

Geoscience Australia Analysis Center

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Abstract

This report gives an overview about activity of the Geoscience Australia IVS Analysis Center during the year 2005.

1. General Information

The Geoscience Australia (GA) IVS Analysis Center is located in Canberra. After organizational changes the Geodesy group became part of the Geohazard and Earth Monitoring Division (GEMD).

2. Component Description

Currently the GA IVS Analysis Center contributes nutation offsets, three EOPs and their rates on regular basis for IVS-R1 and IVS-R4 networks and their predecessors (IRIS-A, NEOS-A). The EOP time series from 1983 to 2005 are available. Also the CRF catalogues using a global set of VLBI data since 1979 are regularly submitted.

3. Staff

- Dr. Oleg Titov - project officer

4. Current Status and Activities

The last global solution has been done using the new features of the OCCAM 6.1 software. VLBI data comprising 3348 daily sessions from 25-Nov-1979 till 10-Nov-2005 have been used to compute the global solution *aus2005c*. This includes 3,498,973 observational delays from 747 radiosources observed by 57 VLBI stations. Weighted root-mean-square of the solution is about 0.61 cm (about 21 picosec).

The *aus2005c* solution strategy used radiosources as close as possible to the ICRF-Ext.2 [1]. The radiosource catalogue includes 639 sources. Coordinates of 207 of the 212 defining sources [2] were treated as global and imposed by the NNR constraints. 107 'other' sources were treated as local and their positions were estimated for each VLBI session. The rest of 433 sources were treated as global without NNR constraints.

Station coordinates were also estimated using NNR and NNT constraints. The long-term time series of the station coordinates have been established to estimate the corresponding velocities for each station. Due to a limited amount of observations the velocities have been estimated for 52 stations only. Tectonic motion for Gilcreek VLBI site after the Denali earthquake is modelled using exponential function [3].

The adjustment has been done by least squares collocation method, which considers the clock offsets, wet troposphere delays and troposphere gradients as stochastic parameters with apriori

covariance functions. The gradient covariance functions were estimated from the GPS hourly values [4].

Also the GA Analysis Center continues the regular submission of EOPs to the IVS/IERS and works on the development of long-term time series for the EOP, station coordinates and comparison of techniques (VLBI, SLR, GPS) for EOP and ITRF adjustment.

5. Geodetic Activity of the Australian Radiotelescopes

During 2005 two Australian radiotelescopes (Hobart and Parkes) were involved in geodetic VLBI observations. Geodesy group promoted the observations in different ways.

The operations of the Hobart telescope for geodetic VLBI is supported through an Australian Research Council (ARC) grant awarded jointly to the University of Tasmania (UTAS) and GA.

The Parkes 64-meter telescope participated in three geodetic VLBI sessions in 2005. Four sessions are planned for 2006. This program is promoted in cooperation with the Australian Telescope National Facility (ATNF).

6. Future Plans

- update OCCAM software
- submit proposal to establish new geodetic VLBI network included 3-4 new small size fast moving telescopes around Australia
- participation in analysis of simulated VLBI data for optimization of design for the geodetic VLBI network in Australia

References

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