The potential for a high-resolution, Quaternary paleo-observatory network in the Japan, Yamato, and Ulleung Basins

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The Quaternary hemi-pelagic sediments of the Japan, Yamato, and Ulleung (JYU) basins are characterized by centimeter- to decimeter-scale alternations of dark (org-C rich) and light (org-C poor) clay to silty clay that are known to reflect variations in the East Asian summer monsoon (EASM) in association with millennial-scale abrupt climatic changes known as Dansgaard-Oeschger Cycles (DOC). These dark layers can be traced across the deeper (>500 m water depth) parts of the JYU basins, and therefore can be used as synchronous markers.
In the summer of 2013, IODP Expedition 346 drilled 7 sites in the JYU basins, and the 6 sites deeper than 800 m water depth are characterized by dark and light layering. Intercalation of the dark layers show millennial-scale variations in dark and light layers started *c.* 1.45 Ma with over 250 dark layers deposited repeatedly since then. In addition, approximately 100 tephra layers have been correlated across these 6 sites, and as a result we have obtained over 300 time slices with an average resolution of 5 k.y. covering the entire JYU basins.
We have constructed an age model for the Quaternary interval at Site U1424 off Akita using 10 geomagnetic polarity boundaries and 12 marker tephra layers as time constraints. This was then tuned using the gamma ray attenuation density (GRA) profile, which reflects diatom abundance, to the LR04 $d^{18}O$ stack to develop an age model of higher resolution and precision. This high-resolution and high-precision age model is projected to the other 5 sites using the correlation of dark layers and tephra layers. In this way, we have constructed a high-resolution paleo-observatory network from which to assess leads and lags in northern hemisphere climate. We will present a few examples of how to utilize the network.

Keywords: High-resolution, Quaternary, paleo-observatory network, IODP Expedition 346

