



Kamchatkan ash found on Svalbard: towards pan-arctic tephra synchronization

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Rapidly deposited and geochemically distinct volcanic ash (tephra) markers represent a powerful chronological tool that enables precise dating and correlation of geological archives. Recent analytical advances now allow fingerprinting of non-visible ash (cryptotephra) over thousands of kilometres. This opened up tantalizing possibilities for the intercontinental synchronization of records. We present geochemical (electron microprobe) evidence to demonstrate that ash from a radiocarbon-dated Svalbard lake sediment sequence correlates to the Kamchatkan Ksudach 2 (KS2) eruption (± 7300 cal. yr BP). By expanding the known dispersal range of volcanic ash and reporting the first known marker transported across three continents, this study advances the field of tephra analysis. Moreover, linking the Pacific and Atlantic, the detection of Kamchatkan ash on Svalbard raises the prospect of synchronizing paleoclimate records around the Arctic. Owing to its coincidence with the Holocene Thermal Maximum (HTM), a global time-transgressive warming event that may serve as a potential reference for the future, the reported KS2 marker enables us to better understand the spatio-temporal pattern of ongoing Arctic climate change. Finally, this study highlights the importance of looking beyond proximal volcanic sources to correlate tephra horizons.