Nature and cause of millennial-scale Asian monsoon changes during the last glacial period

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The evidence of millennial-scale variation in Asian summer monsoon and its probable association with Dansgaard-Oeschger Cycles (DOC) was demonstrated by the speleothem oxygen isotope record recovered from the southern China (Wang et al., 2001). However, the records mainly reflect summer monsoon variability, and variability of Asian winter monsoon as well as westerly jet and the associated dynamical mechanisms are poorly known. The purpose of our study is to examine the nature of atmospheric circulation variability in East Asia during the last glacial period, and discuss the possible origin of those variations.

The Japan Sea is located at downwind of Asian winter monsoon and beneath westerly jet that passes over dried areas in the Eurasian continent, and receives significant amount of aeolian dust derived from these arid areas. In that sense, the hemipelagic sediments of the Japan Sea are expected to record continuous aeolian dust accumulation, which may provide the information on the past variations in Asian winter monsoon and westerly jet. At this conference of the last year, we presented the results of our analyses for grain size and provenance of aeolian dust in Japan Sea sediments, and suggested the possibility of north to south oscillations of westerly jet axis accompanied by weakened and intensified Asian winter monsoon in harmony with DOC. This year, we will discuss the millennial-scale variations in Asian summer monsoon, Asian winter monsoon, and westerly jet individually based on the paleoproxy data from China and the Japan Sea, and discuss the nature of atmospheric circulation variability in East Asia in consideration of its seasonal change.