EXAMINATION OF SOME ITRF2008 RESULTS

Z. ALTAMIMI, X. COLLILIEUX
Institut Géographique National, LAREG
6-8 Avenue Blaise Pascal, 77455 Marne-la-Vallée, France
zuheir.altamimi@ign.fr, xavier.collilieux@ign.fr

ABSTRACT. Following the procedure already used for the ITRF2005 formation, the ITRF2008 uses as input data time series of station positions and Earth Orientation Parameters (EOPs) provided by the four space geodetic techniques (VLBI, SLR, GPS and DORIS). The integration of these techniques together in the ITRF construction crucially requires co-location sites where two or more techniques are (were) operated and where local ties between the instrument reference points are available. The paper summarizes briefly the main features and results of the ITRF2008, with a particular emphasis on the quality assessment of the estimated quantities: station positions, velocities and Polar motion. For more details regarding the ITRF2008 description and results the reader may refer to Altamimi et al. (2011).

1. INTRODUCTION

ITRF2008 was generated following the same strategy adopted for the ITRF2005. It is a refined version of the International Terrestrial Reference Frame (ITRF) based on reprocessed solutions of the four space geodetic techniques: VLBI, SLR, GPS and DORIS, spanning 29, 26, 12.5 and 16 years of observations, respectively. We recall here that the two steps used for the ITRF2008 construction are: (1) stacking the individual time series to estimate a long-term solution per technique comprising station positions at a reference epoch, velocities and daily EOPs; and (2) combining the resulting long-term solutions of the four techniques together with the local ties in co-location sites. A full description of the procedure used for the ITRF2008 computation as well as a detailed discussion of the results are published in Altamimi et al. (2011). For the purpose of this paper we examine the quality of ITRF2008 station positions, velocities and Polar Motion.

2. QUALITY ASSESSMENT OF ITRF2008 STATION POSITIONS, VELOCITIES AND POLAR MOTION

We evaluate the quality of the ITRF2008 determination of station positions and velocities by comparing the associated spherical errors to past ITRF solutions. The spherical errors correspond, for each point position and velocity, to the square root of the square sum of the formal errors along the three components. Figure 1 shows these errors (computed at the epochs of minimum variances following Altamimi et al. (2002)) in station positions and velocities indicating the precision gain of ITRF2008, compared to ITRF2005 and ITRF2000.

In order to assess the quality of the ITRF2008 associated polar motion estimates, we compared the corresponding two components (x and y) to the IGS reprocessed time series called Repro 1. Figure 2 illustrates the differences in milli-arc-seconds between the two series and Table 1 summarizes the statistics of the comparison showing that the consistency between the two series is at the level of 10 milli-arc-seconds.

	Bias	Drift	WRMS
Xpole	5.3	4.36	9.2
Ypole	15.8	-2.00	10.6

Table 1: Bias (at epoch 2005.0), drift and WRMS of polar motion difference between ITRF2008 and IGS Repro1 solution in micro-arc-seconds

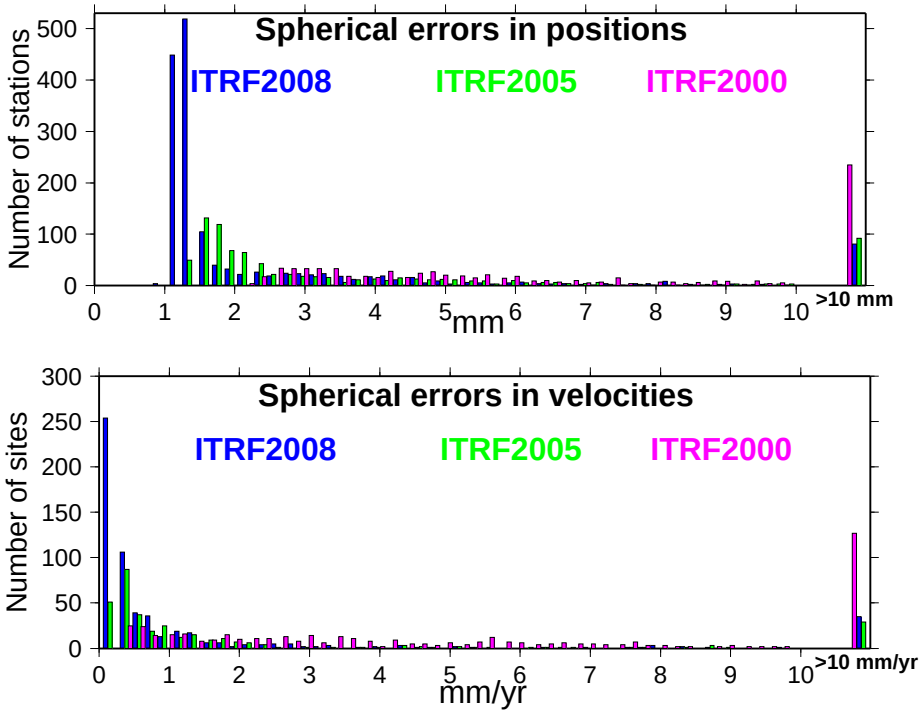

Figure 1. Spherical errors of station positions and velocities of three successive ITRF solutions

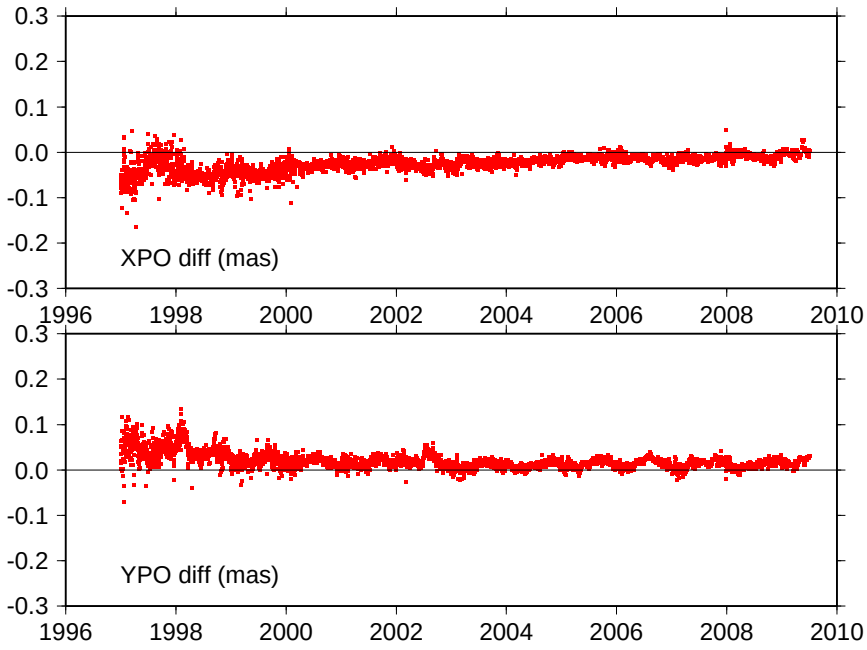

Figure 2. Polar motion difference between ITRF2008 and IGS Repro1 solution

3. REFERENCES

Altamimi, Z., Sillard, P., Boucher, C. 2002, ITRF2000: A New Release of the International Terrestrial Reference Frame for Earth Science Applications, J. Geophys. Res.(Solid Earth), 107(B10):2214, doi:10.1029/2001JB000561.

Altamimi, Z., Collilieux, X., Métivier, L., 2011, ITRF2008: an improved solution of the International Terrestrial Reference Frame, Journal of Geodesy, submitted.