

## Simulation of Little Ice Age Initiation on Baffin Island Using Paleoclimate Modeling Intercomparison Project (PMIP3) Models

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Geological evidence collected from Northern Baffin Island suggests several abrupt cooling events during the descent into the Little Ice Age (LIA) in the late 13th century CE. During these cooling events, the snow line elevation descended by hundreds of meters in a matter of decades. During the height of the Little Ice Age (early to mid 1800's) the snow line was at least 600 m lower than it is today. Modeling efforts have suggested that the LIA could have been induced with four decadal paced volcanic eruptions causing an expanded sea ice state, but these results were sensitive to the conditions of the North Atlantic Ocean when the eruptions took place. Here, we investigate whether any of four PMIP3 Last Millennium simulations produced enough cooling and a sudden enough change in snow line elevation to match the observations from Baffin Island. We compare the amplitude of cooling, snow cover and sea ice expansion, and circulation patterns during the transition into the LIA between models. We focus on summer seasons directly after volcanic eruptions at the onset of the LIA, particularly the 1258 Unknown (Rinjani?) Eruption, since this is when the effect of a snow line elevation descent would be evident.