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# Climate variability and socio-environmental changes in the northern Aegean (NE Mediterranean) during the last 1500 years

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We provide new evidence on sea surface temperature (SST) variations and paleoceanographic/paleoenvironmental changes over the past 1500 years for the north Aegean Sea (NE Mediterranean). The reconstructions are based on multiproxy analyses, obtained from the high resolution (decadal to multi-decadal) marine record M2 retrieved from the Athos basin. Reconstructed SSTs show an increase from ca. 850 to 950 AD and from ca. 1100 to 1300 AD. A cooling phase of almost 1.5 °C is observed from ca. 1600 AD to 1700 AD. This seems to have been the starting point of a continuous SST warming trend until the end of the reconstructed period, interrupted by two prominent cooling events at 1832 $\pm$ 15 AD and 1995 $\pm$ 2 AD. Application of an adaptive Kernel smoothing suggests that the current warming in the reconstructed SSTs of the north Aegean might be unprecedented in the context of the past 1500 years. Internal variability in atmospheric/oceanic circulations systems as well as external forcing as solar radiation and volcanic activity could have affected temperature variations in the north Aegean Sea over the past 1500 years. The marked temperature drop of approximately $\sim$2°C at 1832 $\pm$ 15 yr AD could be related to the 1809 D 'unknown' and the 1815 AD Tambora volcanic eruptions. Paleoenvironmental proxy-indices of the M2 record show enhanced riverine/continental inputs in the northern Aegean after ca. 1450 AD.
The palaeoclimatic evidence derived from M2 record is combined with a socio-environmental study of the history of the north Aegean region. We show that the cultivation of temperature-sensitive crops, i.e. walnut, vine and olive, co-occurred with stable and warmer temperatures, while its end coincided with a significant episode of cooler temperatures. Periods of agricultural growth in Macedonia coincide with periods of warmer and more stable SSTs, but further exploration is required in order to identify the causal links behind the observed phenomena. The Black Death likely caused major changes in agricultural activity in the north Aegean region, as reflected in the pollen data from land sites of Macedonia and the M2 proxy-reconstructions. Finally, we conclude that the early modern peaks in mountain vegetation in the Rhodope and Macedonia highlands, visible also in the M2 record, were very likely climate-driven.