POSTER PRESENTATION

EOCENE NONMARINE DIATOMS FROM NORTHERN CANADA

Peter A. Siver[1], Alexander P. Wolfe[2] and Mark B. Edlund[3]

[1]Botany Department, Connecticut College, New London, CT, USA

[2]Department of Earth & Atmospheric Sciences, University of Alberta, Edmonton, Alberta, Canada

[3]St. Croix Watershed Research Station, Science Museum of Minnesota, Marine on St. Croix, MN, USA.

Siliceous microfossils abound in lake sediments deposited in the Giraffe kimberlite diatreme, a Middle Eocene maar situated in the Northwest Territories of Canada. The lake persisted between the time of kimberlite emplacement at 48 Ma and final paludification at 40 Ma, as constrained by $^{87}Rb/^{87}Sr$ and fission-track ages. An exploration drill core taken from the crater in 1999 contains 113.1 m of organic sediment, including 44.8 m of peaty material underlain by 68.3 m of stratified lacustrine sediment, in many places finely laminated, and rich in siliceous microfossils. Overall, microfossils representing the Chrysophyceae and Synurophyceae dominate samples from the lacustrine facies. Despite the overwhelming abundance of chrysophytes, an astonishing diversity of diatom lineages is also present, including the orders Thalassiosirales, Aulacoseirales, Fragilariales, Tabellariales, Eunotiales and Naviculales. We present details concerning the ultrastructure and stratigraphic distributions of representatives of the genera *Cyclotella s.l.*, *Aulacoseira*, *Fragilaria s.l.*, *Oxyneis*, *Eunotia*, *Nupela* and *Pinnularia*. The complement of thalassiosiroid genera (*Cyclotella, Discostella, Puncticulata*) extends the antiquity of the fultoportula, and implies that the Thalassiosirales lineage is considerably older than previously thought. Species of *Aulacoseira,* with morphological affinites to modern taxa, dominate sections of the core corresponding to deep-water deposition, implying some degree of ecological stasis within this group. As observed throughout the material, the ultrastructure of the araphid diatom species is also directly comparable to modern taxa. The genus *Eunotia* became established as the lake transitioned to a more shallow and acidic waterbody. One of the observed morphotypes of *Eunotia* has a raphe spanning more than 80% of the valve length and a distinct hyaline central area between the proximal raphe endings, suggesting greater raphe development in certain ancient *Eunotia* relative to modern counterparts. The presence of *Eunotia*, along with *Nupela* and *Pinnularia,* further establish that nonmarine biraphid diatoms as a whole are more ancient than previously believed, dating to at least 45 Ma. Collectively, the exquisitely preserved microfossils from the Giraffe Pipe core have enhanced our understanding of freshwater diatom evolution as a whole, and provide valuable new mileposts to discipline molecular phylogenies.