

The Triassic Main Buntsandstein play – New prospectivity in the Dutch northern offshore

Mesozoic Resource Potential in the Southern Permian Basin, 8-9 Sept 2016, London

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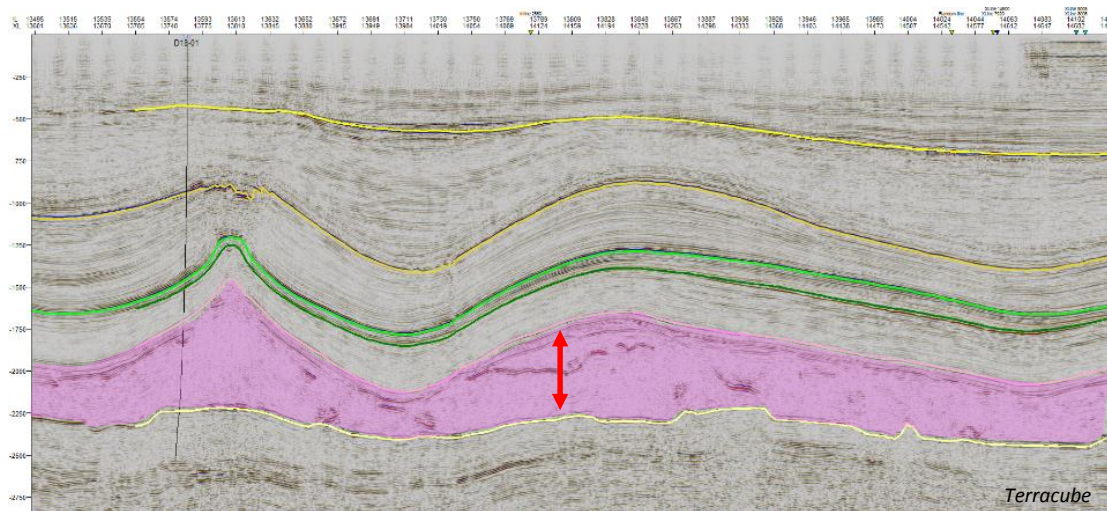
Currently no Triassic fields in Dutch northern offshore

General perception:

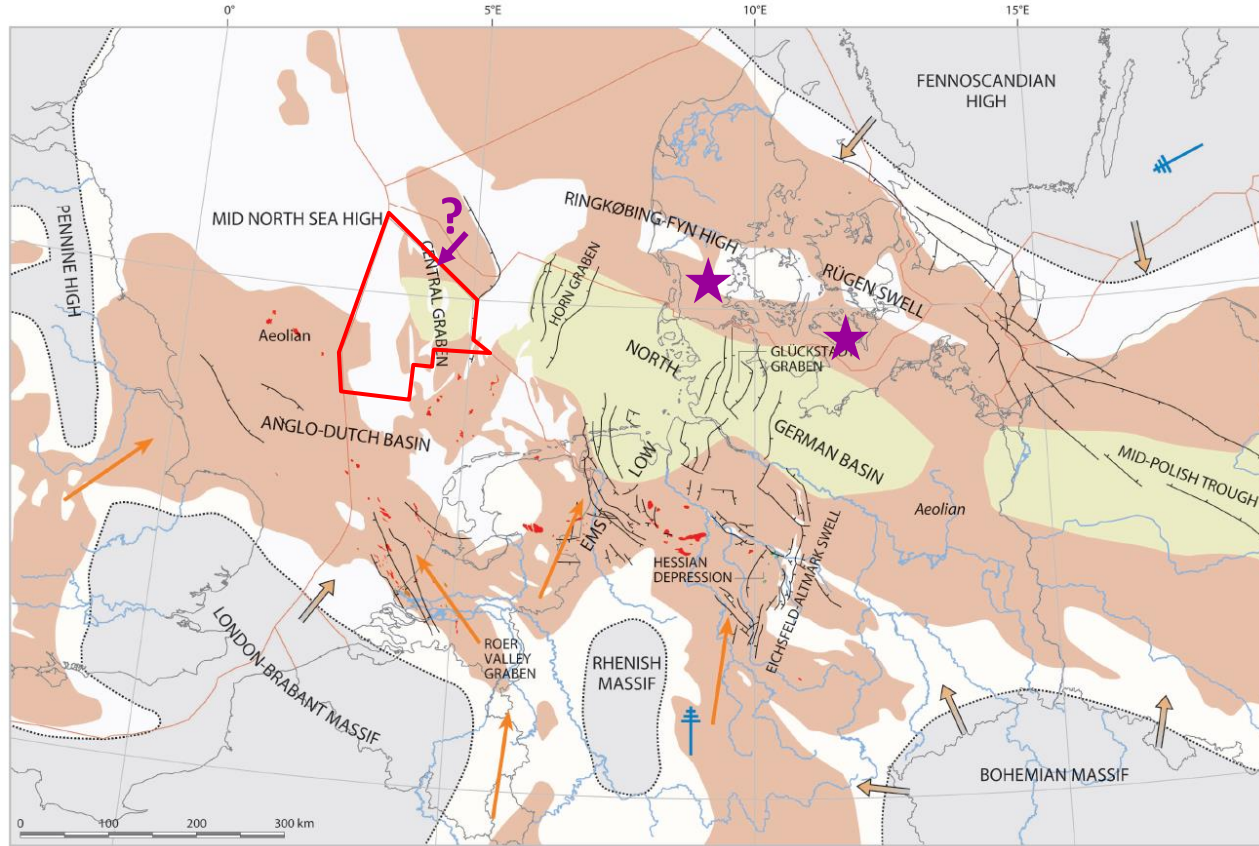
- Thick ZE prevents HC migration into Trias
- Thinning/shaling out of sst packages towards north

Only 20 wells have been drilled in study area (17000 km²) with MBU as primary/secondary target.

11 of these wells: invalid tests of the play



Introduction – northern provenance?



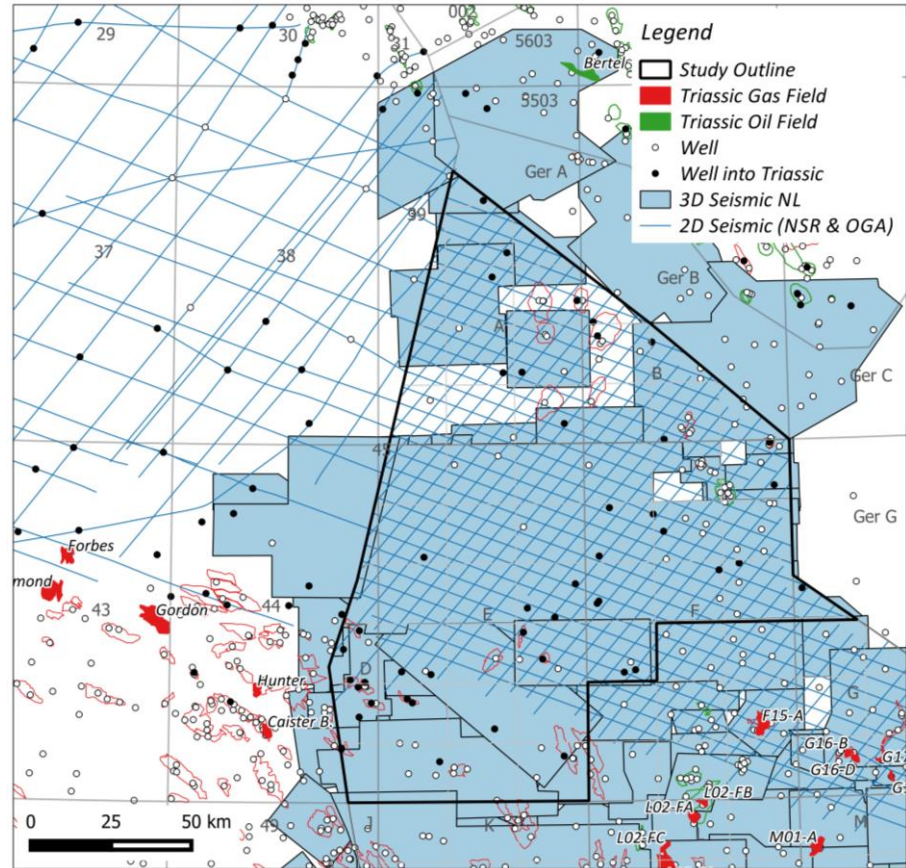
★ Well locations with Solling fluvial sands sourced from Ringkøbing-Fyn High (Olivarius et al., 2015)

- Lake
- Alluvial plain
- Gasfield with Triassic reservoir
- Oilfield with Triassic reservoir
- Gas and oilfields
- Reconstructed basin outline
- Normal fault
- Approximate orientation of fluvial systems
- Direction of clastic influx
- Wind direction
- Direction of marine ingress

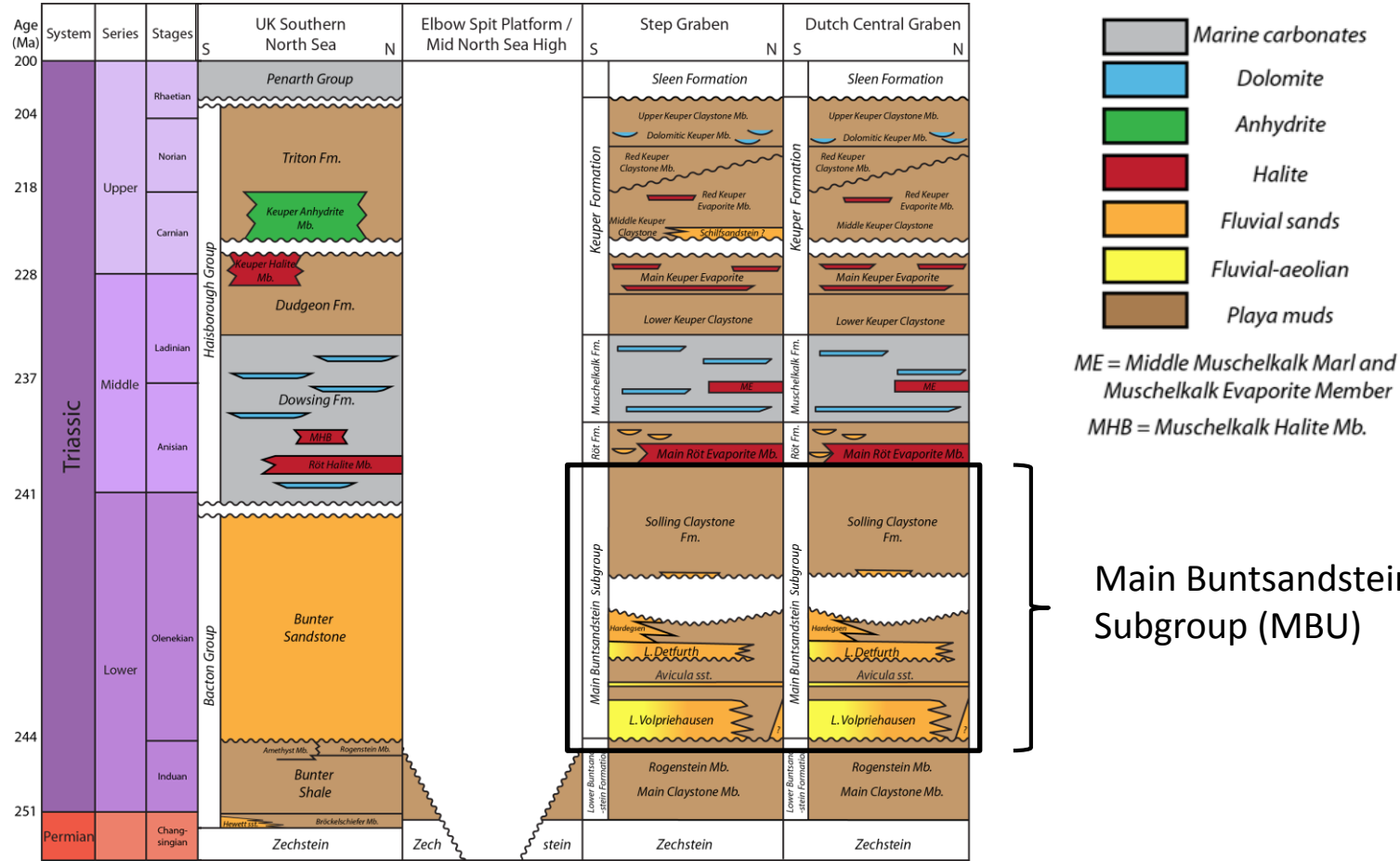
Source: Southern Permian Basin Atlas

Presentation outline

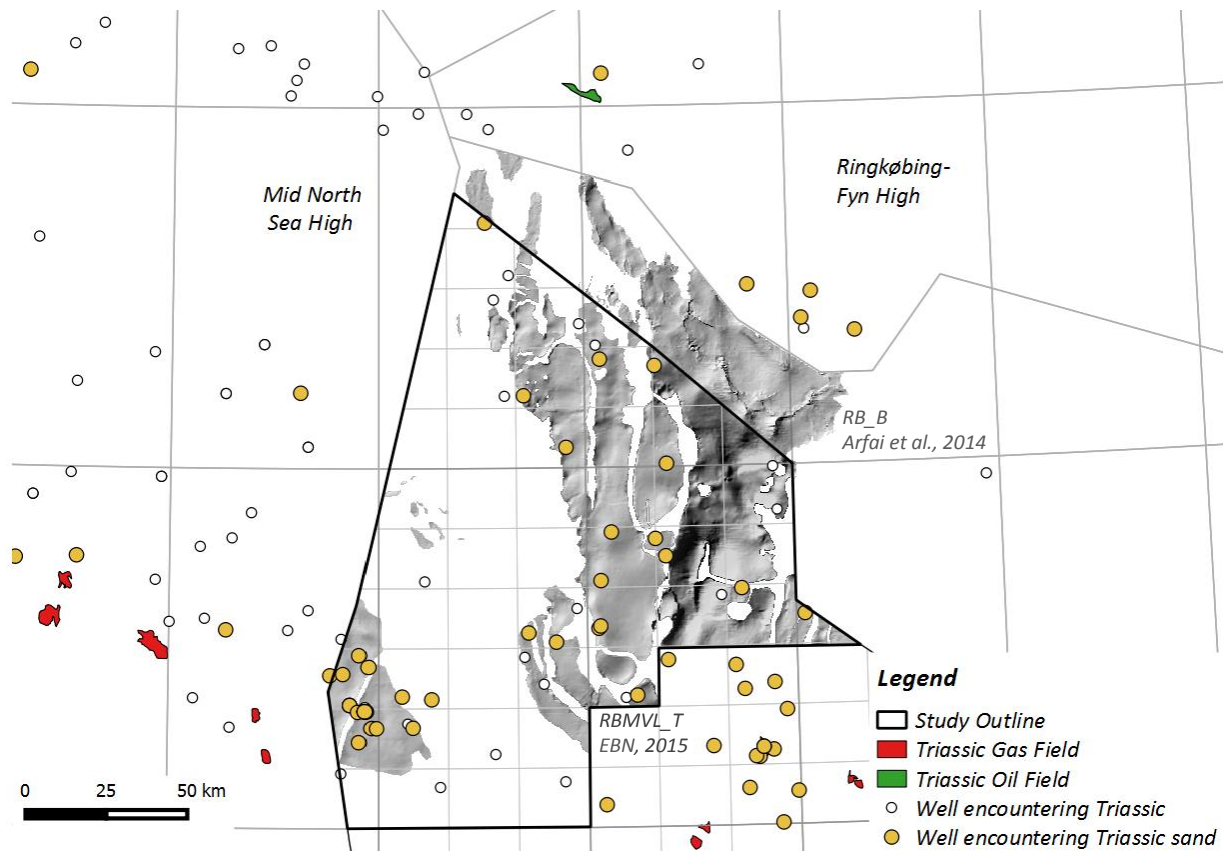
- Regional geology 5 countries-area
Indications for local sediment
provenance (DK and UK)
- New data: biostratigraphy, heavy
minerals, grain size analyses
- New Triassic prospectivity away from
main fairway



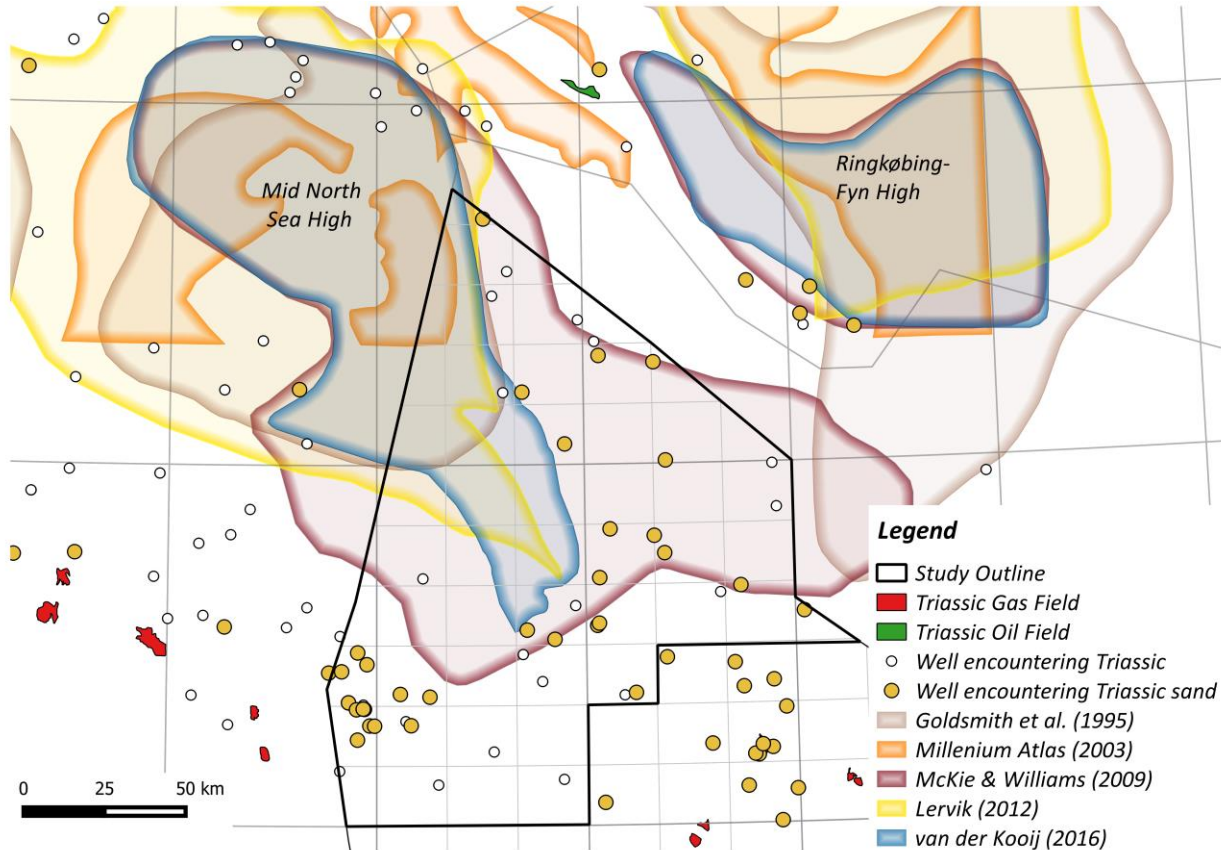
Stratigraphic subdivision of the Triassic



Northern Early Triassic sands: local provenance?



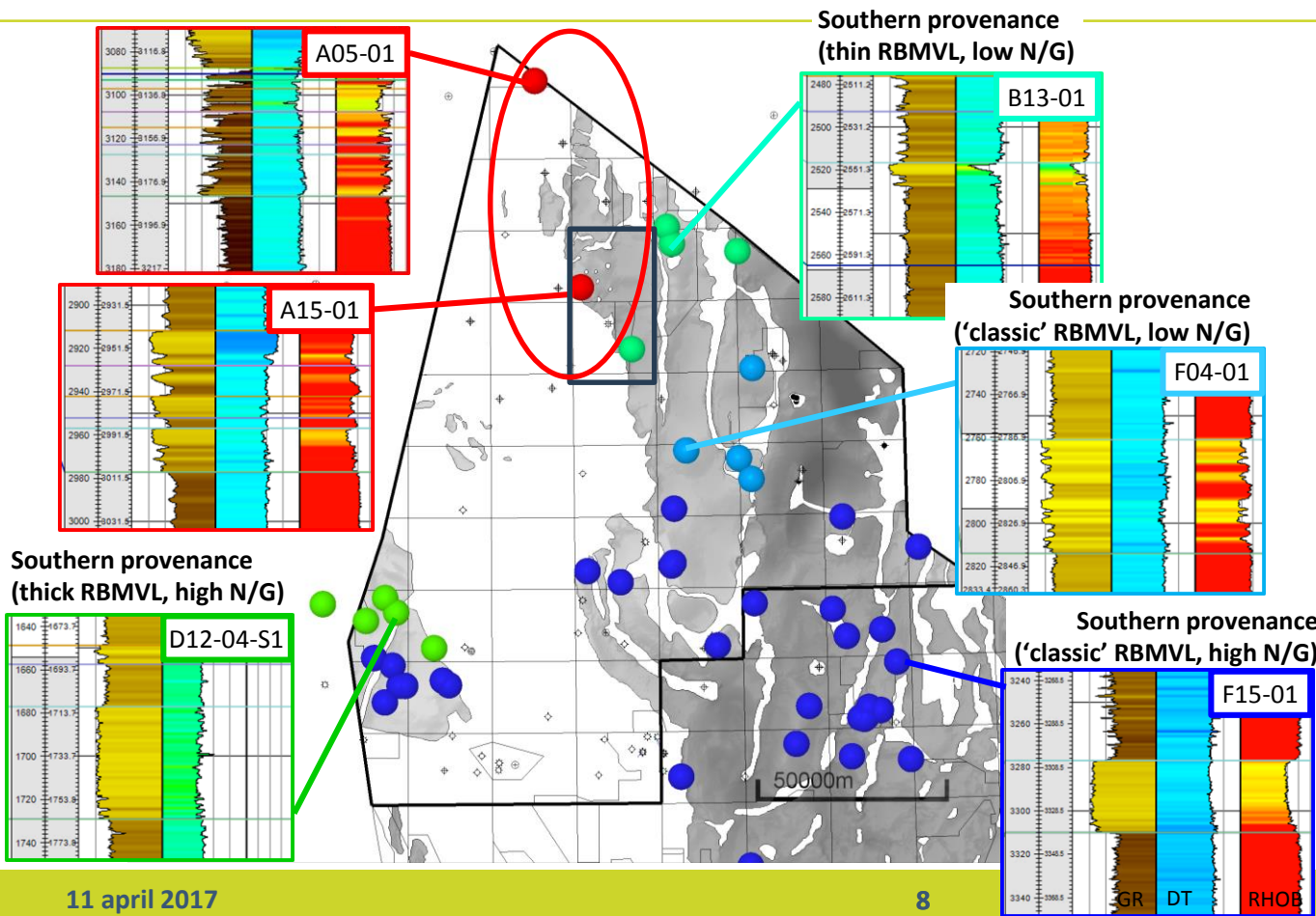
Where are the structural highs?



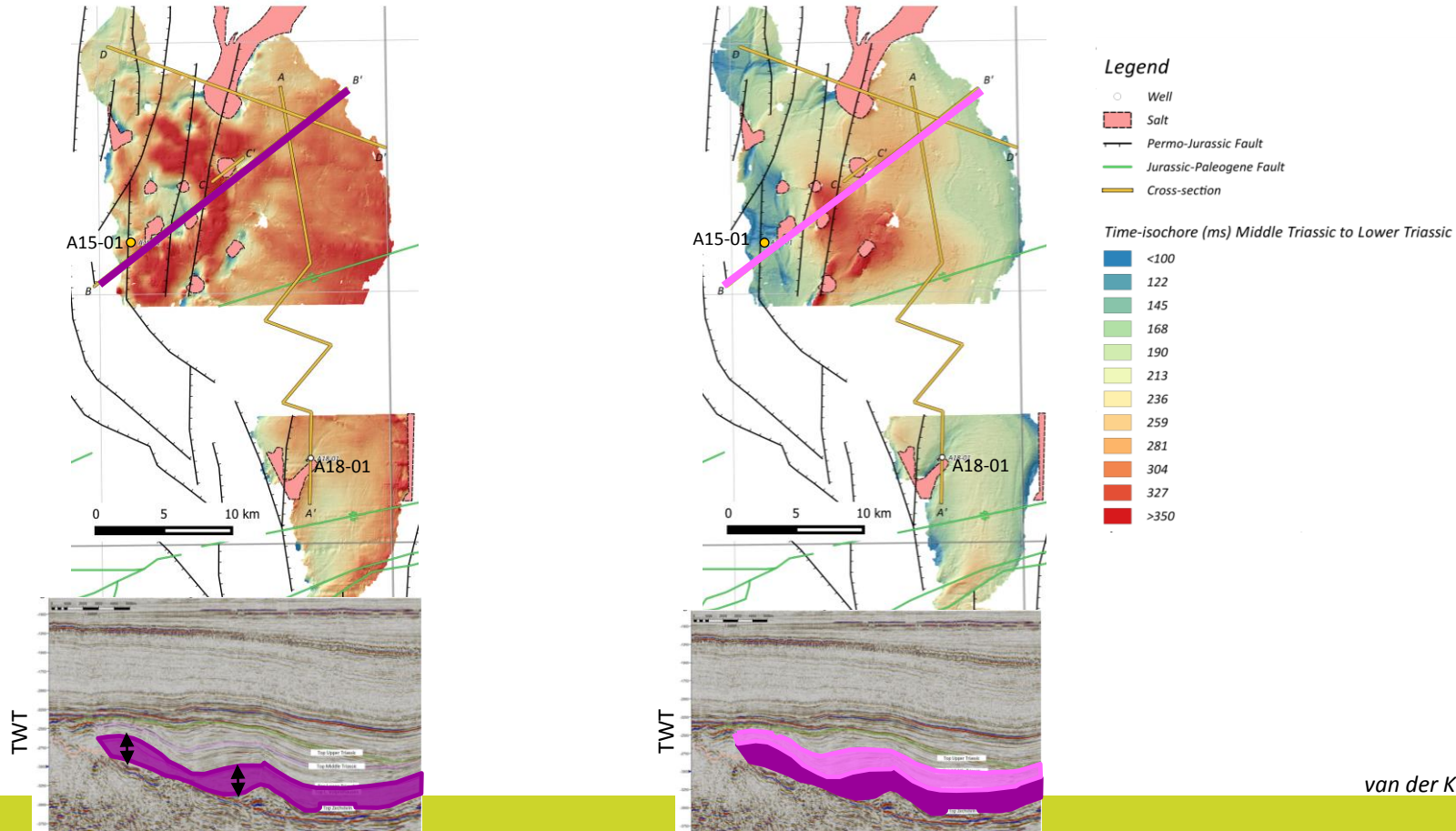
OGA 2D seismic lines could help define outline in UK

Northern reservoir provenance?

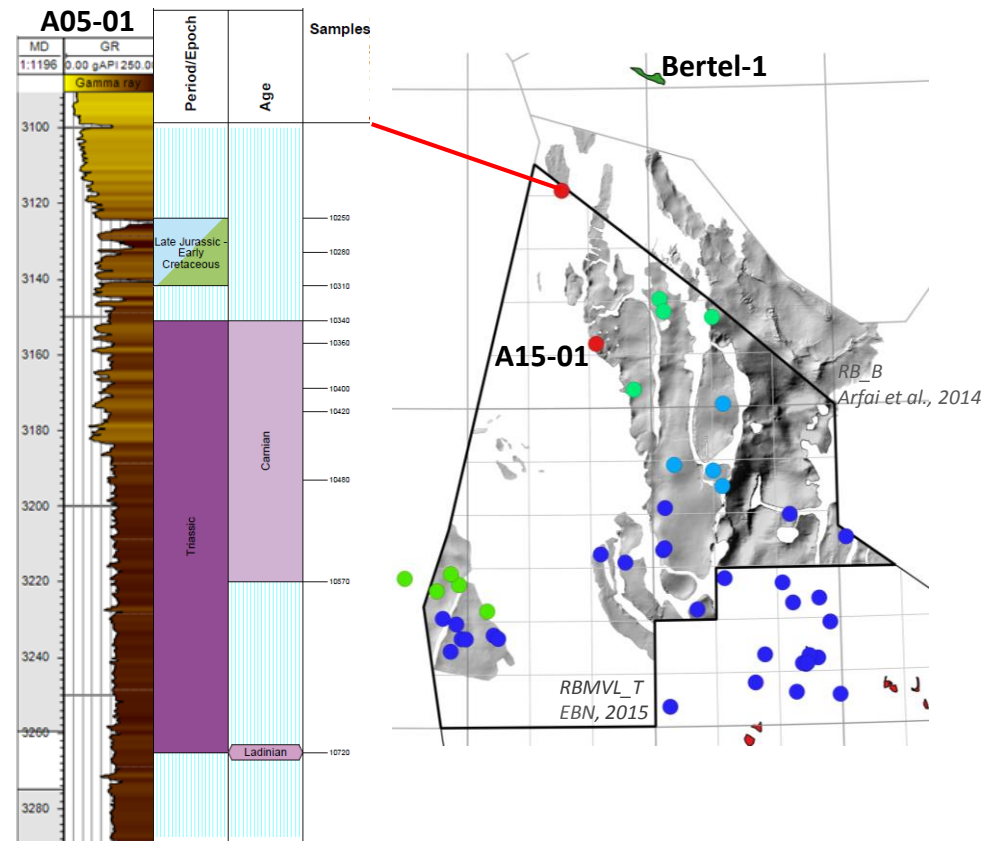
Fluvial sands with northern provenance may have developed as reservoir in the northwestern area.



Early Triassic thickening: depocentre at A15-01?



A05-01, Bertel-1: potential for Keuper Schilfsst?



TNO, 2016: biostratigraphical analysis

Bertel-01 (1992)

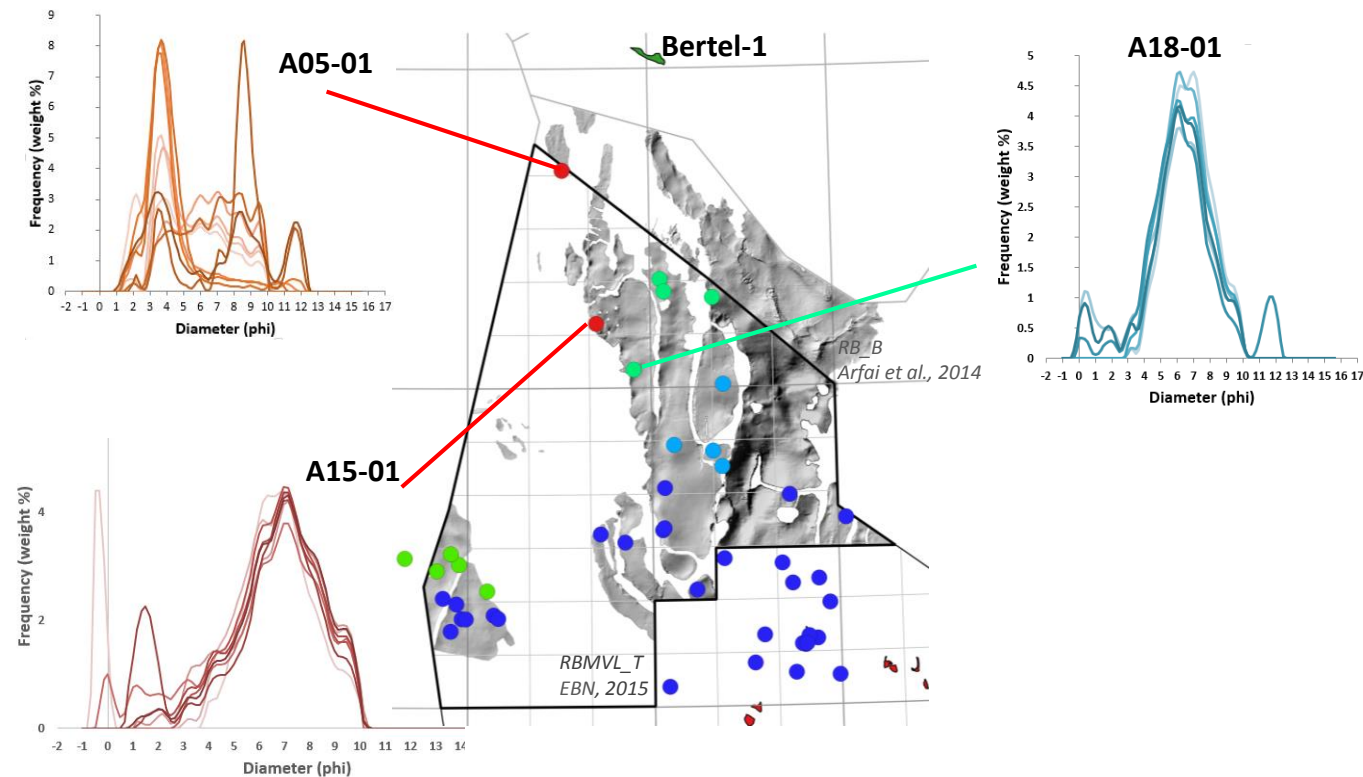
- Inconsistencies in biostrat. analysis reported
- Trias-/Jurassic boundary doubted

A05-01 (1999 – Amerada Hess)

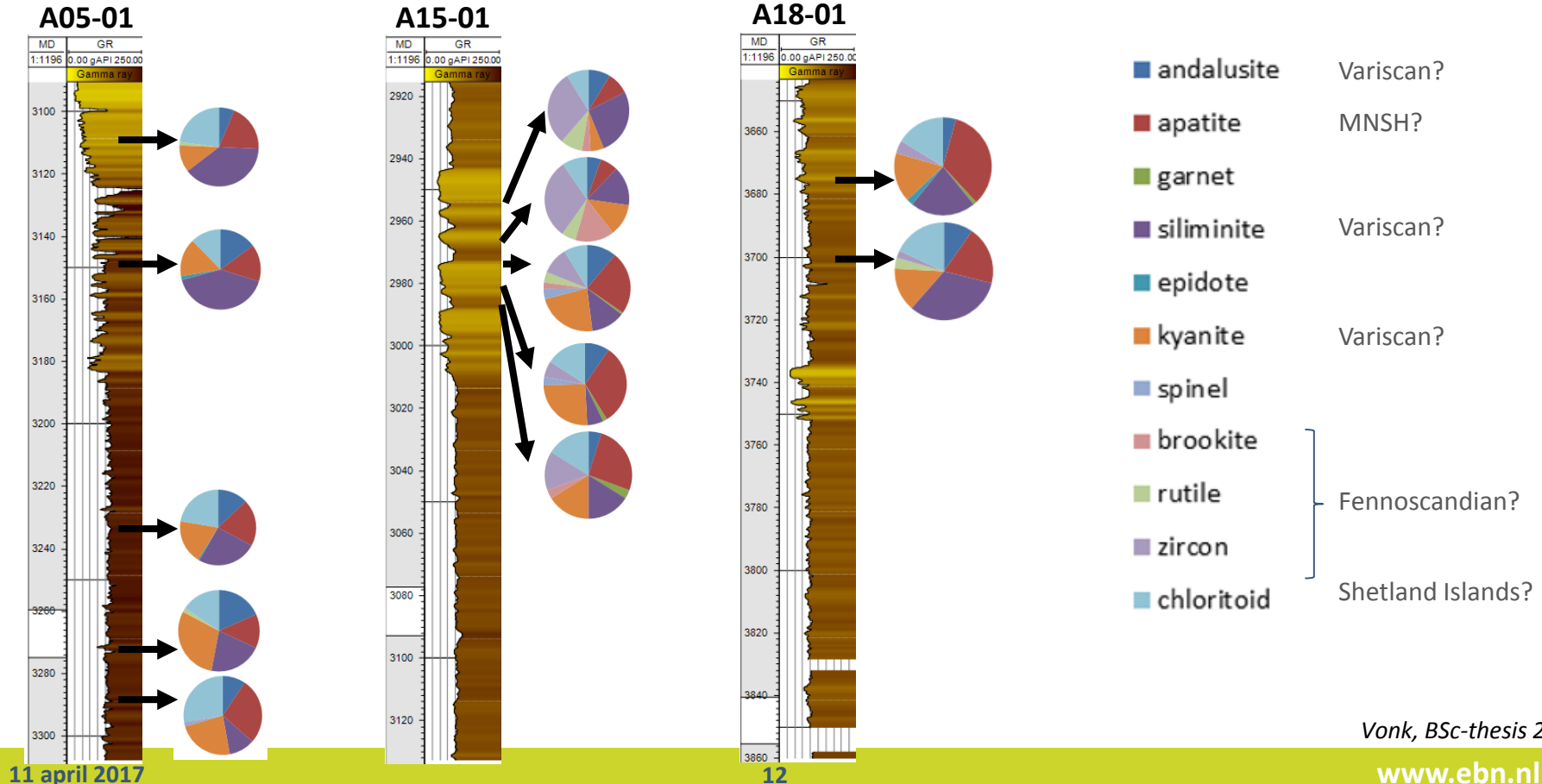
Limited info on nlog

- 2016: Biostrat analyses by TNO: Late Jurassic/Early Cretaceous strata present as well as (Carnian?) Triassic strata

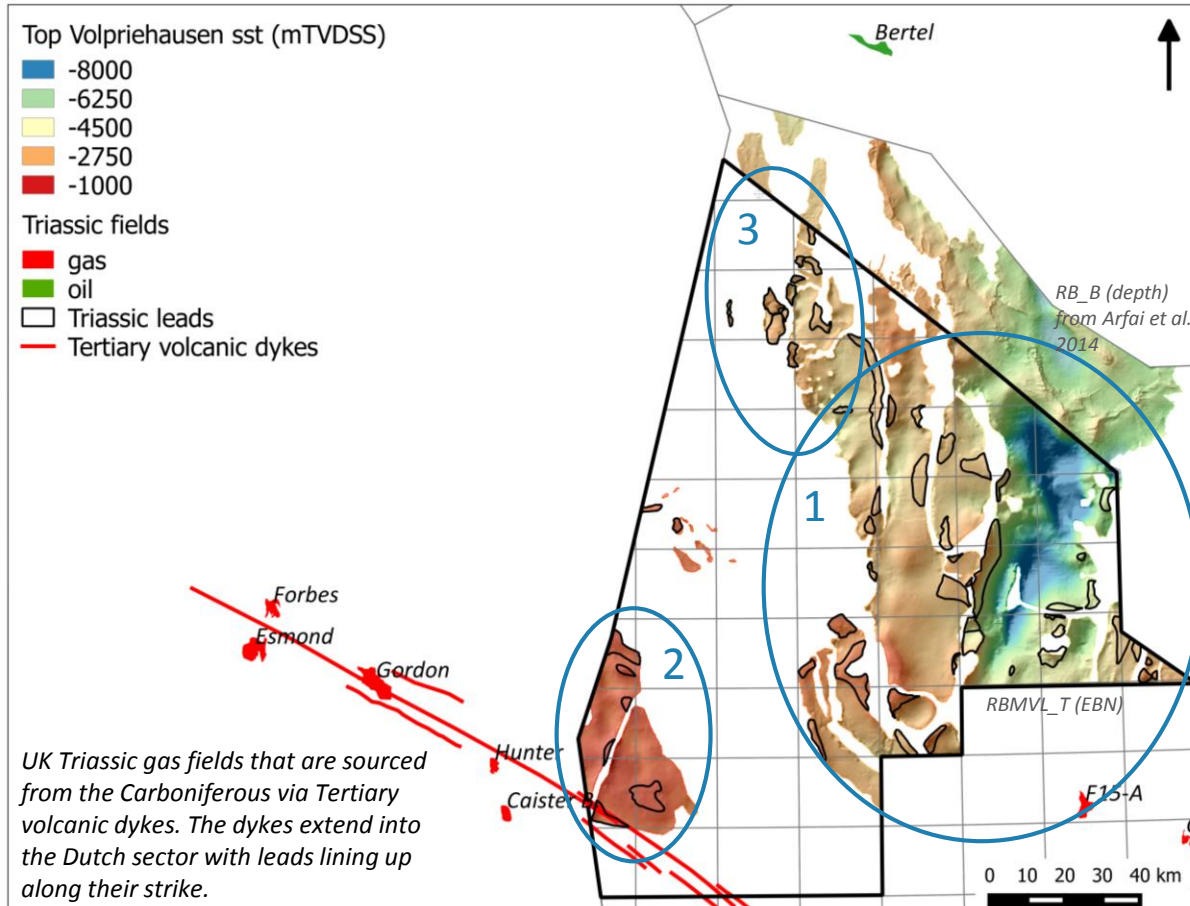
A05-01, A15-01, A18-01: grainsize analysis



Intermediate results heavy mineral analyses



Top Lower Volpriehausen Sst depth map - Prospectivity



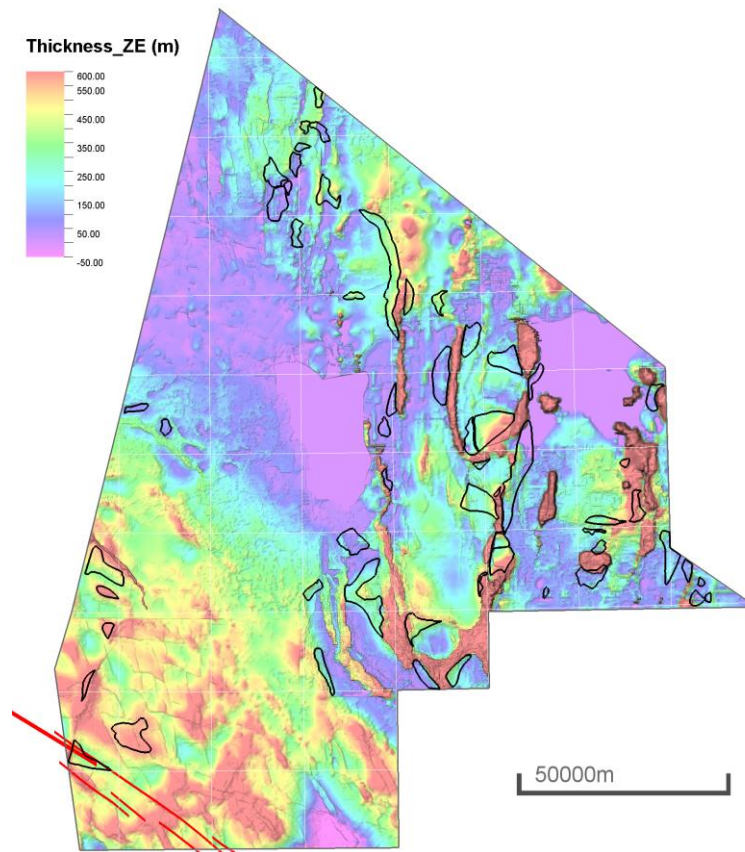
Three types of leads:

- 1) “classic” leads with proven types of trap, source, seal and reservoir
- 2) leads which may be sourced with HC’s via Tertiary volcanic dykes
- 3) leads with local reservoir provenance area

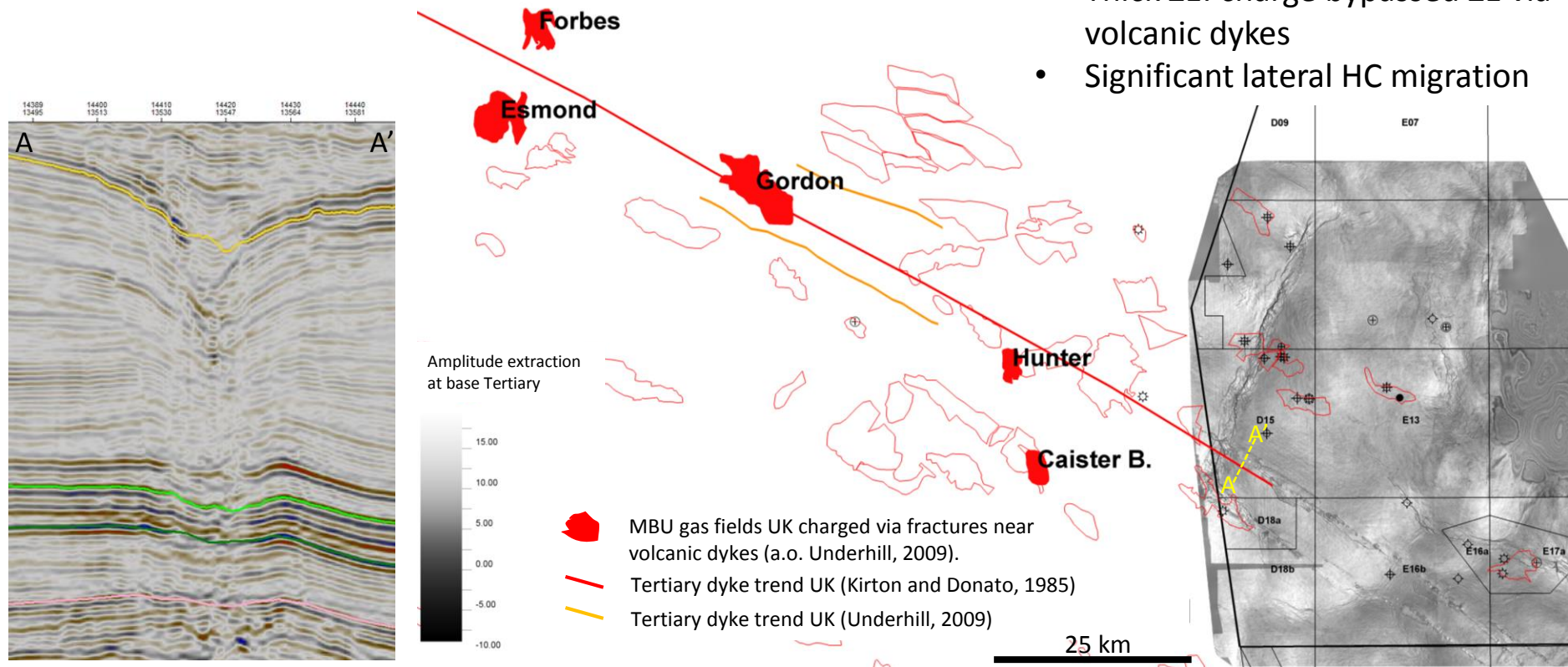
Three charge mechanisms:

- Salt windows (ZE thickness)
- Faults
- Volcanic dykes

Analysis per lead is required



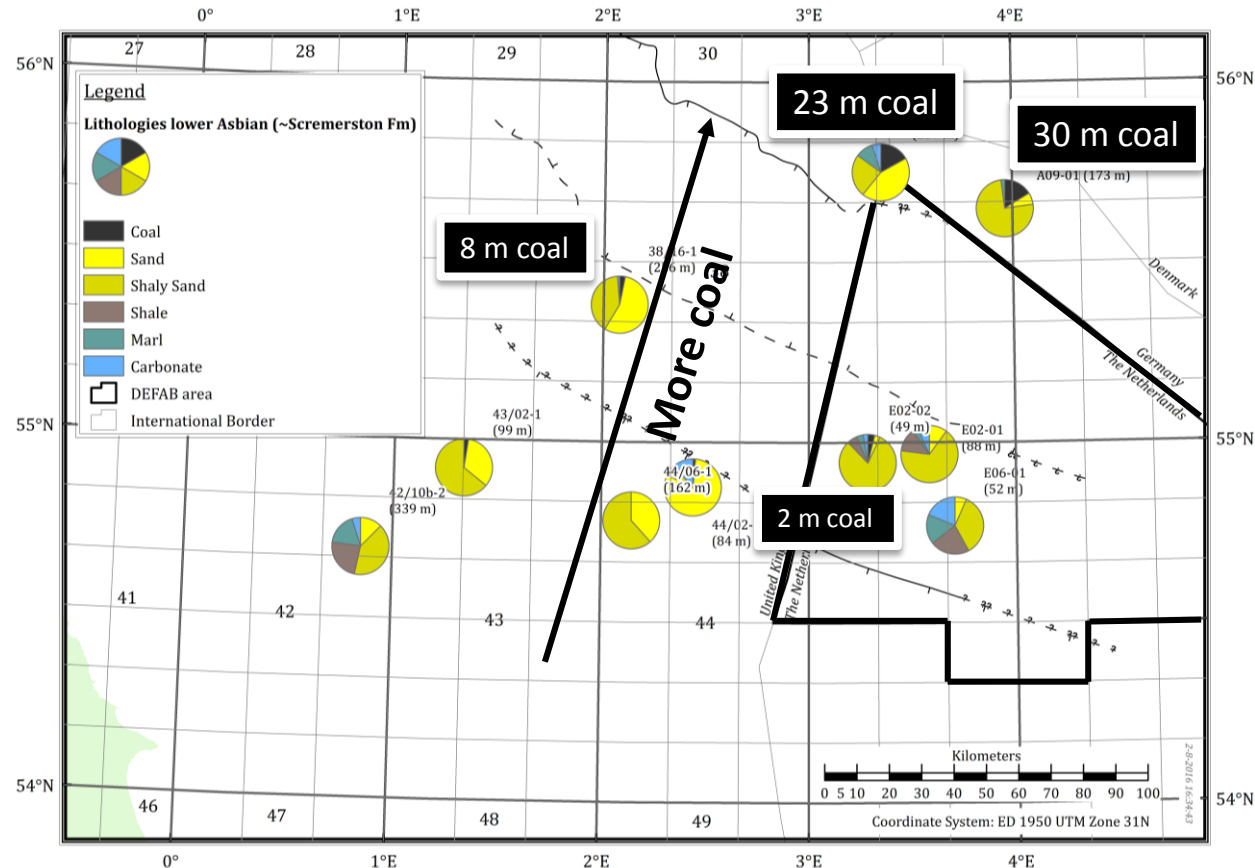
Charge via volcanic dykes



Source Rock potential (Lower Carboniferous coals)

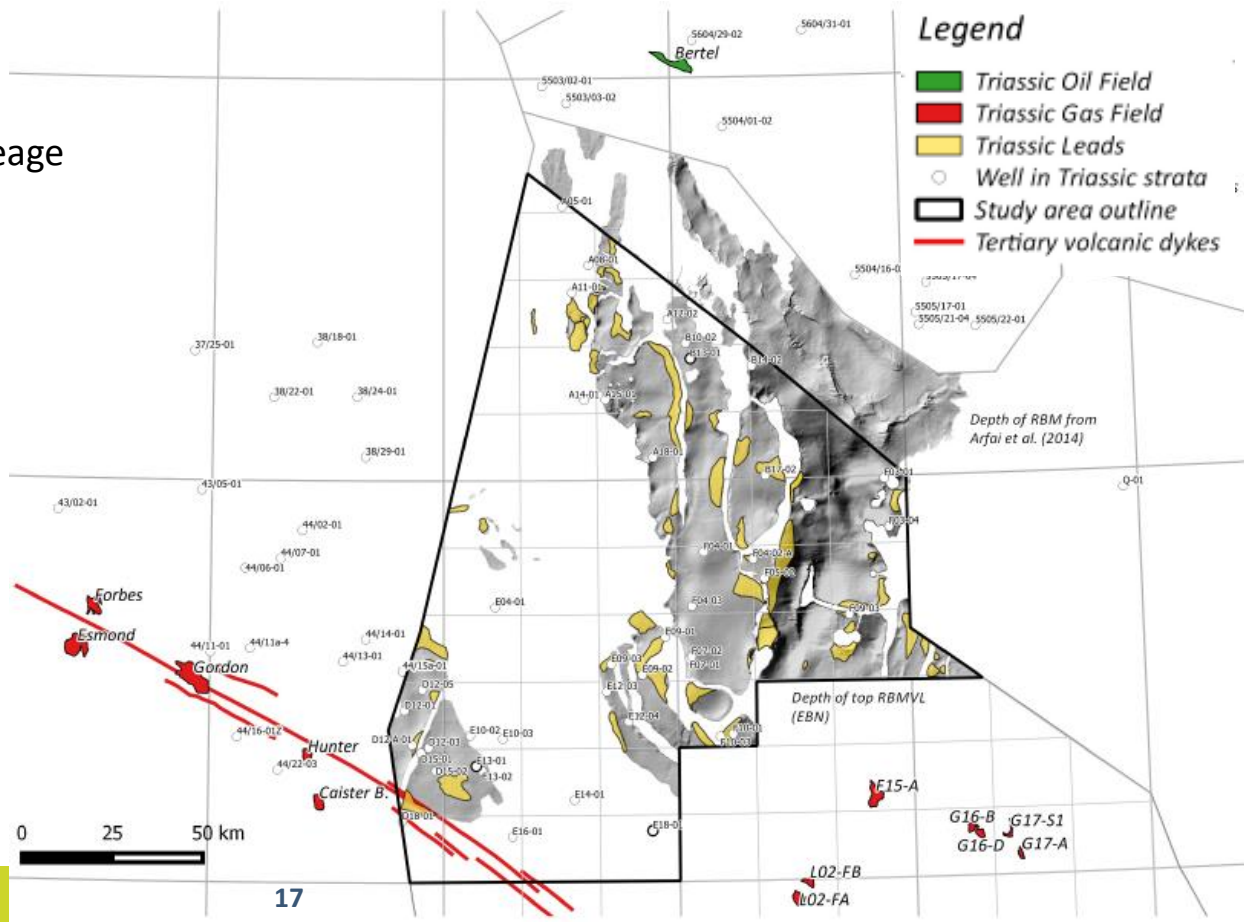
Coals

- N-ward increase in Lower Carboniferous coal content (Scremerston Fm.)
- Yoredale Fm and Namurian also contain coal; up to 7.5 m encountered in wells.



Leads

- 53 structures
- P50 GIIP of ~87 BCM (unrisked)
- Closures also located in open acreage



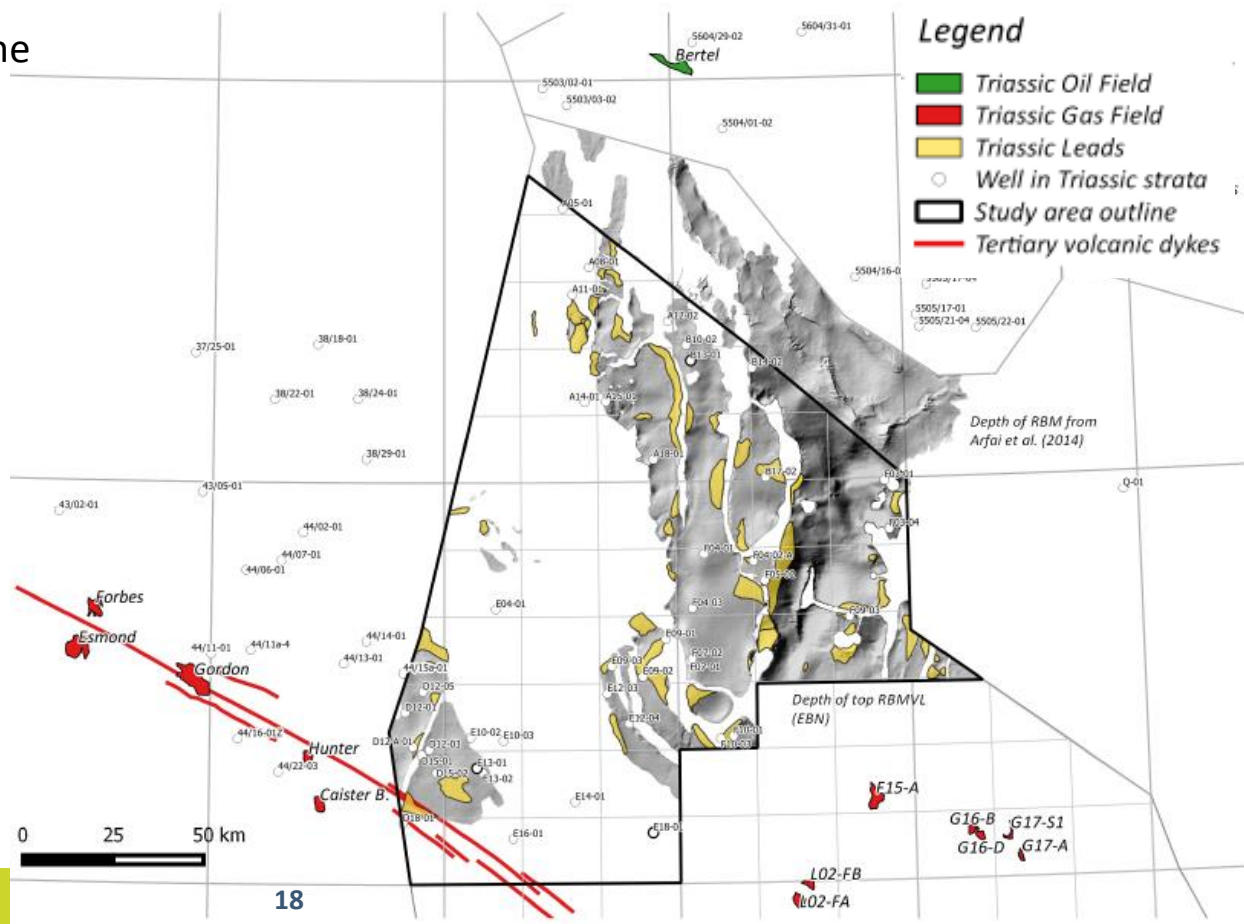
Conclusions

- New prospectivity away from the main fairway
- Local reservoir development
- Potential for Upper Triassic reservoirs?

Work in progress...

We welcome any suggestions:

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Thank you for your attention

More information? Contact us:

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References:

- Southern Permian Basin atlas (2010)
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- Arfai et al. (2014), Late Palaeozoic to Early Cenozoic geological evolution of the Entenschnabel, NJG.
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TNO, 2016: biostratigraphical analysis carried out for EBN.