

Sedimentary Environment of Early Holocene Peat Layer rich with Diatom in South Bank plain of Haihe River, China

*Jing Fang¹, Fu Wang^{2,3}

1. Tianjin Normal University, 2. Tianjin Center of Geological Survey, China Geological Survey, 3. Key Laboratory of Muddy Coast Geo-Environment, China Geological Survey

On the southern bank of the Haihe River where the four chenier ridges developed, two 30 m depth drilling cores, borehole DC01 and QX01, were collected on the landward of the oldest chenier, about 85 km and 53 km from the present shoreline. The results of diatom analysis of the two boreholes at intervals of 20 cm showed that there were little or no diatoms in these two cores except two peat layers. For borehole DC01 collected from the inland side, the diatom in peat layer of 8.46 ~ 8.56 m depth is rich in diatoms, and the main diatoms are *Melosira ambigua*, *Pinnularia* spp., represent a freshwater swamp environment. The layers close to this peaty clay also contains diatoms, and the clay water electric conductivity and ferrous sulfide content of the sediments 70 cm below this layer are all high, represent a saltmarsh environment on the Holocene transgression maximum. Borehole QX01 collected in the eastward of DC01, about 53 km from the present shoreline, there is a 40 cm thick diatom rich layer of peaty clay, from bottom to top are 1) planktonic *Melosira ambigua*, *Melosira granulata*, *Diploneis ovalis* and outer sea *Coscinodiscus* spp. and *Achtiocyclus* spp., represent a seawater-affected salt marsh environment (Zone II); 2) *Pinnularia* spp., *Eunotia* spp., *Synedra ulna*, *Gomphonema* spp., represent a freshwater swamp environment (Zone I). The AMS¹⁴C dating of the bottom of diatom-rich peat in 8.46~8.56m depth, at an altitude of -4.81m, of DC01 is 7487 cal BP, and the peat layer at an altitude of -6.23 m of QX01 is 7855 cal BP.

The study shows that the boundary of zone I and II in QX01 are at an altitude of -6.13 m, representing the height of the mean high tide level in 7855 cal BP at the beginning of the marine transgression. Then the sea water reached or slightly exceeded the location of borehole DC01, and reached its maximum transgression rang about 7483 cal BP. Followed by regression, seawater affected salt marsh environment changed into terrestrial fresh water swamp environment, and formed peat rich with diatom. The boundary between the peat layer and the underlying salt marsh sediment in borehole DC01 is at an altitude of -4.81 m, representing the height of the mean high tide level during regression.

Keywords: peat layer rich with diatom, diatom analysis, subsidence rates