

Various lithofacies of the Quaternary Volcanic Products and related slope movements in central Shimane, Japan

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Although the discrimination of flow units is fundamental and important for the establishment of volcanic stratigraphy, lithofacies classification related to slope movements are not same as them. The Oe-takayama area, located in central Shimane, and composed of the Quaternary volcanic products, is characterized by various slope movements including slope failures, landslides, debris flows and debris avalanches. The authors attempted to understand the relationship between lithofacies of the Volcanic Products composing slopes and the occurrence of slope movements on the basis of field mapping, surveys, and observations.

The Oe-takayama volcanic products are composed of dacite lava and pyroclastic rocks, and they cover the Plio-Pleistocene Tsunozu Formation. At least three lava flow layers and three pyroclastic flows deposits were confirmed in study area. Although the latter are mainly composed of tuff breccia and lapilli tuff, they are sometimes accompanied with fluvial gravels and lacustrine silt layers. Considering that thin silt layers interbedded within pyroclastic deposits are soft and impermeable, the combination of such layers and lava or pyroclastic rocks may cause cap-rock type landslides. Geological primary causes of large landslides in the foot of the mountains may be these types.

Systematic joint planes tend to develop parallel or normal to flow structures within dacite lava. Toppling and translational slide along joint planes were frequently recognized in steep slopes of systematic joints. Debris avalanche deposits of dacite observed along northwestern cliff of the Mt. Dotoko may be the special case of such toppling.

Regional uplift during the Quaternary Period is considered to have accelerated the occurrence of slope movements in the area. Based on the topographical and geological developments in the area, various types of slope movements may also occur depending on various lithofacies and their combination and slope structures in the future.