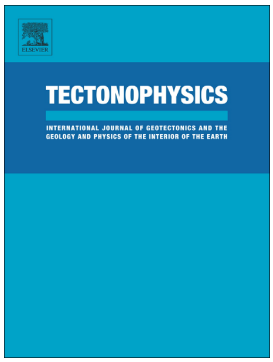

The 12 June 2017 Mw 6.3 Lesvos Island (Aegean Sea) earthquake: Slip model and directivity estimated with finite-fault inversion

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The 12 June 2017 Mw 6.3 Lesvos Island (Aegean Sea) earthquake: slip model and directivity estimated with finite-fault inversion

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Abstract

On 12 June 2017 (UTC 12:28:38.26) a magnitude Mw 6.3 earthquake occurred offshore Lesvos Island in SE Aegean Sea, which was widely felt, caused 1 fatality, and partially ruined the village of Vrisa on the south-eastern coast of the island. I invert broad band and strong motion waveforms from regional stations to obtain the source model and the distribution of slip onto the fault plane. The hypocentre is located at a depth of 7 km in the upper crust. The mainshock ruptured a WNW-ESE striking, SW dipping, normal fault, projecting offshore and bounding the Lesvos Basin. The strongest and most aftershocks clustered away from the hypocentre, at the eastern edge of the activated area. This cluster indicates the activation of a different fault segment, exhibiting sinistral strike-slip motions, along a plane striking WNW-ESE. The slip of the mainshock is confined in a single large asperity, WNW from the hypocentre, with dimensions 20 km × 10 km along fault strike and dip, respectively. The average slip of the asperity is ~50 cm and the peak slip is ~1m. The rupture propagated unilaterally towards WNW to the coastline of Lesvos island at a relatively high speed (~3.1 km/s). The imaged slip model and forward modelling was used to calculate peak ground velocities (PGVs) in the near-field. The damage pattern produced by this earthquake, especially in the village of Vrisa is compatible with the combined effect of rupture