

## ***Interactive comment on “Earth’s surface mass transport derived from GRACE, evaluated by GPS, ICESat, hydrological modeling and altimetry satellite orbits” by Christian Gruber et al.***

### **Anonymous Referee #2**

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The authors discuss a novel method based on radial basis functions for recovery of the global Earth’s gravity field from GRACE inter-satellite range-rate data. To test its performance, they authors use four independent datasets and using various metrics they compare results of the new method with respect to three global geopotential models derived from GRACE data. Obtained numerical results demonstrate that the new method can be used for global gravity field modelling as an alternative to classical spherical (spheroidal) harmonic models.

In my opinion, the article contains interesting new results. Thus, I support the publication of the article in ESD, maybe after the authors consider my remarks:

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1- Both the abstract and discussion should explicitly state that the RBF modelling technique can be used for processing GRACE data yielding global gravity field models which fit independent reference values at the same level as commonly accepted global geopotential models based on spherical harmonics. Advantages (and potentially also weaknesses) of the new technique (implementation complexity, computational cost, temporal and spatial resolvability etc.) could be mentioned in the text.

2- The RBF-based modelling technique is described in Section 1 using the standard text with some references. I would like to see at least fundamental equations of the mathematical model to make the article self-contained for its readers.

3- The alternative global geopotential models are referenced in Section 1 but for the same reason given above, few words about each model could be added (maximum resolution, processing technique, estimation of low-degree coefficients etc.).

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