AGU 100 ADVANCING EARTH AND SPACE SCIENCE | FALL MEETING
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PP51D-1171: Long-Term Recovery of Life in the Chicxulub Crater

Friday, 14 December 2018
08:00 - 12:20
Walter E Washington Convention Center - Hall A-C (Poster Hall)

At the end of the Cretaceous Period (66 Ma), the impact of a meteorite on the Yucatán platform in the southern Gulf of Mexico caused the extinction of 75% of species on Earth, including 90% of planktic microorganisms like foraminifera and calcareous nannoplankton. As the ocean ecosystem struggled to get back on its feet after this calamity, the recovery of marine primary productivity was geographically heterogeneous. Some authors had speculated that this heterogeneity was driven by the uneven distribution of toxic metals in the ocean, and was directly related to distance from the Chicxulub crater. However, results from recent International Ocean Discovery Program/International Continental Drilling Program (IODP/ICDP) joint Expedition 364, which drilled the Chicxulub crater itself, found evidence of the rapid establishment of a healthy, high-productivity ecosystem in the crater within 30 kyr of the impact. This result suggests that the recovery of marine productivity is likely driven by ecological factors like incumbency and competitive exclusion. However, it also raises several additional questions: How long does high productivity last in the crater? Is this high productivity driven by the impact-generated hydrothermal system or is it a Gulf-wide phenomenon? If so, what's driving it?

Here, we examine planktic and benthic foraminifera, calcareous nannoplankton, major, minor, and trace elements, and stable isotopes from the Paleocene interval of IODP Site M0077 in the Chicxulub Crater, and compare it to publically available planktic foraminifer and nannoplankton counts from three oil wells in the northern Gulf of Mexico to determine the long term trends in productivity in the Chicxulub Crater and whether or not they are limited to the crater or extend across the Gulf. We show that the first ~million years of the Paleocene are characterized by eutrophic surface waters that slowly transition to mesotrophic and then oligotrophic by the middle Paleocene. Foraminiferal data from the northern Gulf of Mexico demonstrates that this trend is regional.

Authors

Chris Lowery
University of Texas at Austin

Heather Jones
Pennsylvania State University Main Campus

Timothy J Bralower
Pennsylvania State University Main Campus

Michael T Whalen
University of Alaska Fairbanks

Ligia L Perez-Cruz
Univ. Nal. Auton. de Mexico

Catalina Gebhardt
AWI Bremerhaven

Kosei E Yamaguchi
Toho University

Marcie Purkey Phillips
University of Texas, Institute for Geophysics

John Snedden
University of Texas at Austin

Scientific Team: IODP Expedition 364 Scientists

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