Review of egusphere-2023-2132, "High-precision 1'×1' bathymetric model of Philippine Sea inversed from marine gravity anomalies"

General comments

It is a good work; however, I think it is a repetition of the authors' work in the South China Sea (An et al. 2022). The IGGM was introduced for the first time in that paper, and was tested in the South China Sea. So, basically the regional capability of IGGM has already been proved in that work. With such considerable number of contributing authors, this study could (or should) have been a global test of the IGGM by merging a suite of regionally predicted depths. If not, then the only difference between this paper and the authors' previous paper is just the change in study area. And since each study area will yield different results, then any subsequent regional application of IGGM will just be a repetition.

Authors should check the units of measurements used. Some readers will argue that g/cm^3 is not the generally accepted S.I. unit of density. Similar statement can be said of the unit of the gravitational constant.

Specific comments

Line 52: The S&S method is also a frequency domain method

Line 87: What do you mean by 'certain parameters?

Figure 1: The color palette used causes the empty grid cells (continent) to blend in as part of the gravity anomaly. Anomalies close to or greater than 80 mGal are showing as white, which is not far from gray. So, I suggest you consider changing this color palette.

You did not define θ and k in Eqs. (3) and (4). How do you compute the value of θ? You should state it in the manuscript.

Check Eq. (5) again. The output of Eq. (4) is $\Delta g_{res}^{j_n}$, and not $\Delta g_{short}^{j_n}$.

Line 171: Change 'objects, analysing and determining' to 'subregions for analysing and determining'.

Line 171 – 172: The optimal parameters are chosen after determining the unknown parameters; am I right? If yes, then change 'in advance' to 'afterwards'.

Table 1: Change the column title 'Removing points' to 'No. of removed points'.

Figure 4: The geographic extents of Area A (6º×7º) and Area D (6º×8º) are almost similar; so, I think you could have plotted Area A to have slightly similar size as Area D. Apart from Area C, Areas A, B and D contain more depth data, but because you have plotted them too small in size, they look quite clumsy. The same applies to the subsequent related figures. Since you used GMT for the plots, you can even increase the plot size of Area B too. Use a different projection (-J option) for the *plot* module for each map.

Line 216 – 217: "and the density contrast $\Delta\rho$ calculated by IGGM is closer to the theoretical value (1.67 g/cm3)". In reference to Table 2, this statement is very misleading. Because, apart from IGGM's 1.4 g/cm^3 in Area B, the other values are far from 1.67 g/cm^3, especially if you express the unit of density as kg/m^3.

Figure 7: It would be better to change the color palette; it has made the figure kind of too flashy. I can hardly see the black points you are talking about, simply because of use of wrong color palette.

Moreover, there has been research commenting on the weaknesses of the rainbow color palette. You can look it up at https://doi.org/10.1016/j.isprsjprs.2022.10.002. Also, increase the sizes of the plots like I have commented in the preceding comment, so that they can be more readable.

Line 238: Change ‘reason’ to ‘factor’.

Line 269 – 270: Change ‘the sea area lacking of’ to ‘marine regions that lack’

You need to rephrase the first sentence of Line 310 – 312; it is not clear to understand.

Line 399: Check the spelling of the first author’s name.