Facies heterogeneity in the Triassic Sherwood Sandstone Group of the UK: Comparing and contrasting coeval depositional basins

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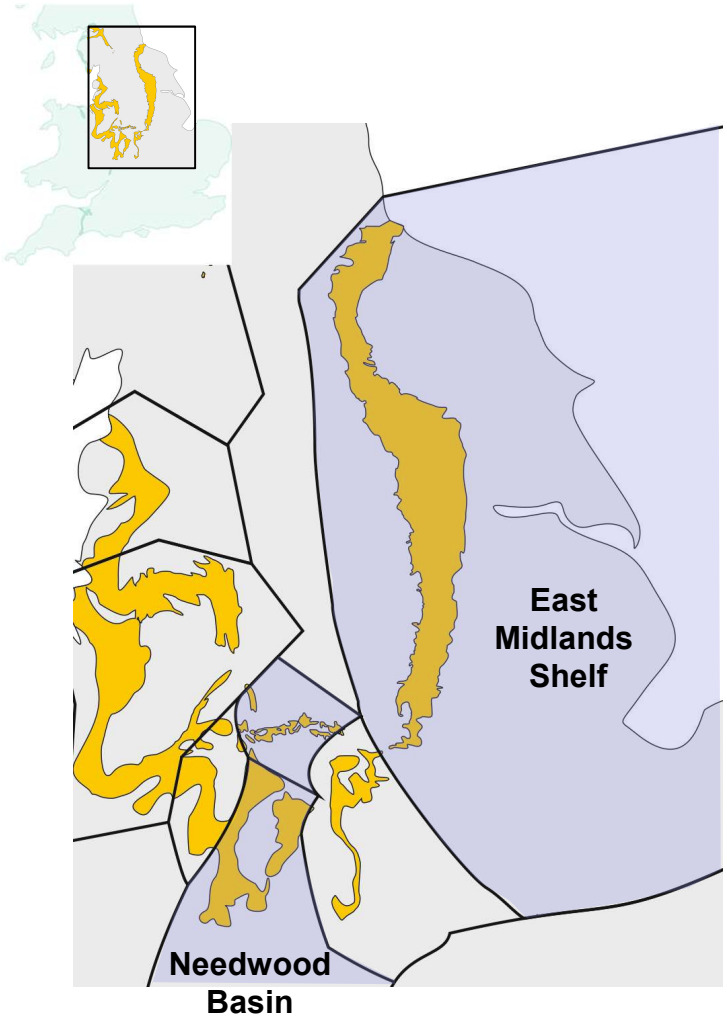
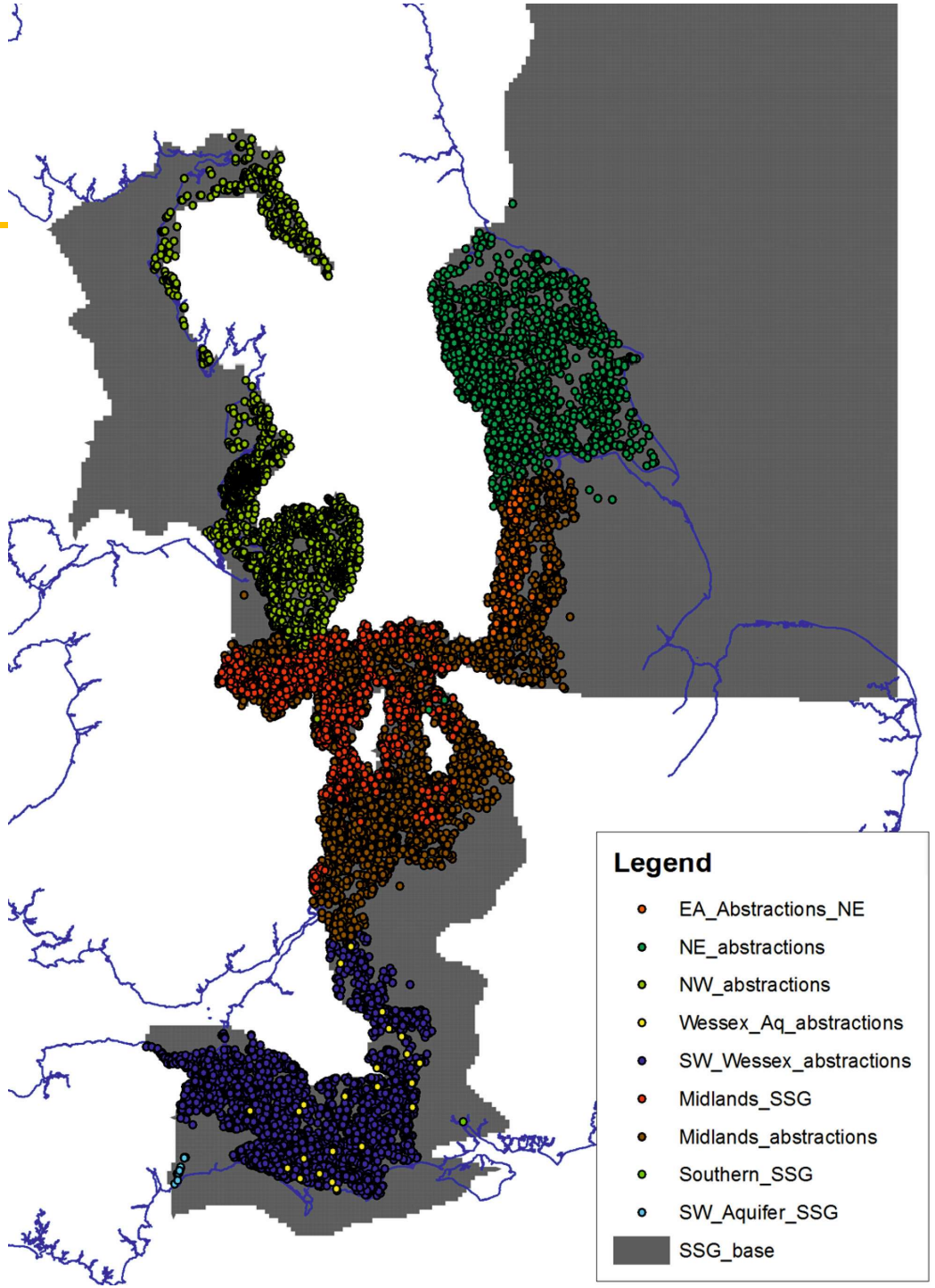
Introduction

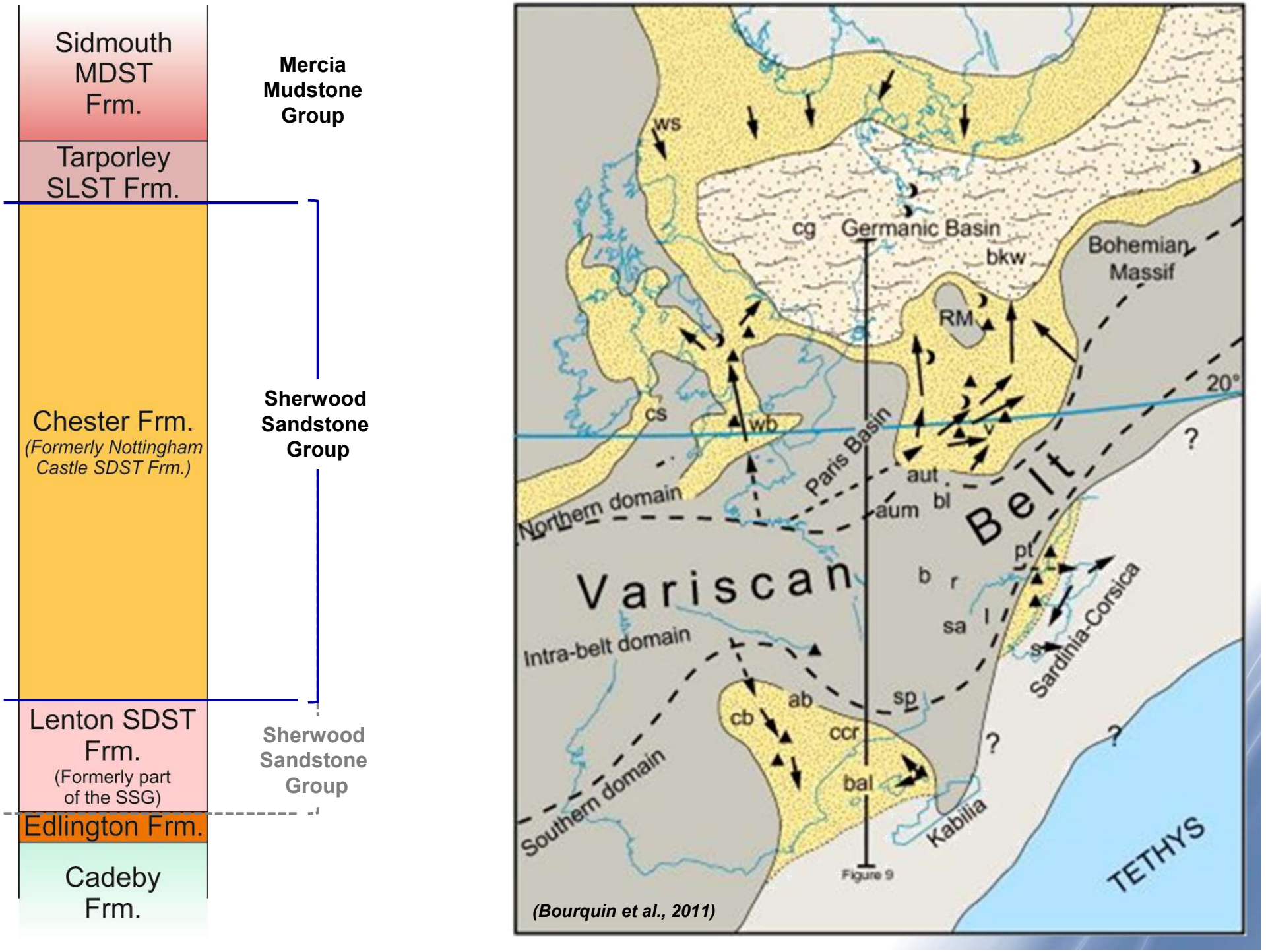


- Triassic (Induan-Olenekian) aged succession comprising mudstone, siltstone, sandstone and conglomerates
- Primarily fluvial = especially in the eastern parts of the UK; little evidence of emergence

Rationale

- Fluid flow within the SSG is relevant to:
  - Aquifer and hydrocarbon reservoir management
  - Contaminant flow models
- A primary control on rock properties which influence fluid flow is sedimentology; influences facies architecture, porosity and permeability
- *Good opportunity to study a relatively well exposed unit in the UK!*




Sidmouth MDST Frm.
Tarporley SLST Frm.
Chester Frm.
(Formerly Nottingham Castle SDST Frm.)
Lenton SDST Frm.
(Formerly part of the SSG)
Edlington Frm.
Cadeby Frm.
Mercia Mudstone Group
Sherwood Sandstone Group
Sherwood Sandstone Group
ws
cg
Germanic Basin
bkw
Bohemian Massif
RM
20°
cs
wb
Paris Basin
aut
aum
bl
Northern domain
Variscan
Belt
pr
b
r
sa
l
s
Sardinia-Corsica
Intra-belt domain
ab
sp
cb
ccr
bal
Southern domain
Kabilia
TETHYS
Figure 9
(Bourquin et al., 2011)

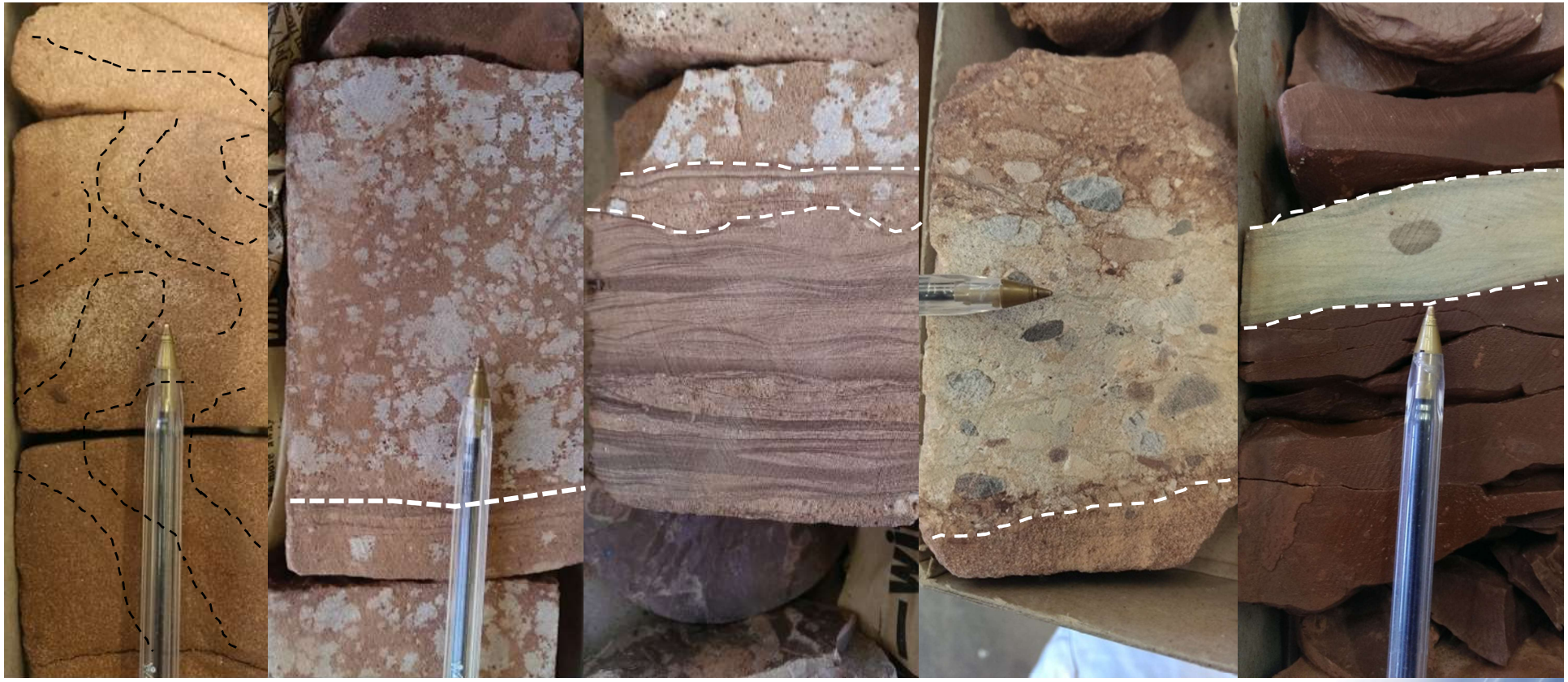
Data Collection

- Data collected from six field localities across the East Midlands Shelf and Needwood Basin supplemented with borehole cores (290m core logged and 14,000 m^2 architectural panels)

Parkhall Quarry, S-o-T

Park Tunnel, Nott.

Facies



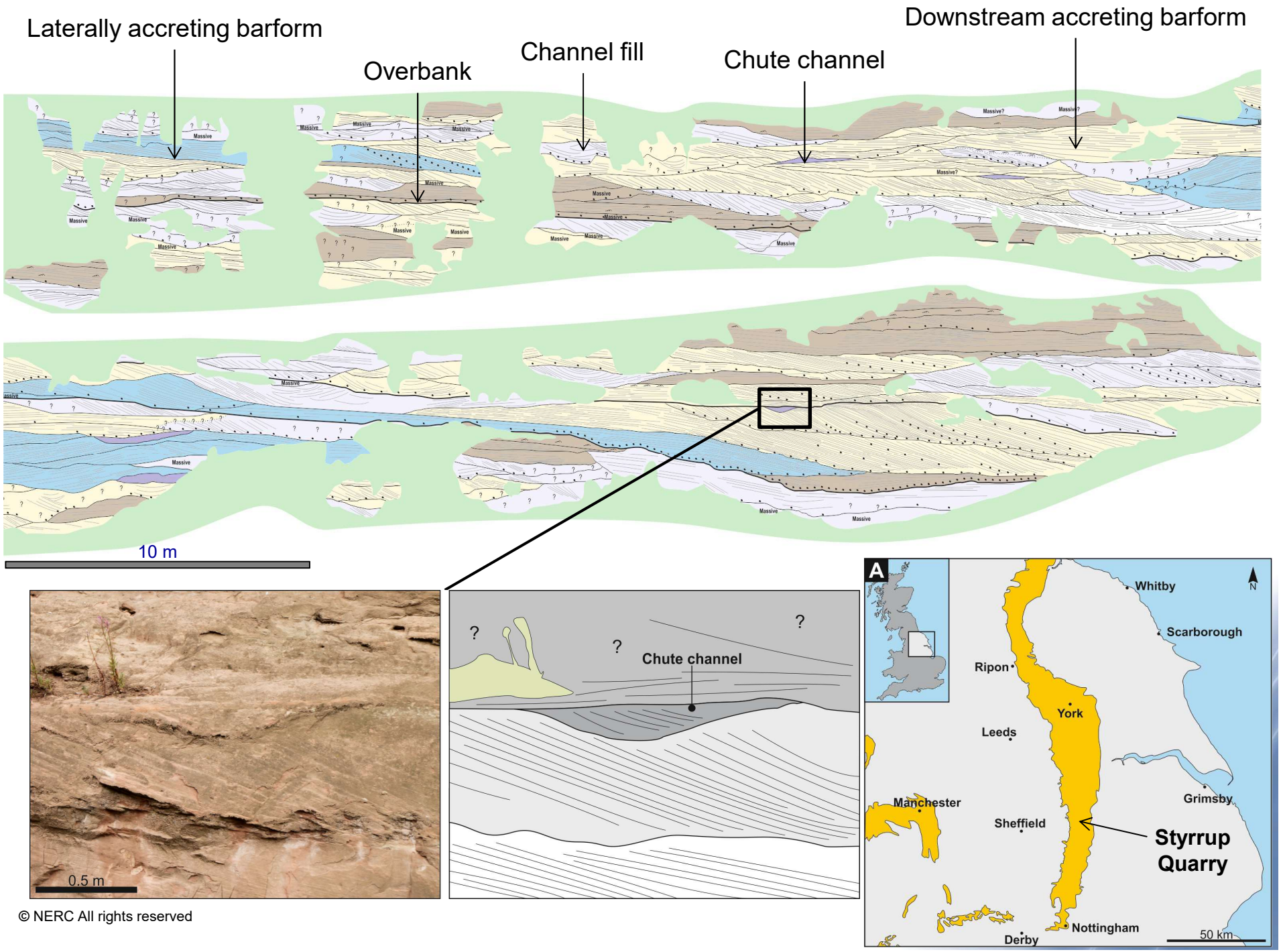
Deformed SDST

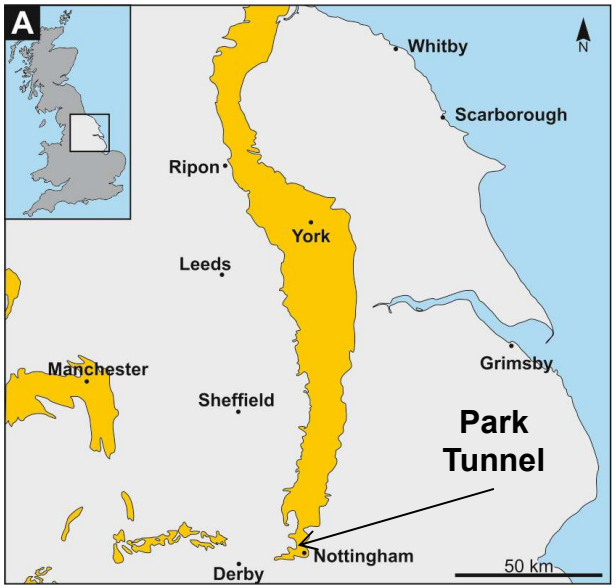
Massive SDST

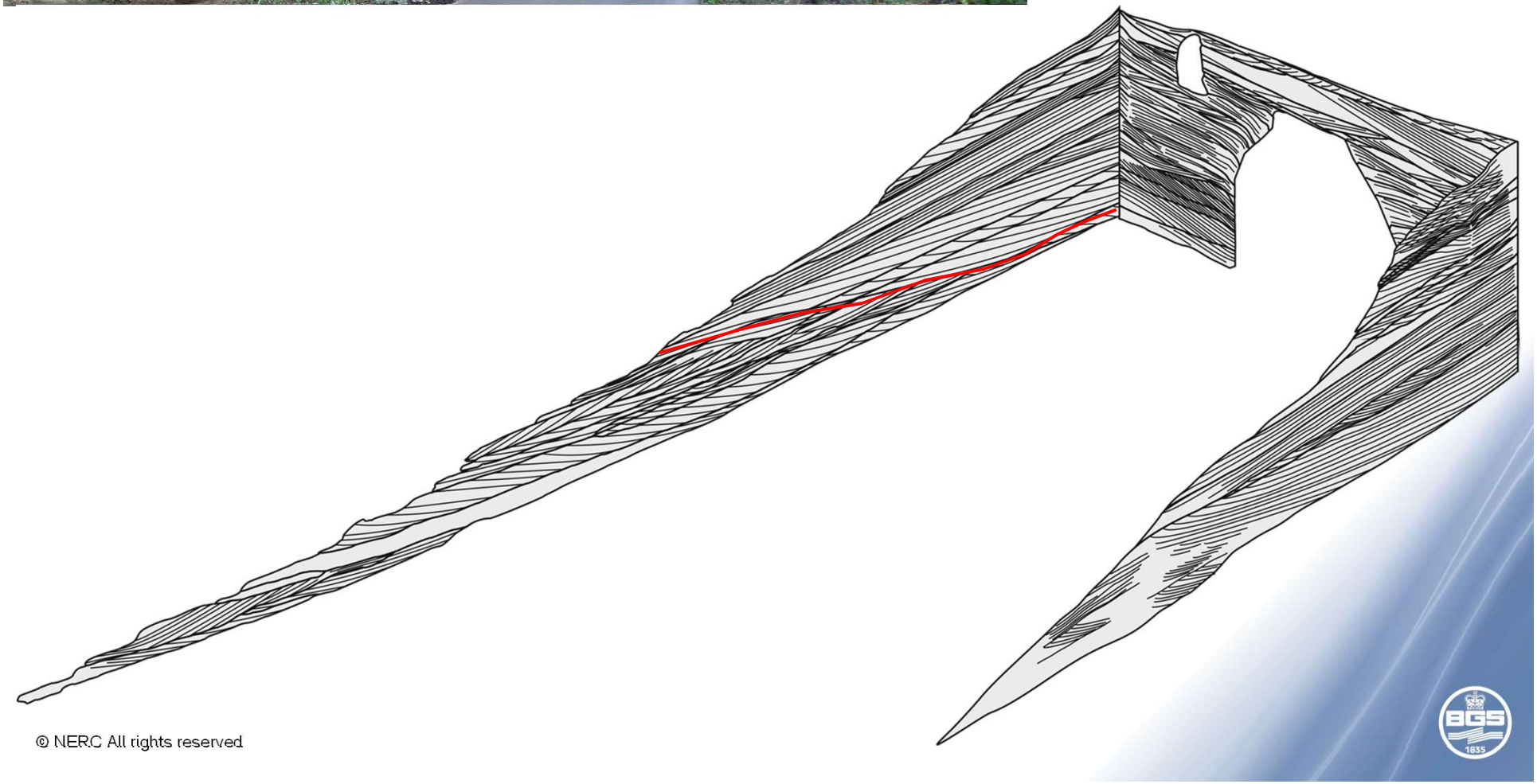
Rippled SDST

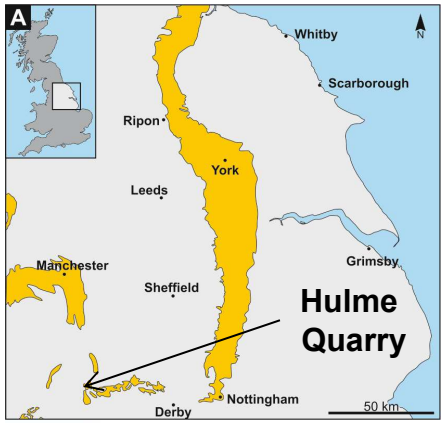
Pebbly SDST

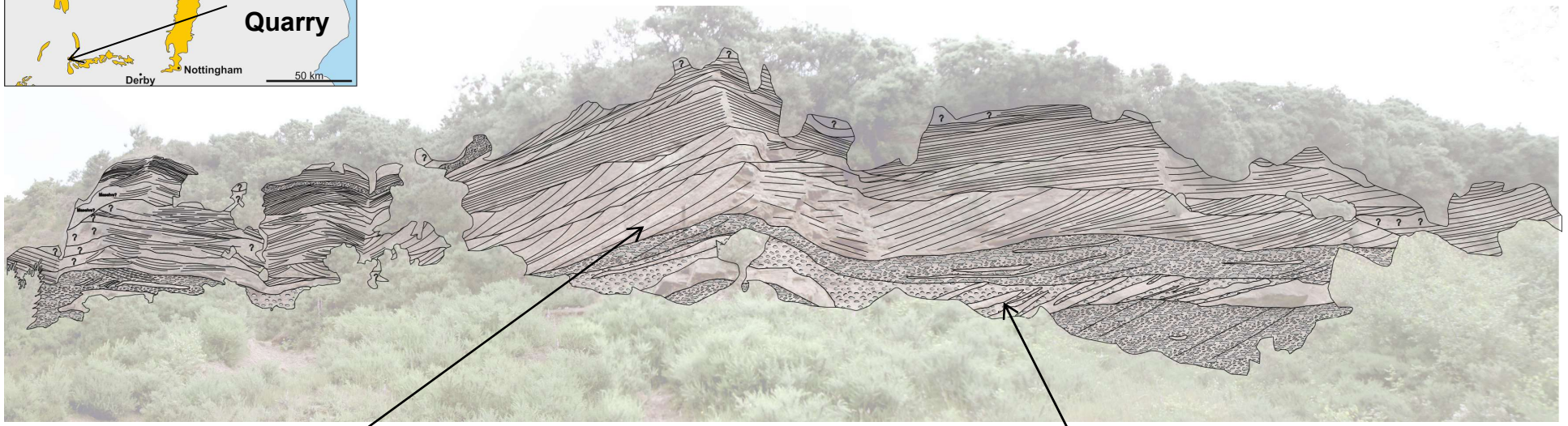
Mudstone & Laminated sandy SLST

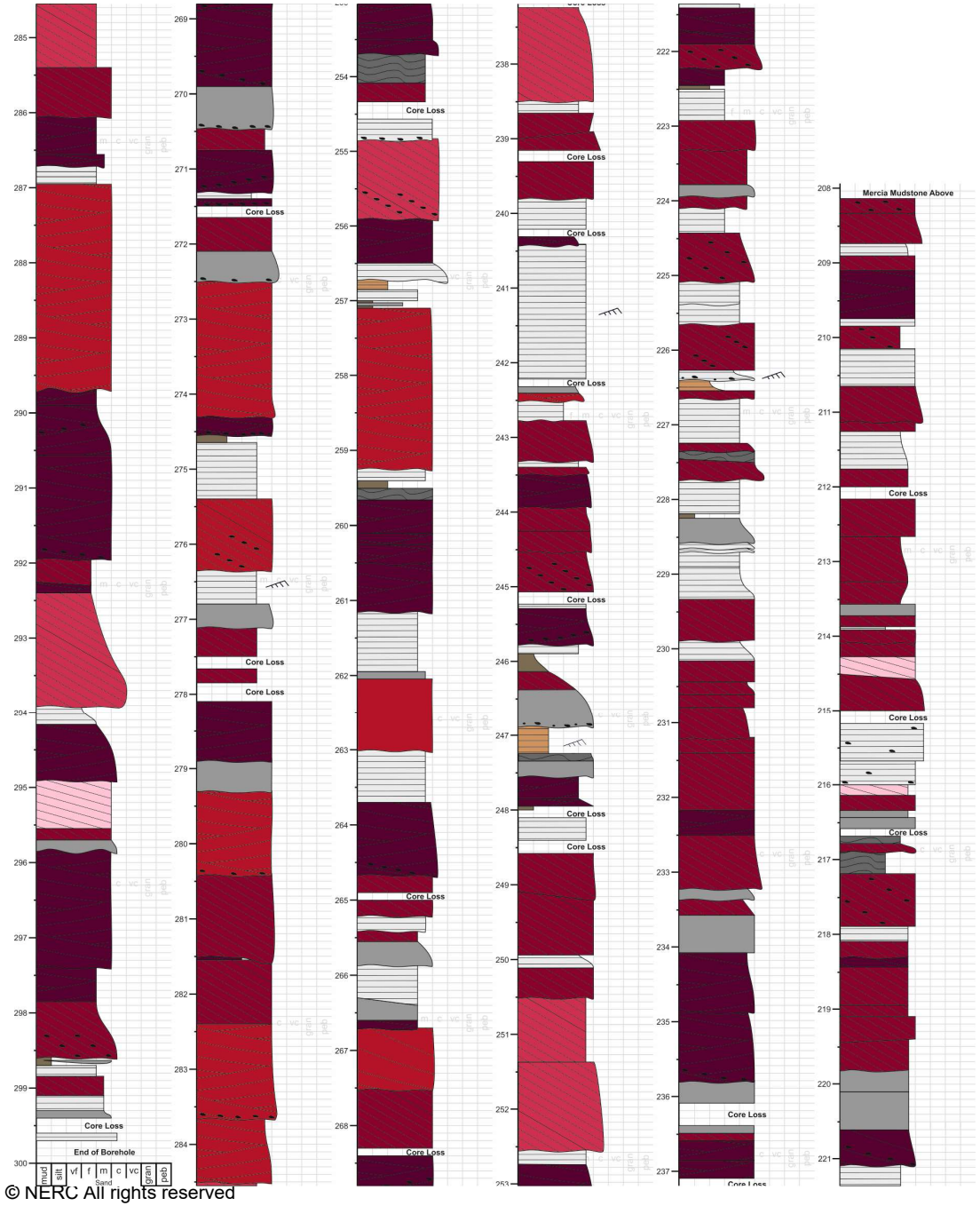




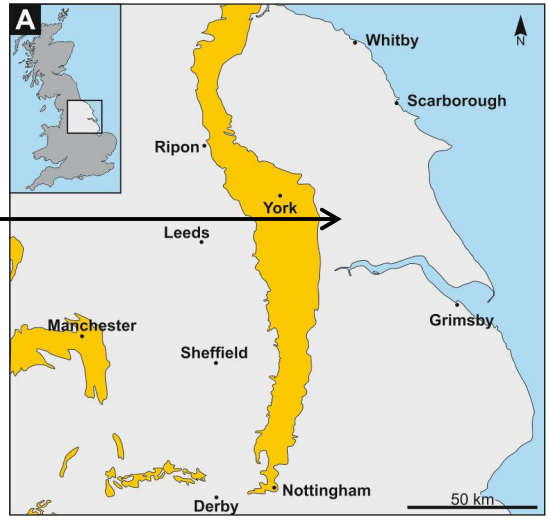



A
Whitby
Scarborough
Ripon
York
Leeds
Manchester
Sheffield
Grimsby
Hulme
Quarry
Nottingham
Derby
50 km
N



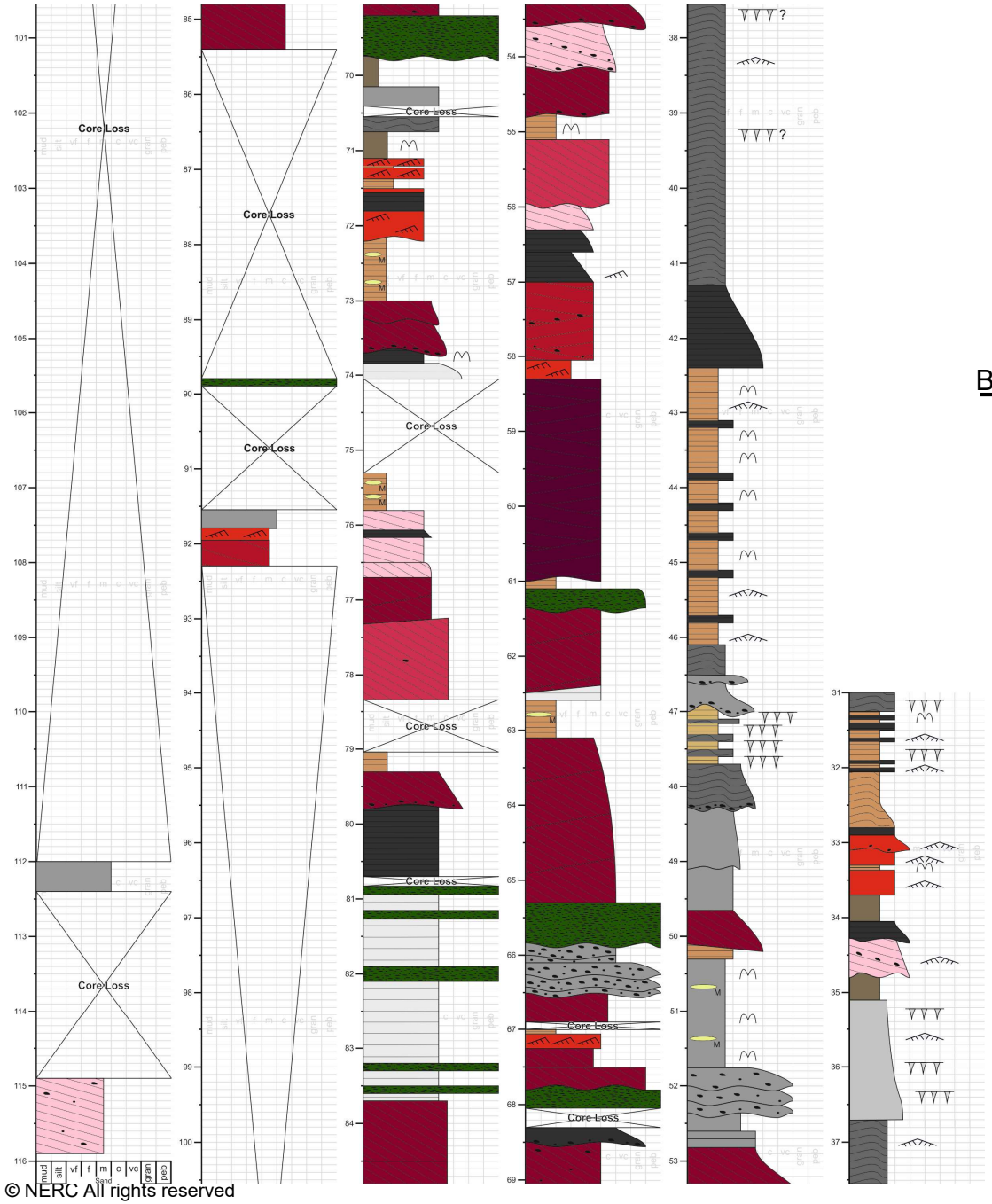


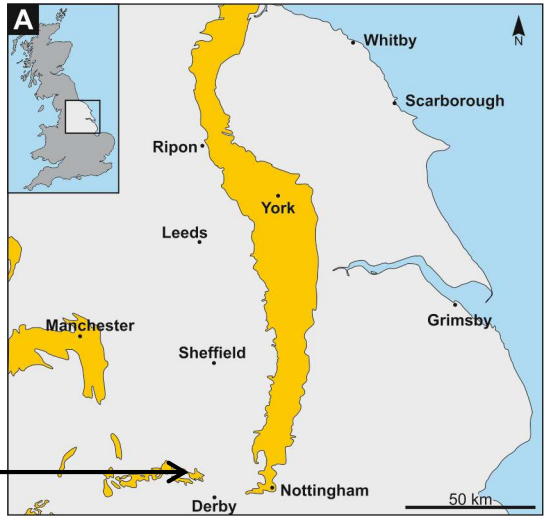
Market Weighton BH Location



- No conglomerates
- Fines <3%
- Sandstone ~97%

- Less facies variability
- 9 facies types





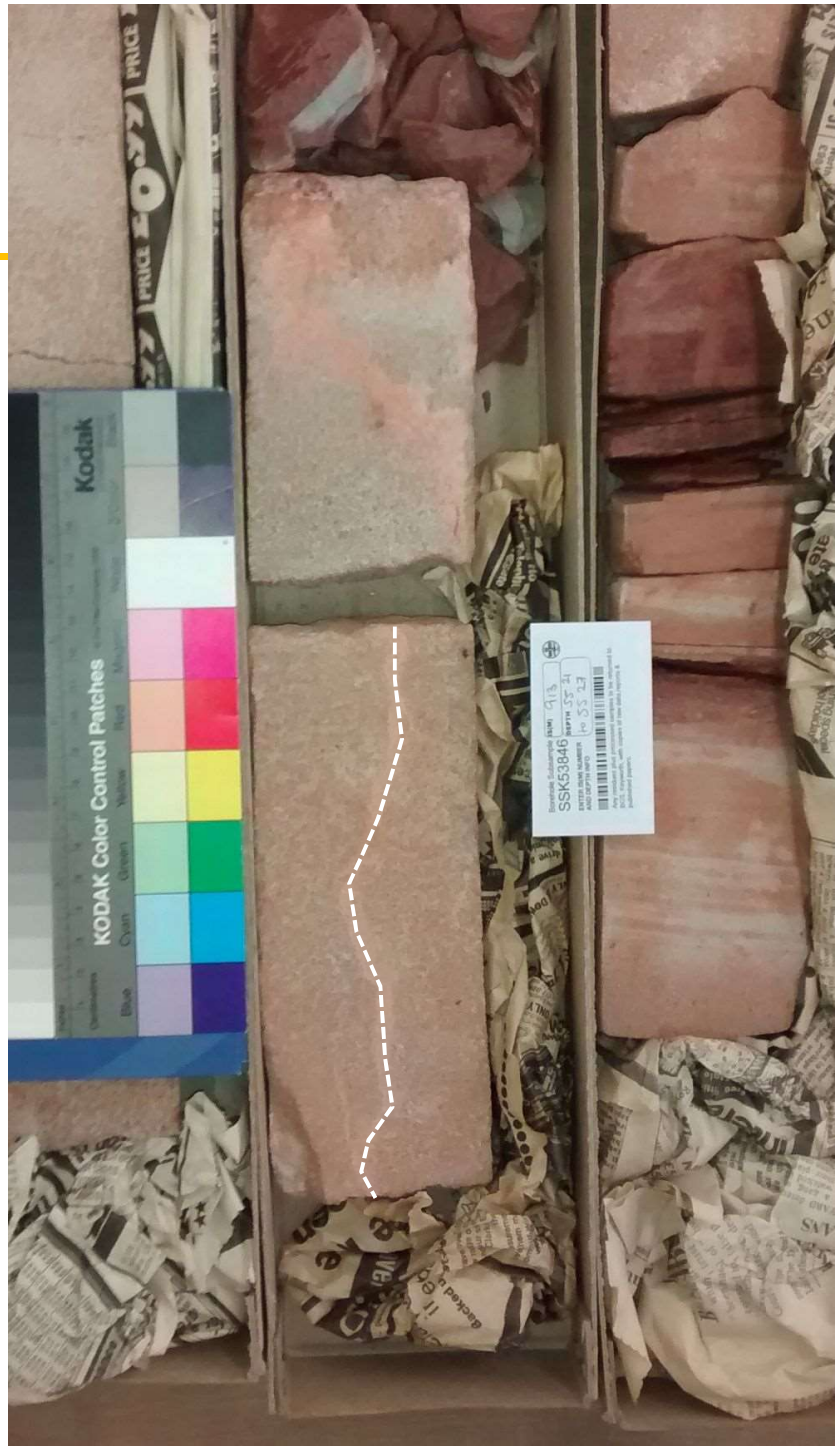
BH Location

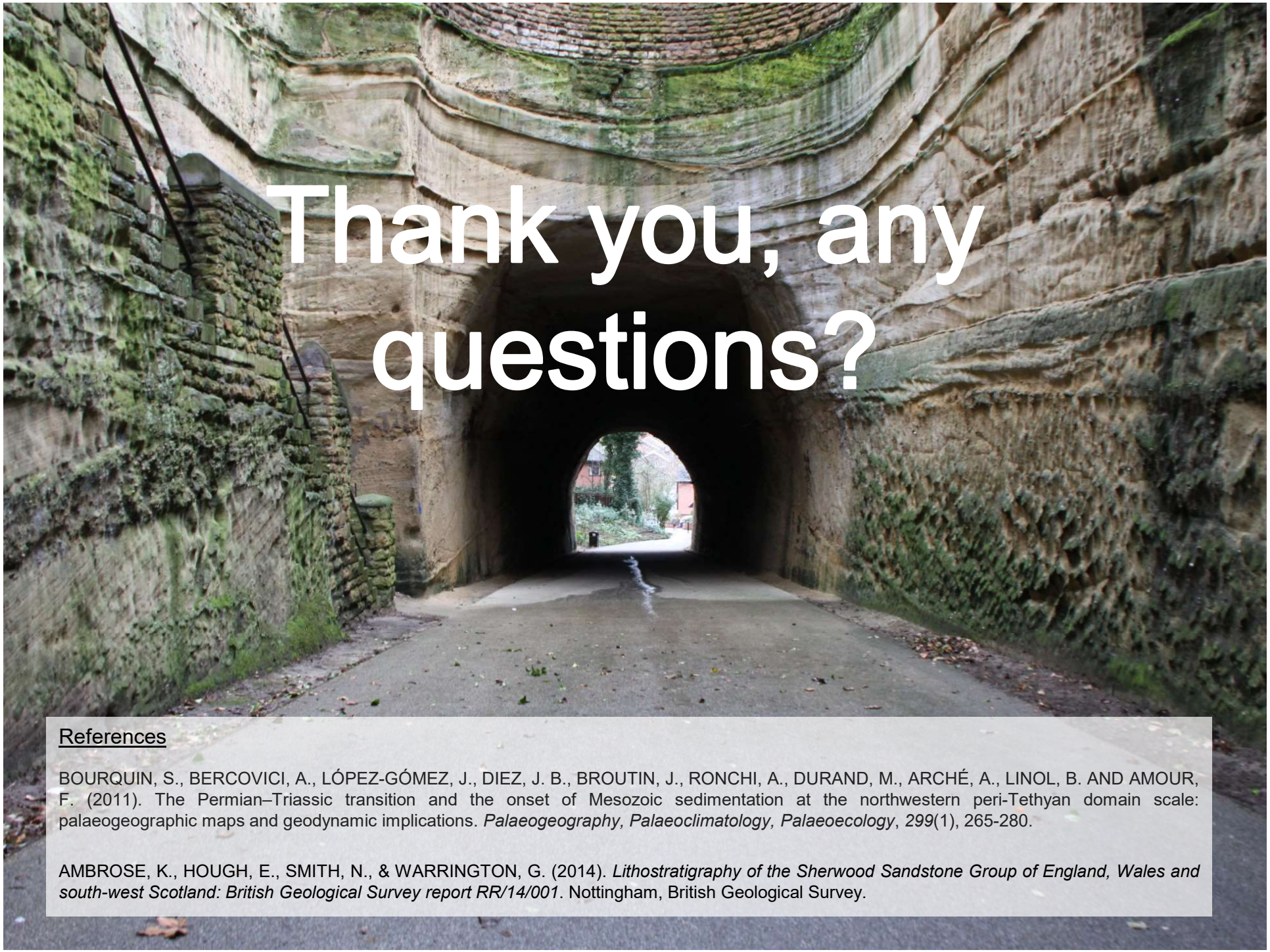
- Conglomerate ~5 – 40%
- Fines ~12 – 20%
- Sandstone ~30 – 83%

- Higher facies variability
- 16 facies types

Future work

- Moving to understand the role of diagenesis and fractures (secondary controls on poro-perm)
- Moving geographically North-West where there is more aeolian influence
- Predictive models of properties
- System interactions





References

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AMBROSE, K., HOUGH, E., SMITH, N., & WARRINGTON, G. (2014). *Lithostratigraphy of the Sherwood Sandstone Group of England, Wales and south-west Scotland: British Geological Survey report RR/14/001*. Nottingham, British Geological Survey.