Did a massive comet explode over Canada 12,900 years ago and start an ice age?

Curious Cat Science and Engineering Blog

I think it is important to increase scientific literacy. One thing that is greatly misunderstood is the process for new scientific explanations being accepted by the scientific community. It is often quite a drawn out process over years (and for the explanation provided in this paper the debate is certainly still ongoing [1]). And for issues that really shake up past explanations it can take decades and be quite contentious. I think posts tagged with “scientific inquiry” are a very interesting collection to explore.

It is important to understand the difficulty in providing evidence that satisfies the overwhelming majority of the scientific experts in any area. And it is important to understand the claims in one (or numerous papers) are not the accepted proven wisdom of the scientific community. Thankfully the process is rigorous. While mistakes can still be made, the evidence needed to substantiate a scientific hypothesis is significant. Their is still plenty of room for position to color accepted scientific wisdom. A respected professor is often able to make a claim that is more readily accepted and even more-so for to insist the new claims do not provide enough evidence in support of them to accept the new claims and have there position accepted (even when it really shouldn’t be looking just at the facts).

Topper site in middle of comet controversy [2]
Firestone found concentrations of spherules (micro-sized balls) of metals and nano-sized diamonds in a layer of sediment dating 12,900 years ago at 10 of 12 archaeological sites that his team examined. The mix of particles is thought to be the result of an extraterrestrial object, such as a comet or meteorite, exploding in the earth’s atmosphere. Among the sites examined was USC’s Topper, one of the most pristine U.S. sites for research on Clovis, one of the earliest ancient peoples.
“This independent study is yet another example of how the Topper site with its various interdisciplinary studies has connected ancient human archaeology with significant studies of the Pleistocene,” said Goodyear, who began excavating Clovis artifacts in 1984 at the Topper site in Allendale, S.C. “It’s both exciting and gratifying.”
Younger-Dryas is what scientists refer to as the period of extreme cooling that began around 12,900 years ago and lasted 1,300 years. While that brief ice age has been well-documented – occurring during a period of progressive solar warming after the last ice age – the reasons for it have long remained unclear.

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Firestone's team presented a provocative theory: that a major impact event – perhaps a comet – was the catalyst. His copious sampling and detailed analysis of sediments at a layer in the earth dated to 12,900 years ago, also called the Younger-Dryas Boundary (YDB), provided evidence of micro-particles, such as iron, silica, iridium and nano-diamonds. The particles are believed to be consistent with a massive impact that could have killed off the Clovis people and the large North American animals of the day. Thirty-six species, including the mastodon, mammoth and saber-toothed tiger, went extinct.
The scientific community is rarely quick to accept new theories. Firestone's theory and support for it dominated the annual meeting of the American Geophysical Union and other gatherings of Paleoindian archaeologists in 2007 and 2008.

However, a 2009 study led by University of Wyoming researcher Todd Surovell failed to replicate Firestone's findings at seven Clovis sites, slowing interest and research progress to a glacial pace. This new PNAS study refutes Surovell's findings with its lack of reported evidence.

"Surovell's work was in vain because he didn't replicate the protocol. We missed it too at first. It seems easy, but unless you follow the protocol rigorously, you will fail to detect these spherules. There are so many factors that can disrupt the process. Where Surovell found no spherules, we found hundreds to thousands," said Malcolm LeCompte, a research associate professor at Elizabeth City State University and lead author of the newly released PNAS article.
LeCompte began his independent study in 2008 using and further refining Firestone's sampling and sorting methods at two sites common to the three studies: Blackwater Draw in New Mexico and Topper. He also took samples at Paw Paw Cove in Maryland, a site common to Surovell's study.

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