

Occurrence of hydrobiotite in granitic saprolite of northern Abukuma Mountains, Fukushima Prefecture, Japan

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Granitic rocks are widely exposed and often changed into saprolite as a result of weathering alteration in Japan. Biotite is one of the major rock-forming minerals contained in granitic rocks and pseudomorph of biotite altered by vermiculite and kaolin minerals is often observed in weathered granite. It is known that biotite is gradually weathered and to form several different minerals as a result of alteration.

Experimental alteration and field observation of biotite are studied by many researchers and several alteration ways are proposed. Vermiculitization is one of the major ways, and mixed layer mineral of biotite and vermiculite is sometimes formed as an intermediate product.

Altered biotite in weathered granitic rocks from Tamura-shi, Fukushima Prefecture, northern Abukuma Mountains, Japan, is studied. The study area is covered with granitic saprolite with small amount of fresh medium grained biotite hornblende granodiorite, which is grouped as 'older granite'. Biotite is separated from crushed fresh granite and saprolite by handpicking, to prepare for the analyses. Biotite in the study area is divided into two groups by magnesium and iron contents as a result of analysis of chemical composition of major elements using SEM/EDX. Observation of thin sections by a polarized microscope and back scattered images of an electron scanning microscope as well as elemental mapping images by EDX revealed that alteration had progressed along cleavage and also from rim of biotite.

Hydrobiotite, which is a 1:1 regularly mixed layer mineral of biotite and vermiculite, is found in biotite with higher magnesium content as a result of powder XRD. Irregularly mixed layer mineral of biotite and vermiculite is identified instead of hydrobiotite in biotite with lower Mg value. Other minerals considered to be formed by weathering alteration such as kaolin minerals and goethite are the same among the samples.