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Fjord sediment archives: assessing the recent (post LGM) millenial to sub-decadal scale variability of marine and continental climates in the northeastern North Atlantic

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Norwegian and Svalbard fjords communicate with the Norwegian Sea and Greenland Sea/Fram Strait, respectively, and constitute extensions of the open ocean towards land. Changes in their modern hydrology and sedimentary budget are related to changes in the volume transport and physical-chemical signature of Atlantic and Arctic-derived water masses circulating over the continental margin, to the seasonal development of sea-ice such as in coastal Svalbard, as well as to processes acting on the hinterland such as precipitation variations and the dynamics of tidewater glaciers (when present). Their estuarine circulation and adjacent ocean circulation are strongly influenced by modes of atmospheric circulation of regional to global significance (e.g. North Atlantic Oscillation -NAO- / Arctic Oscillation –AO-) which in turn modulate the amount and seasonality of precipitation over the hinterland. Finally, fjords are the foci of frequent mass-movement events induced by climatic deterioration (affecting the amount of sediment supplied by rivers and tidewater glaciers) or tectonic processes (e.g. isostatic adjustment, local earthquakes and tsunamis triggered by offshore megaslides or mass failure within fjords). Their understanding is of vital importance given their catastrophic impacts on coastal infrastructures and human lives.
The general paucity of high resolution, continuous, coupled marine and continental records of Holocene environmental changes in the northeastern North Atlantic region since the initial demise of the NW European ice-sheets has precluded any firm understanding of (1) high and low frequency behaviors, and the impact in this region of internal modes of the climate variability such as NAO and the Atlantic Multidecadal Oscillation, (2) interactions with external climate forcing acting over short (volcanic and solar forcing) and long (orbital forcing) time-scales, (3) the coupled ocean/ cryosphere/ atmosphere dynamics and the connections between marine and continental climates, (4) the synchronicity and trigger mechanisms of past mass movements in high latitude coastal environments of Northwestern Europe.
This context has motivated the setting-up of the IODP initiative “FANA” (Fjord sediment Archives in the Northeastern Atlantic) – active proposal IODP-915-Pre -. This presentation will summarize the rationale and overarching objectives of FANA, as well as the proposed coring and analytical strategies.