PALYNOLOGICAL STUDY OF CLIMATIC AND OCEANIC VARIABILITY DURING "ROMAN WARM PERIOD" IN EASTERN MEDITERRANEAN

Liang Chen [1]*, Karin Zonneveld [1] and Gerard Versteegh [1]
[1] Fachbereich-5, Geowissenschaften, Universität Bremen, 28215, Bremen, Germany - lichen@uni-bremen.de

Abstract

.
Keywords: Primary Production, Paleoceanography, Temperature

To date there is a strong debate about the question if the current rise in global temperature is in range of the normal climatic "noise" or if it is a significant positive anomaly. A way to obtain more insight into this question is by studying past time intervals where potential analogue conditions existed. One of these time intervals is the "Roman Warm Period" (RWP: ~200 BC – 600 AD). Although it is generally thought to be an time interval where global temperatures were relatively high, reconstructions vary remarkably for different regions. Even within a region, reconstructions are not always uniform. For example, the SST in Bermuda Rise studied by Keigwin (1996) shows a temperature decrease between 200 BC and 200 AD. Mangini et al. (2005) and Taricco et al. (2009) also suggest a cold and dry period based on ^{18}O isotopic records of stalagmite from the Central Alps and foraminifera from Central Mediterranean. However, a recent review (Reale and Dirmeyer, 2000) of Mediterranean climate history indicates a gradual warming during the Late Roman Period, and Sicre et al, (2008) reports SST between 0 and 100AD that are similar to those observed during the MWP from the Atlantic, off North Iceland. To obtain more insight into the climatic variability during the RWP there is an urgent need for highly detailed climatic reconstructions.

It has been proved that Mediterranean is a suitable area for paleoclimate studies as it is located between low and mid-latitudes and is influenced by both monsoonal and NAO climate systems. In this study we will present the results of a high temporal resolution study on the climatic and paleoceanographic changes during the "Roman Warm Period" in the Eastern Mediteterranian region (off southern Italy). Excellent time control based on AMS dating and tephra-chronology allows the establishment of three-annual resolution reconstructions. Detailed information about the variability in the organic dinoflagellate cyst associations of piston core DP30PC (39° 50.07' N, 17° 48.05' E, water depth 270 m) allows the reconstruct of short term climatic steered cyclic changes in upper water temperature, productivity and bottom water oxygen concentrations as well as of Italian local river discharge/precipitation signals. Possible mechanisms behind the observed records will be discussed.

References

1 - Keigwin, L. D.1996. The Little Ice Age and Medieval Warm Period in the Sargasso Sea, Science, 274(5292), 1504–1508.
2 - Reale, O. and Dirmeyer, P. 2000. Modeling the effects of vegetation on Mediterranean climate during the Roman classical period. Part I: History and model sensitivity, Global Planet. Change, 25, 163–184.
3 - Sicre, M. A., et al, .2008. Decadal variability of sea surface temperatures off North Iceland over the last 2000 yrs, EPSL., 268, 137–142.
4 - Taricco, C. et al:2009. Two millennia of climate variability in the Central Mediterranean. Clim. Past, 5, 171–181.
5 - Mangini, A., Spötl, C., and Verdes, P.2005. Reconstruction of temperature in the Central Alps during the past 2000 yr from a ^{18}O stalagmite record, EPSL, 235, 741–751.