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Resistance and resilience of forest soils in the Limestone Alps

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During the last decades a dramatic increase in frequency and extent of forest disturbances, in particular of bark beetle infestations after windthrows, can be observed in Austria. In protective forests of the montane and subalpine vegetation zone, forest recovery can take several decades – a period of altered micro-climatic conditions and nutrient cycles. Soils on calcareous bedrock are considered to be particularly vulnerable under these conditions. Erosion and disintegration of ecto-organic layers of folic Histosols (Tangel) and lithic and rendzic Leptosols will lead to a loss of soil functions. In a pilot study on resilience of protective forests, soil development along chronosequences of windthrows has been surveyed in three climatically different test regions. Multivariate statistics uncover the relation between micro-topography, time since disturbance, and vegetation status on the one hand and morphological characteristics, carbon and nitrogen stocks of soils on the other hand. Factors affecting resistance and resilience of soils on calcareous bedrock are discussed.