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Single-Baseline VLBI Observations for the Estimation of Universal Time

Tobias Nilsson, Johannes Boehm, and Harald Schuh

Vienna University of Technology, Institute of Geodesy and Geophysics, Vienna, Austria (tobias.nilsson@tuwien.ac.at, +43 1 58801 12896)

The IVS Intensive sessions are single baseline, one-hour VLBI sessions carried out every day in order to determine Universal Time (UT1). As the timeliness of the results is improving due to the usage of e-transfer of the data from the radio telescopes to the correlators, these sessions get more important for the prediction of UT1. However, there is a discrepancy between the formal errors (approximately 10 micro-seconds) and the accuracy (approximately 20 micro-seconds) of the UT1 estimates from these single-baseline sessions which is not yet fully understood.

CONT08 was a 15 days long continuous VLBI campaign and is one of the best VLBI data sets that have ever been observed. From the CONT08 data we extracted single-baseline observations in two hour intervals. These databases were analysed in the same way as typical intensive sessions. The estimated UT1 values are then compared to those estimated from the full CONT08 data set. From the analysis of the CONT08 data we also have good estimates of parameters which are normally not estimated in the analysis of intensive sessions, like polar motion and tropospheric gradients. We make tests in which we include these estimates as a priori values in the single-baseline analysis and investigate the respective impact on the UT1 estimates. This procedure makes it possible to assess the impact of different error sources on the UT1 estimates and to give recommendations how the analysis of intensive sessions can be improved.