

## A 1000-YR RECORD OF ENVIRONMENTAL CHANGE IN NE CHINA INDICATED BY DIATOM ASSEMBLAGES FROM MAAR LAKE ERLONGWAN

Luo Wang<sup>1</sup>, Patrick Rioual<sup>1</sup>, Virginia N. Panizzo<sup>2</sup>, Houyuan Lu<sup>1</sup>, Zhaoyan Gu<sup>1</sup>, Guoqiang Chu<sup>1</sup>, Deguang Yang<sup>3</sup>, Jingtai Han<sup>1</sup>, Jiaqi Liu<sup>1</sup> & Anson W. Mackay<sup>2</sup>

<sup>1</sup>Key Laboratory of Cenozoic Geology and Environment, Institute of Geology and Geophysics, Chinese Academy of Sciences

<sup>2</sup>Environmental Change Research Centre, Department of Geography

<sup>3</sup>School of Geosciences and Resources, China University of Geosciences

Past environmental changes based on diatom relative abundances have been inferred from the maar Lake Erlongwan in northeast China. The limnology of Lake Erlongwan is affected by the strongly seasonal regional climate. The composition of diatom assemblages, in turn, responds to changes in the seasonal duration of ice cover in winter, water-column turnover in spring and autumn, and thermal stratification in summer. Statistical analysis of the sedimentary diatom assemblages reveals three significant stratigraphic zones over the past 1000 yr. The highest abundance of the planktonic species *Discostella* species occurs between AD 1050 and 1400 and suggests an annual ice-free period of long duration and well-developed summer stratification of the water column. This planktonic diatom peak between ca. AD 1150 and 1200 suggests that this period was the warmest over the past 1000 yr. The interval between AD 1400 and 1800 is marked by a decline in planktonic diatoms and suggests shorter duration of the ice-free season, weaker water stratification and possibly generally cold conditions. After AD 1800 relative abundances of planktonic diatoms, including *Puncticulata praetermissa* and *Asterionella formosa*, increase again, which indicates lengthening of the duration of the annual ice-free period and a stronger overturn of the water column. All these data imply that the pattern of the seasons is different between the MWP and the 20th century. During the MWP the duration of summer was longer while the spring and autumn were shorter than the 20th century.