Editor comments on angeo-2018-93-manuscript-version8

Comments on yours answers (in green) to my previous review

We do not understand "Given the above remark this result was actually expected".

One can expect that the two gradient computation methods using NWM data would agree better than one of the NWM gradients agrees with GNSS gradients, because both use NWM data and NWM fields are smoother than reality which is leading to small gradient estimates.

We cannot state that tropospheric gradients estimated with CH are more (or less) accurate than tropospheric gradients estimated with BS.

This situation is annoying if one thinks about using GNSS gradients for data assimilation or climate monitoring. For comparison, consider the ZTD estimates. A lot of efforts have been made to achieve accurate mapping functions such that the ZTD estimates have now negligible biases and you don't need to know which mapping function was used when you want to assimilate GNSS ZTD data. It should be emphasized that more work is still necessary to improve the gradient mapping functions.

The impact can be also study during events with significant gradients in a dense network only while it easily remains hidden in most other cases.

Good point. You can mention this when you study the case of 31 May 2013 in Section 4.

From the global map (Appendix), maximum values can be clearly identified, and these are rather stable over time.

The maximum values cannot be se clearly identified because of the continuous colour shades. Could mention in which region(s) the maximum value is observed? It would also be useful to report the value of the bias in the benchmark region.

The figure shows a mean map, so it cannot be speculated if the results are stable or not in time. Actually the time series shown in Figure 11 show quite large variability so the stability in time is disputable.

Unrealistic cases with the RT3 solution were detected, the statistics were re-computed and updated in Table 2 and Table 3.

I noticed that results for RT1 also changed in these Tables. What is the reason for this?

Yes, we used the first approach which you describe – statistics were computed directly from the ZTD and gradient differences of all pairs of values (55 days x 243 stations x 288 estimates per day).

Please mention it in the manuscript as it implies that the results in the Tables are representative of all stations mixed together (i.e. region-average statistics) rather than statistical for a "typical" station (i.e. station-mean statistics) such as in Dousa et al., 2017.

We do believe it does not need a scatter plot (thought we added them), which does not give clearer picture.

What you added actually are histograms and not scatter plots (e.g. GN/CH vs. GN/BS plots).

Minor corrections on the new manuscript (angeo-2018-93-manuscript-version8)

P2L1: Numerical Weather Prediction models (NWM) => Numerical Weather Models (NWM) or Numerical Weather Prediction (NWP) models ; change consistently throughout the manuscript is the latter is kept

P3L20: From the formula (1) is evident that GNSS gradient represents a gradient of both hydrostatic and wet part of the delay, therefore a total delay gradient. => The GNSS gradient modelled by Eq. (1) represents a total gradient (the hydrostatic and wet components are not explicit in this formulation).

P4L13: We can thus further focus on BS and CH mfg only… => In the following we focus on BS and CH mfg only…

P9L22: Naturally, smaller formal errors correspond to the lower elevation angle cut-off which can be observed for both ZTDs and tropospheric gradients in Table 3. => This can be observed in Table 3 when the elevation cutoff is increased.

P10L19-20: The gradients estimated with improved geometry and using more observations are expected to provide more accurate and reliable estimates. => The gradients estimated with improved geometry and using more observations are expected to be more accurate and reliable.

P10L24: "The ZTDs were thus practically unaffected by different gradient models." Remove this sentence. The correlation coefficients of 1.000 for the ZTD estimates is very likely biased because they are computed from all stations mixed together (a well know artefact when the mean values are different from one station to another).

P11: number of section is 3.3 not 3.2

P12L10: the reference to Appendix A is not relevant, unless you indicate the value of the bias in the Benchmark region.

P15: title of section 4: "Systematic effects" is misleading as mainly one day (initially, and now 8 days) of the Benchmark period and region are studied. Suggest to change to "Impact of different gradient mapping functions and elevation-dependent weighting".

P16L1-2: I think both plots show results close to the expected behaviour: smaller residuals near the zenith and larger at low elevations. SINEL2 is preferred not because of the residual properties but because more accurate parameters are estimated (ZTD, coordinates, etc.).

P16L5: do you have a reference for your previous finding? If not, summarise the results or remove this sentence.

P16L8: Thought => though