Imaging of hydrological processes in a lowland wetland of the Lambourn river, Berkshire, UK

Uhlemann, S.S.*, Sorensen, J.P.R., Chambers, J.E., Wilkinson, P.B., Oxby, L., Gooddy, D.C., Old, G.H., Kuras, O., Meldrum, P.I.

* Presenting author

The River Lambourn and the associated wetlands comprise some of the least impacted chalk river systems in Britain. The associated lowland wetlands, due to their hydrological characteristics, may form a key conduit for, or barrier to, aqueous fluxes between land, rivers and groundwater. At Boxford, Berkshire, UK, a research site has been monitored for a number of years to establish the degree of groundwater and surface water interaction. Recently, two geoelectric monitoring lines have been added and measurements have been repeated every month.

The imaging of shallow processes in a regime where moisture content is hardly changing generates an environment for time-lapse electrical resistivity (ERT) monitoring in which accurately modelling temperature effects and their correction is necessary to define changes caused by hydrological processes. We present the methodology of temperature correction, as well as the corrected resistivity models, which are compared to geotechnical data (i.e. moisture content, water level, soil temperature, bulk conductivity). By applying edge-detection on the inverted, temperature-corrected resistivity models we obtain the thickness of a peat layer throughout the monitoring period. By comparing these thicknesses with dGPS measurements we evaluate the capability of ERT for imaging shrinking and swelling processes of this peat layer.