Geophysical Research Abstracts,
Vol. 10, EGU2008-A-07122, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-07122
EGU General Assembly 2008

Modelling individual sources of mass distribution and transport in the Earth system by means of satellites

Tonie van Dam (1), Jonathan Bamber (2), Marc Bierkens (3), Johannes Bouman (4), Thomas Gruber (5), Matt King (6), Martin Losch (7), Nico Sneeuw (8), Pieter Visser (9), Michael Kern (10), Roger Haagmans(10)

(1) University of Luxembourg, (2) Bristol Glaciology Centre, Bristol University, (3) Utrecht Centre of Geosciences, Utrecht University, (4) SRON Netherlands Institute for Space Research, (5) Institute für Astronomische und Physikalische Geodäsie, IAPG, TU München, (6) School of Civil Engineering and Geosciences, University of Newcastle, (7) Alfred-Wegener-Institut für Polar-und Meeresforschung, Bremerhaven, (8) Institute of Geodesy, Stuttgart University, (9) Department of Earth Observation and Space Systems, TU Delft, (10) ESA/ESTEC

It has been generally acknowledged that practically all mass-motions within and on the Earth generate a signature in the gravitational field. Current satellite gravity missions, e.g. GRACE, have improved our understanding of the interactions and dynamics of the various components of the Earth's fluids. Future missions such as GOCE promise to enhance our understanding of the dynamics of these fluids even more. Nonetheless the task of unambiguously unravelling the different sources of mass distribution and transport from the accumulated gravity signal as it is observed remains nontrivial. In order to optimally benefit from the high-resolution (both in time and space) and high-accuracy gravity data coming from possible future gravity missions, a study has been initiated by ESA to investigate the potential for improving our ability to separate the various contributions. In this study, we will investigate the need for improved geophysical modeling, mission design and scenario, and methodology required to 1) to de-alias noise from real signal as well as to 2) separate the contributions from the various sources (e.g. to separate ocean mass variability from atmospheric mass variability). This study is being performed by a consortium of nine European groups, combining expertise in all relevant geophysical fields and in designing satellite grav-

ity missions. The study started early 2007 and will last until the end of 2008. This paper presents the background of the study, and explains the (simulation) approach that will be taken to address the goals of the study. Major issues that play a role for the latter are the mission concepts, the state-of-the-art geophysical modelling, the use of dedicated spatio-temporal sampling to tackle the separability issue and the use of complementary data and models.