Troposphere parameters estimated by the new GEONET analysis strategy

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A new analysis strategy of GEONET has been developed (Hatanaka et al., 2007, 2008). and improvements of coordinates of the new solution (F3 solutions, hereafter) in comparison with the former routine solutions (F2 solutions, hereafter), such as mitigation of annual variation of scale and variance reduction of baseline components, was confirmed. In this presentation, we evaluate tropospheric parameters that are estimated together with coordinate parameters in the F3 analysis system in comparison with those of F2 solutions.

The estimated zenith total delay (ZTD) parameters of the F3 solutions are compared with those of the F2 solutions. The former are about 1 cm smaller than the latter in average. In more detail, the biases between F3 and F2 solutions range from several millimeters to 2 cm depending on period and regional cluster which a station belongs to,. There are clear offsets in the biases at around 2003. It is inferred that the antenna replacement of most of the GEONET stations which was carried out around this period affects to the biases. The time series of bias shows long term trend after 2003, especially, and the biases tend to increase in recent years.

Tropospheric gradient parameter, which was introduced in F3 solution as an estimated parameter, also shows change in bias around 2003. The gradient vectors point mostly southward after 2003, while they point from southward to southeastward, depending on the region, before 2003. The former feature is consistent with that shown in solutions of global GPS networks (e.g. Meindl eta al., 2004). Interpretation of the gradient vectors before 2003 should be done carefully since they may be biased. The north-south component of the gradient parameters shows annual variations. The amplitude of the annual signals are larger in pacific-side of Japanese islands in a region to the south of Kanto district. This distribution of the amplitude is consistent without depending on period and analysis software, and may originate from true meteorological signals.