



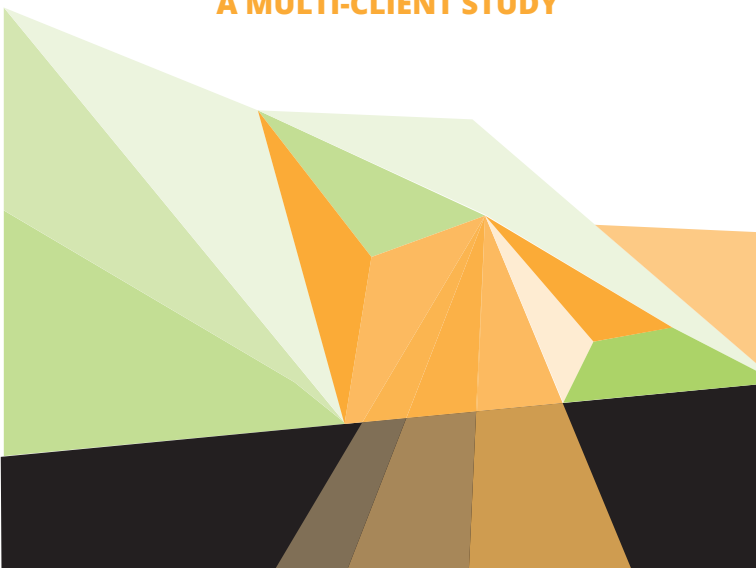
MIGRIS

FINDING MORE WITH LESS

Tampen Spur Charge Atlas

**Migris now offers a study
assessing the probabilities
of hydrocarbon charge in the
Tampen spur area.**

A MULTI-CLIENT STUDY



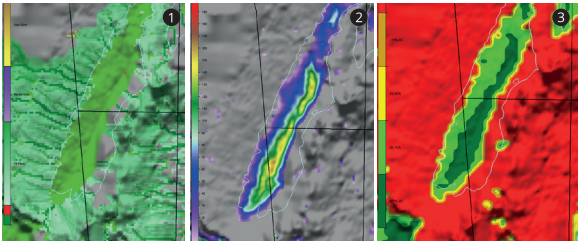
DELIVERABLES

The results of the study are delivered as a PDF report consisting of two parts:

- 1) Summary description of the input data, model building, calibration and main results
- 2) Charge Atlas containing the main result maps from the modelling in high resolution

All maps contained in the Charge Atlas are delivered as a set of grid files at 200-400 m resolution.

The grids can be loaded into standard interpretation software for use in the day-to-day exploration work. The “best case” migration simulations are also made available as interactive 3D animations.



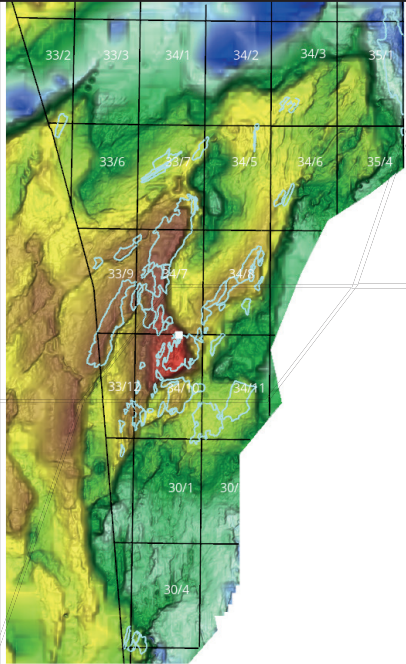
Examples of migration (1), modelled HC columns (2) and charge risk (3) in the Statfjord Field area.

The database used in the project is not included as a deliverable. The seismic data and interpretations can be purchased separately from PGS. The full Migri basin model can also be purchased separately from Migris.

**THE RESULTS FROM THE STUDY
ARE AVAILABLE FOR PURCHASE:**

MIGRIS.NO/STUDIES-AND-SERVICES

STUDY AREA



LAYER MODEL

Ages	Layer names	Lithologies
0.Ma	Seabed [1]	
2.Ma	Pliocene [2]	
5.Ma	Miocene [3]	
23Ma	Hordaland [4]	
34Ma	M. Eocene [5]	
49Ma	Balder [6]	
56Ma	Sele [7]	
60Ma	L. Pal [8]	
65Ma	Chalk [9]	
68Ma	U. Hod [10]	
100Ma	L. Cret [11]	
120Ma	I. L. Cret [12]	
140Ma	U. Jurassic [13]	
151Ma	Heather [14]	
161Ma	M. Jurassic [15]	
165Ma	MJ. Coal [16]	
175Ma	IL. Jurassic [17]	
190Ma	Statfjord [18]	
200Ma	Triassic [19]	
255Ma	Zechstein [20]	
260Ma	Rotliegendes [21]	
299Ma	Devonian [22]	

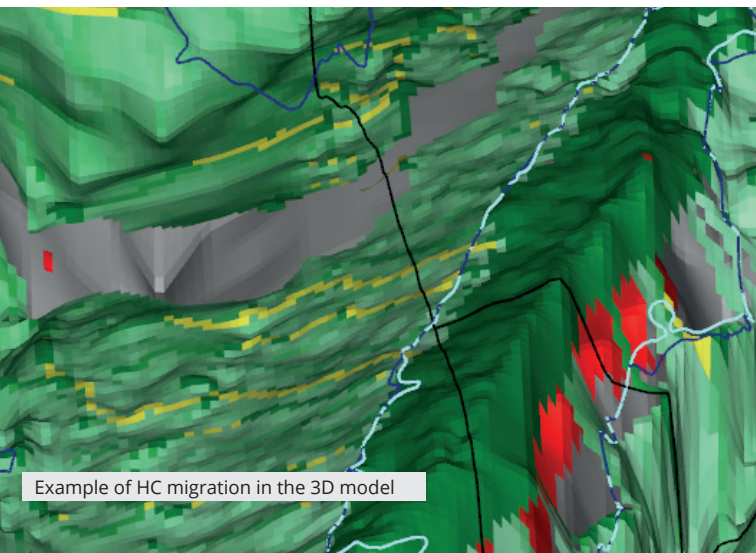
Source rocks

TAMPEN SPUR CHARGE ATLAS

We have performed high-resolution probabilistic charge modelling in the Tampen Spur area. Modelling results include predictions of the probabilities of charge, phase and hydrocarbon trapping for the main carrier systems. The modelling uses the North Sea Charge Study (2013) as a basis. The depth model is based on the PGS MegaSurvey and Digital Atlas interpretations.

Burial, maturation, generation, migration, and leakage were dynamically modelled through time in each realisation of the full 3D basin model. Important parameters such as the temperature field, lithologies and source rock properties are all described using a combination of maps of most likely values and uncertainties.

The results from this project will provide insights to understanding the overall hydrocarbon charge systems and petroleum systems risks in the Tampen Spur area. The charge risk maps will be useful for highlighting prospective areas and to identify overlooked exploration targets. The maps will be valuable input to e.g. farm-in evaluations and license application screening.



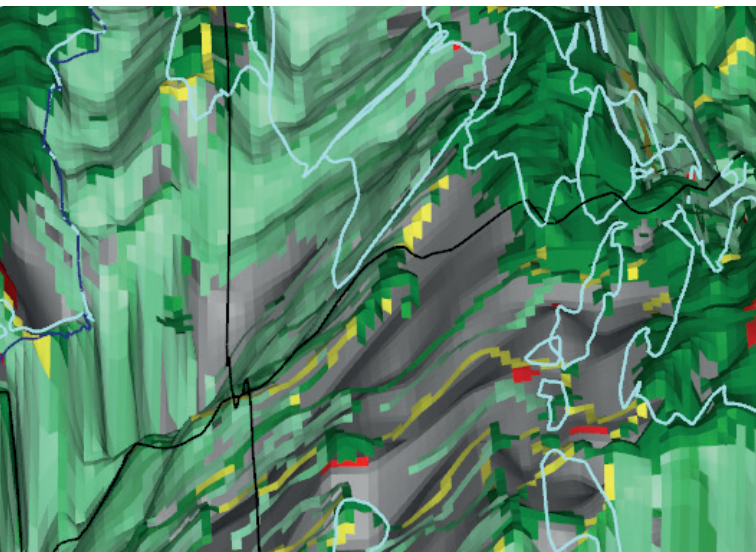
Example of HC migration in the 3D model

Model calibration and results

The model is calibrated against a database consisting of more than 200 hydrocarbon column observations at different carrier levels. An iterative stochastic modelling procedure is used to improve the model fit to the observation data. The approach allows for estimating uncertainties in the modelling results by weighting the compiled results from a large database of simulation runs against the observation dataset.

Important results from the modelling include:

- \\ Maturity maps (Transformation/HC windows/timing) of source rock intervals
- \\ Generated oil and gas volume maps for each source rock unit
- \\ Base case migration maps through time for the main carrier intervals
- \\ FlowRisk maps showing risk of charge
- \\ PhaseRisk maps showing probability of oil charge
- \\ P10, P50 and P90 hydrocarbon column heights for the main carrier intervals



Multi-client studies

- \\ Digital maps of hydrocarbon maturity, oil and gas generation histories and migration modelling results
- \\ Investigations of sensitivities and uncertainties (e.g. P10-P90 results) using stochastic methods
- \\ Useful in assessing where to explore for prospective areas and understanding the petroleum charge systems of the study area
- \\ Can be used as framework for our in-depth Single Client Studies using high resolution local maps

Single-client studies

- \\ Our geoscientists perform an in-depth, high resolution study of a licensed area, prospect, basin or play
- \\ Client normally provides additional data, such as maps, well data and faults
- \\ Describe exploration potential and risk using the clients exploration model, ideas and concepts

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