# Heterotrophic modification and production of long-chain *n*-alkanes during early diagenesis

YOSHITO CHIKARAISHI AND NAOHIKO OHKOUCHI

Japan Agency for Marine-Earth Science and Technology

Molecular and isotopic compositions of long-chain *n*-alkanes have explosively been employed as terrestrial higher plant biomarkers in many studies, particularly for reconstructing vegetation and associated climatic changes in the geological past. However, several previous studies reported that long-chain *n*-alkanes in soils are enriched in $^{13}$C by several ‰ compared to those from the higher plants growing on the soils [1] [2] [3] also reported a certain alteration in the isotopic compositions within sequential samples of maple leaves, fallen leaves, mold, and soils in a field, with the δD values gradually decreasing by ~30‰ from plant leaves to soils but the δ$^{13}$C values gradually increasing by ~3.5‰. These gradual changes in isotopic compositions cannot be simply explained by the input of plant leaves as the sole source of soil *n*-alkanes.

During early diagenesis, *n*-alkanes are exposed in the complex processes including not only dilution and mixing but also heterotrophic assimilation/disassimilation, recycling, and production [4]. Understanding of each effect in the molecular and isotopic compositions of long-chain *n*-alkanes are thus required to enhance the reliability on the interpretation of the molecular and isotopic compositions of *n*-alkanes in sols and sediments.

In the presentation, I would like to discuss “effects of early diagenesis” on long-chain *n*-alkanes by focusing “heterotopic production” as a potential factor responsible for the significant alteration in molecular and isotopic records of long-chain *n*-alkanes during early diagenesis.

[1] Lichtfouse et al. (1995) Org. Geochem. 23, 865-868. [2] Nguyen Tu et al. (2004) Paleogeogr. Paleoclimatol. Paleoecol. 212, 199-213. [3] Chikaraishi & Naraoka (2006) Chem. Geol. 231, 190-202. [4] Chikaraishi et al. (2012) Geochim. Cosmochim. Acta 95, 53-62.