

On the improvement of the consistency and the temporal regularity of combined ERP time series

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Abstract. Our previous GNSS and VLBI combination studies allow the consistent estimation of Earth Rotation Parameters (ERP) time series with a regular daily resolution and latencies of about 1-2 and 14 days. The established data processing is based on homogenized, datum-free NEQs, which allow a rigorous combination on the normal equation level instead of the observation level. The significant accuracy improvement is achieved for the obtained dUT1 time series in comparison with the individual technique-specific solutions.

Our recent studies focus on the generation of a stable VLBI-only ERP series with a regular daily resolution using a continuous ERP parameterization. This approach of stacking of the VLBI Intensive (INT) NEQs of several consecutive days aims to stabilize the dUT1 time series and improve the accuracy compared to the classical single-day VLBI INT dUT1 solution. Contrary to the commonly estimated single-technique solution, the accuracy of the multi-day dUT1 time series is less dependent on the irregularity of the VLBI INT observations, thus the dUT1 time series with a daily resolution (e.g. at 12:00 UTC) can be obtained. Besides, the constraints on LOD can be omitted in the multi-day VLBI INT solution. The adding the VLBI 24-hour data to the VLBI INT data further stabilizes the multi-day solution and enables the estimation of a full set of ERPs including the celestial pole offsets. The improved combination method is intended to be extended to the operational ERP products at BKG.