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

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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.

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