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Lowering the Boom? Impact crater may predate extinction of the dinosaurs

Sid Perkins March 6, 2004

Analyses of sediments from hundreds of meters beneath the Yucatán suggest that an extraterrestrial object's impact there more than 65 million years ago—the punch that many scientists propose wiped out the dinosaurs—actually happened about 300,000 years before those mass extinctions occurred. Many researchers reject the new conjecture, however.

At the heart of the debate is a 1.5-kilometer-long rock core that scientists drilled 2 years ago at a site 40 km southwest of Mérida, Mexico. That spot is near the edge of a gravitational and magnetic anomaly that many scientists interpret as a long-buried, 180-km-wide pockmark—the Chicxulub crater—that resulted from a space rock's hit.

The deepest rocks in the core were deposited in a shallow marine environment, says Gerta Keller of Princeton University. Atop those undisturbed sediments is a 100-meter-thick layer of rock fractured by the space rock's impact, she and her colleagues report. Large rocks in the top 15 m of that layer are mixed with stones and pebbles that gradually decrease in size toward the highest levels of the stratum—a sign that this material was suspended in strong ocean currents in the aftermath of the impact, she asserts.

Just above this jumbled layer lies a 50-centimeter-thick section of finely laminated sediments, capped by an iridium-rich layer that elsewhere in the world is associated with the mass extinctions of 65 million years ago. Keller and her colleagues contend that those intervening sediments were laid down over millennia, so the Chicxulub impact and the one associated with the dinosaur die-offs were separate events. The researchers make their case in an upcoming Proceedings of the National Academy of Sciences.

First, they say, within the 50-cm section of finely laminated rocks lie three thin layers of a greenish mineral called glauconite, an iron-rich silicate that is typically a sign of slow sediment accumulation. Features preserved in the material just beneath each sheet of glauconite appear to be burrows, possibly left by sediment-dwelling invertebrates. Keller regards this as another sign of slow deposition on the seafloor.

Furthermore, magnetic characteristics of the sediments, which recorded the direction of Earth's magnetic field at the time they were laid down, indicate that they were deposited before the mass extinctions. Keller suggests that the ratios of carbon isotopes present in the rocks, as well as the distinctive fossils of microscopic marine plankton in those layers, back up that time line. "It all fits," she says.

The team's findings confirm some observations noted in sediment cores obtained in the area during oil exploration in the early 1970s, says Paul Wignall of the University of Leeds in England. Other researchers, however, seriously question the new interpretations. David A. Kring of the University of Arizona in Tucson, who has examined samples from the same core, says that many of the

microscopic items described by Keller as fossils are actually mineral crystals.
In sediments elsewhere, the iridium-rich layer marking the mass extinctions lies directly atop the layer of debris blasted out of the impact crater, says Alan R. Hildebrand of the University of Calgary in Alberta. The presence of intervening sediments in the core that Keller studied is a testament to the chaotic environment within the Chicxulub crater just after the impact occurred, he proposes. Large amounts of sediment near the impact could have slumped or washed into the hole in hours or days, glauconite layers and all.

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References:

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Further Readings:

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