Geophysical Research Abstracts, Vol. 9, 06510, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-06510

Climate and sea level changes of the Black Sea during the Holocene

A. Preisinger (1), M. Filipova-Marinova (2), and S. Aslanian (1)

(1) Technical University of Vienna, Austria, e-mail: apreisin@mail.zserv.tuwien.ac.at

(2) Museum of Natural History, Varna, Bulgaria

In our study, we used satellite photography and Sedigraph SES 96 measurements for the Bulgarian shelf zone of the Black Sea and the sublacustrine river valley parallel to the Bulgarian coast as well as sediment analyses of drilling cores [1]. The geomorphological measurements in the coastal area near Sozopol as well as in front of the estuary of the Veleka river were done with GPS-Garmin 168-Sounder in combination with a Sony-film camera. A submerged settlement was analysed by ^{14}C-AMS analysis and dune formation by grain size analyses [2]. Statistical analysis of biomineralized sulphate reducing bacteria in the gravity cores of the Black Sea, as well as glacier melt and growth in the Austrian Alps and δ^{18}O-measurements in the Greenland ice cores GRIP and NGRIP indicating rhythmicals climatic changes of cold and warm periods of 176 ± 11 years, which correspond to the periodic change of sunspot cycles [3,4].

^{14}C-AMS analyses of peats of 3 drilling cores of the palaeo river valley of the Veleka river near the firth to the Black Sea, as well as pollen records were used for dating sea level and climatic changes [5,6].

After the formation of the sublacustrine river valley during the Younger Dryas all the Bulgarian rivers - including the Veleka river - flowed into this valley before their entrance to the Black Sea in the Southern part.

At around 9500 yr BP Mediterranean Sea water began to enter the Black Sea over the Bosporus as the sea level of the Black Sea was lower than - 34 m. Thus high salinity water flowed in a one-way system to the Black Sea. Around 8300 yr BP the sea level of the Black Sea rose to the same height as that of the Mediterranean Sea, starting a two-way system, through the Bosporus with high salinity water flowing into the Black

Sea and low salinity water into the Marmara Sea [7]. During the period of the one-way system lasting $\sim$ 1200 years the increase of the SO_4-content reached a maximum at $\sim$9100 yr BP as did the value of the biomineralized sulphate reducing bacteria in the drilling core from the Black Sea. Parallel to this event the salinity in the Black sea increased.

On the basis of dinoflagellate cyst analysis of the hydrological regime of the Veleka river core we found a first occurence of marine dinoflagellate cysts of *Lingulodinium machaerophorum* and acritarchs *Cymatiosphaera globulosa* dating to this event.

The increase of the sea level during the last 7500 years in the Bay of Sozopol led to the submersion of settlements and formation of new settlements. We studied dune formation around Sozopol and at the estuary of the Veleka river occurring the last 3000 years.

References

[1] Preisinger, A., S. Aslanian and W.-D. Heinitz - The Formation of a Sublacustrine River Valley in the Bulgarian Shelf Zone of the Black Sea. Geophysical Research Abstracts, Vol. 7, 07076, 2005.

[2] Preisinger, A., S. Aslanian, W.-D. Heinitz - Geomorphologic development of the Bay of Sozopol, Bulgaria (Black Sea) during the last 7500 years. Bulletin du Musée National de Varna, Vol. 51-52, p. 7-16, 2004.

[3] Preisinger, A. and S. Aslanian - The Black Sea during the last 20000 years Sea level, Salinity and Climate. GAS, Annual Meeting, Seattle, 2003 http://gsa.contex.com/gsa/responses/2003AM/33.doc.

[4] Preisinger, A., S. Aslanian and J. Wernisch -The Biomineralisation of Iron Sulfides under anoxic conditions. Acta Cryst. A61, C312, 2005.

[5] Filipova - Marinova, M. - Postglacial vegetation dynamics in the coastal part of the Strandza Mountains, Southeastern Bulgaria-in: Tonkov, S.(ed.) Aspact of Palynology and Palaeoecology: Festschrift in honour of E. Bozilova. pp. 213-231. Pensoft, Sofia-Moscow, 2003.

[6] Filipova - Marinova, M. - Palynological data of the vegetation dynamics and climatic changes along the Bulgarian Sea coast during the Quarternary. Thesis, BAS,2006.

[7] Preisinger, A. and S. Aslanian - The sea level of the Black Sea during the Holocene. International Symposium on Earth System Sciences 2004, Istanbul - Turkey, pp.225-232, 2004.