PROGRAMME CHANGEMENTS
ENVIRONNMENTAUX PLANETAIRES
& SOCIETES

EDITION 2011

Projet **MEDEA**

DOCUMENT SCIENTIFIQUE

Acronyme / Acronym	**MEDEA**		
Titre du projet	Cartographier les débats environnementaux sur l'adaptation		
Proposal title	Mapping Environmental DEbates on Adaptation		
Axe(s) thématique(s) / theme(s)	☒ 1 ☐ 2 ☐ 3 ☐ 4		
Type de recherche / Type of research	☒ Recherche Fondamentale / Basic Research ☐ Recherche Industrielle / Industrial Research ☐ Développement Expérimental : Experimental Development		
Coopération internationale (si applicable) / International cooperation (if applicable)	Le projet propose une coopération internationale / International cooperation with : ☐ avec un ou des pays spécifiquement mentionnés dans l'appel à projets / countries explicitly cited in the call for proposal ☐ autres pays / other countries		
Aide totale demandée / Grant requested	399 125,92 euros	**Durée du projet / Projet duration**	36 mois

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1. EXECUTIVE SUMMARY

Most debates that define the future of our society and our planet are opaque. In the case of the debates on adaptation to global environmental change (GEC), the cause of this opacity is twofold: the extreme technicality of the issues at stake and the multiplicity of scales and actors they imply. Despite its magnitude and urgency, the issue remains incomprehensible to most of the population. The reason is not, however, the lack of publicly available information. The UN Framework convention on Climate Change, the Intergovernmental Panel on Climate Change and many other national and international bodies release extensive documentation on the topic. Official negotiation documents, position papers, scientific reports, and pamphlets are all freely available on the Web in near real time. But as research on the media has shown, information overload does not necessarily foster better democracy. The proof is that the agenda of public opinion is still occupied by the issue of the anthropogenic origin of global warming, while this issue has for long now been a point of consensus both in scientific community and political negotiation.

To contribute to understanding the challenges raised by adaptation, the exploratory and collaborative research project MEDEA (Mapping Environmental Debates on Adaptation) proposes a fourfold research programme based on the innovative methodology of controversy-mapping. Firstly, drawing on a close collaboration between climate experts and social scientists, it aims to collect an extensive corpus of both scientific and media discourses on GEC adaptation debate in France. Secondly, it aims at analysing such corpus using methods and tools developed in the field of Science and Technology Studies. Thirdly, drawing on media design expertise, it aims at developing an on-line interactive platform to make the debate legible to a large audience. Finally, the project will conclude by disseminating this platform to all relevant stakeholders in the debate.

Overall, the project intends to provide an answer to the following question: What difference does it makes to be equipped with tools for mapping technoscientific debates? Can such equipment change (and potentially improve) the way we publicly discuss climate change adaptation?

In line with the priority of the call for projects, the MEDEA intends to give the project an original approach combining quantitative and qualitative methods from social sciences (particularly, science and technology studies, sociology of public problems and media sociology), climate sciences and digital and communication design. To ensure such original disciplinary articulation, this research project engages the collaboration of three partners: Sciences Po (particularly its médialab and the IDDRI), the Laboratoire des Sciences du Climat et l'Environnement, a CEA-CNRS-UVSQ mix research unit (UMR8212), and the ENSADlab de l'Ecole Nationale Supérieure des Arts Décoratifs. Given its extensive experience in controversy mapping, the Sciences Po médialab will ensure the management of the project, under the scientific coordination of Tommaso Venturini.

While being innovative, the clear-cut strategy of MEDEA establishes a sound basis for an interdisciplinary research project, ensures that relevant answers to the challenges pointed in the project at the end of the three-year duration, and integrates dissemination activities. In this manner, the project will contribute to support policy development and public debate on adaptation and to provide a relevant contribution to the understanding of the processes underlying the GEC and its governance – which are core objectives of the CEP&S call for projects.

2. CONTEXT, POSITION AND OBJECTIVES OF THE PROPOSAL

Most debates that define the future of our society and our planet are opaque to the public. In the case of the debates on adaptation to global environmental change (GEC), the cause of this opacity is twofold: the extreme technicality of the issues at stake and the multiplicity of scales and actors it implies. Societies, organisations and individuals have been adapting to changing conditions for centuries. However, the advent of climate change brings new challenges. Some of these are brought about by the speed of change of climate, the potential for non-linear changes and the long time horizons. Anticipatory adaptation is moreover made difficult because of unavoidable substantial uncertainties. Relying on incomplete knowledge of future climate is in itself a new challenge. The adaptation debates deal with many questions including, the methods and the knowledge needed to assess climate change and impacts and strategies for decision-making on adaptation under uncertainty. Some of the questions are: How can climate change impact be assessed to inform adaptation decisions and which uncertainties subsist? How can this assessment be informed by the relevant knowledge produced by all concerned actors? How does such knowledge circulate? To what climate changes do we need to adapt? Who are the most vulnerable to it? Which are the different possible strategies cope with it? Where, and which actors are involved in adaptation decision-making? Where are adaptation decisions expected in France? To what changes does the French society need to adapt in each different environment? What are the most desirable governance frameworks for adaptation and strategies according to the different actors? Which role the business and industry actors assume? How can we strike a balance the prediction-oriented top-down approaches and those approaches exploring changes and resilience and robustness of adaptation strategies from the bottom if impacted system?

Despite the urgency and magnitude of the challenge of adaptation to GEC, and weight of the scientific and political debates they raise, the issues at stake remain incomprehensible to the majority of the population. The reason is not, however, the lack of publicly accessible information. For example, the UN Convention on Climate Change, the Intergovernmental Panel on Climate Change (ipcc.ch), as well as other national and international bodies engaged in addressing climate change are characterized by the extensive public documentation they release. Official working documents, position papers, scientific articles, pamphlets, are all freely available on the Web in near real time. But as research on the media has shown, information overload does not necessarily contribute to better democratic governance. The evidence is that the agenda of public opinion is still mainly focused on the issue of the anthropogenic origin of global warming, while this issue has for long now been a point of consensus in the scientific community and political negotiation. Moreover, as climate experts Bart et Delmotte (2010) note in an article published in *Le Monde*, surprisingly, the media debate is more focused on the scientific challenges ("Is that true?") than on the political ones. Doubt, they remind us, is an intrinsic part of the scientific approach: "The debate is continuous among climatologists who, like all researchers, are professional sceptics!" Understanding the climate system requires specialized scientific knowledge and therefore it is necessary and urgent to foster new ways of dealing with this debate in society, in order not to capitulate to the demagoguery of simplicity to the detriment of the public understanding of complexity (Bart et Delmotte, 2010). To foster the democratic governance of such a complex debate, it is therefore necessary to develop tools capable of promoting a better understanding among scientists, policy-makers, industry and the different publics around climate change adaptation.

To contribute to tacking this challenge, the exploratory and collaborative research project "Mapping Environmental Debates on Adaptation" (MEDEA) proposes a fourfold research programme based on the innovative methodology of controversy-mapping. Firstly, drawing

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on a close collaboration between climate experts and social scientists, it aims to collect an extensive corpus of both scientific and media discourses on GEC adaptation debate in France. Secondly, it aims at analysing such corpus using methods and tools developed in the field of Science and Technology Studies. Thirdly, drawing on information design expertise, it aims at developing an on-line interactive platform to make the debate legible to a large audience. Finally, the project will conclude by disseminating this platform to all relevant stakeholders.

Overall, the project intends to provide an answer to the following question: What difference does it makes to be equipped with on-line tools for mapping technoscientific debates? Can such equipment change (and potentially improve) the way we publicly discuss climate change adaptation? The project's underlying hypothesis is that the involvement of different publics (scientists, journalists, activists, corporations, citizens…) will come from favouring the political relevance of their disagreements through access to datasets and documentation and the representation of the debate's dynamics.

In line with the priority of the CEP&S call for projects, the MEDEA intends to give the project an original approach combining quantitative and qualitative methods from social sciences, climate sciences and information design. To ensure such original disciplinary articulation, this research project engages the collaboration of three partners: Sciences Po (particularly its médialab and the IDDRI), the Laboratoire des Sciences du Climat et l'Environnement, a CEA-CNRS-UVSQ mix research unit (UMR8212), and the ENSADlab de l'Ecole Nationale Supérieure des Arts Décoratifs.

2.1. CONTEXT, SOCIAL AND ECONOMIC ISSUES

The context of MEDEA's research programme is twofold: firstly, the post-Copenhagen evolution of the debate on climate change; secondly the rise of social media in the Internet over the last years.

The climate change debate post-Copenhagen

Three aspects of the post-Copenhagen context are particularly relevant to our project.

Firstly, adaptation to climate changes appears in the public scene as an emerging topic, brought to the fore by several States and NGOs particularly in COP 15 and COP 16. Currently, we are witnessing a growing public and policy interest at all levels, from the local level to the international stage with the post-2012 negotiations. In this context, debates on adaptation are many-sided and the very concept of adaptation suffers from a lack of clear definition. Back in 2001, the IPCC report broadly defined the adaptation as "the adjustment in ecological, social or economic systems in response to actual or expected climatic stimuli and their effects and impacts" and refers to changes in "processes, practices, or structures to moderate or offset potential damages or to take advantage of opportunities associated with changes in climate". Yet, the effects of climate change are multifaceted and contexts are not equally adapted to the development of diagnostics and the implementation of solutions (vulnerable zones, potential areas of mitigation). Conceptualizing and implementing adaptation is proving to be a thorny societal challenge. In France adaptation the challenge gained public attention with the elaboration of a first national plan of adaptation debated both at the Grenelle de l'Environnement and through a consultation process in 2009. According to the Observatoire National sur les Effets du Réchauffement Climatique (ONERC) the concept of adaptation still needs to be refined to become fully operational. This entails ambivalence: while the lack of definition may be an obstacle to concrete actions, it may produce a sort of soft consensus facilitating the continuation of discussions. The long term nature of the effects of climate change, the uncertainties as to the quantification of its

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impacts and the belief to be less vulnerable than other countries generate a very open discussion space rapidly spreading to a wide range of media and public forums (see figure 1.)

Secondly, this new topic emerges in a specific moment of the trajectory of climate change controversy in the media. Indeed, the media coverage of climate change in France has steadily increased in the last few years, with new actors entering the scene to challenge the dominant framings and affect the political processes, the scientific research and the relationship between them. In this context, the sceptic offensive gained a renewed visibility with the violent attacks that targeted the IPCC in 2009 and 2010 (Climategate) and the results of Copenhagen. Against this backdrop, several lines of disagreement appeared questioning the validity of the scientific consensus, the legitimacy of experts or the neutrality of their advices. The climate problem is therefore ideal case for the analysis of relations between science and society, for it contributes to scramble several major dichotomies of modernity (nature / culture, science / politics, local / global, present or future) (Aykut & Dahan, Forthcoming 2011).
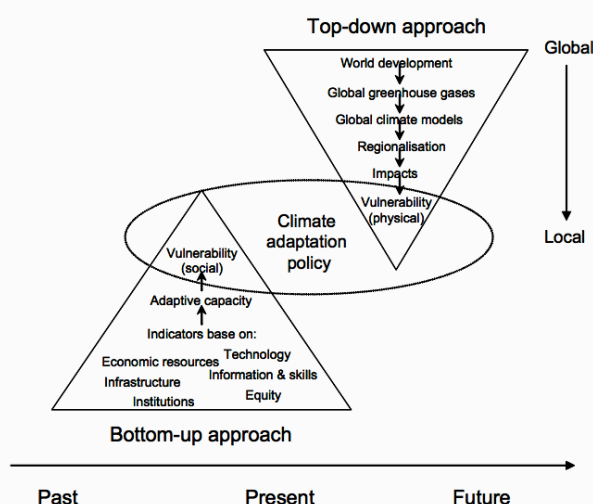

Figure 1. Top-down and bottom-up approaches (Dessai and Hulme 2004)

Finally, some SHS scholars have recently engaged in the debate on climate change, focusing, among other topics, on the role of expertise in democratic governance. For example, Sheila Jasanoff (2010), has focused on the need to articulate the scientific representations of environmental knowledge and smaller scales of social significance and practice, suggesting a neutral interpretation of the scientific activity of global expertise may be impossible to reach because of the diversity of the debate context of each country. While the IPCC produced knowledge for global policy, it cannot respond to the specific cultural and national traditions of political legitimacy.

The rise of Social Media

The Internet has evolved during the last 15 years into a key infrastructure of modern societies. Its open architecture has allowed the number of Internet users throughout the world to grow exponentially. Nowadays, the Internet is experimenting yet another transformation with the so-call 'Social Media' playing a leading role. 'Social Media' is an umbrella term covering a wide range of online applications and platforms that support on-line interaction, collaboration and the sharing of content among users of all kinds. It includes in its diversity social networks, blogs and microblogs, wikis, sites for sharing photos, videos

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or slide presentations. The uptake of Social Media by the public at large during the last four or five years has been nothing short of spectacular. At the end of 2010, the statistics point out to Facebook replacing Google as the most visited site on the Internet, and also as the main influence of directing traffic to the content sites. The power of social seems to be replacing the power of search, at least in the Internet.

The social significance of this uprising of Social Media will be manifold. It is undoubtedly provoking a significant reconstruction of the mechanisms of social communication. Therefore, as the communication processes "decisively mediate the way in which power relationships are constructed and challenged in every domain of social practice" (Castells, 2009:4) Social Media are leading to the reconstruction of power relations, including those where the soft power of influence prevails. This includes, of course, the domain of scientific collaboration and the debates over the mutual relationships between science and society.

It can be expected that evolution of Social Media in the medium term can result in a useful tool to improve the level of information, engagement, debate and societal participation around controversial relevant issues. Currently available Social Media tools and services might be a good starting point towards this objective. However, extensive research is still needed in tools that foster wider participation, offer better support for deliberations and sophisticated interactions and embody the appropriate qualities and attributes to allow the expression of citizen (as opposed to consumer) behaviour.

Nevertheless, almost none of those platforms provide their users with tools to capture the nature and structure of the discussions taking place, even less their evolution in time. With this being true in a Social Media space, it is now almost impossible to distinguish the 'wisdom of the masses', the result of expert opinion or the influence of covert advertising, deliberate misinformation or bias.

2.2. POSITION OF THE PROJECT

The issue of adaptation to GEC and the ad hoc publics that it engenders cannot be addressed by a ready-made standard approach (Hajer, 2005; Latour, 2005). As research in science and technology studies has shown, each sociotechnical controversy involves a specific network of agents and deserves to be treated in a specific forum (Callon, Lascoumes and Barthe, 2009). Moreover, it has been said that modern societies have difficulties in handling such technoscientific issues because their institutions are not issue-specific and thus unable to treat the specific complexity of each scientific controversy (Marres, 2007). The same holds for digital media. Online and offline experiences have proven how difficult it is to 're-use' the procedures developed for a given issue. Most of the time, the success obtained in the original case is impossible to be reproduced just by reapplying the same procedures. Each scientific debate deserves and requires an ad hoc debate space.

For this reason, MEDEA concentrates on developing an ad hoc controversy-map platform to explore and represent one of the most crucial controversies of our times. The MEDEA project falls specifically in theme 1 ("Les sociétés et territoires face aux CEP – vulnérabilité, adaptation et mitigation") of the ANR CEP&S call for proposals. In keeping with the Programme's priorities for the current call, MEDEA addresses vulnerabilities and adaptation to global environmental changes through a disciplinary and methodological articulation resulting from the close collaboration of climate scientists, social scientists, and communication and media experts. Using a unique approach resulting from such articulations MEDEA will investigate, map and analyse the positions of different actors in the debate around adaptation – and consequently on vulnerabilities – to GEC.

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Controversy mapping was conceived by Bruno Latour more some 20 years ago to train students in following technical and scientific disputes by the creative use of digital media. It is currently taught at Sciences Po Paris and in several other universities in France (Ecole des Mines, Telecom ParisTech) in Europe (Oxford, Manchester, Lausanne) and the U.S. (MIT, Portland). The Science Po course provides students with a series of theoretical and practical tools for observation and description of modern scientific and technical. During the autumn semester, the main lectures (cours magistraux) focus on giving students the theoretical underpinnings required. During the second part, students consolidate that knowledge with the reading in the method lectures (conférences de méthode) of the anthology *Science and Technology Studies and Media Studies*. During the Spring Semester, students work in small groups on a specific controversy. Each group will consist of: 1 project manager, 2 investigators, a cartographer, 1 designer, 1 a webmaster. See http://médialab.sciences-po.fr/controversies/ for a more detailed presentation.

The FP7-funded project MACOSPOL (mappingcontroversies.net) laid the foundation for transforming this method in a full-fledged operational research tool. In MACOSPOL, the leader of the present consortium (Sciences Po) worked to build a first online platform for exploring and representing controversies around technoscientific issues. MACOSPOL explored the public exposure to a growing number of scientific disputes asking which advantages could be drawn from this situation (Venturini, 2010).

Right from the beginning, the partners of the MACOSPOL consortium felt that the new tools for public debate were to be found in digital technologies. Digital media are particularly adapted to the heterogeneous character of scientific disputes, for they provide a unique and coherent space where debates can be projected and traced. On the Web, one can easily retrieve not only the whole scientific literature concerning any relevant dispute, but also the full extent of public opinions, commercial patents, institutional positions, journalistic coverage, legal decisions and so on. Using the same hardware (an ordinary personal computer) and the same interfaces (a web browser), it is possible to follow controversies across the full range of environments and networks they permeate (Venturini, 2011).

What none expected at the beginning of MACOSPOL was the incredible richness of tools, projects and well-developed initiatives fostering public participation to scientific debate to be discovered. Long before social scientists, Internet users recognized the role that digital technologies could play in opening scientific controversies to public exploration. Much of MACOSPOL work consisted in reviewing, testing and documenting the resources freely available on the Web. The result is an online platform meant as a toolkit for observing and describing contemporary scientific debate: http://www.mappingcontroversies.net.

Since the end of MACOSPOL, the results of the project have been extensively used within the Demoscience consortium (http://www.demoscience.org/). Demoscience is an informal consortium gathering all the universities experimenting controversy-mapping as a didactic tool. Using the tools gathered by MACOSPOL, several groups of students have analyzed dozens of disputes and produced dozens of websites to present them http://médialab.sciences-po.fr/controversies. The work of Demoscience students demonstrated the value of MACOSPOL's results, but also revealed two main limits of our controversy-mapping platform. MACOSPOL has been simultaneously too ambitious and too modest. It has been too ambitious, because it addressed socio-technical controversies in general instead of focusing on a few specific case studies. Too modest, because it collected hundreds of remarkable mapping tools, but did not integrate them under a single mapping methodology.

The MEDEA project will address a research question that is very close to the one of MACOSPOL, but will reverse its approach. This time, we will be both more humble and

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more ambitious. Instead of aiming at the impossible goal of creating a universal tool for controversy mapping, we will develop a fully integrated platform to map a single carefully chosen debate, the adaptation to GEC, to assess its potential to foster enhanced on-line public engagement of all concerned publics.

With such ambition, the MEDEA project can be considered to be in line with several research projects financed by the European Commission, both under FP6 and FP7, to foster and reflect on the public engagement with complex scientific and technical issues[1]. None of this projects focusing on science-society interactions specifically focused both on a specific controversy-mapping tool and on facilitating public engagement.

As regards the topic of adaptation, the Institute for Sustainable Development and International Relations at Sciences Po has been making a considerable effort in this field of adaptation for several years, associating anthropogenic and environmental dynamics, conceptual analyses and case studies, research and dialogue with stakeholders. The purpose of this is threefold: contributing to the improvement of scientific knowledge on vulnerability and adaptation; fostering the implementation of pragmatic, contextualised adaptation strategies, on different spatial and temporal scales; and using this in-depth research to contribute to international negotiations. IDDRI has pursued its activities in this field particularly through its strong involvement in two ongoing projects:

-   Circe (Climate change and impact research : The Mediterranean environment), a FP6-European project on climate change in the Mediterranean and adaptation strategies, for which IDDRI is coordinating economic and social science research, mainly focusing on induced policies. Particular attention is given to the tourism sector and the regions in which it is developing http://www.iddri.org/Iddri/CIRCE-Project-Research

-   INVULNERABLe (Industrial Vulnerability Project) aims to create the conditions for a dialogue between the scientific community and the private sector on climate change scenarios and their industrial impacts. The initial findings of the project have been published in the form of fact sheets that present series of data to inform the strategic guidance of industrial activities. http://www.iddri.org/Iddri/Fondation/INVULNERABLe-Project

Finally, it should be noted that the MEDEA project is in keeping with two other projects recently funded by the ANR CEP&S programme: "The questions of confidence in global warming: climate modelling, expertise, and relationship with politics" (CLIMACONF) and "The democracy in front of environmental stakes" (DEMOENV). CLIMACONF addresses the issue of confidence in the climate change problem by studying the conditions of its construction. Focus is on the analysis of the peculiar role of climate modelling and the epistemic controversies surrounding models, and more generally on the relationship between science, expertise and politics in the construction of this confidence. While both projects propose close collaborations between climate and social sciences and focus – in

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[1] Among these projects, the ones that are more closely related to MEDEA are: CARGO - Comparison of approaches to risk governance; CIPAST - Citizen Participation in Science and Technology; DECIDE - DEliberative CItizens' DEbates in European science centres and museums; PATH - Participatory Approaches in Science and Technology; PSX2 - Participatory Science and Scientific Participation (financed under the FP6). MIRRORS - Monitoring Ideas Regarding Research Organizations and Reasons in Science; FUND - Facilitators' Units Network for Debates; CRÊPE - Co-operative Research on Environmental Problems in Europe; ACCENT - Action on Climate Change through Engagement, Networks and Tools (financed under the FP7).

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general – on the climate controversies at the science-society interface in a *science studies* approach, MEDEA differentiates particularly by adding communication and media digital design to the disciplinary articulation and by focusing in both scientific and media discourses to develop a controversy-map for a fostering a deeper understanding of the adaptation debate in France by all concerned actors. MEDEA and CLIMACONF are therefore complementary projects, each providing in a specific way and on a particular aspect a deeper understanding of the dynamics of the GEC problem in society.

On the other hand, the DEMOENV project focuses, in a multidisciplinary SHS approach, on new practices of governance of conflicts brought about by new forms of vulnerability resulting environmental change. It particularly investigates the capacities of democratic societies to respond an environmental emergency considering the possibility of a drift towards authoritarianism. MEDEA somewhat shares with this project its concern with democratic governance of the environmental crises. It does so, however, following the actors of a concrete case, focusing on their production of discourses and knowledge on highly complex issues linked to adaptation to climate change.

Vis-à-vis these different but related research projects sharing one or another common aspect with our project, MEDEA' originality stands out, for none of them specifically focus on the debate mapping as a tool to foster public participation in climate change. Indeed, these concentrate either on investigating the existing one or another issue around science in society, or on opening new spaces for debate. Except for FP7-funded MACOSPOL, no previous project, as far as we know, has tried to occupy the 'medium' position that MEDEA proposes to fill. Aiming at equipping citizens with the tools to make sense of the complexity of the adaption debate, intends to do more than just observing the technoscientific debate, but without directly intervening on it. In this medium position lies the originality of this project and the potential for contributing to the participatory communication of science and technology.

2.3. ÉTAT DE L'ART / STATE OF THE ART

Science and Technology Studies: on technoscientific issues and their publics

Those who envisage the science-society relation as a percolation of scientific truth through social channels, risk to be bitterly frustrated by digital media. In theory, the Web constitutes an ideal medium for the public understanding of science. Not only scientific knowledge can be broadcasted easily and in real time, but scientists and citizens can meet directly without the interference of journalists, politicians, activists and other intermediaries (Butler, 2005). In practice, however, things are more complicated. Type 'stars' into a search engine and you will probably learn less about astronomy than about astrology (not to mention movie stars).

On the Web, there is no evident distinction between truth and error, episteme and doxa. All viewpoints may be equally expressed and there is no way to estimate a priori their value, interest and importance. That's not all. Not only does digital communication not provide any ready-made distinction between facts and opinions, but it actively multiplies the connections between the two. The marginal cost of hyperlink connections as well as the aggregation efforts of all sorts of portals and search engines effectively erase any residual separation between facts and opinions (Latour, 2007). Editors of scientific websites can be as rigorous and exclusive as they may, yet they will always remain a few clicks away from the worse pseudoscientific claims (Ciolek, 1996).

Still, there is ground to be optimistic about the role that the Web can play in modern technoscientific societies. What makes the Web an awful medium for the public understanding of science is precisely what makes it a wonderful place for the public

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discussion of science - upon the condition, however, that we assume a more reasonable definition of 'science' and of 'society'.

As STS (Science and Technology Studies) have demonstrated, there is no such thing as Science. Scientific knowledge does not originate in isolated ivory towers – laboratories, universities, research centers – and trickle down to the general public. Scientific knowledge is always created within society and would not exist without the contribution of a variety of actors: citizens, politicians, industries, NGOs, legal institutions, activists, journalists, technical artifacts, natural elements and, of course, scientists, scientific institutions and scientific instruments (Jasanoff et al., 2001). Far from existing as abstract platonic ideas, scientific facts are rooted in social life. They are not merely discovered; rather they are constructed by the cooperation of a multitude of heterogeneous actors (Latour, 1988).

Conceiving scientific facts and technical artifacts as collective constructions has a major advantage: it draws attention to the work needed for constructing them. No discovery or invention, no matter how persuasive or effective, can produce an immediate consensus. Science and technology do not impose themselves under the impetus of an indisputable logic. They need to be collectively discussed and collectively accepted (Felt and Fochler, 2008). Far from being the ultimate resort for closing social debates, scientific truth and technological progress are the results of such debates (Gibbons, 1999). Whenever we use words such as 'science' or 'technology', therefore, we should always keep in mind the collective work of a multitude of heterogeneous actors, the networks they form, the controversies they fight, the agreements they reach (Law, 2000).

It is interesting to note that this definition of science is very close to John Dewey's definition of 'public opinion' as a heterogeneous mixture of ad hoc audiences, coalescing around specific issues (Dewey, 1946). Drawing on the work of Walter Lippmann (Lippmann, 1927), Dewey claims that it would be unrealistic to expect citizens to be engaged in all the issues that trouble collective life. Modern societies are so full of debates and controversies that no citizen, no matter how diligent and motivated, can follow all of them. People only care about the issues in which they are directly involved and dedicate a fleeting attention to the rest of public debate (Michael, 1996). Not only (as STS showed us) is there no such thing as the Science, but (according to Dewey) there is also no such thing as the Public either.

Consider any of the technoscientific disputes that trouble our collective existence, be it industrial agriculture, energy production or medical genetics. None of these controversies can be simply ascribed to a public misunderstanding of science (Irwin and Wynne, 1996); none can be solved just by spreading scientific consensus through public opinion; first of all, because the scientific community is far from reaching an agreement and, secondly, because the participation of public actors (institutions, NGOs, activists, corporations...) is already massive, but this does not seem to bring the disputes any closer to resolution.

By saying that sciences are heterogeneous and that public opinions are fragmented, we are not denying the possibility of technoscientific democracy (Latour and Weibel 2005). We just wanted to shift the focus from the percolation of science through society to the collective work of construction of socio-scientific networks (Latour, 1999). While chaotic in assuring the former, the Web may be unexpectedly helpful for the latter. Thanks to its neutrality and connectivity (and notwithstanding the limits that we will discuss in paragraph 1.2.a), the Web offers a unique space for discussing and constructing technoscientific issues. Not only can all sorts of actors easily and inexpensively express their viewpoints, but the hypertextual texture of the Web facilitates the emergence of alliances and oppositions (Rogers, 2002).

Web communication is often said to be many-to-many (as opposed to the one-to-one media as the telephone or the one-to-many as the television) (see, for example, Morris and Ogan, 1996). This definition is inexact: online communication is rather several-to-several. The Web

is a great place to come together, but not all together. The reason why the Web is often described as a space (the cyberspace) is that online communication generates territories (Boullier, 2009). The fact that anything can be connected through a hyperlink does not mean that it will be (Barabasi, 2009). Despite the marginal cost required to create a hyperlink, people tend to be relatively careful in establishing connections. The result is that the Web is not randomly organized. Linking their discourse to other online discourses, users establish hierarchies and clusters (Gibson, Kleinberg and Raghavan, P. 1998).

Once again, we can draw on the philosophy of John Dewey to show the potential of the Web as a debate space (Coleman and Gøtze, 2001). Because of their capacity to assemble people around discussion themes, digital media are very close to Dewey's idea of a democratic communication: they allow actors to gather around the issues they share (Sustein 2006 and 2007). By combining ex ante neutrality and ex post organization, digital media seem capable of fulfilling the same function fulfilled by professional journalism: filtering and sorting information, allowing citizens to browse the complexity of public life and to identify the issues that concern them (Castells, 2008 and Cardon, 2009). Online debate, to be sure, is not the panacea of all political problems, yet, digital environments have proved to be particularly fertile in equipping public engagement (Dahlgren, 2005; Davies, and Pena Gangadharan, 2009; Wright, 2006).

This function is particularly crucial when it comes to the public debate around science and technology (Benvegnu, 2006). Considered how eco-activists use the Web to coordinate internationally, how deceived consumers mount lawsuits over the Internet, how people affected by rare diseases organize online. Where else could such issues be discussed? Where else can questions that are both local (for their thematic extension) and global (for their geographical extension) be raised, if not on a medium that is both geographically and thematically clustered?

To be sure, scientific and technological issues did not wait for the Web to organize as networks. Thanks to digital media, however, technoscientific networks are now materialized in networks of hyperlinks and web pages, facilitating their deployment and their organization.

Integration of data sets and data mining of the debate on climate adaptation

To assess the credibility of climate research a recent study by Anderegg et al (2010) performs a simple analysis segmenting climate researchers into two groups of either convinced by or unconvinced by the evidence for anthropogenic climate change. The assignment is based on a much-reduced set (<20) of signed statements in favour or against anthropogenic climate change. However, such a simple split ignores the (likely) existence of grey zones and does not assess at all the diversity of opinions around the issue and the possibly overlapping subcommunities around specific topics in the scientific debate.

To overcome these limitations a much wider approach is needed, which takes advantage of the great amount of useful information that can be found in unstructured form in various textual sources, be they scientific articles, blog posts, or discussions, and that has be extracted using what is commonly referred to as opinion mining and/or sentiment analysis.

A recent and comprehensive review of the state-of-the-art on these technologies is provided by Pang & Lee (2008). The most common sub-tasks involved in opinion and sentiment analysis are: (i) the detection of the subjective nature of text (Wiebe & Riloff, 2005); (ii) the determination of the opinion polarity, which is generally based on vector method or lexical indicators, (Turney, 2002), (Esuli & Sebastiani, 2006); and (iii) the identification of the topic or attribute being referred to by the opinion.

One of the technologies of Natural Language Processing that has reached a higher level of maturity these last years is Named Entity Recognition (NER). The task of detecting and marking entities, objects and events (generally relative to predefined categories such as persons, locations, institutions, etc. that are referenced within a text segment) is an important aspect of Information Extraction. Entity identification has been developed for a large variety of thematic domains, from news items (e.g. for market intelligence) to scientific literature, e. g. in order to feed computational models of gene and protein interactions, using thousands of biomedical articles each contributing some data about the complex interactions of metabolic regulation (Rodríguez, 2007).

Dependency parsing (Attardi, 2007) can provide information about the syntactical relations of different parts of a sentence, and thus provide the basis to relate entities with the opinions that refer to them.

The MEDEA project presents a particular challenge in the variety of aspects and the complexity of multi-facetted opinions it aims to deals with in the adaptation debate. The focus of opinions needs specifically adapted robust detection models. The mixture of opinions and stated facts need a representation beyond simple polarity. The combination of *linguistically driven information extraction* with *statistical techniques for semantic classification* can then provide a valuable tool for the exploration, aggregation, and summarization of very large amounts of textual data that would be beyond the possibilities of human annotation and analysis. The resulting data landscape will be the base for a detailed analysis of the temporal and structural dynamics of scientific and media discourse.

The role of Communication Design

Visualization has always played an important role in scientific activities thanks to the ability to represent abstract data (Latour, 1988 and 1990). Recently, however, it is science itself which has become an object of visualization. Drawing upon data such as research papers, patents, and funding awards sciences have been visualized as highly interconnected spaces (Börner, Maru, and Goldstone 2004; Kutz 2004; Börner, Chen, and Boyack 2005). Diagrams, maps and graphs have been employed to identify research areas, experts, institutions, and journals. Knowledge cartography has emerged as a new area of studies, aiming at depicting spatially knowledge domains (Shiffrin and Börner 2004), providing both descriptive and explanatory models.

The rise of this field of research has been made possible by the growing availability of three resources: larger and data sets on sciences and technologies; algorithms capable to handle large and continuous streams of data; computers capability of processing large data amounts. These three phenomena have deeply redefined the purposes of data visualization and widen its potential audience. While 'dataviz' used to be limited to expert applications, more and more non-scientific applications have been developed in the last few years (Pousman, Stasko, and Mateas 2005) to address common users (Masud, Valsecchi, Ciuccarelli, Ricci and Caviglia 2010). Data showed the potential to become stories (Segel and Heer 2010) when handled by creative people and as such they can promote public engagement in social and political issues. Visualization has therefore become a relevant topic in social researches (Scagnetti, Ricci, Baule and Ciuccarelli 2007; Ricci 2010) and humanities studies (Drucker 2010; Schich, Meirelles, Barabási 2010).

The MEDEA project is meant to contribute to this line of research on visual methods, by analysing how data and information visualization can be effectively put at the service of public debate. While the digital tools of visual representation of controversial issues become more and more powerful, their interest to political arena is still to be proved. It is this interest that MEDEA ultimately aims to explore by applying the cutting-edge visualization resource to the debates on climate change adaptation.

2.4. OBJECTIVES, ORIGINALITY AND NOVELTY OF THE PROJECT

MEDEA has three main objectives

Objective I   Investigating scientific and media debates around CEP adaptation in France

Too often, the investigation of debates climate change related issues is limited either to the discussions within the scientific community or to the media debate, as if the two discursive spheres were clearly separated (Couldry, 2008). By focusing on both scientific and media debate on adaptation at the same time, we hope to be able to explore the full complexity of the debate it raises online and offline. If scientific facts and technical artefacts do not exist in the void and are built though a network of multiple collective discourses and practices, it is crucial to be able to follow each thread of such network and their entanglements (Rip, 2010)

Following heterogeneous discourses in the debate on adaptation to global environmental change is a task of great complexity, which we intend to approach in a multidisciplinary manner, articulating the contributions of two Sciences Po and LSCE. Far from being a well-identified controversial issue, climate change adaptation is a cluster of disparate and yet interconnected questions: which seeds will we sow to comply with a changing weather? Which energy source will we privilege? How will we organized our industrial production? How will we protect our landscape, manage our freshwater supplies, shelter natural and agricultural biodiversities?

All these problems have in common the fact they can neither be resolved by local goodwill nor entrusted to a national or international authority. Too many actors are concerned as well as too many questions, their connections are too intertwined; their mutual dependences too complex; climate adaptation is just too complex to hope that solutions can be imposed by an authority (in a purely top down approach) or spontaneously emerge from the accumulation of individual choices (in a purely bottom-up approach). Solutions can only come from a tremendous work of negotiation and coordination to be organized at any level, from the tiniest personal choices to the management of international relations and throughout all the intermediate networks of governance and conciliation. MEDEA expects to be able to make a contribution by trying to make more visible the work of negotiation that hundreds of thousands of actors are doing all over the world in a variety of different ways.

Objective II   Developing an integrated platform for debate mapping

The second objective of this project is developing an online platform for mapping the debate on climate change adaptation. MEDEA is meant not only to assess the current state of online debate this issue, but to contribute to its improvement as well. This is, of course, an extremely ambitious objective and one that need to be carefully specified.

To be sure, MEDEA does not intend to provide yet another web-space for discussing climate change issues. The problem with any online technoscientific debate, like the one surrounding adaptation global environmental changes, is not the shortage of discussion spaces, but their proliferation. For any issue in science and technology, the simplest Web search returns thousands of discourses connected through thousands of hyperlinks and dispersed through hundreds of websites. In online environments, expressing one's opinion is relatively easy. What is difficult is making sense of the deluge of discourse and discussions entangling any technoscientific issue. It is this difficulty that this project is meant to address.

The good thing about digital technologies is that they not only allow the proliferation of the discourses around science and technology, but they also provide the techniques for handling them. First of all, an essential feature of electronic media is that everything they mediate is automatically traceable and often actually traced. To be sure, harvesting the Web and retracing thousands of discussions from a myriad of dispersed web-pages is far from being

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trivial. Yet, once collected, these traces can be easily recorded, massively stored and inexpensively retrieved. Second, besides making it possible to integrate a whole scientific debate in a single dataset, digital technologies also provide the techniques to analyze it.

How will the final on-line platform be? At this stage, it is difficult to anticipate what such a platform will look like. Its functions and interface depend heavily on the evolution of the adaptation debate. We can however draw on the experience of a few previous projects in controversy mapping to provide a tentative list of the possible mapping-layers composing the platform (Venturini, 2011). For examples of how these layers have been implemented by Sciences Po students see http://médialab.sciences-po.fr/controversies/guidedtour.

1) *Glossary of non-controversial elements*. Every debate always involves a foundation of shared notions. Some of these non-controversial elements are so common that they do not need to be explained. Others may hinder the understanding and the participation of the public. Instead of describing in words the procedures of science, it is now possible to actually show them through simulations and multimedia, thereby partially overcoming the difficulties of specialized jargon.
ionesco.sciences-po.fr/scube2009/sangdecordon/wordpress/?page_id=571
médialab.sciences-po.fr/controversies/2007/implants_cochleaires/
ionesco.sciences-po.fr/scube2009/arctique/Geologie1.html
www.dnatube.com/

2) *Documentation repository.* While we will try to preserve as much as possible the complexity of the discourses around climate adaptation, it will not be possible to provide a legible representation of the debate without incurring some simplification. This is why our maps will be accompanied by the complete documentation gathered by the study (obviously within the limits imposed by copyright and privacy) as well as direct link to the original online resources.
ionesco.sciences-po.fr/scube/gaia/wordpress/?page_id=79

3) *Scientometrics.* Scientific literature is obviously one of the most important forums where the adaptation to GEC is debated. Scientometrics can reveal the networks of scientific collaboration through the analysis of co-authorship; the relative authority of actors through citation analysis; and the diffusion of ideas through lexicographic analysis. The results of these analyses may be displayed as indicators or as connection graphs. This second method is to be preferred as it allows revealing the opposition and alliances in the scientific community, as well as the existence of disciplinary or institutional clusters.
médialab.sciences-po.fr/controversies/2010/ModelisationFinance/sciento.html
well-formed.eigenfactor.org/

4) *Web cartography*. Until a few years ago, textual statistics were handmade or limited by the availability of digitalized texts. As a result, the use of lexicographic and graph analyses techniques was restricted to scientific literature or a small portion of the press. The expansion of digital mediation is extending the scope of such techniques to all types of discourses. News, gossip, opinions, rumors, discussions, and quarrels can be followed with the very same tools used for scientific theories. Not only are media discourses, institutional statements and public opinions now traceable, but they can also be presented in the same visualization space employed for sciences and technology.
www.médialab.sciences-po.fr/controversies/2010/Hadopi2/index.php?cat=ondaweb&subcat=carto
politicosphere.net/map/

3) *Debate scale.* Every debate is made of several sub-discussions, horizontally and vertically connected to several other debates on different spatial scales and part of one or more larger controversies (Young 2002). Choosing the level of granularity is, in itself, a major decision to be taken by this project. Taking this decision, however, will not exempt us from the need to

situate our subject in the scale of disputes where it belongs, showing how it affects and is affected by the other smaller or larger debates (Ciuccarelli, Ricci, Valsecchi, 2008).

médialab.sciences-po.fr/controversies/2010/HypersensibiliteOndes/index.php/perspectives/

4) *Tree of disagreement*. Few debates can be reduced to a binary opposition between two alternative viewpoints. Debates always involve a plurality of different questions and only a few of them can be answered with a simple yes or no. The platform should reveal how arguments are articulated one to the other logically or pragmatically, showing which arguments contradict or strengthen each other. Moreover, since the debate on climate change adaptation is considerably influenced by legal-administrative settings, cultural beliefs, social milieus etc., the same arguments are differently articulated and contradicted depending from the existing context (Massey and Bergsma 2009).
médialab.sciences-po.fr/controversies/2010/Copenhague1/flash/ fertilisation_ocean.swf
debategraph.org/

5) *Diagram of actors-networks*. As technoscientific debates rarely are binary oppositions, their actors rarely confront each other as two opposing armies. More often debates resemble a complex geometry of alliances and oppositions, an ever-changing space where clusters of actors emerge and dissolve unpredictably. Debates evolve through this magmatic movement that is very difficult to represent on paper, but can be rendered by digital.
ionesco.sciences-po.fr/com2009/streetart/wordpress/?page_id=147
médialab.sciences-po.fr/controversies/2010/ StatistiquesEthniques/reseau_acteurs.php
www.theyrule.net/

6) *Table of cosmos*. While separating the tree of arguments and the network of actors may facilitate they representation, it also makes it impossible to have a full appreciation of the debate. The table of cosmos is meant to show which actors support and are supported by which arguments, revealing how arguments may connect because they are held by allied actors and how actors may associate by the sharing an argument.
médialab.sciences-po.fr/controversies/2007/marees_vertes/schemassi.swf

7) *Debate dynamics*. Debates are the most dynamic phenomena of social life and as such they can only be explored through dynamic maps. Time is a crucial variable in debate mapping and one that deserves to be present in every representation composing our platform.
ionesco.sciences-po.fr/com/2007/groupe8/pages/index2.html
médialab.sciences-po.fr/controversies/2010/MontSaintMichel/
www.mfsa.ch/fileadmin/projects/macospol/
www.msa.ac.uk/mac/london/animations

8) *Reflexive mapping*. There is one more function that we hope to be able to offer through our platform: the possibility for the users of locating themselves within the space of the debate. Consider a traditional geographic map: no matter how accurate and precise it is, it will be completely useless for a user that does not know where he is. It is only by portraying ourselves in the map, that we can use cartography as tool for orientation (Corner, 1999). The same is true for debate mapping. If we want our atlas to be a navigation device and not only a representation device, we should allow users to read our maps reflexively (November, V., Camacho-Hübner, E., & Latour, B. 2010).
thes.scpo.siteo.com/fr/pag12-Votre-ranking.html
www.state.gov/opinionspace/
en.wikipedia.org/wiki/Smartvote

Objective III Disseminating the platform and the lessons learnt from it

Dissemination activities are crucially important in this project, for it is impossible to understand and improve the technoscientific debate without entering in it. Developing and integrating a series of mapping tools is less important to this research than understanding

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their impact on public debates. A significant effort will therefore be deployed to engage as many users as possible in the platform.

This means using it, but also contributing to its development. The success of the so-called Web 2.0 has proved that a large part of the Internet audience is reluctant to be confined to the role of information consumers. To be sure, many people use to the Web as they use traditional media, as a place to find information. Many others, however, (and in particular those concerned by technoscientific controversies) are willing to assume a more active role: not just receiving, but also providing and elaborating information. MEDEA must be able to engage all these different types of users. Bloggers, journalists, decisions makers, activists, researchers and ordinary citizens may all be interested in debate mapping, but their interests are obviously very distant. Disseminating our platform means being open to the diverse expectations of its different publics. According to their interests and to the resources they wish to dedicate to it, users will be able to:

- Skim through the debate, for a rapid appreciation of the questions and actors involved.
- Follow the dynamics of the controversy, tracing actors and arguments in time and space.
- Take part in the debate providing comments, ideas or interpretations.
- Contribute to the mapping efforts by submitting new data or analysing the existing ones.
- Contribute to the platform's enhancement by developing plug-ins or extensions.
- Use the platform strategically as a set of tools to act in the debate.

The platform will be released under an open-source licence encouraging users' appropriation. Unlike most academic projects, the final dissemination phase of this project is not meant to divulge the results of the research to a passive audience, but to share its conclusion with the actors already active in climate adaption controversy.

3. SCIENTIFIC AND TECHNICAL PROGRAMME, PROJECT ORGANISATION

3.1. SCIENTIFIC PROGRAMME, PROJECT STRUCTURE

The work plan of MEDEA is composed by 5 main tasks:
- T1 Constitution of a corpus of scientific discourses
- T2 Analysis of scientific and media discourses
- T3 Design and development of a debate mapping platform
- T4 Dissemination and valorisation
- T5 Management

The first step of this project is building an exhaustive collection of the discourses composing the debate on adaptation climate change. The word 'discourses' is purposely vague as it is meant to cover at least three types of enunciations: the documentation of the international climate negotiations, the academic and grey literature on the subject, the opinions and insights published on the traditional and social media.

Significant effort will be necessary to integrate all these discourses in a single data set, but once this work is done, we hope to be able to model, analyse and interpret the dynamics of climate adaptation debate. Such models and interpretations will be the basis for devising a mapping platform capable of deploying the complexity of technoscientific debate in a readable representation.

The final phase of the project will be the dissemination of the platform to as many participants as possible. This last phase has a crucial importance for at least two reasons. First of all, it will allow this project to provide an actual contribution to the debate on climate

adaptation. Second of all, it will make sure that the results of this project are spread and discussed beyond the limit of academic community, becoming a resource for policy-makers, activists, scientists and all the actors working with technoscientific debates.

3.2. PROJECT MANAGEMENT

At the crossroads of social sciences, climate sciences and digital design, MEDEA is a truly multidisciplinary project. Conscious of the challenges entailed by bringing together researchers with such a different background, we decided to dedicate to management a full-fledged task of the project (for a full description of the management tasks see 3.3.4). The management structure of the project is specially tailored to fit the scientific objectives, as well as the scientific characteristics of the Consortium. It will be composed of the Coordinator, a Project Assistant, two Scientific Leaders acting as liaison persons between the Coordination and the other two partners, a Steering Group, and a Scientific Advisory Board.

The **Project Coordination** will be ensured by the médialab of Sciences Po. The direction of the Sciences Po fully supports the implementation of the project, both in scientific and management aspects. Tommaso Venturini (see 5.2.) will ensure the coordination. A Post-doc hired by the Sciences Po's médialab will assist the Coordinator in both the scientific and the management activities (see 6.1). Sciences Po's Administrative and Financial Department, which has a longstanding experience in facilitating laboratories' participation in project-funded research[2] will assist the Coordinator in accomplishment of the administrative, legal and financial tasks.

A **Steering Group** will be the main formal governance instance chaired by the Coordinator, and gathering all the project participants. Its role will be to launch, implement, follow up and discuss each phase of the project. Within this group, the two partner leaders they will ensure the follow-up of the technical progress, namely the production of the deliverables in accordance with the project's schedule.

A **Scientific Advisory Board** gathering senior researchers will be specially set up in order to have a constant external feedback on the scientific development of the project as well as to provide specific expertise to tackle the challenges raised by disciplinary articulation in each task and in project as a whole. The Steering Group will meet every six month to assesses and give recommendations to reorient the project's work plan according to progress made. Ad hoc meetings could be set up between members of the Board and the Coordination in order to meet specific issues at any time. The foreseen scientific advisors so far are:
- Michel Callon: Emeritus Professor at the Centre de Sociologie de l'Innovation at Mines ParisTech, Paris
- Bruno Latour: Professor and Dean of research at Sciences Po Paris
- Laurence Tubiana: Director and founder of the Institute for Sustainable Development and International Relations (IDDRI-Sciences Po) in Paris.
- Raphael Billé: Programme Director Biodiversity and Adaptation at IDDRI-Sciences Po
- Valérie Masson-Delmotte: CEA Senior scientist at LSCE

Coordination will be additionally facilitated by the fact that all three partners are geographically situated in Paris and because of the relatively small number of people

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[2] Today, 15 of the research teams of Sciences Po have been involved in more than 18 ANR projects and 35 European projects.

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involved. What is more, the médialab of Sciences Po and the ENSADlab have three years of experience in collaborating in the frame of the controversy-mapping course. Not only some 20 ENSAD students participate at the Sciences Po's course each year, but also several ENSADlab researchers are actively involved in the didactic team. Under the responsibility of Tommaso Venturini, the controversy mapping course of Sciences Po will therefore become an occasion for regular meetings among the teams of the Consortium and with the participation of young lecturers-researchers and PhD students working on cartography mapping and on STS issues. During the three years of the project, the course will be centred on the climate change controversy and students of the course will be asked to choose sub-controversies of this debate for their fieldwork. Two or three sessions of the course will specifically be devoted to the presentation and discussion of work done under this project. The climate science partners of the LSCE will be invited to present the results of the work conducted in common with médialab. Thus, the controversy-mapping course will act as a small forum for dialogue and reflection on issues related to the project.

3.3. DESCRIPTION BY TASK

3.3.1 TASK 1: COLLECTION OF SCIENTIFIC AND MEDIA DISCOURSES

Responsible (in bold) and partners involved: **LSCE**, Sciences Po

Objectives: If we want to map the complex territory of adaptation to climate change, we need first of all to explore it and identify its landmarks. The task aims at collecting a largest possible share of the discourses that animate the debate in the scientific community and in traditional and social media.

Description of work and role of participants: Tasks 1 includes the following subtasks:

*T1.a   Collecting discourses in scientific and grey literature (**LSCE and Sciences Po**)*

The first subtask is collecting the full extent of the disagreement among the scientists working on climate change adaptation, gathering all the relevant literature published in academic journals as well as in grey literature (working documents, pre-prints, research papers, statistical documents…). LSCE and Science Po carry this task in close collaboration in order to be sure that all the relevant literature is harvested.

*T1.b   Collecting discourses in traditional and social media (**Sciences Po**)*

Although climate change adaptation is certainly a scientific controversy, its networks extend far beyond the limits of the scientific community. As climate change is likely to have dramatic impacts on every aspect of our collective existence, the debate on adaptation is emerging in the most disparate economic and political forums and on different spatial scales. The occasions and settings where this debate is discussed are so numerous that it would be impossible to trace them all, if it wasn't for the traceability of digital media.

Thanks to the digital convergence of communication media, it is now possible to retrieve on the Web a large share of the public debate around climate change adaptation. The médialab Sciences Po will drive the task to identify, harvest and structure the digital traces from digital datascapes. One of the main data source for this subtask will be a web corpus that MEDEA will acquire from the French specialist company: Linkfluence. Such corpus is constituted on the basis of the analysis of the topology of hyperlinks network (how the websites are connected one to another) in order to assure the best coverage by a large representative sample of websites : traditional media, political spheres, individual blogs and forums about

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health, mode, sports, technology, creative leisure... The contents are then harvested, cleaned and indexed through time making it possible to study what has been written in the last year on the web of different countries.

Risks: The main risk that challenges task 1 is the incompleteness or poor integration of scientific and media discourses. Acknowledging all the viewpoints concerned by the climate adaptation debate is essential to prove that our platform is credible and impartial. Unfortunately, if there is something that the experience with the cartography of controversies taught us, this is that, no matter how restricted a debate is, it will always raise an endless series of arguments and counter-arguments. Exhaustiveness in debate mapping is both necessary and impossible to obtain.

Luckily, one of the advantages of digital media is that they can be flexible enough to accommodate an unlimited number of revisions and adjustments. Our mapping platform will therefore draw on this flexibility to remain open to users' contribution. Far from being fully exhaustive at the moment of its release, our platform is meant to become the more extensive the more it is used.

Deliverables

D1.1   *Report on the dataset on scientific discourses (month 12)*

The document will describe the structure and the content of the database containing the discourses around climate adaptation collected in scientific and grey literature.

D1.2   *Report on the dataset on media discourses (month 12)*

The document will describe the structure and the content of the database containing the discourses around climate adaptation collected in traditional and social media.

3.3.2 TASK 2: ANALYSIS OF SCIENTIFIC AND MEDIA DISCOURSES

Responsible (in bold) and partners involved: **Sciences Po**, LSCE

Objectives: This task aims at submitting the discourses collected in T1 to a technical and sociological analysis to reveal the dynamics of the debate.

Description of work and role of participants: Tasks 2 includes the following subtasks:

T2.a   *Integration of datasets and data mining (**Sciences Po**)*

Once collected, the datasets on scientific and media discourses will have to be merged in a single heterogeneous landscape of data. This is an extremely difficult operation, but one that is necessary to establish an integrated investigation of the debate on climate change adaptation. Such an investigation will be based on a series of EDA (exploratory data analysis) techniques in order to reveal the key arguments, their exponents and their interrelationships.

First, opinion-mining techniques, based on natural language processing techniques and statistical models will be used to extract relevant aspects of textual discourse, such as the targets of opinions or facts, the stated opinion, the relationships between different aspects of the discourse and the opinion holders. This will provide the basis for connecting and grouping the different arguments that can be found in different sources, and build a semantic space reflecting the spectrum of diverging or concurring opinions. Furthermore, the debate actors can be grouped and the relationships between different networks can be

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revealed to add a further dimension to the analyses of the debate. Finally, temporal aspects will be considered to detect movements of individuals between networks or shifts in the argumentation as a whole.

*T2.b   STS analysis and interpretation (**Sciences Po** and LSCE)*

The technical elaboration of the debate dataset will not be realized in the void. On the contrary, the data-mining will be accompanied by a parallel analysis based on the methods and concepts of STS, as well as on the competences of climatology of LSCE. A strict collaboration between the two types of analysis is crucial for the project and will assure that all the relevant phenomena are identified and interpreted.

The analysis will focus on four main objects:
- Scientific and media discourses, narratives, and proposals, their mode of justification, the values and the kinds of knowledge mobilized, and their circulation;
- The reconfiguration of knowledge-power relations, action rationales, and capabilities emerging in the actor-network dynamics;
- The modes of scientific, technical and ordinary knowledge production ; and
- The specificity of the dynamics of the French debate on the strategies to face global environmental change, particularly considering the different spatial and temporal scales of action.

Risks: The main risk of this second phase of the project is the insufficient integration between the two types of investigation carried out in the two sub-tasks constituting T2. If the quantitative data mining analysis and the qualitative STS analysis are not combined in an integrated quali-quantitative approach, they will not be able to benefit from the respective insights.

The risk of insufficient integration in the analysis is real, given the wide disciplinary gap that separates the two approaches. This risk, however, will be counterbalanced by the fact the two analyses will be leaded by the same team of researcher. Combining the competences and skills of social scientists and engineers is the very mission of the médialab of Sciences Po and we are therefore confident that can handle T2 in an integrated fashion.

Deliverables

D2.1   Scientific publication (month 24) about the controversy on climate change adaptation

This document will integrate the mathematical models and the sociological analysis performed on the collected data in a publishable paper.

3.3.3 TASK 3: DESIGN AND DEVELOPMENT OF THE ADAPTATION DEBATE MAPPING PLATFORM

Responsible (in bold) and partners involved: **ENSAD,** Sciences Po

Objectives: The objective of T3 is to deliver an online platform offering a series of interactive maps of the debate on climate change adaptation. This platform should provide a legible and yet precise description of the debate and make it available not only to experts, but to any interested citizen as well.

Description of work and role of participants: Task 3 includes the following subtasks:

*T3.a   Information design of the platform (**ENSAD**, Sciences Po, LSCE)*

At the end of the task 1 we will have a fairly detailed understanding of the debate on climate change adaptation: we will know who are the involved actors, what arguments they employ,

and how they are related. The goal of T2.a is to find ways to present this information complying with two slightly contradicting mapping needs:
1) Preserving as much as possible the original complexity and richness of the debate;
2) Providing a set of representations simple enough to be easily readable by a wide public.

The objective of this subtask it to design the way information will be presented on the platform so that the two mapping need can be simultaneously fulfilled. The only why this can be achieved is by multiplying the representation devices, producing not a map, but an atlas of the debate. In point 2.4, we described in details the different types of representations that will probably be included in out platform (glossary of non-controversial elements; documentation repository; debate scale; tree of disagreement; diagram of actors-networks; table of cosmos; debate dynamics; reflexive mapping). In this subtask, the designers of the ENSAD will work in close collaboration with the social scientists of Sciences Po and the climatologists of the LSCE to design each of this maps and make sure that they are both legible and correct.

*T3.b   Interaction design of the platform (**ENSAD**, Sciences Po)*

Even if the platform developed by this project is meant to be tool for mapping climate change adaptation controversies rather than a tool for debating them, the platform should remain open to the potential contributions coming from its users. Even if most users will just consult the platform for information, some may be interested in contributing actively to the mapping effort. These contributions are precious to this project and should be welcomed. Remaining open to the contributions of the users however expose the platform to the risk of vandalism, errors and edit-wars. In order to assure the stability of the platform, it is necessary to meticulously design the interaction with its users, conciliating the need to remain as open as possible to users' contributions with the necessity to avoid chaotic and disruptive interventions.

Defining the procedures and limits of the interaction between the users and the platform is the main objective of this subtask and it will achieved by organising a series of protype-tests with a selected sample of the platform users. As the platform is meant to be a place where the actors of the climate change controversy could agree on their disagreement, the beta-tester should ideally be as varied and representative as possible, representing all the viewpoints of the debate. Those beta-testers will help us design the platform by criticizing the prototype regarding the information interaction design, as well as the scenarios of use, which imagine how the users could participate into the very mapping process.

*T3.c   Development and ongoing correction of the platform (**ENSAD**)*

The objective of this task is to develop the mapping platform to explore and represent the debate on climate adaptation. The work will be realised by the designers of the ENSAD that will technically develop the platform and the code that will allow its interactivity. The technologies, the languages and the formats employed for such development will be standard (in order to assure the largest accessibility of the platform) and open-source (in order to assure the openness of the platform).

Obviously, this is a decisive subtask for our project, the moment in which all the preparatory work materializes in an integrated toolkit for debate mapping. We will do carefully seek to anticipate and overcome the obstacles that may hinder the success of our platform. Still, we are aware that there are problems that will emerge only *after* it has been launched. This is why the development of the platform will continue until the end of the project, constantly correcting and improving the platform while it is in use.

Risks: A possible problem that may arise at this stage of the project is that the actual implementation of the maps designed by the ENSAD exceeds the technical competences of the designers involved in the project. Should this happen, we will not let technical difficulties hinder the realisation of platform. Drawing on the budget we dedicate do technical development, we will hire one or more specialised developers in order to remove the encountered obstacles.

Deliverables.

D3.1   Functional specifications of the platform (month 26)

The document will contain the detailed functional specifications of the platform, describing as meticulously as possible all the functionalities that shall be implemented.

D3.2   Release online of the platform (month 26)

The document will contain the detailed functional specifications of the platform, describing as meticulously as possible all the functionalities that shall be implemented.

3.3.4 TASK 4: DISSEMINATION AND VALORISATION

Responsible (in Bold) and partners involved: **Sciences Po**, LSCE, ENSAD (names of the persons involved)

Objectives: The last scientific task of our project is dissemination and valorisation of the results, which is an integral part of our research. Our platform is in fact to be considered as an experimental device and its dissemination represents the very launch of such and experiment.

Description of work and role of participants: Task 4 includes the following tasks:

T4.a   Dissemination of the platform (Sciences Po, LSCE, ENSAD)

We mean by dissemination the organization of the use of the platform by the stakeholders of the controversy on climate adaptation. This task is meant to animate the engagement of users on the platform, creating a user design cycle that goes from experiments to new developments or corrections. Indeed Internet users have proved to be far more creative than social researchers in discovering new repository of data, releasing new resources, inventing new tool of analysis and visualization. A key factor of success of our project will be its capability to engage a fruitful dialogue with all the bloggers, wiki-editors, online journalists and simple Internet users already involved in the climate adaptation debate

There will be a high-profile launch event, which we would like to organise with Universcience, to showcase the platform and its application. The general success of MEDEA will be measured by the success of the response to dissemination.

*T4.b   Valorization of the scientific results (**Sciences Po**)*

If we manage to involve a large set of actors on our platform, should be able to provide an answer to the basic research questions of this project: What difference does it makes to be equipped with tools for mapping technoscientific issues? Can such equipment change (and potentially improve) the way we publicly discuss science and technology? There is no doubt that answering this question would constitute an important contribution to the research on the public debate on science and technology. The last task of the project is therefore dedicated to the valorization of such contribution, making sure that it circulates not only within the scientific community, but also to policy-makers and issue-professionals.

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Risks: The greatest risk challenging MEDEA is that of being ignored by its audience. If the actors of our target debate find our platform unreliable or, even worse, irrelevant, MEDEA will have failed its mission. This explains why so much importance is given to working with users throughout the whole project. Involving the users in all the stages of conception and development, we want to make sure that the final platform corresponds to their needs and interests.

Still, despite all our efforts, the platform as we will release it at the beginning of year 3 may fall short of users' expectations. Should this happen, we are ready to spend the rest of the project to correct the platform. This is why dedicated several months to the dissemination activities and why the development of the platform is intended to last until the end of the project. If everything goes well, the involvement on developing activities will of course diminish after the release of the platform, but, should problems arise, we want to make sure that we have the resources to overcome them.

Deliverables

D4.1   *Report about the dissemination results (month 36)*

This report will discuss the results of dissemination activities, describe how the platform was received by its different audiences, highlight its elements of success and failure.

D4.2   *Scientific publication (month 36) about public participation to science through digital communication*

This last deliverable will provide a concluding reflection on the project in the form of a publishable paper. This paper will provide a detailed answer to the main research question of this project: how is public participation to science enhanced by digital mapping tools?

3.3.5 TASK 5: MANAGEMENT AND SCIENTIFIC COORDINATION

Responsible (in Bold) and partners involved: **Sciences Po**

Objectives: The management structure of MEDEA is designed to be as efficient and flexible as possible. The management and the scientific coordination objectives are the following:
-    Ensuring an efficient liaison with the ANR when required;
-    Defining, distributing and developing the tasks according to the time schedule;
-    Checking the progress of the work;
-    Advising and directing the partners on the development necessary for the project;
-    Following up, and reassessing the budget utilisation according to the evolution and progress of the project's needs.
-    Coordinating the preparation of reports (financial, technical) and deliverables.

Description of work and role of participants: Task 5 is composed by two subtasks:

*T5.a. General management of the research project (**Sciences Po**)*

The *Coordinating partner* will be Sciences Po. The *Project Coordinator* (see point 5.2.) will be Tommaso Venturini, who will be responsible for the scientific and technical coordination of the project, the establishment and formalization of the collaboration between partners, the production of project deliverables, the holding of meetings for the advancement, and the communication of results. He will be the liaison person with the ANR and its support units.

The *Scientific Leaders* of the other partners will be Gilles Ramstein for LSCE and Timothée Colignon for ENSAD. They will be the privileged liaison persons with the Project Coordinator and will be responsible be responsible for the co-ordination of the technical progress in the different tasks they are involved as well as for producing the partner's deliverables.

To ensure the general management task, a specific management strategy combining specific management tools will be set up from the very beginning, particularly an online knowledge management system to make sure that the whole workflow of the project can be carefully traced, stored and made available. The collaborative tool the Management Team is planning to implement is an aggregator of simple and easy-to-use tools:
- E-mails, Doodle, etc.
- File sharing system (like Dropbox),
- Bibliographic reference sharing tool (such as Mendeley),
- Mailing list and archive of emails sent through the mailing list,
- Collaborative task management online platform via an enhanced version of Wordpress.

T5.b. *Ensuring disciplinary dialogue, articulation and synthesis* (*Sciences Po*, *LSCE, ENSAD*)

The Consortium is representative of the articulation of the theories and practices assembled in the project: science and technology studies and communication design (Médialab) environmental and climate sciences (LSCE) and digital methods (ENSAD). The fact the project is built on a disciplinary tripod will require creating an organizational interface capable of nurturing the originality of the project.

The main management challenge will be, therefore, to ensure the adequate articulation and harmonisation of the different disciplinary methods and contributions of the partners. To tackle this issue (and ensure the monitoring of the progress, the breakdown of the overall work in sets of items of tasks, the timely delivery of the outcomes) two distinct work groups will be set up. Among other means, the collaboration will include topical meetings, whose participants will be decided by the team leaders of each partner institution. They might also require some members of the advisory board to be present, depending on the issue at hand.

As regards the first task Sciences Po and LSCE have symmetrical roles and they will need effective dialogue to ensure the articulation of sociological insights provided by the Sciences Po's team and the climate expertise provided by LSCE in the constitution and analysis of the corpus on adaptation, and including both scientific and media discourses. A specific collaborative group of team of Sciences Po and LSCE will focus on the analysis and interpretation of the data collected in the footsteps of other STS studies.

Then, the Sciences Po and ENSAD will have to engage in the translation of that analysis in an adequate digital platform by the ENSAD team, and finally in the coordination of the dissemination and valorisation actions. Special meetings will be held to discuss the technical challenges posed by the building of the 'debate-mapping' platform, and will serve to bridge the gap between the data modelling and the development of the platform.

In sum, for the project to succeed, the three team leaders will have to work in close cooperation sharing views, concepts, and information as often as possible. Accordingly, much attention will be dedicated to the coordination by planning monthly meetings of all participants to the project.

Risks: While the small size of the MEDEA Consortium certainly facilitates the management and coordination of the project, it also attributes a crucial importance to the contribution of each partner. Because of the integrated structure of the research, difficulties experienced by any of the partners may seriously jeopardize the whole project. Besides, several key tasks of

the project require the tight cooperation of two or more partners. Lack of coordination to ensure the cooperation between the partners may thereby hinder the success of the research.

However, as it has been already mentioned, the consortium gathers two research centres having previous or ongoing collaborations on other projects (see point 3.2). This should facilitate the teamwork and minimize the coordination difficulties. In any case, should cooperation problems emerge, the project's leader (Science Po) and the project's Scientific advisors have the competences to assist both LSCE and ENSAD on specific tasks, in order to remove potential blocking obstacles.

Deliverables

D5.1   Kick-off meeting and report on the meeting (month 1)

D5.2   Meetings of the Steering Group and reports (months 14, 20 and 34)

D5.3   Intermediate report (month 20)

D5.4   Final report (month 36)

3.4. TASKS SCHEDULE, DELIVERABLES AND MILESTONES
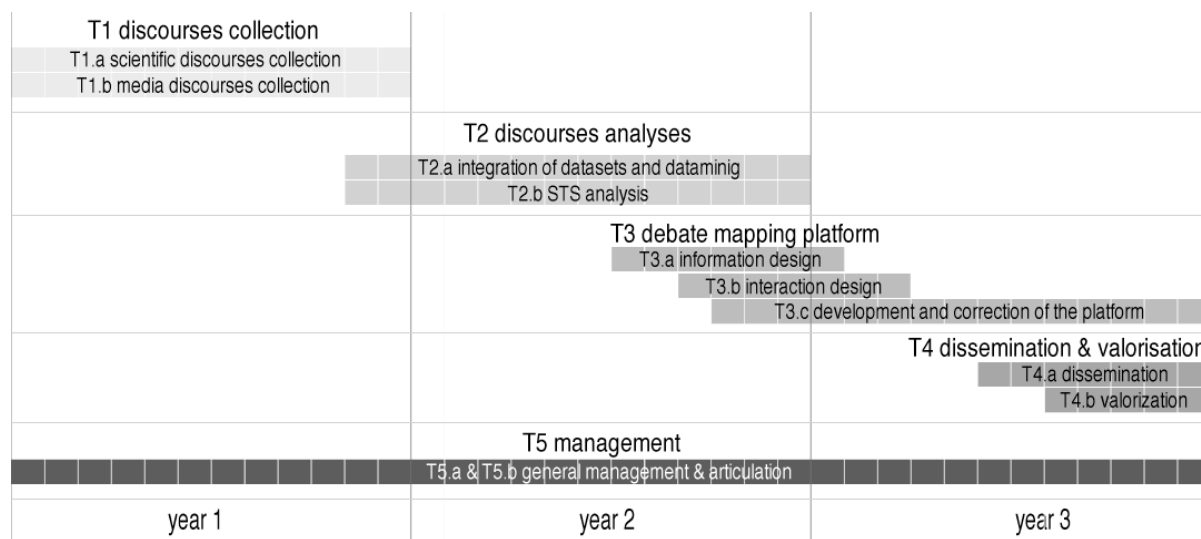
Tasks list

N°	Task title	Leading participant	Start month	End month
1	Collection of scientific and media discourses	LSCE	1	12
2	Analysis of scientific and media discourses	Sciences Po	10	24
3	Design and development of the platform	ENSAD	19	36
4	Dissemination and valorisation	Sciences Po	30	36
5	Management and scientific direction	Sciences Po	1	36

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Deliverables List

N°	Deliverable name	Task	Delivery date
D1.1	Dataset on scientific discourses	1	Month 12
D1.2	Dataset on media discourses	1	Month 12
D2.1	Scientific publication	2	Month 24
D3.1	Functional specifications of platform 2	3	Month 27
D3.2	Online platform	3	Month 30
D4.1	Report about the dissemination results	4	Month 36
D4.2	Scientific publication	4	Month 36
D5.1	Kick-off meeting and report	5	Month 1
D5.2	Meetings of Steering Committee and reports	5	Months 14, 20, 34
D5.3	Intermediate report	5	Month 20
D5.4	Final report	5	Month 36

List of milestones

N°	Milestone name	Expected date	Means of verification
1	Debate corpus	Month 12	Release of the relational databases
2	Platform	Month 29	Public release of the platform

M.1   Adaptation debate corpus: The debate corpus will be constituted by one or more relational databases gathering and integrating all the collected data in form that will support their use and visualization in the platform.

M. 2   Platform: The release of the mapping platform (and of its code source) is meant to be first key achievement of the project (see paragraph 3.2). The platform will provide an integrated and user-friendly interface allowing users to explore the complexity of the climate adaptation debate through a series of legible representations.

4. DISSEMINATION, EXPLOITATION AND INTELLECTUAL PROPERTY

Expected impacts of MEDEA

MEDEA aims to improve the debate on climate change adaptation by providing its actors with a cartography of the arguments and the positions of the dispute. Success in meeting the MEDEA objectives will have a positive impact at different levels:

-   **For scientists,** it would provide a significant improvement over the currently available tools in order to visualize the extent and content of relevant controversies as they extend not only among peers but also among other constituencies, including decision makers, journalists and the public at large. This might in turn stimulate the framing and phrasing

of scientific issues in terms which help clarifying points of conflict, including those arising from incomplete or inadequate understanding from other agents.

- **For educators**. The platform developed by MEDEA could also be employed as a set of tools for teaching and learning the science of climate beyond the simplistic approach of Public Understanding of Science. By showing the full complexity of a real scientific controversy as well as its entanglement of relations and networks, the MEDEA platform can provide an innovative viewpoint on the 'science in action'.

- **For decision makers,** both public and private, it would allow on one hand to more readily understand the essence and the extent of the controversy on adaptation among scientists, and therefore the assessment of their potential consequences. In parallel they will be able to obtain, using the same tools, an integrated view of the perception of the same issues by other affected constituencies, including media representatives, professional bodies, specialists in connected disciplines, and the citizenship at large.

- **For communicators**, be it on professional media or in open platforms such as blogs, having access to the background of the controversies, including their geographical and temporal evolution, will allow for a better-informed description of issues to the public.

- **For citizens** wishing to be better informed, access to an integrated platform which maps the nature and the extent of controversies will help on one hand alleviate the danger of the communication silos, polarization and information cascades which are observed to form around disputed issues (Sunstein, 2007). At the same time, access to the background of the controversy will facilitate the online implementation of consultation and deliberation mechanisms with a degree of variance and sophistication at least as varied as the ones that have been developed over time for off-line public debate.

- Finally, it is hoped that the development of MEDEA will stimulate a fruitful dialogue with all the bloggers, designers, developers and researchers working to foster public participation in climate debates. The technologies and platform resulting from this dialog will undoubtedly be useful in many other social domains where substantial technoscientific controversies are apparent and relevant.

The actions included in the Dissemination Work-package will guarantee that appropriate relationships with all those different social groups are adequately explored and sustained during the course of the project.

The outcome of MEDEA is therefore expected to have a multiple positive impact by:
- Contributing to the advance of the public debate over climate change adaptation in France and beyond.
- Assessing the qualities of the social technologies that facilitate an efficient debate on scientific topics.
- Promoting the design and widespread availability of digital methods, technologies and platforms that facilitate and stimulate social participation of scientific disputes, taking into account the different 'personalities' of the public that can be involved (e.g. research bodies, media, government, scientists or the public at large).

Dissemination strategy

At the beginning of the project, an action plan outlining the guidelines for dissemination will be drafted and circulated among the project partners. The Dissemination Action Plan will remain an open document, subject to constant updating agreed upon by the Steering Group and the Scientific Advisory Board.

The first strategic goal will be to indicate ways to create external awareness of the project and to disseminate its results to the widest audience possible. Accordingly, it will make mandatory for each activity of the project to include a dissemination dimension. In the case

of confidential activities, it will specify how to report the activity without exceeding the confidentiality threshold.

The second strategic goal will be that of identifying specific audiences of MEDEA among the broad categories mentioned above and possibly beyond these. The compilation of the contact database will be key in this respect (see below). Moreover, it will crucial to indicate the means of dissemination that each partner institution will be invited to make use of according to its capacity.

Finally, it will set both qualitative and quantitative parameters to evaluate progress of the dissemination effort. Qualitative parameters will include the publication of papers/articles produced in the framework of MEDEA in peer-reviewed publications. Quantitative parameters may include the various logs of activity of the platform regarding the number of users and more precisely the level of involvement.

The success of this project is intrinsically connected to its openness: the capability to remain as transparent as possible and put actor's contribution at the centre of its development. The effort to remain open will invest all the project activities and will have direct consequences on the management of its intellectual property question. All the results of activities carried out within this project (being them piece of software, data, visualizations…) will be released under open licenses. The precise licenses employed for each part of the project will be object of a meticulous reflection within the consortium in order to assure that they fit the specific challenges meet by the project. Generally speaking, we will prefer licenses containing *Attribution* and *Share-Alike* clauses such as:

- Reciprocal Public License for software (www.opensource.org/licenses/rpl1.5)
- Attribution-ShareAlike 3.0 for visualization (creativecommons.org/licenses/by-sa)
- Open Database License for data (hwww.opendatacommons.org/licenses/odbl).

Our preference for open licenses will admit two exceptions:

- The need for protecting the privacy of the personal data that may be collected.
- The respect for the previous work realized by the partners of the consortium or acquired from private companies through subcontracting, which could be 'imported' in the project without having to comply with the selected licenses.

5. CONSORTIUM DESCRIPTION

5.1. PARTNERS DESCRIPTION & RELEVANCE, COMPLEMENTARITY

PARTNER 1 : Fondation Nationale des Sciences Politiques

The *Fondation Nationale des Sciences Politiques* (Sciences Po) is a fully-fledged, self-governing research university specialised in the social-economic sciences and the humanities which enrols some 9,600 students per year. Sciences Po is the leading research university in the social sciences in France with 50 full-time professors, 190 researchers, 80 foreign professors invited each year, nine research centres, five of which are closely linked to the Centre National de la Recherche Scientifique (CNRS). Sciences Po facilitates laboratories' participation in the European Research Area. Today, 15 of the research teams of Sciences Po have been involved in more than 35 European projects and 18 ANR projects.

The Science Po team is will gather researchers working at the médialab and IDDRI.

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Médialab: Established in 2009 thanks to the support of the île-de-France region, the médialab of Sciences Po is a laboratory of digital resources centred on all the new technologies of information and communication. The médialab has been created to explore how data and resources provided by information and communications technologies can be harnessed for the benefit of social sciences. The médialab is a site dedicated to digital research. It is a team of specialists bringing together social scientists, engineers and designers. It is a high-tech facility, a hub for vanguard research, a scientific toolkit at the disposal of the Sciences Po academic community and a platform for launching national and international collaborations.

Institute for Sustainable Development and International Relations (IDDRI): At the interface between research and decision-making, IDDRI is a foundation that examines sustainable development issues that require international coordination, such as climate change or the depletion of natural resources. Its research focuses on global governance, North-South relations and international negotiations. IDDRI has three objectives: informing policy decisions; identifying emerging issues; and creating a platform for dialogue between stakeholders whose interests are often at odds - research organizations, public and private economic actors, unions and NGOs. To meet these objectives, IDDRI defines the challenges, gathers stakeholders - whatever their origin and discipline - and identifies new issues. It thus promotes a common understanding of concerns, while at the same time putting them into a global perspective.

PARTNER 2 : Laboratoire des Sciences du Climat et de l'Environnement

The LSCE is a laboratory (UMR 1572) related to the CNRS, the Atomic Energy Commission and the University of Versailles Saint-Quentin. With about 300 people (150 permanent), the LSCE is a part of the Institute Pierre Simon Laplace (IPSL), which federates several laboratories involved in climate and environment studies. Three research axes are developed:
- natural climate variability at different time scales and interactions between human activity, environment and climate,
- processes involved in the carbon cycle, greenhouse gases, aerosols interacting with climate,
- geochronology and geomarkers, with several techniques applied to studies of the geosphere and interactions with climate.

In this project the LSCE will have a role of advice and of contact. The field of climate change adaptation is very broad and the LSCE's competences are primarily focused in Climate and Environment (although within a larger coverage offered by the IPSL Institut Pierre-Simon Lapalace of which LSCE is a member).

The research units that allow the LSCE to contribute to the investigation of human adaptation are research axe 'Environment and Climate' and 'GIC-Climat' (the directors of both these units are involved in the current project). While the LSCE does not claim to be able to cover all the scientific problems connected to the adaptation, our network of partners and contact may significantly benefit the project.

On the contrary, in scientific areas where its has a specific expertise, the LCSE will give its contribution both by striving to open the project the whole spectrum of scientific positions far beyond our own convictions and by providing a continuous feedback on the mapping.

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PARTNER 3: EnsAD, École nationale supérieure des Arts Décoratifs

EnsAD. The École nationale supérieure des Arts Décoratifs – whose origins date back to 1766 - is an administrative public establishment under the authority of the French Ministry for Culture and Communication. It is administered by a Board of Directors, headed by a Director and endowed with a Studies and Research Council.

EnsADlab: The École nationale supérieure des Arts Décoratifs pursues an ambitious research policy through its research laboratory, EnsADlab, set up in 2007. It provides the school with a specific entity engaged in reflection and research on programmes relating to the fields of creation and innovation, whether already identified or emerging, linked to the social, economic, technological, political, industrial and cultural contexts of today's world. Combining research and training « in research and through research », in preparation for a third cycle at Doctorate level, EnsADlab currently consists of some ten research programmes covering the fields of both art and design, such as graphic design and typography, the design of services, objects or spaces, interactive installations, virtual spaces, new materials, mobility. These programmes are directed by research professors, faculty members and professionals with the highest levels of expertise. Each programme involves a number of research students (around five per programme), French and foreign, selected by the school, all of whom hold at least a Master's degree – and some being doctoral students – generally from EnsADlab partner research institutions (around 50 student researchers and 20 faculty members, researchers and well-known professionals).

5.2. QUALIFICATION OF THE PROJECT COORDINATOR

Tommaso Venturini was trained in sociology, communication sciences and semiotics at the University of Bologna (department of Umberto Eco) where he graduated with full marks. He has been visiting student at the UCLA. He attended the international Ph.D. program on the Quality of Life in the Society of Information (www.quasi.unimib.it) at the University of Milano Bicocca, investigating the biopiracy controversies aroused by the modernization of traditional agricultural communities. As a post-doc researcher, he worked at the University of Bologna analyzing the Italian food distribution systems. Since 2008, he coordinates the courses of controversies mapping at Sciences Po Paris and, since September 2009, he has joined the médialab as coordinator of the research activities.

As a professional, Tommaso Venturini funded and leaded an innovative web-agency (www.ideaedi.it) taking part in several vanguard web projects and being responsible for numerous virtual communities.

Despite his young age, Tommaso Venturini has the suitable profile for leading this project. Working in close collaboration with Bruno Latour, Tommaso Venturini has developed the research line of cartography of controversies both by coordinating the controversy mapping course at Sciences Po and assisting the Principal Investigator of the MACOSPOL project. The coordinator of the MEDEA project is therefore deeply involved in the research on controversies and will assure a zealous and passionate coordination of the project.

Moreover Tommaso Venturini is also the principal researcher of the médialab of Sciences Po and as such he is in the perfect position to operate the combination among social sciences, climate sciences, design and digital methods required by the MEDEA project.

Selected publications on controversy mapping

- Venturini, T. (forthcoming). Building on Faults: how to represent controversies with digital methods. *Public Understanding of Science*, (X), 1-17. doi: 10.1177/0963662510387558.

- Venturini, T. (2010). Diving in Magma: how to explore controversies with actor-network theory. *Public understanding of science*, 19(3), 258. SAGE Publications. doi: 10.1177/0963662509102694.

- Venturini, T., & Latour, B. (2010). The Social Fabric: Digital Traces and Quali-quantitative Methods. *Proceedings of Future En Seine 2009*.

- Venturini, T. (2008). Piccola introduzione alla cartografia delle controversie. *Etnografia e ricerca qualitativa*, 3, 369-394.

- Venturini, T. (2007). Les trous noirs de la Réevolution Verte. *Décroissance & technique*, 3.

- Venturini, T. (2007). Verba Volant, Scripta Manent: The Discontinuity Effect of Explicit Media. *American Behavioral Scientist*, 50(7), 879-896. doi: 10.1177/0002764206298313.

5.3. QUALIFICATION AND CONTRIBUTION OF EACH PARTNER

Partner	Name	First name	Position	Field of research	PM	Contribution to the project
Sciences Po	VENTURINI	Tommaso	Researcher	sociology	14	* project leader * specialist on controversies mapping * scientific coordination of the project
Sciences Po	GIRARD	Paul	Software architect	ingeneering	7	* technical supervision of harvesting and data treatement in task 1 and 2
Sciences Po	BANEYX	Audrey	Researcher	ingeneering	7	* expertise in scientometrics in task 1 and 2
Sciences Po	BOULLIER	Dominique	Professor	sociology	4	* sociological supervision of the project
Sciences Po	GEMENNE	François	Researcher	sociology	4	* expertise on climate negotiation in task 1 and 2
LSCE	CHARBIT	Sylvie	Researcher	climatology	4	* expertise on climate change impact on marine environments
LSCE	MASSON	Valérie	Senior scientist	climatology	1	* supervision of the project
LSCE	MAZAUD	Alain	Researcher	physics	4	* expertise on public relations and results dissemination
LSCE	PAILLARD	Didier	Researcher	climatology	4	* expertise on climate change models
LSCE	RAMSTEIN	Gilles	Senior scientist	climatology	6	* expertise on the relation man-climate-environment
LSCE	VAUTARD	Robert	Senior scientist	climatology	2	* expertise on climate change dynamics
LSCE	VRAC	Mathieu	Researcher	Statistical climatology	3	* expertise on statistical climatology
ENSADlab	COLLIGNON	Timothée	Professor 2	Design	6	* expertise in interactive design
ENSADlab	DEPELSENAIRE	Jean-François	Professor 1	Design	3	* expertise in information design
ENSADlab	MILLOT	Philippe	Professor 2	Design	3	* expertise in information design

6. SCIENTIFIC JUSTIFICATION OF REQUESTED RESSOURCES

6.1. PARTNER 1 : SCIENCES PO

- *Équipement / Equipment*

The MEDEA project includes in T2 and T3 a considerable work of collect and analysis of digital data. Such work will require the use of advanced technical equipment necessary for data archiving and computation. The cost of such equipments, however, will not be charged on the MEDEA project as the médialab of Sciences Po already disposes of such equipment (thanks to the generous funding of the Île de France region).

- *Personnel / Staff*

POST-DOC – 36 man.month 150.000 €

The Post-Doc hired by the Sciences Po's médialab will play a crucial role in the MEDEA, by assisting the Coordinator of the project in both the scientific and the management activities. He will be responsible for supervising T1 assuring that the three corpora collected by the project (negotiations documents, scientific literature, media discourses) are complete and solid. The Post-Doc will also be closely work with the Coordinator and the Partners in the crucial phase of the analysis by providing his/her competences of social sciences. Finally the Post-Doc will be involved in the dissemination task, in particular by organising the closing symposium of the project and editing the book presenting the results of MEDEA.

This profile requires training in sociology especially Science and Technology Studies (STS), a knowledge of the methodology of controversy mapping as well as some ability in project managing.

A selection process will be open to fill this position at the very beginning of the project, but we think we already identified a strong candidate whose profile would strongly contribute to the project. We include here a short biography of the person identified:

Nicolas Baya-Laffite was trained in Political Science and Urban Environmental Management at the University of Buenos Aires, and in Science and Technology Studies (STS) at Centre Alexandre Koyré of the École des Hautes Études en Sciences Sociales of Paris. Working under the supervision of Dominique Pestre and Marie-Angèle Hermitte, his PhD thesis (to be presented for defence in 2011) focused on the interplay between expert knowledge, politics and the law resulting from the use of environmental and risk management instruments, including EIA and Best Available Techniques, in transboundary controversies taken before international jurisdictions. After teaching Political Theory in the University of Buenos Aires, he currently teaches courses of STS at Sciences-Po Paris and at AgroParisTech. As a Consultant on science-in-society issues, he has worked for international and French organisations in several projects, namely OECD (in the elaboration of policy briefs for the new Innovation Handbook), UNESCO (in the elaboration of a publication on the Social Science-Policy Nexus), French Agency of Environmental Security - ANSES (in the elaboration of scientific briefs on the contributions of civil society to expertise), French Ministry of Ecology (in the REPERE programme, on the elaboration of a report on NGO and research institutions engagement in research for sustainable development), Cité des Sciences (in two international projects, the EU-FP6 funded CIPAST project on citizen participation in S&T debates, and the World Wide Views on Global Warming citizen consultation), and INRA (in the preparation of a dossier on Nanotechnology and society).

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- *Prestation de service externe / Subcontracting*

Subcontract "Social media harvesting" – 10.000 €

The harvesting of web data is a difficult activity that requires a high level of knowledge and expertise into web mining. The Médialab Sciences Po signed a research partnership with the French startup Linkfluence, which tracks, analyzes and maps social media. Linkfluence gained a valuable expertise on creating corpuses of social web media and on methodologies to analyze the contents of those corpora through time. Both topological and contents can be analyzed with a time depth which allows studying the dynamics of information spreading.
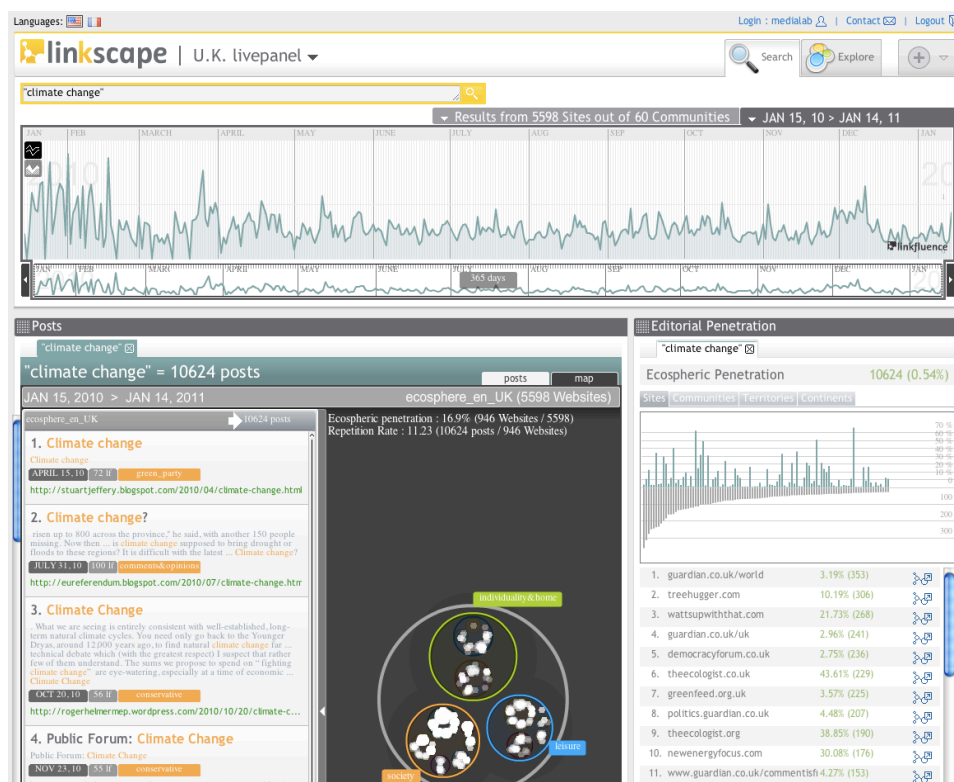
Linkscape, the social media exploratory tool from Linkfluence

Subcontracting the provision of the web corpus to Linkfluence will save the project a great deal of time and energy to focus on the analysis. This provision will include the sourcing activity to frame the corpus and the transmission of the data. The existing research partnership between Médialab Sciences Po and Linkfluence will assure an efficient collaboration between the fields of social media mining and STS, a key to success for mapping controversial issues.

Technical Development subcontracting – 23.000€

Although the analysis activities carried out in T2 will extensively drawn on the digital tools developed by the Sciences Po médialab some personalisation of such tools is to be envisioned. The instruments currently at our disposal (HCI, ScholarScape, ANTA described in T2) are general tools that can be employed for a variety of different subjects. The specificities of the debate on climate change adaptation suggest the importance developing a specialized application of those tools for the purposes of this project.

- *Missions / Travel*

Travel connected to the field investigation – 3.000 €

As the MEDEA project focuses of the debate on climate change adaptation in France, the travels costs required by the acquisition of data could be limited to 1.000 € per year.

Symposium organisation – 5.000€

The dissemination phase of MEDEA (T4) includes the organisation a medium-scale symposium closing the project. Travel expenses are meant to cover the costs (train/plain tickets and hotel) for inviting a few national and international researchers. This one-day event will have three main objectives:
- presentations of project results
- discussions on future developments
- presentations of related works

- *Dépenses justifiées sur une procédure de facturation interne / Costs justified by internal procedures of invoicing*

None

- *Autres dépenses de fonctionnement / Other expenses*

Scientific Publication – 2.000€

An important part of the dissemination strategy of MEDEA consists in the publication of a scientific book making available to the scientific community both the theoretical results of the project and the discussions of the closing Symposium. The little budget provided for this publication to Sciences Po will cover for the costs of professional editing of the book.

6.2. PARTNER 2 : LSCE

- *Équipement / Equipment*

None

Personnel / Staff

Junior researcher – 24 man.month 83.448 €

The junior researcher hired on the project will be the interface between the LSCE and other teams of the MEDEA consortium. Based at LSCE and having the appropriate scientific background, he/she will be responsible for establishing links between the mapping activities and the scientific expertise. Moreover according to the needs emerging from the investigation, he/she will identify the methodological flaws or weaknesses in the interpretation of the scientific discourse.

The profile for this position is that of someone having a solid scientific basis in climatology and some expertise in the global warming potential consequences. Open-mindness and interest for the social issues of climate adaptation will also be an important requirement.

- *Prestation de service externe / Subcontracting*

None

- *Missions / Travel*

Travel connected to the field investigation – 15.000 €

On the one hand, the requested budget is meant to cover travel costs of the junior researcher specifically hired on the project. His/her role makes it necessary to meet the many different scientific teams working in France on the issues of climate change and climate change adaptation and participating to national and international conferences.

On the other hand some of the travel budget will be used to finance the cost of the permanent staff involved in the project, in order to allow them to fulfil their role of interface with other laboratories and to disseminate the results to conferences and meeting of international scientific bodies.

- *Dépenses justifiées sur une procédure de facturation interne / Costs justified by internal procedures of invoicing*

None

- *Autres dépenses de fonctionnement / Other expenses*

Functioning expenses – 13.000 €

This cost covers the organisation of seminars and workshop. This budget also cover for the small electronic equipment to be used in the project.

6.3. PARTNER 3 : ENSAD

- *Équipement / Equipment*

None

- *Personnel / Staff*

Web and information designer – 12 man.month 48.000 €

The designer hired on the project will be responsible for coordinating the work of the development of the mapping platform. He/she will have to work in close collaboration with the social scientists of Sciences Po and with the climate experts of the LSCE.

The profile for this position requires therefore excellent competences in information and web design, as well as the capacity to interact with other discipline and to understand the social and scientific issues at stake.

- *Prestation de service externe / Subcontracting*

Technical Development subcontracting – 15.000€

In order to help the designers to technically develop the platform and the code that will allow its interactivity, the need for a regular developer will be a benefit. The technologies, the languages and the formats employed for such development will be standard (in order to assure the largest accessibility of the platform) and open-source (in order to assure the openness of the platform).

- *Missions / Travel*

Travel connected to the field meetings – 1.500 €

The MEDEA project focuses of the debate on climate change adaptation and on the design of a series of interactive maps of the debate. The travels costs required by the participation to design meetings on the subject could be limited to 1.500 € per year.

- *Dépenses justifiées sur une procédure de facturation interne / Costs justified by internal procedures of invoicing*

None

- *Autres dépenses de fonctionnement / Other expenses*

Scientific Publication – € 15.000€

An important part of the dissemination strategy of MEDEA consists in the publication of a scientific book making available to the scientific community both the theoretical results of the project and the discussions of the closing Symposium. The budget provided for this publication will cover for the costs of design and production of the book.

7. ANNEXES

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7.2. CV, RESUME

Tommaso Venturini was trained in sociology, communication sciences and semiotics at the University of Bologna (department of Umberto Eco) where he graduated with full marks. He has been visiting student at the UCLA. He attended the international Ph.D. program on the Quality of Life in the Society of Information (www.quasi.unimib.it) at the University of Milano Bicocca, investigating the biopiracy controversies aroused by the modernization of traditional agricultural communities. As a post-doc researcher, he worked at the University of Bologna analyzing the Italian food distribution systems. Since 2008, he coordinates the courses of controversies mapping at Sciences Po Paris and, since September 2009, he has joined the médialab as coordinator of the research activities.

As a professional, Tommaso Venturini funded and leaded an innovative web-agency (www.ideaedi.it) taking part in several vanguard web projects and being responsible for numerous virtual communities.

Selected publications

- Venturini, T. (forthcoming). Building on Faults: how to represent controversies with digital methods. *Public Understanding of Science*, (X), 1-17. doi: 10.1177/0963662510387558.

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Gilles Ramstein made his PhD (1987) and his HDR (Habilitation à diriger des recherches – 1992) in accelerator Physics. Since 1992, he shift to climate Modelling, first years as researcher (1992-1998), then as head of LSCE Climate Modelling Group (1998-2006, around 20 people) then since 2006 as head of Climate Division (80 to 100 people). In developing that approach, he was the head of the CNRS multidisciplinary program "ECLIPSE" from 1999 to 2006. Gilles Ramstein was also involved in the CNRS Ocean Atmosphere section from 2004-2008. On the other side: at CEA, he was responsible for Climate and Environment prospective towards next ten years (2004). Since 2004, he is Research Director at CEA.

Gilles Ramstein main expertise is in modelling the climate of the Earth System. The publications listed below show that he is interested both in the Past (from Deep Time to Quaternary) and future climates with emphasis on modelling the climate – Cryosphere response to climate changes as well as the change in hydrologic cycles.

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12.   Le Hir G., Donnadieu Y., Goddéris Y., Pierrehumbert R.T., Halverson G.P., Macouin M., Nédélec A., Ramstein G., 2009. The snowball Earth aftermath: Exploring the limits of contiental waethering processes. Earth Planet. Sci. Lett. 277, 453-463

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Timothée Collignon. lives and works in Paris. Graphic design and multimedia creative with a strong visual design sense, demonstrated ability to use technology creatively, solid Experience with the Flash Platform , web and mobile development workflows. Outspokenly passionate about technology, with good communication skills, and a strong professional and academic background. Since 2002: Professor at the Ecole Nationale Supérieure des Arts Décoratifs (ENSAD), Paris. Oda editions, laboratory department for printed and multimedia editions at France Telecom. Creative and multimedia designer of cultural projects for secondary school pupils (www.louvre.edu, educative website of the museum, then www.texteimage.com) : 2006: Graduate thesis, The Use of Multimedia in Teaching. 2006: Co-founder and partner of Since Studio, enterprise for the creation of design, visual and architectural identities. 2010-Ohm studio: Art direction and design interfaces for collaborative media projects.

PROGRAMME CHANGEMENTS
ENVIRONNMENTAUX PLANETAIRES
& SOCIETES

EDITION 2011

Projet MEDEA

DOCUMENT SCIENTIFIQUE

7.3. STAFF INVOLVMENT IN OTHER CONTRACTS

Sciences Po

Part.	Nom de la personne participant au projet / name	Personne . Mois / PM	Intitulé de l'appel à projets, source de financement, montant attribué / Project name, financing institution, grant allocated	Titre du projet : Project title	Nom du coordinateur / coordinator name	Date début & Date fin / Start and end dates
Sciences Po	Tommaso Venturini	12	EU SiS.2011.3.0.6-1 (under evaluation)	EMAPS	Bruno Latour	01/10/11 01/10/14
Sciences Po	Paul Girard	7	ANR blanc 2010	Re-Analyse	Sophie Duchesne	01/01/11 01/01/14
Sciences Po	Paul Girard	5	ANR jeunes chercheurs 2001 (under evaluation)	DECIVOT	Tiberj Vincent	01/09/11 01/09/14
Sciences Po	Dominique Boullier	3	FUI Conseil Régional Ile de France	SOLEN	e-pagine	01/11/10 06/11/13
Sciences Po	François Gemenne	18	ANR Les Suds	CADHOM	Jean-Pierre Marguénaud	01/01/11 01/01/14
Sciences Po	François Gemenne	2	Programme GICC du MEDEEM	ExClim	Chloé Vlassopoulou	01/11/09 01/11/12

LSCE

Part.	Nom de la personne participant au projet / name	Personne . Mois / PM	Intitulé de l'appel à projets, source de financement, montant attribué / Project name, financing institution, grant allocated	Titre du projet : Project title	Nom du coordinateur / coordinator name	Date début & Date fin / Start and end dates
LSCE	Robert Vautard	2	ANR CEPS	CHEDAR	Pascal Yiou	1/01/10 31/12/13
LSCE	Robert Vautard	2	ANR CEPS	GREEN GREENLAND	Valérie Masson - Delmotte	1/03/11 28/02/14
LSCE	Gilles Ramstein	4	ANR Blanc	PHYLOSPACE	Alan Franc	01/01/10 01/01/13
LSCE	Valérie Masson – Delmotte	4	ANR VMC	NEEM	Valérie Masson - Delmotte	2009-2012

LSCE	Valérie Masson - Delmotte	28	ANR CEPS	Greenland	Valérie Masson - Delmotte	2011-2014
LSCE	Valérie Masson - Delmotte	2	FP7	PAST4FUTURE	Dahl Jensen	2010-2013
LSCE	Mathieu Vrac	4	GIS	PEPPER	Philippe Naveau	2010-2013
LSCE	Mathieu Vrac	7	ANR	McSIM	Jean-Noel Bacro	2010-2014
LSCE	Sylvie Charbit	13	ANR VMC	NEEM	Valérie Masson - Delmotte	2009-2012

ENSAD

None