



Influence of the global precipitation budget on Earth rotation using water storage variations from the hydrological model LSDM and GRACE

Robert Dill (1) and Henryk Dobslaw (2)

(1) GFZ, Helmholtz Centre Potsdam, 1.5 Earth System Modelling, Potsdam, Germany (dill@gfz-potsdam.de), (2) GFZ, Helmholtz Centre Potsdam, 1.5 Earth System Modelling, Potsdam, Germany (dobslaw@gfz-potsdam.de)

Simulation results from the hydrological land surface discharge model LSDM and its deviation from observations are dominated by characteristics of the precipitation forcing fields. In order to improve LSDM model results, the errors introduced by the mismodelled fresh water income, like operational ECMWF precipitation and evaporation, should be well-understood. Overestimated precipitation in global ECMWF fields is a known problem but there exist no quantitative correction patterns to bring the atmospheric freshwater budget into global balance as it is particularly important for the determination of Earth rotation excitation functions. As the LSDM model can provide the general relationship between the atmospheric freshwater income and the continental water storage variations hydrological mass variations detected with GRACE can also be associated with global precipitation fields on seasonal timescales. Comparisons of LSDM and GRACE water storage variations lead to seasonal correction patterns for ECMWF precipitation fields that are also contrasted with global precipitation estimations from the Global Precipitation Climate Centre. The differences in precipitation are related to seasonal signals in hydrological Earth rotation excitation functions.