



Modelling global freshwater resources using WaterGAP 2.2 – model overview, selected results and applications

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The estimation of global freshwater flows and storages and their dynamics is essential for the assessment of historical and future water availability both for mankind and ecosystems. WaterGAP 2 is a state-of-the-art water model covering the entire global land area (except Antarctica) on a 0.5° by 0.5° grid. WaterGAP consists of a set of water use models and a hydrological model. Five global water use models representing the sectors irrigation, domestic water demand, manufacturing industries, livestock farming and cooling of thermal power plants inform the sub-model GWSWUSE which calculates net water abstractions distinguishing surface water and groundwater sources. Water flows and storages are simulated by the WaterGAP Global Hydrology Model (WGHM). WGHM is calibrated against measured discharge for basins covering around 50 % of global land area. Since the original development of WaterGAP in the late 1990s, new input data and refined process algorithms have led to a significant improvement of the results. We present the current version WaterGAP 2.2 including selected results (e.g. discharge seasonality, water storage) and the global water balance for the time period 1971-2000. In addition, some examples of the application of WaterGAP output, e.g. within the GRACE community and for global environmental assessments are shown, reflecting the importance of global hydrology modeling in our globalized world.