A comparison of 27 wheat crop models for climate change impact: The AgMIP Wheat pilot study

Asseng, Senthold
University of Florida, UNITED STATES


1 University of Florida, Agricultural and Biological Engineering, USA, 2 Universität Bonn, Germany, 3 NASA Goddard Institute for Space Studies, USA, 4 USDA National Laboratory for Agriculture and Environment, USA 5 Department of Agronomy, University of Florida, 6 CSIRO Ecosystem Sciences, Australia, 7 Plant Production Research, MTT Agrifood Research Finland, 8 INRA, Grignon, France, 9 AgroParisTech, France, 10 University of Potenza, Italy, 11 Michigan State University, USA 12 Queensland University of Technology, Australia, 13 INRA, Clermont-Ferrand, France, 14 Blaise Pascal University, France, 15 INRA, Avignon, France, 16 FAO, Italy, 17 IAEA, Austria, 18 Rothamsted Research, UK, 19 Washington State University, USA, 20 Department of Primary Industries, Australia, 21 CCAFS, India, 22 Indian Agricultural Research Institute, India, 23 Joint Global Change Research Institute, USA, 24 USDA Arid-Land Agricultural Research Center, USA, 25 University of Guelph, Canada, 26 University of Alberta, Canada, 27 Leibniz Centre for Agricultural Landscape Research, Germany, 28 University of Reading, School of Agriculture, Policy and Development, UK, 29 University of Reading, NCAS & Department of Meteorology, UK 30 Wageningen University, The Netherlands, 31 Aarhus University, Denmark, 32 Agricultural Research and Training Centre (CIFA), Spain, 33 University of Tübingen, Germany, 34 Universität Hohenheim, Germany, 35 Helmholtz Zentrum München, Germany, 36 Chinese Academy of Science, China, 37 Potsdam Institute for Climate Impact Research, Germany, 38 INRA, Castanet-Tolosan Cedex, France, 39 INTA-CIRN, Argentina, 40 University of Leeds, UK

AgMIP- the Agricultural Model Intercomparison and Improvement Project (www.agmip.org) (Rosenzweig et al. (2012) aims to provide more robust estimates of climate impacts on crop yields and agricultural trade, including estimates of associated uncertainties. During the AgMIP Wheat Pilot Study 27 wheat crop simulation models were compare with detailed field experimental data from four contrasting environments (The Netherlands, Argentina, India and Australia) using standardised protocols to study the role of crop model-based variability in projections of climate change impacts. The four environments represent major wheat-producing regions of the world. A standardised sensitivity analysis was carried out with all models for each of the environments with a range of temperature, including heat stress, CO₂ changes, soil, management and seasonal variability. Differences in the variability in model responses indicated strengths and weaknesses across crop models. Results from the model intercomparison will be presented. Implications for model applications to climate change and global food security assessments, for specific model improvement and for needed field experiments are discussed.

Reference


Dr. Nadine Brisson died during the study in 2011.