G^{3}M-f a global gradient-based groundwater modelling framwork

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Summary

The global gradient-based groundwater model framework G^{3}M-f is an extesible model framework that is the basis for the global groundwater mode G^{3}M. In order to represent groundwater-surface water interactions as well as the impact of capillary rise on evapotranspiration in global-scale hydrological models, it is necessary to simulate the location and temporal variation of the groundwater table. This requires replacing simulation of groundwater dynamics using groundwater storage variations in individual grid cells (independent from the storage variation in neighbouring cells) with hydraulic head gradient-based groundwater modelling. G^{3}M is a newly developed gradient-based groundwater model which adapts MODFLOW (Harbaugh 2005) principles for the globalscale. It is written in C++ and intended to be coupled to the global hydraulic model WaterGAP (http://watergap.de) (Alcamo et al. 2003; Döll, Kaspar, and Lehner 2003; Döll et al. 2012; Doell et al. 2014; Müller Schmied et al. 2014), but can also be used for regional groundwater models and coupling to other hydraulic models. While it is intended to be used as a in memory coupled model it is also capable of running a standard standalone groundwater model.

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