

**22-25 October**
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192-5: FIRST DAY OF THE CENOZOIC: PROCESSES RECORDED WITHIN THE CHICXULUB CRATER AT IODP-ICDP SITE M0077

Tuesday, 24 October 2017**09:25 AM - 09:45 AM**📍 *Washington State Convention Center - Ballroom 6A*

International Ocean Discovery Program (IODP)- International Continental Scientific Drilling Program (ICDP) Expedition 364 drilled into the offshore portion of the Chicxulub impact crater in April-May, 2016. Site M0077 recovered core from 505.7-1334.73 m from Chicxulub's topographic peak ring and overlying strata providing a unique setting for examining the Cretaceous-Paleogene (K-Pg) boundary deposit within the crater. The bulk of the cored interval of the peak ring at Chicxulub consists of granitoids originating from mid-crustal depths which are overlain by ~130 m thick sequence of impact melt rock and breccias (suevite). The contact between impact melt rock (Unit 3) and suevite (Unit 2) is gradational as indicated by partially digested clasts within an impact melt rock matrix overlain by 10 m thick sequence with large clasts (Unit 2C). These are impactites that initially stayed within the transient cavity and were dynamically emplaced onto the peak ring immediately after its formation and prior to reentry of ocean waters. Upsection Unit 2B includes a 30 m thick section with similar clast sizes followed by a 15 m thick upward fining section. The consistent clast size is consistent with emplacement without settling through water whereas the fining upward sequence may indicate emplacement through the ocean waters that re-entered the Chicxulub basin within 10s of minutes. To examine the role of water we utilize machine learning algorithms to analyze grain shape, for which rounding is used as an indicator of transport by resurge. Across an erosional surface, the suevite of Unit 2A (~45 m thick) includes a reverse graded section followed by a fining upwards section overlain by sand-sized suevite with successive zones upsection of faint layering, possible cross bedding, and then clear dipping layers and cross-cutting beds. These observations suggest a complex series of resurge events (tsunami and/or seiches) probably occurred for several or many hours after impact. In order to investigate clast lithology to assess depth of excavation for differing units within the suevite, we employ machine learning algorithms to classify the type and shape of clasts within the suevite section. A key result is an apparent absence of evaporite clasts within the suevite despite being a volumetrically important target rock lithology.

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