

Combined sheeting joints in granitic rocks and the occurrence of slope failures along the Yahata River, Hiroshima, Japan

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Sheeting joints tend to appear in granitic rocks, and they make one of potential causes for the occurrence of slope failures on valley slopes. However, the spatial extent of their appearance is indefinable and the mechanism of jointing is not clear. Then, the authors studied the configuration and distribution of sheeting joints in granitic rock slopes along the Yahata River, Hiroshima, Japan, where many slope failures with debris flows occurred at the 1999 Hiroshima rainfall disaster. The area is geomorphologically an antecedent stream, where the Yahata river flows eastward penetrating a mountainous zone uplifted along the NE-SW trending Itsukaichi Fault.

Among several trends of joint planes developed in the area, sheeting joints are widely recognized. They are subdivided into three systems. Two of three are E-W trend with north and south dips, and other is NE-SW trend with eastward dip. The former two is mostly concordant with valley slopes formed by detecting of the Yahata river. These are also well recognized along the Aratani river, an tributary of the river. On the contrary, the latter is almost concordant with the trend the scarplet of the NE-SW trending Itsukaichi Fault. These zones are steep slopes, and are geomorphologically estimated to have been eroded with high erosion rate. Although the strike of sheeting joints are parallel to outline of valley slopes, it does not correspond to those of small valley, of which width is narrower than 100m.

Not only one trend, but also two or three trends of sheeting joints coexist in some locations, and they forms a combined sheeting joints system. This means that sheeting joints developed in there were formed at different periods. Consequently, they make unstable slopes at the present.