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Mass Variations in the System Earth – Forward Simulation and Geoid Impact

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A comprehensive forward modelling of relevant mass variation sources has been performed in context of the ESA project “Modelling Individual Sources of Mass Distribution and Transport in the Earth System by Means of Satellites” using up to date models in the various domains. This includes atmospheric, oceanic, hydrological, continental ice as well as solid Earth mass variation models. A coupling between the water cycle models has been taken into account by a twofold approach: (1) All models were driven (where necessary) with atmospheric data taken from the same global atmospheric model. (2) Water flows between hydrology and oceans as well as between continental ice areas and oceans have been taken into account in the ocean model as additional forcing parameters. From the simulation all together 12 years of 6 hourly gravity coefficients have been computed. The paper summarizes the approach applied and shows results from the forward simulation in terms of gravity field and geoid variations.