Global environmental change during the last 12 million years inferred from inorganic components in Baikal sediment cores

Nobuki Takamatsu[1], Genki Inoue Matsumoto[2], Takayoshi Kawai[3]

[1] Dep. Chem., Toho Univ, [2] Sch. Social Info. Studies, Otsuma Women's Univ., [3] NIES

Lake Baikal has the greatest advantages to know paleoenvironmental change in the Eurasian continental interior during the last 30 million years. We have reportedthat the significant signals of changing paleoclimates are the concentration of inorganic elements in Lake Baikal sediments (Takamatsu et al., 2000). Some elements are the reverse proxies of the productivity in the lake and hence may directly reflect the paleoenvironmental changes. Here, we report the contents of 30 chemical elements (Na, K, Mg, Ca, Al, Fe, Li, Be, B,Sc, Ti, V, Cr, Mn, Co, Ni, Cu, Zn, Ga, Ge, As, Rb, Sr, Mo, Cs, Ba, W, Pb, Th & U), for 589 subsamples of BDP96 cores and for 703 subsamples of BDP98 cores from Academician Ridge of Lake Baikal were determined by using ICP-MS to estimate paleoenvironmental changes during the last 12 Myr in the Eurasian continental interior as well as in the world. The contents of terrigenous elements (Na, K, Mg, Ca, Al, Ti, etc.) increased gradually from about 6 Ma B.P. to the present with repeated major fluctuations after 3.6 Ma B.P., indicating significant climate change at 3.6 Ma B.P. in the Eurasian continental interior. The abrupt change may be mainly associated with the uplift of the Tibetan Plateau and Himalayas. This result corresponds well with the rapid increase of the eolian dust accumulation rate in the Central North Pacific sediment core (Rea et al., 1998). Principal component analysis of data sets for 30 element/aluminum weight ratios in BDP96/1 and BDP98 cores showed that the first principal component

scores indicated that some big changes in thesources of chemical elements occurred at about 7 Ma B.P. when the sedimentation rate in the core suddenly increased. We also estimated fromthese data that the variation of the climate from 8 to 12 Ma B.P. was small.