

Variability in vegetation and depositional environment as reflected by organic geochemical analysis in the Neogene lignite sequences from the Zhaotong Basin, Yunnan(SW China)

Liduan Zheng¹, Xianyu Huang¹, Xueping Ji^{2,3}, Chenglong Deng⁴, Shucheng Xie¹

¹ School of Earth Sciences, China University of Geosciences, Wuhan 430074, China

² Department of Paleoanthropology, Yunnan Institute of Cultural Relics and Archaeology, Kunming 650118, China

³ Yunnan Key Laboratory for Paleobiology, Yunnan University, Kunming 650091, China

⁴ State Key Laboratory of Lithospheric Evolution, Institute of Geology and Geophysics, Chinese Academy of Sciences, Beijing 100029, China

Organic geochemical studies on lignite from the locality of Shuitangba, an open-pit lignite mine located in the Zhaotong Basin in northeastern Yunnan Province, SW China were carried out. The outcrop of lignite sequences, which is estimated to be aged from Late Miocene to Early Pliocene, is up to 16 metres thick and lithologic character is mainly composed of lignite, peaty clay and clay. The values of loss on ignition (LOI) were obviously higher in lignite deposition than in other lithology, showing the varying depositional environment (lacustrine or swamp environment). The n-alkanes were dominated by long-chain n-alkanes with a marked odd over even predominance, suggesting an important contribution from terrestrial higher plants. In addition, terpenoid (diterpenoid and non-hopanoid triterpenoid) biomarkers characteristic for conifers and angiosperms were also detected. In general, the ratios of concentrations of the diterpenoids to the sum of diterpenoids plus non-hopanoid triterpenoids (di-/di-+tri- terpenoids), as the best quantitative expression of the contribution of conifers vs. angiosperms, are consistent with the previous pollen records. The distribution pattern of terpenoids further illustrate the organic matter is mainly from higher plant waxes. The hopane distributions showed a dominance of those with the biological 17 β , 21 β -hopanes indicative of a low level of maturity. In some layers(peaty clay and clay), the carbon isotopic value of C₂₉ 17 β , 21 α -hopane is very depleted(< 50 per mil), supporting an enhanced activity of methanotrophic bacteria.