Analysis Coordinator Report

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Abstract

IVS analysis coordination issues in 2011 are reported here. Routine Earth orientation parameter combinations on the basis of datum-free normal equations are being carried out by the IVS Combination Center at BKG, Frankfurt a.M., Germany. The IVS Analysis Coordinator is responsible for consistency of the input data and requires strict adherence to models and conventions.

1. General Issues

The "Twelfth IVS Analysis Workshop" was hosted by the Max-Planck-Institute for Radio Astronomy in Bonn, Germany, on March 31, 2011, in connection with the 20th Meeting of the European VLBI Group for Geodesy and Astrometry (EVGA). The coordination of IVS routine data analysis was discussed as well as developments for improving geodetic and astrometric data analysis in general.

The timeliness of the submission of the SINEX files from the operational IVS Analysis Centers (ACs) to the IVS Data Centers has improved considerably since the last report, although individual analysis centers still attract attention by not providing input according to their initial proposals. With more operational analysis centers coming online, the less reliable ACs may be subject to a more rigorous assessment.

It is well known that the treatment of the sub-daily tidal Earth rotation parameter variations and the introduction of harmonic site position variations may generate alias effects in the daily EOP time series. During the Analysis Workshop, Thomas Artz presented an empirical sub-daily EOP model combined from VLBI and GPS observations [1]. This model comprises the strengths of both techniques and compensates at least some of the deficits which are inherent to empirical models. The model should be tested by the IVS ACs for use in routine IVS data analysis.

The attendants of the meeting discussed the impact of the IERS Conventions 2010 [5] on IVS analyses. The main issues are the new mean pole model, the S1/S2 tides, the Earth's libration, and the ocean pole tide. These effects are already included in the Calc/Solve analysis package and should also be incorporated into the other independent packages.

Concerning atmospheric gradient modelling, there are two models available, the so-called Macmillan model [3] and the Chen and Herring model [2]. They are very similar in formulation and in the results, but a consistent use of one of these two models throughout the IVS should be achieved. For the decision, it should be taken into account that the IGS uses the Chen and Herring model and that for combination of VLBI results with GPS the models should be identical. It was agreed that it would be advisable to use the Chen and Herring model as the IVS conventional model but that tests will have to be done on the impact of such a move. The results should be discussed at the next IVS Analysis Workshop in Madrid in 2012.

The decision on the a priori gradients was less critical. All participants agreed unanimously that the Goddard Data Assimilation Office (DAO) results should be used as the conventional IVS a priori gradient model. Nothing has happened concerning the reference pressure for atmospheric loading, which is under the responsibility of the Special Bureau of Loading of the International Earth Rotation and Reference Systems Service (IERS).

2. IVS Operational Data Analysis and Combination

Since October 1, 2009, the operational combination has been carried out by the IVS Combination Center at the German Bundesamt für Kartographie und Geodäsie (BKG) in Frankfurt a.M. (see separate report by BKG/DGFI). The input to these combinations are datum-free (constraint-free) normal equation systems in SINEX format (Solution Independent Exchange format). The nutation representation in the IAU2000 paradigm, dX and dY, is now the standard. For users of the old system, a separate table is generated through a transformation.

At the 12th IVS Analysis Workshop it was also agreed by all participants that the SINEX files reported to the Combination Center have to include the elements of the normal equation system for the positions of the radio sources. So far, this is done routinely only by three IVS ACs but others will follow step by step. Investigations are being carried out to determine how this affects the combination and what benefits can be drawn from this additional information in the normal equation systems.

At present, the combination product is still dominated by input from the Calc/Solve software. For good combination products it is, however, important that results from many different software packages be contributed. If the same analysis software is used, it is important that the analyses are independent and that the analysts create their solutions with their own approach. The IVS Analysis Coordinator has, therefore, established a new template for the analysis description that accompanies the solutions. This template gives a deeper insight into the genuine nature of each contribution.

Further details of radio telecopes have been collected in the antenna information file under http://vlbi.geod.uni-bonn.de/IVS-AC/Conventions. The background of the thermal expansion models is described in [4].

3. Personnel

Table 1. Personnel at the IVS Analysis Coordinator's office

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References

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