

Ordovician carbon isotopic evidence from Yangtze Platform and Tarim Basin, China for a climatic cooling associated with the Great Ordovician Biodiversification Event

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The Great Ordovician Biodiversification Event (GOBE) began ~470 Ma ago in the Early Ordovician, and was terminated by a great mass extinction in the Late Ordovician. The Late Ordovician mass extinction was attributed to the environmental changes associated with the Late Ordovician glaciation. However, the cause of GOBE still remains unclear. According to oxygen isotopic thermometry recorded in conodonts, it is suggested that climatic cooling after a super greenhouse environment could trigger the GOBE in the Early-Middle Ordovician. If so, how did climatic cooling result from the greenhouse environment in the Early Ordovician? We report high-resolution carbon isotopic data from the Yangtze and Tarim areas, China in order to investigate the Ordovician global carbon cycle and climate changes related to the GOBE.

The evaluation of diagenetic alternation and global correlation suggest that those C-isotopic data may record the primary carbon isotopic compositions in Ordovician. Four positive C-isotope excursions were observed in the high-resolution Ordovician $\delta^{13}\text{C}_{\text{carb}}$ curves from the Yangtze Block as well as the Tarim Basin. The positive excursions occurred in the Early Floian, the Early Dapingian, the Early Darriwilian, and the Middle-Late Katian, respectively. Those positive $\delta^{13}\text{C}_{\text{carb}}$ excursions observed in the Floian and the Dapingian indicated increased burial of organic carbon during the Early-Middle Ordovician. The episodic increased burial of organic matter could have drawn down atmospheric pCO_2 and led to a climatic cooling in the Early-Middle Ordovician. The climatic cooling after the greenhouse period could have played an important role in triggering the GOBE.

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