

The purpose of this research is to investigate the mineralogy of sediments collected from the Greenland Ice Sheet in order to constrain past climate conditions. One set of samples came from the silt-rich portion of the ice core extracted by the Greenland Ice Sheet Project 2. The other set of samples consists of sediment collected from ice at various locations along the edges of the ice sheet including Upernavik, Ilulissat, and Kangerlussuaq. This investigation was done to ascertain whether or not the mineralogy of the samples indicated chemical weathering processes and pedogenesis. The mineralogy was also compared against other proxies for surficial weathering for each of the samples. If the sediments have mineralogical components associated with chemical weathering it would suggest retreat of the Greenland Ice Sheet at some time in the past. The behavior of the Greenland Ice Sheet has important implications for climate change so understanding the glacial history of this area is the first step in predicting what may occur in the future. The mineralogy of the samples was investigated using powder X-ray diffractometry. Clay minerals are often indicators of weathering and have identifiable peaks within the lower angles of 2θ space. Peaks were identified within this low angle area and minerals indicative of weathering were found in some samples including vermiculite, mica, and possibly chlorite. There are also different groupings of mineralogy that appear to correlate with sample location. The presence of minerals associated with weathering in the samples implies that historically the Greenland Ice Sheet may have retreated at least past the collection areas for these samples. This research was partially supported by NSF grant EAR-0922961 to JMH and the UVM Geology Department Hawley Award.