

Interactive comment on “Daily GRACE gravity field solutions track major flood events in the Ganges-Brahmaputra Delta” by Ben T. Gouweleeuw et al.

N. Tangdamrongsub (Referee)

nattachet.tangdamrongsub@newcastle.edu.au

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The paper utilizes GRACE daily solution on detecting major flood events over the Ganges-Brahmaputra basin. Results from two different daily solutions are investigated and compared with the monthly solution from the same data centers. The paper shows that the daily solutions are capable of monitoring (temporally) the 2004 and 2007 flood events. The analysis also provides an insight into the timing of streamflow, which explains why the events can be observed by GRACE. The final part of the paper also discusses the difference between ITSG and GFZ solutions.

I thank authors for sharing such a very interesting article. I find the paper very motivat-

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ing particularly the use of a daily solution that has not really been exploited. I strongly recommend its consideration for publication.

The article is indeed well-written, but some clarification is still needed. I wish authors found my suggestions/comments below helpful for the revision:

1. Daily or monthly GRACE solutions? Authors generally use the term “GRACE”, and it is quite confusing which solutions authors meant. For example, page 2, line 26 “Limited spatial sampling in East-West means that GRACE contributes . . .”, I believe authors mean “daily GRACE” here. This is found throughout the text. Please consider using “daily GRACE” or “monthly GRACE” instead of “GRACE” where necessary.

2. ITSG or GFZ solutions? Similar to the above, please consider using “GRACE ITSG solution” or “GRACE GFZ solution” where necessary. For example, page 4, line 23 “The GRACE input is identical . . .”, it is unclear what solution authors used here. Please consider including this information in Fig. 1 (a-c) as well.

Fig. 1, it is likely that only one solution is used for the analysis. Is it possible to present both solutions?

3. GRACE data processing. Can methodology presented in Eq. (1-4) be found in Kurtenbach et al. (2012)? If so, I think it can be removed from the paper since authors do not discuss the methodology further. Particularly the methodology regarding GFZ daily solution (which is more interesting) is not presented here at all. Could authors explain in details how GFZ daily solution is derived, or at least provide some references?

4. GRACE data processing. I believe the Sect. 2 can be organized better. I recommend using subsection here, like 2.1 ITSG, 2.1.1 daily ITSG, 2.1.2 monthly ITSG, 2.2 GFZ, 2.2.1 daily GFZ, 2.2.2 monthly ITSG, or 2.1 daily solution and 2.2 monthly solutions. The current format is shuffling around, which is quite confusing.

What are the maximum harmonic degrees of daily ITSG and GFZ solutions? 40?

5. GRACE data processing. Page 4, lines 6 – 17 are very confusing. Could you please

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verify if the post-processing lines 6 – 12 is for the daily or monthly solutions? I guess it is “daily”. Authors state that the GRACE Tellus procedure is used, but what about degree 1, destriping, smoothing and scaling (they are not mentioned in the paper)? It is likely that the spatial smoothing is not used (this is stated later in line 14), so I think referring to GRACE Tellus here is very misleading. Line 9, the daily GFZ uses degree 1 from SLR, but later on, authors cite Swenson et al. (2008). I am confused here which solution is really used. Also, are degree 1 and 2 available daily? Please consider rewriting this section.

For the monthly solution, why do authors use the DDK2 filter? This is quite aggressive filter compared to e.g., DDK3-DDK5, and might lead to significant attenuation of the TWSA amplitude. Authors discuss this issue later on page 5, lines 10 – 11.

What is the maximum degree used to computed TWSA in this study? Are they the same for both daily and monthly solutions?

6. The 2004 flood. Page 5, lines 4 – 5, why do the comparisons between daily ITSG and GFZ are based on a different day? If it does not require much work, it might be more informative to show all consecutive days of the flood periods instead of some particular snapshots. The visualization how flood distributes during the events will be very interesting. Line 13, please clarify what do you mean by “. . . while high TWSA values are slightly concentrated.”. Line 15, “Flood stages were reached between 10 and 26 July . . .”, this is not presented in Fig. 2 and 3, I think authors refer to the time series in Fig. 4. Please clarify.

7. Page 5, lines 10 – 11, this might not be fully due to the filter. The monthly value computed based on both flood and non-flood days likely show lower amplitude compared to the signal of the flood day.

8. Page 6, lines 1 – 2, authors present the correlation at specific epoch while the values in Table 1 is computed based on the entire time series. Is the correlation presented in line 1 – 2 significant? I suggest include all analyses into Table 1 and present Table 1

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instead.

9. Please consider including the discussion of daily ITSG and GFZ performances in the conclusion. The daily ITSG tends to perform better in general and should be mentioned.

10. Page 7, Line 14, “seasonally-corrected LPF”, is it daily or monthly?

11. Page 9, Line 2, the GFZ’s ftp is not accessible. Is it possible to provide a public access address?

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