Mammoths, Meteors, Supernovae

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Simultaneously, ≈12,900 years ago, the mammoths, megafauna, and Paleo-Indians in the Americas disappeared and the Earth suddenly cooled by 10°C, staying cold for 1300 years, an era called the Younger Dryas (YD). At the same time massive fires burned and a ubiquitous black mat began depositing across the Americas and into Europe. Investigation of the sediment layer directly beneath the black mat revealed high concentrations of metallic and carbon microspherules, and radioactivity. Prompt and delayed neutron activation analysis (PGAA/NAA) of the metallic spherules showed that they are rich in iridium, titanium, and water, while analysis of the carbon spherules found that they are rich in Fullerenes and nanodiamonds. This evidence is inconsistent with any known terrestrial process but consistent with a comet or meteor impact. Evidence has since be found in dozens of sites extending over North and South America, Europe, and the Middle East, suggesting that there were a cluster of impacts, possibly resulting from an encounter with the Taurid Complex debris field.

Following up on this research we investigated ice age fossils from Beringia for evidence of an impact and found specimens containing metallic particles embedded at high velocity on only one side. NAA and XRF analysis of the particles found an iron/nickel composition similar to common meteorites but very different from the YD impact layer. These fossils were dated to ≈37,000 years ago and associated with a different impact, possibly in Alaska. Investigation of the radiocarbon record showed a substantial increase in global ^{14}C corresponding with the Younger Dryas impact. Other recent meteorite impact events also show a ^{14}C increase suggesting that impacts may induce nuclear fusion. Even larger increases in radiocarbon, uncorrelated with impacts, were observed in the ^{14}C record. These increases are found to be due to near-Earth (<250 pc) supernovae. Combined with an analysis of the ^{10}Be cosmogenic isotope record, a total of 22 prehistoric supernovae have been identified during the past 300,000 years. Our research continues with the investigation of Alaskan loess deposits containing mammoth, megafauna and tree fossils broken and mixed together by some catastrophic event.