

3.6.2 Combination Research Centres

3.6.2.1 Agenzia Spaziale Italiana (ASI) – Centro di Geodesia Spaziale

Introduction

The Matera ASI Space Geodesy Center (CGS) is a Fundamental Geodetic Station, hosting three permanent Space Geodetic systems (SLR since 1983, VLBI since 1990, GPS since 1995) providing raw observational data, acquired, screened and archived continuously and then forwarded to the technique-dedicated organisations (ILRS, IVS, IGS). Since several years, besides the single-technique data analysis providing many geodetic products on routinely basis compliant with the needs from international geodetic organisations (ILRS, IVS, IGS, IERS) as Analysis Center (AC), ASI-CGS is involved in combination activities aiming to provide specific products and as well as to test combination methodologies; in particular, from June 2004, ASI-CGS is the primary ILRS Combination Center (ILRS CC).

Combination research activity and products

In 2006, the ASI-CGS combination activities have been focussed on the continuous provision of the official ILRS combined weekly solution, on the Mediterranean area combined solution and on the development of value-added geophysical products based on combined geodetic products.

1. ILRSA Weekly Solutions

The main lines of the ASI-CGS combination methodology rely on the direct combination of loose constrained solutions, described in previous IERS reports. ASI-CGS operates since June 2004 as the primary ILRS Combination Centre (“ILRSA”) in charge of providing weekly combined solutions, from individual contributing SLR solutions based on the observations to Lageos 1-2 and Etalon 1-2, to the users at the CDDIS and EDC archives.

The official ILRSA solutions contain:

1. weekly coordinates of the worldwide SLR tracking network,
2. daily EOPs (xpole, ypole, LOD), ITRF2000-framed for IERS Bulletin B.

The ILRSA solutions are provided with a quality report allowing the monitoring of each contributing solution and of the combined product; in the following plot, the WRMS values of the site coordinate ITRF2000 residuals (all sites and core sites) are reported for the period of interest. The 1-cm level for the Core Sites residuals wrt ITRF2000 is maintained throughout 2006.

In the following, the residuals of ILRSA EOP values w.r.t. the IERS EOP C04 are reported. The weighted mean/std of the residuals (x_p : -0.12 ± 0.15 mas; y_p : -0.10 ± 0.15 mas; lod: 0.003 ± 0.045 ms) indicates the quality level of the ILRS contribution to IERS EOP products.

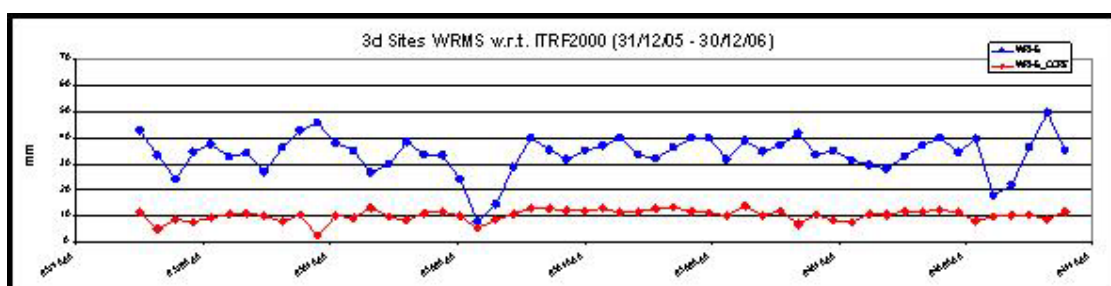


Fig. 1: ILRSA SSC differences w.r.t. ITRF2000 for 2006

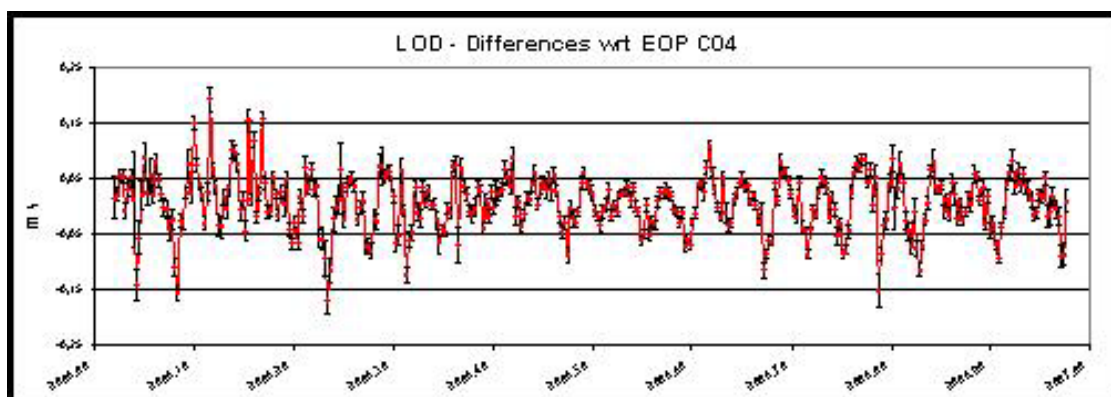
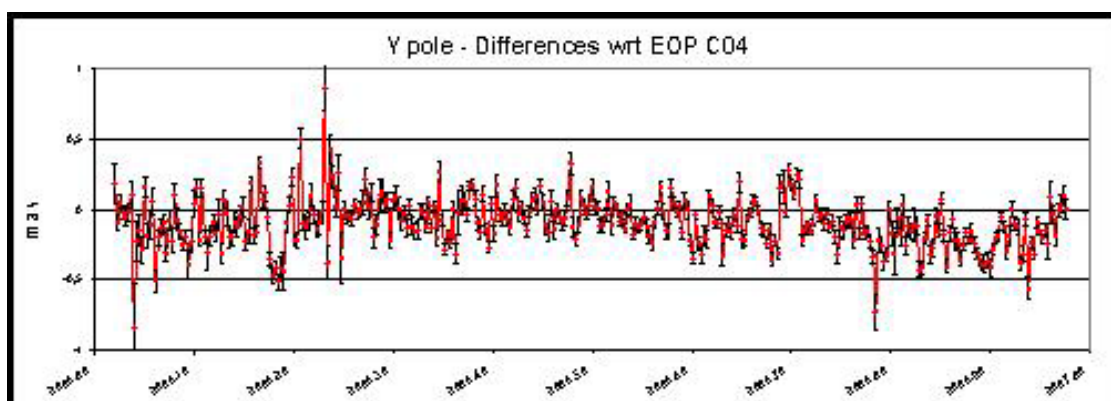
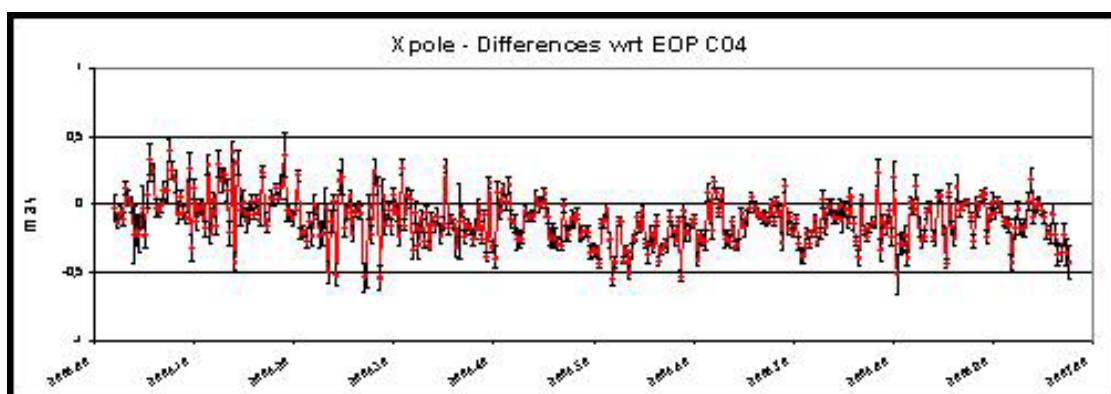


Fig. 2: ILRSA EOP differences w.r.t. IERS C04 for 2006

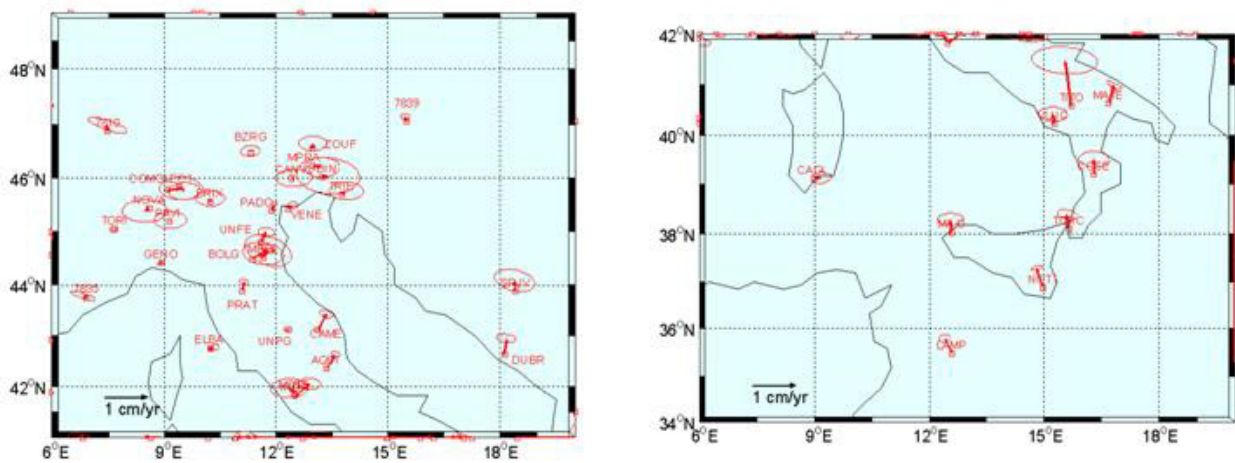


Fig. 3: Italian residual velocity field from ASIMed2006_ver2.0

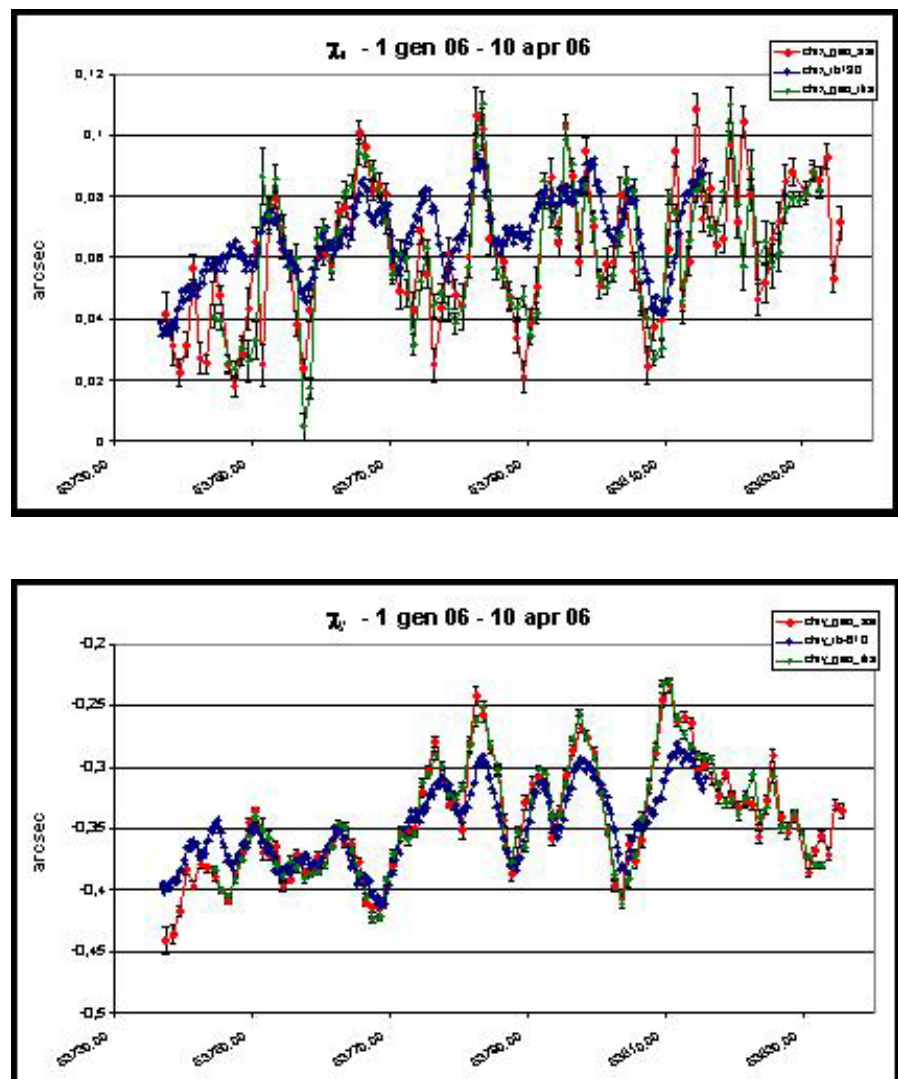


Fig. 4: ASI-CGS EOP Excitation Functions Jan–Apr 2006 (under testing)

3. The EOP excitation functions

Twice a year, ASI-CGS produces a combined velocity solution for the Mediterranean area using its own mono-technique velocity solutions (SLR, VLBI, GPS) that cover the whole data span acquired by the three co-located systems from the beginning of acquisitions in Matera. The ASIMed solution (<http://geodaf.mt.asi.it/html_old/ASImed/ASImed_06.html>) gives a detailed picture of the residual velocity field in the area, profiting of the dense permanent GPS coverage.

2. The ASIMed solution

ASI-CGS is developing a geophysical value added product based on its own estimation of EOP values (at present SLR only; the use of VLBI and GPS EOP is also planned) to be available on the ASI geodetic web site <<http://geodaf.mt.asi.it>>: the geodetic excitation functions in comparison, if possible, with the atmospheric excitation functions from the IERS SBA. The product, after the definition and prototyping phases, undergoes a testing/validation phase started in the examined period and to be continued in 2007.

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