

# Geochemical Study of Organic Matter in the 15 Ma to 12 Ma Sedimentary Rocks in the Hokuroku District, Akita

\*Seina Tsuchida<sup>1</sup>, Takeshi Kakegawa<sup>1</sup>

1. Graduate School of Science, Tohoku University

Kuroko deposits were formed by submarine hydrothermal activity occurred ca. 15 Ma in the Hokuroku district in Akita. Kuroko deposits, in many cases, are covered with the 15 to 12 Ma mudstone layer (M2 mudstones). Details of sedimentary environments and origin of organic matter in those mudstones are unclear. Therefore, in the present study, three sections were surveyed in the Hokuroku district and geochemical analyses were conducted on M2 mudstones.

Oshigenaisawa is the stratigraphically lowest and most likely deposited at the same period of Kuroko deposits. Nittobezawa and Koyukisawa represent stratigraphically middle to upper of M2 mudstones, respectively. Concentrations of total organic carbon (TOC) were the same among examined samples. The H/C ratio and R2 ratio by Raman spectroscopy analyses, and  $\delta^{13}\text{C}$  and  $\delta^{15}\text{N}$  values were different among examined kerogen samples. The H/C ratios of kerogen from the Nittobezawa section were smaller than those of the other sections. Ratios of D1 and D2 bands (corresponded to R2 ratios), indicates higher grade of thermal maturation of organic matter. Such feature was not observed to other two sections. Intense dolerite intrusions limited in Nittobezawa were responsible for increasing local geothermal gradients in Nittobezawa. The  $\delta^{13}\text{C}$  values of kerogen from the Nittobezawa section were -23.2 to -21.8‰, and those of the Koyukisawa and Oshigenai sections were -22.8 to -21.6‰. The  $\delta^{15}\text{N}$  values of kerogen were roughly corresponded to  $\delta^{13}\text{C}$  values.

These results suggest that temporal change of source organic matter in during the evolution of the Hokuroku basin associated with chemical modification by local thermal alterations. We propose that those rocks have a potential for an indicator to explore submarine hydrothermal ores buried deeply in modern marine sediments.