

Analysis Center of Saint-Petersburg University

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Abstract

This report contains information about current and future activities of Analysis Center of Saint-Petersburg University.

1. Introduction

Our Analysis Center is located at the Astronomical Institute of Saint-Petersburg University. It began its activity in 1998. Initially we made an analysis of NEOS-Intensives VLBI sessions only. Since 2000 year we have started to process the weekly NEOS-A experiments.

2. Staff

The staff and their responsibilities are:

V.Vitayzev – Director of Astronomical Institute of Saint-Petersburg University, PhD, General coordination and support of activity at the Astronomical Institute.

O.Titov – Assistant Professor of Saint-Petersburg University, PhD. Current processing of VLBI data.

M.Kudryashova – Postgraduate student of Saint-Petersburg University. Current processing of VLBI data.

3. Data Analysis

The Analysis Center participates in regular submission of EOP from both NEOS-Intensives and NEOS-A observational programs. We use OCCAM (version 3.4) package to get the solutions. VLBI data files are downloaded in NGS format from Paris Observatory database (IVS component). Almost all reductional calculations are in accordance with IERS Convention 1996 and later modifications (Explanatory Supplement). Relativistic corrections are from IERS Recommendations 1992. Secular polar motion for pole tide correction is given by formulae from The Explanatory Supplement. Station coordinates are referred to ITRF97. The celestial reference frame was fixed to Reference Frame Navy 1997-8.

Values of UT1-UTC are estimated within the scope of EOP's operative service. For the purpose we use short (1-2 hours) VLBI sessions obtained by NEOS-Intensive program. Data are processed by OCCAM software using weighted least squares method. Wettzell is used as reference station for all sessions. Its wet delay, clock offsets and clock rates for other stations are regularly estimated. The solution SPU00001.EOPI contains 778 estimates of the UT1-UTC since 01 September 1997.

As to processing of NEOS-A VLBI sessions, five parameters of Earth Rotation (pole coordinates, UT1-UTC, nutation offsets) are estimated by Kalman filter technique. For the reference station (Wettzell on default) only wet delay is estimated. Wet delay, clock offsets are also estimated for other stations. A random walk model has been chosen to adjust the stochastic behaviour of the wet delay and clock offset. Usually clock rate is a constant parameter. For the last years clock behaviour for WETTZELL is not perfect sometimes. In this case we use another suitable VLBI

site as reference. Moreover, in this case we have to use a random walk model to adjust the clock rate for WETTZELL as well. The solution SPU00001.EOPS contains 987 estimates of all five EOPs since 07 February 1983. Fig.1-3 demonstrate the residuals between the solution and IERS C04 system for 1996-2000.

4. Outlook

During the year 2001 we are planning:

- to make weekly comparison and combination of Intensive Series EOP.
- to upgrade OCCAM software jointly with groups from DGFI and Vienna Technical University.

5. Acknowledgments

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6. References

1. D.McCarthy (ed.), IERS Recommendations 1992, Paris Observatory, 1992.
2. D.McCarthy (ed.), IERS Conventions 1996, Paris Observatory, 1996.
3. H.Schuh (ed.), Explanatory Supplement to the IERS Conventions (1996) Chapters 6 and 7, DGFI Report 71, Munchen, 1999.
4. O.Titov, Analysis Center of Saint-Petersburg University, IVS 1999 Annual Report, 1999.
5. O.Titov, Influence of adopted nutation model on VLBI NEOS-Intensives Data Analysis, Proceedings of IAU 180 Colloquium, Washington, pp. 259-262, 2000.
6. O.Titov, N. Zarraoa, OCCAM 3.4. User's guide, IAA Communications, 69, Saint-Petersburg, 1997.
7. O.Titov, Estimation of subdiurnal tidal terms in UT1-UTC from VLBI data analysis, IERS Technical Note 28, Paris Observatory, pp.11-14, 2000.

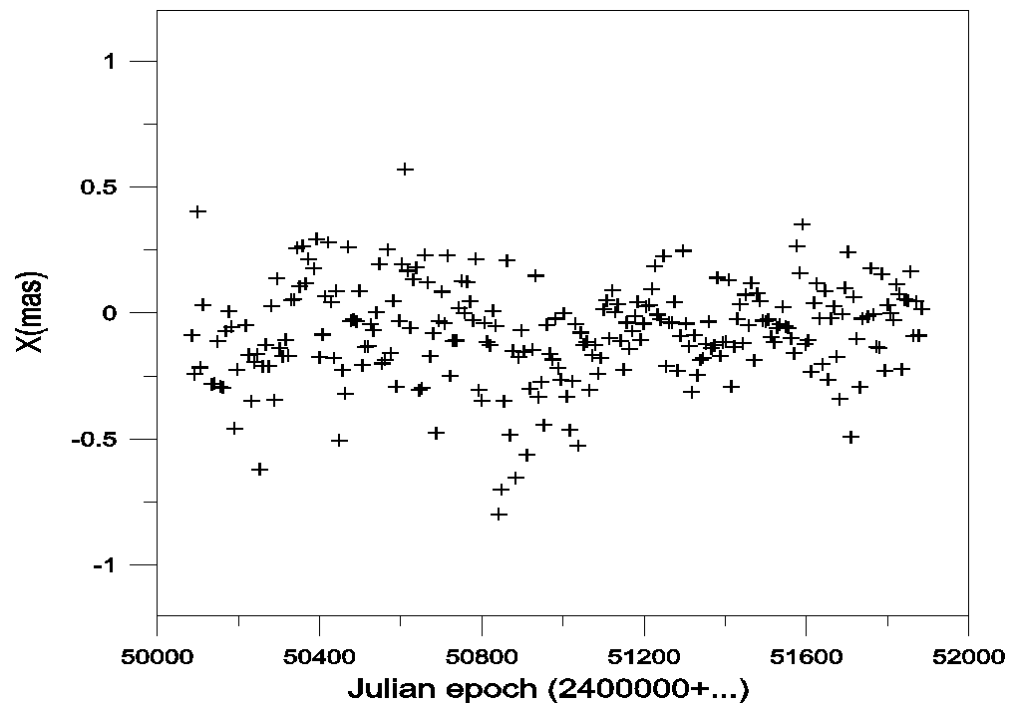


Figure 1. Residuals SPU00001 - IERS C04 for X-coordinates.

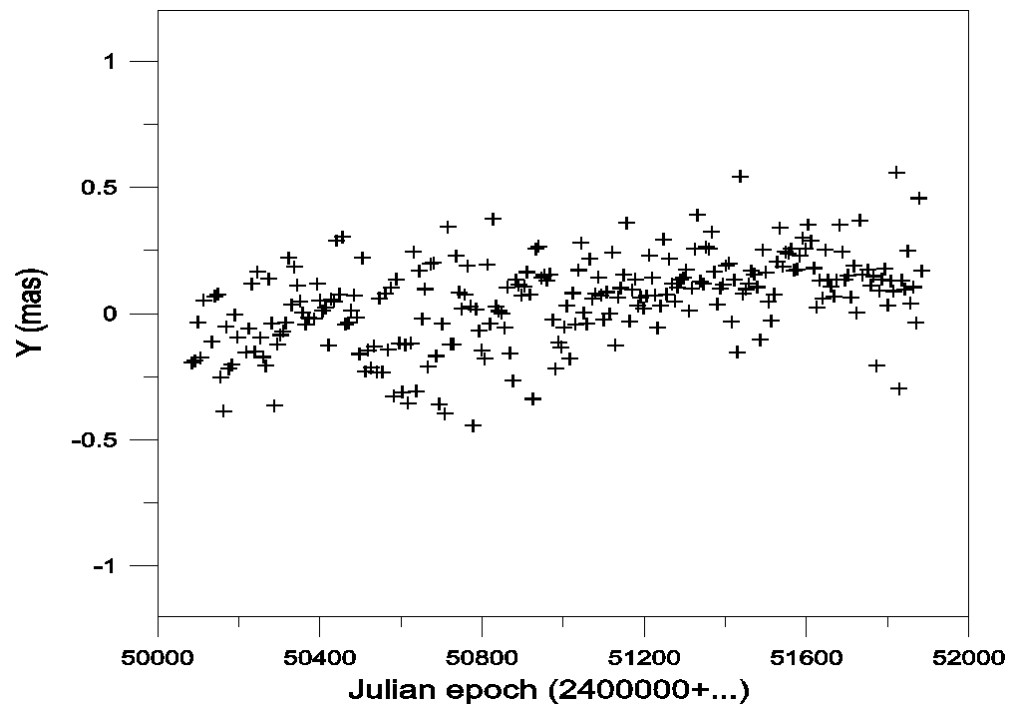


Figure 2. Residuals SPU00001 - IERS C04 for Y-coordinates.

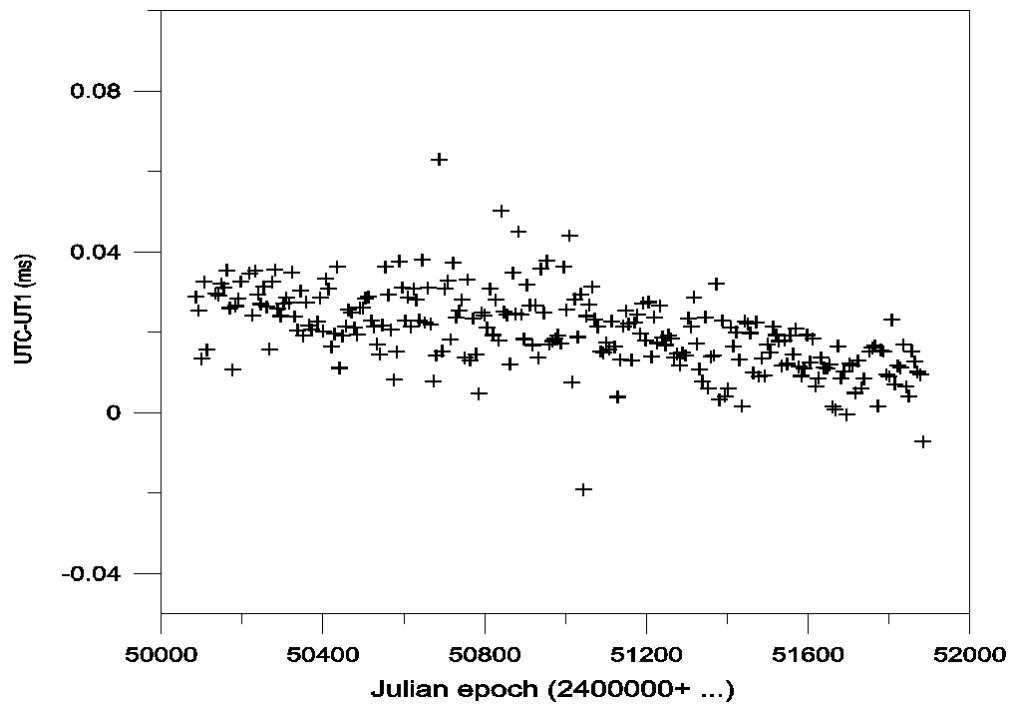


Figure 3. Residuals SPU00001 - IERS C04 for UT1-UTC.