



Investigating GRACE gravimetry and satellite altimetry for studies of large scale hydrological signal and flooding in Bangladesh

O. Andersen (1), P. Berry (2), J. Freeman (2), F. G. Lemoine (3), S. B. Lutcke (3), M. Butts (4), F. Jakobsen (4)

(1) Danish National Space Center, Copenhagen, Denmark (oa@spacecenter.dk), (2) De EAPRS Montford University, Leicestershire, UK (3) NASA/GSFC, Space Geodesy, Greenbelt, Maryland, USA, (4) DHI Water and Environment, Hørsholm, Denmark

Bangladesh is heavily exposed to Monsoon river flooding as an annual event with river water levels rising and falling slowly during the monsoon season, though with some pulsation. Bangladesh is located at confluence of three major rivers: the Ganges, the Brahmaputra, and the Meghna.

In this study we investigate the possibility of applying available remote sensing data from GRACE and satellite altimetry as a supplement to existing hydrological studies. The GRACE gravity changes are analysed using a local MASCON approach derived by NASA/GSFC, solving for mass change at 10-day intervals using 4 deg X 4 deg blocks from GRACE level 1B data. ENVISAT altimetry over the region have been submitted to the EARRS Expert-retracker System in order to derive height of rivers, in particular the Ganges and Brahmaputra rivers. The EAPRS system has the ability to recover nearly uninterrupted time series over these rivers. GRACE derived mass change from 2002 to 2004 have been studied along with altimetry for the same period.

The main forcing factors causing the floods in Bangladesh are high inflows from upstream combined with extreme high rainfall inside the country. ENVISAT has the ability of modeling the changes upstream the rivers, which is a major causing factor. GRACE gravimetry can model the integrated amount of ground and river water stored in Bangladesh on monthly to inter-annual scales which is an important parameter as well.

In this study we will validate and investigate the possibly use of these new datasets for studies of these large scale hydrological signals in Bangladesh.