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Geophysical exploration of the Wildalpen rockslide in the area of Siebensee, Hochschwab region, Styria

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The Wildalpen rockslide is situated in the Hochschwab region near the SEMP-fault (Salzach-Enns-Mariazell-Puchberg), which is one of the major strike-slip faults in the Alps. The surrounding mountains are composed of limestones and dolomites and are glacially shaped. The south to north oriented rockslide, which is dated to 5900-5700 b.p. had a volume of about 1.4 km3 and a run-out distance of the sliding mass up to at least 12 km (Fritsch 1993, Van Husen 2007). The area of the rockslide deposits can roughly divided in 3 main regions (area south of Kohlermauer, basin of Siebensee and Salza valley). The geophysical exploration took place in the basin of Siebensee, because this area belongs to the catchment area for the springs of the 2nd Viennese water supply pipeline and therefore the hydrogeological situation of the rockslide deposit is also of special interest. At 4 profiles seismics, resistivity measurements with multielectrode array, GPR and gravity measurements for 2D-imaging were performed to get detailed information of the subsurface. Different seismic methods, Seismic Refraction Tomography for exploring the rockslide deposits and Seismic Reflection for exploring the basement, were applied. The seismic results show an average p-wave velocity of 2300m/s for the rockslide deposits and about 3000m/s for the underlying layer in a depth between 20-100m where clear reflections can be seen. This feature is confirmed by the gravimetric results. By summarizing the consistent results of all profiles an underground map of this boundary could be created which shows a small basin diving in NNE direction. Up to now it is not clear, if this boundary represents a loosened rock basement or a former sedimentation caused by the glacier (e.g. moraine).

The geoelectric results show a heterogenous underground image of the rockslide mass, with alternating zones of low and high resistivity near the surface, which points to either clayey regions or great boulders. They agree with low frequency GPR results, which in part show clear reflections, probably caused by washing in of fine-grained sediments.

Fritsch, A., 1993, Das Quartär der westlichen Hochschwab-Nordabdachung unter Berücksichtigung des Bergsturzes von Wildalpen.- Diploma thesis, 122 pp., Univ. of Vienna

Van Husen, D., and Fritsch, A., 2007, Der Bergsturz von Wildalpen (Steiermark), Jb. Geol. B.-A., Volume 147, p 201-213