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FINDING THE RIVER SIGER: BGA GRAY-MILNE TRUST REPORT 2023

In southwest England, the coastal wetland plain of the Somerset Levels is strewn over with buried ancient river systems, that provide a glimpse into the natural history of the riverine landscape. I use a combination of ground penetrating radar, seismic refraction, and electrical resistivity surveying techniques to image the subsurface and learn about the development of the rivers for my PhD. With such a lot of equipment, I'm extremely grateful to the BGA Gray-Milne Trust for providing me the funding to hire a van for getting to and from site for my most recent field campaign to the River "Siger".

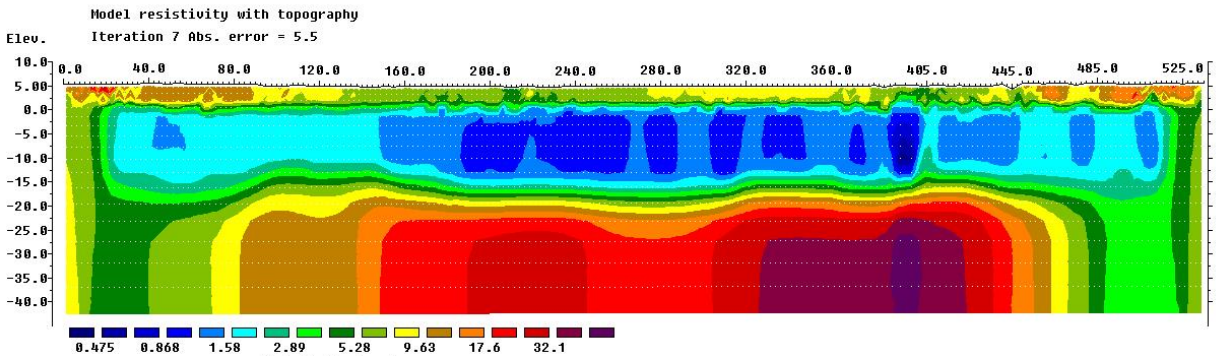
Holding two ends of the same cable after a long week of fieldwork.

The Siger was a large tidal channel that has been subject to changing climatic conditions from the early Holocene up to its eventual abandonment during the medieval period. Although the river is clearly visible from LIDAR imagery, the internal structures of the banks and channel fill has only been investigated by one-dimensional coring, and so its true magnitude, dynamic processes, and relationship with the tidal Bristol channel are not fully understood. In a risk management framework shifting ever toward *working with natural processes (e.g., river restoration)*, understanding the responses to climatic and anthropogenic influences—often occurring over long-time periods—is essential to creating sustainable flood risk reduction.

Survey Parameters
ERT: 5m electrode spacing, Wenner-Schlumberger array.
Seismic refraction: 2m-spacing, 14hz geophones, sledgehammer source.
GPR: dual antenna (70mhz, 300mhz), skidplate.

With the help of the BGA, this fieldwork has helped explore the advantages and limitations of using different two-dimensional geophysical surveying techniques to image clay-dominated palaeochannels on a largely reclaimed coastal floodplain. Initial analysis demonstrates the ERT abilities for capturing the extent of the channel and its relationship to the surrounding sediment sequence, but the cross-sectional shape, was obscured (likely by water table interference). Depth calibration on the bank margin has been explored using expected ground penetrating radar and seismic refraction velocities of silty-clay sediments at the position of an erosive surface likely to be the northern perimeter of the channel fill.

A final fieldwork campaign is planned this year which will complete the set of palaeochannels chosen across the Somerset Levels to be used for constructing a comprehensive understanding of river system development under varying levels of human and climatic influence. The work that the BGA has supported on the River Siger has therefore played a key role in the case study comparison that will inform the final findings of my thesis.



Electrical resistivity inversion profile of the buried River Siger, revealing its two-dimensional structure.