



COMBINE

Quarterly Newsletter 5 – July 2011

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

This issue:

- Report on the 2nd COMBINE General Assembly (GA), kindly hosted by the Met Office in May 2011.

Announcements:

- The 3rd COMBINE GA will take the form of the International Science Conference planned for the third year of the project and jointly organized with the 3rd **International Conference on Earth System Modelling** of the Max Planck Institute for Meteorology in Hamburg, Germany, **17-21 September 2012**. For more information, read the conference website: www.mpimet.mpg.de/en/icesm

Project News:

- The project welcomes a new associate partner: The University of Leipzig (ULEIPZIG), Institute for Meteorology, in Leipzig, Germany, and represented by Johannes Quaas.

2nd COMBINE GA 2011



The 2nd COMBINE GA was held in Exeter, UK, kindly hosted by the Met Office, Hadley Centre. The GA 2010 has brought together 60 participants from 15 countries. Most partners have been represented by 2 or 3 participants. The 2nd COMBINE GA 2011 has included

presentations of scientific results of the first and second year of the project, as well as briefings from all Work Packages (WPs). Each WP briefing reported on the status of the due project deliverables and milestones as well as science highlights from the ongoing work. The first day of the GA 2010 (May 24, 2011) was dedicated to breakout sessions for each WP, to discuss the scientific questions that are specific to each WP and for facilitating the internal WP collaborations. The first day ended with the Opening Reception of the General Assembly. The reception was held at the Hadley Center. With respect to the previous year, the COMBINE GA 2011 has been extended by one more plenary day, to give space to solicited and contributed oral and poster presentations from the COMBINE participants. There have been 23 oral presentations, in addition to the 8 WP briefings, and 27 poster presentations. The poster sessions have been held during the first afternoon sessions of days 1 and 2, and ranged on virtually all the WP topics. The GA has also been enriched by guest presentations from other EC projects and 2 presentations from the International Scientific Advisory Panel (ISAP) members.

Plenary Day 1

The first day of the plenary started with Chris Jones, METOFFICE local organizer, welcoming the participants and Marco Giorgetta, COMBINE Coordinator, motivating the Agenda of the GA 2011. The 2011 General Assembly was designed to report on the project workflow with respect of the plan as well as provide an enjoyable forum to discuss the science developed during the project. The briefing of WP1, by Jones, and three talks on the carbon and nitrogen cycles followed. The first talk by Booth addressed land carbon cycle uncertainties from a perturbed parameter ensemble of model simulations and deduced that they are equivalent in their importance to

atmospheric physical uncertainties. In the second talk, Segschneider discussed the basic features and first results of the oceanic nitrogen cycle of the MPI Earth System Model. The third talk by Guenet reported that the integration of a dynamic N cycle in a land surface model improve the long-term trend of the Leaf Area Index (LAI), in particular for the boreal latitudes; however, over 1982-2002, changing climate might have been the LAI driving factor. The second morning session concerned the WP2 briefing on clouds, chemistry and aerosols, by Raisanen, the introductory talk by Balkanski on recent results on clouds, chemistry & aerosols, and the talk by Reuter on the Influence of different prescribed scavenging ratios on global aerosol and cloud properties in ECHAM5-HAM. Reuter reported that the reduction of scavenging ratios leads to less cloud droplets in ECHAM on a global scale due to a reduced nucleation of new aerosol particles, but increased condensation on existing aerosol particles. The morning was closed by the invited talk by Guilyardi, describing the METAFOR Legacy on Earth System Models and Simulations, and its application to the CMIP5 case. In the afternoon, the oral session was opened by the WP3 briefing, by Butchart, on the inclusion of a well-resolved dynamical stratosphere in climate and Earth system models. Two talks followed. The first talk by Christiansen discussed the low frequency variability of the NH stratospheric winter vortex and provided evidence that the weak/strong vortex bimodality is strongly connected to the east/west Quasi-Biennial Oscillation (QBO) bimodality, and that that they both show a concurrent shift in 1979, possibly due to a random change in the QBO, related to its seasonality. The second talk by Lott discussed possible connections between tropical variability and stratospheric equatorial waves, and reported related results from the preindustrial control simulation carried out with the IPSL CM5 model. The day was closed by the invited talk by Baldwin (ISAP member), on the current understanding of the dynamical coupling between the troposphere and the stratosphere.

Plenary Day 2

The second day covered work on the cryospheric component, the initialization of the ocean and sea-ice and climate prediction. The day was opened by the WP4 Cryosphere

briefing, by Yang. Thereafter, Ridley discussed the processes driving ice sheet dynamics and their interactions with the land, ocean and atmosphere components of the climate system; and Gouttevin the modeling challenges and first results in the simulation of the dynamics of frozen soils in a land surface scheme. The WP5 briefing on ocean and sea-ice Initialization was given by Smith and was followed by the talks of Magnusson on forecast initialization strategies in presence of systematic model errors and Massonnet on the validation of LIM2/3 sea-ice models and the role of sea-ice concentration assimilation in reducing the LIM2 systematic biases in sea-ice concentration and thickness. Two invited talks were also featured in the morning: the first by van Oldenborgh on the decadal prediction skill in a multi-model ensemble analyzed within the THOR project and the second by Joussaume on the IS-ENES (European infrastructure for Earth System Modeling) project. In his talk, Oldenborgh highlighted the challenge in detecting predictability beyond that arising from trends in external forcing such as the increase in greenhouse-gases. The most promising regions showing predictability skills being the North Atlantic and the East Pacific. Joussaume reviewed the history of ENES, its main aims to promote and develop an European collaboration environment for long-term monitoring, modeling and analysis of the Earth system, and the role of the infrastructure necessary to reach these aims, addressed in the EC project IS-ENES. In the afternoon, Haarsma presented the WP6 climate prediction briefing; Koenigk reported on the sensitivity of potential decadal predictability to the parameterization of sea-ice albedo, and Jungclaus (for Matei) showed evidence of interannual predictions of the Atlantic Meridional Overturning Circulation at 26.5°N, up to 4 years in advance. The day was closed by the brilliant report on the decadal prediction experiments with the Japanese AOGCM, MIROC, by Kimoto (ISAP member).

Plenary Day 3

The first morning session of the last day covered WP7, climate projection and feedbacks, briefing by Tomassini, and the talks of Salas y Melia on the recent modifications in CNRM-CM5 ESM and its basic evaluation based on the CMIP5 centennial simulations and of Collins on a generalized framework including both climate

sensitivities and species-species interactions for quantifying biogeochemical feedbacks in Earth System models. Collins reported that the largest non-CO₂ feedbacks are via methane, but there exist opposing effects and permafrost processes were not included in the HadGem2 simulations analyzed. A second THOR talk, on the general aims and results of the THOR project on the North Atlantic Thermohaline Ocean Circulation and its Impact on climate given by Dunstone followed. The second session of the morning started with the WP8 briefing, by Ludwig, on scenario and impacts, followed by the talk by Schaldach on modelling the spatiotemporal development of irrigated area and its impacts on water use and the talk by van Vuuren on further development of the RCP (Representative Concentration Pathways) scenarios. Schaldach described the model framework to be used for the WP8 simulations that will be conducted at the global level using the new CMIP5 climate projections produced within COMBINE and considering the socio-economic and agricultural drivers from the RCP scenarios. Van Vuuren reviewed the work that lead to the new RCPs scenarios for climate assessments and showed that the RCPs provide a comprehensive and detailed set of data for climate model projections and called to the attention that subsequent scenario development for climate change assessment needs to focus on defining a framework for socio-economic assumptions and storylines to guide RCP-based mitigation, adaptation and impacts analysis.

Giorgetta closed the open part of the plenary summarizing the status of the project workflow and thanking the METOFFICE colleagues for providing an enjoyable avenue for the General Assembly 2011. The next appointment for the COMBINE community is for September 2012, in Hamburg, at the 3rd International Conference on Earth System Modeling, Max Planck Institute for Meteorology.

COMBINE Web Site:

<http://www.combine-project.eu/>

Project Coordinator: Dr M Giorgetta
(marco.giorgetta@zmaw.de)

Project Manager: Dr E Manzini
(elisa.manzini@zmaw.de)

Administrative and Financial Manager: C Piltz
(claudia.piltz@zmaw.de)

Max Planck Institute for Meteorology
Bundesstr. 53, 20146 Hamburg, Germany

Partners:	MPG, DE	METO, UK
CNRS, FR	CMCC, IT	MF-CNRM, FR
KNMI, NL	UiB, NO	DMI, DK
ECMWF, UK	ETHZ, CH	FMI, FI
PBL, NL	SMHI, SE	WU, NL
UHEL, FI	CERFACS, FR	UCL, BE
UNIVBRIS, UK	Uni Kassel, DE	TUC, GR
CYI, CY	INPE, BR	UNEXE, UK

EVENTS of interest:

18-23 September 2011 **3rd iLEAPS Science Conference**, Garmisch-Partenkirchen, Germany

24-28 October 2011 **WCRP OSC: Climate Research in Service to Society**, Denver, CO, USA

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

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