

APE031-24

Room:104

Time:May 26 10:15-10:30

The enigma of monospecific planktonic diatoms in the Paleo-Kathmandu Lake during the middle Brunhes Chron

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The occurrences of monospecific planktonic diatom assemblages in the Paleo-Kathmandu Lake at Nepal Himalaya during the middle Brunhes Chron are enigmas because they indicate that the famous paradox of the plankton (Hutchinson, 1961) was not paradox at that time. In this study, we examined the assemblage structure and species diversity of planktonic diatoms over the past 600 kyr, to reveal the cause of the occurrences of the monospecific assemblages of planktonic diatoms. Before 300 ka, planktonic diatoms are characterized by few changes in assemblage structure and extremely low diversity, reflecting the formation of monospecific assemblages of *Cyclotella kathmanduensis* and *Puncticulata versiformis*. In contrast, after 300 ka, planktonic diatoms are characterized by frequent changes in the assemblage structure and relatively high average of diversity. The assemblage structure and species diversity of planktonic diatoms in the Paleo-Kathmandu Lake were controlled by lake-level fluctuations (ecological disturbances), which were ultimately induced by Indian monsoon climatic changes. Additionally, variations in the assemblage structure and diversity of the planktonic diatoms are explained in a manner to the so-called intermediate disturbance hypothesis (Connell 1978). Before 300 ka, low-frequency lake fluctuations probably encouraged evolutionary-level competitive exclusion, and resulted in the occurrences of monospecific planktonic diatom assemblages.

Keywords: planktonic diatoms, the paradox of the plankton, the Paleo-Kathmandu Lake