



Periodic components of water stock changes in catchment areas from GRACE and global hydrology models

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Appropriate techniques for separating the relevant hydrological signal from the integral gravity effect are necessary in order to exploit the GRACE-based time-variable gravity data in hydrological modeling of the global water cycle. Since the hydrological signal contains significant periodic components, this investigation is focused on their identification based on water stock changes given in global hydrology models and those traceable in time series of GRACE monthly gravity field solutions.

To this end an Empirical Orthogonal Functions analysis is performed as a first step for a decomposition of the total signal of the hydrology as well as the GRACE data. In a subsequent step we search for major periods contained in the most significant principal components from the hydrology models and from GRACE by means of an alternative analysis method which allows for the determination of harmonic waves of arbitrary periods in given time series. Thus, in contrast to a Fourier-type of analysis, which is limited to the detection of multiples of some fixed basic wave, it is possible to detect both pronounced global as well as catchment-specific periodic components. The paper will present current results for selected river basins.