Sulphide sulphur and carbonate carbon isotopic evolution of the Cambrian Series 2 and 3, South China

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Sulphur and carbon isotope variations characterize the Cambrian Series 2 and Series 3 transition that is exposed on the Yangtze Platform at Balang and Jianshan, Guizhou Province, South China. The carbonate carbon isotopic composition fluctuates between -6.9 and +3.1 ‰. A prominent negative carbon isotope excursion occurs at the traditional Early-Middle Cambrian interval, both in South China as well as in numerous successions worldwide.

Highly variable sulphide sulphur isotope values between 2.7 and 37.3 ‰ identify bacterial sulphate reduction under variable geochemical conditions, ranging from optimal to sulphate limited. Again, data obtained for the Chinese sections can be compared with the known record of sulphur isotope data for Early Paleozoic sedimentary pyrite. Strongly positive sulphur isotope values from Balang suggest the development of closed system conditions with regard to sulphate availability. Such high bacterial turnover of sulphate could well be a consequence of abundant organic matter, preserved under anoxic conditions. These, in turn, are linked to biological changes across the Cambrian Series 2 and Series 3 transition.

Global signals reflecting secular variations of the ocean-atmosphere system across the Lower-Middle Cambrian transition are reflected in the carbon and sulphur isotope records from sections in Guizhou. Their chemostratigraphic potential will be evaluated in the light of diagenetic overprints.

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Post-collisional, primitive, potassium-rich magmatism of the Northern Tibetan Plateau: A petrologic record of the plateau uplift

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Post-collisional, primitive (e.g. MgO>6 wt %), potassium-rich igneous rocks in the Qiangtang, Songpan-Ganzi and Kunlun terranes of the northern Tibetan Plateau are located in a near E-W trending, 1200 km long magmatic belt, with ages ranging from 45 Ma to the present. They display an enrichment in LILE and LREE and depletion in Ta-Nb-Ti elements, and have high $^{87}Sr/^{86}Sr$, $^{206}Pb/^{204}Pb$ and low $^{143}Nd/^{144}Nd$ ratios. The dominant factors, controlling petrological and geochemical variations of the primitive K-rich magmas in North Tibet, are thought to be nature of asthenospheric mantle metasomatized and mantle melting processes. Geochemical, geochronological and geophysical characteristics indicate that the continuous northward underthrusting of the thick Indian continental lithosphere following India-Asia collision has given rise to upwelling of hot and weak asthenospheric mantle beneath North Tibet, squeezed up between the advancing Indian lithosphere and the backstop of the rigid Asian continental lithosphere. The asthenospheric upwelling has contributed to uplift of the northern Tibetan Plateau and resulted in synchronous decompression melting of asthenospheric mantle metasomatized by incorporation of subducted sediments into the mantle wedge above a subducted slab of Indian lithosphere during India-Asia convergence. Resultant partial melting of the asthenospheric mantle metasomatized led to formations of the post-collisional primitive potassic and ultrapotassic magmatic rocks of the northern Tibetan Plateau. The consistent occurrences between the post-collisional primitive potassium-rich magmatic rocks and the large-scale uplift of the northern Tibetan Plateau suggest that the primitive K-rich magmatism may be thought as a petrologic record of the Tibetan Plateau uplift.

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