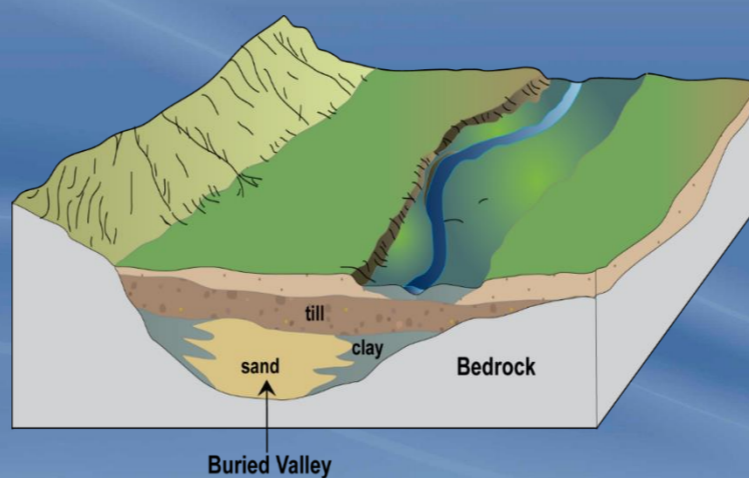


Ancient valleys buried beneath the UK



British Geological Survey
Expert | Impartial | Innovative

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Andrew Finlayson, Hannah Gow.

National Buried Valley dataset

GIS dataset is freely available from:

<https://www.bgs.ac.uk/products/onshore/BuriedValleys.html>

Buried valleys are valleys that have become infilled by sediment so that they have little or no surface expression in the landscape. They represent the thickest accumulations of superficial deposits in the UK

They conceal ancient, abandoned sub-aerial (river) or subglacial drainage networks that can have significant and often unexpected implications for hydrogeology.

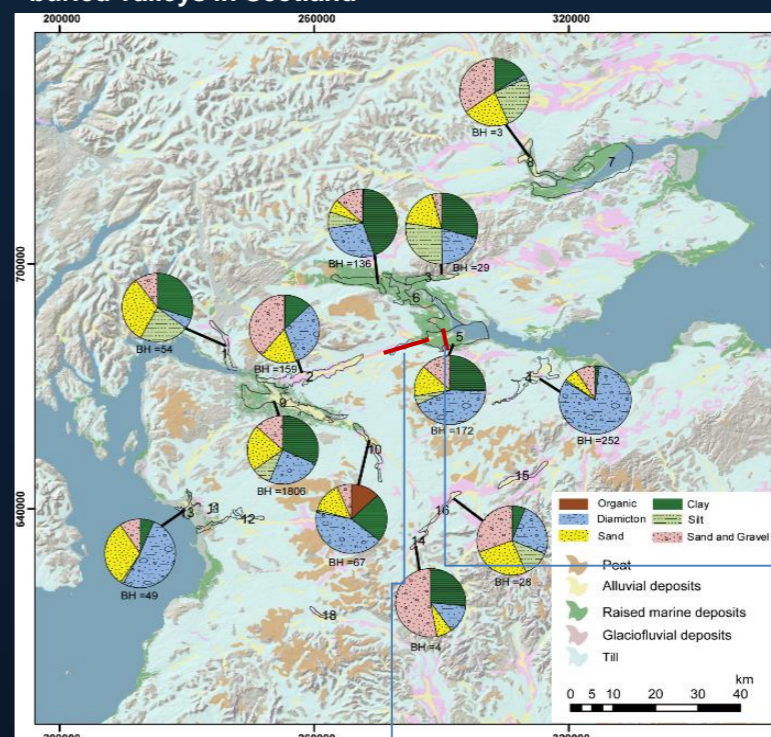
Discovery - using 'big' borehole data and data mining

The British Geological Survey has recognised the occurrences of buried valleys through its survey activities since the 1870's. By using newly developed data mining methods we reviewed all of BGS's historical records and created a national dataset of recorded buried valley.

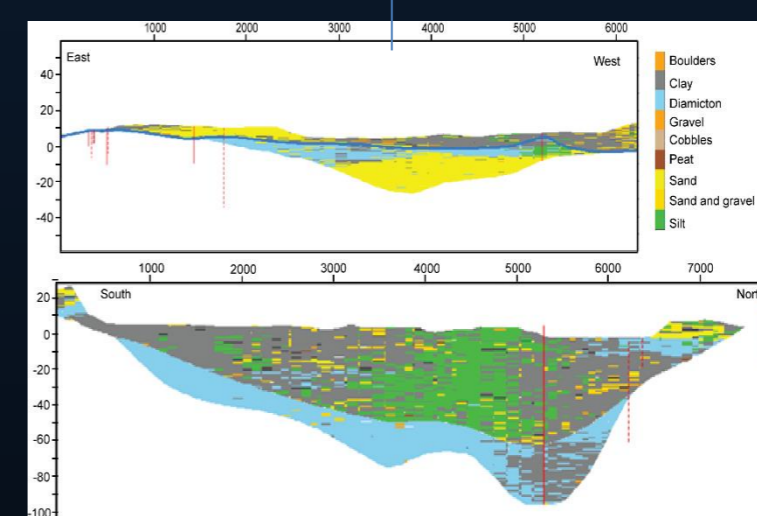
Now the availability of 'big' borehole data for the UK means that these features can be studied at a national scale for the first time. There are currently nearly 300,000 boreholes that penetrate the full thickness of superficial deposits, and which can be used to identify and quantify the shape, fill and evolution of these features.

Case study Midland Valley of Scotland

Proportion of different types sediments that fill the buried valleys in Scotland



In the Midland Valley of Scotland 18 buried valleys were identified, ranging from 4-36 km in length and 24-162 m in depth. Geometric analysis has revealed four distinct valley morphologies which were formed by different subglacial and river processes.



Cross sections through the Carron buried valley illustrating the lithological variability in the fills

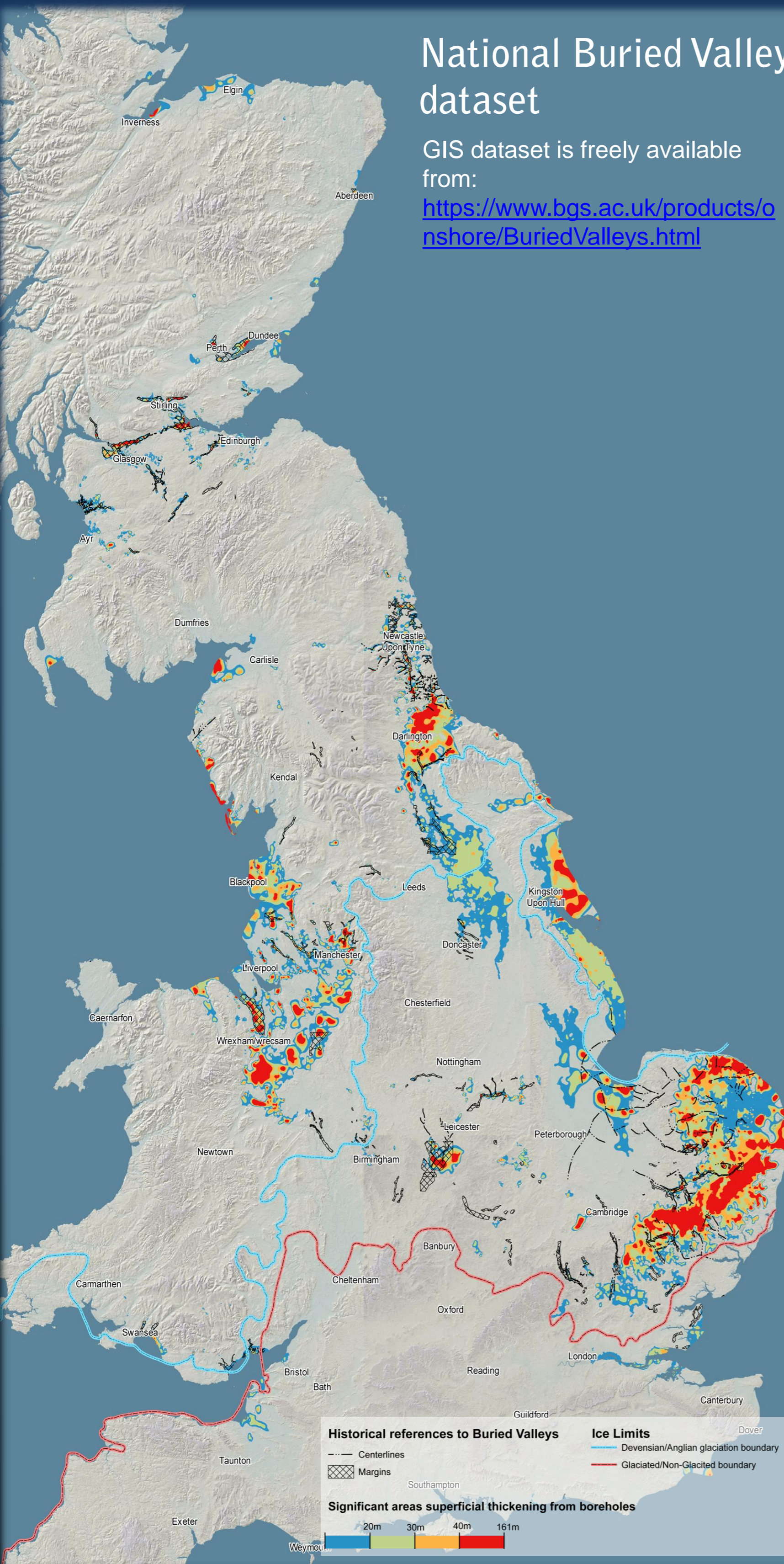
The infills of these palaeovalleys are equally variable ranging from less than 10% to over 50% sand and gravel and appear largely unrelated to the processes that formed them. Instead, infilling occurred predominantly during deglaciation in response to fluvial capture and/or sea-level change (drowning)

Publications
Kearsey, Timothy I.; Lee, Jonathan R.; Finlayson, Andrew; Garcia-Bajo, Marieta; Irving, Anthony A.M.. 2018 Examining the geometry, age and genesis of buried Quaternary valley systems in the Midland Valley of Scotland, UK. *Boreas* <https://doi.org/10.1111/bor.12363>

Future work

The work in the Midland Valley of Scotland has shown that buried valleys are have very variable fills and geometries

Our current methods are limited to those areas with digital borehole records. By combining airborne and ground geophysics with boreholes and geomorphology is may be possible to identify buried valleys in areas without boreholes.



Historical references to Buried Valleys
Centerlines
Margins
Ice Limits
Devensian/Anglian glaciation boundary
Glaciated/Non-Glaciated boundary

Significant areas superficial thickening from boreholes
20m 30m 40m 161m

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Dataset will be available from www.bgs.ac.uk