

Seeking the distribution of cryoconites using satellite images

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Cryoconites, which are small dark objects on glacier are formed by cyanobacteria tangling with minerals, melts the glacier faster because of its high absorption of sun light. These cryoconites were researched only by field survey which was valuable, low frequency and could only be researched in small ranges. Also there were some remote sensing researches about darkening and regression on the glaciers. However cryoconites have had difficulties in distinguishing with clouds, sands, shadows and other dark things on the glacier. Here, according to the different luminance' s between the glacier and the cryoconite, we propose a new method with using multispectral bands of Landsat8 (resolution 30m), band2 (450-515nm, B2) and band5 (850-880nm, B5) to distinguish those two by making a new formula" $(B5-B2)/(B5+B2)$ " (R). At the range of B2, the cryoconite' s reflectance is about 10 %; otherwise the glacier has high percentage. In the range of B5, the cryoconite' s one is about 20%; in contrast the glacier' s almost half. The satellite images we use in 2016 July 30th, are analyzed since the cryoconite appeared widely and well in the period of 2016 late July to the beginning of August. We were successful in removing the shadow on this image by comparing R and RGB image. If a pixel in R is brighter than the other images, the place of the pixel should contain cryoconite or sand. We used the satellite image from 2016 July 30th. This is because the cryoconites appeared well in the period of 2016 late July to the beginning of August. The calculated index(R), in their spectra from previous studies, applied that both of the cryoconites and the sands take a positive value while the glacier take a negative value in the pixel. The criterion will be shown in the presentation.

Keywords: cryoconite, remote sensing, glacier