

Ground deformation effects from the ~M6 earthquakes (2014–2015) on Cephalonia–Ithaca Islands (Western Greece) deduced by GPS observations

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Abstract

The implications of the earthquakes that took place in the central Ionian Islands in 2014 (Cephalonia, M_w 6.1, M_w 5.9) and 2015 (Lefkas, M_w 6.4) are described based on repeat measurements of the local GPS networks in Cephalonia and Ithaca, and the available continuous GPS stations in the broader area. The Lefkas earthquake occurred on a branch of the Cephalonia Transform Fault, affecting Cephalonia with SE displacements gradually decreasing from north (~100 mm) to south (~10 mm). This earthquake revealed a near N-S dislocation boundary separating Paliki Peninsula in western Cephalonia from the rest of the island, as well as another NW-SE trending fault that separates kinematically the northern and southern parts of Paliki. Strain field calculations during the interseismic period (2014–2015) indicate compression between Ithaca and Cephalonia, while extension appears during the following co-seismic period (2015–2016) including the 2015 Lefkas earthquake. Additional tectonically active zones with differential kinematic characteristics were also identified locally.

Key words: tectonic motions, ground deformation, GPS measurements, Cephalonia, Ithaca Islands, Ionian Sea.

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