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Mountain forests as slope stabilizing elements in alpine catchments - Examples from Western Austria

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Recent studies on severe disasters caused by landslides in Middle Europe indicate that there is no difference between forest vegetation and other types of vegetation in slope stabilization.
During documentation and analysis of landslides in several communities of the Bregenzerwald in Vorarlberg (Western Austria) members of the Department of Natural Hazards and Alpine Timberline at the BFW came to quite different results.
Numerous shallow landslides with volumes between 20 to 5000 m^3 had been released as a consequence of extreme precipitation (maximum values about 240 mm per 24 hours) from 22nd to 23rd August 2005. Though quality of vegetation cover could not be analyzed in detail field observations indicate that disposition for slope failure was significantly influenced by slope morphology, soil texture and way and intensity of site management. The majority of the slides - 128 sites (71%) out of 181 - occurred in open land (meadows, grassland, swards and marsh areas). Only 42 slides (23%) out of 181 were released on slopes under forest cover. Sliding activity under woody vegetation was strongly related to forest condition. Often mass movements were observed in gaps, in and under grassland in forests, in areas which have formerly been agriculturally used and now suffer from an uncontrolled succession to new vegetation forms and in forests with loose structure. Abandonment of formerly intensively used agricultural land showed to be an eminent factor of landslide release, too.
Shallow slides directly below the forest edge were observed frequently and confirm results of former investigations in the region. Root system of the adjacent grassland is less dense, weaker and concentrated near the soil surface. So reinforcement of upper soil in grassland is significantly weaker than under optimally structured forest cover.