



Crustal deformation in the Calabro-Peloritan area from GPS measurements: an analytical model of the local tectonic

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On 1908 December 28 a $M_w=7.1$ earthquake straggled the cities of Messina and Reggio Calabria causing more than 100.000 casualties. Since that dramatic episode, geologists and geophysicists have attempted to understand the complex tectonic of the Calabro-Peloritan Arc, with the aim to improve the knowledge of the active faults of this area and the seismic hazard. In this work we have studied the deformation pattern along the southernmost part of the Calabro-Peloritan Arc through 12 years of GPS measurements. We present and discuss mayor results, in terms of rates of movements along the principal fault systems and of velocity field (computed in an Eurasian reference frame) and strain-rate field of the investigated area. In particular, we have found that a $0.15 \mu\text{strain/yr}$ extension across the Messina Strait and across the Aeolian-Tindari-Letojanni fault system is acting. Moreover, an N-S compressive strain ($0.65 \mu\text{strain/yr}$) is acting across Vulcano and Lipari Islands coupled with an extensional strain-rate of $0.15 \mu\text{strain/yr}$ in E-W direction. The results are also investigated through a simplified analytical model of the local tectonic, taking into account the regional context at a larger scale (Eurasia-Africa convergence). The results inferred from the analytical inversion of geodetic velocities have been compared with structural and seismological data of the investigated area.