Mg isotope geochemistry during carbonate diagenesis in the Cambrian Machari Formation, South Korea

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In order to understand the behavior of Mg isotopes during carbonate diagenesis, we measured Mg isotope compositions of carbonates in the Machari Formation, carbonate ramp deposits of the Middle to Late Cambrian age in the Yeongweol area, South Korea. Four groups were divided by petrographic components: (1) limestone I (microsparry calcite with crystal sizes less than 20 μm > sparry calcite), (2) limestone II (microsparry calcite < sparry calcite), (3) dolomitic limestone, and (4) dark gray calcareous shale. δ^{26}Mg values of limestone I range from -2.69‰ to -1.00‰ with an average of -1.98‰, limestone II from -2.61‰ to -1.48‰ with an average of -2.12‰, dolomitic limestone from -1.63‰ to -1.10‰ with an average of -1.30‰, and dark gray calcareous shale from -1.73‰ to -1.24‰ with an average of -1.55‰. Relatively higher δ^{26}Mg values of limestone I compared to limestone II could be resulted from more contents of aragonite precursor because more aragonite contents result in high δ^{26}Mg value in limestone due to larger $\Delta^{26}Mg_{min\text{-}sol}$ value of aragonite than of calcite [1]. In dolomitic limestone, δ^{26}Mg values may be ascribed to the fluids enriched in ^{26}Mg during the re-crystallization of clay minerals and/or the percolation through the silicate rocks. High δ^{26}Mg values of dark gray calcareous shale seems to be mainly affected from silicate minerals due to high proportion of clay minerals. This study suggests that δ^{26}Mg values during carbonate diagenesis are mainly ascribed to the mineralogy.

[1] Saenger and Wang (2014) *Quaternary Science Reviews* 90, 1-21.