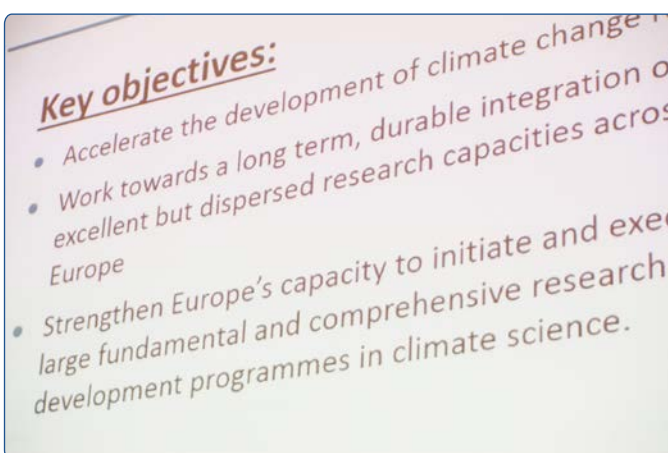


European Climate Research Alliance General Assembly 2015

„New knowledge for risk reduction“

25-26 March 2015, Square Brussels Meeting Centre,
Coudenberg 3, 1000 Brussels



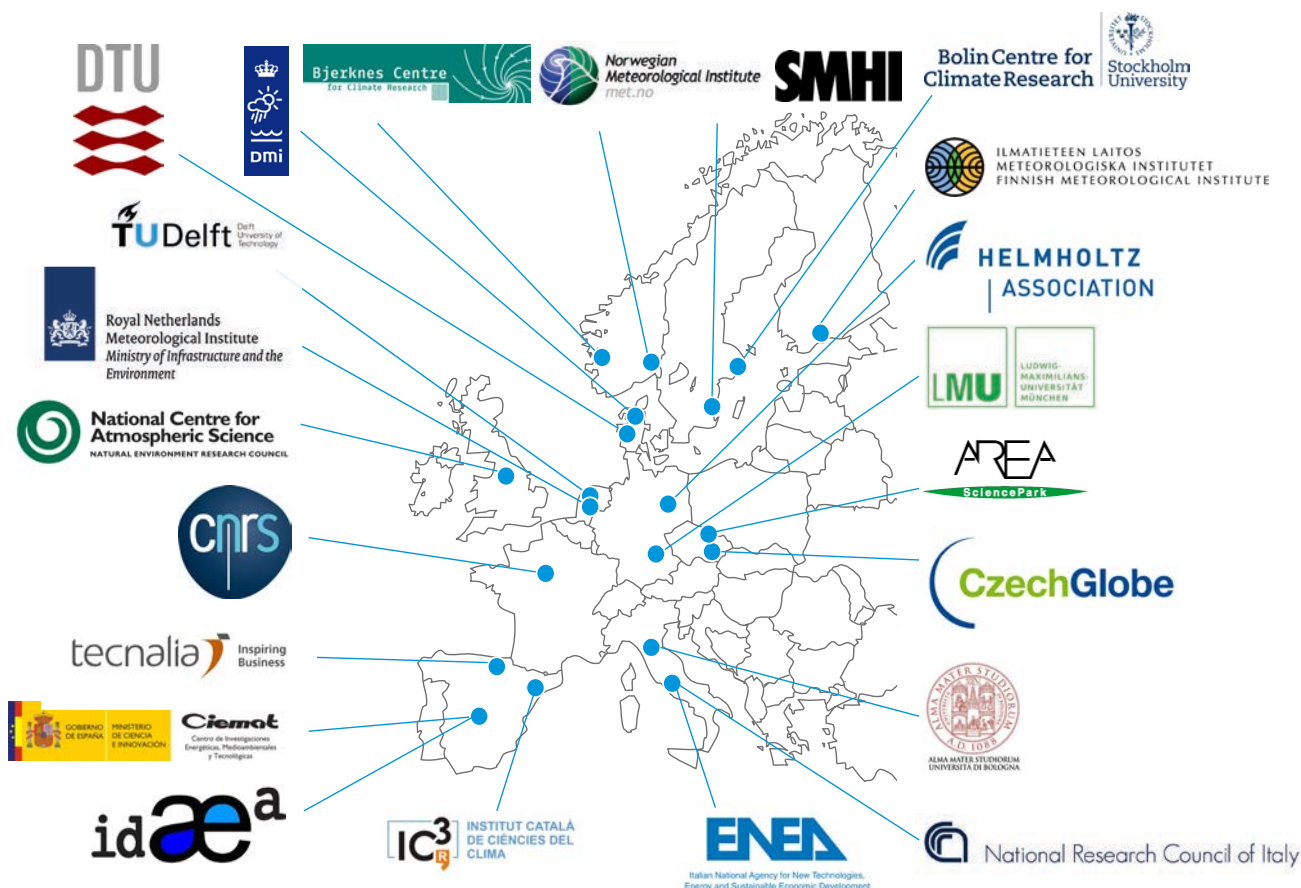
The ECRA General Assembly counted 170 participants from Academia/Research, European Commission, as well as NGO's and other representations. Future challenges posed by climate change were discussed in the context of research priorities, providing a comprehensive and robust knowledge base for future mitigation and adaptation measures.

This documentation summarizes key challenges of climate research identified at the ECRA General Assembly 2015 (page 3) and presented in ECRA's Collaborative Programmes (pages 6-7). Importance of collaboration in climate research to face societal challenges was discussed together with researchers, the European Commission, JPI Climate, Future Earth and WCRP (page 4-5).

The European Climate Research Alliance (ECRA)

ECRA was launched in 2011 by signing a joint agreement between national research institutions in Europe. ECRA works as a bottom-up initiative and aims at strengthening, expanding and optimizing EU climate research capabilities. Since 2011 many more institutions joined the ECRA network (11 core members and 11 Participants/Associates). As an alliance of leading climate research institutions it provides access to essential capacities realizing research.

ECRA Members



ECRA - Collaborative Programmes

ECRA is a think tank for emerging research topics. Recently there are four Collaborative Programmes, addressing topics of high relevance – topics that cannot be done by individual institutions alone. Their major conclusions drawn from the ECRA conference are summarized on page 6 and 7.

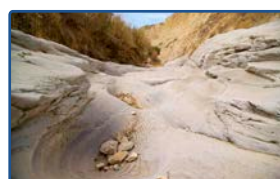
Arctic stability and change



Changes in the hydrological cycle



High impact events and climate change



Sea level changes and coastal impacts



Key Messages

The ECRA conference 2015 identified overarching issues for the improvement of climate research in Europe:

The observational network for climate data is not sufficiently secure.

Key observations have to be maintained on a long-term basis and data have to be easily accessible. International agreements on the upkeep of an essential observational network and related data would be desirable.

Models have to simulate processes across all scales.

Modelling frameworks connecting global to regional to local and impact models have to be implemented. Regions with high risk potential have to be in the focus of regional assessments and prediction. Impacts of climate change on civil society as well as resilience to its risks have to be considered on a regional and local basis.

The interactions within the Earth System have to be addressed.

Sectorial research fields have to join forces from natural science to economy and social science in order to be trans-disciplinary. This complexity has to be reflected in model development activities.

Attribution of natural versus anthropogenic changes is still incomplete (incl. understanding of natural processes and time-scales of change).

More effort needs to be spent on identification of the extent of natural variability and the human impact on these natural cycles. Substantial risks can emanate from combination of several climate impacts.

Climate change research requires “translation” for stakeholders.

Scientific results need to be made useable for the climate services community, the broader public, other stakeholders. In particular, people need to be made aware which risks will emanate from climate change and have to contribute towards responding in a constructive way. A systemic pathway from scientific understanding to climate resilience is needed.

More education about risks associated with climate change.

People have a different perception of extreme events under climate change. In order to gain a better understanding of consequences resulting from climate change and for a better acceptance of risk management, more education is needed.

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- ▶ ECRA will link to other international and European climate research activities combining capacities and make climate science relevant for society.
 - ▶ Young scientists are already participating within the ECRA network. This engagement will be more strengthenend within the future, in particular within the ECRA Collaborative Programmes activities.

Panel Discussion

Importance of collaboration in climate research to face societal challenges

Two initial statements representing the scientific point of view (Karin Lochte) and the European Commission's point of view (Kurt Vandenberghe) opened the panel discussion focusing on the future role of Climate research collaboration from different perspectives.

Ralf Ludwig (moderator), Prof. Dr. is the co-chair of the ECRA, Collaborative Programme Changes in the Hydrological Cycle'. He is the Dean of the Faculty of Geosciences at the Ludwig-Maximilians-University in Munich, Germany.



The following questions (a selection) were posed to the panellists:

1. Climate change research – Where do we stand?
2. What are the deficits and research needs in the next years?
3. How to perform the transition from basic research to risk governance and risk reduction?
4. How to improve the science-policy interface?

Kurt Vandenberghe is the director of the Directorate I - Climate Action and Resource Efficiency at the Directorate General for Research and Innovation, European Commission

“Traditional climate science should be ready for transformation, i.e. a change in thinking from problems to solutions by using climate knowledge and be aware of user needs.

That is now the societal challenge we need to address: a systemic transformation for a low-carbon, climate-resilient Europe and world. And we need research and innovation to play an essential role to make this happen.

The scientific community – as the one represented by ECRA – has the responsibility of offering society a palette of options for transforming our economic system and our behaviour as part of a sustainable future.”



Humberto Delgado Rosa, PhD is the Director of the Directorate C (Mainstreaming Adaptation and Low Carbon Technology), DG Climate Action, European Commission.

Climate scientists should re-think their role in society towards also providing solutions, e.g. in the land-use sector or in risk assessment.

The challenge for climate science should be to focus more on the interplay between the natural and socio-economical sciences, so as to address both mitigation and adaptation for gaining the maximum benefit for society through soft, green, cost-efficient and win-win solutions grounded on science.



Karin Lochte, Prof. Dr. is the chair of the European Climate Research Alliance (ECRA). She is director of the Alfred-Wegener Institute, Helmholtz Centre for Polar and Marine Research in Bremerhaven, Germany.

“We will need a much better data base from observations to improve the models. We furthermore have to ask ourselves which of our scientific results are actually needed by policy-makers? We need to know who are the users of our scientific results and what are the user needs from science?”

Sanna Sorvari, PhD is research manager at the Finnish Meteorological Institute. She is a Management Committee member in the JPI Climate (Joint Programming Initiative Climate).

“In the era of solution-oriented climate science, we should acknowledge that all the research pillars of climate knowledge production are equally needed and resources should be balanced among activities. The full chain needs support actions – as excellent basic research with the world-class research infrastructure provides novel climate information for solution-oriented, stakeholder co-designed research activities in the provision of better climate knowledge for the society”.



David Carlson, PhD is the Director Joint Planning staff (JPS) of the World Climate Research Programme (WCRP). WCRP has the main objective to determine the predictability of climate and the effect of human activities on climate.

“In the Climate science world, there are different scientific networks working on urgent but separate research priorities. We actually need a much better communication between the different networks of scientists in order to provide good scientific expertise to policy. Collaboration between scientists should be more efficient and coordinated in order to provide the best scientific results for policy and society.”

Martin Visbeck, Prof. Dr. is the chairman of the German Committee Future Earth. He leads the research unit “Physical Oceanography” at the GEOMAR Helmholtz Centre for Ocean Research Kiel and the Kiel Cluster of Excellence ‘The Future Ocean’, Germany.

„An important question for climate research should be: Who needs to know the scientific results? Climate research should focus on fundamental understanding and discovery, but at the same time be responsive to need of society when managing regional climate risks.

Today there is a significant opportunity to improve the uptake of scientific results into policy. Therefore, in addition to internationally coordinated science it might be wise to increase efforts that strengthen the science-policy interface.”



ECRA Collaborative Programmes

Session 1 - Arctic climate stability and change (Arctic ECRA)

“What happens at the poles does not stay at the poles!”

Observations clearly show that the Arctic is warming faster than the rest of the planet, that sea ice and snow cover is thinning and shrinking in all seasons, and that the Greenland ice sheet is losing mass at record rate. These Arctic changes have local and global consequences for atmospheric circulation, sea level, ecosystem functioning and commercial activity. The disappearance of sea ice will open up a whole new area of geopolitical importance. Massive investment is estimated over the next decade in the Arctic. Sustainable development depends critically on scientific understanding of impending changes and improvement of predictive power. To advance weather and climate prediction more observations are needed of the Arctic climate system, better models are urgently needed, and advances in bringing models and observations together through data assimilation and improved process understanding are needed.

Research priorities:

- Reasons for rapid Arctic sea ice disappearance
- Local and the global impacts of Arctic climate change
- Advance environmental prediction capabilities
- Improve the understanding of natural versus forced variability
- Long-term observations using novel technologies
- Governance in a changing Arctic that fosters a sustainable development
- Link scientific results to stakeholder needs

Session 2 - Changes in the hydrological cycles (CHC)

“Models of the hydrological cycle are still unsatisfactory”

Main topics linked to changes in the regional and global hydrological cycle under changing climate are: (1) Performance and limitations of models and observations in representing the closure of the large-scale water cycle (including global precipitation changes and runoff); (2) The extent to which models can simulate the main processes and feedbacks acting in the water cycle system; (3) The uncertainty in precipitation observations and simulations in the mountain regions; (4) The societal challenges, which are linked to the impacts of changes in different components of the hydrological cycle. The discussion pointed out that scientific hydrological output needs to be linked to societal needs. To gain an advanced risk assessment, the different scientific institutions have to be connected.

Research priorities:

- Focus on the climate-hydro interface (general understanding of processes and adoption of specific analysis methods, e.g. bias-correction).
- Relevant “hot topics” in hydrological science: earth’s critical zone science, paleoclimate perspective of the hydro-cycle, technological development
- Improve impact-oriented research by including a wider spectrum of scientists for risk assessment: hydrologists, social scientists, economists.
- Implement modelling frameworks (incorporating both downscaling and upscaling approaches) to address the issue of scales and better estimate changes of hydrological cycle under climate change
- Focus on specific regions with particular problem.

Session 3 - High impact events and climate change (HIE)

“High impacts feed the imagination of people”

By definition a HIE is an extreme event that is difficult to predict and has significant consequences. We need a better understanding of the likelihood of HIEs and how we can avoid or mitigate their worst consequences to protect people. Society can be very vulnerable to HIEs – people notice them far more than gradual climate change. We already know that climate change cannot solely be considered as a “mean state” modification. Changes in the characteristics, frequency, and severity of extreme events are typically responsible for the most important impacts, and consequently are one of the most significant aspects of climate change to understand and predict. The session about HIE CP was a reflection of the key questions, covering the themes of extremes, including future changes in extreme weather in the Mediterranean region and scenarios for extreme events, also with linkages to economic considerations.

Research priorities:

- ▶ Strengthen the link to potential users of HIE research, to improve the usability of scientific results in socio-economic risk assessments and further planning.
- ▶ Characterization of vulnerabilities to better understand the occurrence and consequences of HIEs.
- ▶ Identify likelihood of HIEs occurring in certain regions based on historical/paleodata.
- ▶ Improve estimates regarding regional impacts of extreme events.
- ▶ Reliable understanding of extreme events, including fluid dynamical simulations and statistical analysis.

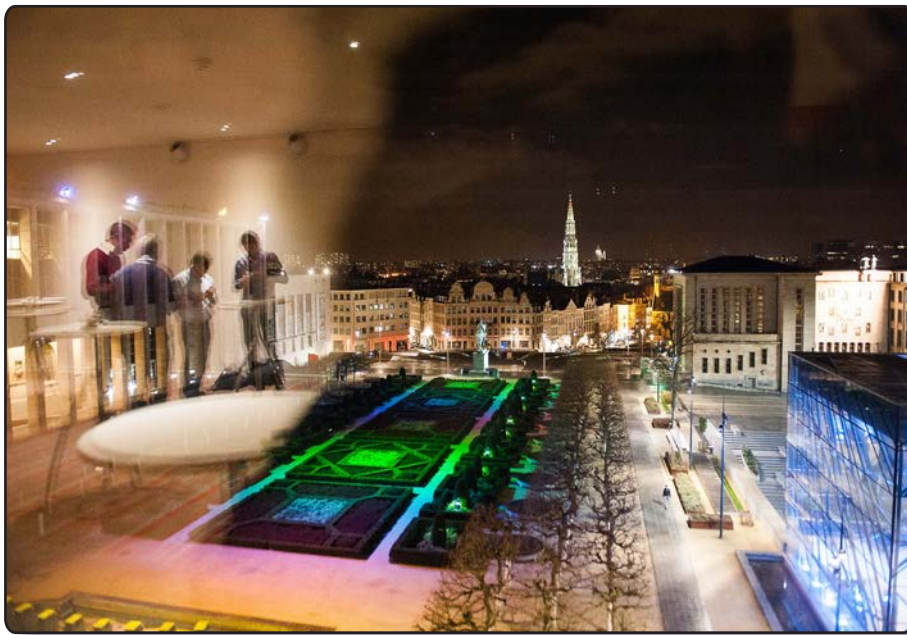
Session 4 - Sea level and climate change (SLC)

“Sea level changes act regionally”

Sea level extremes result in coastal flooding and have a high impact including the potential of massive economic consequences. These extremes occur in concert with a climatic driven sea level rise and may have more in-land reaching impacts in the future. Regional studies combining knowledge of future regional sea level change, sea level extremes, and possible impacts are now possible and form a necessary step for our research efforts. A careful analysis of the interaction of the different components affecting the sea level change has to be conducted on semi-enclosed regional seas, as for example the Mediterranean Sea and Baltic Sea, as well as on the western coastlines. Coastal impacts of sea level changes are the ultimate target for our contribution to society, where both extreme events and general sea level rise and what the appropriate adaption measures might be, on a local scale, is in focus. Vertical land movements are in some places as fast as the sea level rise itself, and their scales range from the large scale adjustment from previous ice ages, to localized sinking in deltaic regions.

Research priorities:

- ▶ Observations of mean sea level and processes are important in order to improve the modelling of future regional sea level change.
- ▶ Modelling, in particular regional modelling sea level changes is necessary in order to predict future sea level changes.
- ▶ Improve regional studies combining knowledge of future regional sea level change, sea level extremes, and possible impacts.
- ▶ Vertical land movements vary regionally and are in some places as fast as the sea level rise itself. The determination of these processes is an important task to improve the accuracy and detail of the current estimates.



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