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A high resolution, multi-proxy approach to the reconstruction of the Holocene palaeoclimate of northwest Iceland.

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Fjords are transition regions between land and the open ocean. Thus their sedimentary records afford the opportunity to study marine and terrestrial palaeo-climatic changes and therein studying interactions of, and linkages between the two environments. Additionally, fjordic environments typically have a higher sediment accumulation rate than deeper ocean sites, therefore providing archives which, when sampled at an appropriately high resolution, show rapid climate change (RCC) events during the Holocene which can be compared against 20th century climate change.
During the early Holocene and deglaciation the (sub)polar regions have been shown to be sensitive to climate change (Yu et al., 2010). Two periods of cool climate after the Younger Dryas highlight the sensitivity of that region, the 8.2 and the 9.3 ka events (Alley & Ágústsdóttir; Yu et al., 2010). Both were likely caused by freshwater flooding into the Atlantic Ocean. In respect to current climate change it is important to study these events to better understand possible effects which the increased melting of the Greenland ice sheet may have on ocean circulation and the climate of the North Atlantic margins.
Additionally it is important to study more recent RCC events such as the little ice age and the medieval warm period to disentangle natural climate change from that caused by anthropogenic influences. Recent RRC events, even though they represent periods of small climatic change compared to that of glacial/interglacial change, had marked effects on human societies and populations (Mayewski & White, 2002).
Alkenones and terrestrial leaf wax components from a sediment core (MD99-2266) from the mouth of Ìsafjarðardjúp were studied to produce a high resolution record of Holocene climate change between 10700 calibrated years before present (cal. a BP) and 300 cal. a BP. For more information on the core see Quillmann et al., 2010. Over the first 2000 cal. a BP and from 7300 to 8800 cal. a BP the sample density is 1 sample/25 years. The rest of the sediment core was sampled at 1 sample/50 years. The average chain length (ACL) of terrestrial n-alkanes indicating changes in aridity and/or ecological turnover, and the Alkenone Unsaturation Index UK'37 representing changes in sea surface temperature, exhibit remarkably similar trends over the studied time period into which RCCs are embedded. Moreover, the biomarker record shows similarities with GISP 2 oxygen isotope records (Johnsen et al., 1992) and chloride concentrations (Mayewski & White, 2002).

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