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Corrigendum

Corrigendum to 'Gas leakage from abandoned wells: a case study for the Groningen Field in the Netherlands' [International Journal of Greenhouse Gas Control 126 (2023), 103906]

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The authors regret the printed version of the above article contained a number of errors. In this paper, we modelled the potential leakage rate from the depleted Groningen Field. The results showed negligible leakage rates even with high levels of cement damage. For the sake of general applicability, we included a fictitious gas bearing formation above the modelled target gas reservoir to assess the impact of shallower, normally-pressured formations that are present in other parts of the Dutch subsurface. This should not be misinterpreted as actual presence of such formations above the Slochteren Formation. Below, some clarifications are made and the correct version of Figure 3 is presented. The authors would like to apologise for any inconvenience caused.

Corrigendum abstract and paragraph 2 in Section 1.3

The following clarification is necessary. In this work, "shallow gas" refers to gas-bearing formations that are above the target gas reservoir. In other literature, the term is often used to indicate biogenic gas in the Upper North Sea Group. There is no evidence indicating the presence of shallow gas-bearing formations above the Slochteren Formation. However, we developed this scenario to produce a more generic quantitative leakage analysis that is applicable to other Dutch fields, extending the findings of this research.

Corrigendum Figure 3

The shallow section of Figure 3 (less than 500 depth) was mistakenly interpreted as coal and identified as a potential gas source. However, the formations are lignite and do not contain free gas. In addition, the Quaternary should be Neogene-Quaternary.

Corrigendum paragraph 9 in Section 3

The following clarification is needed. In some parts of the Dutch subsurface (not in the Groningen Field), the compound stratigraphic interval referred to as "Organic-rich claystone (ORC)" can be a potential source of free gas (www.dinoloket.nl, EBN Gas Shows database, well ZWD-01 retrieved Jan. 2021), and was included in the model in addition to the Slochteren Formation (main/target reservoir). There is no strong indication that the ORC contains a significant amount of gas or is permeable. This was introduced to extend this study to other areas with shallower sources of gas present. We considered fictitious gas saturations of 10% and 60% to investigate the impact of a wide range of values on the leakage. For more information regarding the assumptions and conclusions of the paper, please refer to the full report of the KEM-19 project (TNO and Deltares, 2022; KEM-19 Research Review).

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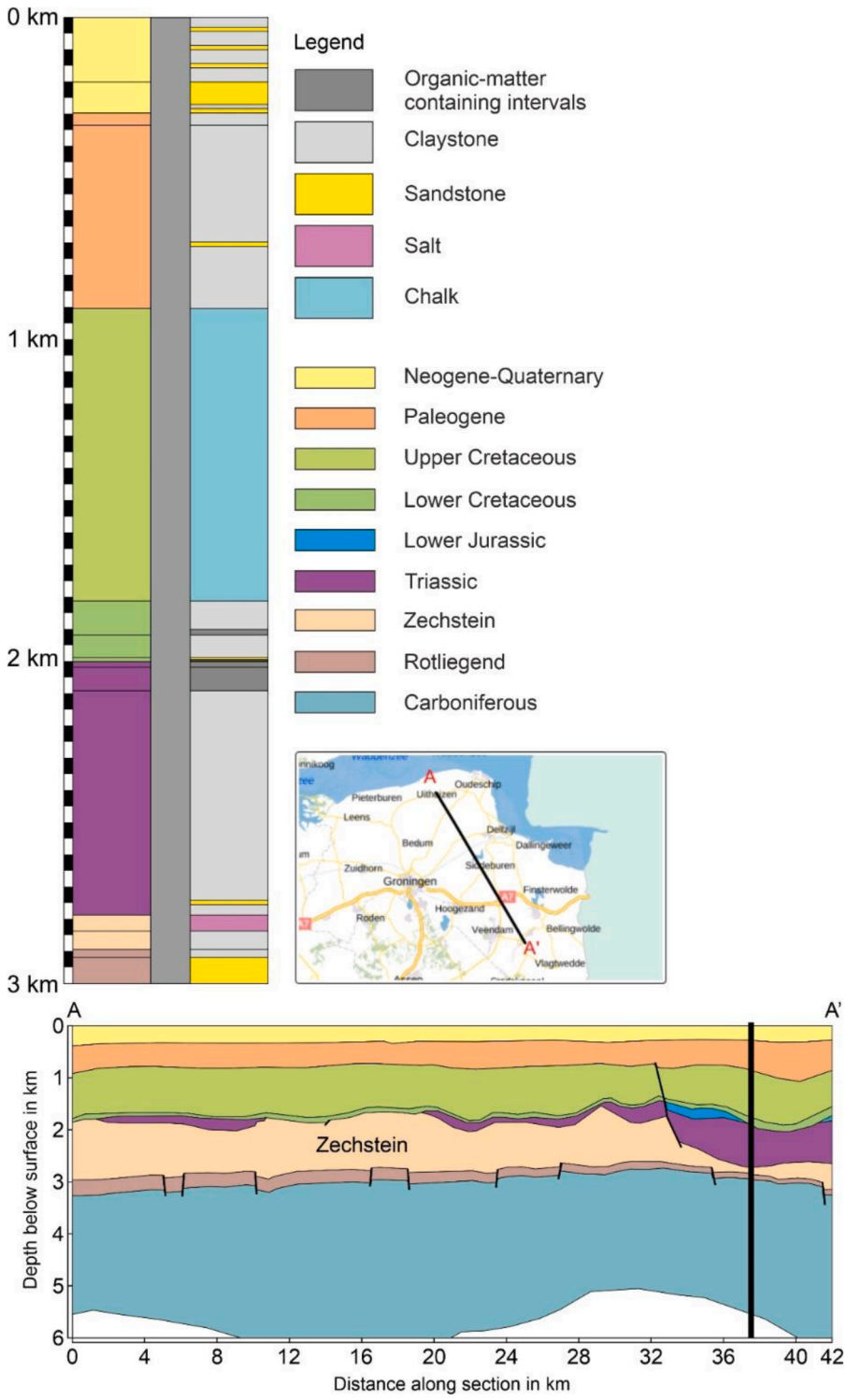

Figure 3. Generalized stratigraphy of the 1D model used for leakage modelling and the 2D Cross section through the Groningen Gas Field from NNW to SSE, showing the main structures and formations in the area (redrawn from www.dinoloket.nl).

References

KEM-19 Research review, evaluation and interpretation. Long term fluid migration, leakage risks and monitoring strategies. www.kemprogramma.nl.

TNO and Deltares, 2022. KEM-19 Evaluation of post-abandonment fluid migration and ground motion risks in subsurface exploitation operations in the Netherlands. Phase 2, 158.