



## **Next Generation Satellite Gravimetry Mission Study (NGGM-D)**

Thomas Gruber and the NGGM-D Team

Technische Universität München, Institut für Astronomische und Physikalische Geodäsie, Muenchen, Germany  
(thomas.gruber@bv.tu-muenchen.de, 49 89 28923178)

The main goal of this project is to develop an advanced mission concept for long term monitoring of mass variations in the system Earth in order to improve our knowledge about the global and regional water cycle (with the components continental hydrology, ocean, ice, atmosphere) as well as about processes of the solid Earth. In times of global change this is needed to make more realistic predictions of system Earth parameters on the basis of models derived from these observations. While geometric observation concepts like remote sensing by optical and microwave techniques mainly observe changes at the Earth surface, gravimetric methods are the only measurement technique, which is sensitive to mass variations. Because of the complementarity of gravimetric and geometric observation concepts significant synergies and added value for the understanding of global processes can be obtained. Starting from the existing concepts of the GRACE and GRACE-FO (Follow-On) missions, sensitivity and spatial resolution shall be increased, such that also smaller scale time variable signals can be resolved, which cannot be detected with the current techniques. For such a mission new and significantly improved observation techniques are needed. This concerns in particular the measurement of inter-satellite distances, the observation of non-gravitational accelerations and the configuration of the satellite orbits or of a constellation of satellites. These new components and their complex interactions form the basis for a new space based observation concept for mass variations in system Earth.

The German Aerospace Center (DLR) currently is funding a preparatory study in order to develop a mission concept for a next generation gravity field mission. The study is coordinated by Technical University Munich and incorporates all major players in the field of satellite gravimetry in Germany. By joining scientific, technological and industrial expertise the resulting mission concept shall form the baseline for a potential and realistic mission proposal for a next Earth Explorer Mission by the European Space Agency. The poster presents the study layout as well as results obtained during the initial phase.