

Paris Observatory Analysis Center OPAR: Report on Activities, January - December 2009

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Abstract

We report on activities of the Paris Observatory VLBI analysis center (OPAR) for calendar year 2009 concerning the development of operational tasks, the OPAR Web site, and research.

1. Developments at OPAR

1.1. Operational Status

OPAR personnel routinely analyzed diurnal (IVS rapid turnaround R1 and R4) sessions since 1979 (solution 2009a). Unconstrained normal equations of diurnal sessions were sent to the IVS in SINEX format for combination in the framework of the IVS analysis coordinator's task.

Late in 2009, an operational solution (2009i) analyzing Intensive sessions after 2006 was submitted to the IVS together with corresponding SINEX files.

Two reanalyses of diurnal sessions were done (2009a and 2009b), and the resulting EOP series and radio source catalogs were sent to the IVS.

Station and radio source coordinate time series were also produced and updated regularly.

Operational analysis of both diurnal and Intensive sessions will be continued in 2010. All the above products, except SINEX files, were also published on the OPAR Web site at <http://ivsopar.obspm.fr>.

1.2. Web Site and Virtual Observatory

The reader is referred to the IVS 2008 Annual Report for explanations about the Virtual Observatory (VO) activities at OPAR. In 2009, we developed the interface between the OPAR Web site and a number of astronomy and astrometry databases (e.g., NASA/NED, BVID, CDS, and the MOJAVE database at Purdue University, IN). The visitor is allowed to get information about radio sources observed during the analyzed VLBI sessions, including an optical view using the French Aladin software package.

1.3. Working Groups

OPAR members are involved in various working groups. A.-M. Gontier is a member of the IVS WG 4 and of the IAG WG 1.4.1. S. B. Lambert is the chair of the IAG WG 1.4.3. Both were members of the IVS/IERS WG on the Second Realization of the ICRF.

2. Research Activities Involving OPAR

2.1. Finalizing the ICRF2

We actively participated in the analyses for the IVS/IERS WG on the Second Realization of the ICRF. Especially, during the final phase of the frame construction, A.M. Gontier, S. B.

Lambert, and P. Charlot selected the 295 defining sources on the basis of coordinate time series derived by D. Gordon and structure indices produced by P. Charlot. The alignment of the ICRF2 catalog onto the ICRS was done as well by A.M. Gontier, E. F. Arias (BIPM), and S. B. Lambert, following a method developed and tested at the Observatoire de Paris. The details of the analyses and their results were reported as chapters of the IERS Technical Note 35 (Fey et al. 2009).

2.2. The Large Quasar Astrometric Catalog (LQAC)

The very large and increasing number of quasars reckoned from various sky surveys leads to a large quantity of data which brings various and inhomogeneous information in the fields of astrometry, photometry, radioastronomy, and spectroscopy. In [2], we described a work that aims at making available a general compilation of the largest number of recorded quasars obtained from all the available catalogs, with their best position estimates, and providing physical information at both optical and radio wavelengths. Thus, we constructed a catalog compilation giving coordinates, multiband photometry, radio fluxes, redshift, luminosity distances, and absolute magnitudes. We gathered the 12 largest quasar catalogs (four from radio interferometry programs and eight from optical surveys), and we carried out systematic cross-identifications of the objects. Information concerning *ubvgrizJK* photometry as well as redshift and radio fluxes at 1.4 GHz, 2.3 GHz, 5.0 GHz, 8.4 GHz, and 24 GHz were given when available. A small proportion of remaining objects, not present in the 12 catalogs but included in the Véron-Cetty & Véron quasar catalogs, are added to the compilation.

The LQAC contains 113,666 quasars. We discussed the external homogeneity of the data by comparing the coordinates, the redshifts, and the magnitudes of objects belonging to different catalogs. We used up-to-date cosmological parameters as well as recent models for galactic extinction and K-correction in order to evaluate the absolute magnitudes of the objects. In 2010, we foresee publishing an update of the present version, including the ICRF2.

References

- [1] Fey, A. L., Gordon, D., & Jacobs, C. S. (Eds.) 2009, The Second Realization of the International Celestial Reference Frame by Very Long Baseline Interferometry, IERS TN 35, in print
- [2] Souchay, J., Andrei, A. H., Barache, C., et al. 2009, The construction of the large quasar astrometric catalog (LQAC), *A&A*, 494, 799