

DETAILED MORPHO-LITHOLOGICAL MAPPING OF THE TSCHIRGANT ROCKSLIDE - ROCK AVALANCHE DEPOSIT (TYROL, AUSTRIA) AND IDENTIFICATION OF EMPLACEMENT PROCESSES

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rock avalanche, emplacement processes

In order to understand the emplacement dynamics of the Holocene Tschirgant rock avalanche (Tyrol, Austria), we systematically investigated the spatial distribution of lithological units, interrelationships of deposit morphology and sedimentology, as well as interactions with runout path topography and sedimentary valley fill. Lithological field mapping shows that the source stratigraphy was preserved in that the initial sub-vertical configuration of lithological units (as encountered in the source area) was translated into a radial, sub-horizontal geometry of broken, highly fragmented, spread, and sheared granular mass during rock avalanche deposition. Furthermore, strong connections between emplacement processes and deposit facies, as well as clear evidence of runout path materials influencing facies development was discovered through the detailed sedimentological studies.

Morphological mapping showed that two different emplacement modes of rock sliding and rock avalanche spreading occurred in this event. Since longitudinal ridge axes on the central rockslide deposit point straight back to the source scarp, these sliding blocks travelled along the main rockslope failure direction without being deflected by runout path topography. On the rock avalanche part, on the other hand, the ridge axes are oriented obliquely to the main failure direction and hence evidence motion change to radial spreading. However, distinct ridges are present exclusively in competent lime- and dolostones (Wetterstein Fm), whereas weaker siliciclastic-carbonate beds (Raibl Group) do not form pronounced ridges. Yet, the tendency of longitudinal feature formation is present in these units as well since clayshale marker beds are offset parallel to the local spreading direction.

Overall, the Tschirgant deposit impressively demonstrates the variant mechanical factors of rock mass properties and runout path conditions in the emplacement dynamics of large rockslides and rock avalanches.