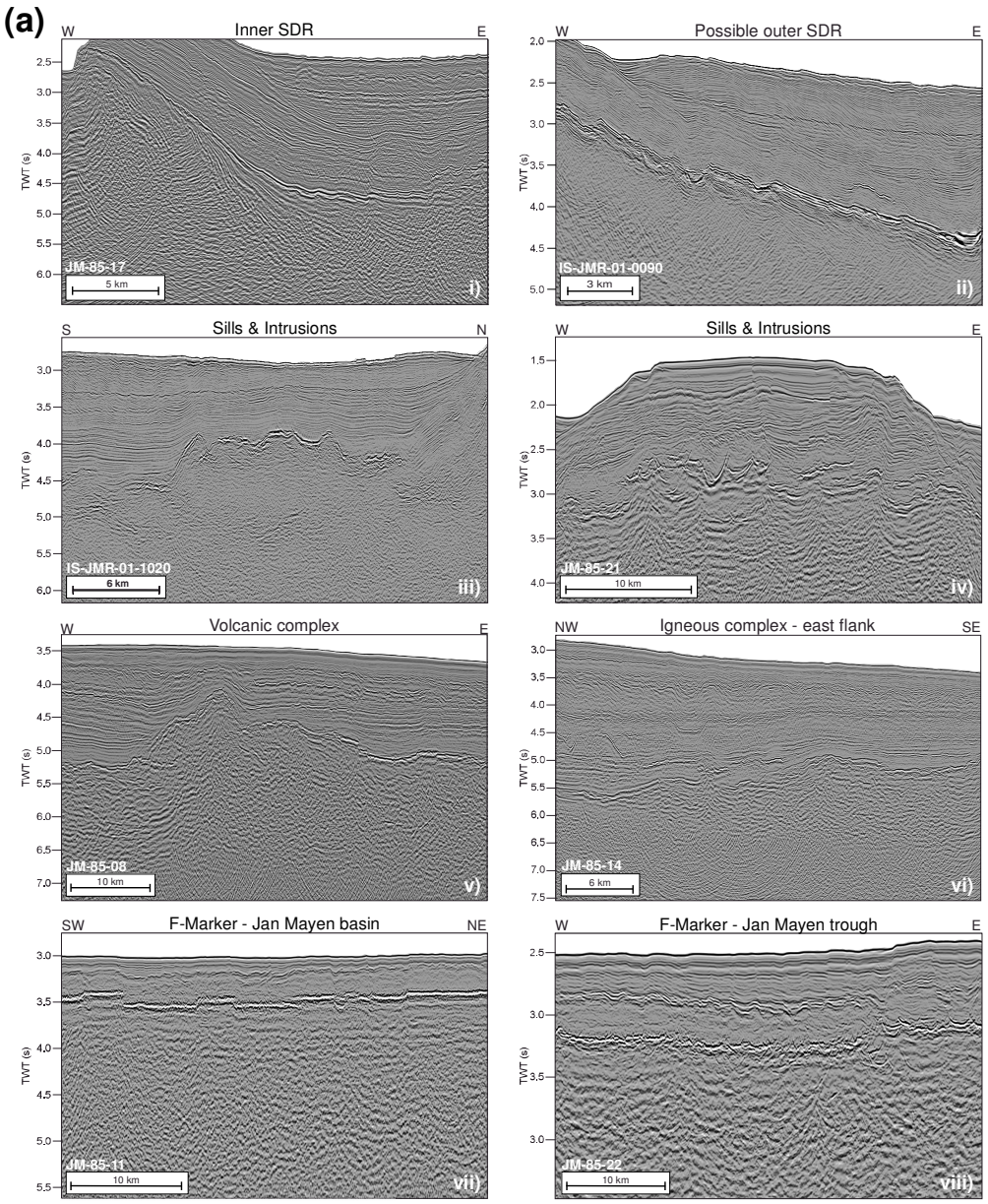
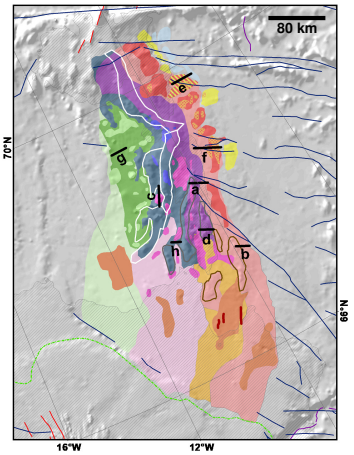
Supplement 6

Mapped JMMC volcanic facies, stratigraphic horizons and igneous events.





Jan Mayen microcontinent area volcanic facies types example:

(i) ***Seaward dipping reflector (SDR´s) / Inner SDR:***
clearly visible wedge feature of eastward dipping reflectors into the Norway basin, discordantly overlaying the JMMC breakup margin.

(ii) ***Atypical seaward dipping reflector (SDR´s) / Outer SDR:***
not clearly showing wedge shape units connected to the south-eastern SRC igneous margin (IPR-I) that has been heavily affected by later faulting during the rift transfer across the IPR.

(iii & iv) ***Sill and dyke intrusions:***
layer parallel, saucer-shaped, to fault parallel sill and dyke intrusions within the Eocene to Early Miocene strata.

(v & vi) ***Volcanic and igneous complexes:***
build up onto the SDR´s and the firstly established oceanic crust along and east of the continent ocean boundary (COB).

(vii & viii) ***Shallow rift basalt - F-Marker:***
series of shallow intrusions and regional extensive lava flows, possibly in shallower water, occurred in different IPR activity phases during Late Oligocene within the Jan Mayen trough and during Early Miocene within the Jan Mayen basin. that relate to the rifting and separation of the western flank of the JMMC from the main land.

(b) Examples of volcanic and stratigraphic facies and related structures.

Data interpretation is based on 2D multi-channel seismic reflection data from surveys NPD-2011, ICE-02 in 2009 and reprocessed data from the JM-85, JMR-01, and JMR-08 surveys.

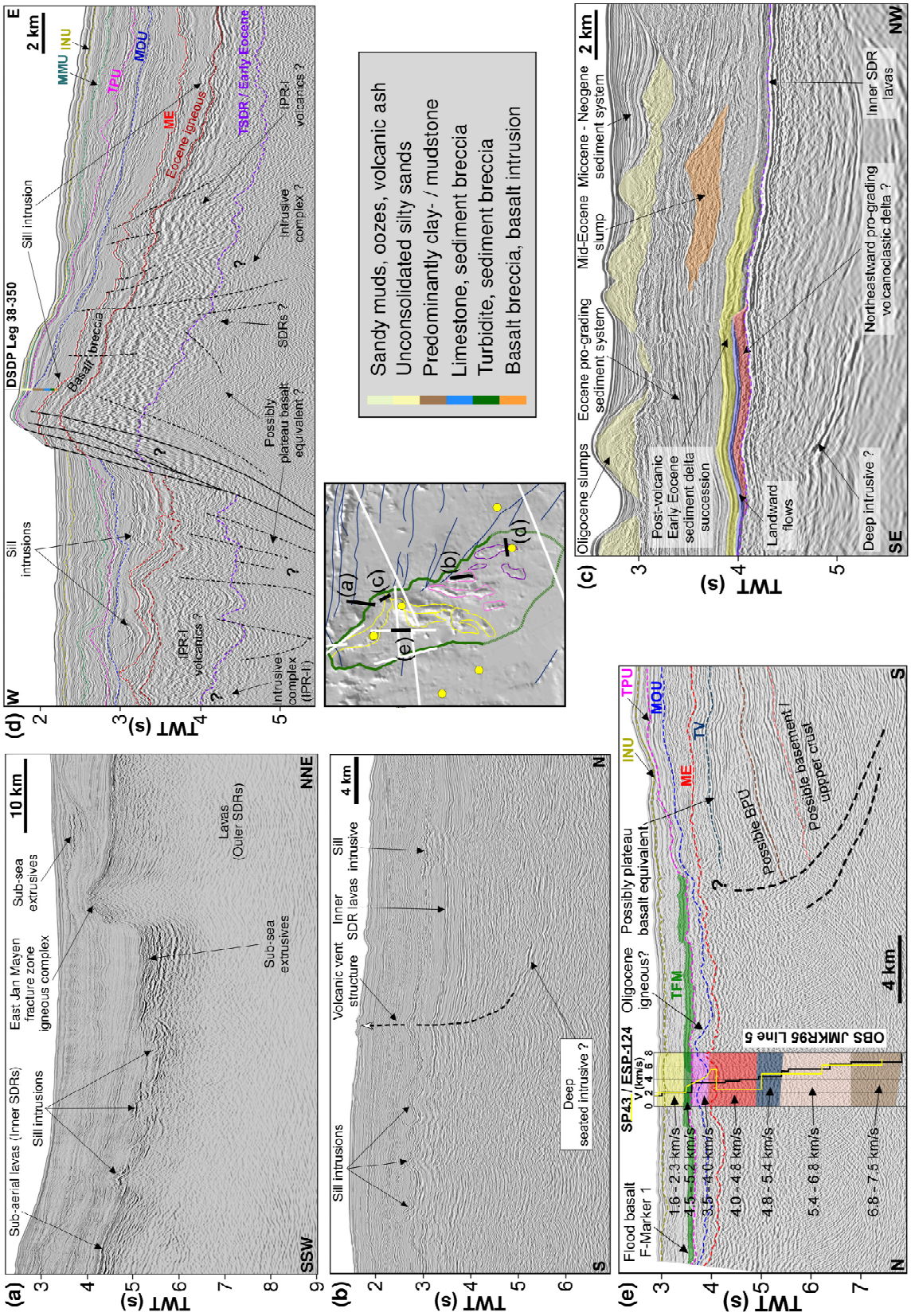
(a) Fracture zone intrusive, sill and dyke intrusive – JMMC northeast flank;

(b) Vent structures, sill and dyke intrusive – JMMC southeast flank;

(c) Eocene terrestrial to shallow marine transition from landward flows to hyaloclastite delta and pro-grading sediment systems;

(d) Early-Mid Eocene IPR basalt breccia and Eocene to Oligocene sill intrusive; and

(e) Oligocene F-Marker extrusive and intrusive.


(a)
Sub-aerial lavas (Inner SDRs)
Sill intrusions
East Jan Mayen fracture zone igneous complex
Sub-sea extrusives
10 km
Lavas (Outer SDRs)
Sub-sea extrusives
SSW
NNE
TWT (s)
(b)
Sill intrusions
Volcanic vent structure
Inner SDR lavas
Sill intrusive
4 km
Deep seated intrusive ?
S
N
TWT (s)
(c)
Oligocene slumps
Eocene pro-grading sediment system
Mid-Eocene slump
Miocene - Neogene sediment system
2 km
Post-volcanic Early Eocene sediment delta succession
Landward flows
Deep intrusive ?
Northeastward pro-grading volcanoclastic delta ?
Inner SDR lavas
SE
NW
TWT (s)
(d)
W
DSDP Leg 38-350
Sill intrusion
2 km
E
MMU
INU
TPU
MDU
ME
Eocene igneous
TSDR / Early Eocene
Basalt breccia
Sill intrusions
IPR-I volcanics ?
Possibly plateau basalt equivalent ?
SDRs ?
Intrusive complex ?
IPR-I volcanics ?
Intrusive complex (IPR-I)
TWT (s)
Sandy muds, oozes, volcanic ash
Unconsolidated silty sands
Predominantly clay- / mudstone
Limestone, sediment breccia
Turbidite, sediment breccia
Basalt breccia, basalt intrusion
(a)
(b)
(c)
(d)
(e)
(e)
Flood basalt F-Marker 1
SP43 / ESP-124
V (km/s)
Oligocene igneous?
Possibly plateau basalt equivalent
INU
TPU
MDU
TFM
ME
TV
1.6 - 2.3 km/s
4.5 - 5.2 km/s
3.5 - 4.0 km/s
4.0 - 4.8 km/s
4.8 - 5.4 km/s
5.4 - 6.8 km/s
6.8 - 7.5 km/s
?
Possible BPU
Possible basement / upper crust
OBS JMKR95 Line 5
4 km
N
S
TWT (s)

(c) Summary of interpreted stratigraphic horizons and main igneous events.

Horizon	Epoch	Igneous/ tectonic events
JM10	Plio-Pleistocene	Strong reflector. Unconformity. Continuous seafloor spreading Kolbeinsey Ridge, subsidence affecting the Jan Mayen Ridge (deep marine environment).
JM15	Middle Miocene	Unconformity. Rift transfer in Iceland, Kolbeinsey Ridge active seafloor spreading
F-Marker 1	Early Miocene	2nd breakup, IPR-IV, emplacement of flood basalt (intrusive & extrusive formations) during a breakup event (JMB – west flank domain)
JM20	Top Paleogene	Unconformity. Uplift and erosion
Volcanic SW-W margin	Late Oligocene to Early Miocene	Rift transfer across IPR forming of large igneous complexes and forming of volcanic margin.
F-Marker 2	Late Oligocene	Emplacement of flood basalt (intrusive & extrusive formations) during IPR rift transfer (JMT domain)
JM30	Middle to Late Oligocene	Unconformity. Onset of deposition after the main breakup within the Greenland margin
F-marker 3	Middle Oligocene	Emplacement of flood basalt (intrusive & extrusive formations) during IPR rift transfer (SE SRC)
JM35	Early to Middle Oligocene	Unconformity. Onset of main rifting and breakup within the Greenland margin.
JM40	Late Eocene	Unconformity, intrusive complexes
JM45	Middle to Late Eocene	Seafloor spreading at the Ægir Ridge and accumulation of sediments at the Jan Mayen Ridge, derived from Greenland highlands.
JM50	Middle Eocene	Rift transfer across IPR forming of large igneous complexes and well-defined unconformity
Poss. Volcanic Conduit	Early to Middle Eocene	Rift transfer across IPR forming of large igneous complexes and forming of volcanic margin.
JM-60 SDR &Plateau Basalt equivalent	Early Eocene	1st breakup extension between Greenland and Norway. Forming of the plateau basalts and sub-joined with onset of seafloor spreading at the Ægir Ridge and forming of SDR´s
JM70	Paleocene	Pre-rift strata