

**We would like to thank the reviewer for his comments that have helped to improve the readability of the paper and increase the precision of the language and the statements. We respond to each comment in detail below as indicated in bold. Reviewer's original comments can be found in italic font.**

#### *Detailed 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 sub-section 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?*

**Initially, we wanted to introduce the service, and provide information about its components through the paper. Then we thought collecting all the future plans at the end of the paper would be ideal and conclude the paper. Nevertheless, presenting them in Section 2.1 might be a good idea as well. In the revised version, it is applied as suggested by the reviewer.**

*P.1, L.17/18: modify to "including those from the 1960s to the 1990s, as well as the most recent ones"*

**Applied as suggested by the reviewer.**

*P.1, L.19: "such as satellite" should read "such as satellite altimetry and. . ."*

**Added.**

*P.1, L.23/24: polish text*

**This sentence has been removed from the abstract and included in the rest of the manuscript in different forms.**

*P.1, L. 25: paper does not present models. Change to ..We present a list of static, temporal. . .*

**The sentence has been rephrased to "We present the ICGEM's data by means of ....."**

#### 1. Introduction

*Introduction is too long, needs shortening*

**Some reductions are applied also to the introduction (e.g. removing Fig. 1), besides data and other sections.**

*P.2, L.5: change to "..in the 1960s to 1990s"*

**1990s is added..**

*P.2, L.6: Better “mass change”*

**Edited.**

*P.2, L.17: I suspect “analysis techniques” is meant*

**We have replaced with the technologies.**

*P.2, L.18,20 Drewes et al., 2016, why the 3 references in Line 20?*

**Drewes and Toth include actually the ICGEM reports for different periods which include the mentioned information in the text. But, to avoid confusion and make the text more readable the references are removed.**

*P.2, L.22: satellite orbit perturbations are derived quantities, not satellite observations*

**It is mentioned in the text as “...derived from GNSS measurements”. Therefore, we agreed that they are not direct observations.**

*P.2, L.30: imprecise phrasing: “terrestrial” gravity measurements collected on the “Earth surface”*

**These refer to the gravity measurements collected on the Earth surface. For the purpose of this paper, the details given in this part would be enough from our point of view. But, any suggestion to make it more precise is very welcome.**

*P.3, L.5: imprecise phrasing: new measurements become available from. . .terrestrial measurements*

**Since inclusion of such information would further increase the size of the paper, we have avoided adding more information on such items.**

*P.3, L.7: modify wording in reality ICGEM is not a meeting point, but acts as an interface*

**We changed as the meeting platform which may replace the 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?*

**This is also a part where we discussed among the co-authors while writing the paper. We believe adding this part makes the position of such a service clear and complete the content of the paper. The need for the ICGEM Service is made obvious with the information and support provided by the association. Therefore, we would like to keep this part in the paper. However, to save some space, we removed Fig.1 and some more text.**

*P.4, L.31: modify text into “various types of gravity field models*

**Modified.**

*P.5, L.3: and section 7?*

**Added.**

*2. The Background of the ICGEM Service*

*2.1 History*

*P.5, L.6: change perhaps to History, Status and Future Planning of ICGEM.*

**Modified as suggested, and we moved some sentences from the Conclusion and Future Plans to this section.**

*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>*

**Added.**

*P.5, L.19: add developed “by various institutions”*

**Added.**

*P.5, L.20: add “dedicated” gravity missions*

**Added.**

*P.6, L.7: add some wording that EIGEN-6C4 is a combination solution derived from. . .*

**Added in the caption.**

*2.2 Scientific background and ICGEM’s Data*

*P.9, L.1: misleading wording: ICGEM does not provide data but gravity model related quantities.*

**ICGEM collects and distributes global gravity field models, as well as provides products via calculation service. Within this concept, after some discussions with data service in our institution, our understanding is any of the above mentioned can be called data in general. Therefore, the subtitle includes “Data” to refer to all these in general.**

*P.9, L.7: polish wording “including on the ground. . .”*

**This part has been removed in the revised version.**

*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.*

**This part has been reduced as well in the revised version. We still think having the equations for the geoid undulation and gravity disturbances can be good references for the other functionals without the need of going to the references in the first place. For detailed information, the complete references either Barthelmes 2013 and other textbooks are given.**

#### *2.2.1 Static gravity field models*

*P.14, L.5: replace by “above geoid “*

**Indeed. Replaced in the revised version.**

*P.15, L.22: sloppy formulation . . . underneath the Earth!*

**Replaced with “in the deep mantle” as given in the original reference.**

*P.15, L.25-30: What's the point at this point of the text? Wouldn't it better fit to future aspects?*

**It is a link to the preliminary model of EGM2020, XGM2016 which is shortly covered in one of the examples provided in the paper. Moreover, since these are future aspect of the global gravity field models and not the ICGEM Service directly, it may be more suitable to keep it in this section.**

#### *2.2.2 Temporal global gravity field models*

*P.19, L.2: improve wording: . . .as for longer*

**Edited.**

*P.19, L.4: change to 300 km*

**This was written considering the maximum degree and order expansion of the temporal models. In the revised version, we have replaced it with ~300 km for monthly solutions.**

#### *2.2.3 Topographic global gravity field models*

*P.21, L.1: designation missing for plots*

**Letters are added to the figures.**

*P.21, L.7: in table 1- for sea level, ice and atmosphere only mass change can be meant.*

**A note to the caption is added for clarity “Note that the variations refer to the mass change”.**

## 2.2.4 Models of other celestial bodies

*P.22, L.7: polish wording*

**Original sentence”** These models are also developed based on similar observations of the gravity field of the body.

Replacement: **These models are also developed based on similar observations.**

*P.22, L.9: add “the presently most detailed (or best) gravitational field”*

**Revised version:” ....have been used to develop the most detailed gravitational field of the Moon so far”.**

## 3. Service of ICGEM

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

**Indeed. Replaced.**

*3.2 3D Visualization Service*

*P.29, L.27: improve wording by beginning “clearly visible in these representations is. . .”*

**Applied.**

*P.31, L.24: mass change is more appropriate*

**Indeed, applied as suggested.**

*3.3 Evaluation of global gravity field models*

*P.32, L.14-L.21: different fond*

**Edited.**

*P.34, L.25ff: what is the purpose of the quick check assessments of the service, if not allowing fair comparisons?*

**Maybe we should have used another wording instead of “fair”. The service still performs very useful comparisons among the models but does not apply sophisticated comparisons that are interest of many other studies published individually. Since the ICGEM’s aim is to compare various models wrt exactly the same external, independent datasets, the results still serve for basic comparison purposes. In the revised version more explanations and future plans for the GNSS/levelling comparisons are added.**

### *3.5 DOI Service*

*P.36, L.27: polish text “ and is equipped “ ??*

**We have changed the original text “and is equipped with” to “Metadata can be harvested via an Application Programming Interface (OAI-PMH).”**

### *4. Documentation*

*P.38, L.14: polish wording “scientific disciplines and industry related background” ??*

**Industry part is removed in the revised version.**

*P.39, L.4: change to “pays “*

**Indeed, thank you for noting.**

### *6. Conclusions and future aspects*

*P.42, L. 6 ff: see remark under Abstract*

**Applied as recommended in Section 2.1**