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The Cephalonia (Greece) January 26, 2014 M6.1 earthquake: preliminary interpretation and stress transfer analysis

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On January 26, 2014, a strong (Mw 6.1) earthquake hit the westernmost Paliki Peninsula of Cephalonia Island in western Greece, causing widespread environmental effects, moderate damages and minor injuries. The main shock was followed by several aftershocks, the strongest of which measured Mw 5.2. Environmental effects include rockfalls, landslides, liquefaction in coastal areas) etc. A village was evacuated due to landslides. Preliminary focal mechanisms of the main shock show that it was caused by a dextral fault with a small reverse component, striking NNE-SSW. The distribution of aftershocks indicate an area covering the entire extend of Paliki Peninsula, while preliminary focal mechanism analysis shows that they have been caused by both dextral and reverse faults, striking approximately NNE-SSW and NW-SE respectively. Taking into account the proximity of the area to the well-known offshore Cephalonia dextral strike slip fault zone (CFZ), the epicentral depth of the main shock and the aftershocks (up to 15 km), the geometrical characteristics (strike and dip angle) of the planes in the preliminary focal mechanisms, as well as their deformation pattern, this earthquake sequence can be interpreted as an activation of a transpressional bend of the CFZ with no expression of the causative fault on land. This transpressional bend is expressed as a series of blind thrust faults, causing uplift and bending of the overlying Eocene to Miocene sediments, as shown in geological maps of the area.
Based on information available at the time of compiling this abstract, a preliminary stress transfer analysis based on the Coulomb failure criterion has been applied to all types of active faults (in sense of geometry and kinematics) that are met in the nearby area. The stress change pattern suggests that this earthquake sequence caused stress accumulation and loading on neighbouring faults. Although the aftershock sequence is still evolving, its distribution pattern will be compared with the areas of stress accumulation. Moreover, earthquake triggering scenarios will be considered from the recent rich earthquake history of the area in order to model the cumulative stress change that affects the region.