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First GNSS results in the Oran area (northwestern Algeria)

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Sparse results along northern Algeria are so far available to better understand how Nubia/Eurasia convergence is accommodated in the western Mediterranean and quantitatively assess seismic potential in that area. In this study, we show new GNSS results in the Tellian atlas in western Algeria. The studied area encompasses the Mleta basin bordered in the north by the Murdjadjo range, which is thought to be the locus of the large 1790 earthquake (estimated magnitude 7.5 Bouhadad, 2001). This area includes the city of Oran, the second most populated city of Algeria.

The GNSS network includes 18 sites, spanning 180km East-West along the coast of Algeria and 40 km inland, with inter-site distance of 15 km. It has been observed in 2008, 2012 and 2013 for enabling velocity to be estimated at the 1 mm/yr. GNSS Data have been processed using GAMIT/GLOBK software, together with 04 permanent sites in Algeria and 87 IGS sites surrounding the area of study. Uncertainties on campaign results have been rescaled according to the analysis of the nearby CGPS time series.

The recorded seismicity and the obtained GNSS velocity field from the three campaigns with a five years span, indicate that this region is tectonically active and subjected to significant horizontal motions. A regional NW displacement of 2-4mm/yr in the Eurasia stable reference frame is consistent with the expected Nubia-Eurasia motion. The obtained velocity field in the Nubian fixed reference frame gives a slow strain rate less than 2mm/yr representing the strain rate accommodated across the Murdjadjo range and the different features around the Mlena basin.