

Neodymium isotope compositions of the Turonian carbonates in central Italy: Implications for paleocurrents of Tethyan deep waters

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Nd isotope system is a powerful tool for distinguishing between different water masses and for tracing the water exchange between different basins in both the modern and ancient oceans. The purpose of this study is to reconstruct the Nd isotope evolutions of Tethyan deep waters at the Turonian by analyzing marine carbonates collected from the Contessa Vispi Quarry section in central Italy (Hu et al., 2006). Eighteen samples were collected from 9.97m to 10.96m above Livello Bonarelli black shales (OAE2). These samples are white, light gray and pink limestone, which are estimated to deposit at about ~93 Ma. About 200mg carbonate samples were dissolved in 2ml 1N acetic acid for one day at ~50°C. Then, the suspend solution were used to separate Sr and Nd by cation exchange techniques. Sr and Nd isotope analyses were performed on a Finnigan MAT Triton TI mass spectrometer at Nanjing University. The ⁸⁷Sr/⁸⁶Sr ratios of these samples vary from 0.707387 to 0.707409. These values are consistent with those of coeval seawater (Jones and Jenkyns, 2001). The calculated $\epsilon_{Nd}(t)$ values vary from -5.05 to -7.17, which are more radiogenic than those values (about -9) reported by Puc at et al (2005) for the upper ocean water at Turonian. The $\epsilon_{Nd}(t)$ values of carbonates may represent those of coeval NW Tethyan deep waters at Turonian era. Therefore, our data suggest that the Tethyan deep waters at Turonian may have different origin from the upper waters, and the high $\epsilon_{Nd}(t)$ values indicate that the deep water mass may directly come from the Pacific.

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