AN EXPANDED RELATIVE SEA LEVEL DATABASE ALONG THE MEDITERRANEAN COASTS

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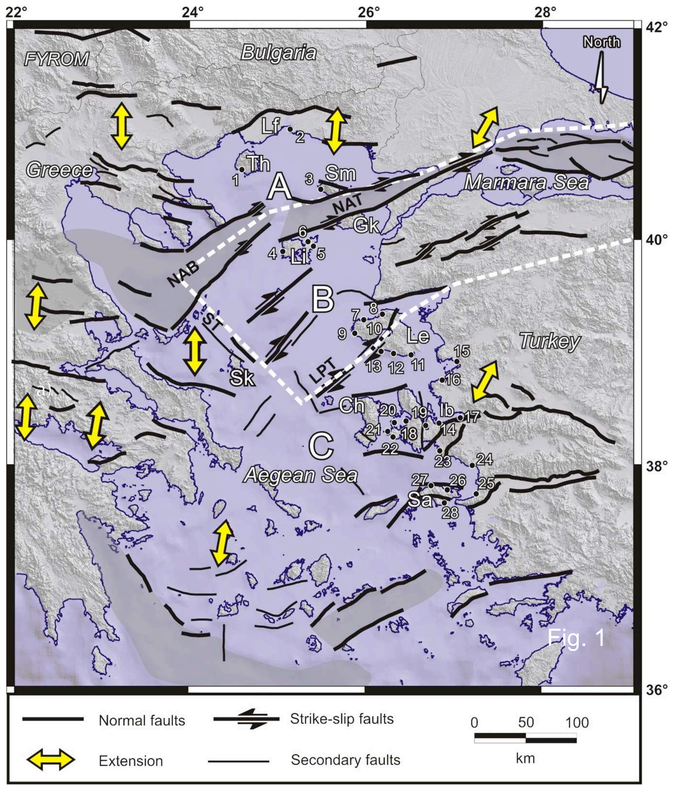
1. Introduction.

Mediterranean coasts offer an exceptional opportunity to investigate the various mechanisms that contribute to sea level variations on different time-scales. In fact, geological, geomorphological and archaeological indicators can be coupled with the available instrumental observations. This research aims to create a coherent, comprehensive, and spatially explicit database of Holocene Relative Sea Level (RSL) data of the Mediterrenean basin. This represents a tool of fundamental importance for understanding and tuning glacio-isostatic adjustment (GIA) models as well as to understand the role of neotectonic in controlling the RSL sea level history in the seismically active areas of the Mediterranean [1]. Here we present the first results of this research carried out in NE Aegean Sea (Eastern Mediterranean). In particular we analyzed, the role of the North Anatolic Fault in controlling the RSL sea level changes in the last 12.0 ky BP.



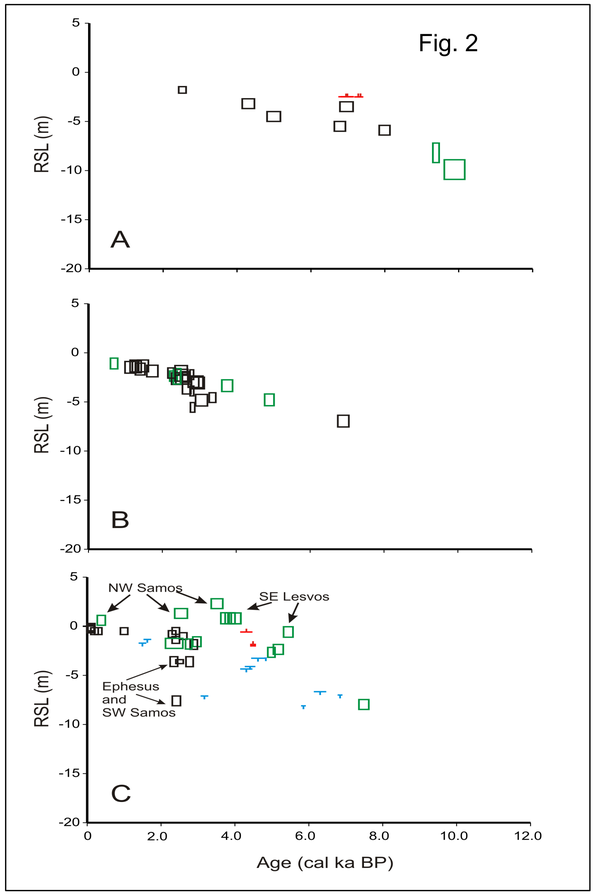
2. Methods

The database included a wide range of geological RSL indicators (geomorphological and biological markers as well as marshy organic material and peats derived from sediment cores) as well as geo-archeological sea level data [2,3] Ages of geological samples were estimated using radiometric dating of organic material of salt and fresh water marshes or marine shells. Ages of geological samples were estimated using radiocarbon (14^C) dating of organic material of salt and fresh water marshes or marine shells that we recalibrated using CALIB 6.0.

3.2. RSL history in NE Aegean Sea

RSL history is majorly influenced by changes in deformation patterns. For the whole mid to late-Holocene, RSL in the western part of South Marmara microplate was significantly lower than in the bordering tectonic blocks. Therefore, the intense tectonic activity mainly related to the right-lateral North Anatolian Fault [4] seems to produce minimal vertical movements in the whole area.

On the contrary, vertical displacement associated with the activity of normal faulting strongly controls the RSL history in the coastal sectors located south of the South Marmara microplate.
The analysis of the database brings a contribution to the open debate about the RSL highstand in this sector of the Mediterranean Sea [5]. Even if with different rates, data provided by our database are consistent with a continuous RSL rise in the last 6.0 ka BP in the whole NE Aegean Sea. Positions of RSL indicators above the present were all controlled by the footwall activity of normal local faults. For this reason, our results do not support the hypothesis of a relative mid-Holocene sea level highstand, which partly reached or even slightly exceeded present MSL.



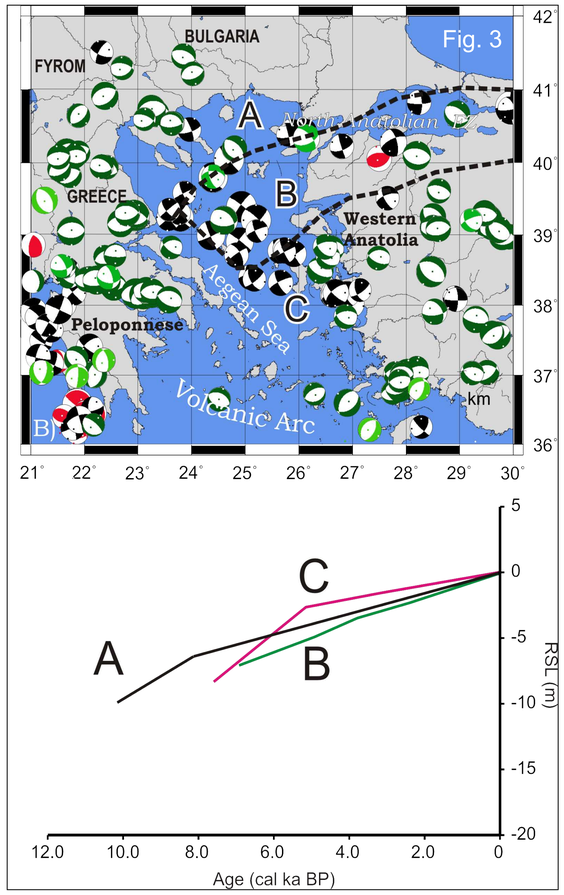


Figure captions. 1) Tectonic setting of the study area, dashed line defines thesouth Marmara microplate (i.e. the area majorly affected by North Anatolic Fault activity). Numbers indicate the sites included in the database. 2) Sea level indicators for the three sectors (A, B, C) along the NE Aegean coast plotted as calibrated age against change in sea level relative to present (m). Green boxes are virtually incompressible samples. Blue and red lines represent marine and terrestrial limiting; Arrows indicate RSL index indicators whose elevation was significantly influenced by local faults. 3) Reconstruction of RSL history within the South Marmara microplate (B) and in the surrounding areas (A and C).

4. Conclusion

Such study is part of a largest project aiming to assess the spatial variability of RSL changes along the Mediterranean coastlines.
Such kind of studies have proven useful to assess coastal vulnerability to sea level rise and to quantify the coastal vertical displacement. Much SL published data exists, and such literature, still rapidly growing, has led to the obvious consequence of fragmented information. With this study, we raised the importance of a standardized review of Mediterranean SL data in order to better assess the future sea level scenarios.

Acknowledgments
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