



Faulty protocols yield contaminated samples, unconfirmed results

LeCompte et al. (1) reported abundant magnetic microspherules from three Younger Dryas Boundary (YDB) sites, which they concluded are consistent with those interpreted by Firestone et al. (2) as markers of extraterrestrial impacts or airbursts. LeCompte et al. argued that the negative results of Surovell et al. (3)—who did not observe microspherules—must have been because of a deviation from an analytical protocol of A. West that is required to observe them. A. West developed and refined various protocols that enabled him to prepare samples in which putative impact markers have been reported. Samples collected by others have failed to reproduce his findings.

Magnetic microspherules are only one of a large suite of professed impact markers found in samples prepared by A. West, and the LeCompte et al. (1) result must be put into context. The most celebrated example was the report of hexagonal nanodiamonds in Greenland ice samples collected for a television program in 2008 (4), prepared by A. West using a nonstandard protocol. This result was never confirmed, and repeated requests for samples have been denied. A. West stated that samples were limited and would be provided to other researchers. However, no other researcher has reported receiving a sample, and no participants of any subsequent expedition to Greenland have reported locating the layer or collecting samples.

Boslough et al. (5) did acquire carbon microspherules that A. West prepared from the Gainey site in Michigan, one of nine key YDB sites for which Firestone et al. (2) presented marker evidence. One microspherule was dated and yielded a radiocarbon age of 207 ± 87 y BP. This result suggests that A. West's protocols and sample preparation methods do not eliminate contaminants that are unrelated to the YDB or to an impact. Unfortunately, no samples from the LeCompte et al. (1) study are available for distribution to test for this possibility.

Finally, the protocol for the blind study was not revealed, nor the identity of the nonparticipating third party who was responsible for preparing, repackaging, and distributing the blind samples. The article described itself as an “independent blind evaluation.” However, there is overlap in the authorship of LeCompte et al. (1) and Firestone et al. (2). Without full disclosure of individuals and their involvement, it is not possible to confirm independence. Blind protocols and techniques can vary, depending on applications that range from drug testing to high-energy physics. LeCompte et al. (1) did not refer to their study as double-blind, which is conventionally applied to research involving human subjects to control for placebo effects. M. LeCompte revealed that it was indeed double-blind but failed to provide details. In physical sciences, the meaning of “double-blind” is ambiguous. Only when all protocols are precisely

defined, all key collaborators identified, and materials made available, can the LeCompte et al. (1) results be properly evaluated to determine whether or not they are consistent with and fully independent of Firestone et al. (2).

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1 LeCompte MA, et al. (2012) Independent evaluation of conflicting microspherule results from different investigations of the Younger Dryas impact hypothesis. *Proc Natl Acad Sci USA* 109(44): E2960–E2969.

2 Firestone RB, et al. (2007) Evidence for an extraterrestrial impact 12,900 years ago that contributed to the megafaunal extinctions and the Younger Dryas cooling. *Proc Natl Acad Sci USA* 104(41): 16016–16021.

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4 Kurbatov, et al. (2010) Discovery of a nanodiamond-rich layer in the Greenland ice sheet. *J Glaciol* 56(199):749–759.

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