



Marine evidence from Lomonosov Ridge for an Arctic trigger event of the Younger Dryas

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During last decades vigorous debates persist with respect to the geographical location of the source area of the drainage pathway responsible of the Younger Dryas (YD). Recently different studies based on model simulations (Tarasov and Peltier, *Nature*, 2005; *Quaternary Sci. Rev.*, 2006) and land fields data from Richards Island region (Murton et al., *Nature*, 2010) lead to consider that a large flood into the Arctic Ocean from the Mackenzie area at the start of the Younger Dryas could have been the trigger of the event. However, unquestionable marine evidence for a freshwater pulse in the Arctic, which would have been responsible for the slow down of the Atlantic Meridional Overturning Circulation (AMOC) and of the YD cold spell. Detailed analysis of sediment-cores from Lomonosov ridge provides evidence for such an event as documented here. Sedimentological and geochemical analyses were carried out on a multi core and a trigger core sediment retrieved from the Lomonosov ridge during the HOTRAX 2005 expedition (Darby et al., *EOS* 2005). Site HLY0503-18 is located at approximately 2500 m water depth in Lomonosov Intra Basin. Based on Hanslik et al., (*Quaternary Sci. Rev.*, 2010), ^{14}C ages obtain for this site show a characteristic "plateau" in the sedimentary layer compatible with a YD age assignment. This layer is also characterised by high ^{230}Th activities, which we link to an enhanced flux of scavenging particles, thus to a pulse in fine detrital material with a clear dolomitic component in the medium silt fraction notably. Uranium isotopes data indicate a change in sedimentary sources at this time periods whereas sedimentary feature (mean grain size, carbonate characterisation) indicate a deglacial meltwater event from the Canadian Arctic, very likely a drainage pulse from the Mackenzie area. This event and its recording on Lomonosov ridge strongly support the hypothesis of an Arctic trigger of the YD climate excursion.