



1 Interpreting engineering geologic and geophysical research in the Gschlifgraben (Gmunden/Upper Austria) for analyzing shallow Sedimentation and Mass Movement Processes within Earth-, Mud- and Debris-Streams

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A tectonic window of Ultrahelvetic rocks overthrust by the Flysch Nappe is exposed in front of the border of the Calcareous Alps (Mt. Traunstein, 1691m) in the valley of the so called Gschlifgraben, east of Lake Traunsee, district Gmunden (Upper Austria).

Lithologically this area of 3 km² is composed of marls of the “Buntmergelserie” forming glacier-like streams of earth-, mud- and debris (velocity: 20m/yr) down the valley, to the shore and even into the named lake.

Besides overthrusting of the Calcareous Alps bordering to the S, and neo-tectonic movements, climatic conditions (precipitation: 2500 mm/year, with maximum of 200 mm/day) and the infiltration of water into the ground have played an important role as preparatory causal factors and triggers of the periodically occurring intense mass movements, which have been reported for the past 500 years.

New geologic mapping of this geomorphologic highly active area should serve as a

base information for the interpretation of geophysical measurements (multi-electrode-geo-electric), which both methods are part of two research projects of the Austrian Academy of Science (2004-2006).

In addition 2d- multi-electrode-geo-electric measurements (steel electrodes in a distance of 10m) were done with the STING/SWIFT system (by AGI) along selected cross sections. Five of these multi-electrode-geo-electric profiles (lengths: 550m-850m) are crossing the mass movement in N-S direction, while two more of them (lengths: 800m-900m) are E-W directed, valley long cross sections.

As a result of these studies we can show that a correlation of data of the engineering geologic field mapping and the geo-electric measurements has proved as a helpful tool for the interpretation of actual shallow sedimentation processes (up to 100m of depth) within the mass movement area, such as i) movement horizons, ii) consolidation and compaction of transported material, iii) detection of moisture as well as iv) distribution of solid rock from mass movement sediments.

Further research work (2006) should provide an analyses of all geologic-geo-technical processes and subsequent consequences, which should give answers to questions such as i) what are the pre-existing structures, ii) what are the triggering effects, iii) how can we describe the dynamics and iv) how can we describe the internal mechanisms of all mass movement processes of the Gschlifegraben.