High-resolution Holocene Paleomagnetic Secular Variation Records from Iceland: Towards Marine - Terrestrial Synchronization

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Paleomagnetism offers the unique potential for marine – terrestrial correlation. Here we explore this potential using the paleomagnetic secular variation records recovered from Icelandic Holocene marine and lacustrine sediments. Long cores were collected from two Icelandic lakes, Haukadalsvatn (HAK03) and Hvitarvatn (HVT03). The marine core MD99-2265 is from an inlet fjord, Jokulfirðir with Holocene sedimentation rates of 1 m/kyr.

The paleomagnetic records were studied from u-channel samples measured on the longcore cryogenic magnetometers at the Paleomagnetism Laboratories at University of Florida and at the University of California, Davis. HAK03 preserves a strong (NRM > 0.5 A/m), stable (MAD < 1), low coercivity (< 10% of the NRM remained after 60 mT AF demagnetization) magnetization consistent with magnetite as the remanence carrier. HVT03 also preserves a strong (NRM > 0.5 A/m) and stable (MAD < 2) magnetization, though the coercivity is significantly higher (30-50% of the NRM after 60 mT AF), resulting from finer grain sizes and/or more felsic source rocks. The Holocene sections of the marine core MD99- 2265 also preserve a strong (NRM >0.1 A/m), stable (MAD <1.5) and low coercivity (<10% of the NRM after 60 mT AF) magnetization.

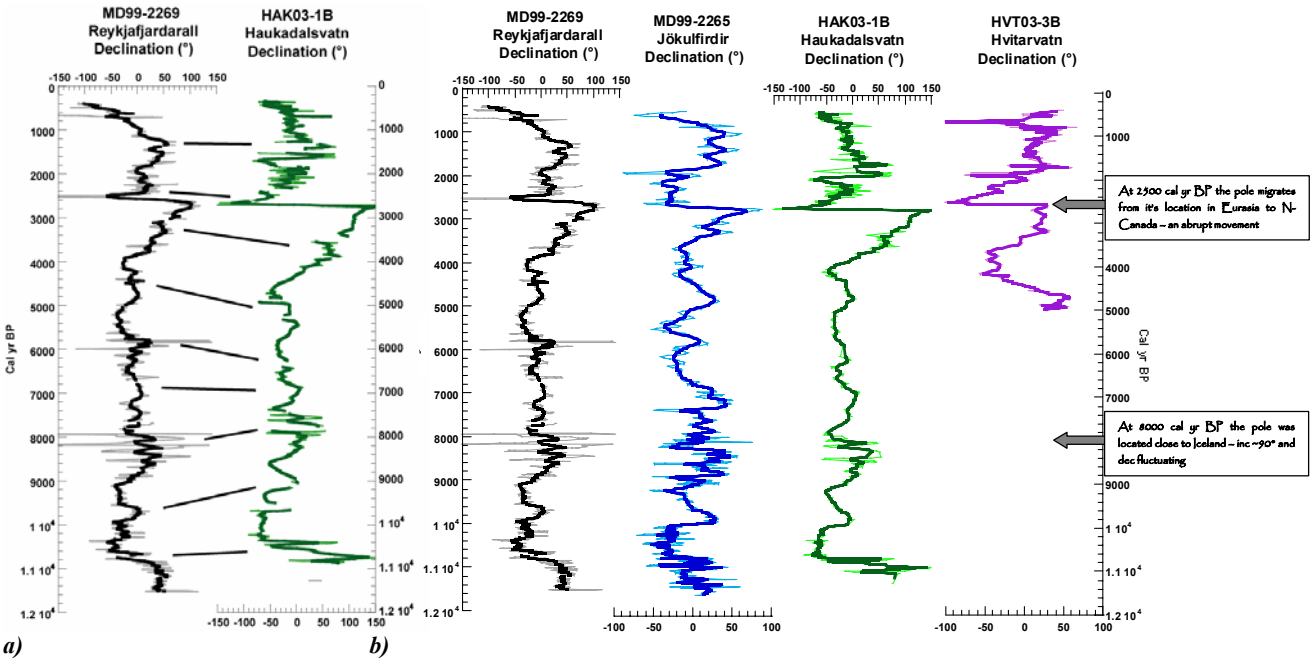

Fig 1. ***a)*** *The black & green curves are declination recorded in core MD99-2269 (the master curve) and core HAK03 on its own independent timescale. The black lines point to synchronized pole movements showing up in both records that can be used to correlate the records.* ***b)*** *Core MD99-2265, HAK and HVT have been correlated to MD99-2269 giving us the opportunity to revise our age models.*

Initial correlations identify at least ten major declination features, which are distinctive and correlative among the three independent PSV records. These are used to synchronize events between these different environments. The PSV recorded by the lacustrine and marine sediments show characteristics in declination that can be correlated to the well-dated PSV curve (MD99-2269) which serves as the PSV template for this region. Valuable information about the paleomagnetic behavior has also been gained by these high resolution records. The PSV records from Iceland indicate that the magnetic pole was located close to Iceland at 8000 cal yr BP and at 2500 cal yr BP the pole migrated very abruptly from its former position in Eurasia to N-Canada.