Geophysical Research Abstracts
Vol. 17, EGU2015-7110, 2015
EGU General Assembly 2015

Hydrological excitation of polar motion by different variables from the GLDAS model

Małgorzata Wińska (1), Jolanta Nastula (2), and David Salstein (3)

(1) Warsaw University of Technology, Faculty of Civil Engineering, Warsaw, Poland (m.winska@il.pw.edu.pl), (2) Space Research Center of the Polish Academy of Sciences, Warsaw, Poland (nastula@cbk.waw.pl), (3) AER, Atmospheric and Environmental Research, Lexington, MA, United States (salstein@aer.com)

Continental hydrological loading, by land water, snow, and ice, is an element that is strongly needed for a full understanding of the excitation of polar motion.
In this study we compute different estimations of hydrological excitation functions of polar motion (Hydrological Angular Momentum – HAM) using various variables from the Global Land Data Assimilation System (GLDAS) model of the land-based hydrosphere. The main aim of this study is to show the influence of variables from different hydrological processes, including for example: total evapotranspiration, runoff, snowmelt, soil moisture to polar motion excitations in seasonal timescale.
Hydrological excitation functions of polar motion, both global and regional, are determined by using selected variables of these GLDAS realizations.
First we compare the timing, spectra and phase diagrams of different regional and global HAMs with each other. Next, we estimate, the hydrological signal in geodetically-observed polar motion excitation as a residual by subtracting the atmospheric - AAM (pressure + wind) and oceanic - OAM (bottom pressure + currents) contributions. Finally, the hydrological excitations are compared to these hydrological signal from the observed polar motion excitation series residuals.
The results help us understand the relative importance for polar motion excitation of the individual variables from different hydrological processes, based on hydrological modeling. This method can allows us to estimate how well the polar motion excitation budget in the seasonal spectral ranges can be closed.