

# Reply to Boslough: Is Greenland Pt anomaly global or local?

Besides providing additional arguments against the Pt depositing event (1) as a cause of the Younger Dryas cooling, Boslough's letter (2) raises an important question about the scale of this event. Indeed, a localized deposition of Pt by the Cape York meteorite shower is an attractive hypothesis considered by us initially (3), but abandoned because of (i) a large difference in the Pt/Ir ratios between the Cape York iron and the Pt anomaly in the GISP2 ice core, and (ii) a long ingrowth time of the anomaly ( $\sim 20$  y), significantly exceeding the expected lifetime ( $\sim 5$  y) of fine dust in the atmosphere. Such a long ingrowth time is unlikely to result from a later disturbance of ice because both chemical (sulfate) and particle (volcanic ash) spikes induced by volcanic eruptions before and after the Pt anomaly are typically contained within a thin ice layer deposited over 1–2 y. Therefore, the

alternative assumed by us is either an abnormally high dust suspension time in the stratosphere or multiple injections of Pt-rich materials to the atmosphere, or both. In either case, a global anomaly is expected.

We believe that the controversy about the scale of the Pt-depositing event, whatever its nature was, could only be resolved by additional analyses of ice samples from Greenland and other localities worldwide. Moreover, given the very high Pt concentrations at the anomaly, such analyses can be successfully performed on ice samples as thin as  $\sim 1$  cm, potentially allowing establishing a finer structure of the Pt anomaly with  $\sim 0.5$ -y resolution. Such data can be used to test whether the Pt anomaly was caused by multiple injections of Pt-rich materials. Currently, there is only a slight hint for an additional smaller peak within the Pt anomaly (figure 1 in ref. 1).

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**1** Petaev MI, Huang S, Jacobsen SB, Zindler A (2013) Large Pt anomaly in the Greenland ice core points to a cataclysm at the onset of Younger Dryas. *Proc Natl Acad Sci USA* 110(32):12917–12920.

**2** Boslough M (2013) Greenland Pt anomaly may point to noncataclysmic Cape York meteorite entry. *Proc Natl Acad Sci USA* 110:E5035.

**3** Petaev MI, Huang S, Jacobsen SB, Zindler A (2013) Large platinum anomaly in the GISP2 ice core: Evidence for a cataclysm at the Bolling-Allerød/Younger Dryas boundary? *44th Lunar and Planetary Science Conference, March 18–22, 2013*, Abstract #1046 (Lunar and Planetary Institute, Houston).

Author contributions: M.I.P., S.H., S.B.J., and A.Z. wrote the paper.

The authors declare no conflict of interest.

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