

Using GIS and remote sensing to assess relationships between landslides and land cover changes in the Sanbagawa and Mikabu Belts, Shikoku, Japan

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The Sanbagawa and Mikabu Belts are metamorphic belts that run across Southwest Japan, and are home to numerous large crystalline schist landslides, including the widely-studied slow but continuously moving Zentoku landslide. Villages and communities have been built on these landslide areas due to historical and cultural factors, as well as the fertility of the soil. With changing human needs and social trends, however, changing land uses is becoming an increasingly important issue. In Japan, movement of the population from rural to urban areas have resulted in much land and agricultural land abandonment. As vegetation cover changes after land abandonment, this temporal and spatial effect may have important effects on geomorphic processes such as landslide susceptibility and landslide kinematics.

Here we track long-term land cover changes over vegetated landslide areas of the Sanbagawa and Mikabu Belts of Shikoku Island, Japan, and conduct spatio-temporal analyses to assess relationships between landslides and land cover changes. Given changing land uses, including land abandonment in these landslide areas over time, we use long-term high-resolution land cover vegetation datasets to examine first the long-term land use changes, and then use statistical methods to explore their relationships with landslide susceptibility and kinematics. Mapping of spatial data and their analysis using GIS constitute a core part of the research. The results suggest interconnections between land use changes and land movement.

Keywords: Landslides, Shikoku, GIS , Remote Sensing