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An Ordovician ostracod palaeopsychrosphere?

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ABSTRACT

Ostracods are tiny bivalved crustaceans with a fossil record extending into rocks of the Lower Ordovician. They occupy almost all aquatic environments today, from the ocean abyssal planes to damp forest leaf litter. Their stratigraphical record suggests they had diversified into a wide range of marine and non-marine habitats already during the Palaeozoic. Through the Ordovician, ostracods are mostly known from marine shelf depositional settings. These are mostly podocope ostracods that appear to have had a benthic mode of life like their modern counterparts; myodocope ostracods, though known from the Ordovician, likely became pelagic only in the Silurian. As they are considered benthic, and possessed no pelagic larval stage, Ordovician podocope ostracods have been widely used as key biogeographical index species for much of the early Palaeozoic.

A fundamental question in the oceanographic evolution of ostracods is: when did a psychrosphere evolve (a fauna inhabiting cool waters below the thermocline)? A psychrospheric ostracod fauna in the Ordovician would question some of their biogeographic utility, given that such taxa might have a much wider dispersal capability than more shallow shelf faunas. Here we describe a new ostracod fauna from a palaeotropical South China plate setting, preserved in Upper Ordovician mudstones and siltstones from northern Vietnam. The fauna contains taxa endemic to the South China palaeoplate, but also yields several taxa at the generic level that are known from European and North American Ordovician settings. We discuss whether these latter taxa might be indicative of a more widely dispersed deeper marine psychrospheric Ordovician ostracod fauna, and the implications this would have on traditional biogeographic models. We also discuss other possibilities for these apparently more cosmopolitan taxa, including homeomorphy, previously unknown palaeogeographical connections, and the possibility of pelagic podocope taxa.

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