

Technology Development at the Institut d'Estudis Espacials de Catalunya

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Abstract

We present a brief summary of the VLBI related work done at the Institut d'Estudis Espacials de Catalunya (IEEC) in the year 2001. The main activities concerned comparisons of tropospheric parameters derived from different and independent techniques (VLBI, NWP model, GPS, RS and WVR) as well as the organization of the 15th Working Meeting on European VLBI for Geodesy and Astrometry.

1. Activity Outline

For three stations of the European geodetic VLBI network (Madrid, Onsala, Wettzell) a comparison study of zenith wet delays (ZWDs) derived from VLBI, the mesoscale numerical weather prediction model MM5, GPS, WVR, and radiosondes (RS) was performed [1]. The comparisons were done for specific days of the arbitrarily chosen year 1999. In general, a good agreement was found with correlation coefficients in the range of 75–95%. Best agreement in terms of RMS difference, bias, and correlation was obtained in the VLBI vs. GPS comparison. In contrast to GPS, VLBI does not appear to have a dependence on the conditions at the station, at least for the three VLBI stations used in the study, probably mainly due to the absence of multipath effects and lesser near-field scattering in the vicinity of VLBI antennas. VLBI appears to be a highly useful calibration tool for numerical weather prediction models and climate studies.

In September 2001 the IEEC hosted the 15th Working Meeting on European VLBI for Geodesy and Astrometry. About 40 scientists from three different continents (Europe, North America and Asia) came together in Barcelona. The topics covered went from reports of the different facilities and IVS components, over data analysis and new developments to reference frames and astrometric results. Other points of special interest were the local surveys performed at several observatories and the modelling of the tropospheric parameters. The meeting culminated in an interesting and, at times, controversial discussion which marked the end of a very successful event.

The proceedings of the workshop have been published in December 2001 [2]. The online version is available at the URL: <http://www.ieec.fcr.es/hosted/15wmevga/proceedings/>. A limited number of printed copies is available from IEEC. Requests may be sent to Antonio Rius (rius@ieec.fcr.es). The distribution will be done on a first come first served basis until the stock runs out.

2. Outlook

The Technology Development Center was formed by two people (Table 1): the head of the Earth observation group and a young researcher within the frame of the Training and Mobility of Researchers (TMR) programme of the European Community (grant FMRX-CT960071 “Measurement of Vertical Crustal Motion in Europe by VLBI”). The latter position was temporary and terminated at the end of September 2001.



Figure 1. The participants of the 15th European VLBI Meeting in front of the premises of the Delegation of the Spanish Research Council in Barcelona.

Table 1. Staff members of IEEC contributing to geodetic VLBI.

Name	Description	Allocation
Antonio Rius	head of Earth observation group	50%
Dirk Behrend	temporary TMR position	50%

Due to lack of manpower the IEEC will discontinue to be a Technology Development center within the IVS. It will concentrate its research and development activities in other fields.

References

- [1] Behrend, D., R. Haas, D. Pino, L.P. Gradinarsky, S.J. Keihm, W. Schwarz, L. Cucurull, A. Rius: MM5 derived ZWDs compared to observational results from VLBI, GPS and WVR. Physics and Chemistry of the Earth, in print, 2002.
- [2] D. Behrend and A. Rius (Eds.): Proceedings of the 15th Working Meeting on European VLBI for Geodesy and Astrometry, Institut d'Estudis Espacials de Catalunya, Consejo Superior de Investigaciones Científicas, Barcelona, Spain, 2001.