Small-scale spatial variations of the stress-field in the back-arc Aegean area: Results from the seismotectonic study of the broader area of Mygdonia basin (N.Greece)

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In the present work a detailed seismotectonic study of the broader area of the Mygdonia basin (N. Greece) was performed. Digital data for earthquakes which occurred in the broader Mygdonia basin and were recorded by the permanent telemetric network of the Seismological Station of Aristotle University of Thessaloniki during the period 1989-1999 were collected and transformed in a suitable digital form. Fault plane solutions for more than 180 earthquakes which occurred in the study area were calculated with a modified version of FPFIT program which incorporates amplitude and radiation pattern information. All available fault plane solutions for the 3 main shocks of Volvi (1978) and Arnaia (1995) events and the 1978 aftershock sequence were additionally used. Moreover, data from 2 local networks established in the Mygdonia basin were also incorporated in the final dataset.

Determination of the stress field was realized by the use of the method of Gephart and Forsyth (1984) for the stress tensor inversion and the results were compared with the independent ones provided by the use of the method based on the calculation of the average moment tensor(Papazachos and Kiratzi, 1992). A very good agreement of the obtained results is observed with independent information about the mean stress axes provided by the study of kinematics on neotectonic faults (Mountrakis et al., 2003). The stress inversion method is adapted in order to decide if one or both planes provided by the fault plane solution should be considered the occurred earthquake. Using this approach, the obtained fault planes are in very good agreement with various neotectonic studies. Moreover, several secondary fault branches are identified by this

method, which are still not clearly observed in the field.

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