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Low degree gravitational effects of water storage variations on polar motion

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We examine the low degree gravitational variations predicted from a hydrological model (NCEP/NCAR reanalysis) for the period January 1980 till July 2001. These estimates were compared with Earth rotation time series. In particular, we analyzed the excitation of polar motion by continental water storage mass load variations. From the changes of the estimated degree 2 spherical harmonics from Earth Orientation Parameters (EOP) seasonal terms were reduced by a least-squares adjustment. We also removed seasonal variations from the time series predicted from atmospheric and oceanic models. The results were compared with the hydrological excitation. The agreement is quite good and the amplitude of the continental water storage excitation is the same order of magnitude than predicted from literature. A wavelet analysis was performed on both time series: the resultant of polar motion without oceanic and atmospheric seasonal contributions and the hydrological excitation. It shows maxima of the annual variations during the periods 1985-1989 and 1990-1996. This last seems to be particular features of the hydrological model.