Geophysical Research Abstracts
Vol. 18, EGU2016-1674-1, 2016
EGU General Assembly 2016

Deciphering paleoclimatic responses for the evolution of Late Pleistocene to Holocene Sedimentary Records of Lake Hazar, Eastern Anatolia, Turkey

Kadir Eriş (1), Sena Akçer Ön (2), Namık Çağatay (1), Tuğçe Nagihan Aslan (3), emre damcı (1), and Umut Barış Ülgen (1)

(1) Faculty of Mines, İstanbul Technical University, İstanbul, Turkey (erisku@itu.edu.tr), (2) Muğla Sıtkı Koçman University, Geology Department, Muğla, Turkey, (3) İstanbul University, Marine Geology Enstitute, İstanbul Turkey

The Lake Hazar basin having 7 km wide and 25 km length is NE-trending elongated intra montane basin on the East Anatolian Fault Zone (EAFZ) that is a left-lateral strike-slip fault. In this study, we aim to discover the paleoclimatic evolution of Lake Hazar during the Late Pleistocene to Holocene. For this purpose, we examined five piston cores recovered from different water depths in Lake Hazar, which were compared to the corresponding portions of 3.5 kHz high resolution seismic data. However, considering the reflector configuration characteristics in the seismic profiles and together with radiocarbon ages obtained from all cores presented here, the lake sediments were deposited over the last 40 ka BP. High-resolution seismic reflection profiles and analyses of the sedimentary substrate by corings in Lake Hazar provide a detailed record of the lake level fluctuations and climate changes. Deciphering such remarkable climatic changes are sensitively recorded in the core sediments by using multi-proxy analyses that provide insight into paleoclimatic changes of Eastern Anatolia.

Based on the studied seismics, an abrupt climatic shift has been recorded at the end of MIS-3, when the shelf edge progradation initiated below -70 m due to lake level drop. The continued lake level drop reached to its maximum lowstand at -95 m due to cold and dry climate at the onset of Last Glacial Maximum (LGM). This climatic period can be infered by high Ca/Ti and Sr/Ca ratios in the core sediments. The initiation of the Bølling/Allerød interstadial is documented in the cores displaying increased clastic sediment supply due to warm and wet climate that allowed rising lake level above shallowest depth (-53 m) prior to the Holcoene. The last climatic drought prior to the Holocene is recorded in the cores during the Younger Dryas (YD) that is marked by high ratio of Ca/Ti, Sr/Ca and also low TOC due to oxgenation of the hypolimnion in the lake. On the seismic data, such remarkable lake level drop is represented by a formation of wave-cut terrace at -73 m on the northern shelf.

Multi-proxies have shown that the Holocene is marked by successions of sub-millennial to multi-centennial climatic fluctuations and rapid shifts to wetter climate. The lake level rises during the Early Holocene was modulated by stillstands at at -63 m, -56 m and -46 m. The most prominent sedimentary sequence both in seismic and cores is the presence of deltaic-complexes that were deposited between 7.4 ka BP and 2.8 ka BP. According to seismic reflection configurations of these extensive deltaic sediments, the Holocene humidity optimum provided to built deltaic units during lake level rises until the Late Holocene. Many recent investigations from the other Anatolian lakes show rather substantial diferences between the early and late Holocene, suggesting a general evolution from wetter to drier climatic conditions. The reason of this inconsistency in Lake Hazar might be large geographic variations of climate over short distances due to orographic effects or time lags of climate events at different localities.