Enhanced ILRS analysis for ITRF2020

Vincenza Luceri (1), Erricos C. Pavlis (2), Antonio Basoni (1), David Sarrocco (1), Magda Kuzmicz-Cieslak (2), Keith Evans (2) and Giuseppe Bianco (3)
(1) e-GEOS SpA, ASI/CGS-Matera, Italy; (2) GESTAR II, University of Maryland, Baltimore County and NASA Goddard 61A, USA; (3) Agenzia Spaziale Italiana (ASI), CGS-Matera, Italy

The time series of station positions and EOP provided by ILRS for the realization of the ITRF2020 was obtained as the combination of loosely constrained individual solutions from the seven ILRS Analysis Centers: ASI, BKG, DGFI, ESA, GFZ, JCET and NSGF. Everyone followed strict standards agreed within the ILRS Analysis Standing Committee (ASC) and used SLR data from LAGEOS, LAGEOS-2, Etalon-1 and Etalon-2. The ILRS ASC devised an innovative approach in handling systematic errors in the network, never before utilized. A preparatory pilot project delivered a series of long-term mean bias estimates for each station, the time intervals of applicability and their statistics. They were derived from freely adjusted station position and EOP solutions for the period 1993.0 to 2020.5, using the latest satellite CoG model. The simultaneous estimation of the station heights and measurement biases resulted in a selfconsistent set of weekly bias estimates for each site. Breaks and “jumps” were used to define the periods of applicability and to calculate the mean bias and its standard deviation. These mean biases were pre-applied in the re-analysis forITRF2020, limiting the remaining jitter of the bias to negligible level. This approach strengthened the estimation process without a compromise of the final results’ accuracy. As a result, the ILRS contribution to ITRF2020 minimized the scale difference between SLR and VLBI to below 2 mm (ITRF2014 ~9 mm). We present an overview of the procedures, models, and the improvement over previous ILRS products, focusing especially on the Core ILRS sites.