RECONSTRUCTING QUATERNARY ENVIRONMENTS OF TAIPEI BASIN WITH CONSTRAINTS FROM ORGANIC CARBON ISOTOPIC ANALYSIS

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The organic carbon isotopic analysis of sediments is not only able to reflect the source of organic matter, but also the environmental changes since different organic pools have their own organic carbon isotopic values. For instance, the terrestrial plant communities can be divided into two large groups, namely C3 and C4 respectively. In general, C3 plant has the δ value ranging from -25 to -30 $^{0}/_{00}$, while C4 plant ranging from -10 to -14 $^{0}/_{00}$. As far as we know, most of terrestrial plants belong to C3 group except for some aquatic and desert plants as well as tropical grasses. If a lacustrine environment experienced a change from warm and humid to cold and arid, the originally existing C3 plant community will evolve into C4 plant community. The corresponding δ values of the organic carbon matters in sediments enable us to be aware of such an environmental change.

We sequentially conducted the organic carbon isotopic analysis of the Wu-ku core drilled at the depo-center of Taipei Basin. Two significantly heavier signals are found, representing two terminations, i.e., Stage 2 and Stage 6. Except for these two periods, C3 plants have prevailed since 300ka in Taipei Basin and its surrounding area. Mollusc and micro-fauna studies indicate that within the upper 100 m the Basin has been invaded by seawater. However, no contributions from marine organic matter can be discriminated. This is probably caused by terrestrial sources is dominant. Based on the radiocarbon ages and abrupt change of organic carbon value, we suggest that the beginning of Holocene should be at depth of -65 m.

The isotopic result of organic carbon and two other thermoluminescece ages enable us to reconstruct entire geohistory of Taipei Baisin as follows. The Banchiao Formation, the earliest stratigraphic unit in the Taipei Basin, was probably formed in Stage 8 to Stage 7. The Wu-ku Formation, overlying on the top of the Banchiao Formation, was formed in Stage 6 to Stage 5. The top of Wu-ku Formation is believed to be a disconformity, which is overlain by the Chingmei Formation. This Fomation is composed of coarse gravels and suggested to develop in Stage 2, a very arid and low sea-level period. Due to its high erosional potential, the previous deposits formed in Stage 3 and Stage 4 might have been eroded away. The uppermost unit, the Sungshan Formation, was formed in the last transgressional period, Stage 1.