Geophysical Research Abstracts,
Vol. 11, EGU2009-4551, 2009
EGU General Assembly 2009

Abrupt climate change in the Black Sea basin during the last glacial period (10-60 kyr)

H. W. Arz (1), F. Lamy (2), O. Kwiecien (1), N. Nowaczyk (1), B. Plessen (1), U. Röhl (3), and A. Ganopolski (4)

(1) Helmholtz-Zentrum Potsdam, Deutsches GeoForschungsZentrum, Potsdam, Germany (harz@gfz-potsdam.de), (2) Alfred-Wegener-Institute for Polar and Marine Research, Bremerhaven, Germany, (3) MARUM – Center for Marine Environmental Sciences, University of Bremen, Bremen, Germany, (4) Potsdam Institute for Climate Impact Research, Potsdam, Germany

As the most distant arm of the Atlantic Ocean, the Black Sea demonstrates an unparalleled feature: it oscillates between lacustrine and marine stages following, respectively, glacial-interglacial sea level changes. Today, the Black Sea is the world's largest anoxic basin. Coring efforts during the last years rather suggested an extensive glacial sediment cover on most of the Black Sea slope areas not reachable with conventional gravity and piston coring devices. Here we present new sediment cores retrieved from the tectonically formed Archangelsky Ridge in the southeastern Black Sea during the 2007 RV Meteor cruise M72/5, which provide a first view into a complete and undisturbed section of the last glacial period.

Different independent stratigraphic approaches (radiocarbon dating, tephrochronology, paleomagnetics, tuning to Greenland ice cores) lead to a consistent age-depth model for the last glacial period. Various proxies from cores 24/25-GC1 suggest strong and immediate responses of the glacial Black Sea freshwater lake to the abrupt D-O climate oscillations of the last glacial period. Each abrupt warming initiated, like during Termination I, inorganic carbonate precipitation in the lake system. Subsequent stadials are marked by increasing IRD input suggesting more abundant coastal ice formation likely reflecting colder winter temperatures. Ostracod stable oxygen isotopes record the precipitation/runoff signal of the drainage basin but show a strongly smoothed signal characteristic to an 1-2 kyr mixing-time in the Black Sea basin with striking similarities to the Antarctic temperature and global ice volume records (Arz et al. 2007).