



Comparisons of regional hydrological excitation of polar motion from models and GRACE-based gravity results

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Here we estimate hydrological polar motion excitation functions over various land areas regionally both using a number of hydrological models (CPC, GLDAS, NOAA, LSDM) as well as deriving them from the gravity fields from the Gravity Recovery and Climate Experiment (GRACE). Our attention focuses on the estimations of the relative contributions of the continental areas to the overall global signal. For example, prominent maxima of hydrological excitation functions of polar motion are situated over the equatorial monsoonal regions of the Amazon, India, central and southern Africa, and northern Australia. In the patterns computed from one of the models (CPC), some signals over western Eurasia are also seen. We compare the timing, spectra and phase diagrams of hydrological excitation functions computed for these areas with each other and with the global polar motion excitation function. There are strong annual signals in the hydrological excitations, with the series from the solutions having somewhat different amplitudes and phases. Much agreement exists among the series, but there are outliers in some cases. The results help us understand one way in which regional variability of the hydrological cycle may impact the Earth globally, through polar motion excitation, because of temporal changes in the mass distribution.