



Geodetic Network Analysis of three Algerian periodic GPS campaigns

Salem Kahlouche, Brahim Djelabi, and Said Touam

Space Geodesy Division – Centre of Space Techniques - PoBox 13 Arzew 31200 –ALGERIA

An important geodynamical activity characterises northern Algeria, which is formed by a chain of mountains constituted of the Tell Atlas. This chain of mountains which includes the Eurasia-Africa plate boundary, is the site of an intense tectonic activity characterized by strong earthquakes, often catastrophic: El Asnam (1954, Ms 6.7; 1980, Ms 7.3), Oran (1959, Ms 5.5), Ain Témouchent (1999, Ms 5.9), Boumerdes (2003, Ms 6.8), etc..

In order to understand the geodynamics of this region, several works using geodetic networks are performed since 1980 (terrestrial network at the El Asnam Fault). In 1998, the Algerian institution (Centre of Space Techniques / CTS, National Institute of Cartography /INCT) started the ALGEONET (Algerian Geodynamical Network) project where three GPS observing campaigns were performed during June 1998 , May 2001 and June 2005, on more than six sites. The use of the data collected on the IGS permanent stations located in southern Europe and non permanent stations located in the inner Algeria, provided some preliminary results, processed with the Gamit/GlobK software, about the behaviour of the deformation activity on the area.

The results of Gamit are the coordinates adjustments and the variance-covariance matrices (in Q,H-files) which used forward by GlobK to obtain the time series, the combined positions and velocities of the stations based on Kalman filtering. For the data validation, the 9.7 mm of the rms of the phase raw data are caused by a water vapour and/or multipath effects on the measurements. The values mean normalised (nrms) on one day are satisfied as they oscillate between 0.15 to 0.20 mm. In general, for all the stations of the network, we obtained a better value of the repeatability on the planimetric components (N,E) than the altimetric one (H) . For the first time, we can evaluate the quality of our results, by analysing the values of the posterior standard deviation. The velocities of the stations are about 7 to 12 mm/year for the planimetric components and 28 mm/year for the vertical components. The displacement fields show a sense of deformation from the North to the East, generally interpreted by the convergence between the African and the European plates, provided by the geological and geodetic models. In perspectives, since 2006 seven GPS permanent stations, with three of them connected to the ITRF network, and distributed with a homogenous cover, are set up by the INCT, for the geodetical network needs.