

3.6.2.5 Institute of Geodesy and Geoinformation of the University of Bonn (IGGB)

The Institute of Geodesy and Geoinformation of the University of Bonn has been operating an IERS Combination Research Center (CRC) since 2001 in cooperation with the Deutsches Geodätisches Forschungsinstitut (DGFI) in Munich. The CRC and its efforts are closely linked to the tasks of the Analysis Coordinator of the International VLBI Service for Geodesy and Astrometry (IVS) hosted by IGGB.

In 2008, the combination process for the two IVS EOP series (rapid and quarterly solutions) has been continued exclusively on the basis of datum-free normal equations in SINEX format and the output has been tested thoroughly. The advantages of this combination strategy are (1) that the full variance-covariance information of the individual input solutions is rigorously carried over and (2) that one common terrestrial reference frame is applied after the combined datum-free normal matrix is generated. Thus, it is guaranteed that an identical datum is used in the combination process for all input series.

After datum definition, the combined system of normal equations is solved (inverted) and the full set of EOP (pole components, UT1-UTC, and their time derivatives as well as two nutation offsets in $d\psi$, $d\omega$ w.r.t. the IAU2000A model) are extracted into separate files. These results are then added to the two EOP time series, the rapid solution file (ivs08r1e.eops) and the quarterly solution file (ivs08q4e.eops), in the IVS EOP Exchange format. Companion files containing the nutation offsets in the X, Y paradigm are routinely generated through a standard transformation process (ivs08r1X.eops, ivs08q4X.eops).

In 2008, it became obvious that a new TRF for the IVS EOP determinations had to be computed for several reasons. ITRF2005, used in 2007 and 2008, has a noticeable deficit due to the pole tide error which had been made in the IVS contribution to ITRF2005. The post-quake movements of GILCREEK in ITRF2005 lacked the continuity of the piece-wise linear elements, thus, introducing discontinuities. In addition, only limited observations for the sites of SVETLOE, ZELENCHK and BADARY had been available for ITRF2005 or no observations had been available yet. Of course, all other stations took their benefit from more data in the new computations as well.

The new TRF (VTRF2008) has been computed from the individual combined SINEX files of all geodetic VLBI sessions available. These have been pre-reduced for EOP so that only the coefficients for the site coordinate parameters remained. In a stacking process, these sets of normal equations have then been combined to a

full TRF normal equation system for site positions and velocities. The subsequent inversion process provided the complete TRF including its variance-covariance information. VTRF2008 is being used for all IVS combinations since December 2008. In addition, VTRF2008 had also been selected by the “IERS Working Group on the Second Realization of the ICRF” as its conventional terrestrial reference frame.

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