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Linking high-resolution geomorphic mapping, sediment sources, and channel types in a formerly glaciated basin of northeastern Alto-Adige/Sudtirol, Italy

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To characterize channel-network morphodynamics and response potential in the Gadria-Strimm basin (14.8 km2) we conduct a concerted effort entailing: (i) high-resolution mapping of landforms, channel reaches, and sediment sources; and (ii) historical evolution of colluvial channel disturbance through sequential aerial photosets (1945-59-69-82-90-00-06-11). The mapping was carried out via stereographic inspection of aerial photographs, examination of 2.5-m gridded DTM and DSM, and extensive field work.

The study area is a formerly glaciated basin characterized by peculiar landform assemblages imposed by a combination of tectonic and glacial first-order structures. The most striking feature in Strimm Creek is a structurally-controlled valley step separating an upper hanging valley, dominated by periglacial and fluvial processes, and a V-notched lower part in which lateral colluvial channels are directly connected to Strimm's main stem. In Gadria Creek, massive kame terraces located in proximity of the headwaters provide virtually unlimited sediment supply to frequent debris-flow activity, making this sub-catchment an ideal site for monitoring, hence studying the mechanics of these processes.

Preliminary results point to a high spatial variability of the colluvial channel network, in which sub-sectors have remained consistently active during the study period while others have become progressively dormant with notable forest re-growth. In an attempt to link sediment flux to topography and substrate type, future work will involve photogrammetric analysis across the sequential aerial photosets as well as a morphometric/geomechanical characterization of the surficial materials.