Study on the Quaternary environmental changes of the Paleo-Kathmandu Lake, based on fossil-diatom study

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For the purpose of reconstruction of the environmental changes of the Paleo-Kathmandu Lake, we studied on the change of fossil diatoms collected from a drilled core at Rabibhawan in the central part of the Kathmandu valley.

We identified and counted diatom valves at 2m intervals, with a scanning electron microscope (SEM). On the basis of relative abundance and number of principal diatoms, we define 7 fossil zones as follows.

Zone 1 (depth 217.5m~189.5m): Dominant centric diatoms are Cyclostephanos dubius, Aulacoseira granulata and Aulacoseira ambigua. Pennate diatoms are various. Number of diatom's valve is very little.

Zone 2 (depth 189.5m~149.5m): Cyclostephanos dubius is dominant in the lower part (2A), and Cyclotella sp.1 is predominant in the upper part (2B).

Zone 3 (depth 149.5m~135.5m): Cyclotella sp.2 is predominant. Amount of Cyclotella sp.2 is very abundant.

Zone 4 (depth 135.5m~111.5m): Cyclotella sp.1 is predominant. Amount of Cyclotella sp.1 is very abundant.

Zone 5 (depth 111.5m~89.5m): Dominant species are Cyclotella ocellata, Aulacoseira ambigua.

Zone 6 (depth 89.5m~17.5m): Cyclostephanos dubius and Cyclotella ocellata are dominant in the lower part (6A). Cyclotella ocellata and Aulacoseira granulata are dominant in the middle part (6B). Staurosira construens (pennate diatom) is comparatively abundant in the upper part (6C).

Zone 7 (depth 17.5m~13.5m): Cyclostephanos dubius is dominant. Number of diatom's valve is very little.

In zone 1, benthic diatoms are dominant around 200m in depth, and number of diatom's valve is very little, which reflects marsh or very shallow-water environments. The lake water deepened gradually from zone 2A to zone 2B. In zone 3, there is a distinctive diatomaceous bed composed of Cyclotella sp.1, characteristic species in zone 3. The amount of Cyclotella sp.1 gradually increases upward. Relative abundance of diatom assemblage in zone 4 is similar to that in zone 2. In transitional part from zone 4 to zone 5, there is apparent change of composition of centric diatoms, but pennate diatoms show no changes. From zone 2 to zone 4, there commonly occur characteristic predominant species and number of their valve is very abundant. It suggests that lake water kept deep condition. In zone5, number of diatom's valve decreases, and it probably indicates shallow-water environments. Based on pollen analysis, dry climate was estimated at the beginning of this zone. In zone 6, water-level might have periodically fluctuated, because amount of several species (e.g., Cyclotella ocellata, Aulacoseira granulata and Martyana martyi) show fluctuation. The amount of Aulacoseira granulata and Cyclotella stelligera, indicator of eutrophic water mass, are comparatively abundant in zone 6A and 6B.