Geoscience Australia Analysis Center

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Abstract

This report gives an overview about the activities of the Geoscience Australia IVS Analysis Center during the year 2006.

1. General Information

The Geoscience Australia (GA) IVS Analysis Center is located in Canberra. The Geodesy group is operated as a part of the Geospatial 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 predeccesors (IRIS-A, NEOS-A). The EOP time series from 1983 to 2006 are available. Also the CRF catalogues using a global set of VLBI data since 1979 are regularly submitted.

3. Staff

- Dr. Oleg Titov - project manager

4. Current Status and Activities

The last global solution has been done using the new features of the OCCAM 6.2 software. VLBI data comprising 3415 daily sessions from 25-Nov-1979 till 07-Sep-2006 have been used to compute the global solution aus2006b. This includes 3,638,913 observational delays from 1559 radiosources observed by 60 VLBI stations. Weighted root-mean-square of the solution is about 0.53 cm (about 16 picosec).

The aus2006b solution strategy used radiosources as close as possible to the ICRF [1]. Coordinates of 212 defining sources [1] were treated as global and imposed by the NNR constraints. 102 'other' sources were treated as local and their positions were estimated for each VLBI session. The rest of the 1245 sources were treated as global parameters 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 55 stations only. Velocities of five stations (DSS65A, MARKUS, METSAHOV, VLBA85-3 and ZELENCHK) were not estimated. The tectonic motion for Gilcreek after the Denali earthquake is modelled using an exponential function [3].

The adjustment has been done by least squares collocation method [4], 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 [2].

5. Geodetic Activity of the Australian Radiotelescopes

During 2006 two Australian radiotelescopes (Hobart and Parkes) were involved in geodetic VLBI observations. The 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 five geodetic VLBI sessions in 2006. Six sessions are planned for 2007. This program is promoted in cooperation with the Australian Telescope National Facility (ATNF).

6. New Geodetic VLBI Network

In November 2006 the geospatial bid within the National Collaborative Research Infrastructure Strategy (NCRIS) capability "Structure and Evolution of the Australian Continent" was approved. The VLBI part of this bid includes three new modern VLBI sites to be built in different parts of the Australian continent. The proposed design includes a small size dish (12 m) with fast slewing rate (5 degrees/second) equipped with Mark 5B recorder. All sites will eventually be linked with optical fiber to transmit the recorded data with high speed to the correlator facility which is being established at Australia's Swinburne University under supervision of Prof Steven Tingay.

References

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