



ICG2022-165, updated on 28 May 2023

<https://doi.org/10.5194/icg2022-165>

10th International Conference on Geomorphology

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Deep-seated gravitational slope deformation and rock-slope failures deposits in Iceland: inventory, dating and role in landscape evolution

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Following the Last Glacial Maximum, icelandic hillslopes experienced a paraglacial crisis, which occurred between 15-10 ka BP. In the North, West and East parts of Iceland, in the high plateaus and slopes developed in the Tertiary basaltic formations, two types of paraglacial denudation features, deep-seated gravitational slope deformation (DSGSD) and rock-slope failure (RSF) deposits, are numerous.

An inventory and several maps of DSGSD and RSF are proposed at the scale of those three icelandic regions of Iceland. The mapping was made by combining aerial photographs, satellite images and field prospections. The DSGSD is characterized by typical ridge-top grabens, scarps and anticarps associated with upslope and downslope dipping fractures along bulged upper slopes. The RSF could be identified by defining the crown and deposits. Both features could be analyzed by using direct observations and NDVI index from satellite images.

An approach of the timing of the DSGSD and rock-slope failures settlement is also proposed in this contribution by using field investigations (geomorphological stacking, tephrochronology, radiocarbon dating of wood remains in depression on RSL deposits, and age-depth models). The genetic links between DSGSD and landslides, the effects of these paraglacial denudation dynamics on the evolution of landforms (cirques, valleys) are discussed. Furthermore, the erosion rates involved by such paraglacial crises (volumes of landslide deposits) are compared with erosion rates involved other processes on icelandic slopes during the Holocene.

Finally, this paraglacial denudation crisis, illustrated by DSGSD and RSF, appears as the main sequence of icelandic landscape evolution since the last glaciation.