Geophysical Research Abstracts
Vol. 17, EGU2015-8543, 2015
EGU General Assembly 2015

Evolution of high-latitude snow mass derived from GRACE regional solutions

Frédéric Frappart (1), Guillaume Ramillien (1), Lucia Seoane (1), and Andreas Güntner (2)

(1) GET-GRGS, UMR 5563, CNRS/IRD/Université de Toulouse, Observatoire Midi-Pyrénées, 14 Avenue Edouard Belin, 31400 Toulouse, France.(frappart@get.obs-mip.fr), (2) GeoForschungsZentrum (GFZ), Telegrafenberg, Potsdam, Germany

Since the launch of the GRACE gravimetry from space mission in March 2002, GRACE data allow the determination of tiny time variations of the Earth's gravity and particularly the effects of fluid mass redistributions at the surface of the Earth. Since GRACE provides vertically-integrated gravity measurements that represent the sum of all mass redistributions in the Earth's system, we propose to apply a method to unravel these different contributions to the satellite gravity measurements, that are related to the variations of water mass of the main reservoirs (i.e. atmosphere, oceans, continental water storage and solid Earth). The approach was previously developed to separate these contributions by inverting Stokes coefficients (i.e. spherical harmonics) up to degree 60 of the Level-2 GRACE solutions with the input of the a priori information of space and time correlations derived from hydrology models such as WGHM and ISBA-TRIP. GRACE Level-2 solutions suffer from the presence of important north–south striping when determining Stokes coefficients which are geophysically unrealistic, and aliasing of short-time phenomena. To overcome this problem, we use GRACE regional solutions obtained adjusting the surface mass density distribution at the surface of the Earth from the accurate satellite to satellite velocity variations or K-Band Range Rate (KBRR) measurements. We propose here to adapt the separation technique to regional grid points. For this purpose, we use a generalized least-square adjustment to extract in particular the time series of the gridded snow mass variations in high latitude regions, and assuming a simple linear mixing of the source signals.