

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

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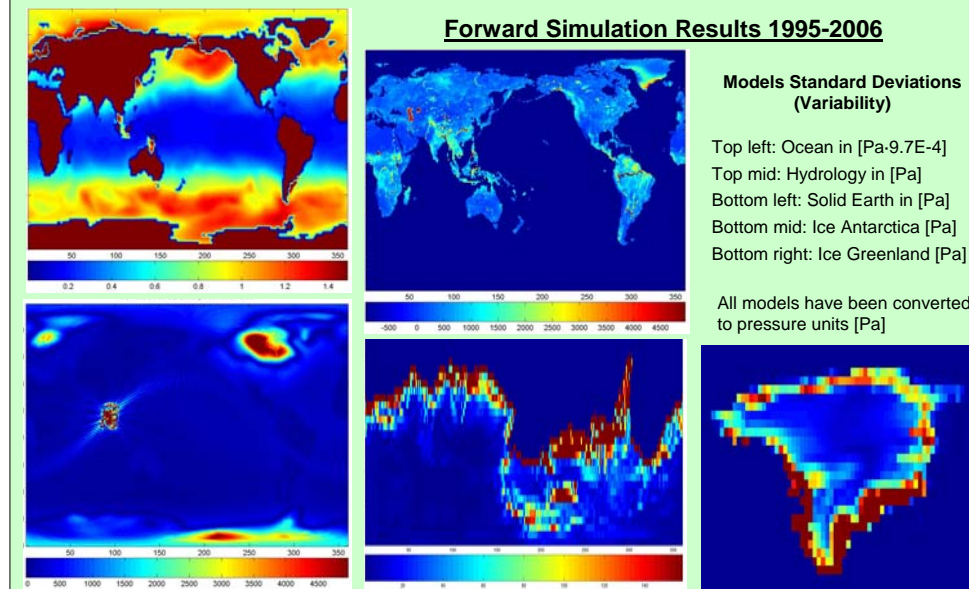
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## Introduction

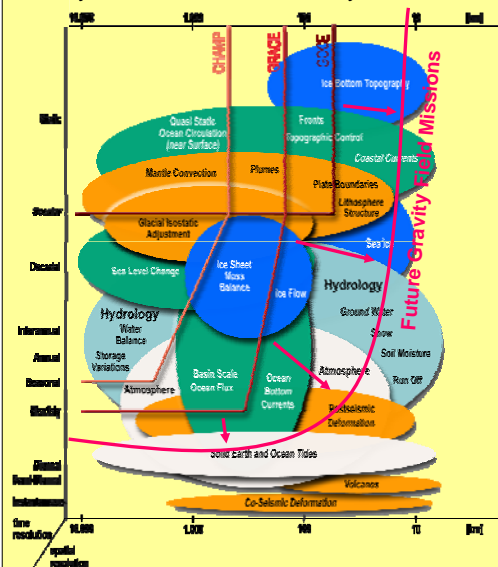
A comprehensive forward modelling of relevant mass variation sources has been performed in context of the ESA project “Modelling Individual Sources of Mass Distribution and Transport in the Earth System by Means of Satellites” using up to date models in the various domains. This includes atmospheric, 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 poster summarizes the approach applied and shows some results from the forward simulation in terms of gravity field and geoid variations.

## Forward Simulation Results 1995-2006



## Study Purpose:

Identify Needs for Future Gravity Field Missions

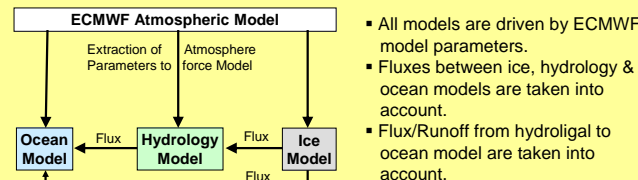


## Study Concept:

Simulate Mass Variations in System Earth

Summary of raw data formats of source masses					
Parameter/signal	Repr.	Deg/Dim	Time step	span from	span to
Solid Earth: PGR, Co- & Post-Seismic	Sph. Harm.	180	n/a	Rate of change or step	
Ocean Bottom Pressure OMCT Model	Grid	1.875	6h	1.1.1995	31.12.2006
Atmosphere Surface Pressure ECMWF	Grid	1.00	6h	1.1.1995	31.12.2006
Hydrology Model PCR-GLOBWB	Grid	0.30	daily	1.1.1995	31.12.2006
Ice Greenland & Antarctica BGC	Stereo Grid	n/a	daily	1.1.1995	31.12.2006

Combination of Mass Source Models of Water Cycle



## Mass Conservation in Water Cycle – What was achieved?

