The geology of the Jan Mayen Microcontinent

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Jan Mayen platform seafloor morphology

–Karin Andreassen and Monica Winsborrow, UiT
Figure 2. Example of large linear iceberg ploughmarks.
Figure 3. Example of large curved multikeel iceberg ploughmarks.
Regional stratigraphy
Middle to upper Jurassic, Jameson Land
Potential Jurassic source rock:
(Hareelv formation)
Clinoforms in the upper Jurassic:
(Raukelv formation)
Jurassic paleogeography

LATE BAJOCLIAN  
(ca 165 Ma)

LATE OXFORDIAN - EARLY KIMMERIDGIAN  
(ca 155 Ma)
Cretaceous paleogeography

**BARREMIAN**

(ca 130 Ma)

- Shallow marine
- Deeper marine
- Emergent area

**EARLY CAMPANIAN**

(ca 83 Ma)

- Deeper marine
- Emergent area
Paleocene paleogeography

**EARLY PALEOCENE** (ca 65 Ma)

- Deeper marine area
- Emergent area

**MID/LATE PALEOCENE** (ca 61 Ma)

- Emergent area
Paleogeography during continental break-up

EARLY EOCENE (ca 56 Ma)

LEGEND

- Emergent area
- Continental clastics, unspecified
- Continental clastics, mainly sands
- Continental clastics, mainly shales and silts
- Halite
- Marginal evaporite deposits, sabkha
- Coastal-, delta- and flood plain deposits
- Marginal marine and shallow marine deposits, mainly sands
- Shallow marine deposits, mainly shales
- Deeper marine deposits, mainly shales
- Shallow marine carbonates
- Deeper marine carbonates
- Volcanic deposits
- Oceanic crust
- Carbonaceous shales
- Clastic mixing in carbonates, sands in shales
- Spiculate
- Normal fault
- Orogen boundary
- Tectonic lineaments and inferred fault zones
Palinspastic Crustal Transects

55 Ma

52 Ma

Mjelde et al. 2008
Palinspastic Crustal Transects

25 Ma

Present

Mjelde et al. 2008
Data coverage

- 5874 km NPD-seismic, (1979, 1985, 1988)
- 4 shallow drillings, (DSDP 1974)
Scientific shallow drilling DSDP 1974

DSDP well 349
Middle Eocene

Oligocene unconformity
Middle Eocene?
Lower Eocene?
Upper Paleocene?

Acknowledge to Spectrum
Outcroping strata present in the Jan Mayen Ridge

Oligocene unconformity

Middle Eocene?

Lower Eocene?
Segmented ridge-structure

Acknowledge to Spectrum
Normal- and reverse (strike-slip) faulting
Conclusive Remarks

- Micro-continent with crystalline basement
- In the Cretaceous, JMMC was part of the western flanking platform of the Møre Basin
- Attached to East Greenland (Liverpool Land) before seafloor spreading in the Oligocene
- Probably most of the post-Mesozoic strata preserved on the JMMC
- 3 heat pulses: - Neogene
  - Middle Oligocene
  - Paleocene-Eocene transition
- Normal, reverse and transverse movements
- Sub-basalt imaging still unresolved