International Scientific Conference

ABSTRACT BOOK

7-10 July 2015 • Paris, France

This Abstract book is based on a compilation of all abstracts selected for oral and poster presentations, as of 15 May 2015.

Due to the inability of some authors to attend, some of those works will therefore not be presented during the conference.

OUR UNDER
COMMON CLIMATE
FUTURE CHANGE

Welcome to the Conference

Welcome to Paris, welcome to 'Our Common Future under Climate Change'!

On behalf of the High Level Board, the Organizing Committee and the Scientific Committee, it is our pleasure to welcome you to Paris to the largest forum for the scientific community to come together ahead of COP21, hosted by France in December 2015 ("Paris Climat 2015").

Building on the results of the IPCC 5th Assessment Report (AR5), this four-day conference will address key issues concerning climate change in the broader context of global change. It will offer an opportunity to discuss solutions for both mitigation and adaptation issues. The Conference also aims to contribute to a science-society dialogue, notably thanks to specific sessions with stakeholders during the event and through nearly 80 accredited side events taking place all around the world from June 1st to July 15th.

When putting together this event over the past months, we were greatly encouraged by the huge interest from the global scientific community, with more than 400 parallel sessions and 2200 abstracts submitted, eventually leading to the organization of 140 parallel sessions.

Strong support was also received from many public French, European and international institutions and organizations, allowing us to invite many keynote speakers and fund the participation of more than 120 young researchers from developing countries. Let us warmly thank all those who made this possible.

The International Scientific Committee deserves warm thanks for designing plenary and large parallel sessions as well as supervising the call for contributions and the call for sessions, as well as the merging process of more than 400 parallel sessions into 140 parallel sessions. The Organizing Committee did its best to ensure that the overall organization for the conference was relevant to the objectives and scope. The High Level Board raised the funds, engaged the scientific community to contribute and accredited side events. The Conference Secretariat worked hard to make this event happening. The Communication Advisory Board was instrumental in launching and framing our communication activities on different media. We are very grateful to all.

We very much hope that you will enjoy your stay in Paris and benefit from exciting scientific

interactions, contributing to the future scientific agenda. We also hope that the conference will facilitate, encourage and develop connections between scientists and stakeholders, allowing to draw new avenues in the research agenda engaging the scientific community to elaborate, asses and monitor solutions to tackle climate change together with other major global challenges, including sustainable development goals.

Christopher Field, *Chair, CFCC15 Scientific Committee*
Jean Jouzel, *Chair, CFCC15 High Level Board*
Hervé Le Treut, *Chair, CFCC15 Organizational Committee*

Committees

Scientific committee

- Chris FIELD *(IPCC, USA) - Chair*
- Philippe CIAIS *(LSCE, France)*
- Wolfgang CRAMER *(IMBE, France)*
- Purnamita DASGUPTA *(IEG, India)*
- Ruth DEFRIES *(Colombia University, USA)*
- Navroz DUBASH *(CPR, India)*
- Ottmar EDENHOFER *(PIK, Germany / IPCC, USA)*
- Michael GRUBB *(University College London, UK)*
- Jean–Charles HOURCADE *(CNRS- France)*
- Sheila JASANOFF *(Harvard Kenny School of Government, USA)*
- Kejun JIANG *(Nanyang Technological Univerisity, China)*
- Vladimir KATTSO *(MGO, Russia)*
- Hervé LE TREUT, France *(CNRS-UPMC/France)*
- Emilio LEBRE LA ROVERE *(National University, Brazil)*
- Valérie MASSON–DELMOTTE *(LSCE/IPSL, France)*
- Cheik MBOW *(ICRAF, Kenya)*
- Isabelle NIANG–DIOP *(IRD, Senegal)*
- Carlos NOBRE *(SEPED/MCTI, Brazil)*
- Karen O'BRIEN *(Universty of Oslo, Norway)*
- Joe JACQUELINE PEREIRA *(University Kebangsaan, Malaysia)*
- Shilong PIAO *(Peking University, China)*
- Hans OTTO PÖRTNER *(Alfred Wegener Institute, Germany)*
- Monika RHEIN *(University of Bremen, Germany)*
- Johan ROCKSTRÖM *(Stockhom University, Sweden)*
- Hans Joachim SCHELLNHUBER *(PIK, Germany)*
- Robert SCHOLES *(University of Witwatersrand, South Africa)*
- Pete SMITH (University of Aberdeen, UK)
- Youba SOKONA *(The South Centre, Switzerland)*
- Jean–François SOUSSANA *(INRA, France)*
- Mark STAFFORD–SMITH *(Future Earth, Australia)*
- Thomas STOCKER *(University of Bern, Switzerland)*
- Laurence TUBIANA *(IDDRI, France)*
- Diana ÜRGE–VORSATZ *(Central European University, Hungary)*
- Penny URQUHART *(Independent analyst, South Africa)*
- Carolina VERA *(University of Buenos Aires, Argentina)*
- Alistair WOODWARD *(University of Aukland, New Zealand)*

Organizing committee

Chair:

- Hervé Le Treut *(CNRS-UPMC)*

Members:

- Wolfgang Cramer *(CNRS/Future Earth)*
- Pascale Delecluse *(CNRS)*
- Robert Kandel *(CNRS/Ecole polytechnique)*
- Frank Lecocq *(AgroParis Tech/CIRED)*
- Lucilla Spini *(ICSU)*
- Jean-François Soussana *(INRA)*
- Marie-Ange Theobald *(UNESCO)*
- Stéphanie Thiébault *(CNRS)*
- Sébastien Treyer *(IDDRI)*

Conference Secretariat:

- Claire Weill, Head *(INRA)*
- Géraldine Chouteau *(Météo-France)*
- Aglaé Jézéquel *(INRA)*
- Gaëlle Jotham *(INRA)*
- Ingrid Le Ru *(IDDRI)*
- Benoît Martimort-Asso *(IRD)*
- Nadia Mersali *(IDDRI)*
- Catherine Michaut *(CNRS-UVSQ/IPSL)*
- Aline Nehmé *(INRA)*
- Jeremy Zuber *(INRA)*
- Aimie Eliot *(INRA)*
- Eve Le Dem *(INRA)*

Communication Advisory Board:

- Richard Black, *Energy and Climate Intelligence Unit*
- Hunter Cutting, *Climate Nexus*
- Owen Gaffney, *Future Earth/Stockholm Resilience Centre*
- Kalee Kreider, *United Nations Foundation*
- Michelle Kovacevic, *Communications consultant*
- Jonathan Lynn, *IPCC*
- Kim Nicholas, *Lund University*
- Tim Nuthall, *European Climate Foundation*
- Nicholas Nuttall, *UNFCC*
- Roz Pidcock, *Carbon Brief*
- Charlotte Smith, *Communications INC*
- Sue Williams, *UNESCO*
- Denise Young, *ICSU*
- Jeremy Zuber *(INRA)*

data from various locations in Europe and looking at various output variables; also an inventory has been made on the available crop models and modelled cropping systems for Europe by the MACSUR CropM partners. MACSUR developed extensive databases on important ongoing and future modelling studies in Europe and it also embarked on developing a centralized system for data storage, distribution and visualization of model results. The knowledge hub systematically analysed scaling methods with focus of scaling up weather and soil information for regional and (supra-) national climate change (CC) impact assessments and related uncertainties for a range of crop models. A large ensemble of 26 crop models has been used for a systematic climate sensitivity analysis based on impact response surface. New CC scenario data was developed for selected locations and regional case studies in Europe and use was made of agroclimatic indicator approaches to indicate shifts in (multiple) risks to wheat production in the EU. Five PhD courses have been organized, dealing with various issues of generating data and applying modelling techniques for assessing CC impacts and adaptations to CC.

In the field of modelling of permanent grasslands, livestock and farms, the main focus across these diverse disciplines was to bring together specialists on a common subject. MACSUR established a performance comparison across several prominent models. Modelling of livestock productivity focused on the impacts of changing climatic conditions on dairy cow health, mortality and milk quantity and quality, and provided contributions to regional case study research. Datasets were identified relating to animal health and disease, and gaps in knowledge were explored at a broad level.

In socio-economic modelling, MACSUR focused on the soft-linking of crop production models to economic models at national and global levels and on comparisons of projections of crop price changes considering global trends in populations, politics, and climate.

Regional case studies constitute opportunities for linking models with less spatial heterogeneity and a longer tradition of model linkage across scientific disciplines. They also allow studying practical effects of the impacts of climate change and discussing them with stakeholders. Our case studies in Finland, Austria, and Italy suggest that a simple climate envelope approach (moving production zones of crops northward) neglects important interactions with soils (water holding capacity) and effects on landscape function/ecosystem services and rural livelihoods.

In the next two years, MACSUR will improve modelling the impacts of weather extremes and consider variations in farm management, cross- and multi-scale issues, uncertainty and error propagation. Exploration of techniques to improve the characterisation (e.g. quality) of feed sources in farm-scale models will also be addressed. Understanding the reasons for the difference between optimal and realised grassland and crop yields and finding solutions for linking these economic models at national to global scales remains a challenge for the next years. Furthermore, we will include more regional case studies and intensify our interactions with stakeholders.

O-2223-02

How accurately do crop models simulate the impact of CO2 atmospheric concentration on maize yield and water use ?

JL. Durand (1) ; K. Delusca (2) ; K. Boote (3) ; J. Lizaso (4) ; R. Manderscheid (5) ; C. Rosenzweig (6) ; J. Jones (3) ; HJ. Weigel (5) ; A. Ruane (6)

(1) INRA, Environnement et Agronomie, Lusignan, France; (2) INRA, Lusignan, France; (3) University of Florida, Gainesville, United States of America; (4) ETSIA UPM, Madrid, Spain; (5) Johann Heindrich von Thunen Institute, Braunschweig, Germany; (6) NASA Goddard Institute for Space Studies, New York city, United States of America

Authors (continued): S. Anapalli (6); L. Ahuja (7); B. Basso (7); C. Baron (8); P. Bertuzzi (9); D. Ripoche (9); C. Biernath (10); E. Priesak (10); D. Derynge (11); F. Ewert (12); T. Gaiser (12); S. Gayler (12); F. Heilein (12); KC. Kersebaum (13); SH. Kim (14); C. Müller (15); C. Nendel (16); J. Ramirez (17); F. Tao (18); D. Timlin (19); K. Waha (20); T. Twine (21); E. Wang (22); H. Webber (23); Z. Zhao (4); R. Rötter (25); A. Srivastava (23); S. Seidel (26).

6 USDA-ARS, Colorado State University, Colorado, USA, 7 Department of Geological Sciences, Michigan State University, Michigan, USA, 8 CIRAD, UMR TETIS, Montpellier, France, 9 INRA, Avignon, France, 10 Institute für Bodenökologie, Helmholtz Zentrum München, Neuherberg, Germany, 11 Tyndall Centre for Climate Change research and School of Environmental Sciences, University of East Anglia, Norwich, UK, 12 Water & Earth System Science (WESS) Competence Cluster, c/o University of Tübingen, Tübingen, Germany, 13 Institute of Landscape Systems Analysis, ZALF, Leibniz-Centre for Agricultural Landscape Research, Muencheberg, Germany, 14 School of Environmental and Forest Sciences, University of Washington, Seattle, USA, 15 Potsdam Institute for Climate Impact Research, Potsdam, Germany, 16 Institute of Landscape Systems Analysis, ZALF, Leibniz-Centre for Agricultural Landscape Research, Muencheberg, Germany, 17 School of Earth and Environment, University of Leeds, Leeds, UK, CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), Cali, Colombia International Center for Tropical Agriculture (CIAT), Cali, Colombia, 18 Institute of Geographical Sciences and Natural Resources Research, Chinese Academy of Sciences, Beijing, China, 19 Crop Systems and Global Change Laboratory, USDA/ARS, Beltsville, USA, 20 Indian Agricultural Research Institute, Centre for Environment Science and Climate Resilient Agriculture, New Delhi, India, 21 Department of Soil, Water, & Climate, University of Minnesota, Minnesota, USA, 22 CSIRO, Land and Water, Black Mountain, Australia, 23 Institute of Crop Science and Resource Conservation, University of Bonn, Bonn, Germany, 24 China Agricultural University, Beijing, China, 25 Natural Resources Institute, Luke, Finland. 26 Technishe Universität Dresden, Germany.

Methods and Results
Given the incertitudes on the climate change impacts on C4 crops, projections of regional maize production remain speculative. Assessment of the impacts of atmospheric CO2 concentration ([CO2]) on crop yield and resources uses using mechanistic models becomes increasingly important. Free Air [CO2] Enrichment (FACE) studies offer data to test and improve model quality. The objective of this work by the AgMIP Maize group was (i) to test multiple maize models for [CO2] responses against data gathered from a FACE study under two water regimes carried out in Germany during 2007 and 2008, and (ii) to pave the way to potential model modifications so as to improve their simulations of crop responses to [CO2]. The Experiment combined two [CO2] levels with two watering regimes. Yield, leaf area, soil water content and [CO2] levels were recorded both years, 2008 only exhibiting significant water deficit. After a preliminary calibration based on non limiting water conditions and under ambient [CO2] treatments of both years, a blind simulation was undertaken for the other treatments: High [CO2] (550 ppm) 2007 and 2008, both watering regimes, and DRY AMBIENT 2007 and 2008. Secondly, with full growth and yield data along with soil moisture data of all treatments, improvements of simulation results were attempted. Changes made to the models have been documented and submitted for further analysis. The results revealed: minimal [CO2] impacts with low variations among « uncalibrated » models except for the dry season of 2008 where the observed drought impact was simulated by the majority of models; most models caught but underestimated the CO2 impact on crop water status, leaf area, grain number and yield; the CO2 effect on transpiration was generally properly simulated, transpiration per leaf area decreasing but green leaf area duration increasing at 550 ppm [CO2]. As more data from FACE experiments become available, it will be highly desirable to replicate this exercise in order to come up with more robust conclusions on these responses and to improve model response to CO2.

2223-POSTER PRESENTATIONS

P-2223-01

Bayesian Inference for the Ricardian Model

B. Abidoye (1)

(1) University of Pretoria, Centre for Environmental Economics and Policy in Africa (CEEPA). Agricultural Economics, Hatfield, Pretoria, France

The Ricardian model is one of the most widely used models to analyze the impact of climate change on agriculture. This paper seeks to empirically extend the