# Variations in Sr and Nd isotopic ratios of mineral particles in cryoconite in western Greenland 

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Recently, the area of dark-colored ice has expanded and reduced surface albedo on the Greenland Ice Sheet. One of the possible causes of dark ice expansion is an increase in cryoconite, which is a dark colored surface dust consisting of mineral particles and organic matters. In order to better understand the source and transportation process of minerals on the dark-colored ice, we analyzed the Sr and Nd isotopic ratios of minerals in cryoconite, which were collected from glaciers in northwest and southwest Greenland.
The mineral components of the cryoconite showed variable Sr and Nd isotopic ratios, which corresponded to those of the englacial dust and moraine on and around the glaciers but were significantly different from those of the distant deserts that have been considered to be primary sources of mineral dust on the Greenland Ice Sheet. This suggests that the minerals within the cryoconites were mainly derived from local sediments, rather than from distant areas. The Sr ratios in the northwestern region were significantly higher than those in the southwestern region. This is probably due to geological differences in the source areas, such as the surrounding glaciers in each region.
The isotopic ratios further varied spatially within a glacier (Qaanaaq and Kangerlussuaq areas), indicating that the minerals on the glaciers were derived not from a single source but from multiple sources, such as englacial dust and wind-blown minerals from the moraine surrounding the glaciers.

Keywords: Greenland, Darkening of glaciers, Sr and Nd isotopic ratios, Mineral source

