

Geoscience Australia Analysis Center

Oleg Titov

Abstract

This report gives an overview of the activities of the Geoscience Australia IVS Analysis Center during 2009.

1. General Information

The Geoscience Australia (GA) IVS Analysis Center is located in Canberra. The Geodesy group operates as a part of the Geospatial and Earth Monitoring Division (GEMD).

2. Component Description

Currently the GA IVS Analysis Center contributes nutation offsets, EOP, and EOP rates on a regular basis for IVS-R1 and IVS-R4 networks and their predecessors (IRIS-A and NEOS-A). The EOP time series are available for 1983 to 2009. The CRF catalogs using a global set of VLBI data since 1979 are regularly submitted.

3. Staff

- Dr. Oleg Titov - project manager

4. Current Status and Activities

Several CRF solutions have been prepared using the OCCAM 6.2 software. VLBI data comprising 3,899 daily sessions from 25-Nov-1979 to 05-Oct-2009 have been used to compute several global solutions with different sets of reference radio sources. This includes 4,769,329 observational delays from 2,872 radio sources observed by 60 VLBI stations. The dipole and quadrupole systematic effects on the apparent proper motion of the reference radio sources (a magnitude of about 20 microarcsec/year) were indicated [1].

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. The tectonic motion for the Gilcreek VLBI site after the Denali earthquake was modeled using an exponential function [2].

The adjustment has been done by least squares collocation [3], which considers the clock offsets, wet troposphere delays, and troposphere gradients as stochastic parameters with a priori covariance functions. The gradient covariance functions were estimated from GPS hourly values [4].

5. Geodetic Activity of the Australian Radiotelescopes

During 2009 two Australian radiotelescopes—Hobart and Parkes, operated by the University of Tasmania (UTAS) and Australia Telescope National Facility (ATNF), respectively—were involved in geodetic VLBI observations. GA's Geodesy Group supported the observations in different ways

including assistance with campaign scheduling.

The Parkes 64-meter telescope participated in four geodetic VLBI sessions in 2009 (RD0902, APSG24, APSG25, and CRF57). All of them were recorded with Mark 5B. One short session (2.5 hours) that included Parkes and Hobart26 was designed to observe lunar occultation of the radio source 1817-254. The primary goal of this project was to measure the moments of a quasar's disappearance behind the moon limb and reappearance. Six 24-hour sessions are planned for 2010 for further improvement of the ITRF and the ICRF in the Southern Hemisphere. This program is undertaken in cooperation with ATNF and UTAS.

6. New Geodetic VLBI Network

Geoscience Australia supported the installation work of the new Australian geodetic VLBI network during 2009. Two telescopes in Hobart and Katherine have been installed during 2009, and installation of the third one, in Yarragadee, will be completed shortly.

References

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- [3] Titov, O., Estimation of subdiurnal tidal terms in UT1-UTC from VLBI data analysis, In: IERS Technical Notes 28, B. Kolaczek, H. Schuh, and D. Gambis (eds.), 11–14, 2000.
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