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First Evidences of Normal-Fault Fast Creeping in the Mediterranean

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A key issue in our understanding of the earthquake cycle and seismic hazard is the behaviour of active faults during their interseismic phase, with locked and creeping faults representing two end-members of mechanical behaviours and two extreme rupturing hazard level, i.e. high and low, respectively. Geophysical and space geodetic analyses, within the framework of SISMA (Seismic Information System for Monitoring and Alert) project, are carried out over the Pollino Range, an extensional environment embedded within the Africa-Eurasia plate boundary, in order to disclose the behaviour of the long-lasting quiescent Castrovillari normal-fault. Inversion of DInSAR and GPS data over a decade shows fast creeping at all depths of the fault plane, reaching maximum rates of about 20 mm/yr, against an average value of 3-9 mm/yr, faster than the tectonically driving rates. These creep rates are comparable with those occurring along the strike-slip North Anatolian Fault (NAF): the novelty of our results is that creep is first evidenced and proven to be feasible for normal faulting. The onset of creep cannot be established, but our decade data coverage indicates that it is a long-lasting phenomenon, reflecting another similarity with creep characterizing strike-slip (NAF) environments.