



Results of a continuous geoelectrical monitoring in the forefront of the large landslide event of 2007/2008 in the Gschlifgraben (Gmunden/Upper Austria)

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In the Gschlifgraben area (Gmunden/Upper Austria) Ultrahelvetic rocks are exposed in front of the border of the Calcareous Alps (Mt. Traunstein, 1691m). This area is well known for the periodical occurrence of major landslides or earth flow events with historically documented time intervals between 50 and 100 years. No remediation efforts have been up to now successful. Within research projects from 2005 to 2007 (GdE*, ISDR*) the area has been investigated by geophysical measurements and a detailed geological investigation. These projects have shown, that geoelectrics in combination with geological data is the most suitable method to explore and monitor the moist zones in the landslide sediments and bedrocks. Actually available computer controlled modern multielectrode equipment enable reliable and useful measurements to be conducted with direct current geoelectrics for exploration and monitoring. Also modern inversion schemes together with petrophysical interpretation methods have been developed in recent times. The stability of potential land slide areas depends to a large extent on the presence, migration and saturation of the mountain waters in the subsurface. After the first measurement series in 2005 a landslide with a volume of more than 100 000 cubic meters moved from the upper to the middle part of the valley. The geoelectric measurements have shown high water saturations in a nearby area. (Weidinger, Niesner, Millahn 2007). Repeated geoelectric measurements after this first slide event showed marked changes in the subsurface resistivities also on other profiles. Since the geoelectric method reacts very sensitive to changes of the groundwater level or moisture content of the subsurface, this resistivity decrease indicated a high probability

for the occurrence of a further landslide in the near future. Therefore it was decided to set up a continuous geoelectric monitoring line at the most interesting profile to monitor the dynamics of the changes in the water saturation. The profile with a total length of 830 meters and an electrode spacing of 10 meter has been measured with a repeat frequency of 3 measurements per day. Additionally an automatic meteorological station has been set up within this area by the Austrian institute of "Wildbach- und Lawinverbauung" for correlation of the resistivity with the precipitation data. The monitoring started in July 2007 and already at the end of November 2007 a large landslide occurred in the Gschliefgraben area. This landslide is moving up to now (January 2008) with a velocity of about 20 m per day continuously downwards to the lake Traunsee and the residents of the houses in the shore area had to be evacuated. Although there had been some problems with moisture in the electronics a lot of interesting data have been collected in the fore field of this large landslide event. This was the rare opportunity to get resistivity data shortly before a landslide event. The monitoring data will be presented. This project was financed by the *Austrian Academy of Science.