

The Vale of York

Multidisciplinary survey and geographical information system

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⁶⁶ gone are mapping pens and layer upon layer of tracing paper, gone are hand-drawn borehole cross-sections, gone are hand-coloured geologists' maps ²⁹ he way in which we make a geological map is changing. Gone are mapping pens and layer upon layer of tracing paper, gone are handdrawn borehole cross-sections, gone are hand-coloured geologists' maps. We now have the project geographical information system (GIS), borehole databases and computers to allow us to collate and compare information and to produce the latest geological maps.

The resurveying of the Selby area in the Vale of York began by bringing together many disparate datasets in the project GIS to allow more information to be collated before a geologist set foot in



Geochemistry of the near surface, analysed to differentiate geological lithologies. The large red dots indicate high levels of titanium oxide in the soil and correspond to the clay lithologies. The sands have small dots and are depleted in titanium oxide. This type of analysis has helped to determine areas where the mapping needed revision.

the field. The project GIS has been taken to the field and modified at the field base station. After fieldwork, it has allowed the information to be further interpreted and modified back in the office. The resurvey has brought together:

- Previous Geological Survey data including field and published maps.
- Soil Survey (National Soil Resources Institute) information under licence.
- Soil geochemistry data from the BGS's G-BASE project.
- Digital borehole information with 3D visualisation.
- Digital Terrain Model data.
- Existing historical map information.
- 3D air photography interpretation.
- Rockhead modelling from the borehole information.
- Coal Authority mine plan and seismic data.
- Oil company seismic data and workstation interpretation.
- Artificial ground mapping from old maps and air photographs.
- Field surveying, feature mapping and augering.
- Four QMT (Quaternary Methods and Training) funded cable percussion boreholes.

The revised Selby geological maps and 3D data models are now being produced. They show us the positions of moraines

Modern geological mapping



 Pro-glacial lake
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 wing positions of the Escrick and York
 pro-glacial lake (mainly blue colours) to the south.

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Digital terrain model (DTM) of the Vale of York showing positions of the Escrick and York Moraines (at York and to the south) with the pro-glacial lake (mainly blue colours) to the south. Based on Ordnance Survey topographical information modified by CEH.

across the Vale of York and the glacial lakes that formed to the south of them. Together, they help us to improve our understanding of the landscape and the development of the last ice age. The low-lying area is undermined for coal, subject to subsidence and prone to flooding; the new geological maps help in the understanding of the mechanisms that interact to cause such environmental problems. The western side of the Selby area is underlain by the sandstones of the Sherwood Sandstone Group. This major aquifer supplies a large amount of the drinking water in the region.

The new geological maps based on borehole and seismic interpretations are helping with the understanding of the fault pattern, the distribution of the aquifer, and the nature and permeability of the overlying glacial and post-glacial deposits. The maps are also providing insight into the nature and distribution of artificial ground, allowing the identification of potentially contaminated sites and the protection of the local groundwater. Because the output from the project is digital, this information is becoming available much faster than it did in the past. The procedures that have been developed also contribute to the eventual capturing of digital information directly in the field.

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