



The ILRS Contribution to ITRF2013

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Satellite Laser Ranging (SLR) data have contributed to the definition of the International Terrestrial Reference Frame (ITRF) over the past three decades. The development of ITRF2005 ushered a new era with the use of weekly or session contributions, allowing greater flexibility in the editing, relative weighting and the combination of information from the four contributing techniques. The new approach allows each Service to generate a solution based on the rigorous combination of the individual Analysis Centers' contributions that provides an opportunity to verify the intra-technique consistency and a comparison of internal procedures and adopted models. The intra- and inter-technique comparisons that the time series approach facilitates are an extremely powerful diagnostic that highlights differences and inconsistencies at the single station level. Over the past year the ILRS Analysis Working Group (AWG) worked on designing an improved ILRS contribution for the development of ITRF2013. The ILRS approach is based on the current IERS Conventions 2010 and our internal ILRS standards, with a few deviations that are documented. Since the Global Geodetic Observing System – GGOS identified the ITRF as its key project, the ILRS has taken a two-pronged approach in order to meet its stringent goals: modernizing the engineering components (ground and space segments), and revising the modeling standards taking advantage of recent improvements in system Earth modeling. The main concern in the case of SLR is monitoring systematic errors at individual stations, accounting for undocumented discontinuities, and improving the target signature models. The latter has been addressed with the adoption of mm-level models for all of our targets. As far as the station systematics, the AWG had already embarked on a major effort to improve the handling of such errors prior to the development of ITRF2008. The results of that effort formed the foundation for the re-examination of the systematic errors at all sites. The new process benefited extensively from the results of the quality control process that ILRS provides on a daily basis as a feedback to the stations, and the recovery of systematic error corrections from the data themselves through targeted investigations. The present re-analysis extends from 1983 to the end of 2013. The data quality for the early period 1983-1993 is significantly poorer than for the recent years. However, it contributes to the overall stability of the datum definition, especially in terms of its origin and scale and, as the more recent and higher quality data accumulate, the significance of the early data will progressively diminish. As in the case of ITRF2008, station engineers and analysts have worked together to determine the magnitude and cause of systematic errors that were noticed during the analysis, rationalize them based on events at the stations, and develop appropriate corrections whenever possible. This presentation will give an overview of the process and examples from the various steps.