

Improved sweet spot identification and smart development using integrated reservoir characterisation (Phase 2)

Publieke samenvatting / Public summary

Summary

This study focused on the main geological parameters controlling the in-situ shale gas presence, such as the thickness and lateral distribution, quality and quantity of organic matter, mineral composition and maturation history. It involved analytically studying the Posidonia Shale Formation from the Dutch subsurface, as well as an outcrop analogue (Jet Rock Formation of the Cleveland Basin) by generating mineralogical, palynological, inorganic and organic geochemical data. Well-logs from Dutch onshore and offshore wells were used for detailed well correlation and property mapping. When combined with the detailed outcrop and core-analyses, these correlations and compilations are pivotal for underpinning the processes that control the deposition, distribution and quality of the shale gas/ source rock in a regional, paleogeographic context.

Background

In contrast to mature shale gas plays, for which extensive exploration drilling is and was possible, exploration in the Netherlands is very challenging in the absence of dedicated exploration wells. This project therefore sought to develop and apply a methodology for shale gas exploration that builds on the synthesis of existing information and data from vintage wells, plus analyses of outcrop

Projectinformatie / Project information

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Algemene informatie / General information

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analogues and core material.

Project objective

The goal of the project was to identify the most promising targets for shale gas presence and production. Ultimately, this will reduce the need to drill hundreds of wells and to rely on production data for the same purpose.

Project results

The results of this study can be grouped into three main parameters that are important for shale gas exploration: thickness and distribution of the shale, organic matter composition and content, and brittleness. The results suggest that it might be useful to include the whole of the Lower Jurassic in a shale gas assessment. The Posidonia Shale Formation itself is an excellent oil source rock with a very homogeneous lateral distribution in the Netherlands, but, due to lower thickness and maturity (onshore), it seems better suited as a shale oil than a shale gas target. Other studies suggest environmental precursors that may provide additional source rock intervals in the Lower Jurassic of the Cleveland Basin. Including these deeper and more mature source-rock layers, together with more brittle rocks of the organic-poor intervals in between, could give a much better shale gas target.

This project therefore shows that it is possible to identify promising shale gas targets or areas of superior source-rock quality from available exploration data. A better understanding of processes that lead to the deposition of organic-rich shales helps in understanding and predicting the distribution and quality of these areas and thus reducing the need for extensive exploration drilling in order to identify shale gas targets.

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