

$\delta^{88}\text{Sr}$ and $^{87}\text{Sr}/^{86}\text{Sr}$ variations in Middle-Upper Permian seawater

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The lowest value of seawater $^{87}\text{Sr}/^{86}\text{Sr}$ in the Phanerozoic called “the Capitanian minimum” represents an extremely unusual condition in the global Sr cycle, which may have been linked to the global environmental changes with major mass extinction at the end-Guadalupian (Middle Permian). We newly measured $\delta^{88/86}\text{Sr}$ values of shallow marine carbonates for the same Middle-Upper Permian interval by TRITON TIMS, with correction of isotope fractionation during mass spectrometry with ^{87}Sr - ^{84}Sr double spike. The $\delta^{88/86}\text{Sr}$ values started to decrease in the Early Permian, and reached to the Phanerozoic lowest value at the end of Capitanian (Late Guadalupian). In turn, the values started to increase across the Middle-Late Permian boundary (G-LB), and kept increasing throughout the early Late Permian. This trend across the G-LB is similar to that of $^{87}\text{Sr}/^{86}\text{Sr}$, even though there is no overall correlation between seawater $\delta^{88/86}\text{Sr}$ and $^{87}\text{Sr}/^{86}\text{Sr}$ through the Phanerozoic. The extremely low $\delta^{88/86}\text{Sr}$ value in seawater may reflect a unique balance between two fluxes to seawater from marine carbonate sources in global-scale; i.e., increase by dissolution and decrease by deposition of carbonates.

キーワード：炭酸塩、海水、Sr同位体

Keywords: carbonate, seawater, Sr isotope