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Earth System Science Data Discussions

Interactive comment on "ICGEM – 15 years of successful collection and distribution of global gravitational models, associated services and future plans" *by* E. Sinem Ince et al.

Anonymous Referee #2

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General Comments The manuscript provides a description of ICGEM, being IAG/IGFS′s unique and worldwide greatly appreciated user service for the collection, archiving, DOI assignment and dissemination of global gravity field models, determined from a variety of satellite and terrestrial observables by various analysis approaches, a service which in addition to these basic service functions provides also online calculation and visualization tools to relieve the user of the task of accurately calculating and visualizing various gravity functionals on selected grids by himself. The paper, providing up to date material and covering all main aspects for the use of the ICGEM service, of relevance for the readership of the journal, is well structured into seven sections of quite different length and language precision (examples are given below). Over all, in

the reviewer′s opinion the paper is well written, but is too long and needs some revision. Because of the importance of this unique gravity product service for research activities in the geosciences he recommends that a revised version be published after a re-review. Specific comments Abstract The manuscript title suggests that in addition to information on models and services presented in sections 2 and 3, something will be said about future plans. Scattered information on future plans can be found in subsection 2.1 History and 6 Conclusions, but wouldn′t it be better to introduce a separate section on Future Plans or to rename subsection 2.1 into History, Status and Future Planning? P.1, L.17/18: modify to "including those from the 1960s to the 1990s, as well as the most recent ones" P.1, L.19: "such as satellite" should read "such as satellite altimetry and. . ." P.1, L.23/24: polish text P.1, L. 25: paper does not present models. Change to ..We present a list of static, temporal. . .

1. Introduction

Introduction is too long, needs shortening P.2, L.5: change to "..in the 1960s to 1990s" P.2, L.6: Better "mass change" P.2, L.17: I suspect "analysis techniques" is meant P.2, L.18,20 Drewes et al., 2016, why the 3 references in Line 20? P.2, L.22: satellite orbit perturbations are derived quantities, not satellite observations P.2, L.30: imprecise phrasing: "terrestrial" gravity measurements collected on the "Earth surface" P.3, L.5: imprecise phrasing: new measurements become available from. . .terrestrial measurements P.3, L.7: modify wording- in reality ICGEM is not a meeting point, but acts as an interface P.3, L.11-L.18. For this paper, the text parts on IAG and IGFS are not of particular relevance. In the opinion of the reviewer it is sufficient to leave the text with the URLs in lines 9 and 10, complemented perhaps by the reference Drewes et al., 2016, and to delete the text part up to line 18. The same applies to page 4 line 17 for the four IGFS services and delete lines 18-26. P.4, L.9: why these references? P.4, L.31: modify text into "various types of gravity field models P.5, L.3: and section 7?

2. The Background of the ICGEM Service

2.1 History P.5, L.6: change perhaps to History, Status and Future Planning of ICGEM. P.5, L8: reference to the 1997 IAGA resolution No 1 for an international Decade of Geopotential Missions would be useful at this point.http://www.iaga-aiga.org/index.php?id=res1-97 P.5, L.19: add developed “by various institutions” P.5, L.20: add “dedicated” gravity missions P.6, L.7: add some wording that EIGEN-6C4 is a combination solution derived from. . ..

2.2 Scientific background and ICGEM′s Data P.9, L.1: misleading wording: ICGEM does not provide data but gravity model related quantities. P.9, L.7: polish wording “including on the ground. . ..” P.9, L.21 to P.14, L.10: Basic equations of the potential of a solid body, of the spherical harmonics expansion of the gravitational potential and the disturbing potential can be found in many textbooks and this text part should considerably be shortened and reformulated. Eq. 7 should be sufficient to explain the content of the ICGEM product archive and the characteristics of the expansion into spherical harmonics. For the various functionals reference could be made to Barthelmes 2013.

2.2.1 Static gravity field models P.14, L.5: replace by “above geoid “ P.15, L.22: sloppy formulation . . ..underneath the Earth! P.15, L.25-30: What′s the point at this point of the text? Wouldn′t it better fit to future aspects?

2.2.2 Temporal global gravity field models P.19, L.2: improve wording:. . ..as for longer P.19, L.4: change to 300 km

2.2.3 Topographic global gravity field models P.21, L.1: designation missing for plots P.21, L.7: in table 1- for sea level, ice and atmosphere only mass change can be meant.

2.2.4 Models of other celestial bodies P.22, L.7: polish wording P.22, L.9: add “the presently most detailed (or best) gravitational field”

3. Service of ICGEM

3.1 Calculation Service P.22, L.13: change have to has

3.2 3D Visualization Service P.29, L.27: improve wording by beginning “clearly visible

in these representations is. . .” P.31, L.24: mass change is more appropriate

3.3 Evaluation of global gravity field models P.32, L.14-L.21: different fond P.34, L.25ff: what is the purpose of the quick check assessments of the service, if not allowing fair comparisons?

3.5 DOI Service P.36, L.27: polish text “ and is equipped “ ??

4. Documentation P.38, L.14: polish wording “scientific disciplines and industry related background” ?? P.39, L.4: change to “pays “

6. Conclusions and future aspects P.42, L. 6 ff: see remark under Abstract

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