

Comparative study of mass extinction: end-Ordovician and end-Guadalupian extinction events

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Among the so-called Big-5 mass extinctions of the Phanerozoic, those at the end-Permian and end-Ordovician stand out high as the largest and the second largest of magnitude. These two mass extinctions occurred respectively before and after the irreversible big change in the biosphere, i.e. the great land forestization during the Devonian and Carboniferous. Characteristics of these two events are compared for searching possible common causes. The end-Permian extinction was two-folded; i.e. the first at the end of the Guadalupian (Middle Permian) and second at the end of the Permian. Some similarities exist between the end-Ordovician (Hirnantian) event and the end-Guadalupian (Capitanian) event; such as the preferential elimination of sessile biota in tropics, sea-level drop, secular changes in seawater C and Sr isotope ratios. All these observations suggest that the Hirnantian and Capitanian extinctions were triggered probably by global cooling resulted in significant glaciation and sea-level drop, although the cause of the global cooling has not yet been identified. In contrast, their mutual differences in screening pattern of biota etc. suggest that the background conditions were significantly different between the Ordovician and Permian cases. This comparison highlighted similar cause/processes but different background conditions and biotic responses.

Keywords: mass extinction, Ordovician, Permian, global cooling