



## **The potential of geoelectrics for landslide forecasting**

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In the last years both authors of this article had been involved into geophysical and geological investigations of potential landslide areas. In one case, fortunately to the researchers but not for the people living in this area, the investigations started three years in advance of an actual landslide. Therefore interesting measurements are now available in the fore field of an actual slide event with a volume of approximately 3.5 million cubic meter. Mainly geoelectric, seismic and geologic data had been gathered. On some profiles also repeat measurements had been done to detect changes in the subsurface, prior to the landslide. These data showed, verified by the later on landslide event, already changes in the subsurface long before the actual movement on the surface could be detected. Also some continuous geoelectric monitoring had been done during a period of ten days about four month before the initialization of the event. In this special case, the area of the Gschlieffgraben in Upper Austria, especially the changes in the water saturation of the potential landslide area showed a high impact on the subsurface resistivity distribution. Geoelectric measurements are ideally suited to detect these changes in subsurface water saturation. Since the water saturation of the sediments is directly correlated to the mechanical properties and therefore the stability of the slope, the changes in the water saturations are directly correlated with the landslide stability or safety factor. Additional to these field investigations also petrophysical measurements had been done on typical samples gathered in the landslide area to get calibration values. Also a limited set of meteorological data of the area had been available. The data gathered during the research project showed already a very high risk for a landslide event. Local authorities had been informed and two public information articles had been published two and one year in advance of the slide event in a local newspaper to warn of the potential danger. But due to a limited budget no further verification of the potential danger could be done. So drilling was done only after the initiation of the catastrophic event in late autumn 2007. Although no further geoelectric measurements had been possible, the additional data gathered by the later on drilling (more than 250 wells had been drilled during the remediation work) and the observations of the landslide dynamics could be included into the reinvestigation of the data. Also laser scanning investigations in time intervals of some months during the acute phase, by order of the Austrian Torrent and Avalanche Control had been available together with a laser scan of the area before the landslide, provided by the government of Upper Austria. All up to now available data had been included. The gathered data and an integrated analysis from the viewpoint of landslide forecasting will be presented, including the knowledge of the starting time and behaviour of the catastrophic landslide event.

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Literature: Niesner,E.; Weidinger, Johannes T. : Investigation of a historic and recent landslide area in Ultrahelvetic sediments at the northern boundary of the Alps (Austria) by ERT-measurements, The Leading Edge, Nov.2008,SEG.