

Manuscript Review

Title: High temporal resolution wet delay gradients estimated from multi-GNSS and microwave radiometer observations

Authors: Tong Ning and Gunnar Elgered

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This manuscript compares the linear horizontal wet delay gradients estimated from multi-GNSS against the corresponding values estimated from WVR using one year data. It is shown that the improvement obtained for the solution using multi-GNSS data is obvious, i.e. an increase in the correlation coefficient of 11 % for the east gradient and 20 % for the north gradient (by comparing with those from the GPS-only solution). In addition, the authors also investigate the impact of different temporal resolutions from 5 min to one day, and the result indicates that the highest correlations obtained for the east and north gradients are for a resolution of 2 h and 6 h, respectively. And for a resolution of one day, all gradients are averaged and the dynamic range of gradient size and the correlation decreases. In addition, it is also shown that, for catching the gradients with a sudden occurrence nature, the GNSS underperforms the WVR. The paper in general is well-written and gives detailed information about the related processes. I have only a few comments for the authors:

Main comments:

1. Section 2.2: How to identify the jumps occurring sometimes at the beginning of the 5 min cycle when you estimate the gradients using WVR. And how many observations from WVR were removed or how many observations are used to compare with the gradients estimated from GNSS?
2. Line 111-112: It is very obvious that the mean and variability of the estimated gradients amplitude increase with an increase in elevation cutoff angle together with its formal error. Why is this?
3. Line 112-114: “The gradient amplitudes estimated by the WVR are approximately twice as large as the GNSS gradient amplitudes at 3° cutoff angle but the decreases to around 50% as large for the cutoff angle of 15°”. I do not find the feature from Table 1. Which column of the table can be used to reach the conclusion?
4. The formal errors of WVR are larger than ones of GNSS in Table 1. Also as is mentioned in line 116-117, the uncertainty in measured sky brightness is unstable. It seems that the uncertainty of WVR is larger than that of GNSS. Therefore, are the comparison results credible?