DGFI Analysis Center Annual Report 2000

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Abstract

This report summarizes the activities of the DGFI Analysis Center from March 1999 to the end of 2000. The report contains planned activities for the year 2001, too.

1. Special Analysis Center Operation

The Deutsches Geodätisches Forschungsinstitut (DGFI) is a non-governmental research institute under the auspices of the Deutsche Geodätische Kommission (DGK). It is housed at the Bavarian Academy of Sciences (BAdW) in Munich. DGFI is financed by the State of Bavaria.

The general task of the IVS Analysis Center at DGFI is to support and to improve the VLBI data analysis and to generate VLBI products, in particular Earth rotation parameters (see DGFI web server `http://www.dgfi.badw.de`).

2. Initial Activities

Since the beginning of IVS, DGFI has carried out following activities:

1. Modification of the OCCAM VLBI software
   - correction of the station coordinates due to atmospheric loading, published by H.G. Scherneck (www.oso.chalmers.se/∼hgs);
   - correction of thermal antenna deformation, according to Haas et al. (1999);
   - implementation of the new model of solid Earth tides, which will be included in the next IERS Conventions (2000);
   - extension of OCCAM by a least-squares approach following the Gauss-Markov model (in cooperation with J. Böhm from the University of Technology, Vienna).
2. Analysis of all NEOS-A, CORE-A, CORE-B and IRIS-S sessions between 1997 and 1999

   Systematic differences between the series were detected. The offsets between results from different networks reach 190 mas (Tesmer and Schuh, 2000).
3. Analysis of the 58 simultaneous NEOS-A and CORE-A sessions between 1997 and 1999

   Differences were found between EOP derived from the two completely independent networks observing simultaneously, which were occasionally two times greater than their formal errors (Tesmer and Schuh, 2000). They are very similar to those obtained by MacMillan et al. (1999) who used the CALC/SOLVE software package.
4. Considering a-priori correlations in VLBI data analysis

   Comparisons between solutions with a full variance-covariance matrix of the observables and 'usual' solutions with the off-diagonal elements set to zero showed that taking a-priori correlations into account yields formal errors of the results of a single session which are greater and hence more realistic than those from an 'uncorrelated' solution. Additionally, the repeatability of the parameters improved significantly (Schuh and Tesmer, 2000).

5. Development of a Knowledge-Based System for the automation of VLBI data analysis by SOLVE (Schwegmann and Schuh, 1999, Schwegmann and Schuh, 2000).

3. Staff

DGFI personnel involved in the IVS Analysis Center are the following (status January 2001):

Hermann Drewes, Hansjörg Kutterer and Volker Tesmer.

Changes in personnel:
In April 2000, Harald Schuh, Head of the Earth Rotation Section, left the DGFI to become a full professor at the University of Technology Vienna. His successor is Hansjörg Kutterer, formerly at the University of Technology Karlsruhe.

In May 2000, Wolfgang Schwegmann left the DGFI for a position at the Istituto di Radioastronomia, Bologna.

4. Plans

For 2001 the plans of DGFI Analysis Center are:

- Further improvement of OCCAM:

  OCCAM will be updated to be in full agreement with the IERS Conventions (2000). The parameterisation will be extended. All changes will be done in cooperation with the VLBI groups of Saint-Petersburg University (O. Titov) and the University of Technology Vienna (J. Böhm).

- Contribution to the VLBI terrestrial reference frame:

  It is planned to compute a terrestrial reference frame with OCCAM, accumulating normal equations of all usable VLBI sessions from 1979 till present.

- Further investigations of offsets between EOP series which depend on the particular VLBI network.

- Further investigations on the stochastical model used in VLBI data analysis.

- Investigations of subdiurnal variations of Earth orientation parameters.

- Generation of IVS products (EOP and TRF) and contribution to the IVS Working Group on data analysis.

Due to the move of W. Schwegmann to Bologna, the work on the development of a Knowledge-Based System for the automation of VLBI data analysis will not be continued at DGFI, but at the Istituto di Radioastronomia, Bologna.

5. References

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