They note, in particular, the damage that climate warming will cause in developing countries or, again, the international security challenges that would undoubtedly be triggered by migratory waves and the scarcity of primary resources in the

[13] SPSS's Proxscal procedure
14 Hamlet III's PINDIS procedure

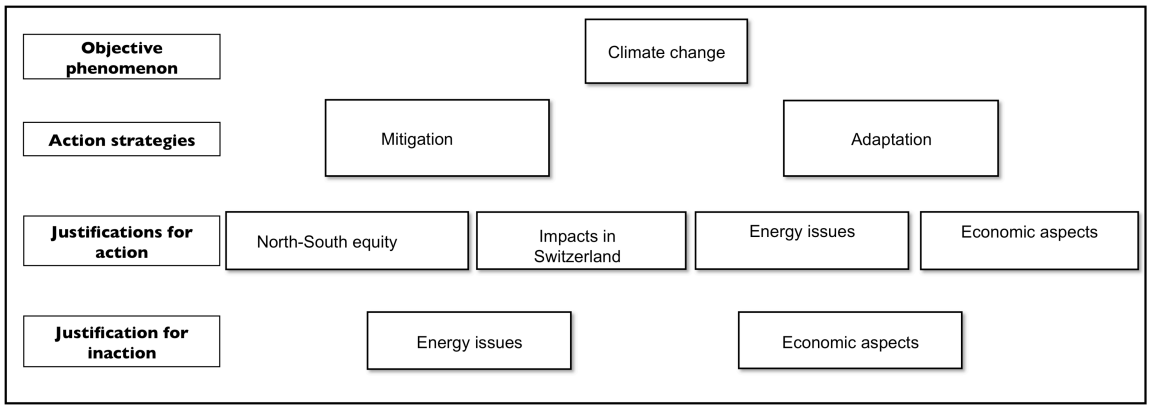
countries of the South. Concepts of ethics, solidarity and moral duty are also mentioned with a view to reminding people of Switzerland's responsibility towards developing countries.

The energy issues. Energy supply occupies a central place in the discourses surrounding climate change. In effect, the laws on climate protection arose historically from energy policies (Thalmann, Baranzini, 2006 ; Sager, 2006). The political actors are very concerned about developing Switzerland's energy supply which they consider to be insufficient. The choices between nuclear power, natural gas and renewable energy sources and their impacts on the climate are the subject of intensive debate.

The economic aspects. The potential costs of climate policy have prompted concerns in economic circles and constitute a significant element of the discussions on the strategies and tools to be used to combat the increase in CO_2 emissions in Switzerland (Ingold, 2008). The idea that the battle against climate change poses a threat to Switzerland's economic competitiveness and risks causing unemployment, the stagnation of economic growth and deterioration in the quality of life is very prevalent. The argument, according to which the battle against climate change could also stimulate the economic and constitute a benefit in the long term is also mentioned, although it is arises less frequently than the opposing view.

These topics assume particular functions in the discourse (Figure 2). Both mitigation and adaptation correspond to the two action strategies to combat climate change. North-South equity and the local impacts of climate change are generally referred to justify the need for strong policies against climate change. The economic aspects and energy issues are alternately mobilised as justifying action but also (and more frequently) inaction.

Figure 2: Topics that feature in the discourse on climate change and their functions



The identified topics were then decomposed into keywords[15] which provided the basic units, on which the various statistical analyses were carried out.

Analysed data

We created a database of all of the documents directly related to climate policy that were produced by Swiss political actors between 1987 and 2009. For the specific requirements of this article, we only used two sets of data, however, which were selected on the basis of three main criteria. First, the documents had to be of sufficient length for the statistical textual analysis to provide valid results. Second, as we are studying the actors and conceptions that they associate with the phenomenon of climate warming, we voluntarily excluded the documents that were too

[15] The full list of keywords is provided in the Annex.

technical in nature, such as laws and decrees, and only retained the documents of an argumentative nature. Finally, the data had to be able to be processed as a temporal series and enable the synchronous analysis of the influence of political affiliation.

Our first set of data comprises dispatches of the Federal Council. The Federal Council is the executive body in Switzerland that initiates most of the country's legislation. For every bill it proposes, the Federal Council provides an argumentative dispatch of around 100 pages in length, which presents the reasons for which the activation of a legislative response is necessary. These dispatches constitute the most complete temporal series available to us. The size and function of the dispatches also renders them ideally suited to the analysis of the ideas held by decision-makers in relation to climate change over the course of time (Hypotheses 1 and 3).

In order to explore Hypothesis 2 regarding the possible influence of political affiliation on the formulation of the climate problem, we use a second set of data comprising the arguments formulated by the political parties and interest groups in response to the consultation procedure on climate change initiated by the Federal Council in 2009. The consultation of interest groups and parties by the federal authorities prior to the presentation of a preliminary draft of a law is standard procedure in Switzerland. It aims, in particular, to reduce the conflictiveness of the proposed text and hence facilitate the subsequent acceptance of the law by the parliament (Klöti, Knoepfel et al., 2006). The bill for the revision of the CO_2 Act contains an article on adaptation and various propositions regarding the extension of the mitigation strategy for the post-Kyoto period from 2012. These documents provide excellent material for comparing the stances adopted by the parties as they were produced at the same time in response to identical questions. Hence, partisan affiliation is the only factor that could explain the differences between the concepts of adaptation presented by the parties. We took into account the arguments of the five main political parties (Social Democratic Party (SPS/PSS), Swiss People's Party (SVP/UDC), The Liberals (FDP/PLR), Christian Democratic People's Party (CVP/PDC), The Green Party (GLP/PVL)), as well as those of the Christian Social Party (parti chrétien social, PCS) whose arguments fulfilled the size criterion. We also included certain interest groups which we judged to be representative of the main social forces involved in the conduct of climate policies in Switzerland, subject to the condition that their responses were sufficient in length. The groups in question are: EconomieSuisse (umbrella organisation representing Swiss business), the World Wildlife Fund (WWF), Constructionsuisse (umbrella organisation representing the Swiss construction sector), ASTAG (Swiss road hauliers' association) and the FEPS (Federation of Swiss Protestant Churches). As the results of the parliamentary votes of the National Council on the introduction of an article on adaptation into the CO_2 Act (Conseil National, 31.05.2010) were also available to use, we were able to compare the results of the analysis of the party discourse with their actual voting behaviour.

4. Results

Perceptions of climate change over time: analysis of the Federal Council dispatches (data set 1)

Table 1: Frequency of occurrence of topics in Federal Council dispatches in percent

Texts	Adaptation	Mitigation	Economic aspects	North-South Equity	Impacts in Switzerland	Objective Phenomenon	Energy Issues	N
Dispatch on a constitutional article on energy, 1987	0	14.04	12.28	1.17	0	1.75	70.76	**171**
Dispatch concerning a Federal decree for the economic and rational use of energy, 1988	0	10.14	18.84	2.9	0	2.9	65.22	**69**
Dispatch concerning the United Nations Framework Convention on Climate Change, 1993	3.03	4.55	2.02	16.67	3.03	60.1	10.61	**198**
Dispatch concerning the Energy Act, 1996	1.23	8.44	32.1	0.82	0	5.76	51.65	**486**
Dispatch concerning the Federal Act on the Reduction of CO2 Emissions, 1997	3.39	47.06	13.12	0.9	4.3	22.85	8.37	**442**
Dispatch concerning the Kyoto Protocol to the United Nations Framework Convention on Climate Change, 2002	3.3	16.3	5.51	4.41	5.07	59.69	5.73	**454**
Dispatch concerning the approval of the sum of the levy on CO2 applied to fossil fuels, 2005	1.02	52.03	11.17	1.27	1.02	28.17	5.33	**394**
Dispatch concerning climate policy after 2012, 2009	6.54	28.46	10.25	3.27	1.42	42	7.85	**917**
N	18.51	181.02	105.29	31.41	14.84	223.22	225.52	3131.00
Average	**3.39**	**26.48**	**13.25**	**3.19**	**2.08**	**32.64**	**18.97**	**100**

We used the dispatches of the Federal Council concerning climate change to identify and evaluate the most important dimensions of the discourse. We also examined the ways in which the conceptions of mitigation and adaptation differ and the phenomena with which the decision-makers associate these policies (Hypothesis 1). Finally, we attempted to identify eventual tendencies and trends over time (Hypothesis 3).

Table 1 tells us about the frequency of occurrence of the topics under investigation in the despatches of the Federal Council. Unsurprisingly, the phenomenon of climate change is the topic most frequently mentioned (32.67% on average) and is followed by mitigation (26.50%), energy issues (18.99%), economic aspects (13.27%), adaptation (3.39%), North-South equity (3.10%) and, finally, impacts in Switzerland (2.08%). In accordance with our initial hypotheses, mitigation occupies a far more prominent place in the discourse of the Federal Council than adaptation. Moreover, the impacts in Switzerland or North-South equity are less frequently mentioned in the justification of the adoption of policies to combat climate change than economic aspects or energy issues.

With regard to the importance attached to adaptation over the course of time, apart from the fact that the last dispatch of the Federal Council mentions adaptation significantly more often than the other texts (6.54%), no clear tendency emerges from our data. The hypothesis of an increase of the importance in adaptation in the discourse on climate change cannot, therefore, be confirmed on the basis of Federal Council dispatches. In order to facilitate the identification of other eventual variations between the dispatches of the Federal Council, we carried out a multiple correspondence analysis (Figure 3) which enabled us to obtain a visual representation of the main differences between the texts, calculated on the basis of the frequency of occurrence of the topics under examination.

Figure 3: Multiple correspondence analysis of Federal Council (CF) dispatches

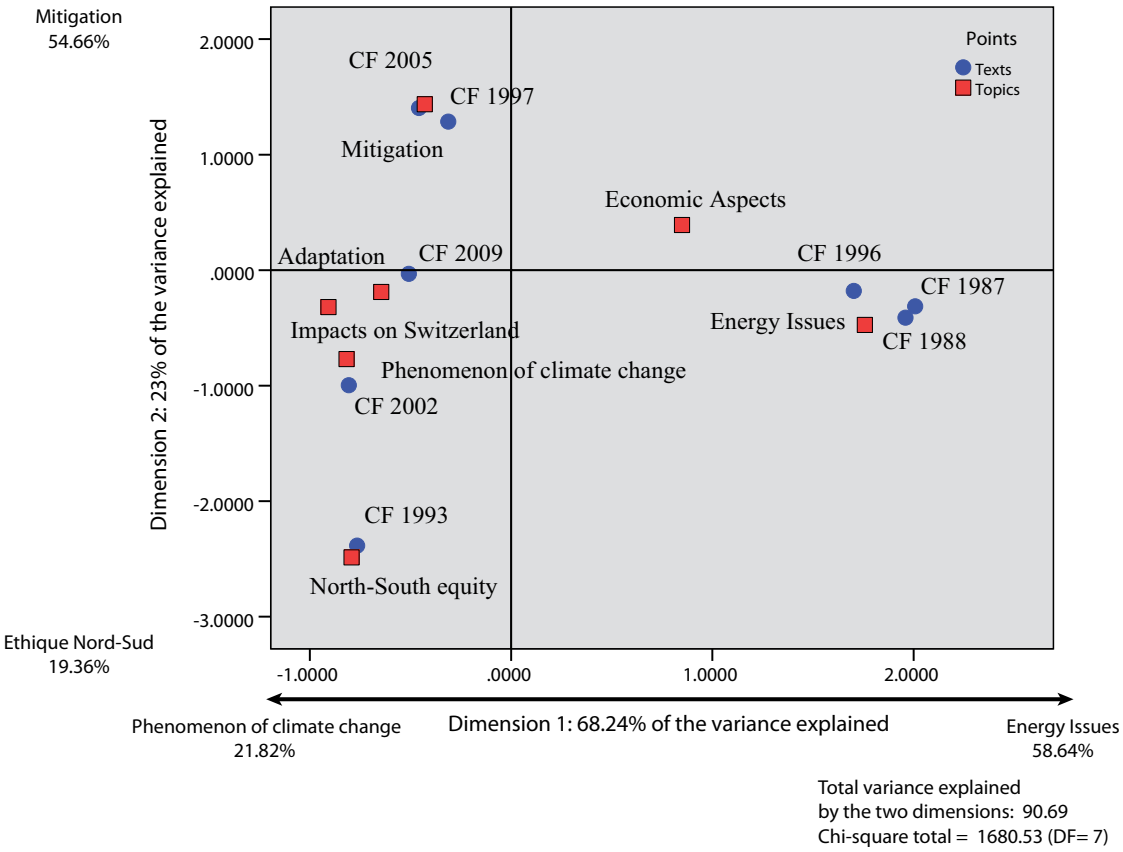
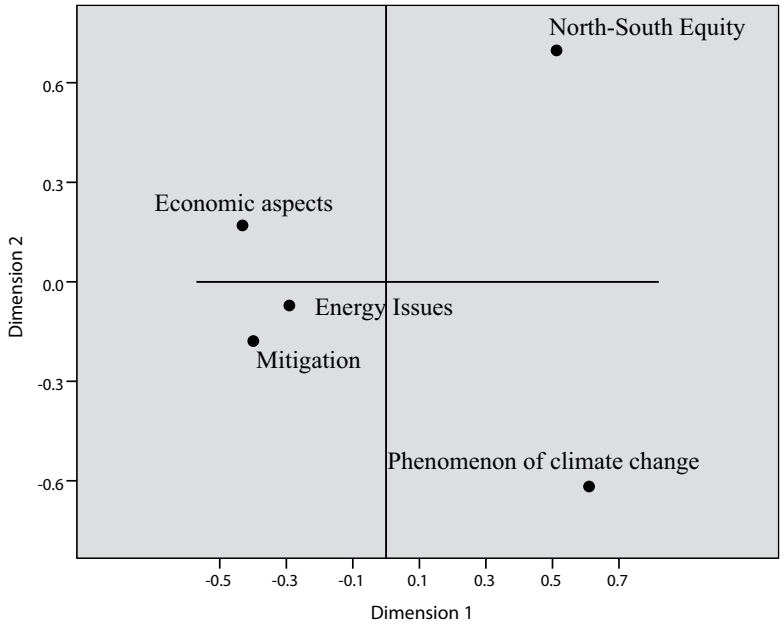


Figure 3 suggests that the Federal Council dispatches mainly differ in terms of the importance they accord to the topics of energy issues and the phenomenon of climate change (Dimension 1). Hence, the dispatches of 1987, 1988 and 1996 differ from the others in terms of the significance accorded to the energy issue and the weak position occupied by the phenomenon of climate change. Among the remaining texts, the importance accorded to the topic of mitigation is the main factor that explains the variance between the texts with respect to the verticality of the representation (Dimension 2). Thus, the dispatches located in the top left quadrant (2005 et 1997) assign a more prominent place to mitigation while the texts featuring lower down on the vertical axis (2009, 2002, 1993) place a comparatively greater emphasis on the topic of North-South ethics.

Figure 3 illustrates the fact, therefore, that the discourse of the Federal Council evolved considerably from the perspective of the importance accorded to mitigation and energy issues. The dispatches of 1987 and 1988, which correspond historically to the first Federal Council documents that refer to the need to reduce CO_2 emissions, refer very rarely to the phenomenon of climate change. The weak presence of this topic in the discourse suggests that at the time when mitigation appeared on the national political agenda, climate change was not yet perceived as an important problem by the Federal Council.

For the purpose of verifying this hypothesis, we analysed the relations between the topics that featured in the dispatch of 1987 so as to explore in greater detail the way in which the Federal Council viewed mitigation at the time. We measured the degree of association between the topics (Jaccard coefficient) and present the results in visual form with the help of a multidimensional scaling procedure (Figure 4).

Figure 4: Multidimensional scaling, dispatch on a constitutional article on energy, 1987[16]



Stress I : 0.03[17]

Figure 4 demonstrates, therefore, that in this particular dispatch, the idea of reducing greenhouse gas emissions (mitigation) is mainly associated with questions concerning energy, and to a lesser extent to the economic aspects. As opposed to this, mitigation is clearly less associated with the phenomenon of climate change. Hence this representation indicates that when the need to reduce CO_2 emissions was presented by the Federal Council for the first time in 1987, the idea had little to do with the consideration of the risks posed by climate change and constituted instead a response to energy-related imperatives. Hence, this result confirms the conclusions of a recent qualitative study on Swiss climate policy (cf.: Knoepfel, Nahrath et al., 2010) which noted that the measures for the reduction in CO_2 emissions were, in fact, initiated with the aim of ensuring a more autonomous energy supply and not with the aim of protecting the global good of climate.

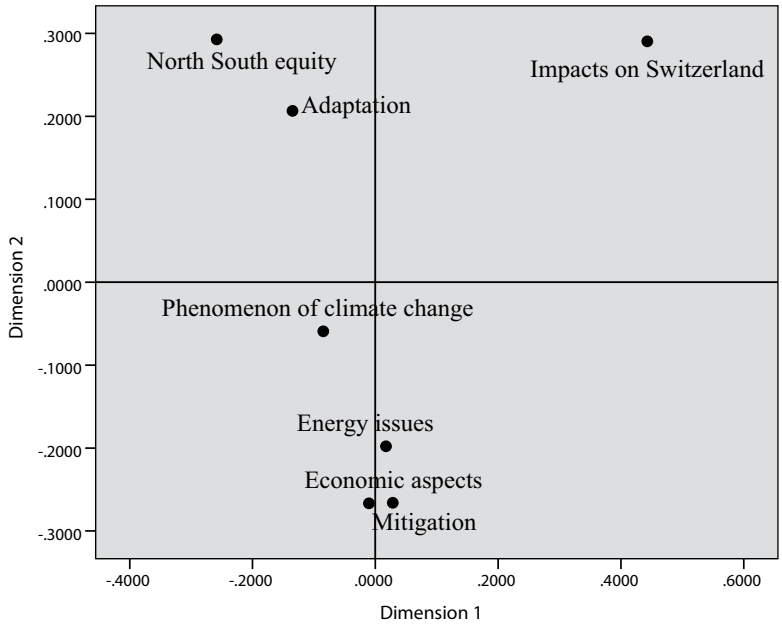
Having analysed the main trends in the discourse of the Federal Council over time, we also examined how the perceptions of adaptation and mitigation differ. Hence we measured the relations between the topics under analysis in the Federal Council and excluded the texts of 1987 and 1988 which presented an excessively particular profile. We reproduced an "average"[18] representation of these relations for all of the texts using the PINDIS procedure provided by Hamlet III.

[16] The topics of adaptation and the impacts on Switzerland are not shown on this diagram as their number of occurrences in the text is equal to 0.

[17] Stress is a measure of the quality of the visual representation in relation to the original data. A stress level of less than 0.15 is considered satisfactory while a level that is lower than 0.05 is indicative of excellence in relation to the reliability of the representation.

[18] The PINDIS procedure provided by Hamlet III takes the multidimensional scaling carried out for each text as a basic unit and produces a general representation which minimises most the differences between each individual text.

Figure 4: Multidimensional scaling of the Federal Council dispatches of 1993-2009[19]



Average stress : 0.00

The structure of the relationships between the different topics in the Federal Council dispatches provides three pieces of information that are central to our topic. First, the distributive aspects and economic consequences of the efforts to reduce GHG emissions are the problems most clearly associated with all mentions of mitigation. The relationship between the GHG emissions reduction strategies and the energy issues also play a central role in the discourse. However, in these texts, the risk posed by the impacts of climate change on Switzerland and the various consequences of climate warming on the countries of the South are hardly related at all to the idea of reducing GHG emissions. This would suggest that such arguments are rarely mobilised to defend the need for restrictive policies in relation to the GHGs.

Second, adaptation is referred to in an extremely different way as it is associated above all with the dimension of justice towards the countries of the South and the risks posed by the impacts of climate change on Switzerland. In contrast, the relationship between adaptation and energy issues or economic aspects is very diffuse. Although several official reports commissioned by the administration demonstrated the impacts of climate warming on the production of electricity (OcCC, 2007, 2008) and the economy (Ecoplan, Sigmaplan, 2007; INFRAS, Ecologic et al., 2007), the Federal Council's dispatches indicate that their authors are unaware of this link or at least fail to express it ostensibly in their discourse. Whether this is a conscious and deliberate strategy on the part of the actors or a problem of information is something that our data analysis method does not enable us to evaluate, however.

Third and finally, adaptation is more frequently associated with the issue of international ethics than with the local impacts of climate change. This result confirms our first hypothesis based on the results of the study carried out by Leiserowitz on the American general public, which indicated that actors have a tendency to view the damage caused by climate change as a risk that mainly affects "others" (Leiserowitz, 2006). As it happens, the Federal Council dispatches

[19] We did not take into account the texts from 1987 and 1988 which do not mention adaptation and are hence of absolutely no relevance in relation to the assessment of the associations of ideas between adaptation and the other topics analysed.

frequently refer to adaptation as a challenge for developing countries and as a necessary strategy in response to the specific impacts of climate change for Switzerland.

Hence, the fact that the impacts on Switzerland are not perceived as an important dimension of climate change and that the links between adaptation, economic aspects and energy issues do not appear to be noticed undoubtedly helps to explain why the implementation of policies for climate change adaptation does not appear to be a matter of urgency in Switzerland.

Perception of climate change, partisan influence and attitude of the political parties to adaptation: analysis of the arguments presented by parties in response to the consultation procedure on the revision of the CO_2 Act (data set 2)

We also tried to establish whether affiliation with the left or right of the political spectrum had an influence on the policy actors' perception of climate change. Hence, we measured the frequency of occurrence of our topics in the responses of the political parties and some interest groups to the consultation on the revision of the CO_2 Act. Table 2 shows our raw results. To facilitate their interpretation, we carried out a multiple correspondence analysis (Figure 4), which enables us to obtain a visual representation of the main differences between the responses of the parties calculated as a function of the frequency of occurrence of each topic.

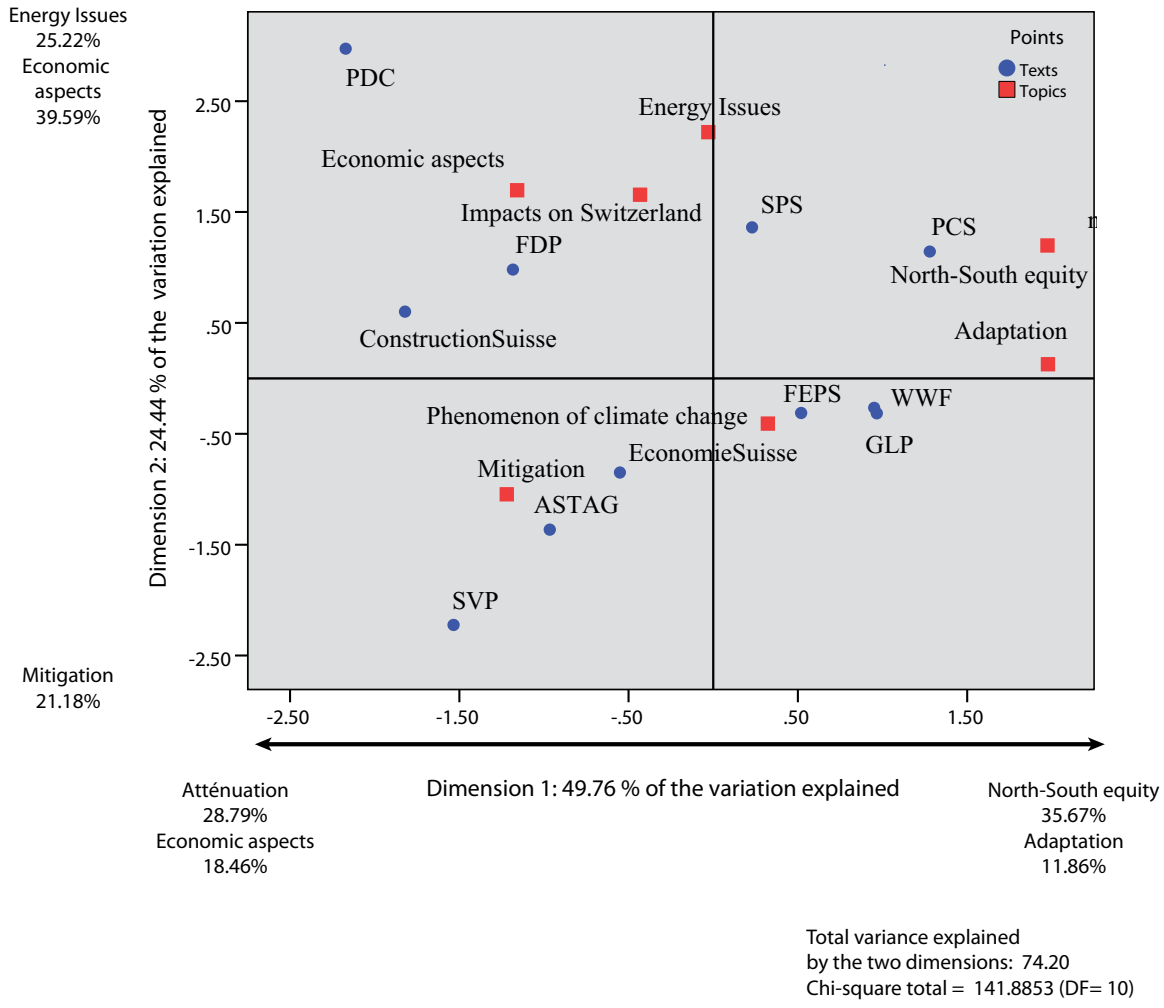
On average, the phenomenon of climate change is the topic most frequently referred to (49.20% of all occurrences), followed by mitigation (19.39%), economic aspects (13.78%), North-South equity (9.13%), energy issues (5.13%), adaptation (3.04%) and, finally, the impacts on Switzerland (0.32%). With the exceptions of North-South equity, which is more prominent in these texts, and energy issues, which feature less prominently, the distribution of the topics is relatively similar to that observed in the Federal Council dispatches.[20] In addition, the impacts of climate change in Switzerland are mentioned significantly less frequently by all of the parties and interest groups in their argumentation on the revision of the CO_2 Act.

[20] Due to the brevity of some of the party responses, the statistical quality of these analyses was poorer than that of the previous data set. This is particularly true of the CVP's text, the brevity of which is problematic. The relatively high number of zero values in Table 2 also means that the quality of the spatial representation proposed by the multiple correspondence analyses is not as high as that obtained for the previous data set (74.20% as compared to 90.69%).

Table 2: Frequency of occurrence of topics in the responses of the political parties and interest groups to the consultation procedure for the revision of the CO_2 Act

Parties and interest groups	Adaptation	Mitigation	Economic aspects	North-South equity	Impacts on Switzerland	Phenomenon of climate	Energy issues	N
ASTAG	0.00%	37.50%	7.50%	0.00%	0.00%	52.50%	3.33%	**40**
ConstructionSuisse	0.00%	36.67%	30.00%	0.00%	0.00%	26.67%	6.67%	**30**
EconomieSuisse	1.75%	24.56%	12.28%	0.00%	0.00%	59.65%	3.33%	**57**
FEPS	1.28%	20.51%	6.41%	17.95%	0.00%	46.15%	20.00%	**78**
GLP	4.82%	8.43%	10.84%	15.66%	0.00%	60.24%	0.00%	**83**
PCS	15.38%	11.54%	7.69%	15.38%	0.00%	38.46%	10.00%	**26**
CVP	0.00%	25.00%	50.00%	0.00%	0.00%	12.50%	3.33%	**8**
FDP	0.00%	20.25%	30.38%	0.00%	0.00%	43.04%	16.67%	**79**
SPS	5.19%	11.69%	16.88%	10.39%	2.60%	41.56%	30.00%	**77**
SVP	0.00%	25.00%	12.50%	0.00%	0.00%	56.25%	6.67%	**32**
WWF	4.31%	10.34%	6.90%	15.52%	0.00%	59.48%	13.33%	**116**
N	19	121	86	57	2	307	32	**624**
Average	**3.04%**	**19.39%**	**13.78%**	**9.13%**	**0.32%**	**49.20%**	**5.13%**	**100%**

Figure 5 : Multiple correspondence analysis, parties and interest groups



The main differences between parties are mainly explained by the horizontal axis (49.76% of the explained variance). Hence, the parties and interest groups located in the right hemisphere of the diagram tend to lend greater importance to the topics of North-South equity (the frequency of occurrence of this topic explains thus 35.67% of the variance from Dimension 1) and adaptation (11.86%). The proximity between the points "North-South equity" and "adaptation" indicates, moreover, that the texts that mention one of these topics also mention the other. Conversely, the texts located in the left hemisphere of the diagram tend to give grater priority to mitigation and to the economic aspects.

Hence, Figure 5 indicates that there is indeed a division between the parties and interest groups that assign a degree of importance to adaptation and the principles of North-South equity (Green Party WWF, PCS, FEPS, and SPS) and those whose discourse is far more focused on mitigation and the economic aspects of climate change and which say little or nothing about adaptation and North-South equity (EconomieSuisse, Astag, ConstructionSuisse, PLR, CVP[21] and SVP). This division of the parties on dimension 1 of Figure five appears to coincide largely with their positioning on the left-right spectrum.

[21] The position of the CVP, whose value is situated on the extreme left of dimension 1, probably owes much to the fact that this party's text is too short.

In order to illustrate this phenomenon more clearly and to be able to account for the relationship between the discourse on adaptation and effective action on the part of the parties, we compare the positioning of the parties along three axes: the perception of adaptation as evidenced by their discourses, their left-right positioning and, finally, the voting behaviour of the parliamentarians from these parties.

As an indicator of the perception of adaptation we took the degree of association between the topic of climate change and the topic of adaptation (Jaccard coefficient). This indicator measures the probability that the presence of the topic "phenomenon of climate change" in the discourse triggers the occurrence of the topic "adaptation" in a close context[22] (and vice versa). Hence our indicator measures the extent to which the actors make the link between climate change and the idea of adapting to it.

We then examined whether this indicator is correlated with the position of the parties on the left-right spectrum. To do this we used Ladner et Brändle's (2001) left-right index which was developed on the basis of surveys carried out among the presidents of the local sections of political parties. This index, which was derived on the basis of the declarations of party members, is comparable to our standardised coefficient of association, which is derived, in turn, from the official position of the parties on the revision of the CO_2 Act.

Finally, we were interested in the relationship between these indicators and the behaviour of party members elected to the National Council. In order to measure this, we took into account the percentage of elected representatives from each party who accepted the introduction of an article on adaptation into law during the National Council session of 31.05.2010 on the revision of the CO_2 Act.

Table 3: Voting behaviour of the parties, left-right positioning and perception of adaptation

Main parties represented at the National Council	Degree of association between the phenomenon of climate change and adaptation (Jaccard coefficient)	Position on the left-right spectrum (Ladner, Brändle: 2001)	Percentage of elected representatives who accepted the article in law on adaptation
CVP	0.00	0.92	0.53
Green Party	0.08	0.75	1.00
PLR	0.00	1.13	0.04
SPS	0.14	0.79	1.00
SVP	0.00	1.08	0.00

All of these indicators are shown in Table 3. Even if it is difficult to draw conclusions on the causal relationship between these different indices due to the low number of cases involved, it emerges clearly that a parallel exists between the positioning of the parties on the left-right spectrum and the degree of association between climate change and adaptation (Pearson's r 0.81). Therefore, insofar as we admit that the discourses objectively reflect the perceptions, membership of the right is correlated with a conception of climate change that tends to ignore the issue of adaptation. Hypothesis 2 regarding the existing of a right-left division in the way in which adaptation is perceived is, therefore, confirmed.

[22] Cf. Section on methodology used

Furthermore, the degree of association between climate change and adaptation is also associated with the voting stance of the party members on the introduction of adaptation measures (Pearson's r 0.85). However, it is difficult to determine the extent to which the voting strategies of the parties would be solely based on their conception of the problem of climate change or whether they are the result of more general ideological orientations arising from the left-right affiliations. In effect, the position of the parties on the left-right spectrum is highly correlated with the voting behaviour of their members in relation to adaptation (Pearson's r -0.99). The right-wing parties largely rejected the introduction of a legislative article on adaptation. The fact that the majority of the coalitions of actors involved in the decision-making process are positioned on the right of the political spectrum constituted, therefore, a barrier to the implementation of a national policy for adaptation to climate change in Switzerland.

5. Discussion

A gulf currently exists between the scientific discourses on the need to combat the harmful effects of climate change and the status of the development of adaptation policy in Switzerland. Although considerable uncertainty persists regarding the extent of the risk posed by climate change at local level and the monetisation of the resulting damage, it is quite clear that climate change will require significant adaptation measures in certain sensitive regions. The melting of the Alpine glaciers will necessitate, in particular, the rethinking of the drinking water supply system and will alter Switzerland's potential for hydropower production to an extent. Intensive agriculture in areas considered as dry currently risks becoming less productive in the future without major adaptations to irrigation systems. The risks and potential damage may seem trivial in relation to the GDP of a country like Switzerland (Ecoplan, Sigmaplan, 2007; INFRAS, Ecologic et al., 2007) or in comparison to the problems faced by certain developing countries (Tol, 2009). However, the research highlights the fact that the damage caused by climate change will be far from equally distributed and that it may weigh heavily on certain social groups (O'Brien, Leichenko, 2000; O'Brien, Sygna et al., 2004). Hence, coordinated policies are necessary at federal level so that the net effect and potential social inequalities caused by climate change can be minimised.

We have drawn attention to the fact that the perceptions of climate change of decision-making actors can act as barriers to the implementation of adaptation policies. We have shown that adaptation is far from receiving the same attention as mitigation in the formulation of policy responses to climate change. We have also succeeded in demonstrating that the decision-makers associate mitigation policies with economic objectives and to imperatives in relation to energy supply while they do not really perceive the links between adaptation and the health of the economy or energy production potential. The problem of the impacts of climate warming on Switzerland is, moreover, little mobilised in the discourse and still appears to be perceived as a trivial matter. Hence adaptation is mainly understood as a requirement for the countries of the South.

In the context of certain theories on agenda-setting, the fact that the decision-makers appear to be more concerned by mitigation than by adaptation is to some extent a paradoxical result and this merits discussion. In effect, the standard view is that problems with immediate and local consequences will be perceived as more important for decision-makers (Rochefort, Cobb, 1994). In addition, decision-makers are usually more inclined to invest in problems that may be resolved quickly so that the credit for the solution will be attributed to them before their political careers come to an end (Nordhaus, 1974; Lijphart, 1984). Finally, the distributive costs and effects of a policy should considerably affect its chances of being realised (Downs, 1957). Hence, based on these three arguments, decision-makers should give priority to adaptation policies over mitigation policies. In effect, the mitigation policies will only take effect in the very long term due to the

inertia of the climate system (Meehl, Stocker et al., 2007). In contrast, the effects of adaptation are directly visible on implementation. Moreover, because the climate system has all of the characteristics of a "common global good" (Ostrom, Burger et al., 1999), the benefits of mitigation cannot be appropriated even if their costs are borne solely by the State which creates these policies. This prompts some authors to conclude that the mitigation policies of developed states actually benefit more vulnerable countries more than their own domestic actors (Tol, 2009). Conversely, adaptation concerns the protection of resources or goods located on national territory. Therefore, the benefits are reaped entirely by national actors (Mendelsohn, 2000).

We have explained the paradox of the weak significance accorded to adaptation in Switzerland by the fact that the decision-makers do not really consider the local impacts of climate change as a threat. An alternative explanation that we have not really explored in the context of this article is that the weak role of adaptation can also be interpreted as a direct consequence of the international regime for combating climate change, which has focused historically on mitigation rather than adaptation. Hence, the content of the climate policies of the states can be seen as being shaped by the international institutions and not subject to the same logic and processes as more overtly domestic public policies. If this argument proves accurate, it would be necessary to investigate the forms that the future climate policies will take if the international post-Kyoto regime becomes weaker. Would the decision-makers in developed countries then prioritise the adaptation track so as to minimise the national impacts in the short and medium term at the cost of mitigation which requires international cooperation in the long term?

We have also shown that the perception of the importance of adaptation is inversely correlated with positioning on the right of the political spectrum. The parties of the right tend to oppose the introduction of adaptation policies. Sabatier's model of advocacy coalitions may explain why this is the case: it is likely that the *core beliefs* (cf. : Sabatier, 1988) of the right-wing parties are the cause of their resistance to this policy change. In effect, as we argued in the theoretical section of this study, the development of adaptation policies at national level is justified by the precautionary principle and is based on the idea of the assumption of a planning role by the State. Moreover, adaptation can be associated historically with political ecology. Hence, it may be argued that these elements contradict the basic values habitually defended by right-wing parties.

We suggest, therefore, that, contrary to the current practices of the research on climate change, the power relations between the dominant coalitions in the decision-making process and their perception of adaptation should be taken into account in assessing the adaptive capacity of a State. Further research will be necessary, however, to back up this argument and to investigate in greater detail why some parties do not give greater priority to adaptation. The extent to which these findings could be applied to countries other than Switzerland would also have to be examined.

From the perspective of methodology, this article demonstrates the relevance of computer-aided textual analysis for the political sciences and, in particular, the study of policy positions, values and ideas. This type of method is effective when the aim is to generate or, under certain conditions, verify rather fine-tuned hypotheses. The method also shows potential in the context of comparative processes involving different countries with the main limitation that the language of the analysis must be identical in all of the cases.

Finally, from the point of view of the conduct of public policies, our results suggest that the expression of the phenomenon of adaptation in decision-making circles remains – voluntarily or involuntarily – partial. Surprisingly, for example, the fact that the increase in temperature risks reducing the productivity of nuclear power plants and that adaptation measures will be necessary to maintain energy supplies in Switzerland (Ecoplan, Sigmaplan, 2007) is seldom referred to. Increasing the resilience of societies to the impacts of climate change also involves, however,

benefits in relation to sustainable development and the conservation of natural resources which do not appear to have been perceived but represent, nonetheless, central issues in the medium term. Furthermore, reducing vulnerability to climate change would also benefit the sectors of the economy that depend directly or indirectly on natural resources. Finally, adaptation involves reflection on our exposure to natural hazards, in general, a process that would reduce the future fragility of our societies.

It is likely that the problem of adaptation will assume a rather more critical position in decision-making circles when the visibility of the local impacts of climate change triggers the most affected social groups to mobilise on the national political scenes. However, the developed States would gain extensively from anticipating these societal demands by attempting to predict – or compensate for – the damaging effects of climate change on the most vulnerable groups, such as farmers or mid-mountain tourism resorts. Hence, the analysis of the socio-political change triggered by the problem of climate warming provides considerable research opportunities for the social sciences.

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Annex 1: List of keywords

The analyses were carried out in German, the main language used in political-administrative circles in Switzerland.

Topic	**North-South Equity**		
Dimensions	*Ethics and justice*	*Development*	*Adaptation and damage in Southern countries*
Keywords	Armut (poverty)	Entwicklungsländer (developing countries)	Archipel (archipelago)
	Ethik (ethics)	Entwickelte Länder (developed countries)	Einwanderung / Immigration (immigration)
	Gerechtigkeit (equity)	Entwicklungshilfe (development aid)	Ernährungssicherheit (food security)
	Justiz (justice)	Internationale Sicherheit (international security)	Hurrikan (hurricane)
	Reichtum (prosperity)	Entwicklungsrecht (development law)	Insel/insular (island/insular)
	Solidarität (solidarit)	Internationale Beziehungen (international relations)	(Klima)Flüchtlinge ((climate) refugees)
	Ungleichheit (inequality)	Internationale Zusammenarbeit (international cooperation	Küste (coast)
	(Planetare/gemeinsame)Verantwortung ((planetary/shared) responsibility)	Schuld (fault/blame)	Malaria (malaria)
			Meeresspiegel (sea level)
			Opfer (victims)
			Technologietransfer (technology transfer)
			Verwüstung / Desertifikation (desertification)
			Zugang zu Ressourcen (access to resources)
			Zyklon (cyclone)
Topic:	**Mitigation**		
Dimensions	*Instruments*		*Objectives*
Keywords	CO2-Abgabe (CO2 tax)		Dekarbonisierung / Dekarbonisation/ Entkarbonisierung (decarbonisation)
	CO2-Emissionszielwert (CO2 emission target)		Emissionsminderung (emissions reduction)
	CO2-Reduktion (CO2 reduction)		Emissionen reduzieren (reduce emissions)
	CO2-Steuer (CO2 tax)		Emissionssenken (emissions sinks)

	Emissionshandel (emissions trading)	Emissionsverminderung (emissions reduction)
	Emissionsrecht (emissions right)	Klimaneutralität (climate neutrality)
	flexible Mechanismen (flexible mechanisms)	
	freiwillige Vereinbarung/Massnahme (voluntary agreement/measure)	
	gentlemen's agreement	
	Klimarappen ("climate cent": *charge levied on all imports of petrol and diesel in Switzerland. The proceeds are used to fund projects for the reduction of GHG emissions both in Switzerland and abroad*)	
	Kompensation (compensation)	
	Normen (standards)	
	Quote (quotas)	
	Verschmutzungsrecht (right to pollute)	

Topic	**Energy issues**		
Dimensions	*Energy market*	*Traditional energy sources*	*Possible alternatives*
Keywords			
	Energieverbrauch (energy consumption)	Kohlekraftwerk (coal-fired power plant)	alternative Energie (alternative energy)
	Energiepolitik (energy policy)	Kernkraftwerk (nuclear power plant)	Atomausstieg (withdrawal from nuclear power)
	Stromversorgung (electricity supply)	Gaskraftwerk (gas-fired power plant)	Biomasse (biomass)
	Stromproduktion (electricity production)	Wasserkraft (hydropower plant)	Energieeffizienz (energy efficiency)
	Stromlücke (electricity shortfall)		erneuerbare Energien (renewable energy sources)
	Unabhängigkeit (independence)		Geothermie (geothermal power)
	Verknappung (scarcity)		Minergie (Swiss sustainability brand for new and refurbished buildings)
	Verteuerung (price rise)		Solarkraft (solar power)
			Windkraft (wind power)
Topic	**Economic aspects**		
Dimensions	*Macro-economic effects*	*Financial effects*	*International aspects*
Keywords	Anreiz (incentive)	doppelte Dividende (double dividend)	Export (export)
	Arbeitslosigkeit (unemployment)	Einkommen (income)	Wohlstand (prosperity)
	Arbeitsplatz (job)	externe Kosten (external costs)	Konkurrenzfähigkeit (competitiveness)
	externe Kosten (external costs)	Markt (market)	Wettbewerbsverfälschung (falsification of competition)
	Fortschritt (progress)	Ölpreis (oil price)	
	Hochwertig (high quality)		
	Innovation (innovation)		
	Lohn / Gehälter (wages/salaries)		
	Mobilität (mobility)		
	Wachstum (growth)		
	Wirtschaftsflaute (recession)		
Topic	**Impacts in Switzerland**		
Dimensions	*Agriculture*	*Extreme weather events*	*Mountain regions*
Keywords	Bewässerung (irrigation)	Erdrutsch (landslide)	Alpen (Alps)
	Hitze(welle) (heat (wave))	Flutkatastrophe (flood	Bergen (mountains)
	Trockenheit (drought)	Hochwasser (flood)	Beschneiung (snowmaking)
		Lawinen (avalanches)	Bergstürze (rockfall)
		Lothar (Storm Lothar)	Glestscher (glaciers)
		Unwetter (thunderstorm)	Erdrutsch (landslide)
		Sturm (storm)	Kunstschnee (artificial snow)
		Überschwemmung (flood)	Murgänge (debris flow)
			Permafrost (permafrost)

			Schneebedeckung (snow cover)
			Schneemangels (lack of snow)
			Skigebiet (skiiing area)
			Steinschlag (rockfall)
Topic	**The phenomenon of climate change**		
Dimensions	*Physical phenomenon*	*Swiss institutions*	*International institutions*
Keywords	Erdeerwärmung (earth warming)	CO2-Emission (CO2 emission)	Bali
	Klima (climate)	Klimapolitik (climate policy)	internationale Abkommen (international agreements)
	Klima schützen (protect climate)	Verpflichtungen der Schweiz (Switzerland's obligations)	Internationale Vereinbarungen (international agreements)
	Klimabedingungen (climate conditions)		internationale Verpflichtungen (international obligations)
	Klimaerwärmung (climate warming)		Internationale Übereinkommen (international agreements)
	Klimaschutz (climate protection)		Klima-Konvention (climate convention)
	Klimaveränderung (climate change)		Klima-Rahmenkonvention (climate framework convention)
	Klimawandel (climate change)		Kyoto
	Klimaänderung (climate change)		Marrakech
	Temperaturantieg (rise in temperature)		Nairobi
	Temperaturaufstieg (rise in temperature)		Rio-Konvention (Rio Convention)
	Treibhauseffekt (greenhouse effect)		UNFCCC
	Treibhausgas (greenhouse gas)		Vereinten Nationen (United Nations)
	Treibstoffemission (fuel emission)		
Topic	**Adaptation**		
	Anpassung (adaptation)	Verletzlichkeit (vulnerability)	
	ausgesetzt (exposed)	verwundbar (vulnerable)	
	empfindlich (sensitive)		
	sensibel (sensitive)		
	Sensitivität (sensitivity)		