



Validation of GRACE-based regional solutions of water mass over Australia

Lucia Seoane (1), Guillaume Ramillien (2), Frédéric Frappart (1), and Marc Leblanc (3)

(1) Université de Toulouse, UPS GET, Toulouse, France (lucia.seoane@get.obs-mip.fr), (2) CNRS, GET, Toulouse, France,

(3) School of Earth & Environmental Sciences, James Cook University, Cairns, Australia

Time series of 10-day regional solutions of water mass over Australia [112°E-156°E; 44°S-10°S] have been computed from 2003 to 2011 by using an energy integral method. This approach uses the dynamical orbit analysis of GRACE Level-1 measurements, and specially the accurate along-track K-Band Range Rate (KBRR) residuals for estimating the continental hydrology changes over 2-by-2 degree surface tiles. The advantages of regional solutions are: (1) a significant reduction of GRACE aliasing errors (North-South striping seen in the classical GRACE Level-2 solutions), and (2) a better localization of the hydrological patterns. Once the dominant seasonal cycle is removed, Principal Component Analysis (PCA) of regional and global data sets reveal consistent main modes of variability that are highly related to SOI and PDO indexes, and thus the long term 2006 drought in the South-eastern region of Australia. The validation of our regional solutions, in the case short term and localized water mass-related events, consists of comparing them to independent datasets such as exceptional rainfall rate due to cyclone Charlotte, as well as in situ water level and discharge stream records of the Fitzroy river floodings.