



ESA's Studies of Next Generation Gravity Mission Concepts

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The presentation addresses the preparatory studies of future ESA mission concepts devoted to improve our understanding of the Earth's mass transport phenomena causing temporal variations in the gravity field, at different temporal and spatial scales, due to ice mass changes of ice sheets and glaciers, continental water cycles, ocean masses dynamics and solid-earth deformations.

The ESA initiatives started in 2003 with a study on observation techniques for solid Earth missions and continued through several studies focussing on the satellite system, technology development for propulsion and distance metrology, preferred mission concepts, the attitude and orbit control system, as well as the optimization of the satellite constellation. These activities received precious inputs from the GOCE, GRACE and GRACE-FO missions. More recently, several studies related to new sensor concepts based on cold atom interferometry (CAI) were initiated, mainly focussing on technology development for different instrument configurations (GOCE-like and GRACE-like) and including validation activities, e.g. a first succesful airborne survey with a CAI gravimeter.

The latest results concerning the preferred satellite architectures and constellations, payload design and estimated science performance will be presented as well as remaining open issues for future concepts.