Tectonic deformations and coseismic landslides in the 2024 Noto Peninsula Earthquake: their implications to long-term landscape evolution

*Yuki Matsushi[1]

1. Disaster Prevention Research Institute, Kyoto University

This presentation will report preliminary results of multifaceted analyses for the geomorphological aspects of the Mw 7.5 earthquake struck northern tip of the Noto Peninsula, Japan, at 16:10JST on January 1, 2024. The earthquake caused significant uplift of the northern coastal areas of the peninsula, accompanying extensive inland tectonic deformations that diminishes toward south. Spatial extent of the crustal movements accords generally with the relief structures and distribution of marine terraces in the Noto Peninsula, implying the long-term tectonic forcing on the landscape evolution in this region. Numerous coseismic landslides occurred in steep mountainous terrains, which yield vast volume of sediment from hillslopes into fluvial channels. Inventory mapping revealed the localized distribution of the landslides, regulated most probably by geologic and topographic conditions. Areal density, individual sizes and types of the landslides can be explained by coupled factors of lithological fragility of the hillslopes to the seismic shaking and amplification of ground motion at the hilltops. Landslide susceptibility in a local scale seems to be linked with characteristic weathering processes of the sedimentary (mainly mud-to-siltstone) and volcanic (mainly pyroclastic) rocks and the resultant structure, thickness, and physicochemical properties of the near-surface critical zone.

Keywords: Noto Peninsula, marine terraces, coseismic landslides, topographic amplification, bedrock weathering, critical zone

