Constructing a 3D block diagram of the tectonic features in the Central Basin, the Marmara Sea, by means of bathymetric and seismic reflection data

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In this study, we made a comparative interpretation of the multi-beam bathymetric and seismic reflection data collected in the last decade along the North Anatolian Fault (NAF) zone in the Central Basin, the Marmara Sea. The main objectives are (i) to investigate and compare the active deformation observed on the sea bottom and within the uppermost sedimentary layers to that of the mid to deep seated ones within the limits of resolution and penetration of the available data and (ii) to build a three dimensional (3D) block diagram of the active faults of the Central Basin by means of sliced mapping technique. In this technique, we produce slice maps of the active faults at feature sampling depths and then combine them to form a 3D block diagram.. The motivation for such an approach is to construct a 3D structural diagram where there is no available 3D seismic data. We think that a 3D block diagram may provide better insight to evaluate the structural features and seismic risk assessment.

To form the 3D block diagram, we produced slice maps of the structures at feature sampling depths from the bathymetric image map and seismic sections and then combined them. We selected three levels of the feature sampling depths as follows: sea bottom is the first level sampling the scarps of the active faults; then, the second and third levels are at 2.0 and 3.0 s two-way-travel time depths in the seismic data, respectively. This approximation allowed us to check the continuation of the fault scarps observed at the sea bottom to deeper part of the sedimentary layers by which we have had a chance to see if some of these scarps were only surface features or if they were connected to the faults at greater depths in the basin.

We preferred to include only those features which we are sure about their continuation in the seismic sections. The surface response of the active tectonism is well marked on the bathymetry and they are correlated with the near surface response obtained from the pasisar seismic data. *R/V Le Suroît* data provided the *en échelon* pattern and *horse tail* splay of the active faults on the bathymetry as well as in shallow depths. *R/V MTA Sismik-1* data provided a good control on if the surface features were indeed faults or they were only surface features with no extension to the deeper parts. Extending the faults to the greater depths were accomplished by use of *R/V Le Nadir* data.