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Development of a Geophysical and Geotechnical remote observatory platform

Meldrum Philip[1], Chambers Jonathan[1], Wilkinson Paul[1], Kuras Oliver[1], Uhlemann Sebastian[1], Gunn David[1], Oxby Lucy[1], Haslam Ed[1]

[1]*British Geological Survey, Nottingham, UK*

Creating a remote geophysical-geotechnical observatory platform presents its own unique challenges, which includes the development of robust field instrumentation as well as associated software systems to facilitate the automated storage and processing of very large time series datasets.

Here we describe the development of the BGS ALERT (automated electrical resistivity tomography) system, and associated geotechnical monitoring capability, for end-to-end data capture, storage, data processing, modelling and information delivery. We discuss the instrument architecture and measurement system design, including the practical considerations of power supply and wireless communications at remote field sites. System control (scheduling and data acquisition), data archiving and data processing are also considered in the context of the ALERT database management scheme (DBMS), which has been implemented to automate many of the data processing tasks required for monitoring activities.

We provide examples of the practical deployment of the ALERT monitoring platform for applications including slope stability assessment and groundwater management.