

Rainfall, slope instability, and deep-seated landslides in Kii Mountains Japan

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Prediction of deep-seated landslides by heavy rainfall needs combination of two complementary approaches that focus on geological and geomorphological predisposition of hillslopes, and hydrological triggering of final slope destabilization. Analyses of topography and rainfall history will provide a clue to understand processes leading to deep-seated landslides in mountainous landscape. This study reports the case of deep-seated landslides caused by typhoon 12 in 2011, in Kii Mountains, Japan. A GIS-based topographic analysis revealed the distribution of potential hillslope instability in the terrain, and hence offered an interpretation for location of the landslides. Timing and motion of several landslides are reconstructed by seismic-wave records. We examined relationships between preceding rainfall and volume or speed of sliding mass to evaluate threshold conditions leading to landslides.

Keywords: deep-seated landslide, rainfall history, landscape evolution, hazard zoning