

EGU24-6462, updated on 14 Oct 2024

<https://doi.org/10.5194/egusphere-egu24-6462>

EGU General Assembly 2024

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Graphical representation of global water models participating in the Inter-Sectoral Impact Model Intercomparison Project (ISIMIP2b)

Hannes Müller Schmied^{1,2}, Laura Müller¹, Simon N. Gosling³, and the ISIMIP2b water model diagram team*

¹Institute of Physical Geography, Goethe University Frankfurt, Frankfurt am Main, Germany

²Senckenberg Leibniz Biodiversity and Climate Research Centre (SBIK-F), Frankfurt am Main, Germany

³School of Geography, University of Nottingham, Nottingham, NG7 2RD, United Kingdom of Great Britain and Northern Ireland

*A full list of authors appears at the end of the abstract

Numerical models are simplified representations of the real world at a finite level of complexity, which means they are not exhaustive in the number of processes they include. Global water models are used to simulate the global water cycle and their outputs are used to estimate important natural and societal issues, including water availability, flood risk, and ecological functioning.

Whilst global water modelling is an area of science that has developed over several decades, and individual model-specific descriptions exist for some models, there has to date been no attempt to visualize how several models work, using a standardized visualization framework. Here, we address this gap, by presenting a set of visualizations of several global water models participating in the Inter-Sectoral Impact Model Intercomparison Project phase 2b.

The diagrams were co-produced between a graphics designer and in total 16 modelling teams, based on extensive discussions and pragmatic decision-making that balanced the need for accuracy and detail against the need for effective visualization. The model diagrams are based on a standardized "ideal" global water model that represents what is theoretically possible to model with the current generation of state-of-the-art global water models. Model-specific diagrams are then copies of the "ideal" model diagram, with individual processes either included or greyed out.

As well as serving an educational purpose, we envisage that the diagrams will help researchers in and outside of the global water model community to select the right model(s) for specific applications, stimulate a community learning process, and identify missing components to help direct future model developments.

ISIMIP2b water model diagram team: Marlo Garnsworthy (Icebird Studio, www.IcebirdStudio.com) | Camelia E. Telteu (Institute of Physical Geography, Goethe University Frankfurt, Frankfurt am Main, Germany) | Lauren S. Andersen (Potsdam Institute for Climate

Impact Research, Member of the Leibniz Association, Potsdam, Germany) | Julien Boulange (Institute of Agriculture, Tokyo University of Agriculture and Technology, 183-8509 Tokyo, Japan) | Peter Burek (International Institute for Applied Systems Analysis (IIASA), Laxenburg, Austria) | He Chen (School of Environmental Science and Engineering, Southern University of Science and Technology, Shenzhen 518055, China) | Manolis Grillakis (School of Chemical and Environmental Engineering, Technical University of Crete, Chania, Greece) | Luca Guillaumot (Water, Environment, Processes and Analyses Division, BRGM – French Geological Survey, Orléans, France) | Naota Hanasaki (National Institute for Environmental Studies, 305-8506 Tsukuba, Japan) | Aristeidis Koutroulis (School of Chemical and Environmental Engineering, Technical University of Crete, Chania, Greece) | Rohini Kumar (Helmholtz-Centre for Environmental Research, Permoserstraße 15, 04318 Leipzig, Germany) | Guoyong Leng (Key Laboratory of Water Cycle and Related Land Surface Processes, Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences, Beijing 100101, China) | Junguo Liu (Henan Provincial Key Laboratory of Hydrosphere and Watershed Water Security, North China University of Water Resources and Electric Power, Zhengzhou, 450046, China; School of Water Conservancy, North China University of Water Resources and Electric Power, Zhengzhou, 450046, China; School of Environmental Science and Engineering, Southern University of Science and Technology, Shenzhen 518055, China) | Xingcai Liu (Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences, Beijing 100101, China) | Vimal Mishra (Civil Engineering, Indian Institute of Technology (IIT) Gandhinagar, Gandhinagar, India; Earth Sciences, Indian Institute of Technology (IIT) Gandhinagar, Gandhinagar, India) | Yadu Pokhrel (Department of Civil and Environmental Engineering, Michigan State University, East Lansing, 48823, United States) | Oldrich Rakovec (Helmholtz-Centre for Environmental Research, Permoserstraße 15, 04318 Leipzig, Germany) | Luis Samaniego (Helmholtz-Centre for Environmental Research, Permoserstraße 15, 04318 Leipzig, Germany; University of Potsdam, Institute of Environmental Science and Geography, Am Neuen Palais 10, 14469 Potsdam, Germany) | Yusuke Satoh (Moon Soul Graduate School of Future Strategy, Korea Advanced Institute of Science and Technology, Daejeon, Republic of Korea) | Harsh Lovekumar Shah (AgroCast Analytics Pvt Ltd - Research Park, Indian Institute of Technology Gandhinagar, Palaj, Gujarat, India -382355) | Mikhail Smilovic (International Institute for Applied Systems Analysis (IIASA), Laxenburg, Austria) | Tobias Stacke (The Ocean in the Earth System, Max Planck Institute for Meteorology, 20146 Hamburg, Germany) | Edwin Sutanudjaja (Department of Physical Geography, Faculty of Geosciences, Utrecht University, The Netherlands) | Wim Thiery (Vrije Universiteit Brussel, Department of Water and Climate, Brussels, Belgium) | Yoshihide Wada (Climate and Livability Initiative, Center for Desert Agriculture, Biological and Environmental Science and Engineering Division, King Abdullah University of Science and Technology, Thuwal, Saudi Arabia) | Niko Wanders (Vrije Universiteit Brussel, Department of Water and Climate, Brussels, Belgium) | Tokuta Yokohata (National Institute for Environmental Studies, 305-8506 Tsukuba, Japan)