Geophysical Research Abstracts
Vol. 15, EGU2013-6986, 2013
EGU General Assembly 2013

Terrestrial Water Storage Variations from GRACE for the Validation of CMIP5 Coupled Climate Model Hind-Casts

Liangjing Zhang, Henryk Dobslaw, Christoph Dahle, and Maik Thomas
GFZ Potsdam, Geodesy and Remote Sensing, Potsdam, Germany (dobslaw@gfz-potsdam.de)

Land-atmosphere feedbacks are increasingly recognized as important drivers for multi-year climate variability. For example, water stored in the root-zone modifies surface albedo by determining vegetation grow, and ultimately limits the amount of water available for evapo-transpiration. Modern climate models therefore require a realistic representation of the terrestrial branch of the hydrological cycle in order to be able to reliably simulate such feedbacks.

Temporal gravity field variations that are observed by the satellite mission GRACE for more than one decade now, provide quantitative information about changes in the terrestrially stored water. in this contribution, we derive basin-scale water mass anomalies from the recent release 05 of GRACE gravity field coefficients from GFZ Potsdam, augmented by degree-one coefficients obtained from a method suggested by Swenson et al. (2008). Correlated errors are removed using an anisotropic filter from Kusche (2007), and the impact of random noise is minimized using the spatiospectral localization method developed by Simons and Dahlen (2007). We use those estimates of terrestrial water storage anomalies to validate an ensemble of hind-casts performed with the MPI_ESM model of the Max-Planck-Institute for Meteorology on seasonal to interannual time-scales, and discuss where GRACE-type observations might contribute to further improvements of those types of coupled Earth System Models in the future.