

## Altitudinal change in slope angle in Taiwanese mountains: implication for dynamic equilibrium

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Topography of mountain slopes in Taiwan was investigated using a digital elevation model (DEM) with a 40-m grid interval, and the results were compared with the slope characteristics in the Japanese Alps. Using vector geology data and GIS, areas underlain by pre-Quaternary bedrock within Taiwan were selected for analysis. The DEM-derived altitudinal change in slope angle for the Taiwanese mountains is similar to that in the Japanese Alps, in that slopes tend to have a characteristic slope angle. The modal slope angle for each altitude zone is ca. 35 degrees except for the highest and lowest zones. This characteristic slope angle reflects the threshold of bedrock erosion on slopes of v-shaped valleys. Slopes which temporarily become steeper than 35 degrees due to valley incision are unstable, and do not survive for a long time because of increased possibility of landsliding. Such a condition can be regarded as dynamic equilibrium. The Taiwanese mountains look closer to complete equilibrium than the Japanese Alps, because the difference between mean and modal slope angles in each altitudinal zone is smaller, and nearly normal frequency distributions of the slope angle around ca. 35 degrees are often observed. Although both the Taiwanese mountains and the Japanese Alps are characterized by rapid tectonic uplift and intense erosion, the former has higher rates of geomorphic processes, leading to a nearly equilibrium condition in terms of slope angle.