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STRUCTURAL SETTING AND LARGE LANDSLIDES IN UPPER ISARCO VALLEY (ITALIAN EASTERN ALPS)

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During the geological survey for the Brenner Basis Tunnel project (BBT), a close relationship between brittle regional tectonic setting and large surface slope deformations was found in Isarco, Vizze and Mules valleys (Italian Eastern Alps). This roughly triangular area is bounded by the Pustertal fault system (tectonic boundary between Austroalpine-Penninic nappe-stack and Southern-Alps) and the Brenner line (extensional detachment between western Tauern window and Austroalpine). From south to north the tectonic units are: i) the Austroalpine polymetamorphic basement (mainly retrogade paragneisses and amphibolites) and related Permian-Triassic cover; ii) the overlying Glockner nappe (Mesozoic calcschists and minor metabasalts and serpentinites). The geomorphology of this area is the product of a complex history started during the Pleistocene Alpine glaciations and continuing with post-glacial gravity-dominated slope processes.

Integration of systematic field survey and image interpretation of aerial-photographs, satellite scene and shaded relief products shows that the main "deep-seated gravity slope deformations" (DGSD) and some large rock-fall landslides are strictly related to the major fault systems. Even if the triggering factors of these processes are generally the post-glacial slope release and the energy of relief, lithological and structural features are always important controlling factors.

In this case the tectonic factor is dominant for the following evidences:

i) Location of major landslides is not influenced by lithology (large landslides both in Austroalpine paragneiss and Glockner calcschists).

ii) DGSD location is closely controlled by major fault systems, i.e. the Pustertal fault system and Brenner-related brittle structures.

iii) Numerous trenches and up-hill facing scarps are located in sector of relatively low topographic stress. These features may also be influenced by deep karst dissolution along faults and fractures.

The best example of fault-related DGSD in the study area is at the confluence between the Vizze and Isarco valleys (Giogo di Trens DGSD). This is a pluri-kilometric area characterised by a poligenic landslide complex with several shallow landslides and rock-falls debris which are closely related to the DGSD itself. The main mass movement is controlled by the interference between a major Pustertal-related tectonic line (Sprecken-stein-Val di Mules fault, previously unknown) and a penetrative set of sub-vertical N-S to NE-SW directed faults and joints, parallel to the Brenner low angle detachment. The NE-SW trending ridge between the Vizze and Senges valleys (Giogo di Trens -C. Cavo) and the E-W trending ridge between the Isarco and Vizze valleys (Giogo di Trens- M. Casaclusa) are strongly deformed by hundred-meters long trenches and up-hill facing scarps. Their location and direction are strictly related to faults and fractures.

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