



Active tectonics on Lanzarote (Canary Islands) from the analysis of CGPS data

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We report on the analysis of about three years of CGPS data collected on a small network consisting in five permanent stations, with the largest baseline up to 40 km, spread over Timanfaya National Park in Lanzarote Island. The GPS stations are operated by different institutions, as follows: CAME is co-operated by the Institute of Geosciences (CSIC-UCM), DiSTAR and the Geodesy Research Group of University Complutense of Madrid (GRG-UCM), while LACV is operated by (CSIC-UCM and GRG-UCM). Stations HRIA, TIAS, YAIZ, belong to GRAFCAN (Cartographical Service of the Government of Canary Islands). Lanzarote is the most Northeast and the oldest island of the Canarian Archipelago (Spain), which is located on a transitional zone, a passive margin, between oceanic and continental crust. Due to some peculiarities in geochemistry and geochronology of the rocks as well as tectonics, the origin of the archipelago from a hot spot is still debated. In fact, the most recent Holocene volcanism is scattered over the islands and the last eruption was a submarine one, occurred in October 2011 at El Hierro Island. The last eruption in Lanzarote was a 7 years voluminous eruptive cycle, occurred during the 18th century. Historical seismicity registered in the region, is customarily attributed to diffuse tectonic activity. This study is intended to contributing to shed light on the active tectonics on Lanzarote island and to separate between local and regional strain fields. With the aid of Gamit 10.6 software, we compute from the GPS observations the “ionofree” linear combinations in order to obtain the positions of the stations in ITRF2008 frame using daily sessions, and IGS precise ephemeris. The frame referencing of the network is realized by eleven IGS GPS stations. Then through a Kalman filtering procedure, implemented in GLOBK software, we obtain the final daily solutions by constraining the fiducial GPS stations to their ITRF2008 coordinates. For a reliable strain field retrieval, a careful study is preliminarily carried out on the time series of the daily solutions aimed at characterizing and filtering out the seasonal periodicities related to “non-tectonic” sources. A tentative strain field is reconstructed through the analysis of the time evolution of the web of the possible baselines ranging the stations. Finally, we try to interpret the observed displacement and strain field in the framework of the known tectonic setting coming from previous and ongoing geophysical studies.