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Phosphorites' Sedimentary Event in Sinian Doushantuo period: the Cases Study of Weng'an Phosphorite and Yichang Phosphorite

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Sedimentary marine phosphorites between the Late Neoproterozoic and Cambrian was the first large-scale global phosphogenesis event[1]. Phosphogenesis also emerged on the Yangtze platform in the Sinian Doushantuo period[2]. Phosphogenesis and biological evolution events were associated with changes of global environment[3]. Biological congregation of phosphorus is an important way to phosphorus enrichment. Its large-scale burial records could reflect the important information about changes in the ancient ocean. At the same time, biological metabolism, photosynthesis and other activities of life are inseparable from the participation of phosphorus, phosphorus plays an important role on the evolution of life. Weng'an phosphorite and Yichang phosphorite were researched, yielded the some results.

An organic geochemical analysis of the phosphorite samples coming from the stratigraphic position of Weng'an biota has been carried out, and the hydrocarbons fractions contain n-alkanes, terpanes, steranes and isoprenoids. The results show that the distribution pattern of n-alkanes has a wide range of carbon atom numbers. The OEP near 1. The Pr/Ph ratio indicating phytane dominance. The curve of the carbon isotope compositions of individual n-alkanes of the phosphorite has a narrow variation range. The biomarkers characteristics indicate that the main sources of the organic matters are algaes and bacteria. Compared Yichang and Weng'an phosphorite's depositional environment, we could conclude that subtidal zone was favorable area for phosphogenesis, which had high energy and abundant algaes. The physical weathering during glacial epoch and chemical weathering during the Doushantuo period produced the phosphoric material, which was input into ocean, with high biological productivity, providing opportunity for biomineralization. Phosphogenesis and transgression have the closed relationship. Intermittent fluctuations of sea level provided the source and power conditions for phosphorite's deposition. The Yichang phosphorite's organic carbon content is between basin phosphorite and platform phosphorite's content. However, the platform phosphorite of Weng'an has the characteristic of low organic carbon content and high P_2O_5 content as a result of more oxidative

environment. Carbon content and high P_2O_5 content indicated that organic material played a significant role in phosphorus element's enrichment. The isotope data indicate that the biological productivity was gradually increased in the early stages of the Doushantuo period. It implied that upwelling of phosphorus-rich bottom water brought the phosphorus source. The migration of phosphorus water provided nutrients for the Doushantuo biota's flourished, and biota's flourished provided the condition for phosphorus's further aggregation and precipitation.

References:

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