

Utsira High Charge Atlas



Migris now offers a study assessing the probabilities of hydrocarbon charge in the Greater Utsira High area.

Using the North Sea Charge Study as a basis, we have performed high-resolution probabilistic charge modelling in the Greater Utsira High area. Results include predictions of the probabilities of charge, phase and hydrocarbon trapping for the main carrier systems.

Basis for the study

The simulations are based on the 21-layer Migri basin model constructed in the North Sea Charge project from 2013. Migris was the operator of this project and PGS provided seismic interpretations based on North Sea MegaSurvey data.

The facies model in the Utsira High area has been updated and refined for the new study, taking into account new well data from the area.

A probabilistic approach has been applied to the description of the source rock model (7 Jurassic, Triassic and Permian source rock units), the thermal history, the hydrocarbon generation modelling and the migration

modelling. The migration modelling is performed at high lateral resolution (400m and 200 m), with detailed calibration to exploration well data.

Burial, maturation, generation, migration, and leakage were dynamically modelled through time in each realisation for the full 3-D basin model.

Important parameters such as the temperature field, lithologies and source rock properties are all described using a combination of maps and normal distributions to include uncertainties in the descriptions.

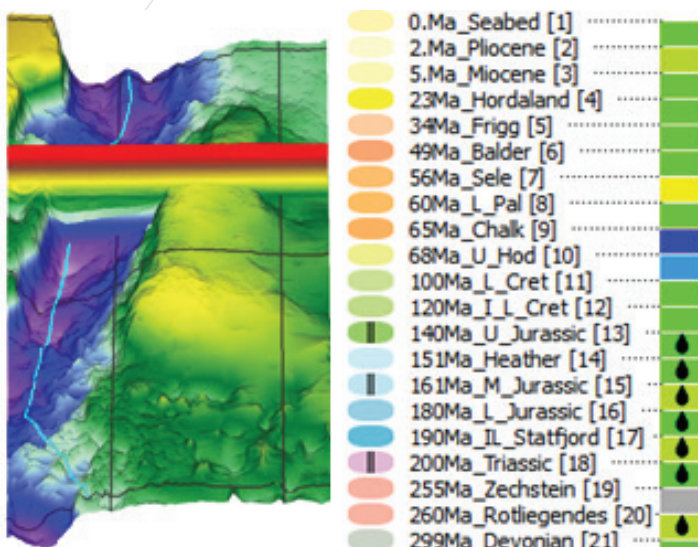
Model calibration and results

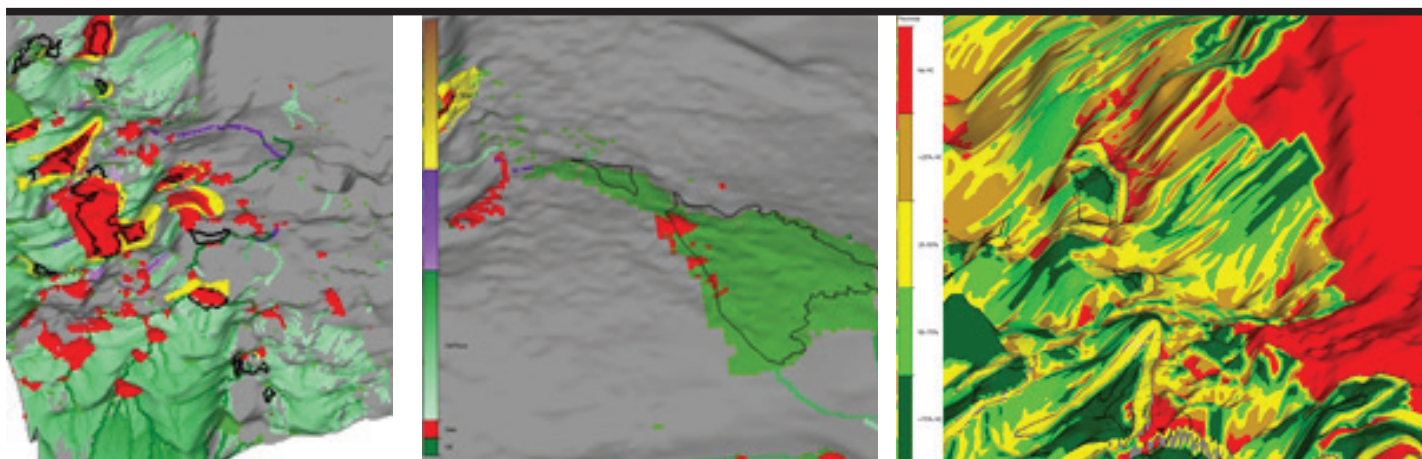
The model is calibrated against a database consisting of more than 500 hydrocarbon column observations (including dry wells) at different carrier levels.

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 (several 1000) of simulation runs against the observation dataset.

Important results from the modelling include:

- Maturity maps (Transformation/HC windows/timing) of source rock intervals
- P10, P50 and P90 expelled oil and gas volume maps for each source rock unit
- Drainage area maps and per-area volumes
- P10, P50 and P90 migration maps through time for the main carrier intervals
- FlowRisk maps showing risk of charge failure
- PhaseRisk maps showing risk of oil charge
- P10, P50 and P90 hydrocarbon column heights for the main carrier intervals
- Best case" migration histories





Examples of migration (left), Johan Sverdrup filling (middle) and Flowrisk map (right)

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 also available as a set of grid files (ZMap ASCII) format at 200-400m resolution. The grids can be loaded into standard interpretation software for use in the day-to-day exploration work. The “best case” migration simulations will also be made available as interactive 3D animations.

The results from this project will provide insights to understanding the overall hydrocarbon charge systems and petroleum systems risks in the Greater Utsira High 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.

The results may also be used as input to detailed charge modelling in a licensed area or prospect evaluation in combination with your own data.

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

The results from the study are available for purchase.

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