Redefinition of stratigraphy from Pliocene to Pleistocene of drill core from Sendai Bay.

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We investigated stratigraphy and geological structure around Sendai Bay by geological survey, which included acoustic profiling and 80m drilling on the sea, in order to estimate the activity of NNW-SSE strike faults developed under the inversion tectonics. (Torigoe and Hashimoto, 2007)
Torigoe and Hashimoto (2007) defined five seismic stratigraphic units along seismic profiles: Unit A (Holocene), Unit B (Pleistocene), Unit C (Pliocene), Unit D (Miocene) and Unit E (acoustic basement; Pre-Neogene). They also recognized four lithostratigraphic units in the borehole drilled at the sea bottom of Sendai Bay: Unit A (0-5.17m; soft silt), Unit B (5.17-26.90m; silt or sand), Unit C-1 (26.90-51.13m; siltstone or sandstone) and Unit C-2 (51.13-78.75m; hard tuffaceous siltstone or sandstone). The core was examined by biostratigraphic (diatom and pollen) and tephrochronologic analyses. The lower part of Unit C-1 was placed in the diatom zone NPD8 of Yanagisawa and Akiba (1998) based on the existence of both *Neodenticula kamtschatica* and *N. koizumii*. The upper part of Unit C-1 was assigned to the zone NPD9 based on the presence of both *N. koizumii* and *N. seminae,* and Unit B was inferred to belong to the zone NPD10. No distinct tephra beds were found.
As for the boundary of Unit B / Unit C, comparing seismic stratigraphic and core lithostratigraphic units, although we recognized several meters difference between them: about 35m in seismic profile to about 27m in core, both almost showed good correspondence, consequently we defined the boundary of Unit B / Unit C of core (about 27m depth) as the boundary of Pliocene / Pleistocene boundary.
However, there were some uncertainties in our previous diatom biostratigraphy due to extremely rare occurrence of marker species along with a current revision of Pliocene / Pleistocene boundary. In this study, we reevaluated the diatom biostratigraphy of the offshore core through reconsidering reworking of diatoms from older sediments. Furthermore, we established the tephrochronology by detecting cryptotephra in the core on the basis of mineral composition, index of refraction and principal component analysis.
As a result, we can assign the top of Unit C-2 (55m depth) to the zone NPD8, and the upper Unit C-1 (33m depth) to upper part of the zone NPD9 (2.2Ma), respectively. Moreover, we have detected five age-diagnostic tephra beds: Ata-Th (240ka) and O-Ik (240-270ka) at horizon 11m depth, Kkt (330-340ka) at 16m depth, TE-5 (350ka) 17m depth and Hap-2 (2.3Ma) at 31m depth.
These results suggest that the upper Unit C-1 (26 to 36 m) would be Gelacian in age, because of the presence of Hap-2 tephra (2.3Ma) at 31m depth and the occurrence of diatoms indicative to zone NPD9 at ca. 33 m depth. We therefore redefine the upper Unit C-1 as Unit B-2. This revised chronology leads to change of Pliocene / Pleistocene boundary from 27m to 36m depth. This horizon corresponds to the most remarkable reflection with truncation of lower sequence in seismic profile. This new redefinition can solve the discrepancy between profile and core in our previous evaluation.
Reference
Torigoe and Hashimoto (2007): Japan Soc. Eng. Geol. 2007 annual study meeting, 51-52.
Yanagisawa and Akiba (1998): Jour. Geol. Soc. Japan, 104, 395-414.

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