

Prospectivity in the Dutch Dinantian Carbonates

Introduction

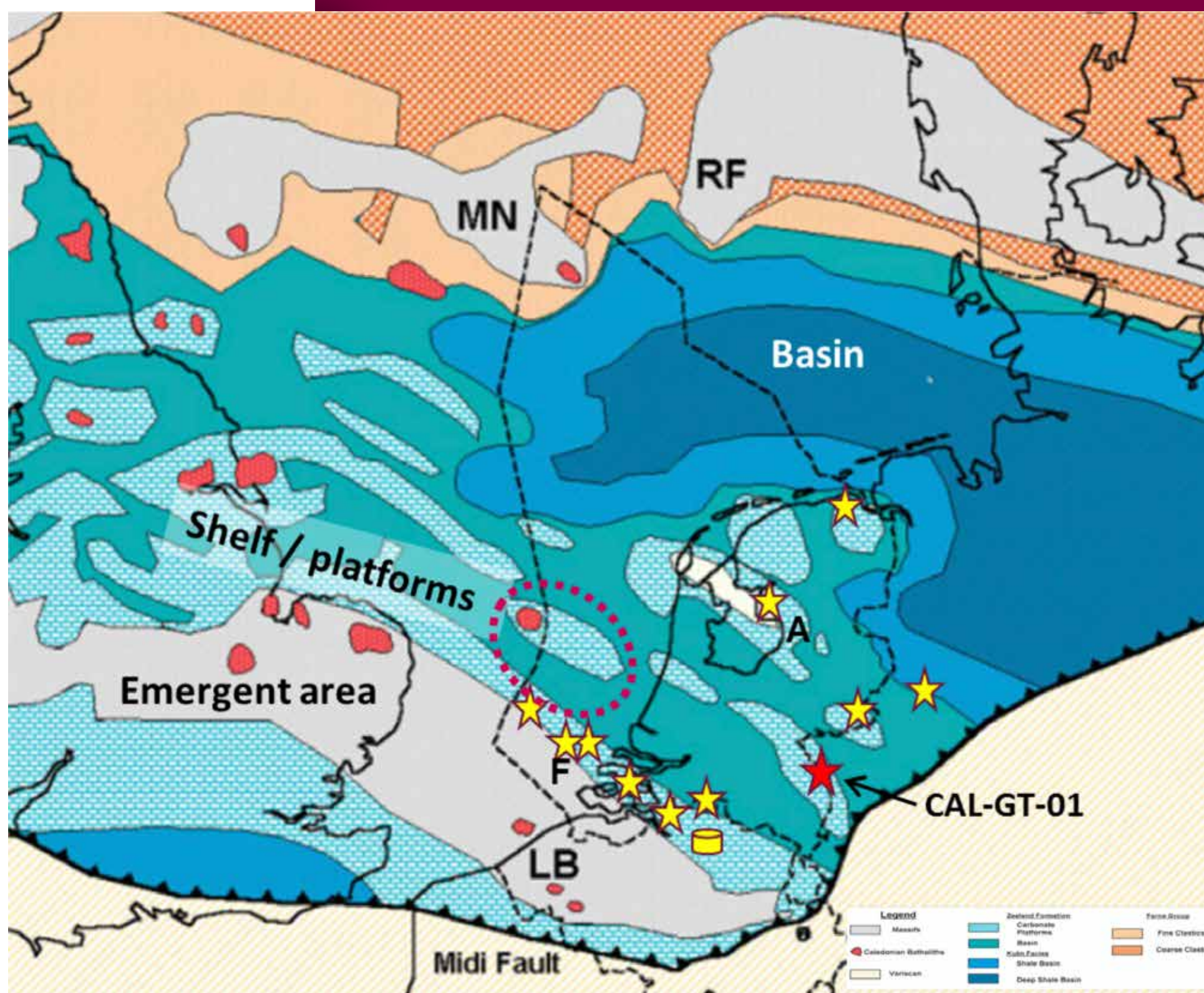
EBN is undertaking a regional review of the Dinantian carbonates play in the Dutch onshore and offshore, as part of the EBN Roadmap Exploration.

A large regional seismic dataset and all relevant wells are being used in this evaluation. The well dataset includes the recently (2012) drilled geothermal well CAL-GT-01, which encountered a thick zone of strongly karstified Dinantian limestone. The reservoir encountered here is very different from reservoir encountered in other, recently released, Dinantian carbonate wells. This stresses the need for a good understanding of the different karstification processes which can take place after deposition of limestone. Fractures also play a key role.

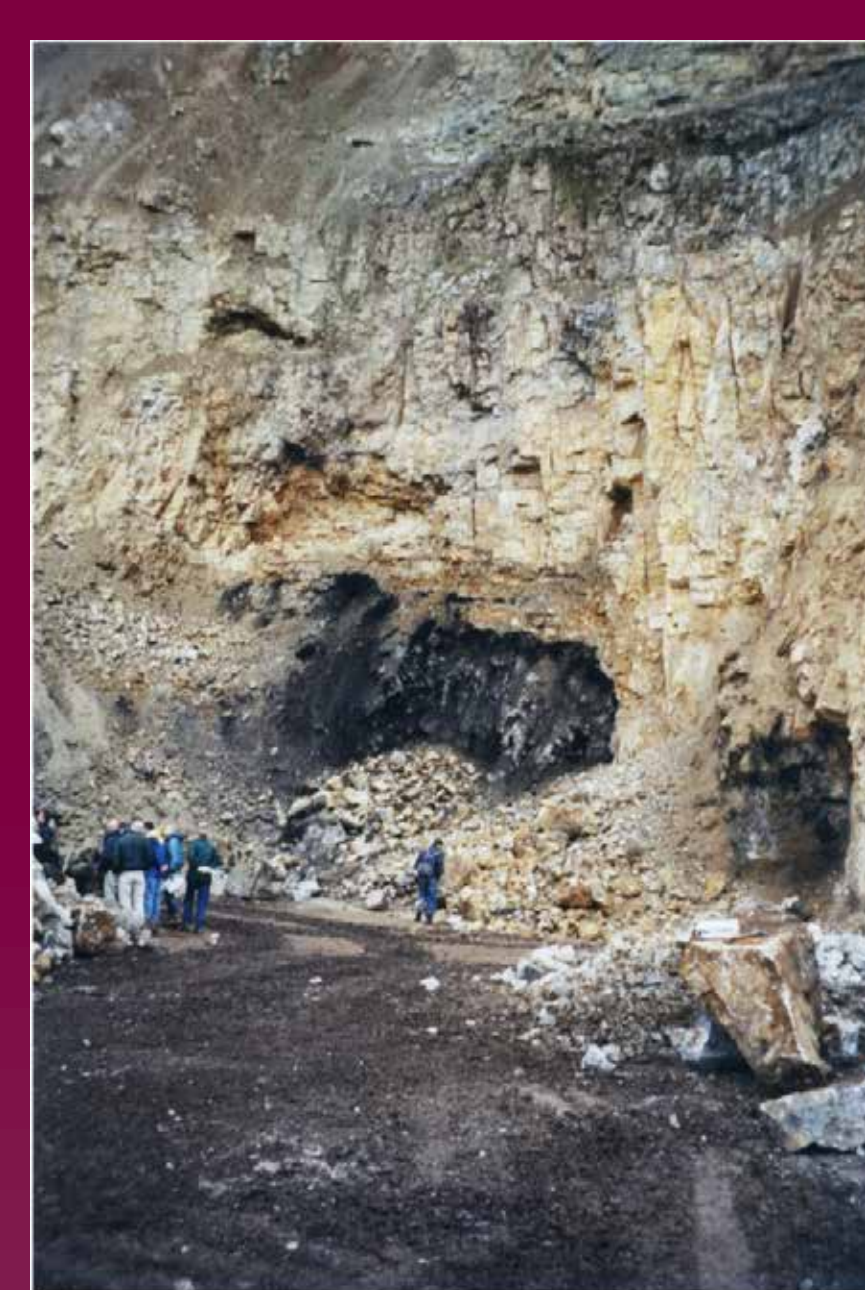
As part of the review, prospectivity screening is taking place in the Winterton High area. The analysis includes mapping of the Dinantian and regional analysis of key play elements incl. reservoir quality, seal and HC charge. A cluster of leads has been identified in currently unlicensed blocks.

Analogues: outcrops, wells and fields

Relevant analogues for the studied Dinantian carbonate reservoirs are found in various parts of the world. Well-studied outcrops are present in Belgium (Ardennes) and Germany (near Aachen). In the underground gas storage of Loenhout (Belgium), gas is stored in karstified / fractured Dinantian carbonates with porosities up to 20% and darcy permeabilities. Examples of oil bearing Dinantian reservoirs are found nearby in the UK East Midlands (e.g. Nocton). Well known fields producing hydrocarbons from this type of reservoir are the Tengiz and Kashagan oil fields in the Caspian Sea region. The 2012 geothermal well CAL-GT-01 drilled onshore the Netherlands encountered heavily karstified (and fractured) Dinantian carbonates, quite different from the wells LTG-01 (2004) and UHM-02 (2002).

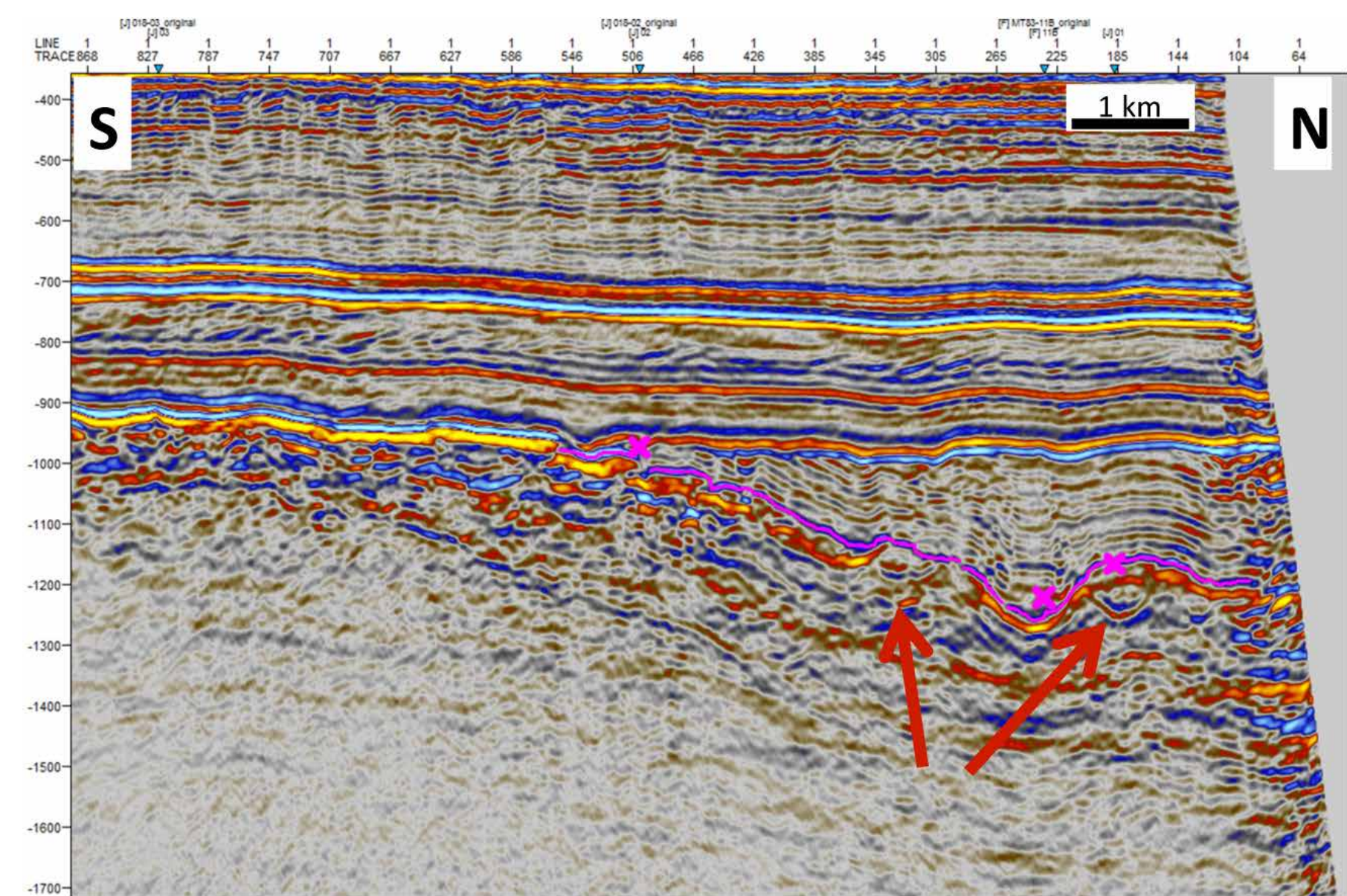


Lower Carboniferous palaeogeography map (from: Van Hulten & Poty, 2008). Red oval indicates prospectivity screening area



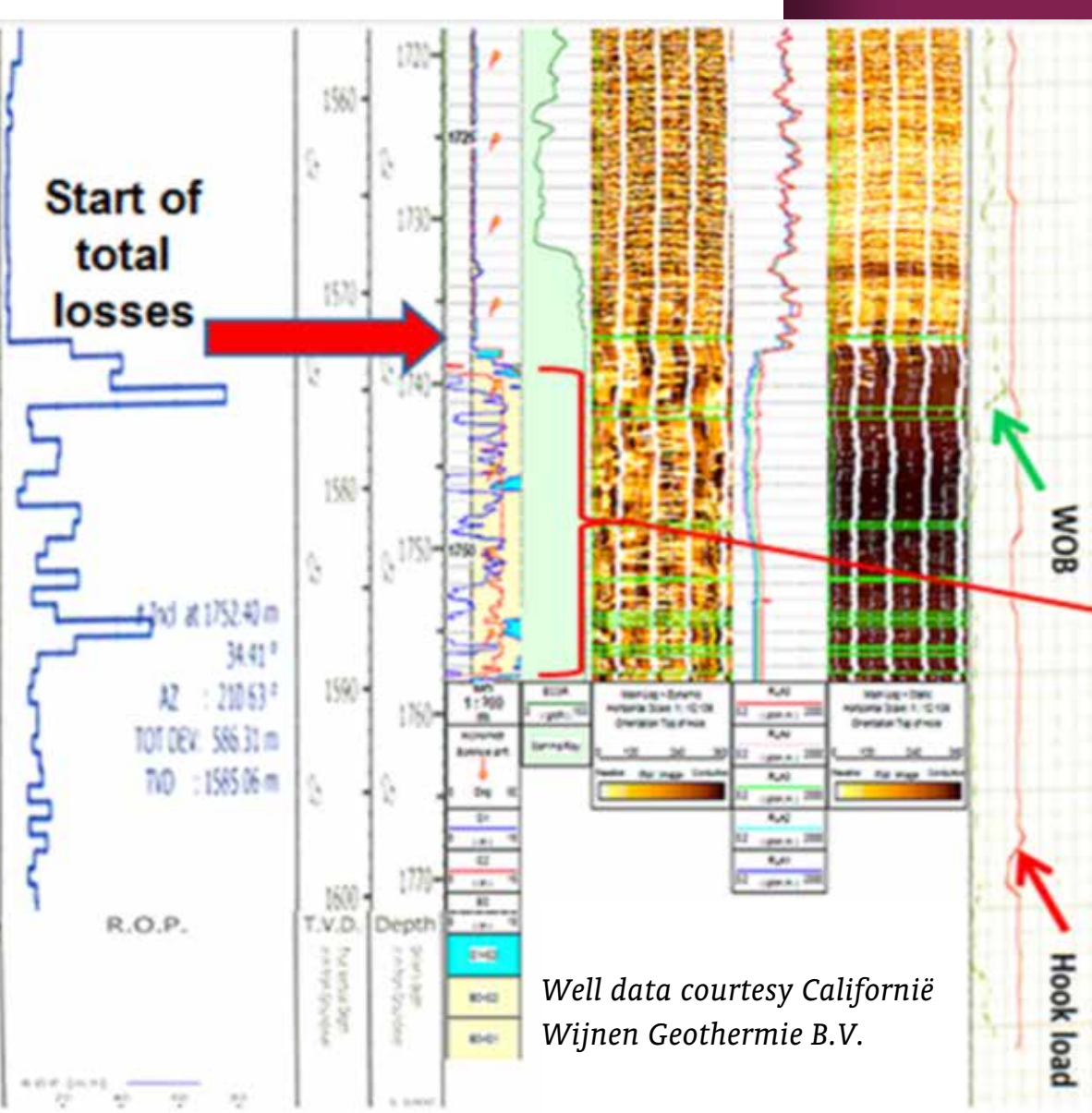
Left: Outcrop Argenteau near Visé (Belgium): karst feature in Dinantian limestone with infill of Namurian clasts (the arrow indicates Euro coin for scale)

Right: Outcrop Hastenrath quarry near Aachen (Germany): karst caves in Dinantian limestone with (partial) Cretaceous infill



Arrows indicate possible karst / doline features

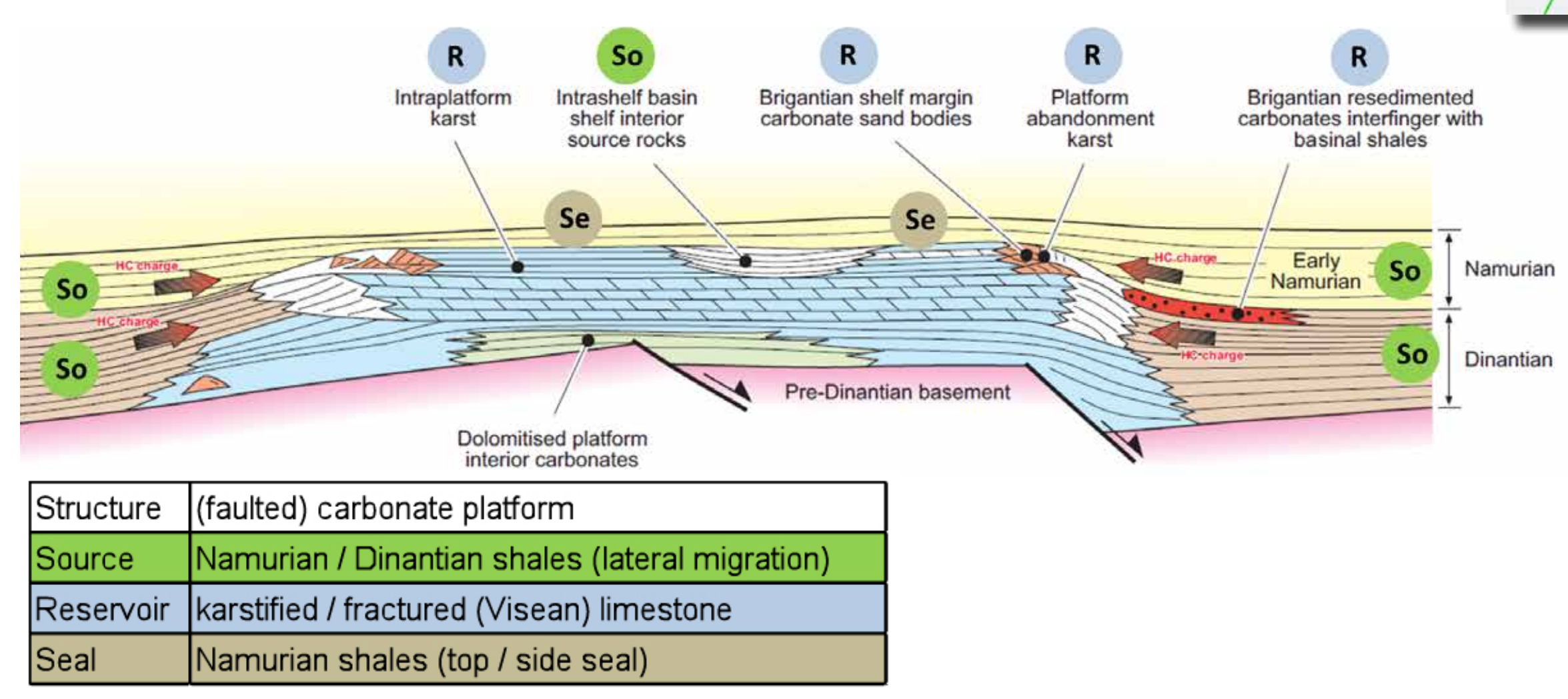
Seismic line through block O18, in SW corner of study area, close to LBM



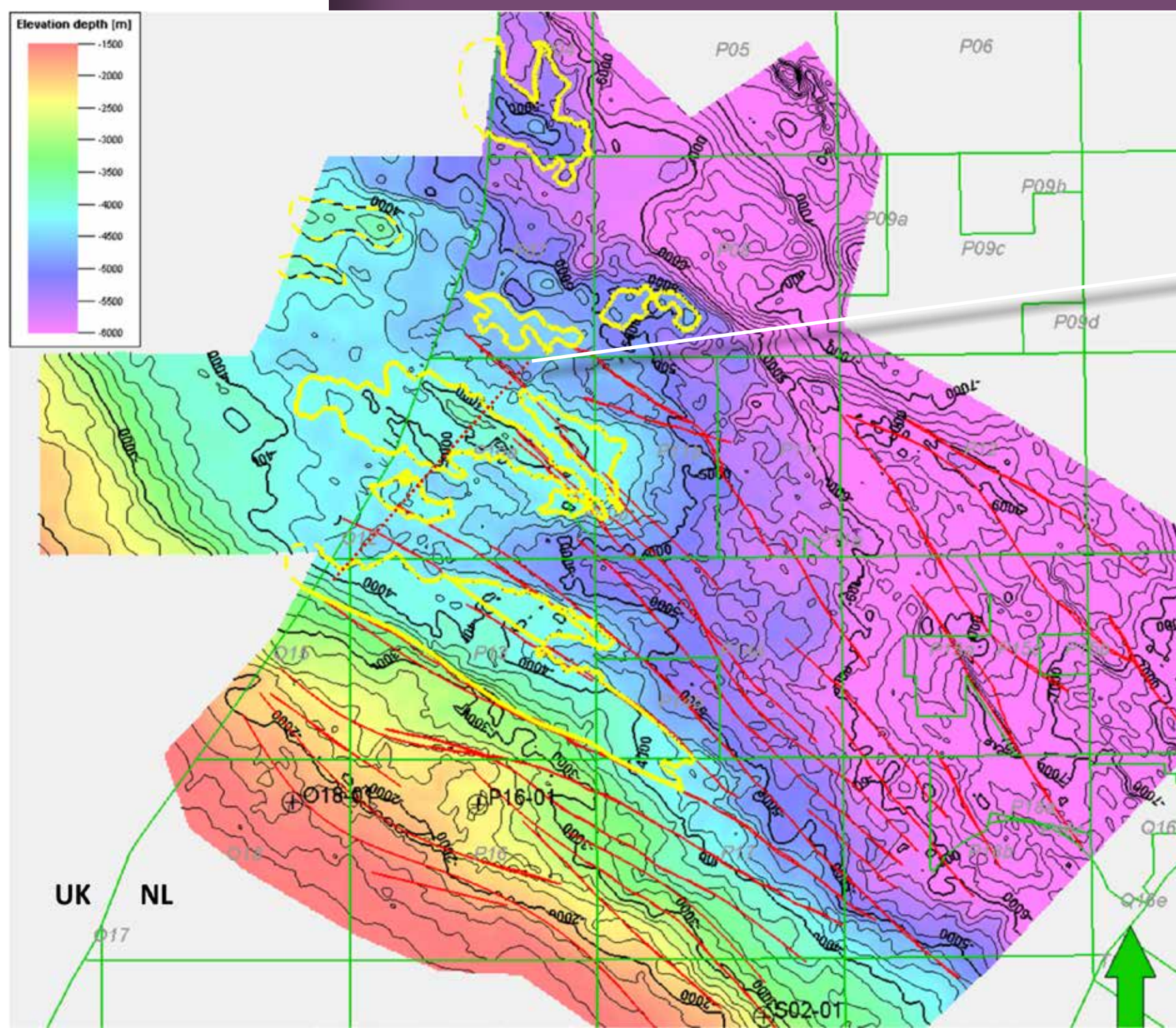
Well CAL-GT-01 encountered heavily karstified zones in the Dinantian limestone, resulting in total losses. The dimensions of the karst feature are estimated to be at least 30 m

Prospectivity review of the Dinantian carbonates in the Winterton High area, Dutch offshore

The Dinantian carbonate play is present in the Dutch Winterton High area (offshore quads P, O and S) and extends into the UK sector. A prospectivity review is taking place, including seismic mapping of the Dinantian and Namurian section, time-depth conversion and regional analysis of the key play elements. A cluster of leads has been identified in currently unlicensed NL blocks. These leads are being evaluated in detail at the moment. This includes the assessment of 1) the presence of fractures 2) the presence and timing of different types of karstification: meteoric, hydrothermal and mix zone karstification. Preliminary volumetrics indicate ~ 10's BCM in 5 leads. Similar leads have been identified on trend in the adjacent UK blocks. The leads have an average depth of ~ 4000 m, which is very similar to the average depth of the Kashagan field. The play could be tested by wells with overlying or laterally present Namurian sands as secondary target.

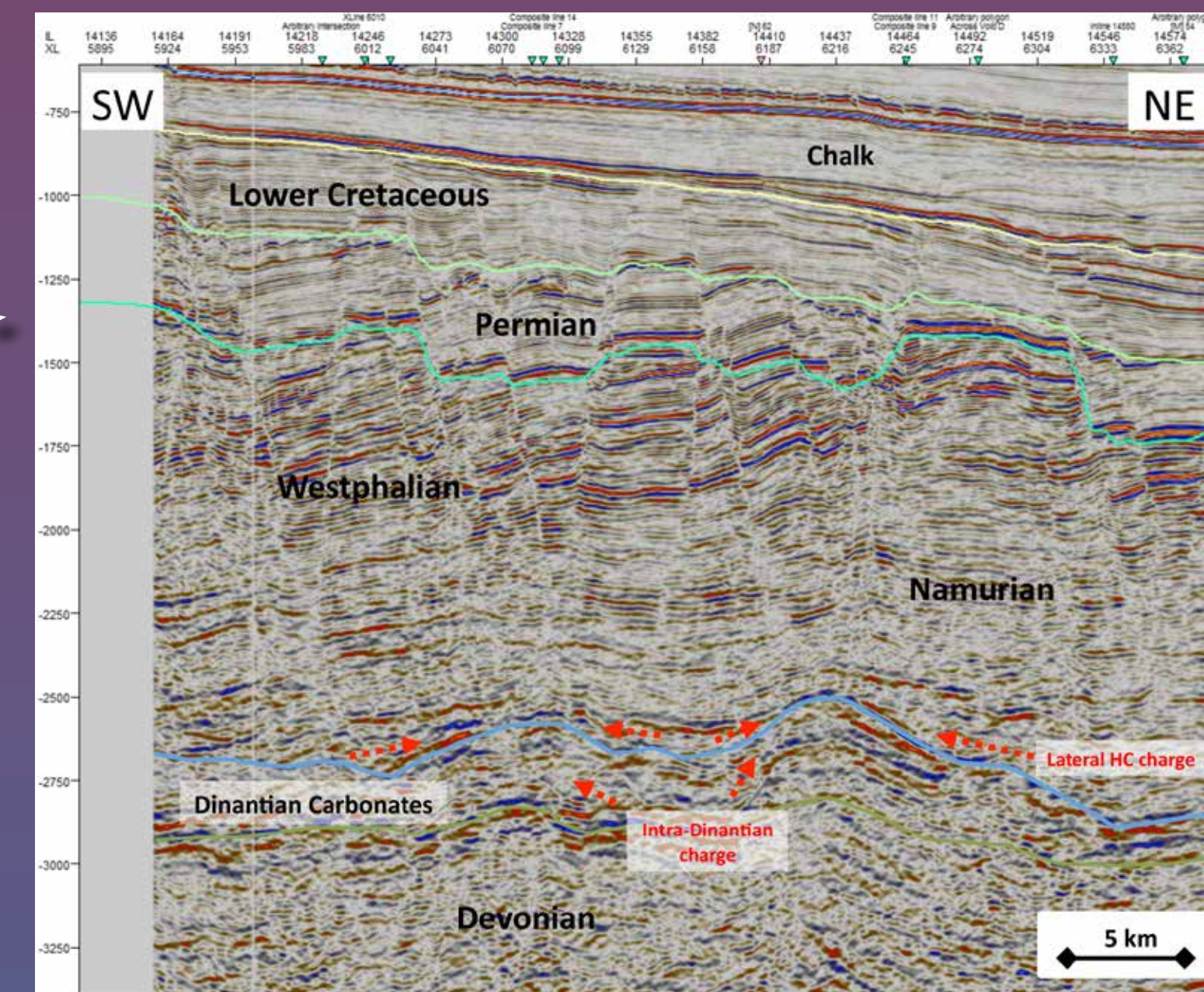


Cartoon from: Total (2007) - regional review of the Dinantian Carbonate Play - SNS and onshore UK.



Top Dinantian depth map in Winterton High area Lead outlines in yellow

Current GIIP estimates are in the 3-15 BCM range per lead



Seismic line through lead showing Dinantian Carbonates section

Way forward

EBN is continuing the review of the Dinantian carbonates play in the Dutch onshore and offshore. The prospectivity review in the Winterton High area will be continued in more detail and similar studies for this play are planned in other parts of the Dutch subsurface. For further information, please contact EBN: bastiaan.jaarsma@ebn.nl or jan.lutgers@ebn.nl



For all information and data on Exploration and Production in the Netherlands, see the Netherlands Oil and Gas Portal

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