

A study on the weathering process of Shirasu surface using the refractive index of volcanic glass

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Shirasu is a general name for unwelded rhyolitic pyroclastic flow deposit in southern Kyushu, Japan. Shirasu steep slopes are sometimes collapsed during heavy rains. To clarify the weathering process of Shirasu slope surface would be important to predict the collapse of Shirasu. We examined degree of hydration of volcanic glass shards using the refractive index in the order of deterioration of Shirasu slope. At study outcrop, the Shirasu slope surface composed of original pyroclastic flow deposit (layer I), talus deposits and overlying fallout tephra. Talus deposits are subdivided into three layers (layer II to IV in ascending order) by the facies and color. The refractive index of volcanic glass shards (layer I to IV) ranges from 1.4960 to 1.5000. Layer II to IV tend to show high index (1.4978-1.4982). On the other hand, layer I have a significantly low index (1.4976) than those of the former layers. Refractive index of dehydrated samples from each layer are 0.002-0.001 lower than those of hydrated glass. There are many incompletely hydrated thick glass shards in layer I. On the other hand, layer II to IV are mainly composed of completely hydrated volcanic glass. We may say that the refractive index of volcanic glass shards is an indicator of the degree of deteriorated Shirasu slope surface.