

Hydrocarbon potential of the Lias: HYPO-Lias

Publieke samenvatting / Public summary

Summary

The Hydrocarbon Potential of the Liassic (HYPO-Lias) Project was a research project executed by TNO in the Dutch TKI Upstream Gas Programme. The project provided an innovative overview of the depositional and paleoclimatic development during the Early Jurassic in the North Sea area (the UK, Netherlands, Denmark and Norway). This overview may facilitate the prediction of hydrocarbon source rock occurrences in the North Sea area.

After the HYPO-Lias report was finished, the UK funded a cross-border addendum and public report on related aspects to challenge the assumption that the Lower Jurassic of the North Sea is very homogeneous and not prospective. A number of analyses provided insight into the paleoclimatic development of the study area and the drivers that affect source-rock potential in various parts of the study area. The results revealed a close correspondence between carbon cycle perturbations.

An important deliverable of the HYPO-Lias Project was the innovative integrated carbon isotope and palynostratigraphic framework. This enables the regional evaluation of stratigraphic relationships.

Background

The Dutch government has set ambitious goals for decarbonising the Dutch energy supply. The current energy mix is dominated by natural gas. Replacing natural gas for domestic uses with heat from

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Algemene informatie / General information

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TNO

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carbon-neutral energy sources will require a massive overhaul of infrastructure and take decades. Natural gas will therefore remain a significant player for both heat and power generation during this transition and will eventually require the large-scale deployment of CO₂ capture and storage (CCS) technology. At the same time as the Netherlands will continue to need gas, it cannot continue to rely on the giant Groningen field as it has in the past. Domestic natural gas production may soon be unable to meet domestic demand, turning the Netherlands from a natural gas exporter to a net importer unless other sources are found.

Project objective

The HYPO-Lias project sought to provide important data, information and concepts to support the de-risking of future exploration for gas. This would aid the knowledge base required to sustainably explore and produce natural gas domestically and regionally. In addition, the project aimed to provide fundamental insights into the geological and palaeoclimatological development of NW Europe – something of fundamental scientific significance.

Project results

As a first step towards cross-border comparisons, a stratigraphic framework was constructed. Outcrop localities in the UK were sampled in high resolution for organic-carbon isotope and palynological analyses. These outcrop localities are important reference sites for ammonite zonations and so provide a firm ‘chronostratigraphic backbone’. The resultant composite stable isotope curve and palynological marker events form the basis for stratigraphic correlation of cross-border records. Outcrop and core sections were analysed in terms of stable isotope composition, quantitative palynology, bottom-water redox indicators and organic petrochemistry. Collectively these analyses provided insight into (1) the paleoclimatic development of the study area and (2) the drivers that affect source-rock potential in various parts of the study area.

Through cross-border log correlation, the team eventually extrapolated trends across the study area. The results revealed a close correspondence between carbon cycle perturbations as revealed by isotope trends, climate, run-off, anoxia and organic-matter enrichment and preservation. The results obtained from the combination and integration of the various analytical techniques provided an unprecedented cross-border perspective on the Early Jurassic, bearing relevance to a multitude of geoscientific challenges.

De data in deze applicatie is afkomstig van de Rijksdienst voor Ondernemend Nederland (RVO) en wordt in samenwerking met de Topsector Energie ontsloten.

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Voor meer informatie over de TSE / Energie-Innovatie regelingen die RVO aanbiedt, ga naar www.rvo.nl/tse.