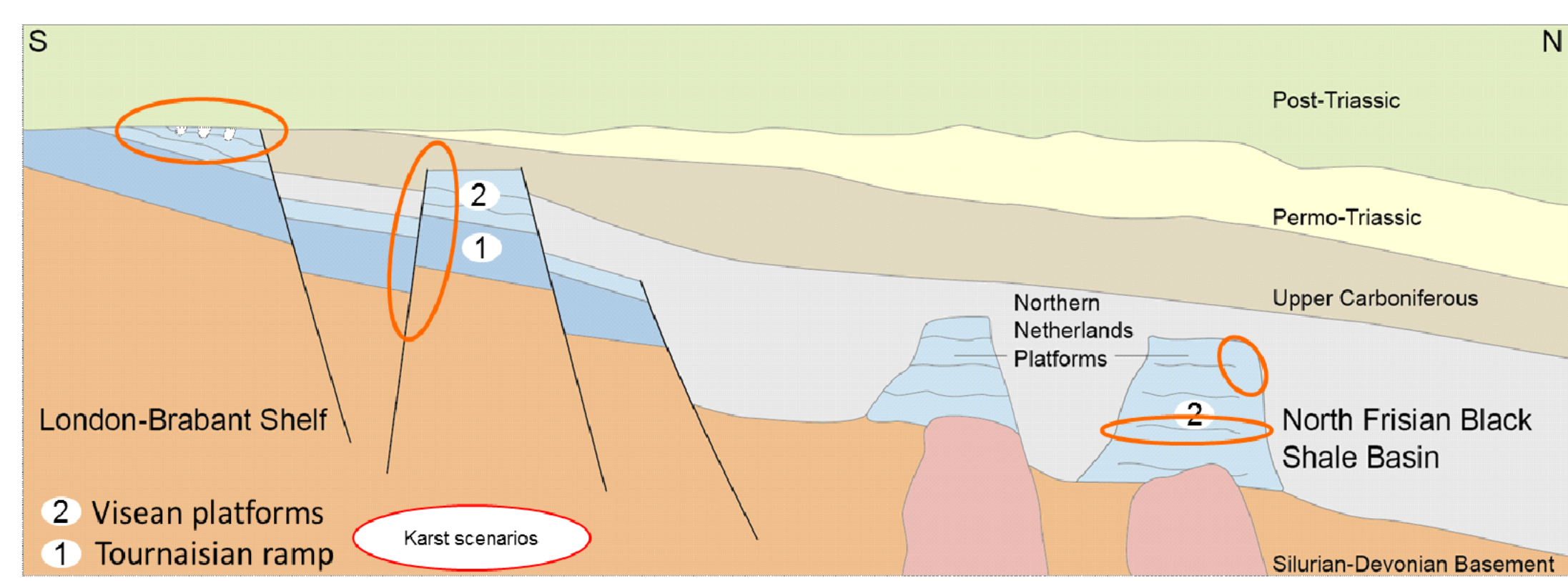


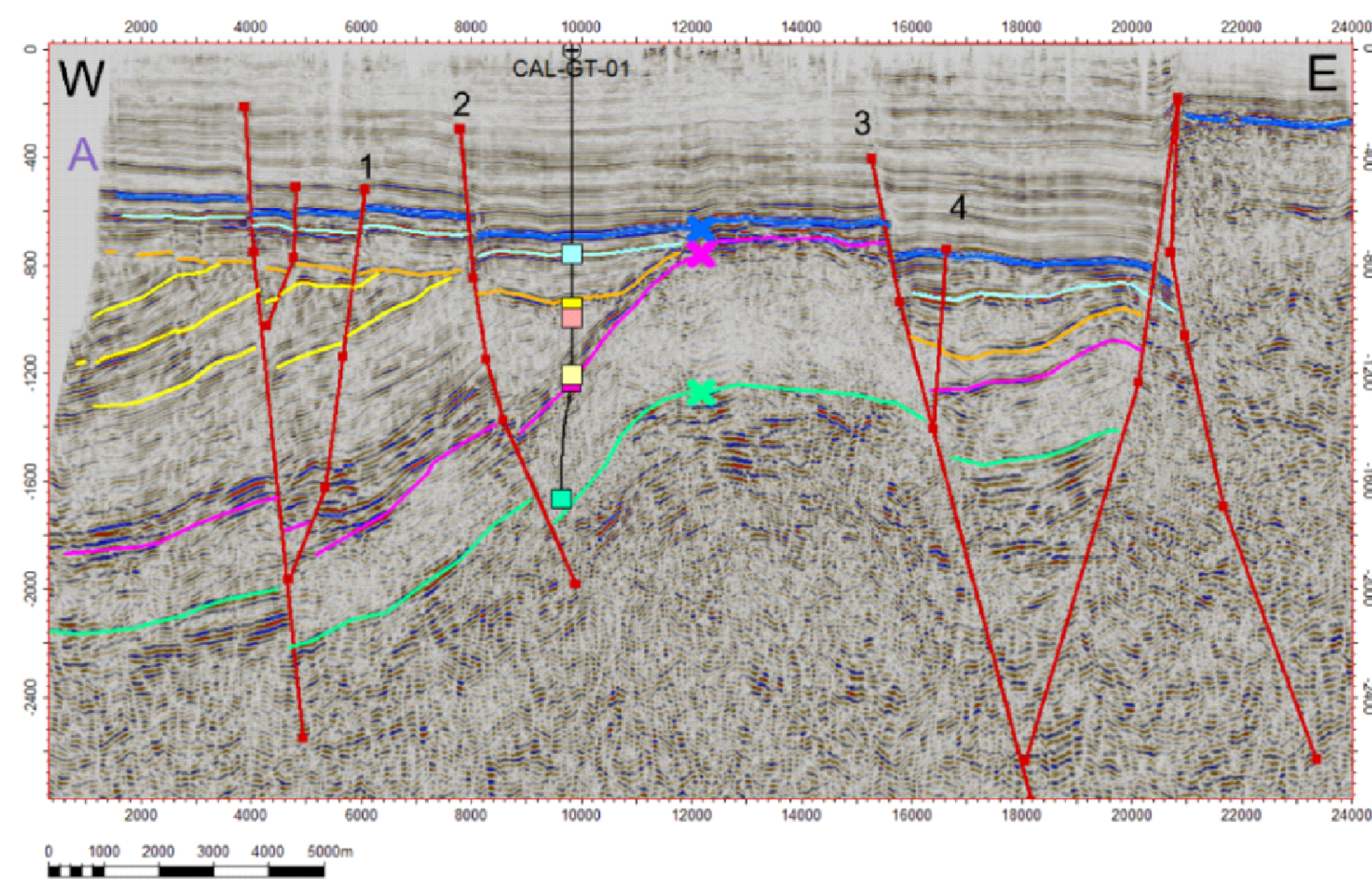
Assessing the HC potential of Devonian-Carboniferous Carbonates in the Dutch subsurface



Dinantian platform carbonates: geological model with karst scenarios

Structure	(Faulted) Carbonate platform
Source	Namurian/ Diantian shales (lateral migration)
Reservoir	Karstified/fractured (Visean) Limestone
Seal	Namurian shales (top/side seal)

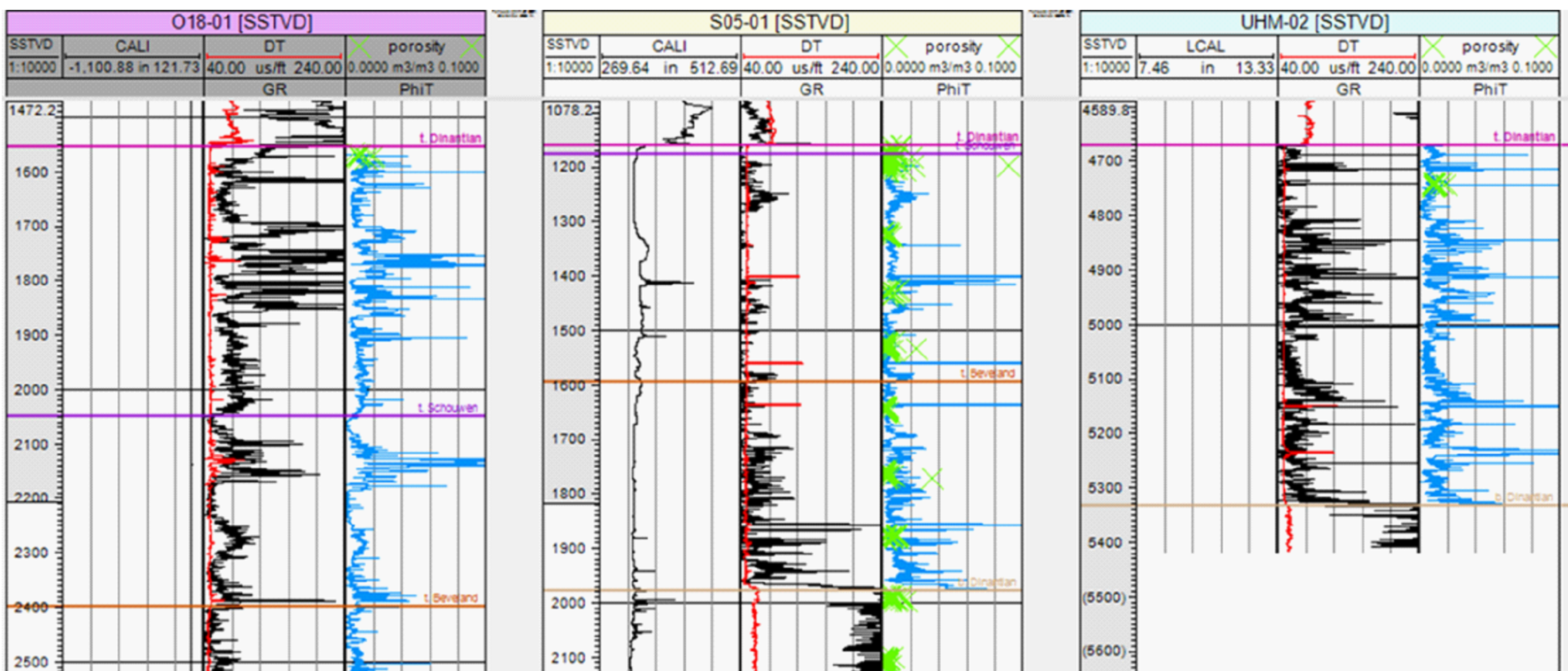
Dinantian carbonates petroleum play key elements



CAL-GT-01 well: cavity > 30 m, productivity 240 m3 / hr

Dinantian carbonates of the Zeeland Group

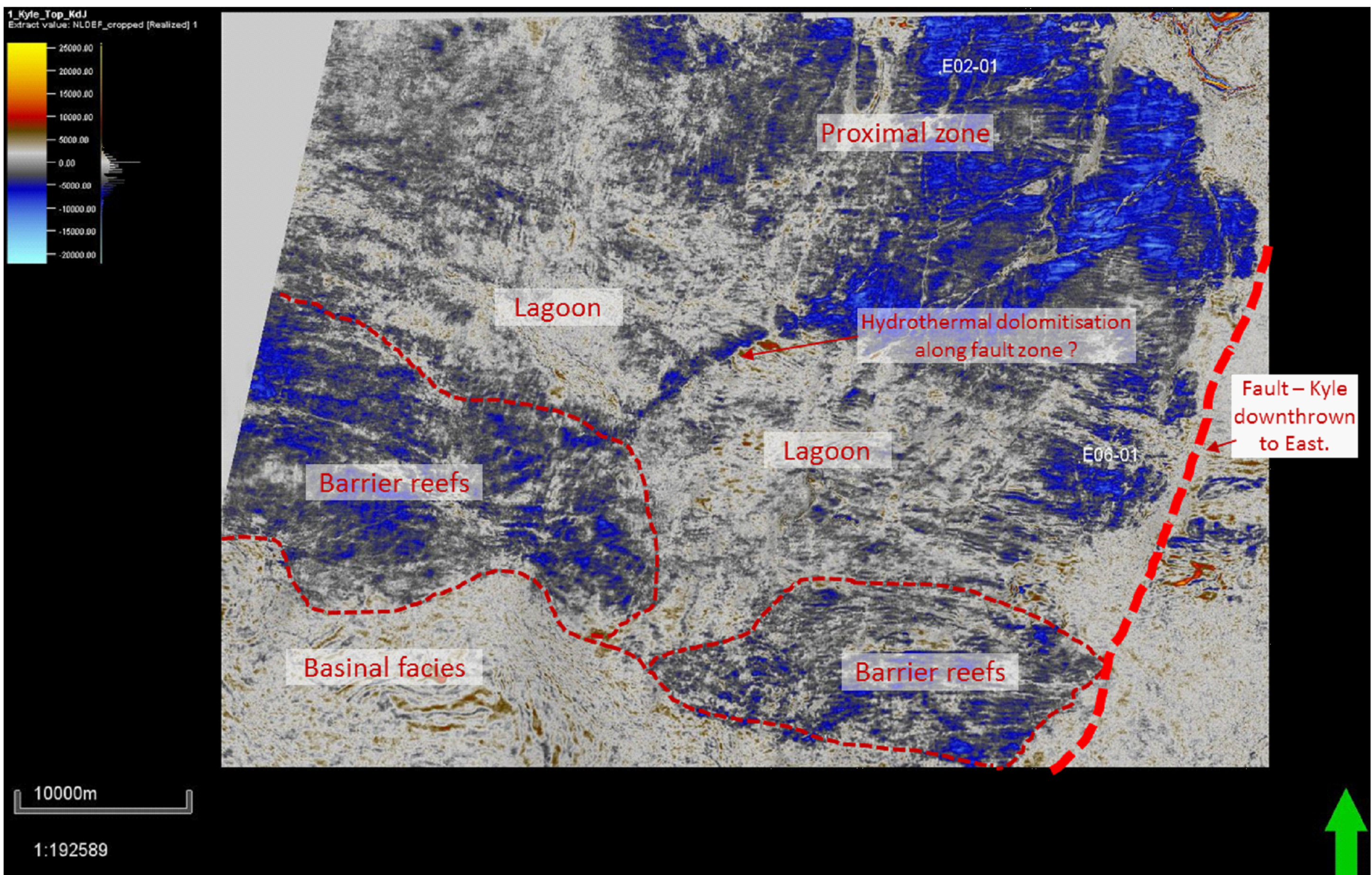
- Petroleum play with analogues in Caspian Sea; Tengiz, Kashagan
- Evaluation of wells and seismic data shows potential for fractured / karstified (producing) reservoir.
- In the dutch northern onshore, area large Visean platforms developed. In the south an extensive Tournaisian ramp developed north of the London-Brabant Massif, followed by a more limited Visean.
- EBN identified a cluster of leads straddling the UK-NL median line, close to existing infrastructure
- Namurian clastics may form secondary target
- NL-block P10c was awarded to Jetex recently, blocks P04, P07 and P08b have been applied for recently.
- Geothermal potential onshore NL



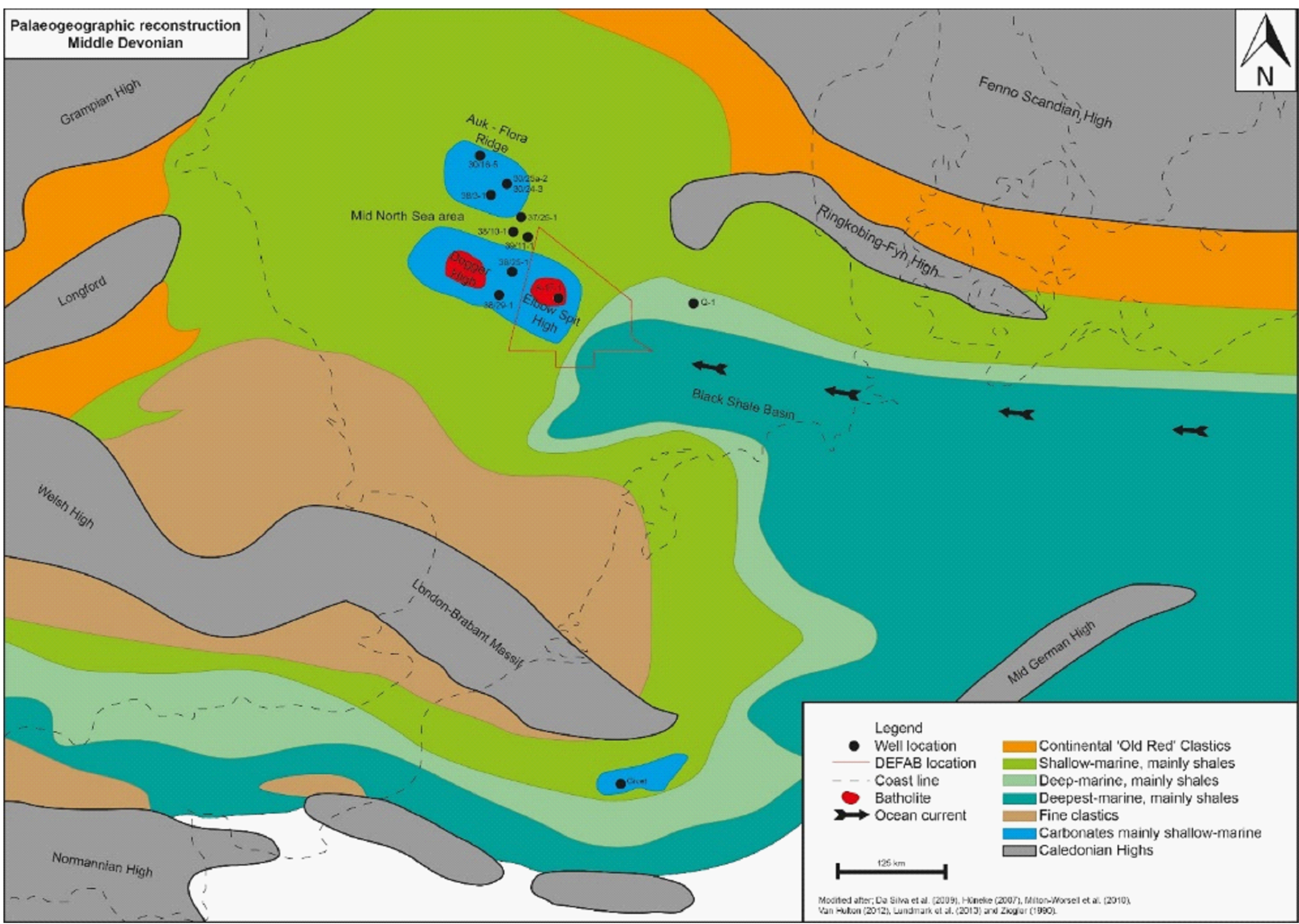
Petrophysical evaluation of 7 wells shows large variations in porosity

Devonian carbonates of the Kyle Limestone Fm

- Petroleum play with producing analogues in Canada, Russia and Australia
- Few UK wells drilled Kyle Lst in MNS area. Relevant outcrops in Belgium, Canada, Australia. Strata clearly imaged on 2D/3D seismic, recent 3D allows for (advanced) seismic interpretation of amplitudes
- A ramp system extending into Dutch territory, possibly with better reservoir towards the edge of the ramp and due to hydrothermal dolomitisation along faults
- Source rock potential and timing of maturity and diagenesis critical



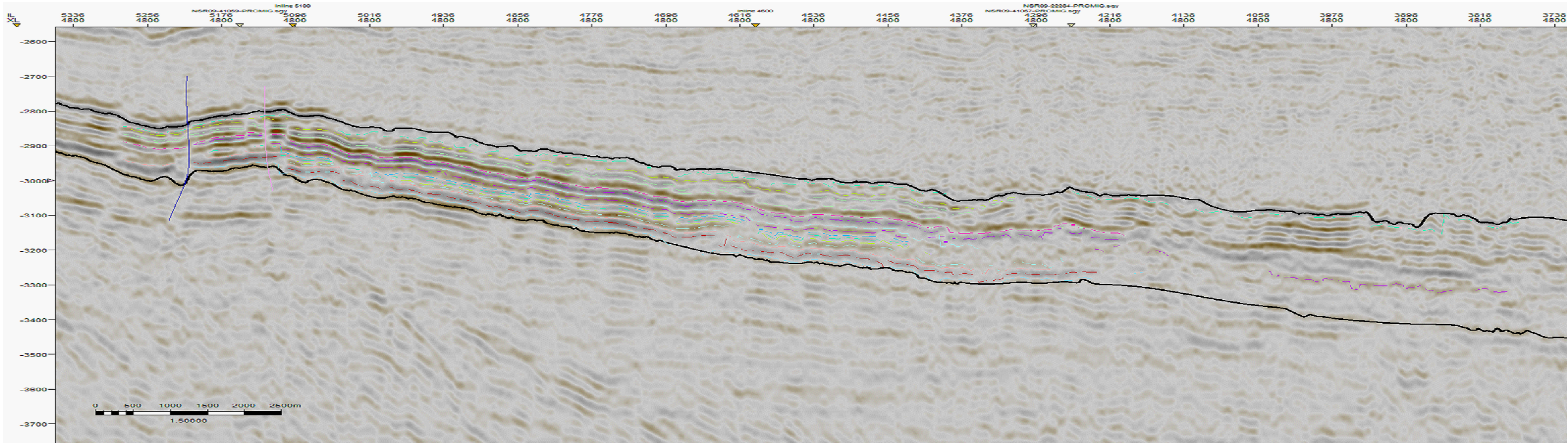
Seismic amplitude extracted at top Kyle with interpretation, from De Jong (2016)



Middle Devonian facies distribution map, from De Jong et al. (2016)

Trap	Fault-dip closures and stratigraphic traps
Source	Intra-Kyle Fm shales (i.e. self-sourcing)
Reservoir	Kyle Fm limestone (karstified/ dolomitised/ fractured)
Seal	Kyle Fm shales

Devonian carbonates petroleum play: key elements



Seismic section showing multi-horizon interpretation of Kyle, from De Jong (2016)