

ENVIRONMENTAL CONTROLS ON THE RECOVERY FOLLOWING THE END-PERMIAN MASS EXTINCTION – NEW INSIGHTS FROM JAPAN

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The Hiraiso Formation of northeast Japan represents an important and underexplored archive of Early Triassic marine ecosystems following the end-Permian mass extinction. Here, I present a palaeoecological analysis of its benthic faunas in order to explore the temporal and spatial variations of diversity, ecological structure and taxonomic composition. The ichnofossils from the Hiraiso Formation show an onshore-offshore trend with high diversity and relatively large faunas in offshore transition settings, but a low diversity of small ichnofossils in basinal settings. The body fossils do not record either spatial or temporal changes, which is likely a consequence of the shell beds representing allochthonous communities due to wave reworking. The dominance of small burrow sizes, presence of key taxa, presence of complex trace fossils, and both erect and deep infaunal tiering organisms suggests that the benthic fauna from the Hiraiso Formation represents an advanced stage of recovery for the Early Triassic, but not full recovery. The ecological state suggests a similar level of recovery to other Spathian communities and that globally the Spathian marks an important recovery interval. The onshore-offshore gradient is also consistent with onshore-offshore ecological gradients known to be controlled by oxygen gradients in modern tropical and subtropical settings. The lack of observed full recovery is likely a consequence of persistently hot Early Triassic temperatures and the lack of a steep temperature/water-depth gradient in shallow marine settings.