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Millennial to orbital-scale variabilities of East Asian Monsoon, its evolution, and the linkage with the HTP uplift and

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It is well-established that millennial-scale variability of East Asian monsoon (EAM) is closely linked with climatic changes in high-latitude North Atlantic and Greenland. However, how they are linked and when such linkage started is still unknown. It is also hypothesized that EAM climate emerged and intensified through Neogene due to the uplift of Himalaya and Tibetan Plateau (HTP) based on the result of climatic simulations, although recent studies suggest possible influence of the emergence and expansion of the northern hemisphere ice sheets on EAM evolution. However, when and how EAM evolved on orbital- to millennial-scales and how its evolution process was influenced by the uplift of HTP and/or the buildup of the northern hemisphere ice sheets are poorly understood.

To approach this long lasting paleoclimatological question, IODP Exp. 346 is scheduled from July 29 to September 28 this year. The cruise focuses on orbital to millennial-scale variabilities of EAM and their evolution during the last 10 My. Especially, our group will focus on orbital to millennial-scale variability of East Asian summer monsoon (EASM) precipitation in South China, millennial-scale changes in westerly jet (WJ) path over Japan, their temporal changes through Plio-Pleistocene, and potential linkage between EASM precipitation and WJ path.

We speculate the amplitude and frequency of the millennial-scale variability of EASM is modulated by the ice volume based on our preliminary analysis of gray scale profile of the Japan Sea sediments. To test this hypothesis, comparison of EASM precipitation record from the northern East China Sea, WJ positional record from the Japan Sea, high resolution gray-scale record of the Japan Sea sediments, with ice volume record is necessary.

Keywords: Asian Monsoon, Tectonics, Climatic change