Geophysical Research Abstracts
Vol. 12, EGU2010-7241-1, 2010
EGU General Assembly 2010

Late Holocene environmental reconstruction of Lake Issyk-Kul (Rep. Kyrgyzstan)

Santiago Giralt (1), Armand Hernández (1), Alberto Sáez (2), Juan José Pueyo (3), Núria Cañellas-Boltà (2), and Olga Margalef (1)

(1) Institute of Earth Sciences Jaume Almera CSIC, Sedimentary Geology, Lluís Solé i Sabarís s/n, E-08028 Barcelona, Spain (sgiralt@ictja.csic.es), (2) Department of Stratigraphy, Paleontology and Marine Geosciences, Faculty of Geology, University of Barcelona, Martí i Franquès s/n, E-08028 Barcelona, Spain, (3) Department of Geochemistry, Faculty of Geology, University of Barcelona, Martí i Franquès s/n, E-08028 Barcelona, Spain

Lake Issyk-Kul is an endorheic mountain lake located at 1608 m a.s.l., in the northern Tien Shan ranges, in the Republic of Kyrgyzstan, Central Asia. It has an area of 6236 km^2, a length of 180 km, a width of 60 km, and a maximum depth of 668 m making it the fifth deepest lake in the world. The lake is monomictic, brackish (6 g/l), oligotrophic to ultra-oligotrophic (2 – 3.8 μg/l of phosphorous), and it has high values of dissolved oxygen (6.5 – 7.5 mg/l at the bottom of the lake).

In August 2000, a gravity 150 cm long core (C142a, 42°34'312" N - 77°20'030" E) was recovered at 150 m of water depth at the central northern shore of the lake. This core was characterized using X-Ray Fluorescence (XRF) core scanner (measurements every 300 μm), X-Ray Diffraction (XRD) every 3 mm, and elemental (TC and TN) and isotopic composition (δ^{13}C and δ^{15}N) of bulk organic matter every centimeter. The preliminary chronological framework was constructed with 4 AMS ^{14}C dates. Statistical analyses (clusters, Principal Component (PCA) and Redundant (RDA) Analyses) were employed to identify and isolate the environmental forcings that have triggered the input, distribution and deposition of sediments within the lake.

The core records the last *c*a. 4,000 cal. yrs BP and, during this time its primary productivity has steadily increased (higher values of TC and TN). δ^{13}C and δ^{15}N values suggest that the main primary producer are blue-green algae. The last *c*a. 100 years, the primary productivity has experienced a dramatic increase. Furthermore, PCA on XRF data also highlights that more than the 50% of the total variance is related to changes in primary productivity (the first eigenvector (EV) is tied by the opposition of the terrigenous - organic matter geochemical indicators). This EV shows that the primary productivity oscillated at decadal and centennial frequencies.

The main forcing of these primary productivity fluctuations seems to be temperature changes linked to both solar activity (11 years Schwabe cycles) and anthropogenic global warming.