

Resistivity monitoring of a landslide in the Swabian Alb, Germany

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The study area is located at the Jurassic escarpment and generally consists of impermeable clays and marls underlying limestone. The investigated slope (approx. 0,5 ha) is periodically active and part of a larger landslide (approx. 3 ha).

In the course of an integrative landslide early warning system (ILEWS research project, sponsored by the German Federal Ministry of Education and Research) a remote controlled resistivity monitoring system with two perpendicular profiles (48 and 30 electrodes, 3 m electrode spacing) was installed. Furthermore an automated procedure for collecting and processing the data was developed. The resistivity data were combined with climate data, in-situ soil moisture measurements (Time-Domain-Reflectometry-probes) and inclinometer measurements gained on location by other partners of the ILEWS project.

Due to variations in resistivity data toward soil moisture and precipitation we mainly pursued two approaches: time lapse inversion and single data point analysis.

The first one detects the reaction of whole regions to rainfall events. The second approach allows the correlation between resistivity data (raw values from pseudo section or inverted data points) and soil moisture content or precipitation. Nevertheless the relationships are non-linear but correlations of resistivity variations and rainfall events are clearly seen.