"Cut-off elevation angle and the baseline length repeatability (a case of CONT05)"

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**Introduction**

In this memo, the results of processing of the CONT05 observations aiming at investigation of the impact of the cut-off elevation angle (CEA) on the baseline length repeatability are presented. For this test, CONT05A observations were processed with different CEA from 3º to 25º, keeping all other options the same as used during the routine processing:

- Kalman filter mode,
- random walk model for clocks, PSD=1.5 ps$^2$/s,
- random walk model for ZTD, PSD=0.25 ps$^2$/s,
- one NS and EW troposphere gradient estimate for the session.

This should be mentioned that in the case of $e_0 = 3º$, all the observations are included, since no observations were made at the elevation less than 4º.

**Test results**

Figure 1 shows the result of the normal (routine) processing, without applying an elevation cut-off, but with elevation-depending weighting using the weight factor $P=(\cos(z_0)/\cos(z))^2$, where normally $z_0 = 80º$, and $z$ is the maximum zenith distance of the source at two stations. Test results obtained with different CEA $e_0$ are shown in Figures 2 and 3.

![Fig. 1. Baseline length repeatability for the normal processing mode.](image-url)
Fig. 1. Dependence of the baseline length repeatability on the cut-off elevation angle. Linear and quadratic regression lines are shown in the plots.
Fig. 2. Dependence of the baseline length repeatability on the cut-off elevation angle (summary of results shown in Fig 1). At the top: all tested CEA; at the bottom: low CEA and normal processing mode with the elevation-depending weighting.

**Conclusion**

The preliminary conclusions from this test are the following.

- The baseline length repeatability steadily grows with the CEA increasing, remaining practically the same in the cut-off angle range from 3° (i.e. no cut-off for the CONT05) to 9°.

- The best result is obtained when the elevation-depending weighting is applied to the low-elevation observations. Further adjustment of the weighting method may be fruitful.

Finally, we can conclude that inclusion of the low-elevation observations, properly weighted, improves the baseline length repeatability.