

## **Calcium isotope systematics of authigenic carbonates at cold seeps**

SHANGGUI GONG, DR. MIN LUO AND DONG FENG

College of Marine Sciences, Shanghai Ocean University

Presenting Author: [sggong@shou.edu.cn](mailto:sggong@shou.edu.cn)

Marine authigenic carbonate is the key component in the removal of CO<sub>2</sub> from the ocean-atmosphere system, connecting the marine calcium and carbon cycles and leaving the imprint in the calcium isotope ratio of carbonate. The calcium isotope systematics of authigenic carbonates at cold seeps, the most active carbonate factories, is not yet fully understood. To investigate this, element geochemistry,  $\delta^{13}\text{C}$ , and  $\delta^{44/40}\text{Ca}$  values were analyzed for porewater fluid and carbonate nodules recovered from sedimentary cores collected in the Haima seeps on the northwestern slope of the South China Sea. Results showed that among the three cores, the one with medium methane flux was dominated by aragonite precipitation, while the other two cores were dominated by calcite precipitations, as evidenced by porewater geochemistry and carbonate nodules phase. Numerical modeling results indicated that apparent fractionation for  $^{44/40}\text{Ca}$  ranged from 0.8‰ to 3.4‰, controlled by the carbonate mineralogy and precipitation rate. The calcium isotope systematics of authigenic carbonates were not determined by the alkalinity release rate, which is a function of methane flux. Our results here highlight the larger calcium isotope fractionation during early diagenetic carbonate precipitation, and further analysis is needed to fully explore the controls of the variable  $\delta^{44/40}\text{Ca}$  values at cold seeps.