# 東南極セール・ロンダーネ山地における花崗岩類の風化過程

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# Weathering process of granitic rocks in Sør-Rondane Mountains, East Antarctica

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Weathering process under the hyper-arid and hypothermal environment is a key to understand geomorphogical processes and landscape evolutions in Antarctica and on Mars. A number of studies have focused on weathering process of basaltic rocks in Antarctica, however, the nature of the weathering process of plutonic type rock, a common rock type on the Earth, have been less focused and remain unclear. Here, we report the physical/chemical weathering process of the granitic rocks obtained from Dronning Maud Land in East Antarctica based on a multiplicity of petrological approaches. Loss on Ignition (LOI) and major element composition of the crust and core of the rock samples indicate that chemical weathering process in this area seems to be very limited. The microscopic observations and laser-Raman micro spectroscopy for thin sections from the crust and core indicate that goethite grains are formed mainly in the vein around the crust, which is consistent with the higher $Fe^{3+}/Fe^{2+}$ contrast from the core to crust. A negative correlation between the rock hardness and color strength index (CSI) values also indicate that crust of rock samples tend to less hard than core due to cracking of the rock samples and following goethite formation. On the other hand, EPMA analysis indicates that original Fe-Ti oxide grains in the core of rock samples are damaged by weathering, and altered to hematite, and to non-stoichiometric Fe-Ti compound associated with ilmenite grains in case of relatively higher sampling sites from the ice sheet. These reveal that the weathering process of the plutonic rocks under the hyper-arid and hypothermal environment are mainly controlled by oxidation, including iron hydroxide formation in the veins formed by mechanical distraction, and Fe-Ti oxide alteration in rock interior. Impotently, these physical/chemical weathering processes probably does not need a liquid water supply from the environment (snow and vapor), and the restricted supply of liquid water and salt is the most probable reason for the extremely slow weathering process in the Sør-Rondane Mountain, East Antarctica. We therefore conclude that this is one of major weathering styles under hyper-arid and hypothermal environment in Antarctica, and potentially on Mars. In-situ color measurement basically expresses amount of the iron hydroxide on the rock surface, thus in-situ/satellite measurements of color of exposed rocks in Antarctica potentially provide quantitative information of the degree of weathering.