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192-11: THE RECOVERY OF LIFE AT GROUND ZERO

Tuesday, 24 October 2017**11:25 AM - 11:45 AM**📍 *Washington State Convention Center - Ballroom 6A*

The asteroid impact that formed the Chicxulub Crater caused the extinction of ~75% of genera on Earth and marks the end of the Mesozoic Era. Although the global pattern of recovery following this mass extinction has been well-described, core samples within the crater collected by IODP Exp. 364 provide the first opportunity to study primary succession in a large impact crater, and provide a test of several hypotheses about the extinction, specifically, whether metal toxicity was a significant kill mechanism and that these environmental effects were stronger closer to the crater. Here, we document the recovery of planktic and benthic foraminifera, calcareous nannoplankton, calcispheres, and trace fossil forming organisms.

The top of the impact sequence at Site M0077 is characterized by a transition from suevite breccia to an 80 cm brown fine-grained micrite, which is overlain by white Danian limestone. This 80 cm transitional unit contains reworked Cretaceous foraminifera and nannoplankton. Maastrichtian foraminifera are most diverse and abundant at the base of the unit and decline upsection. Toward the top of the unit, foraminifer species known to survive the boundary come to dominate a depauperate assemblage. The nannofossil assemblage is dominated by Cretaceous taxa of highly variable size and preservation, with rare survivor species. The upper 20 cm of the transitional unit is also characterized by the first appearance of trace fossils. The lowest sample in the limestone contains a foraminifer assemblage indicative of the base of Zone P α , approximately 30 kyr after the impact. This level also contains a diverse assemblage of benthic foraminifera, indicating normal seafloor conditions, both in terms of organic matter flux and temperature, which suggests the impact-generated hydrothermal system was not strong enough to prevent the colonization of the seafloor by benthic life. Geochemical proxies also indicate a quick recovery of marine productivity at the base of the limestone unit. With the exception of a small increase near the top of the transitional unit, potentially toxic metals (Cu, Cr, Fe, Zn) are not elevated throughout the study interval. The rapid recovery (within 30 kyr) of life within the crater indicates that proximity to the impact was not a significant factor in the geographic pattern of recovery.

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