

***Martin Visbeck: Scientific Grand Challenges for Global Climate Research addressing Societies Needs***

More than 30 years since the establishment of the World Climate Research Programme (WCRP) the overall goals of WCRP remain valid and are arguably more urgent than ever: 1) to determine the predictability of climate; and 2) to determine the effect of human activities on climate. The role of WCRP is to act as the international coordinating body to provide the scientific underpinning of the IPCC process as well as the emerging Global Framework for Climate Services. Specifically, WCRP facilitates the analysis and prediction of Earth system variability and change for use in an increasing range of practical applications of direct relevance, benefit and value to society.

Currently WCRP science coordination is supported by four major projects (CLIC, CLIVAR, GEWEX and SPARC) and a modeling and data council. The four projects have each completed a strategic visioning process and defined several scientific grand challenges. A common thread is to provide the framework for global research needed for improved climate information. Knowledge about past and present changes in the climate system is based on observations and their joint interpretation using statistical and dynamical model-data synthesis systems. Predictions and scenarios of future climate change are based on coupled climate models typically initialized by the current state of the climate system. More accurate climate assessments, predictions and scenarios require a balanced research approach to improve all: climate observations and observing systems and their continuity; climate models on global and regional scales; and climate process and mechanistic understanding.



In the future there will be an increasing demand to fully understand the interactions of the physical, biogeochemical and ecological with human systems. New partnerships and joint research with the other elements of Earth System Science are needed.

Finally, capacity building to train the next generation of climate scientists in the developed as well as in the developing world is a prerequisite to advance climate research and its application to societal issues in the coming decades.

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Dr Martin Visbeck received a PhD in Physical Oceanography from Kiel University in 1993. His research was on deep ocean convection. During a post-doctoral fellowship at

MIT, his research interest focused on the interaction between ocean eddies and deep convection regions, and their respective heat and density transports. As a Research Scientist at LDEO and an Associate Professor at Columbia University in New York City, his interest shifted to more general aspects of the ocean's role in the climate system, including work on the North Atlantic Oscillation and deep water formation off Antarctica.

Since October 2004 he has held the chair in Physical Oceanography at the Leibniz Institute of Marine Sciences at the University of Kiel. His current research is concerned with ocean and climate variability and change, with particular emphasis on the circulation of the Subpolar North Atlantic, climate-biogeochemical interactions in the tropical ocean, observations of ocean circulation and mixing using modern robotic platforms, including profiling floats and gliders, and development of ocean observatories for long-term observations in the water column. Prof. Visbeck has served on several national and international committees. He currently is the co-chair of the CLIVAR SSG and a member of the ICSU Transition Team. He is also Speaker of the Kiel Cluster of Excellence "The Future Ocean".