CONT14 — HIGH-FREQUENCY EARTH ROTATIONS VARIATIONS FROM VLBI OBSERVATIONS

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ABSTRACT. Results of data processing of CONT14 15 day campaign of continuous VLBI sessions with a network of 17 globally distributed stations in May 2014 with participation of two stations of Russian QUASAR network stations Badary and Zelenchukskaya are presented. Preliminary analysis results on EOP precision, baseline length precision are discussed. The observed intraday variations EOP are compared with a tidal model and with results of previous CONT campaigns. Troposphere parameters are compared with ones obtained with GPS technique.

CONT14 is a campaign of continuous VLBI sessions was held from 6-th till 20-th of May 2014. At the global VLBI network from 17 stations with the goal to acquire state-of-the-art VLBI data and continuous to study high frequency (sub-daily) Earth Orientation Parameters (EOP). The data was correlated using BONN correlator.

Secondary treatment program CONT14 observation was carried out using a software package OCCAM / GROSS. In the calculation of diurnal EOP 15 daily sessions were combined into one 15-day session (consisting of 23040 scans and 287,275 delays), which has been processed using a package OCCAM/GROSS using the forward run of the Kalman filter to estimate the stochastic parameters. As stochastic parameters are considered EOP (pole coordinates and universal time), the date, time, wet component of the tropospheric delay at the zenith (WZD). The behavior of stochastic parameters of simulated random walk process. Otherness from standard treatment mode is shown in Table 1.

Solution type	Parametrization
EOP service solution (daily EOP)	constant parameters: X_{pol}, Y_{pol}, $dUT1$, X_c, Y_c stochastic parameters : WZD, $clock$ A-priory spectral density for EOP: 100 mas^2
Intraday EOP solution (X_{pol}, Y_{pol}, $dUT1$)	constant parameters: X_c, Y_c stochastic parameters : X_{pol}, Y_{pol}, $dUT1$, WZD, $clock$ A-priory variance for EOP: 1 mas^2 A-priory EOP spectral density : 1 mas^2 a day

Table 1: Distinction these solution from EOP service solution.

Diurnal variation of X_{pol}, Y_{pol} and $dUT1$ were compared with the model of diurnal variations of EOP recommended by IERS Conventions (2010) (designed here as "model"), RMS (X_{pol} – model) = 188 μas, RMS (Y_{pol} – model) = 159 μas, RMS ($dUT1$ – model)= 19 μs.

The value of Tropospheric Total Zenith Delay (TZD) obtained during CONT14 from VLBI are in a good agreement with date obtained from GPS observations. For example we show s here the picture for Badary station with TZD from VLBI and GPS data. The results of TZD comparison for all stations for CONT14 are in the Table 2. At the row 2 given Number of points, at the row 3 and 4 - RMS and bias for the differences of TZD from VLBI and GPS.

We are planning to continue the data analysis with QUASAR software and careful analysis of obtained series of intraday EOP and tropospheric parameters intraday variations.

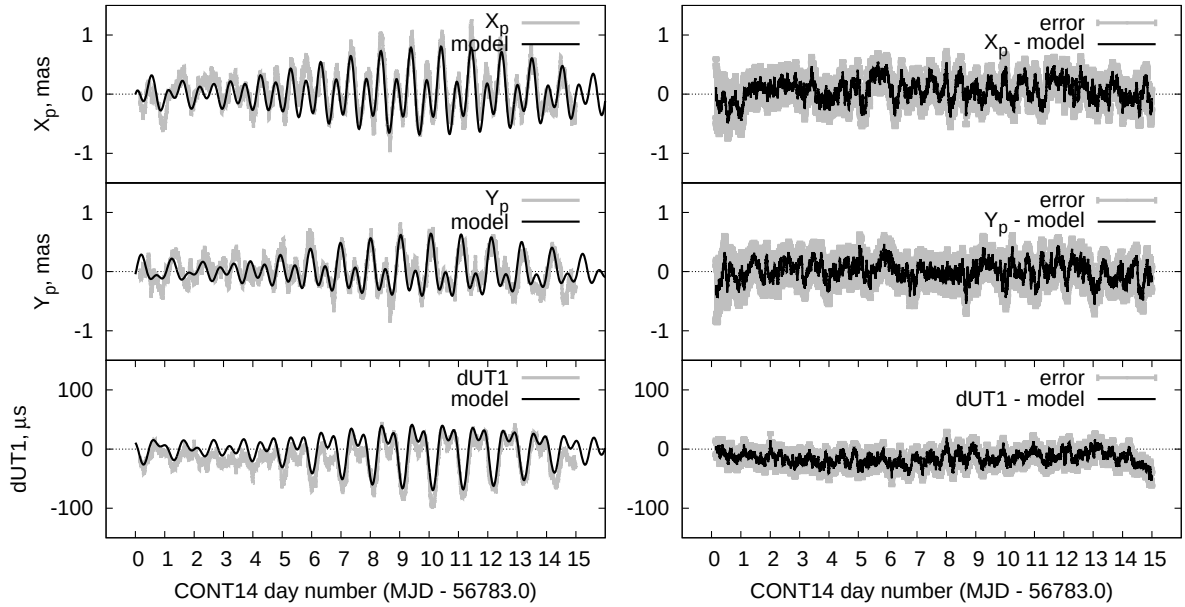

Figure 1: EOP intraday variations from CONT14. At the right side presented X_{pol}, Y_{pol}, $dUT1$ estimated from VLBI in comparison with IERS model intraday EOP variations, at the left side – corresponding differences and errorbars.

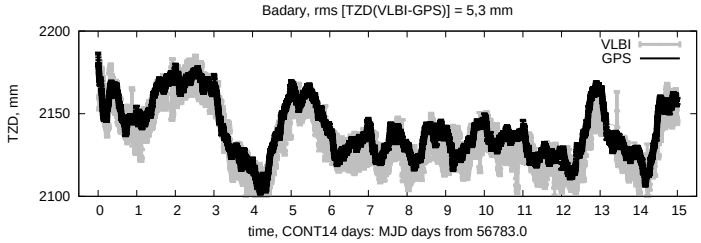

Figure 2: Example of TZD: TZD from VLBI and GPS observations during CONT14 company for Badary station.

Station	Number if point	RMS, mm	bias, mm
Badary	430	2.3	-5.1
Fortaleza	276	3.0	4.1
Hartrao	353	2.7	4.7
Hobart26	340	1.4	-0.1
Hobart12	354	2.3	-10.1
Kokee	390	1.6	0.8
Matera	362	1.5	-3.5
Ny Alezund	367	1.8	-3.8
Onsala	390	1.6	-0.3
Tsukuba	527	1.9	-5.6
Westford	464	2.1	-4.9
Wettzell	434	1.8	0.5
Zelenchukskaya	398	3.1	-8.1
Yarragadee	349	4.2	-11.9
Yebes	429	4.2	-14.3

Table 2: Comparison of TZD from VLBI and GPS observations during CONT14 (for stations in Ny Ålesund and Yebes used for comparison data of USNO GPS Analysis Center (AC), for other stations – CODE GPS AC.