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Operational simulation of continental water masses consistent with atmospheric and oceanic data

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Operational global mass transport data of the atmosphere and the oceans are widely used for studies of earth rotation excitation and gravity field simulations and are essential for GRACE dealising purposes, too. Seasonal and short periodic variations are also caused by continental water mass redistributions. In order to account for the continental hydrology processes as well and to close the global water cycle, continental water mass storage fields and fluxes are needed in the same operational manner as for the atmosphere and ocean.

To simulate continental water mass redistributions a land surface scheme (SLS) is combined with a hydrological discharge model (HDM). The SLS generates components of the land water budget like soil moisture, snow accumulation and evaporation as well as surface fluxes like runoff and drainage. The latter is applied as input data for the HDM simulating the lateral water flow. Both models work on daily time steps. The new extended model combination (LSXM+HDXM) for the operational use, provides daily variations of the global water mass storage and the corresponding water fluxes as well as the hydrological angular momentum functions and low degree gravity coefficients in near real time.

Since both, LSXM+HDXM and OMCT, are consistently forced with operational analyses from ECMWF, the complete data set of atmospheric, oceanic and hydrologic mass variations allows a realistic representation of mass transports in the global hydrological cycle.