ID: Type: **Poster**

States of Local Stresses and Relative Locations of Small Earthquakes in the Sea of Marmara

The goal of this research is to determine earthquake hypocenters and focal mechanism solutions accurately, hence obtain recent states of stresses in the Marmara Region. Accordingly, this research aims to define branches of fault structures and their geometrical orientations. In this study, six clusters of earthquakes are located. Next, they are submitted to the stress tensor inversion procedure and their simultaneous focal mechanism solutions are obtained. Besides, they are relocated once again using HYPODD relative location technique. Consequently, from the comparison of individual and relative relocations, it is found that most of the events have the same orientations due to the usage of a high quality data set. Dipping angles of the segments of the Main Marmara Fault could not be observed; on the other hand, important information is discovered about seismogenic zones. Besides, mostly NE-SW oriented extensional stress structures are found in five regions, while a right lateral strike-slip stress structure is found in the most western Marmara. Further, our sensitive relocation and stress analyses make an important contribution to a better understanding of the movements in the Sea of Marmara, and shed light on earthquake rupture analyses for heterogeneous stress states and other seismological studies.

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Track Classification: 1. The Earth as a complex system