West Greenland ice stream instability during the LGM/Holocene transition

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The continental shelf of West Greenland harbours the imprint of several cross-shelf ice streams. Although research on these ice streams has been limited, new data from two trough systems is shedding fresh light on their LGM dynamic behaviour (eg. Roberts *et al.,* 2013; Ó Cofaigh *et al.,* 2013). The Uummannaq ice stream system (UISS) drained ~6% of the GrIS at the LGM. Deglaciation began on the outer-shelf at ~14.8ka with the mid-shelf ice free by ~12.4ka. This was due to increasing solar radiation and air temperatures, as well as sea-level rise. The grounding line briefly stabilised at the mid/inner shelf boundary due to trough narrowing before the UISS unzipped and retreated ~100 km by ~11.4ka; a response to peak sea-level, increased insolation and bathymetric over-deepening. A YD signal is difficult to differentiate. During the Holocene transition topography became a major control on UISS retreat with, for example, ice in Rinks/Karrat fjord becoming pinned for 5000yrs (11.3-6.5ka) and insensitive to both atmospheric and oceanic forcing. In contrast to the UISS, Jakobshavn Isbrae (JI), which drained ~7% of the GrIS through Disko Bugt, deglaciated from the outer shelf at ~13.8ka and was still on the outer/mid shelf during the YD (12.8-11.7ka). JI then retreated to its coastal fjords between 10.3-10.0ka – over 1000yrs later than the UISS. As both drainage systems were subjected to similar climatic and sea-level forcing mechanisms between 15.0-10.0ka their deglacial dynamics appear to have been heavily influenced by contrasts in trough geometry. There is no strong evidence of a warm West Greenland Current influence on either ice stream until after 9.2ka, precluding an oceanic forcing mechanism for early deglaciation.