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Geoelectrical Investigations and Monitoring in the Context of Disaster Response at the landslide in Pechraben, Austria

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Intense precipitation in late spring 2013 triggered a landslide in Pechgraben (Upper Austria). The landslide was activated in the night of June 6th and one family house had to be evacuated immediately. The mass movement covered an area of approximately 0.4 km² in total and endangered several family houses of the nearby village. To support the remediation measures a geoelectrical monitoring system was installed immediately (June 7th) on the active landslide, encountering displacement rates up to more than one meter per day, within the first week. In order to monitor the movement and to address the problem of data errors caused by substantial changes in profile geometry, several GPS bench marks and two automatic inclinometers (DMS) were installed. High precision GPS measurements were repeated every day to monitor geometry, displacement and velocity of the mass movement within the first weeks after activation of the landslide. Furthermore, a webcam, soil-humidity sensors and a rain-sensor were installed.

Soon after initiation of the landslide, an airborne geophysical survey (EM, magnetic, gamma-ray) was carried out over the whole landslide area. To support interpretation, some further geoelectrical profiles were measured.

The geoelectrical monitoring profile had to be relocated for two times and reached its final position on August 28th. The Implementation of the geometric information and the application of an innovative 4D inversion algorithm (Kim et al. 2012) led to enhanced interpretation results of subsurface electrical resistivity changes, which supported the remediation measures significantly.