



## **COMBINE**

## **Quarterly Newsletter 6 – October 2011**

***Comprehensive Modelling of the Earth System for Better Climate Prediction and Projection***

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This issue presents:

- The scientific program of and the call for abstracts for the 3<sup>rd</sup> International Conference in Earth System Modelling

### **3<sup>rd</sup> International Conference in Earth System Modelling**

The Max Planck Institute for Meteorology and the COMBINE project are pleased to announce the *3rd International Conference on Earth System Modelling* (3ICESM).

The 3rd ICESM will take place from 17 – 21 September 2012 in Hamburg, Germany, with the objective of advancing discourse on Earth system modelling prior to the 5th Assessment Report of the Intergovernmental Panel on Climate Change. Abstracts for oral and poster presentations are called for the 8 sessions of the conference. Each session will be introduced by two invited lectures. Abstracts submission will open 15 February 2012 and close 15 May 2012.

For further information on deadlines, venue, etc. see: [www.meetings.copernicus.org/3icesm](http://www.meetings.copernicus.org/3icesm)

### **Session I: Seasonal to decadal climate predictability and prediction**

*Convenor: W. Mueller*

*Co-Convenor: M. Alonso Balmaseda*

*Invited Speakers: D. Smith (Hadley Centre) and F. Molteni (ECMWF)*

This session will bring together recent progress on seasonal to decadal predictions and predictability. The session will cover the evaluation of different forecasting and initialization strategies, results of the CMIP5 decadal integrations, and results from latest seasonal forecasting systems. In this context we also invite contributions regarding the potential predictability of the earth system on seasonal to decadal timescales.

### **Session II: Changing patterns: Shifting climate regimes and their extremes**

*Convenor: J. Jungclauss*

*Co-Convenor: J. H. Christensen*

*Invited Speakers: K. Kumar (NCAR) and S.-P. Xie (Hawaii)*

The ongoing changing climate is not only expressed in global warming but goes along with changes in regional climate, circulation patterns and their temporal variability and extremes. The session calls for contributions that will characterize the mechanisms and feedbacks behind the most important climate phenomena and teleconnection patterns in the ocean, atmosphere and on land at all latitudes and their changes in the past and in future projections. The session will also consider the influence of changing patterns on regional climate (mean, variability, extremes) in temperature, precipitation and other variables both for past, recent and projected climate change. Climate phenomena under consideration are the Monsoon systems, patterns of tropical convection, El-Nino-Southern Oscillation, Atlantic Multidecadal Oscillation, Northern Annular Modes and NAO, Southern Annular Mode, as well as regional climate patterns, and the evolution of tropical and extratropical cyclones.

### **Session III: Clouds, convection and the global energy balance**

*Convenor: T. Mauritsen*

*Co-Convenor: U. Lohmann*

*Invited Speakers: S. Bony (IPSL) and A. Gettelman (NCAR)*

Clouds play a key role in regulating the energy balance of the Earth system by reflecting part of the incoming sunlight and absorbing and re-emitting infrared radiation. The cloud mediated

feedbacks associated with changes in the climate state and atmospheric composition are identified as some of the major contributors to uncertainty in climate sensitivity. At the same time, universally representing the wide spectrum of clouds in Earth system models, and understanding the myriad of interactions with the climate system remains an immense challenge. We invite contributions dealing with, for example the interactions between clouds, climate and the hydrological cycle, climate change feedback mechanisms, and the influences of the atmospheric composition, greenhouse gases and aerosols, on clouds. Studies dealing with the representation of clouds and convection in ESMs are also welcome.

#### **Session IV: Carbon and beyond: Coupled biogeochemical cycles in the Earth System**

*Convenor: C.H. Reick*

*Co-Convenor: C.D. Jones*

*Invited Speakers: V. Brovkin (MPI-M) and TBD*

On time scales from decades to millennia global climate develops in close interaction with both terrestrial and marine biogeochemical cycles. Due to the strong human influence on the Earth system by combustion of fossil fuels, deforestation and widespread fertilizer application, the link between climate, the carbon cycle and other biogeochemical cycles is today a key issue of climate research. Observing and understanding this relationship for the contemporary period and past climates will help us understand the role of these interactions in the future and guide future sustainable environmental policies. The session aims to provide an overview on current research on these interactions from an Earth system perspective and their relevance to future climate change.

#### **Session V: Cryospheric processes and changes**

*Convenor: U. Mikolajewicz*

*Co-Convenor: M. Kageyama*

*Invited Speaker: D. Notz (MPI-M) and TBD*

The Earth's cryosphere (ice-sheets, sea-ice, permafrost, snow) plays an important role in the energy balance, and in the hydrological and biogeochemical cycles of the climate system.

The main challenges of understanding the current evolution of the cryosphere, as well as predicting its future, are matched by the long standing challenge in understanding, on much longer time-scales, the past glacial interglacial cycles. As fast components of the cryosphere, sea-ice and snow have been included in climate models for a long time, while until recently, only Earth system models of intermediate complexity, tackling climate changes on millennial or longer time-scales, included representations of the ice-sheets. The large potential impact of changes in ice sheets (e.g. sea level rise) and permafrost (e.g. carbon release) and the present fast evolution of these components have prompted developments of their representation in high-resolution Earth System models. This session invites papers focusing on the representation of the cryosphere in Earth system models, as well as on the study of their behavior and feedbacks in past, present and future climates.

#### **Session VI: Stratospheric and solar influences on surface climate**

*Convenor: H. Schmidt*

*Co-Convenor: N. Butchart*

*Invited Speakers: D. Thomson (Colorado State University) and J. Haigh (Imperial College)*

The stratosphere has long been known to be strongly influenced by tropospheric dynamics. In the last decade however, numerous studies have presented evidence that the coupling also acts in the opposite direction and that the middle atmosphere plays an active role in surface weather and climate. The stratosphere also affects the troposphere through cross-tropopause radiative and chemical fluxes. Many outstanding questions remain regarding the dynamical and physical mechanisms involved, their evolution under climate change, and the impact of the stratosphere on forecast skill on the seasonal to centennial timescales. This session calls for contributions that address such questions. The session will also consider the role of solar variability on surface climate and especially the role the stratosphere plays, if any, in communicating this signal to the troposphere.

#### **Session VII: Lessons from the past: Using and interpreting the paleo-record**

*Convenor: V. Brovkin*

*Co-Convenor: H. Goosse*

*Invited Speakers: P. Braconnot (IPSL) and A. Berger (Univ. Catholique Louvain)*

Past climates provide a unique opportunity to understand physical, chemical, and biological processes that govern Earth System dynamics. Paleo-records are invaluable archive for evaluation of climate models used for future projections. This session is focused on Earth System modeling of geological past and model evaluation using geological archives. Expected contributions include, but are not limited to, analysis of changes in atmosphere, ocean, biosphere or cryosphere in the Earth System Model simulations. Contributions are welcome on modeling of relatively recent periods (for example, last millennium, Holocene, or Last Glacial Maximum) as well as periods in a deeper geological past (e.g., Miocene or Eocene). Large-scale syntheses of data archives relevant for evaluation of Earth System Models are of interest.

### **Session VII: Imagining the future: Integrated assessment modelling and impacts**

*Convenor: H. Held  
Co-Convenor: R. Schaldach*

*Invited Speakers: D. van Vuuren (NEAA) and W. Lucht (PIK)*

Global change includes social, economic and environmental drivers, which in their combination affect the structure and functioning of the Earth System. Prominent examples for such drivers are human population growth, changing market prices for food and energy as well as climate change. One scientific approach to analyze the interdependencies between human activities and environmental processes is to explicitly couple macro-dynamics from various domains as numerically expressed in Integrated Assessment Models (IAMs). IAMs have also provided the methodological backbone to derive a new set of “representative concentration pathways” (RCPs) as commonly shared input for present and future global circulation-level Earth System model intercomparison studies. The aim of our session is twofold: (1) to present the state-of-the-art in Integrated Assessment modeling and to identify future research needs (for example, on the technological side for bringing them closer together with Earth System Models), (2) to review their potentials and

limitations as scientific instruments for policy support.

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<b>CYI, CY</b>	<b>INPE, BR</b>	<b>UNEXE, UK</b>

### **EVENTS of interest:**

5-9 December 2011, **American Geophysical Union Fall Meeting 2011**, San Francisco, CA, USA

12-14 December 2011, **IS-ENES 2<sup>nd</sup> General Assembly**, Lecce, Italy

5-9 March 2012 **CMIP5 analysis workshop**, Honolulu, Hawaii, USA

20-23 March 2012 **Workshop on the Physics of Climate Models**, Pasadena, CA, USA

26-29 March 2012 **Planet Under Pressure: New knowledge towards solutions**, London, UK

22 – 27 April 2012 **European Geosciences Union General Assembly 2012**, Vienna, Austria

23-27 April 2012 **10th International Conference on Southern Hemisphere Meteorology and Oceanography**, Nouméa, New Caledonia

7-11 May 2012 **4th WCRP International Conference on Re-analyses**, Washington DC

4-6 June 2012 **‘Rio+20’: United Nations Conference on Sustainable Development**, Rio de Janeiro, Brazil