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# The relevance of periglacial cover beds for slope stability

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The occurrence and distribution of periglacial cover beds provides information on the landscape evolution in space and time. On the one hand requests on age classification of landslide areas and their activity can be solved in the application of the concept of periglacial cover beds. On the other hand, soil mechanical parameters of the cover beds are responsible for the preparation of landslides.
On the basis of two examples in Central European low mountain areas, the survey of periglacial cover beds is connected to questions concerning slope stability and the assessment of hazardous zones.
1) At the slopes of the Jurassic cuesta scarp in SW-Germany, pedological and mineralogical investigations were carried out in landslide areas. So far, it is possible to distinguish two well-defined landslide areas, one of them belonging to the Pleistocene, the other one characterised by Holocene movements. In general, the distribution of soils and sediments is strongly linked to the age of landslide deposits and therefore give information on the hazard potential as well. In Pleistocene landslide areas, the parent material of the studied soils is formed by periglacial cover beds of Upper Pleistocene age, consisting of Jurassic, aeolian and volcanic components. The upper periglacial cover bed was recognised as the most important marker horizon in the studied slope areas. There, the existence of minerals originating from the eruption of the Laacher See volcano, dated to 12.900 yr BP, could be demonstrated for the first time. Most of the Pleistocene landforms are characterised by well-developed soils, like Clayic and Vertic Cambisols, whereas relic soils exclusively occur in the oldest parts of landslide deposits. Landslide areas affected by Holocene slope processes do not exhibit periglacial layers, as mass movements removed periglacial sediments and former soils extensively. By consequence, the parent material is different from those of Pleistocene landslide areas.

2)The Rhenodanubian Flysch zone of the eastern Alps of Austria is considered to be susceptible to landslides. In the study area, an undulating low mountain landscape of the eastern European Prealps, the Flysch bedrock is superimposed by Quaternary periglacial cover beds and loess. Both, the petrography of the bedrock and the soil mechanical properties of Quaternary sediments control the slope dynamics. The study analyses slope stability in the light of slope formation phases with respect to weathering, erosion and geology. Furthermore, geomorphological and soil-geographical methods are combined with soil-mechanical calculations. The application of the concept of periglacial cover beds facilitates the distinction between Holocene and Pleistocene landforms and slide masses in the research area. As a result, the study shows that the properties of Quaternary sediments and the occurrence of the densely bedded basal cover beds are responsible for landslide susceptibility. The variable permeability in loess layers, in contrast to that in the underlying basal cover beds, consisting mainly of marls and clayey material, is one of the fundamental controlling factors of mass movements. In a temporal context it is evident that the stability of slopes in the study area is influenced by several phases of slope formation. The synopsis of field survey, morphometrical, geotechnical as well as laboratory analyses, and slope stability calculation, gives evidence of five morphodynamic phases that partly reoccur in an alternating pattern. After having passed all phases, the stability of the slopes studied is increased, because modified soil- mechanical properties of the slide masses become important. As a consequence, the critical slope angle is raised by 3- 5°.