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192-7: THE “TRANSITIONAL LAYER”: AN EVENT BED THAT REPRESENTS THE IMMEDIATE AFTERMATH OF THE CHICXULUB IMPACT

Tuesday, 24 October 2017
10:05 AM - 10:25 AM
Washington State Convention Center - Ballroom 6A

IODP-ICDP Site M0077 sampled high-energy impact-related units deposited on top of the peak ring of the Chicxulub crater. Drilling recovered an expanded sequence of suevite including an interval deposited by ocean water invasion. Immediately above the suevite, and directly below lowermost Paleocene limestone, is an 80-cm interval of a dark brown, highly calcareous mudstone and siltstone. We hypothesize that this interval was deposited by currents as well by settling of fine debris from the overlying water column over a period of hours to years post impact. The “transitional layer” includes a mixture of reworked Cretaceous foraminifera and nannoplankton as well as rare survivors and trace fossils. This interval thus contains a potentially unique record of immediate post-impact environments and species recovery.

Our investigation is focused on the composition and depositional history of the “transitional layer”. The unit contains fine laminations that suggest deposition by currents, and illustrate moderate degree of fining upward; CT scans also show a minor slump and trace fossils near the contact with the lowermost Paleocene limestone. The combination of grain size and CT scans allows us to determine the importance of settling and current activity in different parts of the “transitional layer.” Smear slides show a predominance of 1-10 micron sized micrite. The euhedral form of the micrite particles indicates growth in the water column and we speculate that this occurred as a result of oversaturation following the impact. Highly negative bulk carbonate oxygen isotope values suggest that this water was relatively fresh or warm. In progress clumped isotope measurements will further constrain the temperature of formation of this calcite.

Fragments of very high rank charcoal are found throughout the “transitional layer” but concentrated in cm-thick layers near its base and at its top. These fragments were probably produced by post-impact wildfires. Ongoing He isotope measurements will help constrain the duration of the “transitional layer”. The stratigraphy, composition, ichnology and geochemistry of the unit provide a basis for interpreting the fossil record that has the potential to provide a window into the recovery of life in the immediate aftermath of the Chicxulub impact.

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