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S2.05

ON THE DYNAMICS OF THE 13 MAY 1995, M6.6 KOZANI-GREVENA AFTERSHOCK SEQUENCE

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On 13/5/1995, a destructive earthquake of M6.6 occurred in West Macedonia, Greece, coordinates 40.158N, 21.673E. The Harvard CMT mechanism indicates normal faulting with nodal plane azimuths, dips and rakes respectively (240°, 31°, -98°) or (70°, 59°, -85°) and centroid depth between 10-13 km. The former is consistent with N65° ground ruptures dipping NW, observed over 15 km in the area of Paleochorion and is assumed to represent the fault plane. The main event was followed by an aftershock sequence on the main and conformal/antithetic faults, investigated with a network of 40 stations. From more than 1000 events recorded, 622 were located to better than 1km. Focal mechanisms with nodal planes constrained to better than 10° were determined for 504 events. The statistical evaluation of the P and T axes and the P-T plane indicates a complex stress field pattern expected to generate normal to oblique/strike-slip faulting, in the E-W, N60°-N70° and N30° directions, remarkably consistent with the orientations of observed surface ruptures. The P axis is mainly oriented in the NE-ENE direction: approx. 30-40% of the total compressional stress acts horizontally, in the NE-ENE direction. The T axis is consistently NNW. The main shock and associated aftershocks are right lateral. Near the base of the main fault, at ~14km we observe low angle to horizontal slip mechanisms. The mechanisms on the antithetic faults appear to be normal to oblique slip and left lateral. A small number of events in the NNW direction is associated with oblique slip mechanisms. A geodynamic model possibly explaining the above pattern involves a stress field generated by a NE-SW couple, generating block deformation by shearing in conjugate planes. The main shock occurred by normal faulting in the N60°-70° direction and the subsequent activity was mainly expressed in terms of internal block deformation by shearing in the conjugate NE-SW (partially) and WNW-ESE (mainly) directions.

S2.06

THE KOZANI-GREVENA (N. GREECE) EARTHQUAKE OF MAY 13, 1995: STRONG MOTION DATA, DAMAGE CAUSED, & A REGIONAL *A POSTERIORI* SEISMIC HAZARD ANALYSIS

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Strong motion data of the Kozani-Grevena (northern Greece) large earthquake, Ms=6.6, of May 13,1995 and its aftershocks are presented. Local attenuation relations of strong ground motion are derived based both on instrumental and macroseismic intensity data. An *a posteriori* seismic hazard analysis is attempted within the affected and surrounding area in terms of macroseismic intensity, peak ground acceleration, velocity, bracketed duration and spectral acceleration. The analysis showed that the event of May 13, 1995 could be characterized as one with a mean return period of about 1000 years. The damage caused by the mainshock both in the epicentral area as well as in the two affected towns of the region is discussed. In the epicentral area, macroseismic intensity was evaluated between VIII and IX, in modified Mercalli scale, and within the towns of Kozani and Grevena between VI and VII. The response spectra of the mainshock recorded in the city of Kozani are compared with code provisions applicable in the examined area. Despite the high spectral values of acceleration and the fact that the ductility demands imposed by the mainshock were quite high, the narrow band of periods to which they corresponded (0.1sec to 0.3sec) seems to have mitigated the consequences of strong ground motion on buildings.

S2.07

THE Ms=6.1 JUNE 15, 1995 AEGHION EARTHQUAKE

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The June 15 1995 Aighion earthquake is the largest event to occur in the Gulf of Corinth since the 1981 Corinth sequence and since the beginning in 1991 of a multidisciplinary project aimed at studying the seismic cycle in the Gulf of Corinth. Within this project, detailed seismological, tectonic and geodetic (GPS) observations have been performed since 1991 in an area surrounding the rupture zone of the event. Few days after the event, the existing geodetic network was remeasured, all active faults were looked at to search for surface breaks and a network of 30 seismic stations was installed to record aftershocks.
The inversion of P and SH teleseismic waveforms indicates almost pure normal faulting (phi=282°, delta=21° and lamda=-72°) with a steeply south dipping EW trending nodal plane and shallow dipping (21) north dipping plane. The centroid depth is 6.5km and the seismic moment 2.6 10^{18} Nm. Surface breaks corresponding to a maximum of 4cm normal slip were only observed on the south shore on a 1.5km long segment along the Aeghion fault, that dips north at about 50, indicating that a small amount of slip may have occur there. On the other hand, comparison of geodetic observations and SAR images before and after the earthquake indicates very little deformation on the south shore, a subsidence of about 10cm of the north shore around the Psaromita peninsula and to its east and an opening of about 6cm across the Gulf. Over one thousand aftershocks were recorded, defining an area 20x10km^2 between 5 and 12km depth. All these observations indicate that the slip during this earthquake occurred mostly at depth. We will be present a joint interpretation of all existing data to constrain the faulting associated with this event.

S2.08

THE M_L=5.5 18 FEB. 1996 PYRENEAN EARTHQUAKE AND ITS AFTERSHOCKS: TECTONIC IMPLICATIONS

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A magnitude M_L=5.5 earthquake occurred in Eastern Pyrenees at February 18, 1996. It has been followed during the two months after by several hundreds of aftershocks. From the permanent regional seismological network, and 25 temporary stations installed shortly after the main shock, it has been possible to analyse in detail this seismic crisis. The main shock is located at 10-13 km depth, at an E-W contact between two different geological units: the granitic Agly massif and the Cretaceous folded basin of St-Paul de Fenouillet, 20 km north of the North Pyrenean Fault (NPF) identifying the boundary between the Iberian and Eurasian plates. The fault plane solution of the main shock, obtained from P first motions, shows an E-W senestral strike-slip nodal plane, in agreement with local tectonics. The most striking observation concerns the distribution of the major aftershocks (M_L>2.5) which do not belong to the main fault. They are distributed southward of the main shock along a N-S direction, any identified tectonic structure at surface having this strike. Moreover, many events are at depths 10-15 km. The fault plane solutions of the aftershocks reveal a great diversity and complexity. The results are interpreted in the frame of the Pyrenean geodynamics and of the local tectonic conditions: the swarm immediately south of the main shock corresponds to the reactivation of the intense fracturation of the Agly massif. Other events south of the NPF, all at depth around 15 km, correspond possibly to a decoupling between upper and lower crust.