New conodont faunas and two proposed conodont evolutionary lineages improve the accuracy of global correlation to Induan-Olenekian Boundary (Lower Triassic)

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Abstract

A precise global timescale for the Lower Triassic series is essential to understand the sequence of events following the end-Permian mass extinction crisis. A crucial step toward providing the necessary high-resolution chronostratigraphic framework for this interval will be the final resolution of a long-disputed Global Stratotype Section and Point (GSSP) for the base-Olenekian. Lower Triassic conodont biostratigraphy has been studied around the world in the past decades and significant recent progress on the recognition of evolutionary lineages is leading to a refined definition. The worldwide distribution of *Novispathodus waageni* sensu lato has been proposed as the marker for the IOB, and another species *Eurygnathodus costatus* represents a significant auxiliary marker. In this study, we report two conodont lineages based on new collections from South China with comparisons to other regions where only one or the other lineage is present. The south China sections yield abundant conodonts throughout the Lower Triassic and the Chaohu section is a well-studied GSSP candidate section for the Induan-Olenekian boundary; it exhibits continuous sedimentation in which transitional morphotypes are recognized. One evolutionary lineage starts with a segminate ancestor and ends with an unornamented platform, and includes *Sweetospathodus kummeli* → *Eurygnathodus costatus* → *Eurygnathodus* sp. D → *Eurygnathodus hamadai*. The second lineage is *Neospathodus dieneri* Morphotype 3→*Nv. waageni eowaageni* Morphotype A→*Nv. waageni waageni*. The integration of both lineages provides the basis for global correlation and eliminates the possibility that the first occurrence of species in one lineage or the other is simply a migration event. In addition, two new conodont species *Neospathodus yangtzeensis* and *Novispathodus shani* were recognized from South China (Jianshi; Chaohu, and Zuodeng) and Oman. We propose to establish the *Ns. yangtzeensis* Zone and/or *Nv. shani* Zone (or a corresponding *Ns. yangtzeensis-Nv. shani* Assemble Zone) in those regions since their wide paleogeographic distribution in Paleotethys and Panthalassic oceans.

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Which can significantly improve the accuracy of stratigraphic division and correlation of the Smithian and also play a role in restricting the IOB interval by their approximate early-middle Smithian interval age diagnostic occurrences.

Keywords: Early Triassic, conodont evolutionary lineage, GSSP, Induan, Olenekian Boundary, South China