

MOLECULAR AND C-ISOTOPIC EVIDENCE OF BIOTIC AND ENVIRONMENTAL CHANGES ACROSS WUCHIAPINGIAN-CHANGHSINGIAN BOUNDARY AT THE MEISHAN SECTION, CHINA

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The Meishan Section (Changxing, Zhejiang province, China) contains the GSSP for the Permian-Triassic Boundary (PTB) and the GSSP for the Wuchiapingian-Changhsingian Boundary (WCB). Many studies focus on the end-Permian extinctions, including some molecular organic geochemical researches (Sephton et al., 2002; Watson et al., 2005; Grice et al., 2005; Wang et al., 2005). The WCB is also characterized by the extinction of a significant number of marine fauna (Knoll et al., 1996; Bowring et al., 1998), but the cause of the crisis remains little understood. In this paper, we present a detailed molecular and C-isotopic geochemical study on the biotic and environmental changes around the WCB, as compared with the PTB and with the Shangsi Section in Sichuan province, China.

The intervals around the WCB were developed during transgression period. They share the common molecular geochemical characters of high Pr/Ph value and pristane enrichment with the PTB strata (Fig.1). The genesis mechanisms for this pristane anomaly around the WCB were suggested as: 1) Strong dysaerobic biodegradation of the OM; 2) Accumulation and preservation of the pristane-rich lipids and metabolites from marine animals under certain special conditions. However, the WCB strata show some important differences as compared with the PTB strata: 1) The WCB strata are characterized by high TOC and HI values (Fig.1). 2) The sediments around WCB are very similar in alkane distribution with $n\text{-C}_{15}\text{-}n\text{-C}_{17}$ as the main peaks. 3) The hopane distribution around the WCB is very homogeneous, although lithology varies. It is characterized by high abundance of $\text{C}_{30}\alpha\beta$ -hopane, but low abundances of Tm and $\text{C}_{31}\alpha\beta$ -hopanes, which is very different from Beds 24–32 around the PTB. This pattern of hopane distribution is common in anoxic marine organic-rich shales or argillaceous marls developed in slope or basin facies during transgression in various geologic eras, including the Cambrian organic-rich shale in which cyanobacteria as predominant primary production. 4) A monophasic positive $\delta^{13}\text{C}_{\text{carbonate}}$ shift (about 4‰) occurs in Beds 1–6,

because the $\delta^{13}\text{C}_{\text{carbonate}}$ data for the strata below Bed 1 was not obtained owing to heavy weathering. But the Shangsi Section provides a negative-positive shift pattern in $\delta^{13}\text{C}_{\text{carbonate}}$ around the WCB. 5) The hopanes in Beds 1–6, with $\delta^{13}\text{C}_{\text{Hopane}}$ value ranging from -21.5‰ to -26.0‰, are ^{13}C -enriched by ca. 4–8‰ compared with $\delta^{13}\text{C}_{\text{Pristane}}$. All the above data strongly indicate that the OM around the WCB at Meishan originated mainly from cyanobacteria and intermittent marine anoxia caused by cyanobacterial blooms (high primary production) could have caused the local biotic crisis around the WCB.

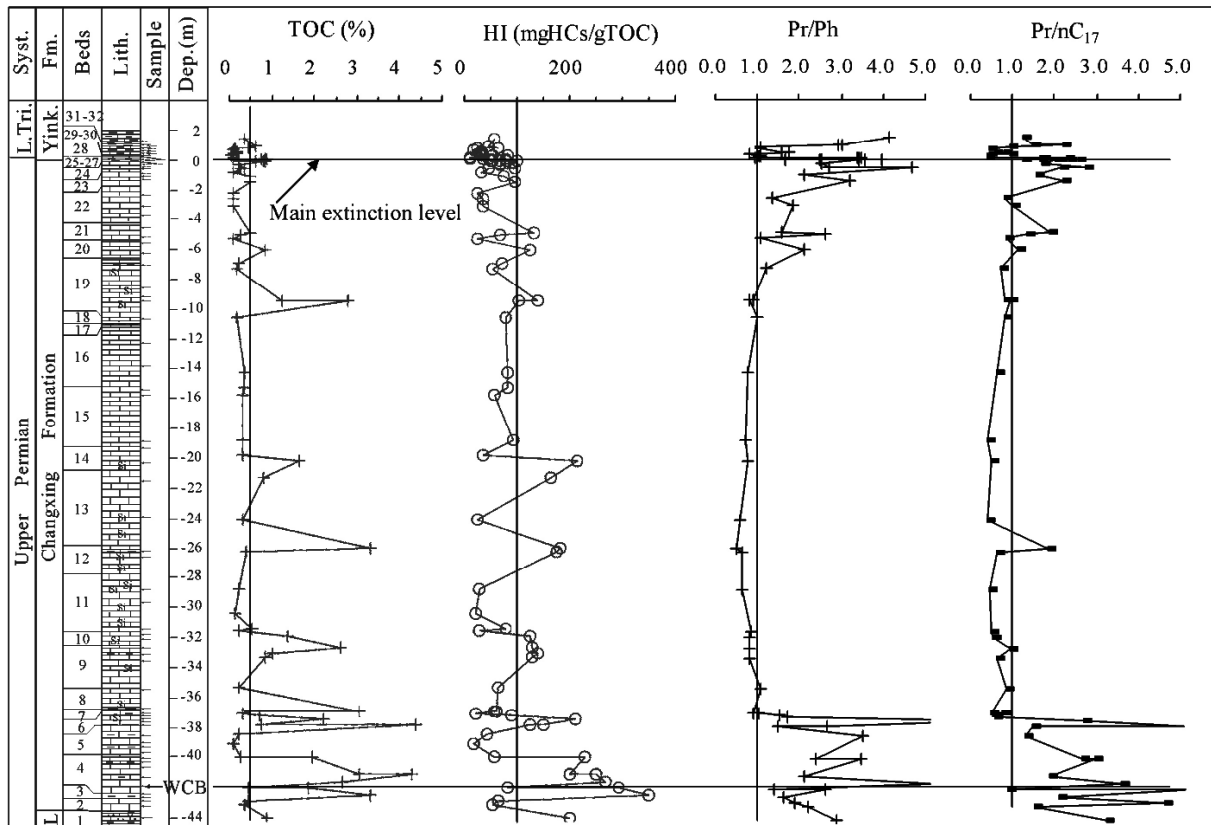


Figure 1. Variation in TOC, HI, Pr/Ph and Pr/n-C₁₇ ratios across the Meishan Section

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