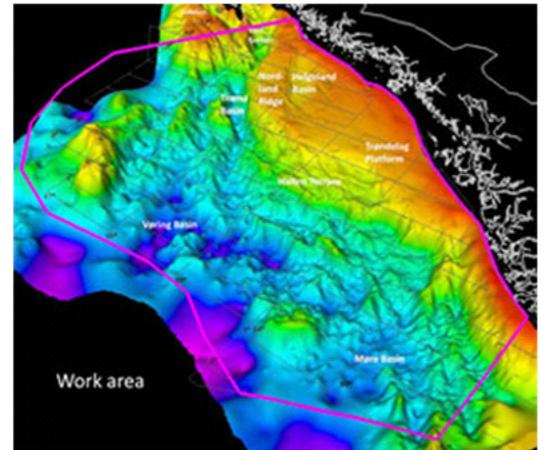


Integrated Norwegian Sea Study - INS 2010

Geological history and petroleum system evolution

SINTEF Petroleum Research, together with its cooperation partners AGR Petroleum Services, Fugro Geolab Nor and Geotrack International, has completed a regional overview study covering most of the Norwegian Sea.

This integrated basin modelling study comprises some of the most comprehensive geochemical, thermal, and pressure databases currently available in the region. Depth maps derived from a consistent interpretation of public seismic and re-evaluated formation tops form the geometrical framework. These data were used to model palaeo-water depth, source-rock quality, burial and thermal history (considering fission-track results), organic matter maturation, formation pressure, hydrocarbon expulsion and migration. Various petroleum systems were characterized and key risk factors identified within this large and geologically complex area.



3D depth map of a key horizon showing the approximate extent of the work area.

Particular attention was paid to identifying and incorporating the timing and extent of geological events (e.g. thermal and erosion events) that exert a profound influence on petroleum generation, migration and entrapment.

Deliverables

- Report (paper and PDF)
- Maps of petroleum generation and expulsion from source rocks
- Maps of petroleum migration and entrapment in carrier rocks
- Maps showing the modelled thermal and fluid pressure history
- Source-rock property maps (thickness, TOC, HI) for marine Mesozoic potential source-rocks, based on organic facies modelling (Åre Fm. coal conceptual)
- Maps of modelled palaeo-water depth for Intra Upper Permian to Base Quaternary
- Erosion maps for selected time steps
- Pressure maps for Jurassic carrier rock and selected time steps
- Depth maps covering the work area from Near Top Permian to sea floor (500 m x 500 m grid)
- Temperature and pressure database
- Geochemical database including analyses of recently released wells
- Geochemical characterization of potential source-rock horizons in wells
- Geochemical correlation between petroleum (oils, gases, shows) and potential source-rock units

All maps will be delivered in a consistent Petrel project or as grids. Other formats (ESRI shape files, Kingdom, Landmark) can be made available on request.

Customers can order a one-day workshop at no additional cost within six months after delivery of the report. The workshop will be held at the customer's premises.



Depth map grids

Seabed, Top Pliocene clinoform (Intra upper Naust Fm.), Base Pliocene clinoform (intra Pliocene Unconformity), Top Tare Fm. (Top Paleocene), Top Springar Fm. (Base Tertiary Unconformity), Top Nise Fm., Top Lysing Fm., Top Lange Fm. (C), Top Lyr Fm. (C), Top Spekk Fm. (Base Cretaceous Unconformity), Top Rogn Fm. (C, not used in the model), Top Melke Fm. (C, where possible), Near base Upper Jurassic (mainly Top Fangst Gp.) / Top Triassic (in parts of work area), Top Not Fm. (C), Top Ile Fm. (C), Top Tilje Fm. (C), Top Åre Fm., Base Åre Fm. (Near top Triassic), Near Top "Permian" (Helgeland Basin and as far west as possible).

(C) = constructed from well data; all other maps are interpreted from seismic and adjusted to well tops.

Well and geochemistry data

Exploration wells

6201/11-1 (R+O)	6406/11-1 S (R+O)	6506/12-3 (O)	6608/10-2 (R+O)
6204/11-1 (R+O)	6406/12-2 (R)	6507/2-1 (R)	6608/10-4 (R)
6205/3-1 (R)	6407/1-2 (R+O)	6507/2-3 (R)	6608/10-5 (R)
6302/6-1 (R)	6407/1-3 (O)	6507/3-1 (R+O)	6608/10-8 (R+O)
6305/5-1 (R)	6407/4-1 (R+O)	6507/3-3 (R+O)	6608/11-2 (R+O)
6305/8-1 (R+O)	6407/5-1 (R)	6507/5-1 (R+O)	6608/11-3 (R)
6305/9-1 (R)	6407/6-3 (O)	6507/5-3 (R+O)	6608/11-4 (R+O)
6305/12-1 (R)	6407/6-5 (R)	6507/5-4 (R+O)	6609/5-1 (R)
6306/5-1 (R)	6407/7-1 S (R+O)	6507/6-1 (R)	6609/6-1 (new R)
6306/6-1 (R)	6407/8-1 (R)	6507/6-2 (R+O)	6609/7-1 (R)
6306/10-1 (R+O)	6407/9-1 (R)	6507/7-1 (R)	6609/10-1 (R)
6403/6-1 (R)	6407/9-5 (O)	6507/7-2 (R+O)	6609/11-1 (R)
6403/10-1 (R)	6407/9-8 (R)	6507/10-1 (R)	6610/2-1 S (R)
6404/11-1 (R)	6407/10-2 (R)	6507/11-1 (R)	6610/3-1 (R)
6405/7-1 (R+O)	6407/10-3 (R)	6507/11-3 (O)	6610/3-1 R (R)
6406/1-4 (new R)	6408/4-1 (R)	6508/1-1 A (R)	6610/7-1 (R)
6406/2-1 (R)	6504/5-1 S (new R)	6508/5-1 (R)	6610/7-2 (R)
6406/2-1 R (O)	6505/10-1 (R)	6510/2-1 (R)	6704/12-1 (R)
6406/2-6 A (O)	6506/6-1 (R)	6605/8-1 (O+ new R)	6706/6-1 (R)
6406/3-2 (O)	6506/11-2 (O)	6607/2-1 (new R)	6706/11-1 (R)
6406/5-1 (O)	6506/11-3 (R+O+ new R)	6607/5-1 (R)	6707/10-1 (R+O)
6406/8-2 (new R)	6506/11-6 (R+O)	6607/5-2 (R)	6710/10-1 (R)
6406/9-1 (O+ new R)	6506/11-7 (O)	6607/12-1 (R)	
6406/9-2 (new R)	6506/12-1 (R+O)	6608/8-1 (R)	

Key to organic geochemical data: R = rock/kerogen analyses, O = oil (from DSTs, RFTs etc.) analyses, new R = new rock/kerogen analyses on recently released material particularly for this study (including TOC/Rock-Eval pyrolysis, vitrinite reflectance, visual kerogen description, extraction - separation - saturated biomarkers).

IKU shallow stratigraphic cores

Data from selected shallow stratigraphic cores were used in the construction of the model but not be documented in the database. Reports including the full documentation of the relevant stratigraphic drilling projects are separately available for purchase from SINTEF Petroleum Research.

Apatite fission track data

Data and results from Geotrack's report "Mid Norway – Northern Trøndelag-Nordland-Vøring Margin. Non-exclusive AFTA® and thermal history study" were used as input to the model, but are not included in the deliverables. The report is separately available for purchase from Geotrack.

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