Geophysical Research Abstracts
Vol. 15, EGU2013-10072, 2013
EGU General Assembly 2013

SLR data for the next ITRF

Stanislaw Schillak and Pawel Lejba

Space Research Centre, Polish Academy of Sciences, Astrogeodynamic Observatory, Kornik, Poland (sch@cbk.poznan.pl, 48 618170 219)

The determination of the new International Terrestrial Reference Frame (ITRF) have to include all significant effects in the SLR data in the long time period. The presented analysis was based on the results of coordinates determination for the most SLR stations in the period 1983-2011. The geocentric coordinates were computed separately for each station by means of NASA Goddard's GEODYN-II program from monthly arcs of LAGEOS-1 and LAGEOS-2 satellites. These station positions and velocities were transformed to the North, East and vertical components in the reference to ITRF2008 and these components were the base for further analysis. The coordinates for each arc were only accepted if the number of the normal points per SLR station was greater than 50. The results of this analysis show several important systematic biases which should be included in the new ITRF. First of all the SLR stations accuracy is stable from January 1997 up to now and only these data should be used in the new ITRF. The earlier data especially before 1993 have too large biases mainly due to results from only one LAGEOS satellite. The positions for the period 1993-1996 have too large variations for the most stations. The systematic biases are the next problem which should be included in the next ITRF. The problem is especially important for the most accurate stations Zimmerwald (7810) and Herstmoceux (7840), both stations had jump in vertical component due to change interval counter to event timer, 2.5 cm in February 2006 and 1.0 cm in February 2007, respectively. The ITRF coordinates should be determined separately for the data before and after jump. The several systematic biases for the other stations e.g. Matera, Monument Peak, Grasse, Wettzell should be take into account. The comparison with the GPS positions transformed to the SLR reference point is the best verification. The position change due to earthquake is the next important task. The effect of the Concepcion station (7405) position change due to earthquake in 2010, February 26 was perfectly determined and included in SLRF2008 by ILRS Analysis Working Group (AWG). But this earthquake also changed positions by more than 3 cm of both SLR stations in South America: Arequipa (7403) and San Juan (7406). The new positions for these stations should be included in the new ITRF. The authors hope that remarks in this presentation will be helpful for ILRS AWG considering importance of the SLR data for the ITRF determination.