

Geological Survey of Norway Organisation

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		<u>Continental Shelf Geophysics</u> Odleiv Olesen			
		<u>Network and cooperation</u> Jan Høst			

220 employees



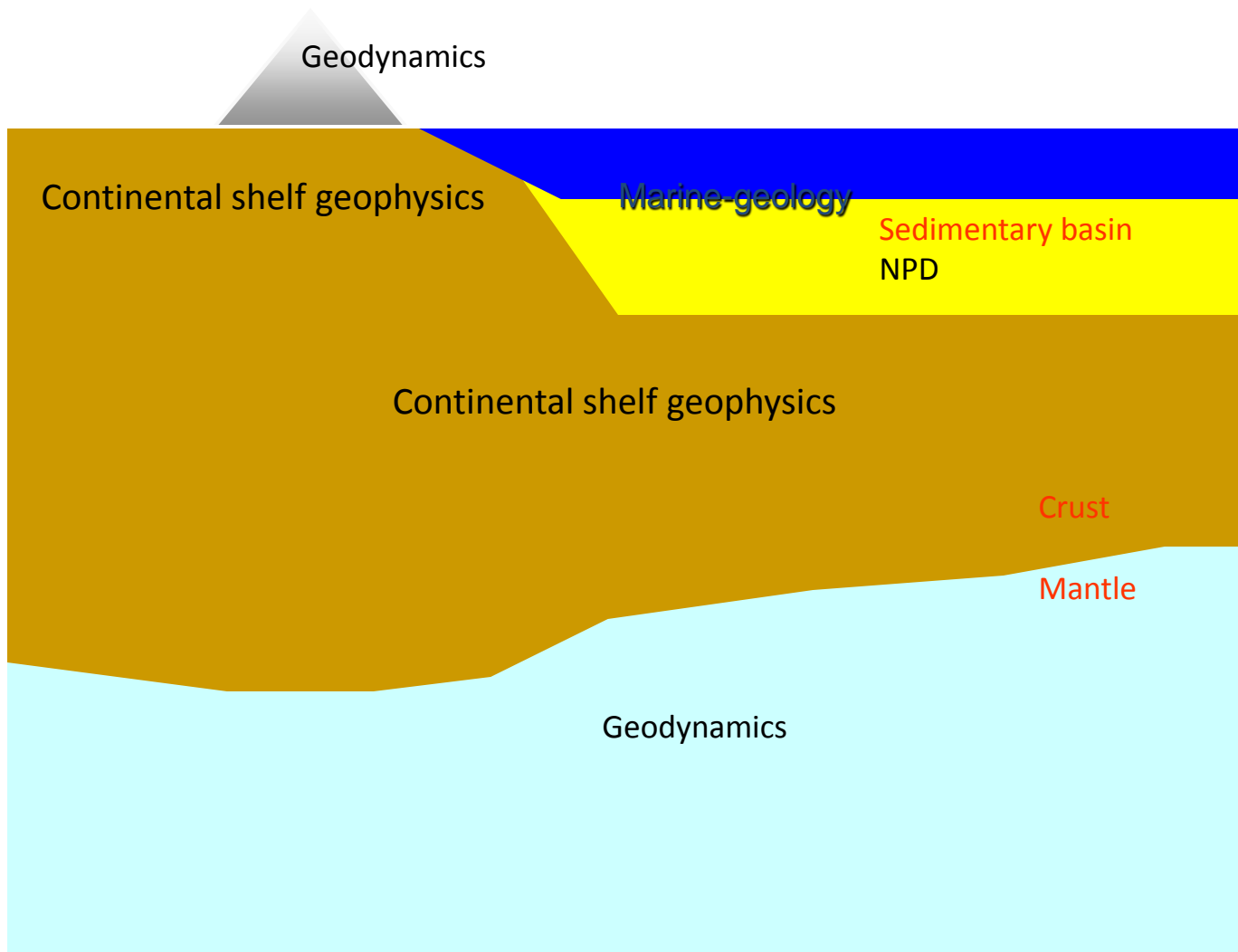
Areas of mapping responsibility NGU - NPD

New projects:

NEONOR2, Neotectonics in Nordland – implications for petroleum exploration

BASE, Basement fracturing and weathering

RESOURCE, Research onshore to understand response to offshore extension



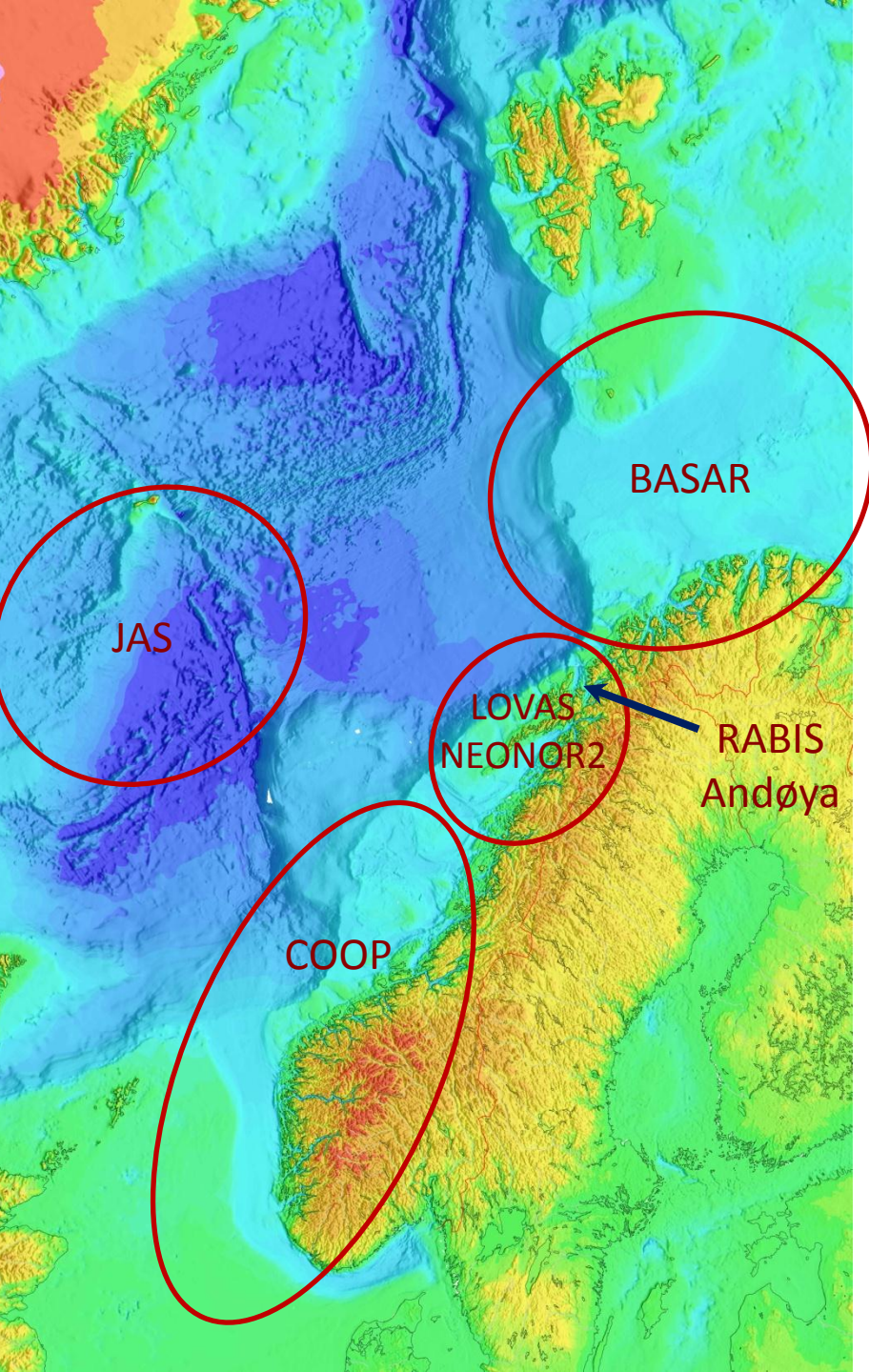
OLJEDIREKTORATET



Geological Survey of Norway

Continental shelf geophysics





NEW INTEGRATED CRUSTAL STUDIES on the Norwegian Continental Shelf

BASAR	Barents Sea Aeromagnetic Remapping
LOVAS	Lofoten-Vestfjorden Aeromagnetic Survey
RABIS	Ramså Basin Integrated Study
NEONOR2	Neotectonics in Nordland
JAS	Jan Mayen Aeromagnetic Survey
COOP	Crustal Onshore-Offshore Project

NAG-TEC Northeast Atlantic Geoscience
Tectonostratigraphic Atlas

www.ngu.no/flymag

Coop

Crustal Onshore-Offshore Project

Main objectives

- Basement characterization

Petrophysics

Heat production

Lithology

Deep weathering

Age dating

- Depth to basement
- Fault zones (onshore-offshore)
- Dyke swarms
- 2D & 3D crustal modelling
- 3D thermal modelling
- Geodynamic and tectonic interpretations
- Subcrop pattern
- Quaternary sand channels

bayerngas



ConocoPhillips



Eni Norge

e-on

GDF SUEZ

Lundin



MAERSK OIL



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RWE The energy to lead



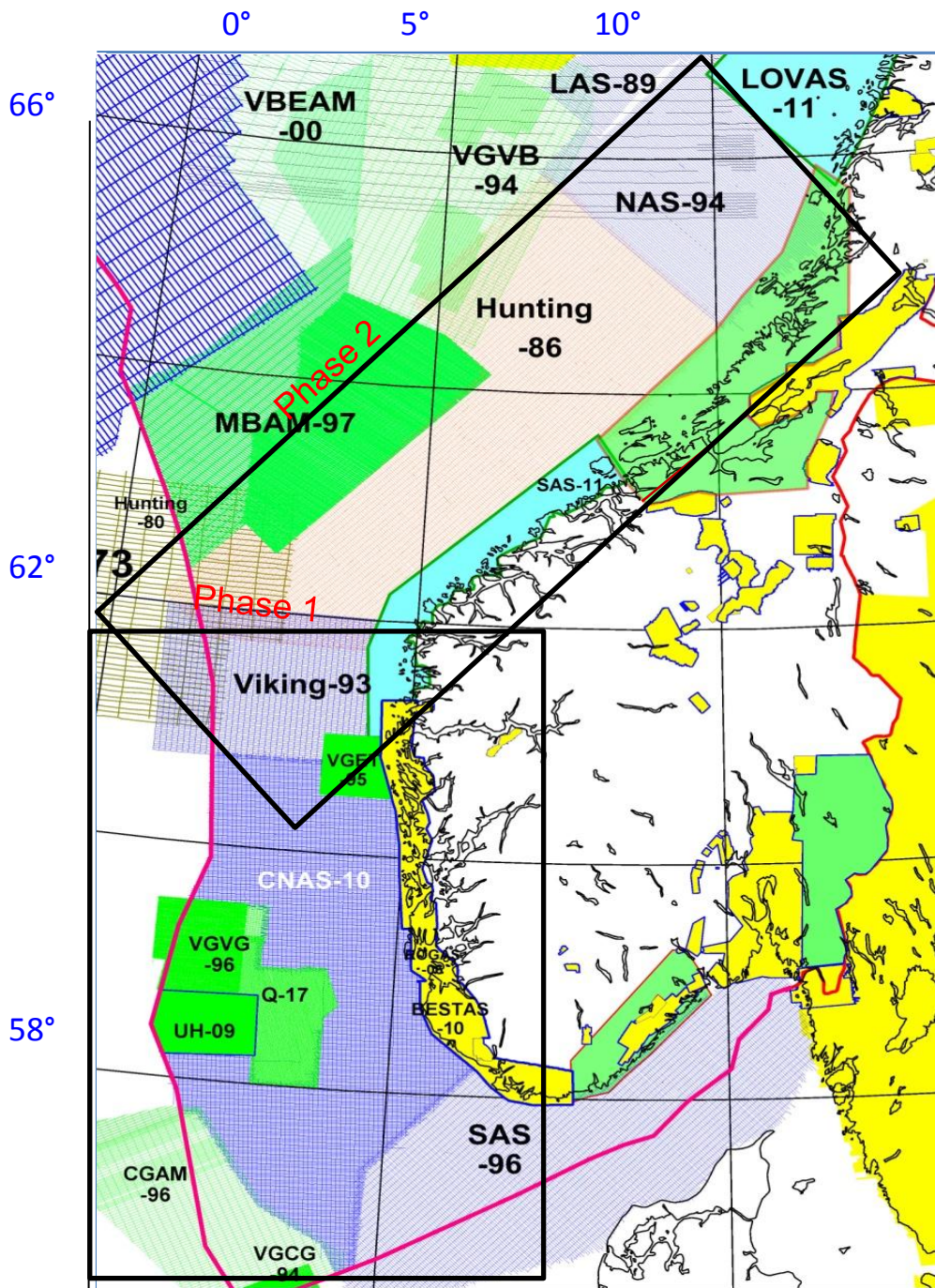
TOTAL

Verbundnetz Gas AG

wintershall

NGU
Geology for Society since 1858

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Aeromagnetic data Coop Project

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RWE The energy to lead



Statoil

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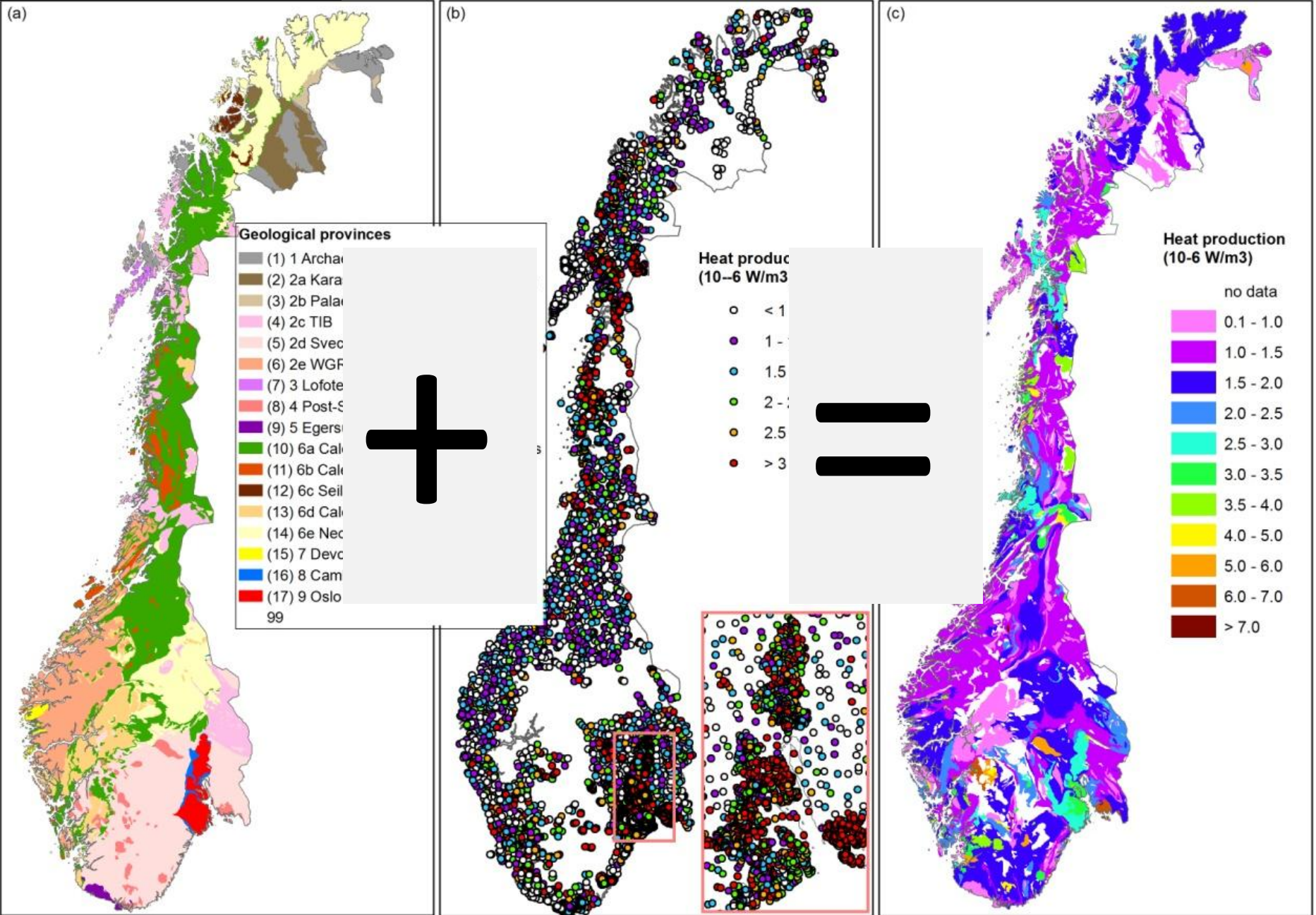
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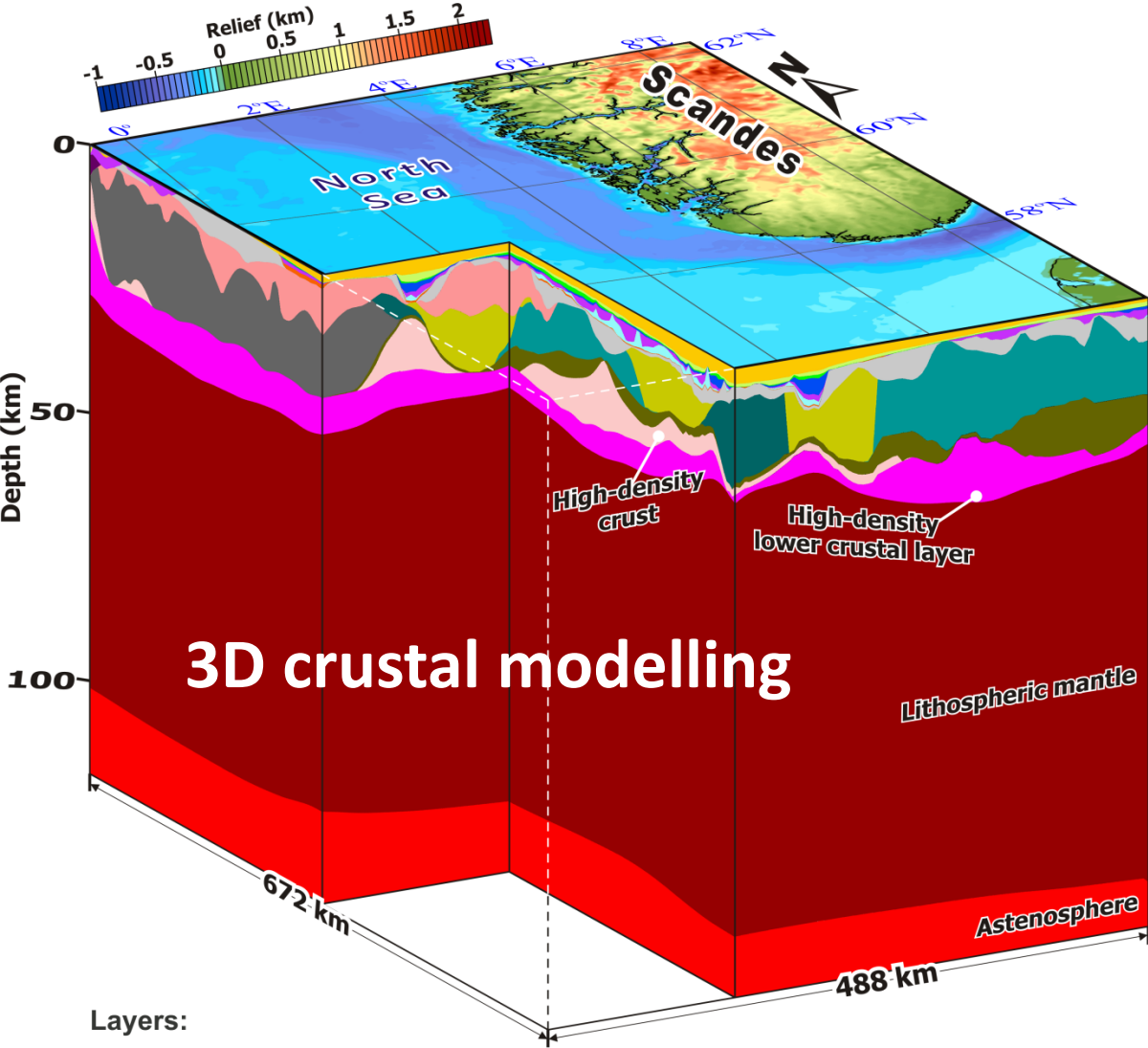
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Determining heat production



Coop – Crustal Onshore-Offshore Project



Layers:

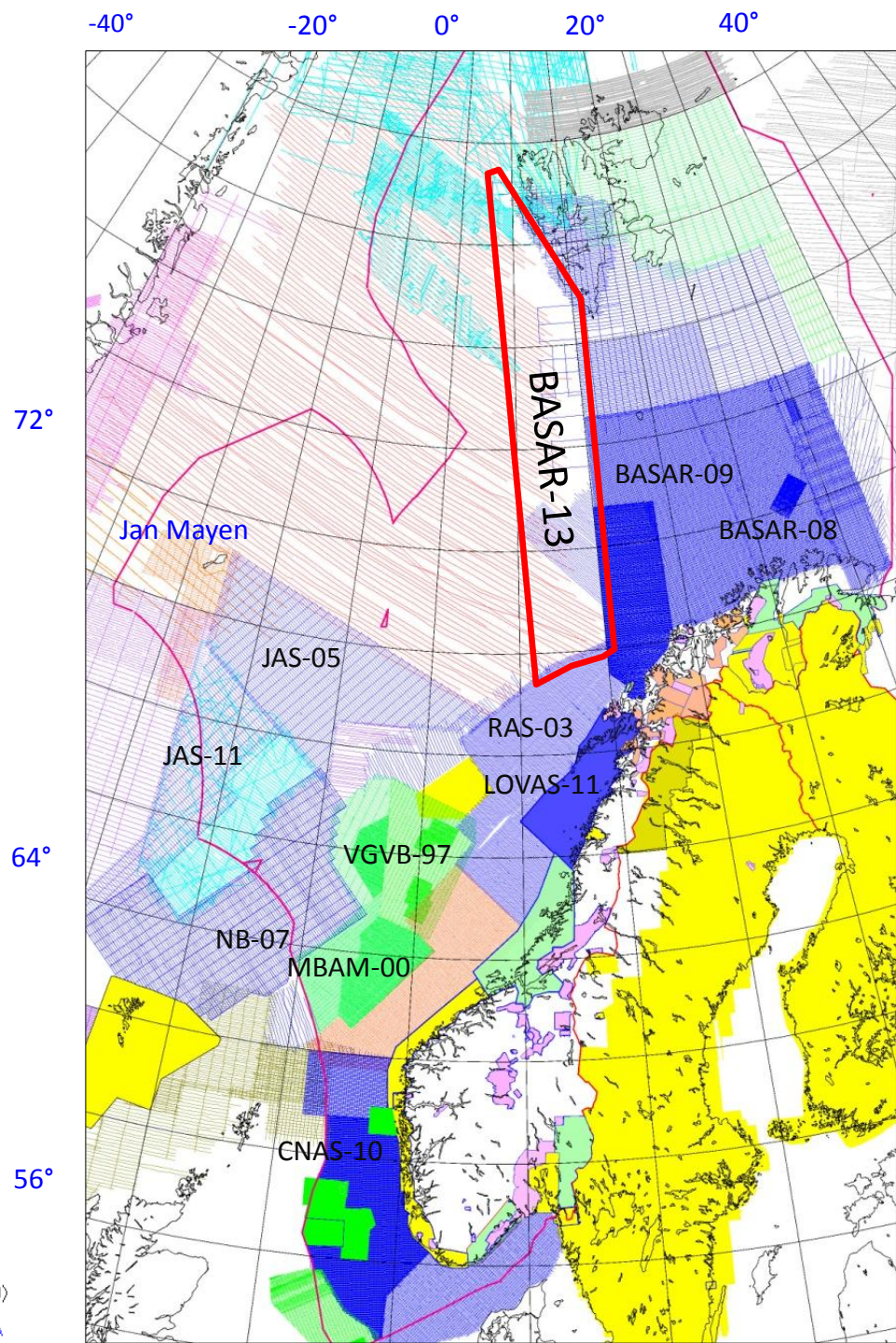
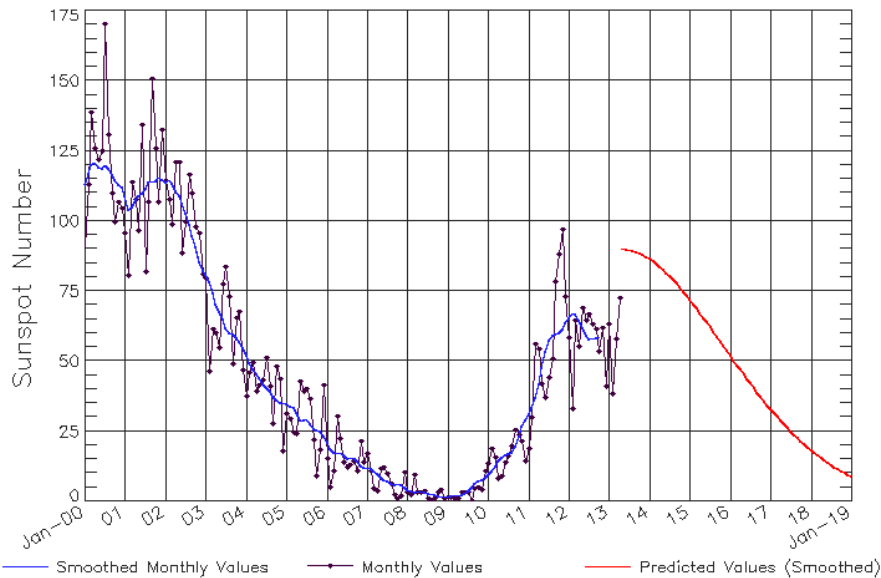
- | | | |
|------------------|---|----------------------------------|
| Sea water | Zechstein salt | Middle crust of Laurentia |
| Cenozoic | Zechstein clastics and carbonates | Middle crust of Baltica |
| Upper Cretaceous | Lower Permian and pre-Permian sediments | Lower crust of Baltica |
| Lower Cretaceous | Upper crystalline crust | High-density crust |
| Jurassic | Granites or gneiss | High-density lower crustal layer |
| Triassic | Granitoid rocks | |



Aeromagnetic data NE Atlantic

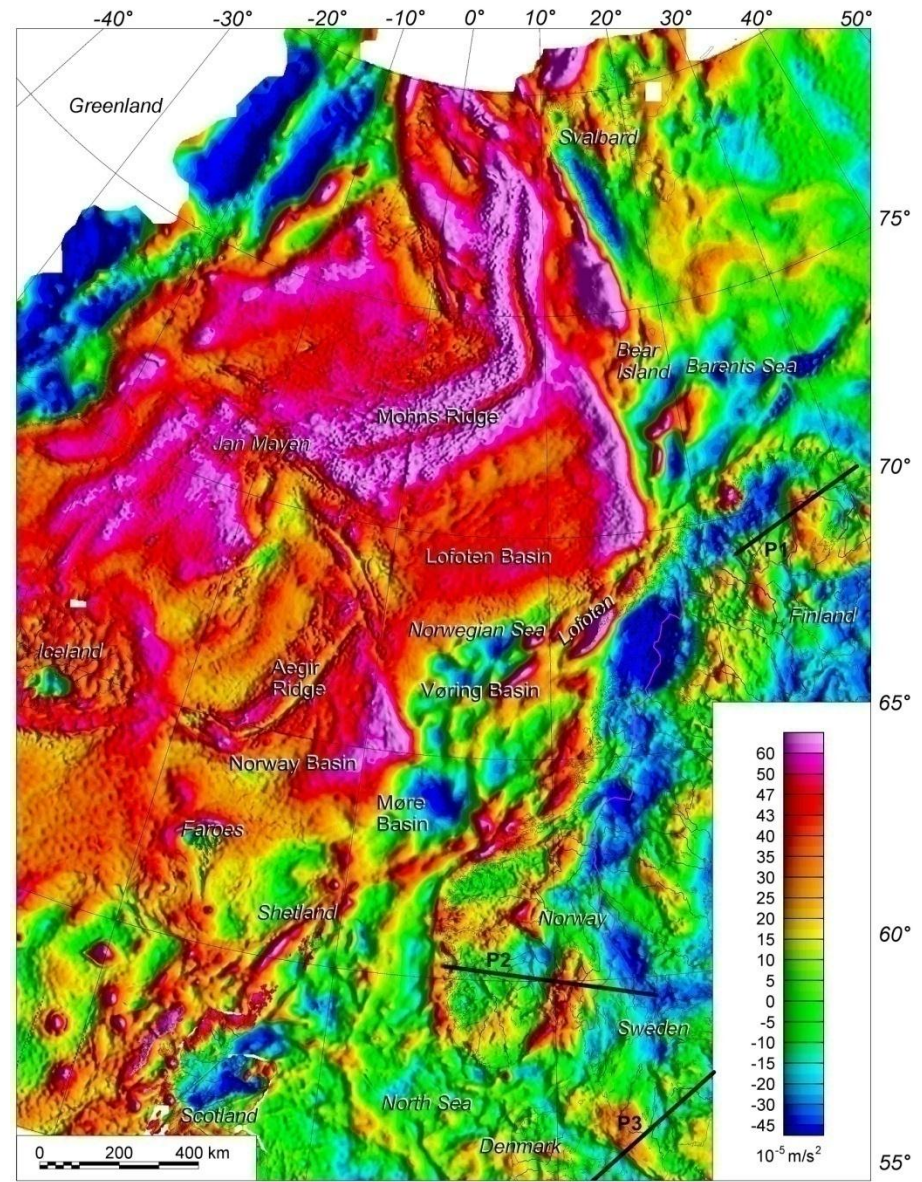
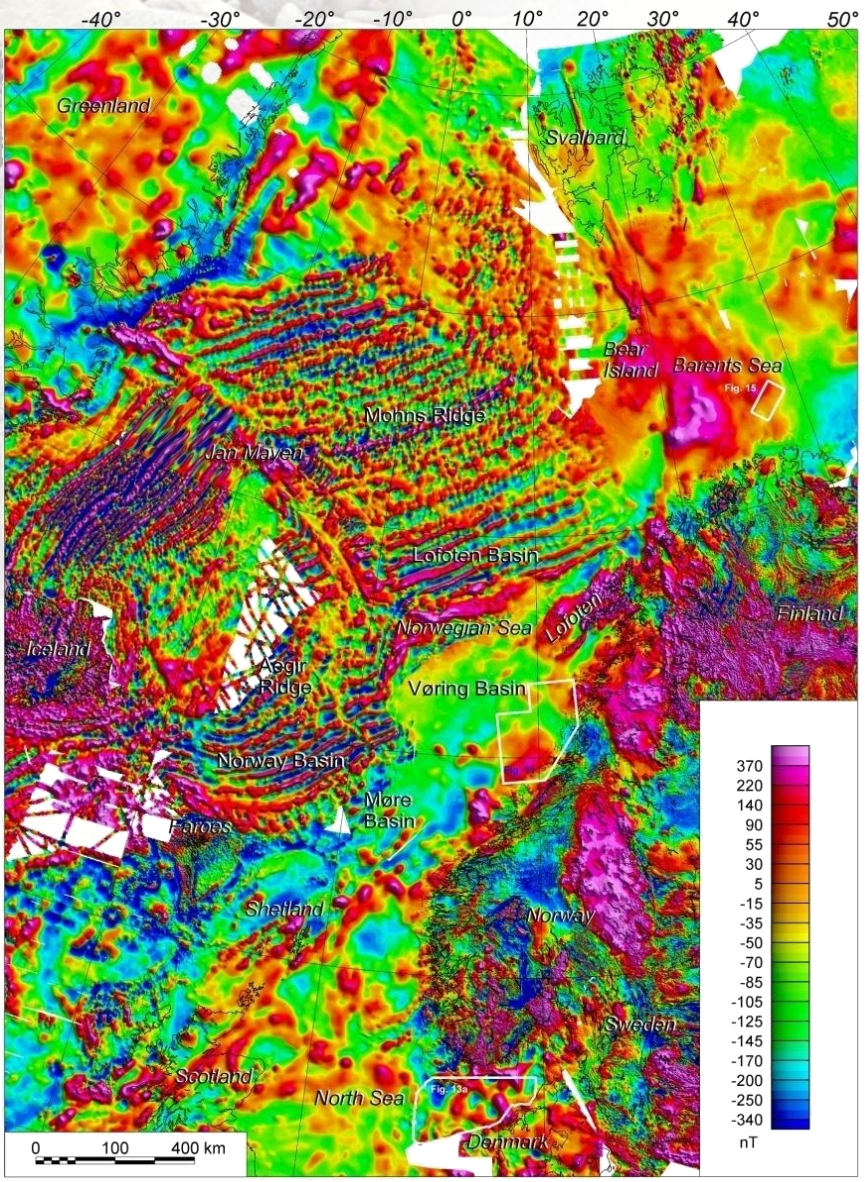
Sunspot number

ISES Solar Cycle Sunspot Number Progression
Observed data through Apr 2013

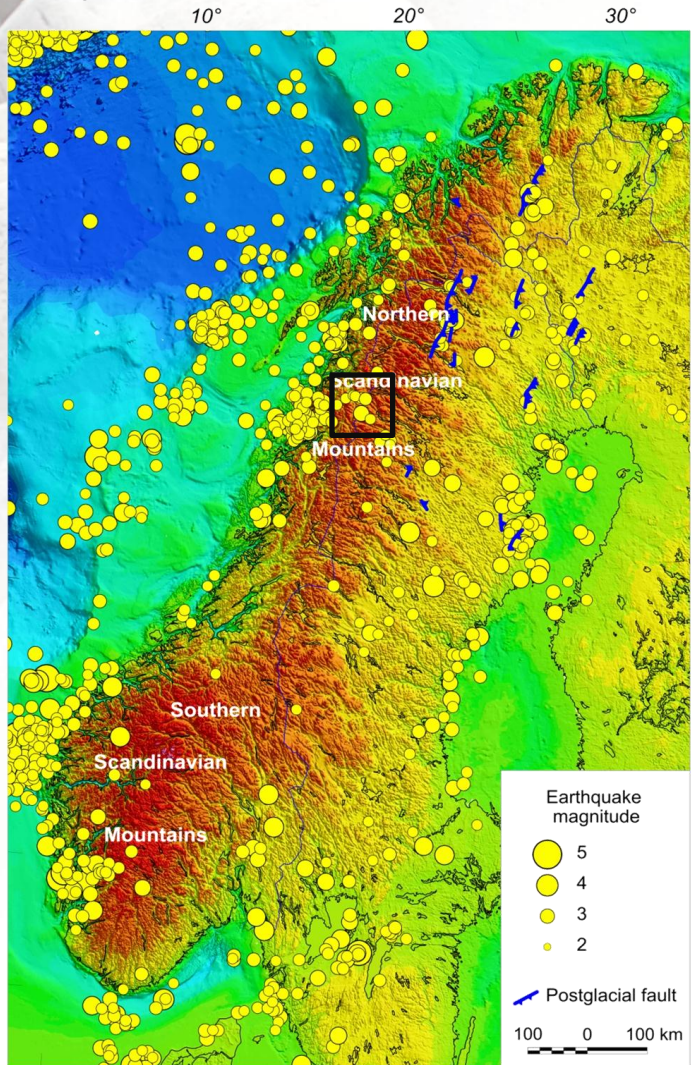


Aeromagnetic compilation

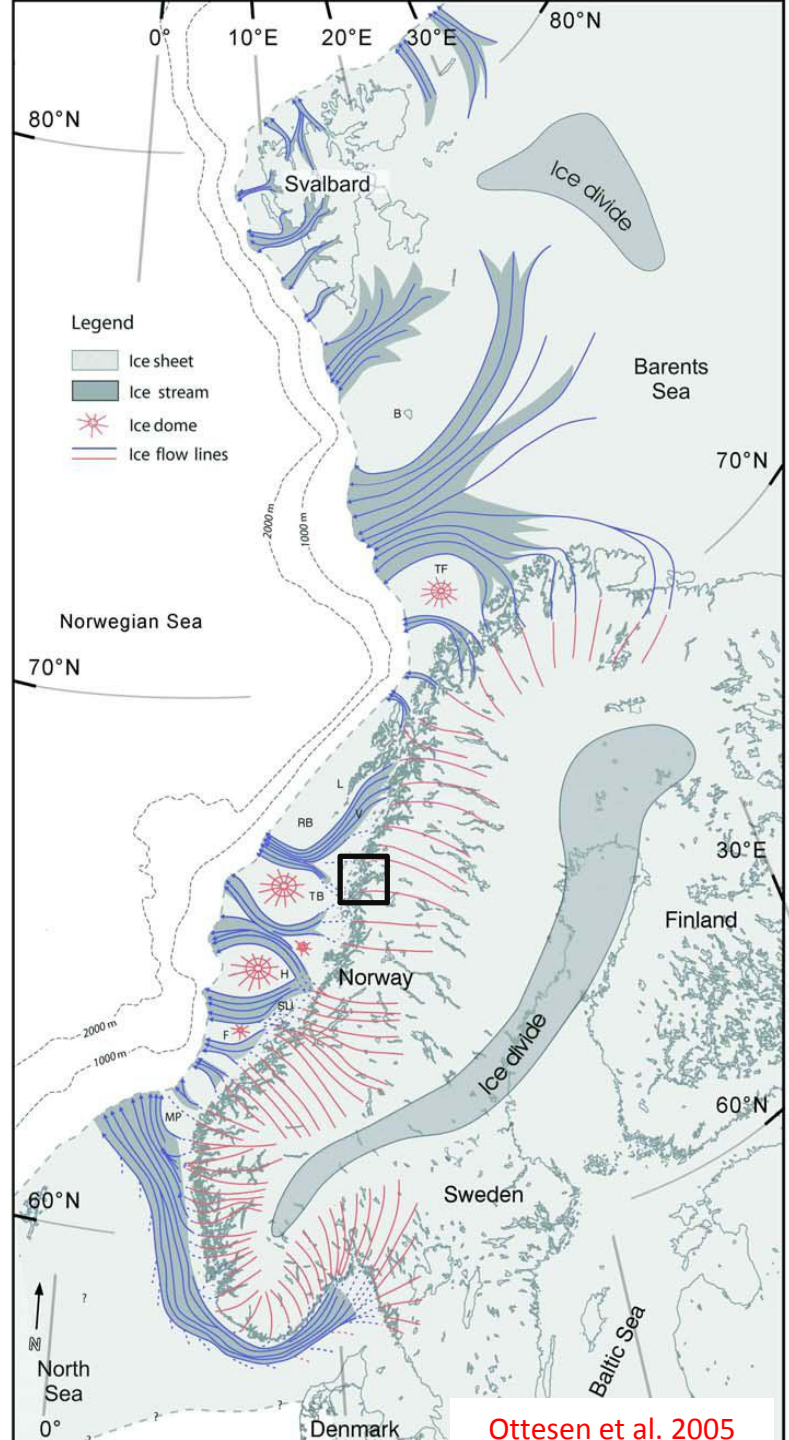
Gravity compilation Isostatic residual



NEONOR2 – Neotectonics in Norland – implications for petroleum exploration



Glacial erosion beneath ice streams

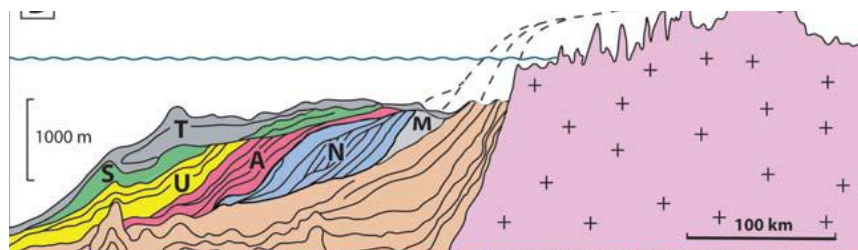
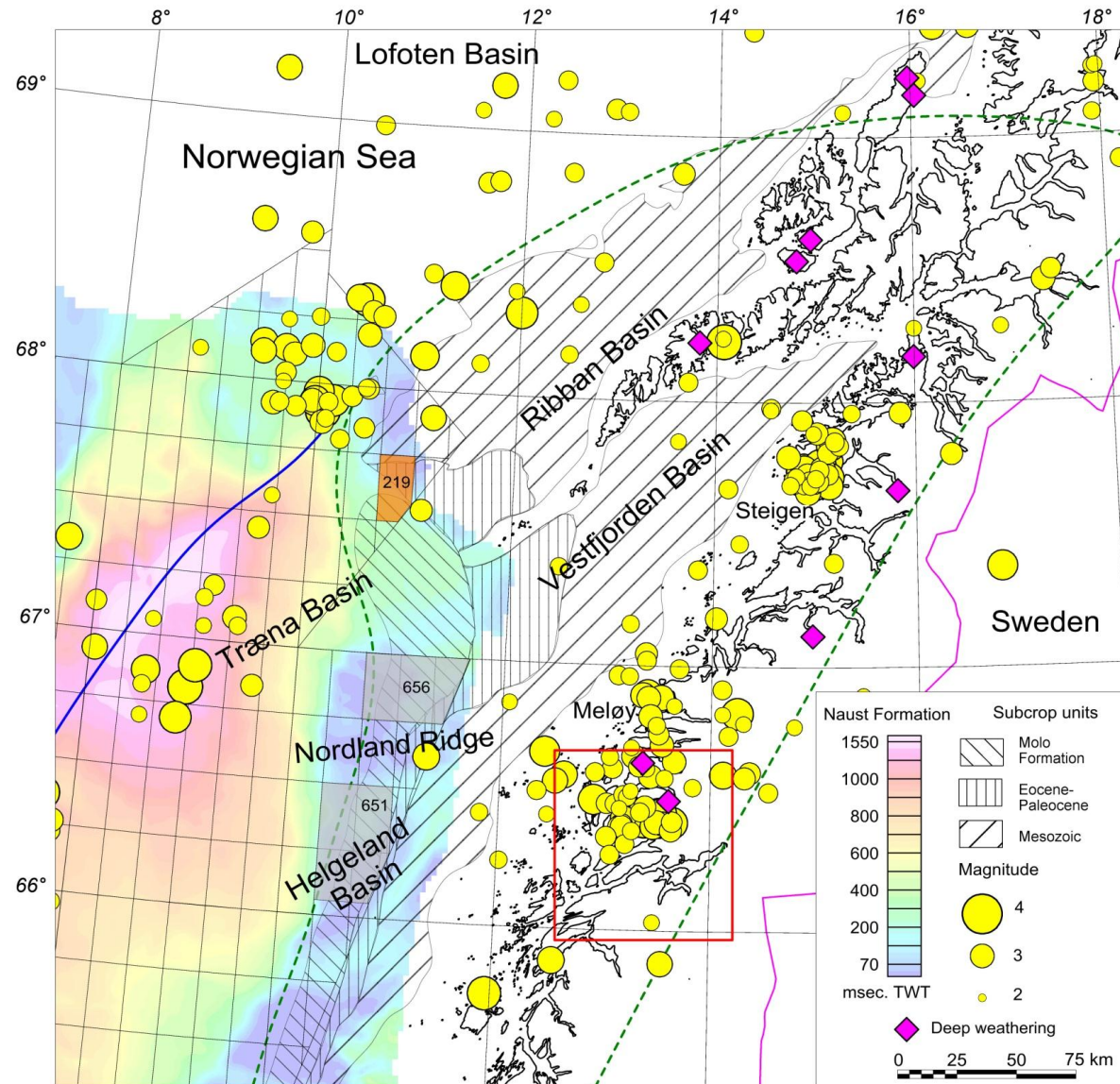


Ottesen et al. 2005

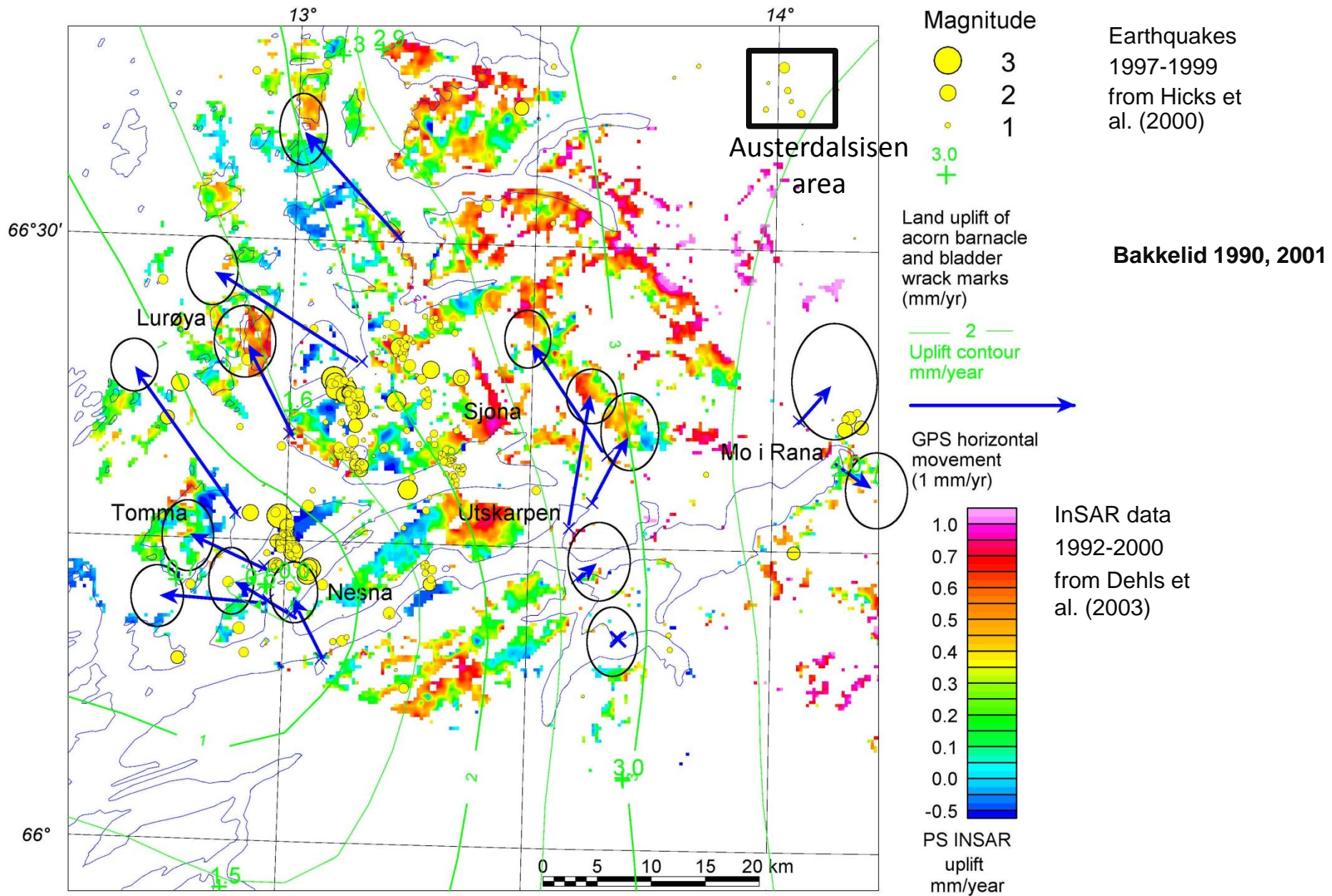


NORSAR

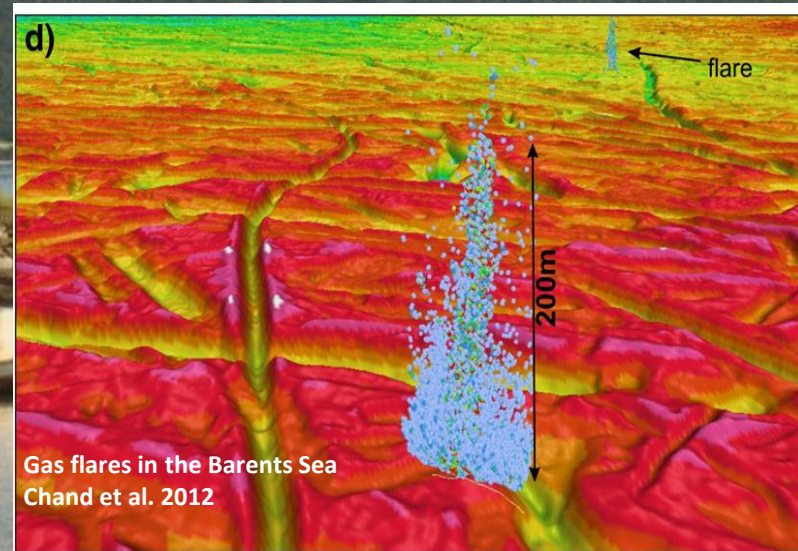
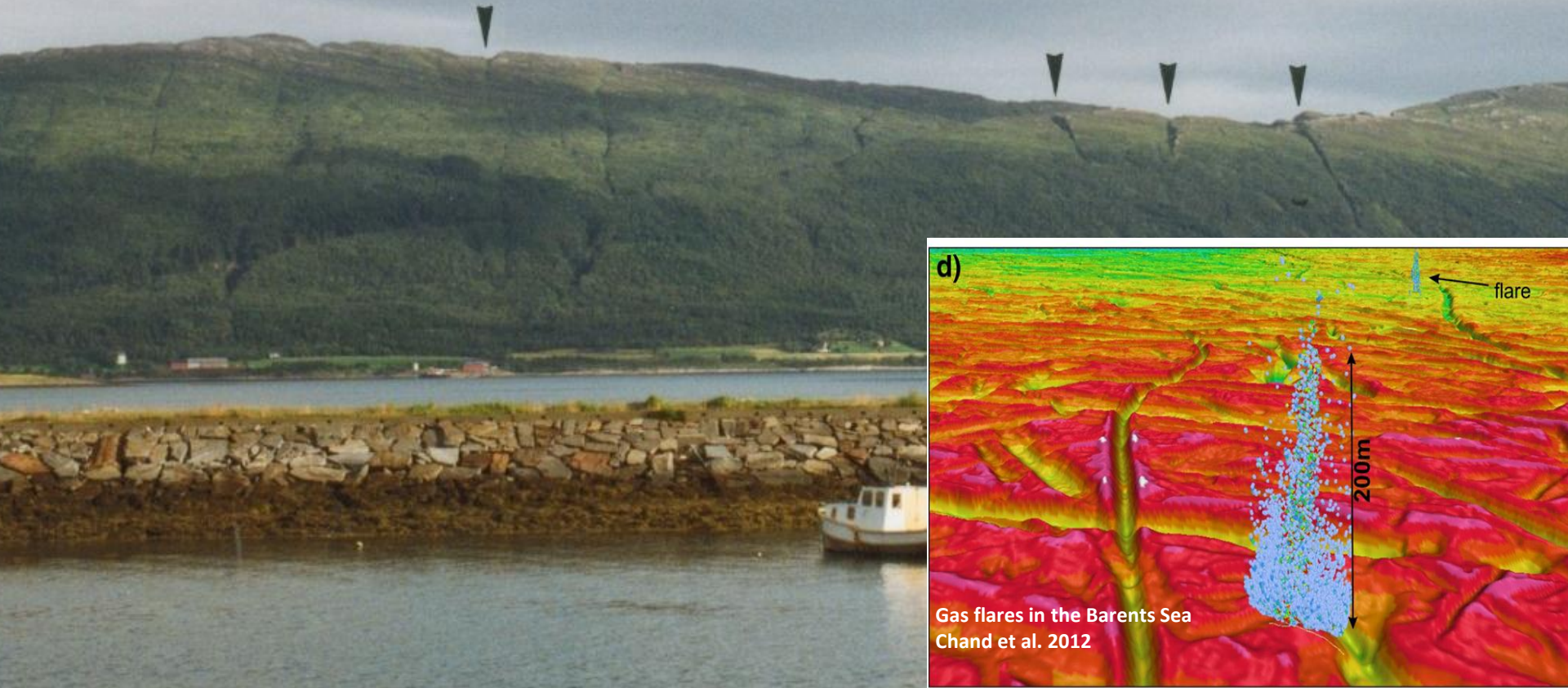
**Source catchment
area of glacial
erosion (green line)
and area of
offshore deposition
(thickness of Naust
Formation)**



Seismicity, GPS vectors and PS INSAR data



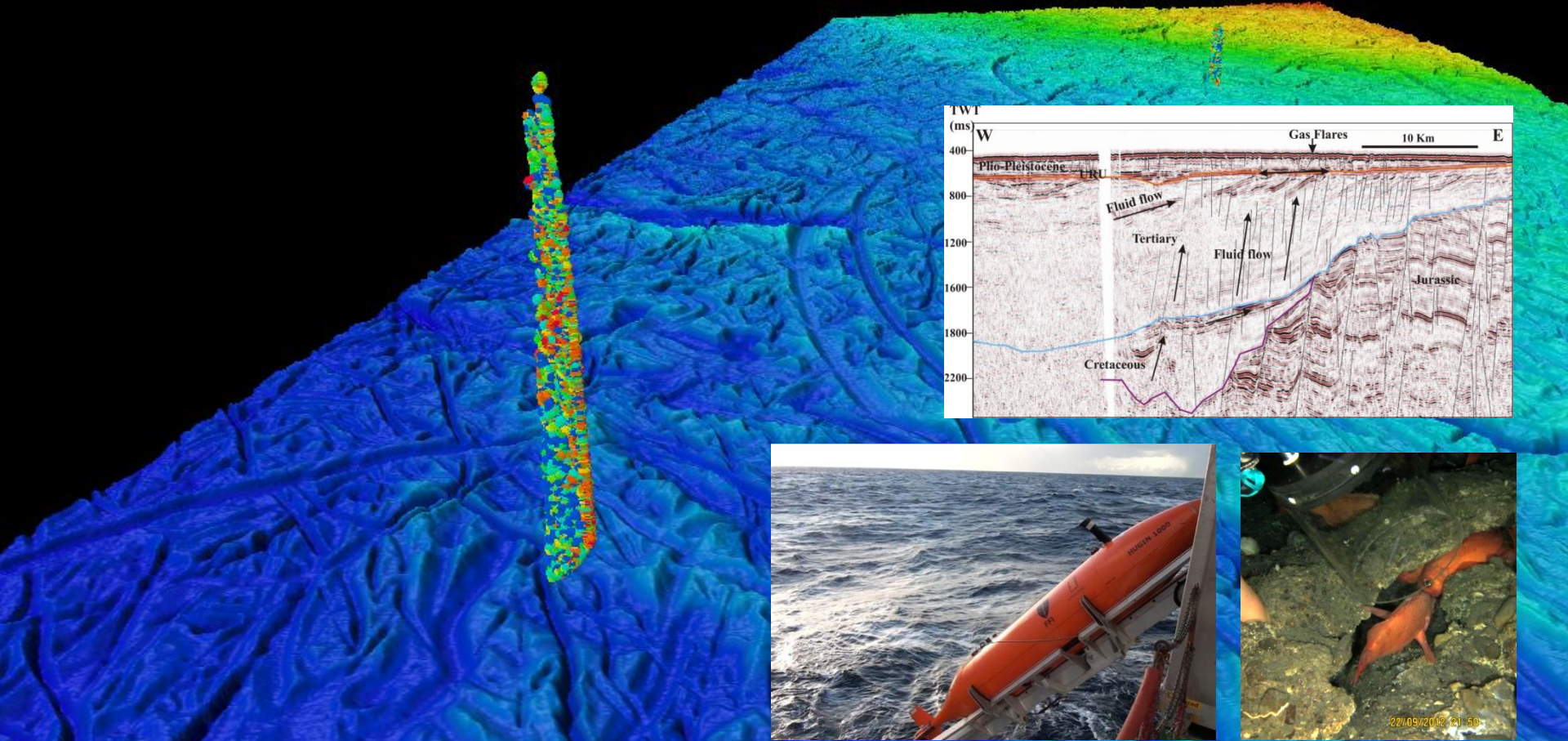
Earthquake
cluster along
fracture zone



Scarps with apparent offsets of glacial morphology on Handnesøya

Marine geology

Neotectonics and Fluid Flow Processes – Phase III - 2013-2016 - Studies of Carbonate Crusts



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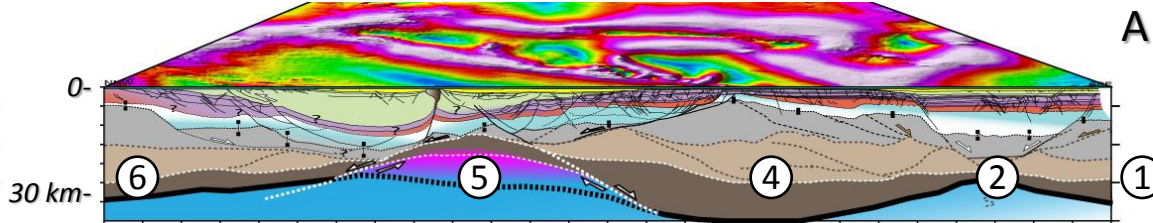
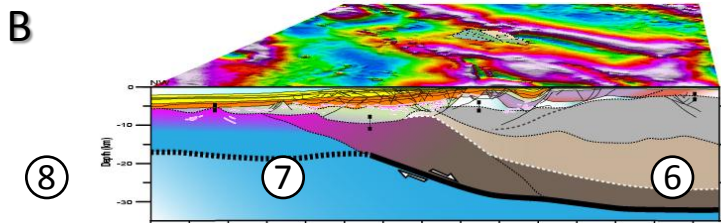
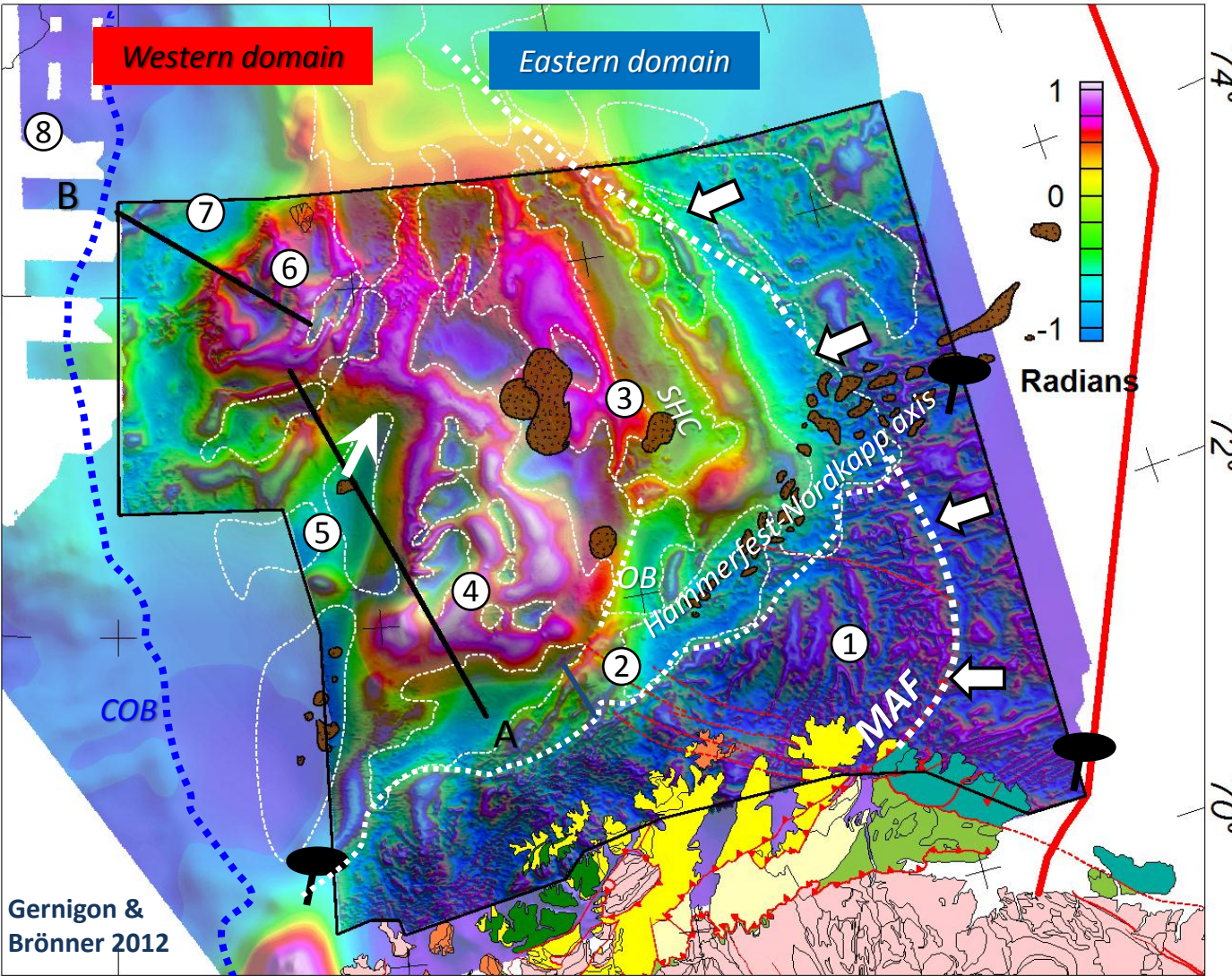
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forskningsinstitutt

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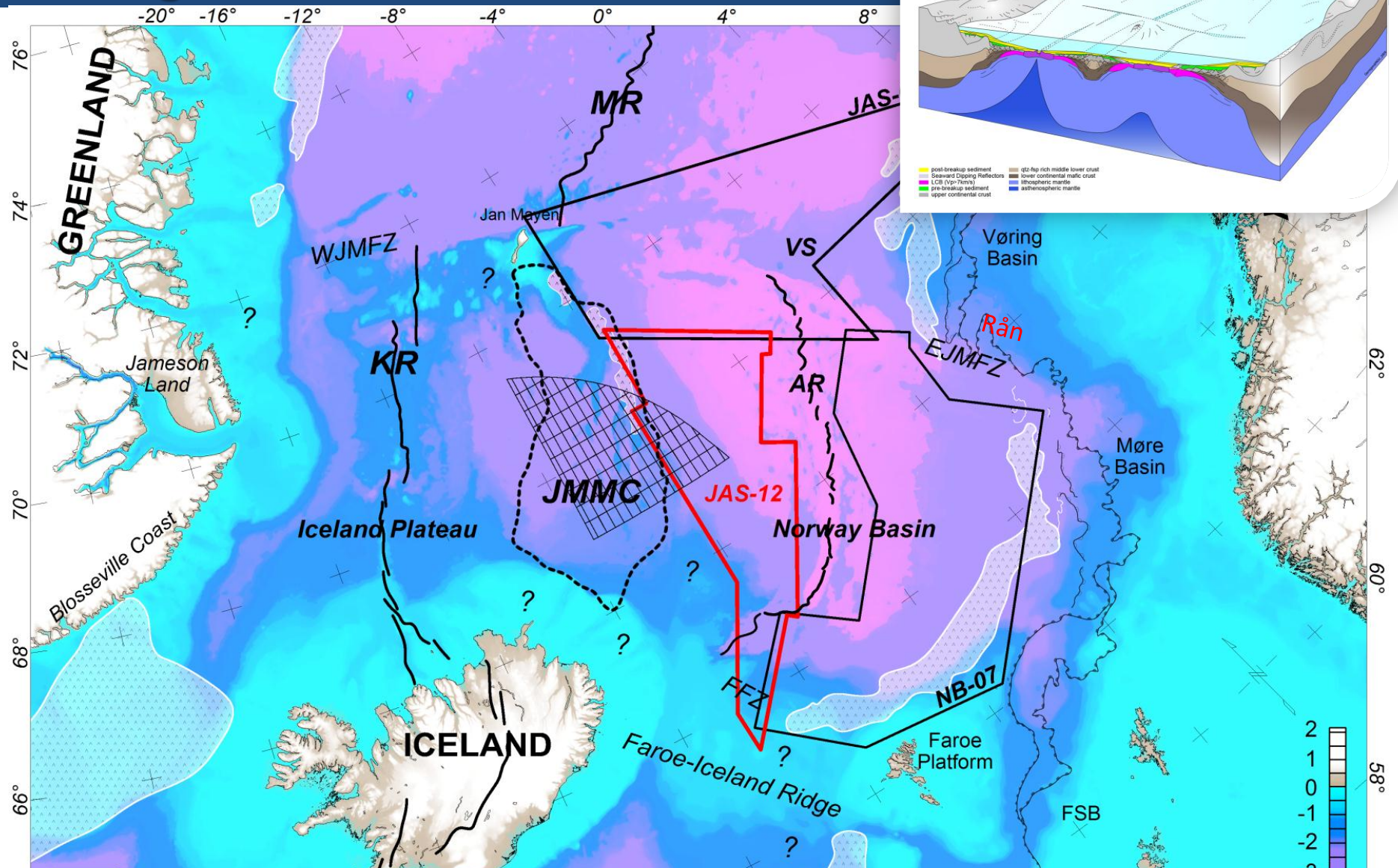
From Caledonian nappes to breakup: BASAR tectonic summary

DIFFERENT CRUSTAL DOMAINS:

1. **Stable platform.** Caledonian nappes mostly preserved, poorly reactivated
2. **Hammerfest-Nordkapp hinge axis:** A old Caledonian strike-slip deformation belt ?
3. **Scott Hansen Complex.** Deep Late Palaeozoic basins, reactivation of old Caledonian thrusts
4. **Loppa High: rigid and thick continental ribbon** (Precambrian ?)
5. **Bjørnøya Basin:** highly extended propagating aulacogen system



Norwegian-Greenland Sea activities



JAS-12: spreading history, conjugate margin system and microcontinent formation (NGU, NPD & Orkustofnun)

JAS-05, NB-07 -2005-2007 (Gernigon et al., 2009, 2012)