



## **Messinian-Pontian Crisis in the Black Sea: Constraining the magnitude of sea level drop**

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It has been proposed that the Black Sea suffered a desiccation period during the Messinian Salinity Crisis (MSC) of the Mediterranean Sea. This is based on the finding of shallow water deposits at 2107 meter below current sea level, a regional erosional surface in seismic sections and on a Pontian low stand in the Dacic basin. If true, and if low stand persisted for longer than a couple of thousand years, the removal of the water column is expected to have evoked an isostatic/flexural response of the solid earth. We use flexural modelling to calculate this response of the solid earth and to constrain the magnitude of sea level drop and its impact on the connectivity with surrounding basins. To reproduce the observations, the sea level in the Black Sea should have dropped between 1730 and 2230 meter. The transitional position of the Aegean region between the Mediterranean and Black Sea and the presence of Miocene and Pliocene fauna suggest that this region acted as an intermediate basin linking both water masses. The large sea level drop during the MSC in the Mediterranean caused a similar isostatic/flexural response of the solid earth. Hence, the transitional position of the Aegean region means that flexural uplift in response to both sea level drops contributed to the strait connectivity: Govers et al., (2008) predicted an uplift between 100 and 200 meter in the Aegean region due sea level drop of the Mediterranean Sea and our results show an uplift between 1 and 50 meter of the southwestern margin of the Black Sea in response to the sea level drop in this basin. We speculate that the limited water depth of the Aegean region during the MSC and uplift due to one of the sea level drops resulted in the disconnection of the Mediterranean and Black Sea. This disconnection turned the Black Sea into an isolated basin in which the sea level is controlled by balance of evaporation, precipitation and river input which are in turn directly controlled by climate. We therefore propose that a change in climate, possible induced by the sea level drop in the Mediterranean, resulted in the installation of a negative water balance and desiccation of the Black Sea.