

# **IVS Memorandum 2007-010v01**

**8 September 2007**

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

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## 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  $3^\circ$  to  $25^\circ$ , keeping all other options the same as used during the routine processing:

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

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

### 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  $z_0=80^\circ$ , 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.

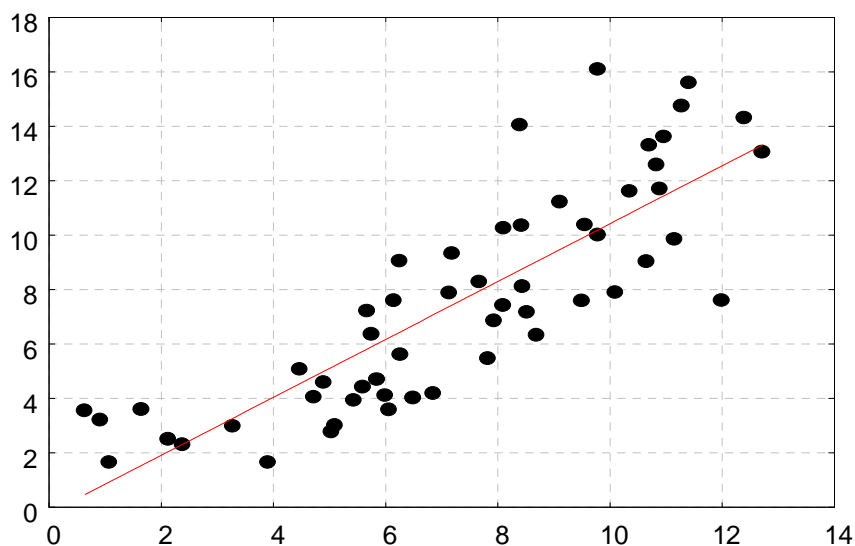


Fig. 1. Baseline length repeatability for the normal processing mode.

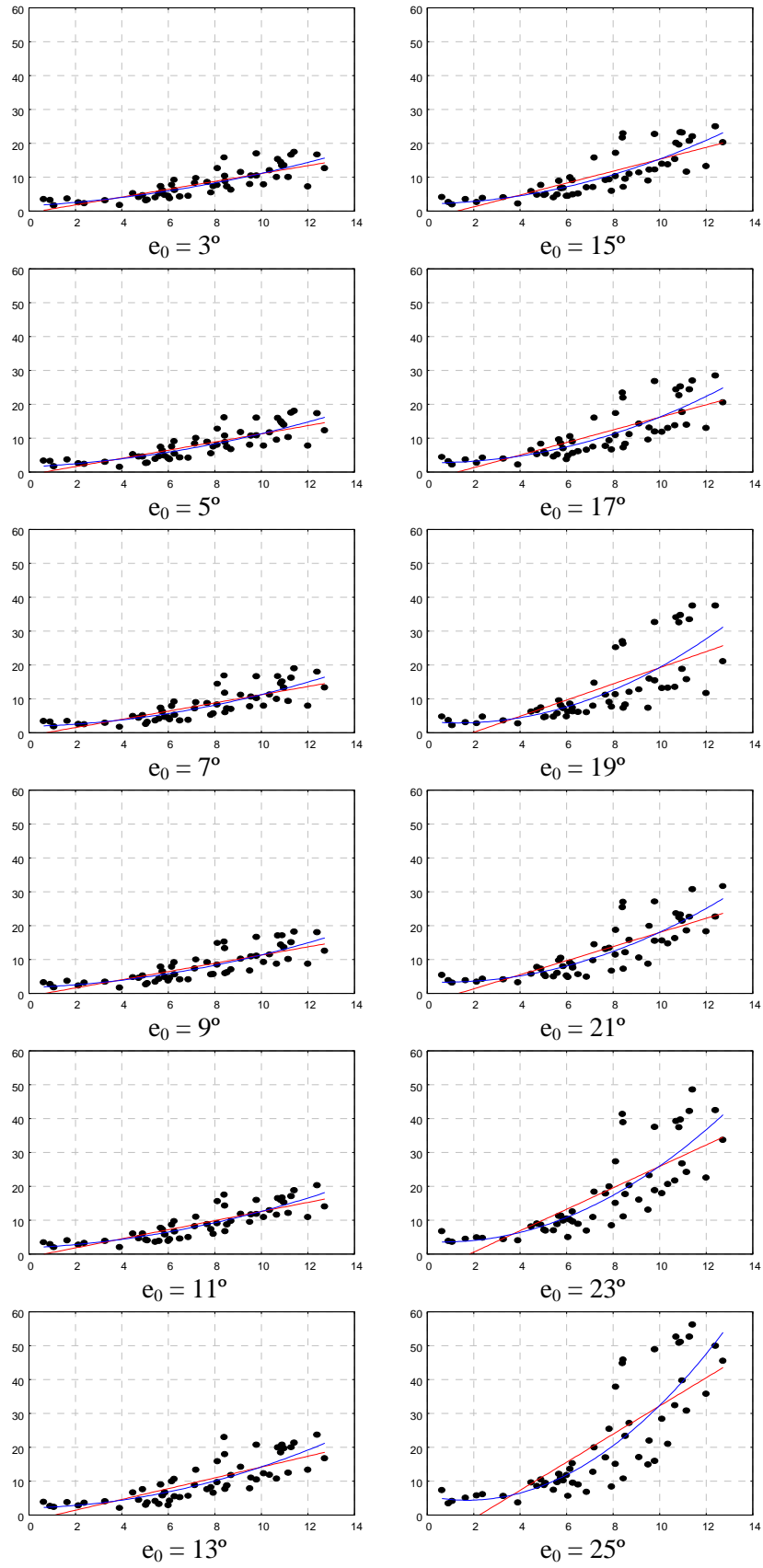


Fig. 1. Dependence of the baseline length repeatability on the cut-off elevation angle. Linear and quadratic regression lines are shown in the plots

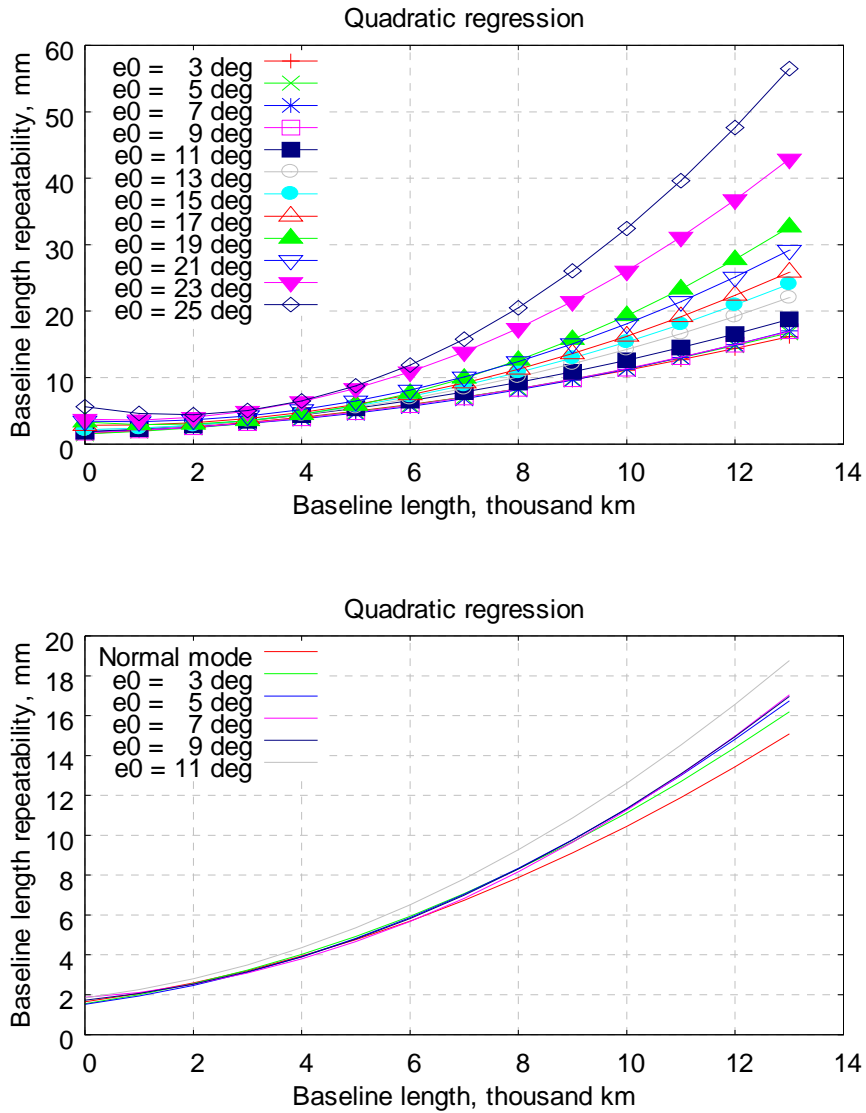


Fig. 2. Dependence of the baseline length repeatability on the cut-off elevation angle (summary of results shown in Fig 1). At the top: all tested CEA; at the bottom: low CEA and normal processing mode with the elevation-dependent weighting.

## 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-dependent 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.