

## Variations in East Asian summer monsoon in the last 400 ky deduced from results of Mg/Ca-sea surface temperature and oxygen isotope of IODP Site U1429

\*Yoshimi Kubota<sup>1</sup>, Etsuko Wakisaka<sup>2</sup>, Steven Clemens<sup>3</sup>, Ann Holbourn<sup>4</sup>, Kyung Eun Lee<sup>5</sup>, Martin Ziegler<sup>6</sup>, Keiji Horikawa<sup>2</sup>

1. National Museum of Nature and Science, 2. University of Toyama, 3. Brown University, 4. Christian-Albrechts University, 5. Korea Maritime and Ocean University, 6. Utrecht University

The East Asian summer monsoon (EASM) system involved in the hydrological cycle and in latent heat and energy transport, and thus plays a crucial role in the regional and global climate system. Modern summer sea surface salinity in the northern part of the East China Sea (ECS) is mainly controlled by the freshwater discharge of the Yangtze River, which reflects East Asian summer monsoon (EASM) precipitation in South China. Site U1429 was drilled by Integrated Ocean Drilling Program (IODP) Expedition 346 in the northern ECS to reconstruct the Yangtze River discharge in high temporal resolution (~100 year resolution). A ~200 m long sediment succession was recovered, which covers the last 400 ky based on a benthic foraminiferal oxygen isotope record. A record of oxygen isotope of seawater ( $\delta^{18}\text{O}_w$ ), a proxy that is related to salinity change and Yangtze River discharge, was reconstructed, based on high-resolution Mg/Ca and oxygen isotope ( $\delta^{18}\text{O}_{\text{pr}}$ ) of the planktic foraminifera *Globigerinoides ruber*. As the surface water in the northern ECS is formed by mixing salty Kuroshio water (high  $\delta^{18}\text{O}_w$ ) and freshwater from the Yangtze River (low  $\delta^{18}\text{O}_w$ ), the  $\delta^{18}\text{O}_w$  of U1429 is interpreted as reflecting mixing ratio between Kuroshio water and freshwater.

The results of U1429 indicate that both  $\delta^{18}\text{O}_{\text{pr}}$  and Mg/Ca are dominated by 100 ky (eccentricity) cycle with 41 ky (obliquity) and 23 ky (precession) cycles. The  $\delta^{18}\text{O}_w$  shows variations that have been in concert with Chinese speleothem oxygen isotope records on millennial to orbital scales except for 100 ky cycles that is not found in the Chinese speleothem record. As the  $\delta^{18}\text{O}_w$  of U1429 follows the global mean  $\delta^{18}\text{O}_w$  on 100 ky cycles, this cyclicity originates from global ice volume change maybe through the Kuroshio water. On the other hand, the prominent 23 ky cycles in U1429  $\delta^{18}\text{O}_w$  may reflect the variations in the freshwater discharge, supporting that the EASM is regulated by summer insolation in the Northern Hemisphere.

Keywords: East Asian summer monsoon, IODP Exp.346, East China Sea