The Chicxulub Impact - the End of an Era

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In 1980 Luis Alvarez and co-workers published an article asserting that a large body hit Earth ~66 million years ago and caused the most recent mass extinction, which notably included the dinosaurs.

The evidence for impact was the extraterrestrial composition of a thin clay layer at the boundary between the Mesozoic and Cenozoic Eras. This became known as the "Impact hypothesis", and was categorically dismissed by many geologists at the time, on the grounds that only two locations had been studied and the clay layer at these sites might be atypical or just unusual but terrestrial, and that the extinction was gradual and started before the impactor hit Earth. This boundary clay has now been studied at many sites around the world and is clearly formed from impact ejecta – material from the asteroid and impact site that has been ejected around the globe. Studies of small fossils in marine sediments, for which the fossil record is more reliable due to high numbers, show that life was thriving and the oceans productive immediately before impact and collapsed precisely at the boundary clay layer. The cause of the extinctions is still not widely agreed, but it is fairly certain that the impact triggered a nuclear winter – an extended period (3-14 years) when the entire Earth was cold and dark, which is likely to have been catastrophic for photosynthetic life.

It took over 10 years to find the impact site – the crater is buried beneath the surface of the Yucatán continental shelf, Mexico, and has a minimal surface expression. Geophysical methods have been used to image the crater and determine its size (~200 km in diameter) and structure. In 2016 we drilled into the impact crater to investigate large crater formation, recovery of life at the impact site (ground zero), habitability of the crater, and improve estimates of the climatic effects of this impact.