Climatic change across the Ordovician-Silurian boundary on the Yangtze Platform, South China

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During the Ordovician-Silurian transition, widespread drastic environmental changes took place; the most remarkable of these, in the context of a long-term greenhouse climate, was the abrupt glaciation in Gondwana. However, the intensity and extent of this glaciation and the effect upon the biotic crisis remain controversial.

The parameters of chemical index of alteration (CIA) and chemical index of weathering (CIW) were applied to the paleoclimatic reconstruction of sediments, i.e., when deposited. We collected 64 samples across the Ordovician-Silurian boundary on the Yangtze Platform, South China (Wangjiawan and Nanbazi sections). In Wangjiawan section, the CIA and CIW data are generally high throughout the *D.complexus* and *P.pacificus* graptolitic Zones (72.4-74.6 and 89.2-93.8, respectively) and show a remarkable decrease beginning in the lower *N.extraordinarius-N.ojsuensis* Zone and persisting into the upper *N.extraordinarius-N.ojsuensis* Zone (57.5-66.5 and 64.7-80.8, respectively), with a temporary and drastic positive shift, rise to roughly the same level as in the *D.complexus* and *P.pacificus* graptolitic Zones, just at the *G.persculptus, A.ascensus, P.acuminatus and O.vesiculosus* Zones (70.4-73.4 and 83.1-89.3, respectively). Similar stratigraphic variation of CIA and CIW values were found for the Nanbazi section samples, with 70-73.7 and 86.1-94.2 for the D.complexus and P.pacificus graptolitic Zones, 51.5-69.1 and 60.2-86.4 for the N.extraordinarius-N.ojsuensis Zone, and 70.8-74.2 and 88.3-89.8 for the G.persculptus, A.ascensus, P.acuminatus and O.vesiculosus Zones, respectively.

The investigation of the CIA and CIW shows that most graptolitic Zones were undergo severe weathering under warm and humid climate. The only exception is the *N.extraordinarius-N.ojsuensis* Zone which was less weathered and deposited under glacial sedimentary environments. The apparent stratigraphic coincidence between the biological discontinuity and climate change may imply a cause-effect relationship between them and add a significant constraint to the current arguments on the cause and sequence of the terminal Ordovician mass extinction.

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