

Interactive comment on “Tropospheric products of the 2nd European reprocessing (1996–2014)” by Jan Dousa and Pavel Vaclavovic

Anonymous Referee #2

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The manuscript presents results of the 2nd reprocessing of the EPN network performed by GOP analysis centre. Seven variants of processing were carried out and compared to GOP-Repro1 and combined EUREF Repro 1 solutions. Moreover, independent data from the ERA-Interim global reanalysis were used to validate tropospheric products from GNSS processing. Authors assessed all solutions in term of repeatability of station coordinates and also analysed biases and standard deviations of the derived ZTDs and horizontal gradients. They also discussed the relationship between tropospheric gradient bias and antenna tracking. In my opinion this paper is well written and will be of interest of AMT readers. However, I have some concerns and questions before it can be accepted for publication.

1. Did you do any screening of coordinates and ZTD/gradients obtained from your processing? If so, what was the screening procedure?

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2. In this paper almost all analysis and statistics (except interesting case with MALL station) are quite general. You may want to try to analyse the results in more details and try to find cases when change of the processing parameters had the clear influence on the estimated coordinates and tropospheric parameters. E.g. you could do more careful analysis and consider possible dependence on the on the localization of stations, antenna models, etc. (for example maybe for stations in high mountains or closer to equator some variant are better than others). This would improve the content of the manuscript.

3. Section 2, line 106, Figure 1:

a) You wrote that the network was split into 10 sub-networks. In Figure 1 based on different colours I can distinguish only 6 clusters. It is better to change the markers and e.g. some clusters mark as squares.

b) Did you use common stations to link the clusters in the network solution?

c) How did you choose the clusters of stations? Based on the localization of the stations? I can see in Figure 1 that clusters are regional – stations which are located close to each other are in the same cluster, and the stations of each sub-networks are always the same. Is it an optimal solution of the sub-networks design? Santamaría-Gómez (2010) showed the results of processing of global network clustered into “dynamic sub-network”, where closer stations were distributed in different sub-networks in order to obtain a regular distribution based on station baseline geometry. They showed a noticeable improvement in the percentage of fixed ambiguities, especially before the year 2000, and also improvement of position repeatability and transformation parameters with respect to a “static sub-networks” solution. Did you test maybe this kind of clustering in your processing?

- Santamaría-Gómez, A. (2010), Estimation of crustal vertical movements with GPS in a geocentric frame, within the framework of the TIGA project, doctoral dissertation of the Observatoire de Paris.

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- Santamaría-Gómez, A.; Bouin, M.-N.; Wöppelmann, G. (2009), Impact of sub-network configuration on global scale GPS processing, EGU General Assembly 2009.

4. Section 4.1, lines 202-223: You wrote that you used an interactive procedure of validation of the fiducial stations. Can you be more specific on what this procedure was and how it works? Did you choose stations based on daily repeatability of their coordinates? What was your set of fiducial stations? IGS stations?

5. Section 4.2:

a) lines 233-253: It's a quite long paragraph about comparison of ZTD obtained from GOP Repro2 reprocessing to EUREF Repro1 products. We can expect that EUREF Repro 1 is worse than each version of Repro 2. The fact that some variant of the reprocessing is closer to EUREF Repro 1 does not mean that it is better. So, is it really useful to show such results? Does it bring any meaningful statistics? I think comparison to any external data (for instance ERA-Interim what is shown in next paragraph) is more interesting and conclusive.

b) lines 260-274, Figure 5: GNSS ZTD from each reprocessing compared to ZTD from ERA-Interim is characterized by a negative bias. We can also notice it in the EPN solution. Can you explain why the bias is negative?

6. References, line 472: Please, change reference Pacione et al. (2017) to: Pacione, R., Araszkiewicz, A., Brockmann, E., and Dousa, J.: EPN Repro2: A reference GNSS tropospheric dataset over Europe, Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2016-369, in review, 2016.

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