Reply: Were last glacial climate events simultaneous between Greenland and France? A quantitative comparison using non-tuned chronologies


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We thank Austin and Abbott (2009) for clarifying the role of the NAAZ II tephra in the debate on the synchronicity of past events of climate change (Blaaauw et al., 2009). Independently identified tephra layers could indeed prove vital in resolving the spatiotemporal pattern of Dansgaard–Oeschger events. However, there are still some caveats regarding the reliability of this tephra in marine and ice cores.

The NAAZ II tephra, caused by multiple eruptions, consists of one rhyolithic and up to four basaltic components (Wastegård et al., 2006). Austin et al. (2004) report a well-defined rhyolithic NAAZ II tephra layer in their marine core. However, other studies such as that of Wastegård et al. (2006) report more mixed populations, including a common basaltic component, at each analysed depth. Therefore not all studies can establish a similar level of certainty that the rhyolithic component of NAAZ II is not icerafted to their sites, resulting in less reliable depths and ages of this tephra.

The age for the NAAZ II rhyolithic tephra in Greenland ice was based on layer counting of the NGRIP core (GICC05; Svensson et al., 2006). However, while this tephra layer has been identified geochemically in other Greenland ice cores (Grönvold et al., 1995; Zielinski et al., 1997), to our knowledge no independent geochemical characterisation has yet been published for NGRIP. Therefore, no matter how plausible, the NGRIP/GICC05 age for the rhyolithic NAAZ II remains indirect.

Finally, even if the NAAZ II tephra could be used to ensure that one single event of climate change occurred simultaneously across a region (Dansgaard-Oeschger event 15), this does not necessarily mean that other climate events were synchronous as well. In other words, one swallow doesn’t make a summer.

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References


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