CLAY MINERALOGY OF ALTERED VOLCANIC ASH BEDS AND FACIES CORRELATION BETWEEN THE PERMIAN TO TRIASSIC BOUNDARY STRATIGRAPHIC SETS IN GUIZHOU AND SICHUAN PROVINCE OF SOUTH CHINA

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Permian to Triassic is the important stage for the Earth from Paleozoic to Mesozoic, and the extinction among the Permian to Triassic is a hot topic by researchers. Many researchers had been study it by different aspect. The view of volcanism to P-T extinction was accepted to more and more researchers, and the wide distribution of Permian to Triassic nearby boundary is the important record of extinction. The mineralogy characteristic of clay mineral can provide important information of sedimentary source, and the research about it has important research significance. Successions of the Permian-Triassic boundary (PTB) altered volcanic ash beds exist in south China.

The Permian-Triassic boundary (PTB) successions in south China contain numerous altered volcanic ash beds (K-bentonites), which presents the opportunity to correlate the PTB position in both marine and non-marine PTB sections. Clay mineralogical and geochemical studies of two altered ash beds in the Chahe(CH), in Guizhou Province and Shangsi (SS) in Sichuan Province sections, in south China, deposited in littoral and interactive marine-terrestrial environments respectively, permit an investigation of the alteration of ashes and correlation of ash beds between disparate facies. The results show that the two CH altered ashes are dominated by R2 and R3 I/S clays, with 86.3 % and 84.04 % illite layers for samples SS and 57.83 % and 68.19% illite layers, respectively. The CH ash samples contain mainly kaolinite and mixed-laye illite/smectite (I/S) clays. The poorly-crystallized kaolinite is present in pseudo-hexagonal plates, and the well-crystallized kaolinite occurs in book-like aggregates in veins or cavities. Obviously, the CH ashes experienced terrestrial weathering and resedimentation prior to final burial and preservation, and local microenvironmental conditions control the formation of clay minerals. The SS ash samples have markedly lower $^{87}Sr/^{86}Sr$ values (0.721708 for SS-1 and 0.717225 for SS-2) than those of the CH samples (0.761077 and 0.742332). The notable difference in $^{87}Sr/^{86}Sr$ value of ash beds between the sections is attributed to variations in Rb-Sr partitioning during the chemical weathering process in different environments. The CH ash samples have notably higher $^{149}Nd/^{144}Nd$ ratios (0.512376 for CH-1 and 0.512424 for CH-2) than those of the SS samples (0.512034 for SS-1 and 0.512043 for SS-2), suggesting that the CH ashes are likely derived from continental crust and the SS ashes originate from new continental island arcs, in agreement with the REE distributions and the Ti *vs.* Zr, TiO_2 *vs.* Al_2O_3, and Zr/TiO_2 *vs.* Nb/Y discrimination plots. The occurence of different volcanisms in PTB stratigraphic sets previously believed to be synchronous, south China, suggests that correlation between disparate facies by an ash marker is unwise without geochemical fingerprinting of the materials.

Keywords: Altered volcanic ash, illite-smectite, Sr isotopic composition, Nd isotopic composition, weathering

