

Diagenetic signatures of the Gaskies glaciation and their implication to the Ediacaran stratigraphy

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The isotopic excursion of inorganic carbon that repeatedly happened in Earth history were linked to biological evolutions and extinctions as well to the significant environmental changes. During the Ediacaran period when multicellular animals dramatically evolved, several distinct isotopic excursions recorded from the stratigraphic sections. The Ediacaran platform in South China exposes well-preserved sedimentary rocks, and high-resolution carbonate carbon isotopic data have been extensively studied (e.g., Sawaki et al., 2010). Although most of the excursions were global, a negative excursion in the middle Doushantuo Formation is unique in South China and presumably correlated with the Gaskiers glaciation (Tahata et al., 2013). These data could have reflected characteristic oceanic structure and influenced by oceanic oxidation in Ediacaran, those causes have been not fully understood. This study investigated a negative excursion observed in the Yangjiaping section in NE Hunan, which records large fluctuation in inorganic carbon isotope (e.g. Kunimitsu et al., 2011). The unique excursion was developed in middle to upper parts of Doushantuo Formation Unit 3. Here, we found that the calcite cement exhibit lower isotopic values than bulk component, by 25 permil for carbon and by 2 permil for oxygen. A reasonable process for these observations was most likely decomposition of organic matter in a meteoric diagenetic environment. Co-occurrence of pyrite implies that the process would be coupled with sulfate reduction in an anoxic condition. Yangjiaping section was located in the shallowest part of the platform together with the famous Wengan section in Guizhou province, and was easily exposed subaerially during the sea-level fall. Some characteristics of this negative excursion were commonly seen in the middle Doushantuo in the type section, and an excursion below the paleokarst in Wengan. Thus, the subaerial exposure was associated with the Gaskiers glaciation in the middle Ediacaran period (580 Ma). Thick phosphoric sediments in the Doushantuo Unit 3 imply intensified upwelling during the glaciation. The Gaskiers glaciation enhances ocean circulation that distributes nutrients and oxygen in the water column and induced the animal evolution in late Ediacaran.

Kunimitsu et al., 2011. *Precambrian Research*, 191, 194-208.

Sawaki et al., 2010. *Gondwana Research* 14, 134-147.

Tahata et al., 2013. *Gondwana Research* 23, 333-353.