# Preliminary Slip Distribution of the 18 October 2005 ($M_w$ 5.6) Zakynthos event (Ionian Sea)

Christoforos Benetatos and Anastasia Kiratzi
**Department of Geophysics, Aristotle University of Thessaloniki, 54124 Thessaloniki, Greece**

On 18 October 2005 an earthquake of $M_w$ 5.6 occurred south of Zakynthos Island in the Ionian Sea (Greece), whose focal mechanism is compatible with ~ N- S thrust faulting, with the low angle plane probably the fault plane.

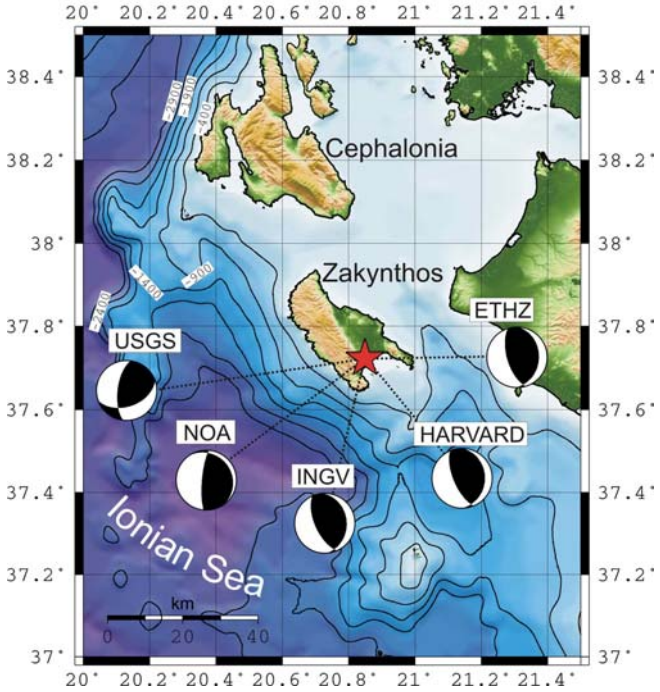


**Figure 1.** Focal mechanism solutions published in EMSC:
[http://www.emsc-cem.org/Doc/IONIAN_SEA_181005/IONIAN_SEA_181005.html ]

**Preliminary Analysis for the Slip Distribution on the fault**

We used the finite – fault inversion code of Antolik and Dreger (2003) and broad band waveforms from IRIS stations (Fig. 2) which provided adequate coverage in azimuths (distances used 500 to 2400 km). Original waveforms have been corrected for the instrument response, band-passed filtered between 0.01- 0.1 Hz and converted to displacement.

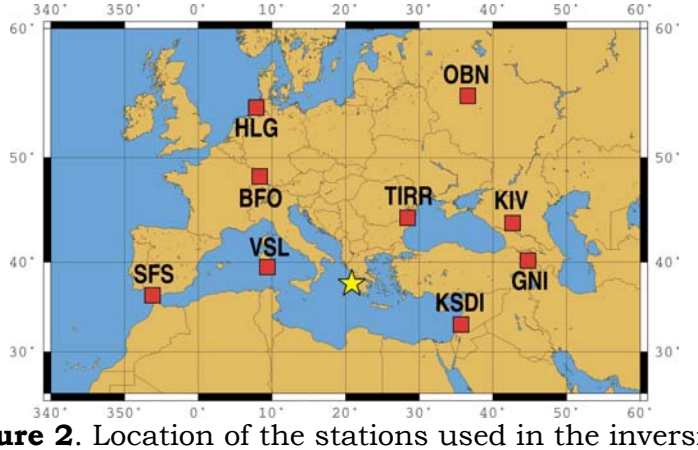


**Figure 2**. Location of the stations used in the inversion

Green's functions were calculated using the FKRPROG code (Saikia, 1994) and the IASP91 velocity model (Kennett and Engdahl, 1991). We adopted the ETH focal mechanism solution and we also assumed that the nodal plane that dips to the E is the fault plane (strike: 4 °; dip: 28 °; rake: 109°). The hypocenter was placed at 20 km. We used a fault with dimensions 40 km × 30 km that has been descritized to 1 × 1 km nodes. The fault has been given larger dimensions from those for an Mw 5.6 earthquake in order to allow the slip to move freely in its preferred position. The rupture velocity used was 2.4 km/sec.

Figure 3 shows our preliminary slip model (total variance reduction of the inversion was 84%).

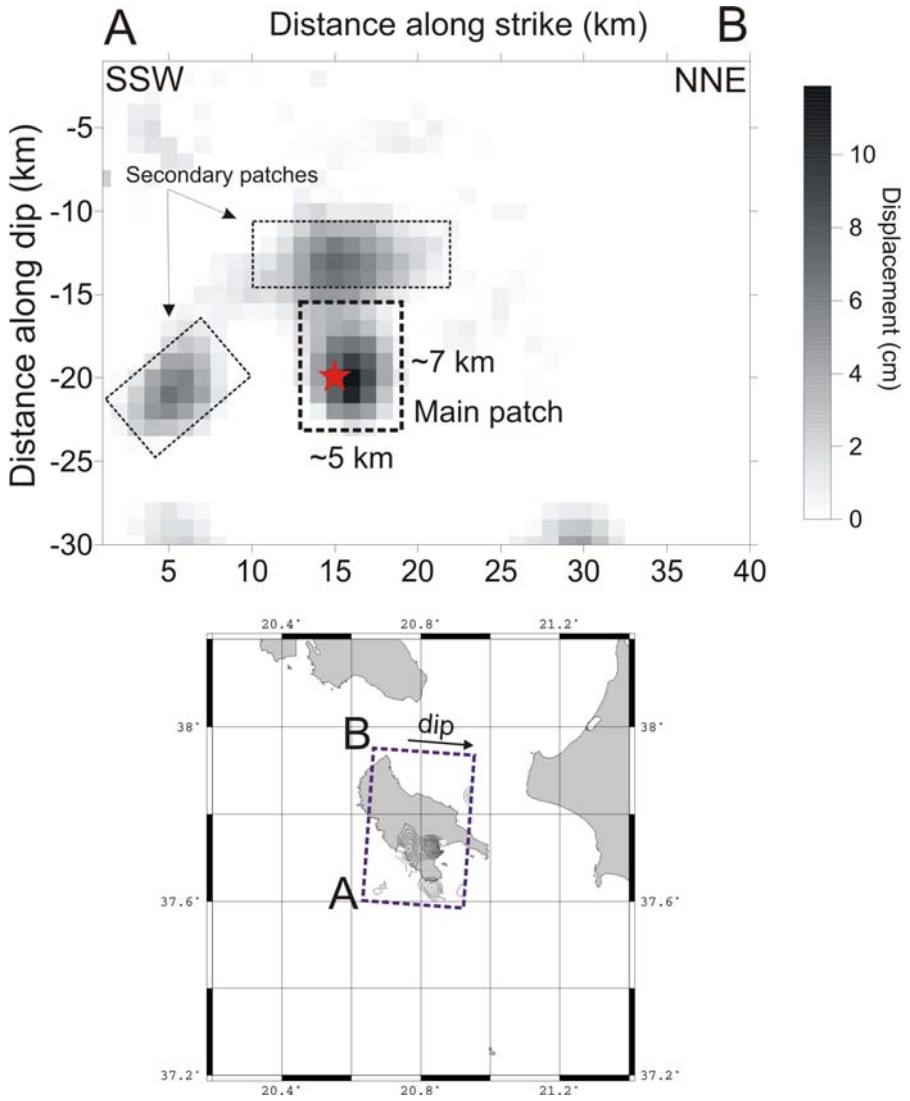


**Figure 3.** Preliminary slip distribution model for the 18 October 2005 Zakynthos (Mw 5.6) earthquake

Moment was released in one main patch, of small dimensions 5 x 7 km$^2$. Two other secondary patches are also identified, north to the hypocenter and to its SW. The average slip is 2 cm and the peak value is almost 12 cm. Rupture initiated at the hypocenter location and propagated upwards to a depth of ~7 km (main patch).

Our preferred slip model produces satisfactory fit of the synthetic to the original waveforms (Fig. 4).

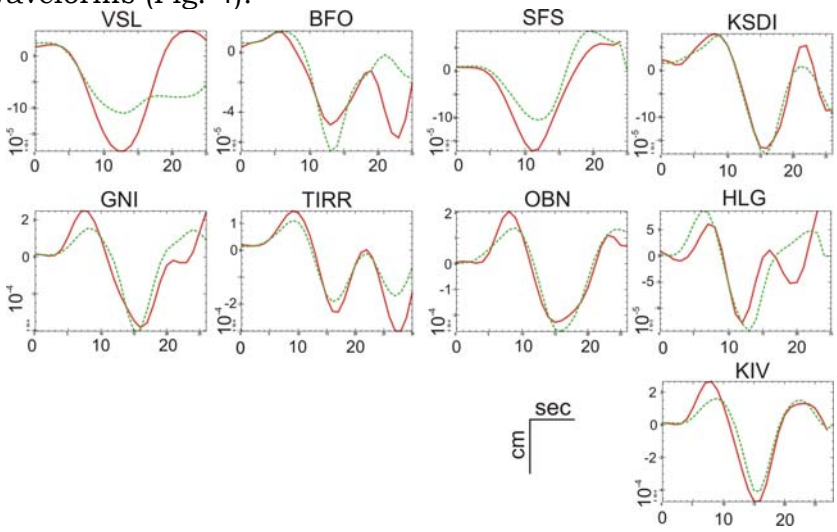


**Figure 4.** Fit of the synthetic (green lines) to the original (red lines) waveforms using our preliminary slip model.

We created the shakemap (Fig. 5) using our slip model and the code of (Kaverina et al., 2002). The velocity model of Novotny et al. (2001) was used to calculate the Green's functions. The maximum values of ground velocity are observed on the island of Zakynthos which experienced most of the seismic motion.

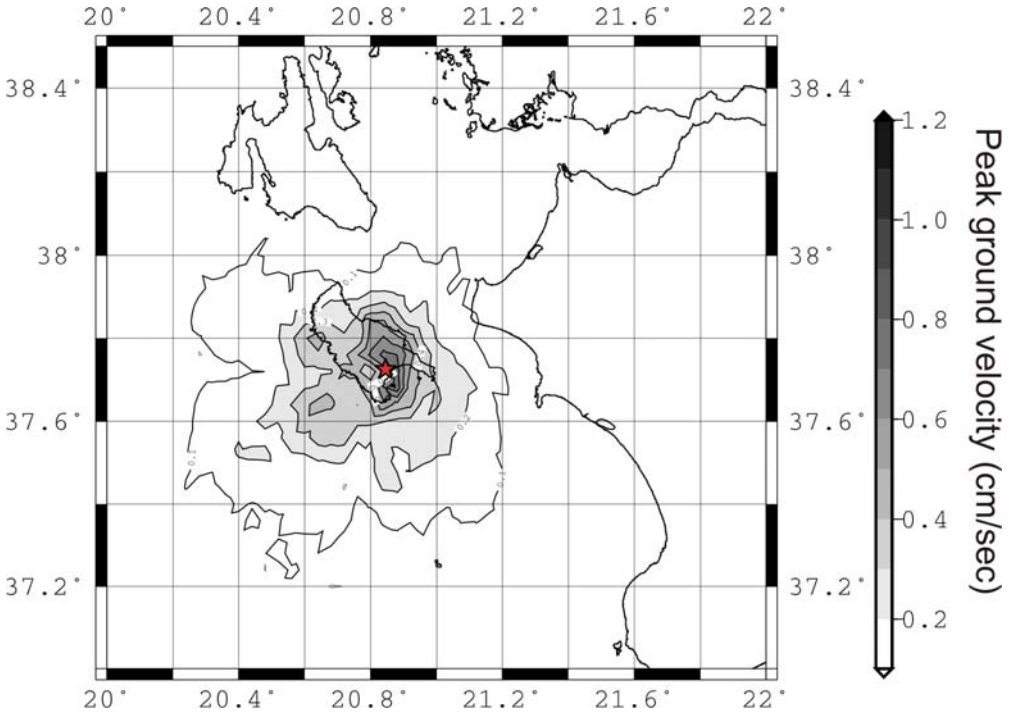


**Figure 5.** Shakemap (PGV in cm/sec) for the broader epicentral area. A maximum value of 1.3 cm/sec is observed that corresponds to an intensity of IV (Wald et al., 1999).

## References


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