Geophysical Research Abstracts
Vol. 15, EGU2013-9762, 2013
EGU General Assembly 2013

GRACE surface mass change in hydrological catchments and ice sheet drainage basins: A comparison of level-1b analysis techniques

Stuart Andrews (1), Matt King (1,2), and Philip Moore (1)

(1) School of Civil Engineering and Geosciences, Newcastle University, Newcastle upon Tyne NE1 7RU, UK, (2) School of Geography and Environmental Studies, Private Bag 76, University of Tasmania, Hobart, Tasmania, 7001, Australia

Surface mass changes from GRACE have been estimated from a number of approaches including precise orbit determinations utilizing the K-band inter-satellite range-rate data and GPS tracking data in a conventional spherical harmonic estimation procedure, the mascon approach using the K-band data and reduced orbital dynamics and short-arc techniques. These estimation methodologies are frequently produced by different groups and obtained using different codes and algorithms. There are, however, only limited studies which have compared the different approaches within the same software base, and none that we are aware of that simulates a known signal and tests the ability of the various approaches to recover the input. In this study we address this by examining the accuracy of GRACE analyses based on the conventional spherical harmonic and the mascon approaches in a consistent analysis at spatial scales appropriate to hydrological/ice drainage basins.

The overall aim is to gain a better understanding of the errors associated with each technique and assess the ability of each technique to resolve basin-level mass changes at a variety of spatial scales. We will firstly apply the different techniques to a known signal using simulation before applying the techniques to real GRACE Level-1B data. We will present results from our work to date focussing on the recovery of a simulated mass signal, for both the mascon and conventional spherical harmonic approaches.