

Interactive comment on “Simulation of the time-variable gravity field by means of coupled geophysical models” by Th. Gruber et al.

Th. Gruber et al.

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Changes have been directly done in the manuscript. Below answers to the reviewers comments are provided.

Specific Comments:

Introduction: Comments are taken into account for the revised manuscript (reference to other studies, description of GRACE).

Section 4: Answer to reviewer's comment: This is not quite correct. Here we used ERA-40 (ECMWF re-analysis data) with a simple downscaling scheme. Van den Broeke et al also used ERA-40 but they use a regional climate model called RACMO-2 to downscale the re-analysis. We did not use the RACMO-2 data in this study because it was not

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available and fully tested in time to do so. However, both SMB time series are derived from the same re-analysis.

Section 6.1: Answer to reviewer's comment: Details about lithosphere thickness and mantle viscosity profile used for the simulation in Figure 10 have been added to the manuscript.

The referee asks for "a more exhaustive description" of geoid height variations as a function of earth model - at least, that is how I interpret his question. This has been done extensively in the two papers that I added to the reference list, including detectability in terms of spherical harmonics of geoid and gravity anomaly variations for differences between earth models (lithosphere thickness, mantle viscosity) for both GOCE and GRACE. No use to repeat this in the present paper, in my opinion.

Same with polar wander: a simple reference has been made to Chapter 4 of Sabadini & Vermeersen's 2004 textbook on how this is incorporated.

Technical Comments: Section 2: re-analysis changed to reanalysis throughout the manuscript. Section 2: Software: sub-sentence deleted. Section 3.1: Reference to Web site of FAO added. Figures: So far possible figures were reformatted and harmonized.

Interactive comment on Earth Syst. Sci. Data Discuss., 4, 27, 2011.