デジタルカメラの RGB データを用いた南極陸上生態系の植生調査法の開発

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Development an analytical method of RGB data for vegetation survey of terrestrial ecosystem on Antarctica

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The quadrat method has been widely used in vegetation monitoring. The method is performed to set some quadrats in a field and survey plants in the quadrat with investigator's naked eyes then the method need monetary cost and human resources. Recently, an approaches analyzing photographs of the investigation object taken by compact digital camera as one of the remote sensing techniques is increasingly attempt to diminish the costs of vegetation monitoring (Richardson 2007, Sakamoto et al. 2011). However the method is never applied to communities constructed by extremely small plants such as mosses, cyanobacteria and lichens. These plants cannot investigate using satellite remote sensing because the plants communities are distributed in micro habitat such as interspace of stones or rocks and are extremely small to survey using satellite remote sensing that has finest resolution of 50 cm. Remote sensing survey for vegetation of these plants require data at resolution of a few centimeters.

We attempt to develop an analytical method of RGB data of photographs by digital video camera for vegetation survey. The analyzed photographs are of permanent quadrat for vegetation survey near Showa station on the north east Antarctica. The permanent quadrat for vegetation survey has been set and kept since 1984 in the Antarctic Specially Protected Area No. 141 and taken photographs using compact digital camera each quadrats by Japanese Antarctic Research Expedition since 1988. The quadrat is chosen places growing mosses, cyanobacteria and lichens in the area. The RGB data ware derived from these photographs and analyze using discriminant analysis to detect the cover degree of whole plant community and each taxonomic groups. And raw RGB value, brightness, relative RGB value to brightness and 2G_RG index (Richardson 2007) ware chosen as variables and examined availability of the variables to discriminate the cover degree of vegetation and separate a vegetation to the each taxonomic groups. It was obtained as a result that raw RGB values had a least error rate when the teacher data and target data are from same pictures. The error rate differed depending on the pictures. And we discuss about the applicability of the derived criteria from the analysis to plants community lived in micro habitat on the other climate zones.