

Static stress transfer within the Cephalonia Transfer Fault Zone (CTFZ) during the 2014 seismic sequence in Cephalonia and the 2015 earthquake in Lefkada

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The 2014 seismic sequence in Cephalonia and the following 2015 earthquake in Lefkada Islands, Greece, showed that the Cephalonia Transfer Fault Zone (CTFZ), which runs along the western coasts of both islands, comprises a wide fault zone of parallel to sub-parallel fault segments. The January-February 2014 sequence of Cephalonia consisted of three moderate to strong events. According to published focal mechanisms, the first strongest shock (January 26, Mw 6.1) was produced by a W-dipping, oblique (right-lateral reverse) fault, the second (January 26, Mw 5.3) by a ENE-dipping, pure reverse fault and the third by a ESE-dipping, almost pure right-lateral strike slip fault. The November 17 2015 (Mw 6.4) Lefkada earthquake was produced by a WNW-dipping, roughly vertical, almost pure right-lateral strike-slip fault. None of the shocks above produced any direct coseismic ground rupture, while published relocated hypocentral locations for the Cephalonia sequence revealed various depths indicating a complex fault pattern.

Based on published seismological, geological and satellite data (i.e. InSAR), the respective seismic sources were modelled in order to calculate the static stress changes i) during the Cephalonia and Lefkada sequences, and ii) after the sequences for the surrounding faults from the Greek Database of Seismogenic Sources (GreDaSS). Results showed that the February 3 2014 Cephalonia fault was variously affected by the rupture of the two January 26 faults. Stress change distribution on the fault plane showed that both stress drop and rise occurred. The November 17 2015 Lefkada fault was slightly loaded after the rupture of the whole Cephalonia fault system due to the great distance. The post-sequence stress changes variously affect the surrounding faults: the southern segment of the CTFZ is relieved from stresses, while the central ones show a mixed situation. The large northern segment, offshore from Lefkada Island, is mainly under stress drop. Stress drop is also observed on the reverse "Assos-Skala" fault that produced the August 12, 1953 (Mw 6.9) Cephalonia earthquake at the eastern part of the island. The "Kastos" fault near to the homonymous islet, which produced the October 21, 1953 (Mw 6.3) event is slightly affected due to distance showing stress drop at toward its southern tip and stress rise toward its northern tip.