A New Local Non-Permanent GPS Network to Constraint Tectonic Motions in Al-Hoceima Region (Rif Cordillera)

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The Al-Hoceima region, located in the central part of the Rif Cordilleras, has undergone an intense seismic activity, in which the most significant events occurred in 1994 and 2004 (M= 6.3). Although seismicity data support the presence of transcurrent faults, and available radar interferometry researches evidence surface deformations, geological data suggest that main seismogentic fault zone has not a surface expression. Anyway, a set of N-S oriented normal faults (Rouadi, Al-Hoceima, Trougout) determines the present-day geomorphology and seems to continue to be active in surface.

In order to quantify with millimeter precision the tectonic motion of the area, a set of 6 new GPS non permanent sites have been constructed and its relative position have been determined in June 2007 by Leika 1200 GPS system. Each GPS station consists in a bench mark anchored to solid rock (limestones, quartzites and volcanic rocks). During measurements, an aluminum tube of 0,5 m is screwed and the GPS antenna is located at the top. The simultaneous records was done during 4 days.

The northern 4 stations are located subparallel to the coast line, intersecting the region that has undergone the maximum motions during the last two seismic series, and monitoring major fault blocks separated by N-S fractures, from Ras Tarf up to the west of Rouadi. In addition, other two stations were located to the south, one in between Tamasint and Imzouren, near the epicenter of the 2004 earthquake. The last station is located southwest-wards, in a low deformed region. The repeated measurements of this network may allow to exactly determine the surface expression of deep tectonic deformations in this region, and to quantify the creep and the coseismic motions in the area, that will contribute to better understand the seismic hazard.

Key words: Al Hoceima, GPS network, crustal motions, active tectonics.