

The Department of Geology at the University of Tromsø as seen by a Fulbright student from Texas

Andrew Smith

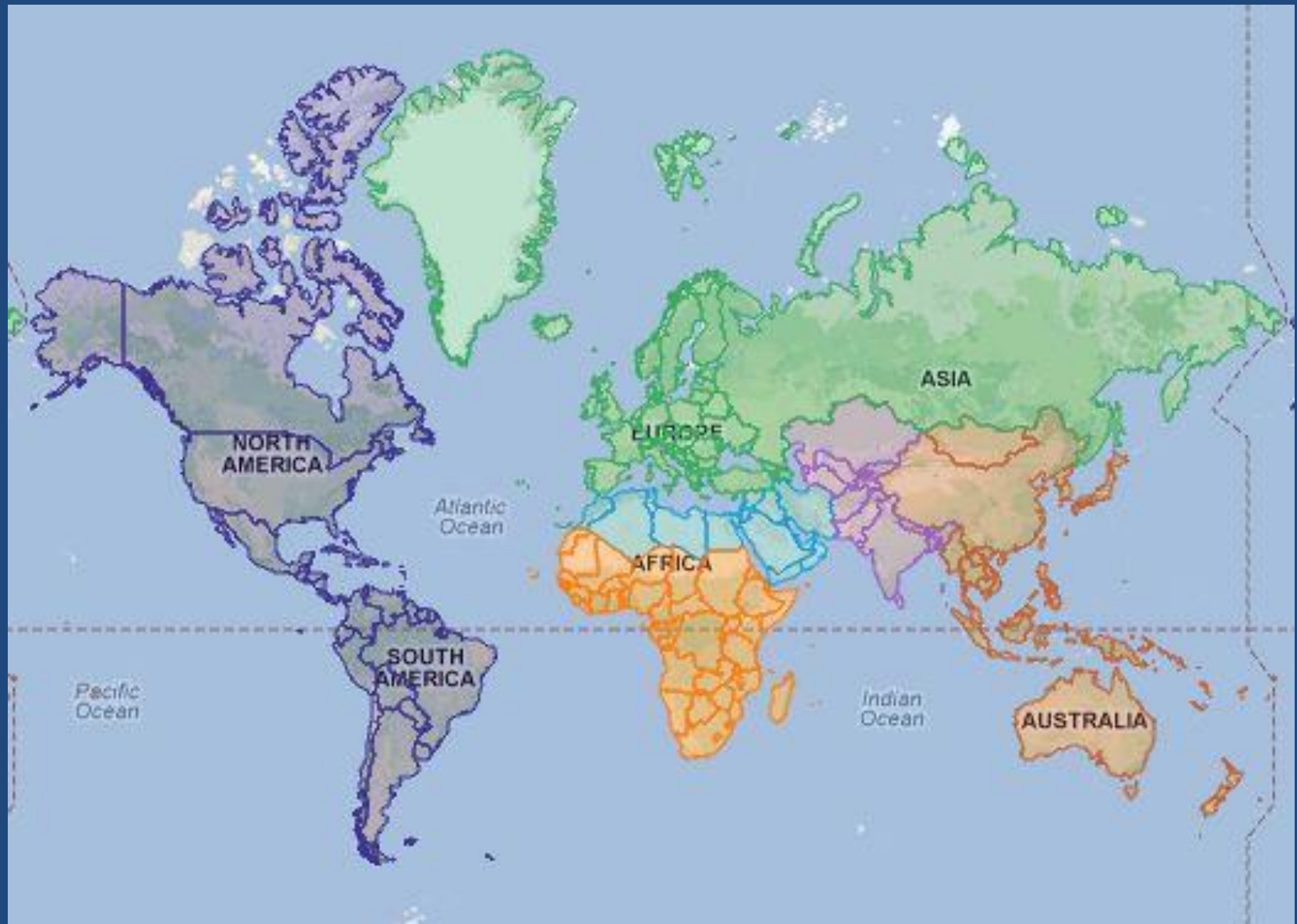


Outline



- 1) About me
- 2) Department structure of the Institute for Geology at the University of Tromsø
- 3) Key strengths of the department
- 4) Areas of current and future research
- 5) How/where UiT might gain from increased industry contact

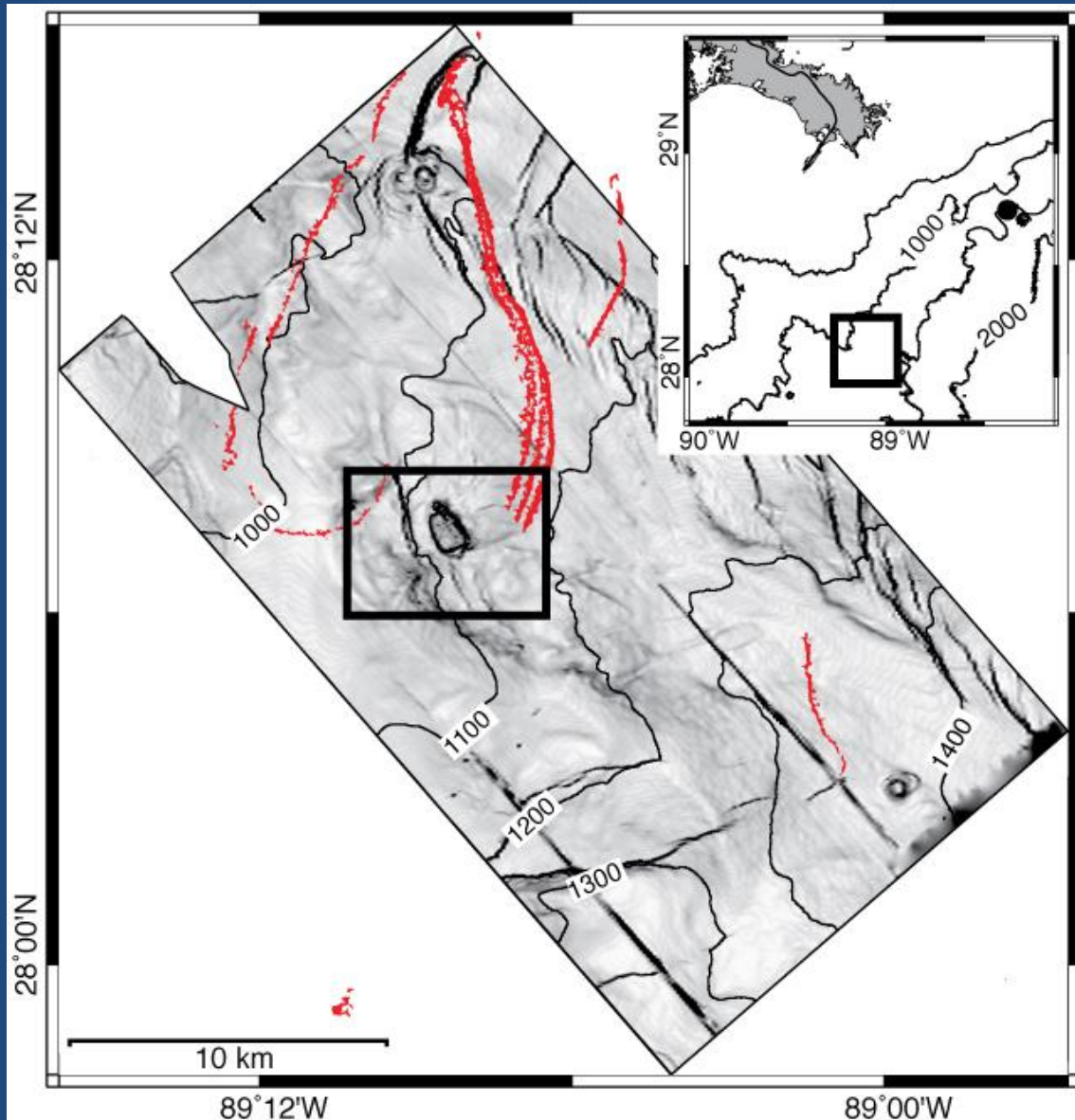
About the Fulbright Program



My Master Project:



UT/MIT Geofluids
Consortium

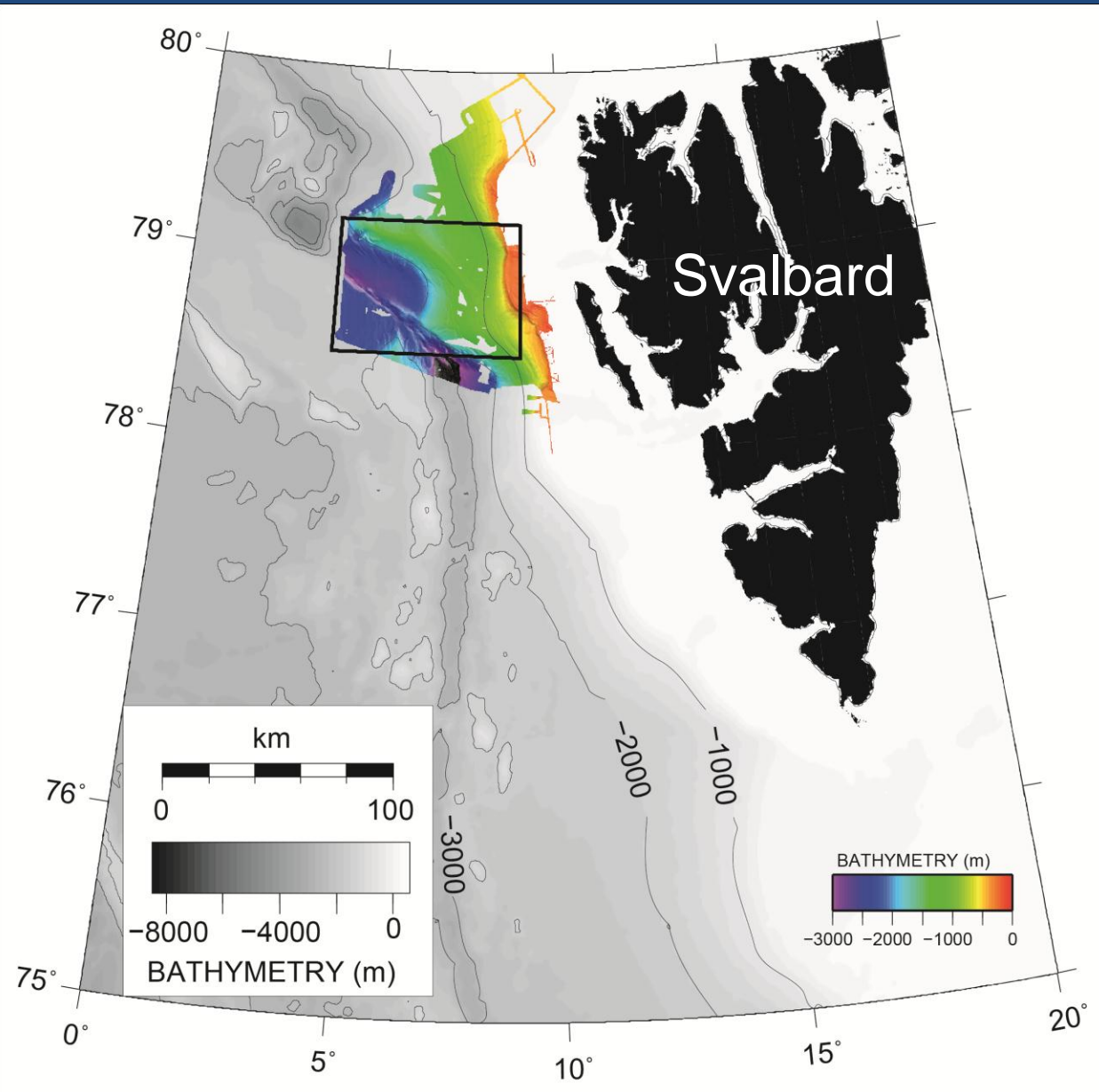


Master's research at
the University of
Texas at Austin

Fluid venting in the
Gulf of Mexico:
surface oil slicks
illustrated in red

Smith et al. (2013)

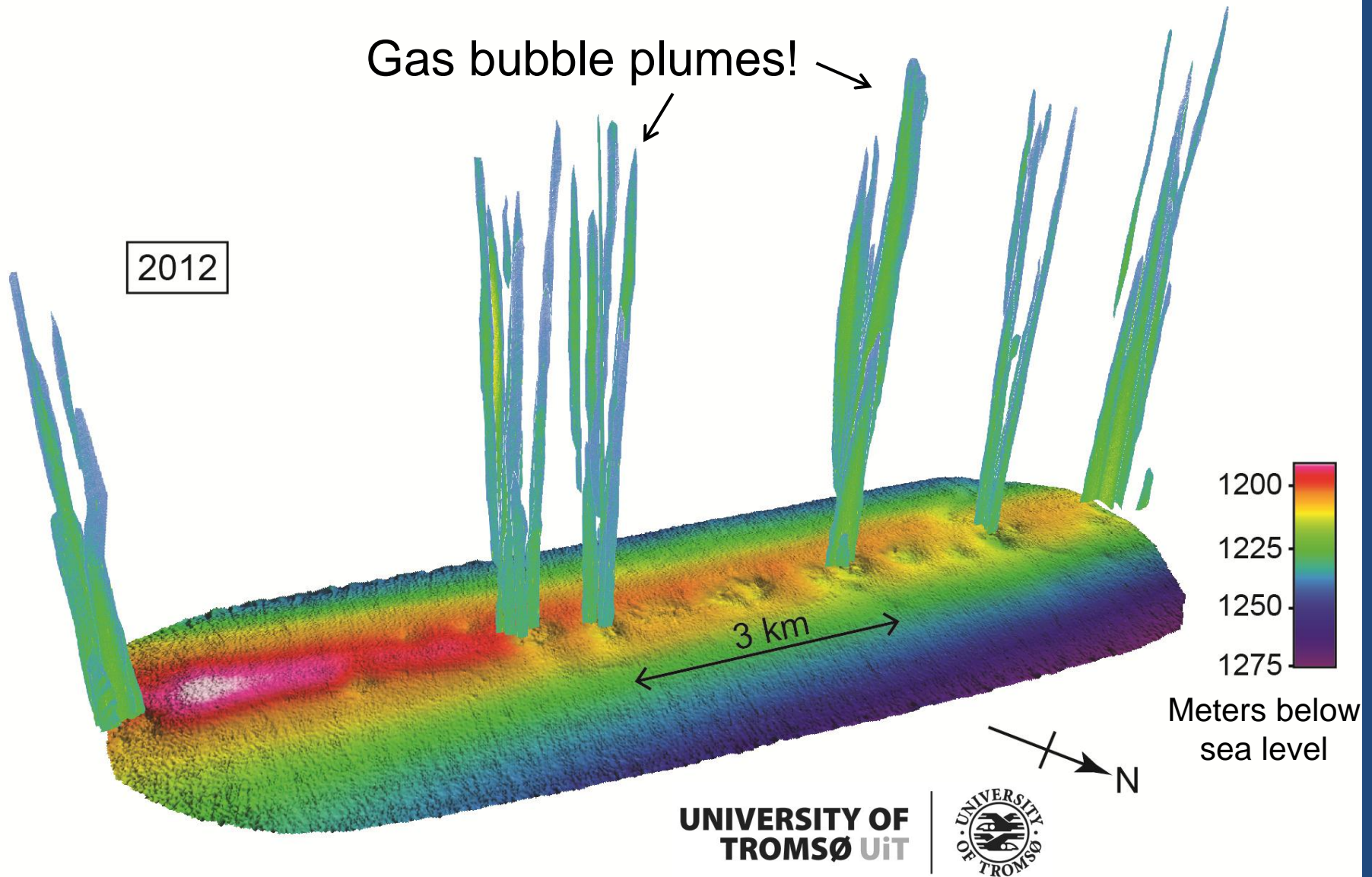
My Fulbright Project



Research in Norway

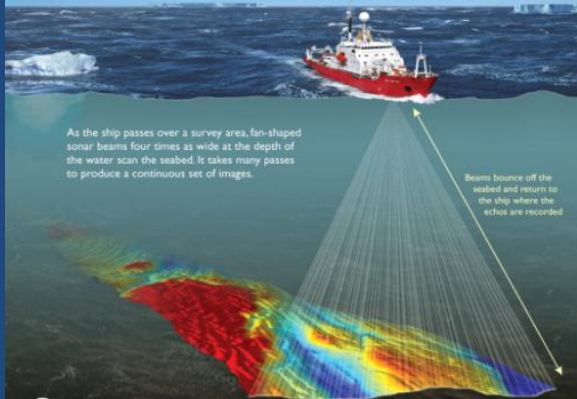
Studying fluid venting and associated gas-hydrate melting in the Arctic Ocean at the University of Tromsø

My Fulbright Project



Department of Geology – University of Tromsø

Polar Marine Geology and Geophysics



Coastal and Terrestrial Geosciences



Crustal Dynamics



PMGG

6 faculty members
3 Prof. II
8 Postdocs
22 PhD students

CTG

2 faculty members
1 Prof. II
3 PhD students

CD

4 faculty members
2 Prof. II
4 Postdocs
3 PhD students

4 administrative staff and 4 engineers; >50% external funding

Department of Geology: Students

- ~230 students from more than 20 different countries
- Gender diversity at the PhD and Postdoc level
- Attracts a diverse group of excellent students with a shared passion for the outdoors



University of Tromsø Campus



Northern Lights in Tromsø

Bachelor (~150 students)

Master (~50 students)

- *Structural geology*
- *Marine geology and geophysics*
- *Sedimentology and Quaternary geology*

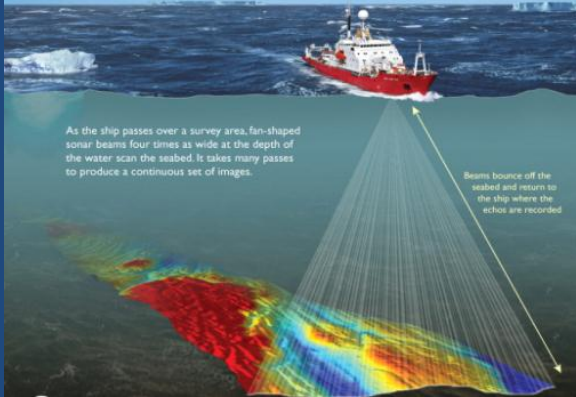
Doctoral (>30 students)

Department Strengths

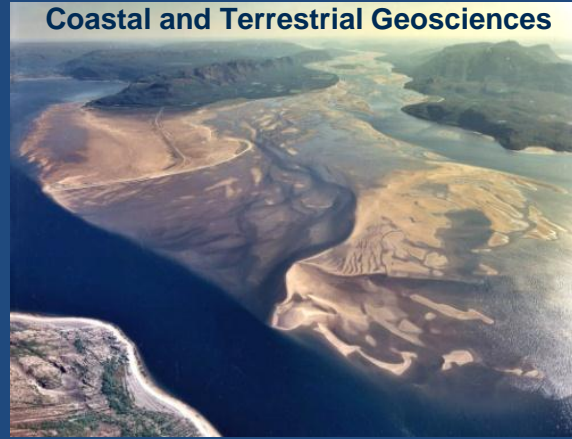
**UNIVERSITY OF
TROMSØ UiT**



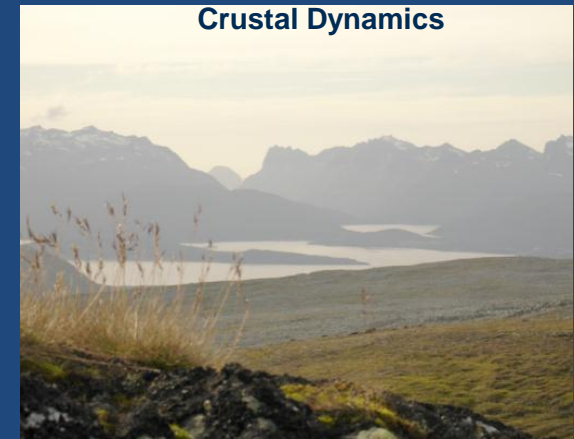
Polar Marine Geology and Geophysics



Coastal and Terrestrial Geosciences



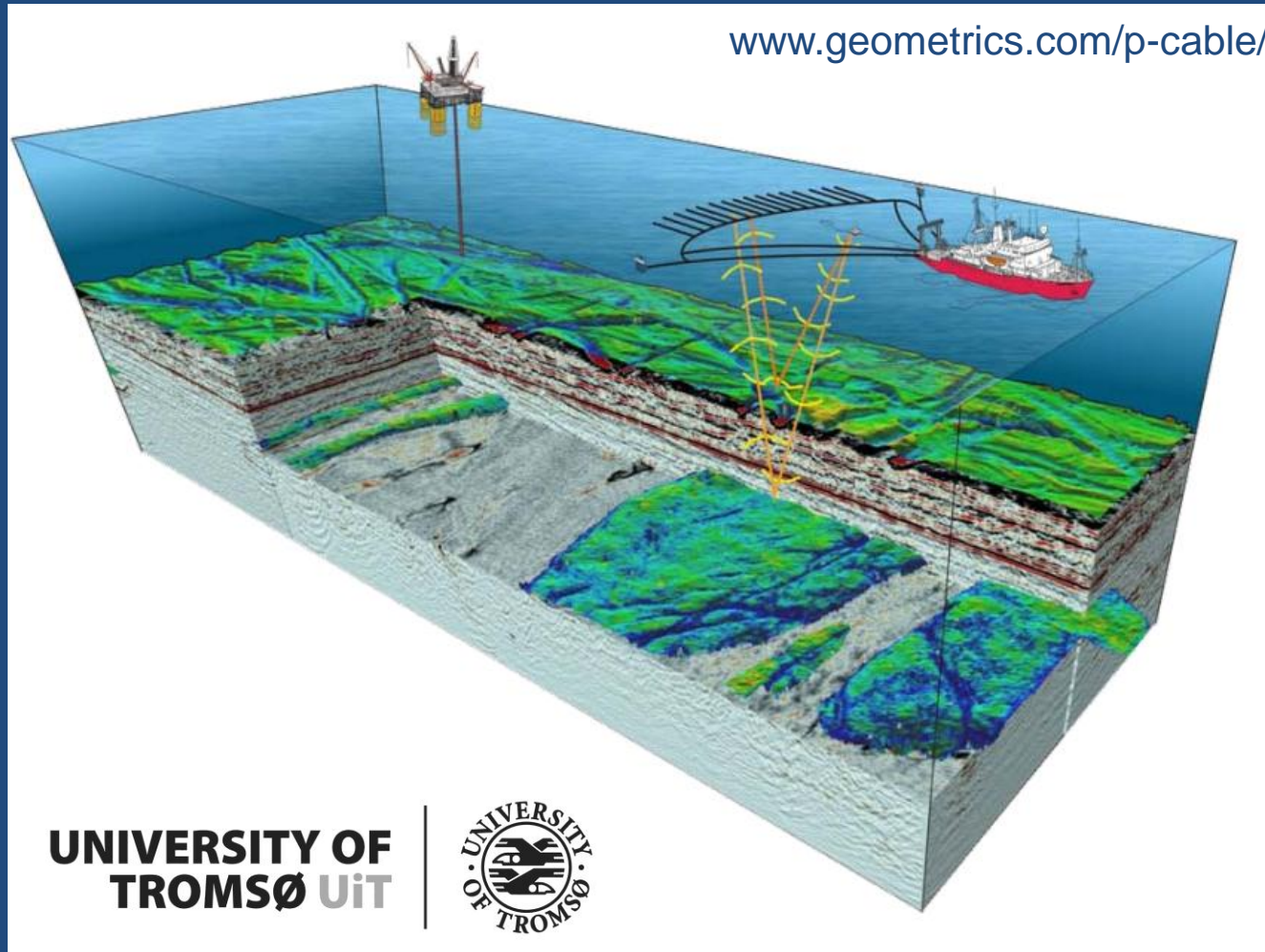
Crustal Dynamics



- High field-based research quality and publication level in PMGG and imminent in CD
- High level of national and international research cooperation (Russia, E.U., U.S., Canada)
- High-quality research-based teaching by all groups

Department Strengths

- Research-based technology development in PMGG and CD



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TROMSØ UiT**



Department Strengths

- Strategic location with high relevance for polar research and geo-resources

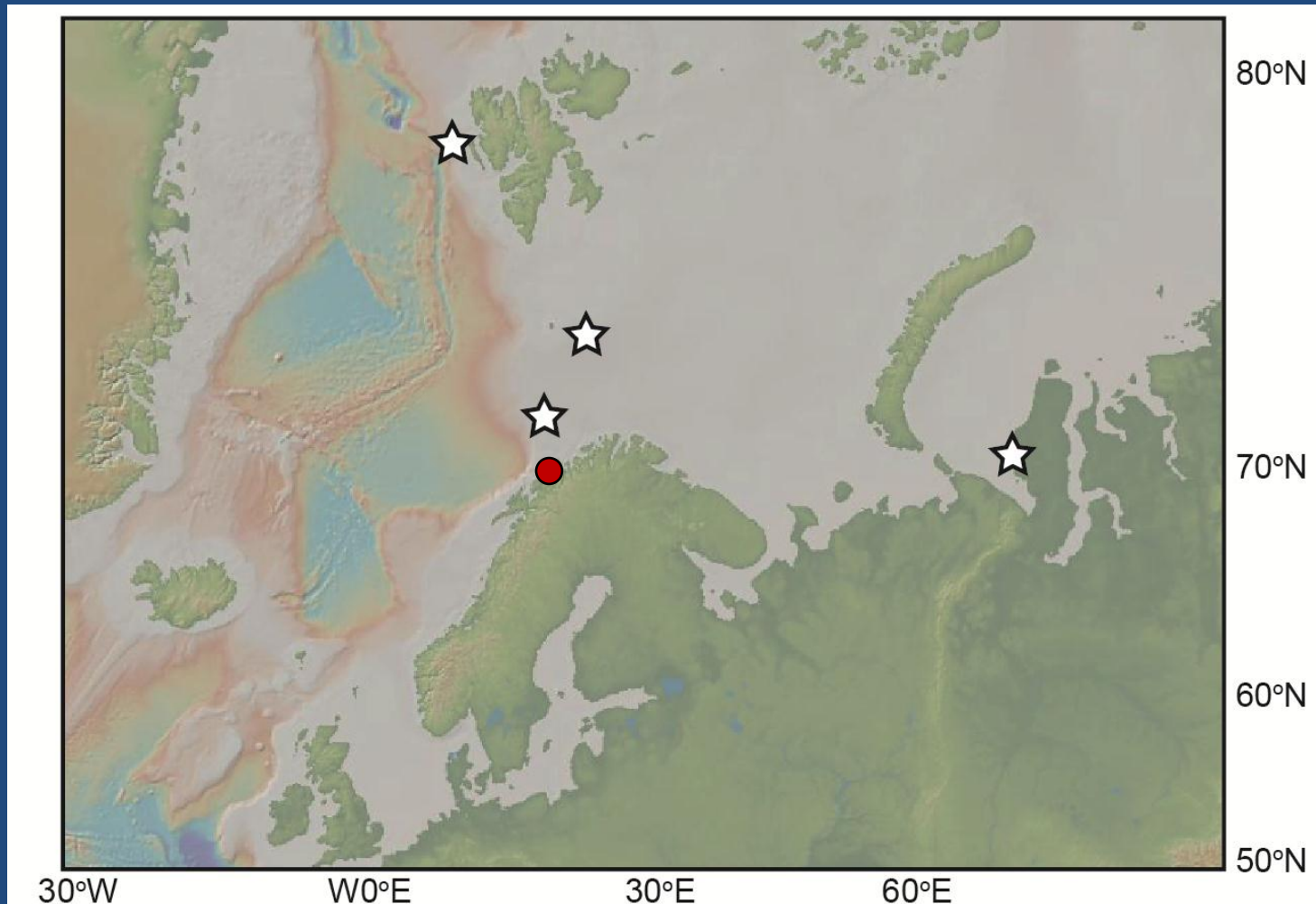


R/V Helmer Hanssen: Existing sea-ice-going research vessel

2015: Norway's new state-of-the-art, ice-breaking research vessel stationed in Tromsø used by NP and UiT.

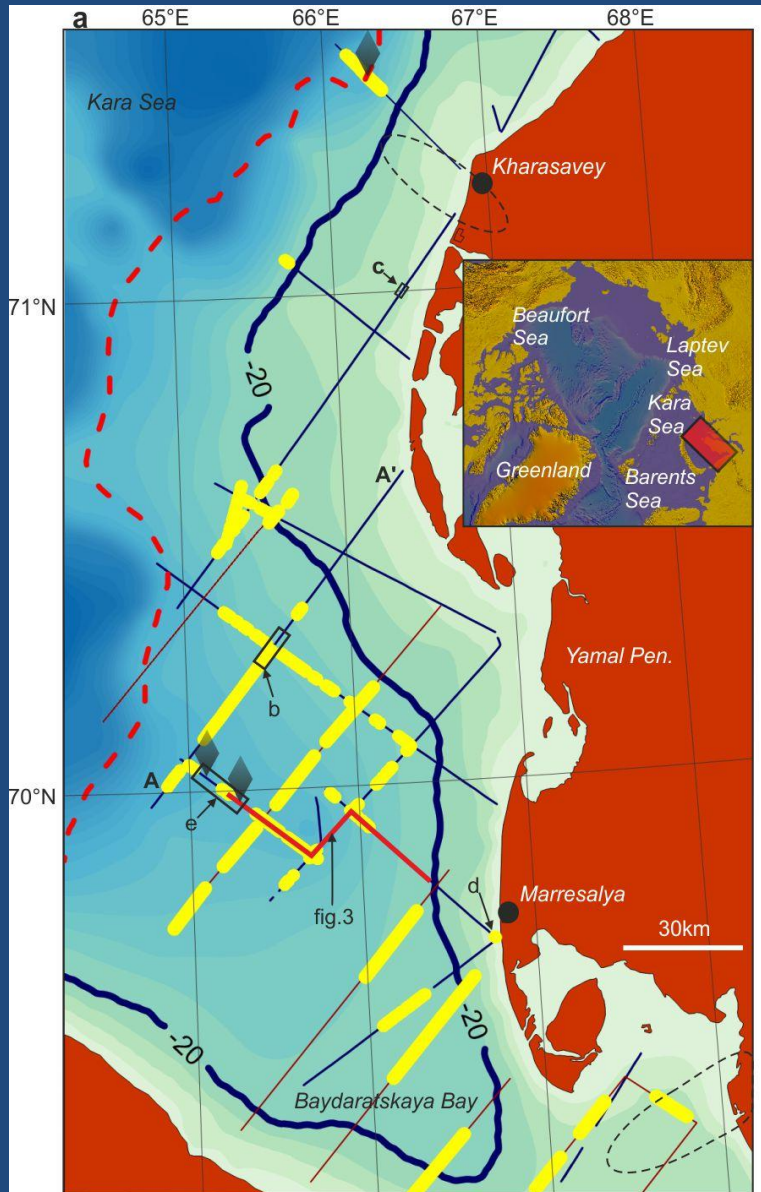
Current and future research activities:

Arctic research focus: Geological research and education related to energy and environmental issues in the High North.

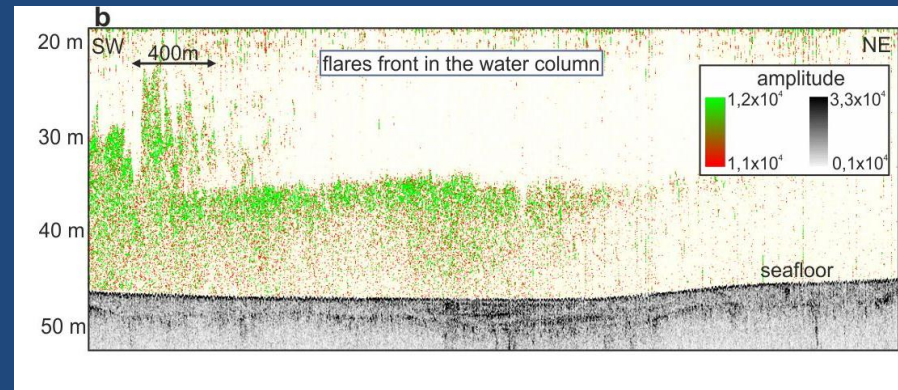


Example 1:

Gas release and permafrost decay in Kara Sea



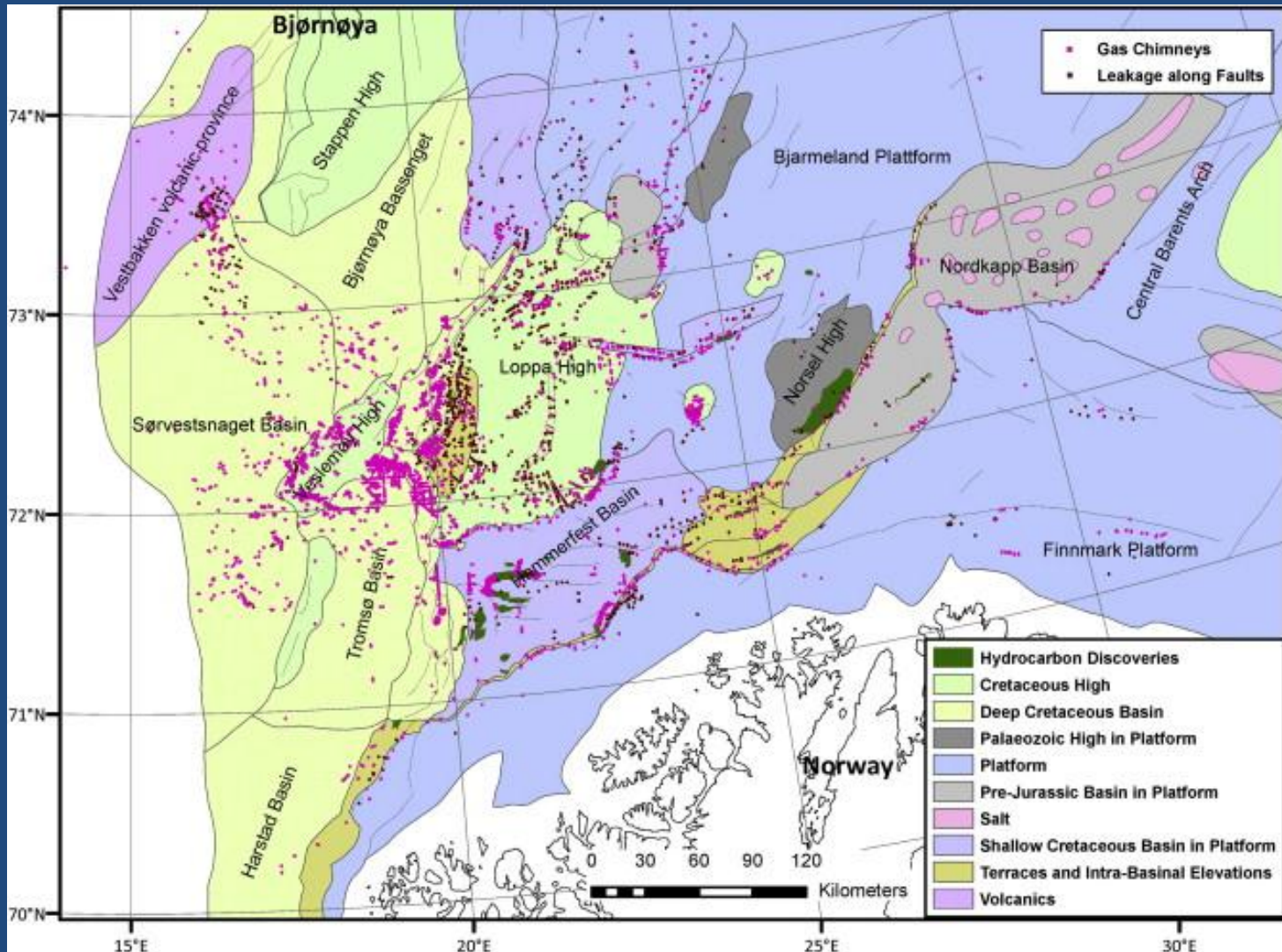
- Work performed by Alexey Portnov (from Russia), PhD Student funded by Statoil
- Research cruises conducted by Russian colleagues in St. Petersburg
- Gas release is widespread over an area of at least 7,500 km² at the South Kara Sea Shelf



Portnov et al. (In Review)

Example 2:

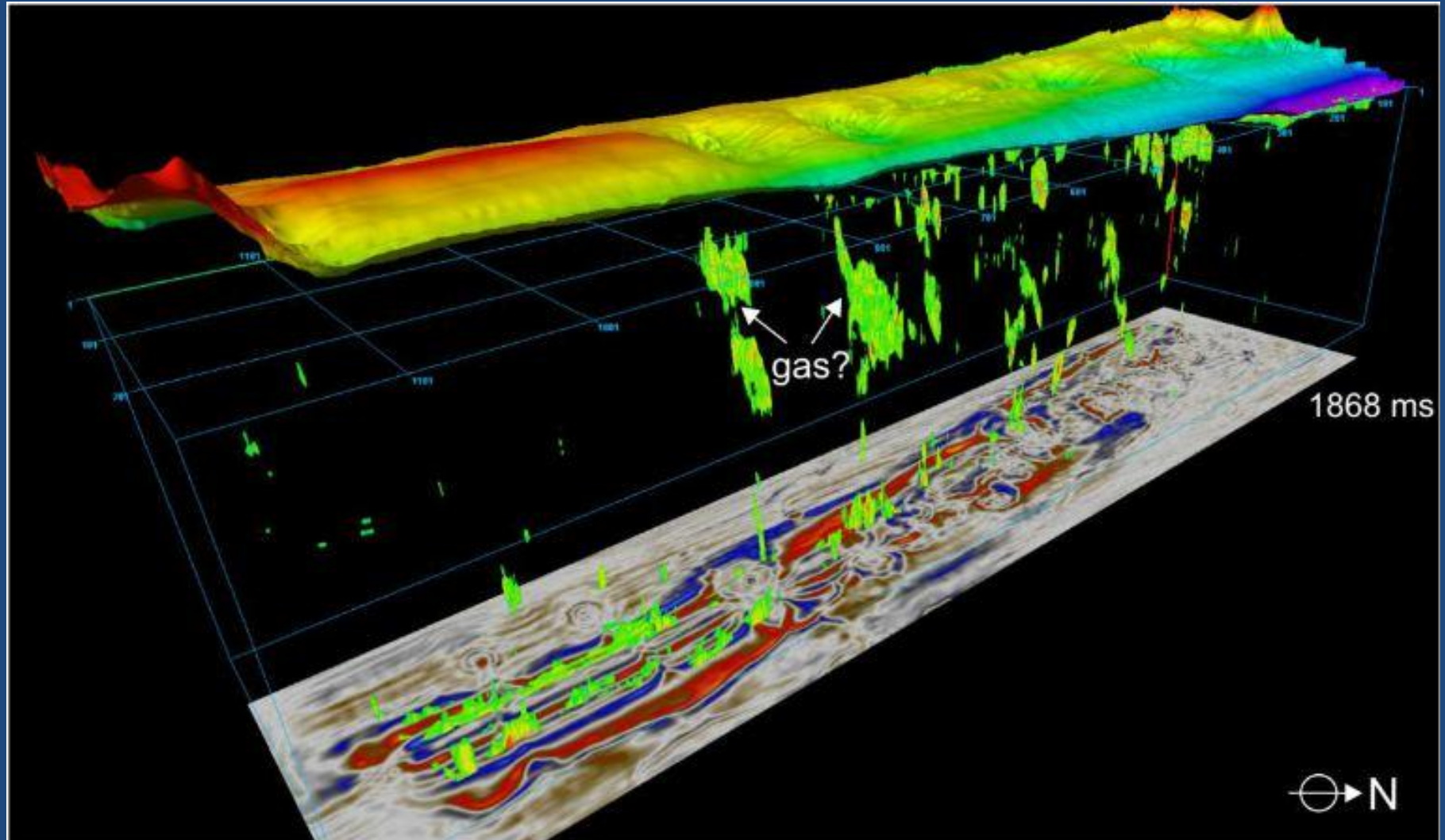
Gas release in the SW Barents Sea



Vadakkepuliyaambatta et al. (2013)

Example 3:

Gas release in deep sea offshore NW-Svalbard



Bunz et al. (2012)

Example 4: *ECO₂ Project*

The ECO₂ project sets out to assess the risks associated with storage of CO₂ below the seabed.

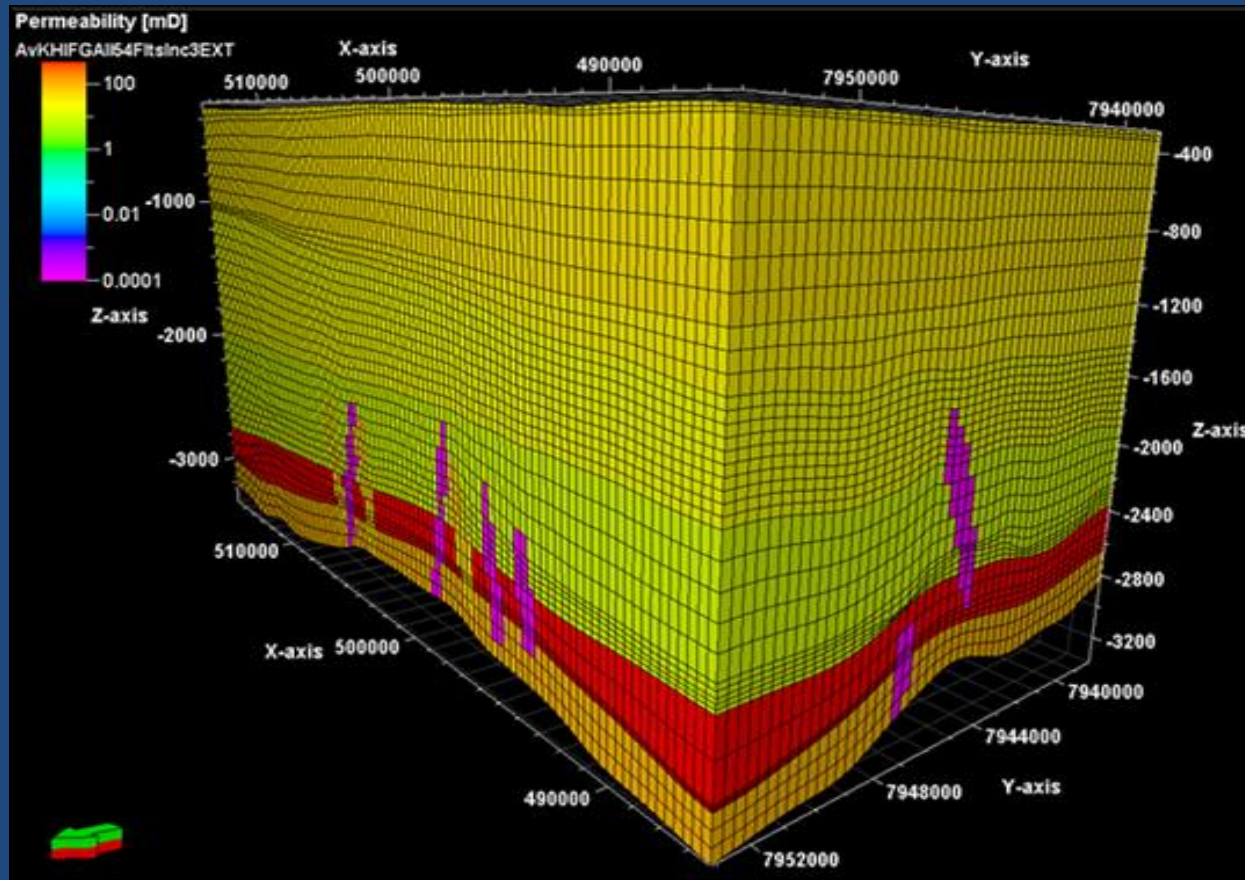
Major final output: Develop a comprehensive monitoring strategy and define guidelines for the best environmental practices.

Large-scale
integrative project

27 participating
institutions

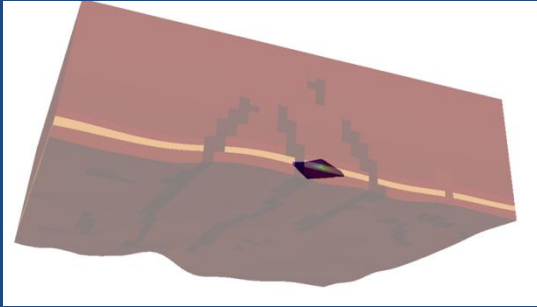
Example 4:

ECO₂ Project

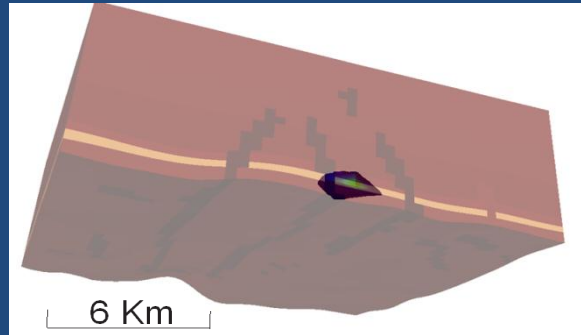


- PhD Project of Alexandros Tassianos
- Better understanding the pathways and mechanisms related to fluid flow at Snøhvit field
- Evaluate potential leakage scenarios

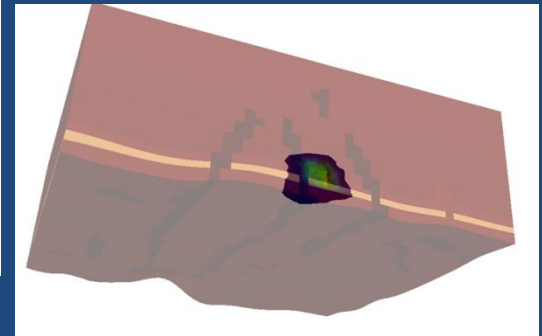
Example 4: *ECO₂ Project*



After 2 years



After 5 years



After 30 years

- Simulate fluid flow using realistic geological models
- CO₂ saturations are highest at reservoir/cap-rock interface
- No sign of CO₂ migrating through faults to the seabed

Example 5:

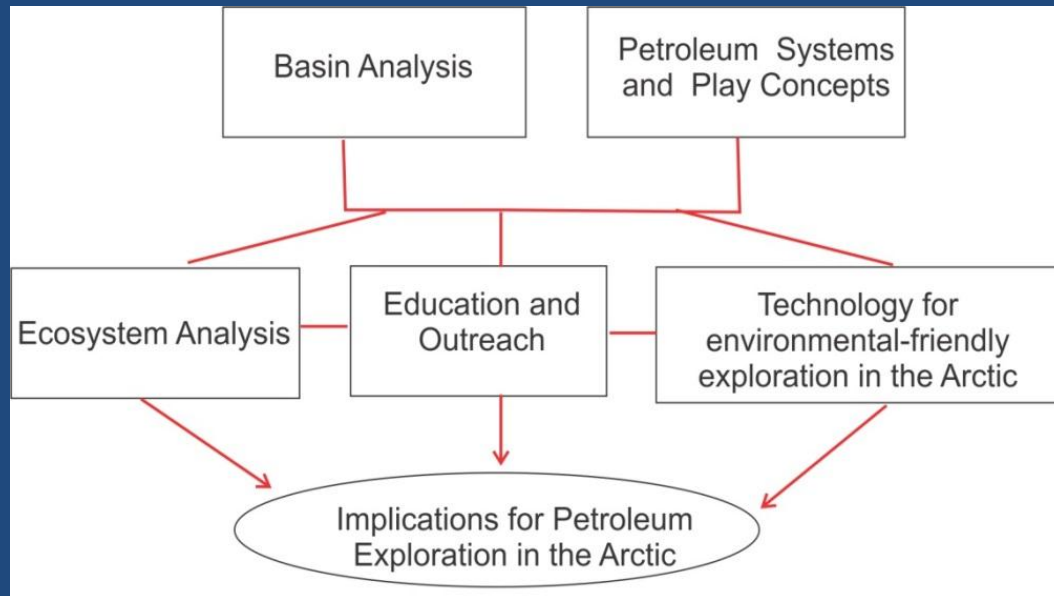
Research Centre for Arctic Petroleum Exploration *Under review*

Objectives:

- Improved geological models for petroleum resources in the Arctic
- Improved basin analysis
- Improved play concepts
- Improved ecosystem concepts

Example 5:

Research Centre for Arctic Petroleum Exploration



WP1: Basin analysis.

PIs: Jan Inge Faleide UiO

WP2: Petroleum systems and play concepts.

PIs: Snorre Olaussen UNIS

WP3: Ecosystem analysis.

PIs: JoLynn Carroll UiT/APN, Paul Wassmann UiT and Kenneth Pettersen UiS-SEROS

WP4: Technology for environmental-friendly exploration in the Arctic.

PIs: Tor Arne Johansen UiB og Ståle Johansen NTNU

WP5: Education and Outreach.

PIs: Jan-Sverre Laberg UiT and Jasmine Nahrgang UiT

Example 5:

Research Centre for Arctic Petroleum Exploration

Partners:

- 9 Norwegian research institutes and universities
- International partners in USA, UK, Canada, Germany, Russia, and Brazil
- Industry partners...

Contact:

- Karin Andreassen, University of Tromsø, Department of Geology, 77644420; karin.andreassen@uit.no

Example 6:

Centre for Arctic gas hydrate, environment and climate (CAGE)



Jurgen Mienert



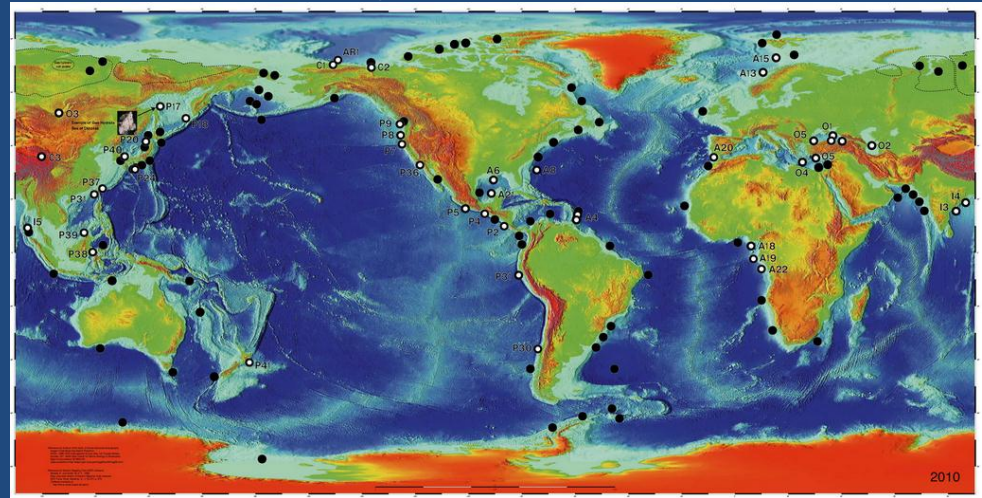
Example 6: *CAGE*

Hydrate:

500-2500 Gt of methane
(Milkov, 2003; Kvenolden, 1993)

Gas beneath hydrates:
1550 Gt of methane
(Hornbach, 2004)

Global inventory of Natural Gas
Hydrate Occurrence

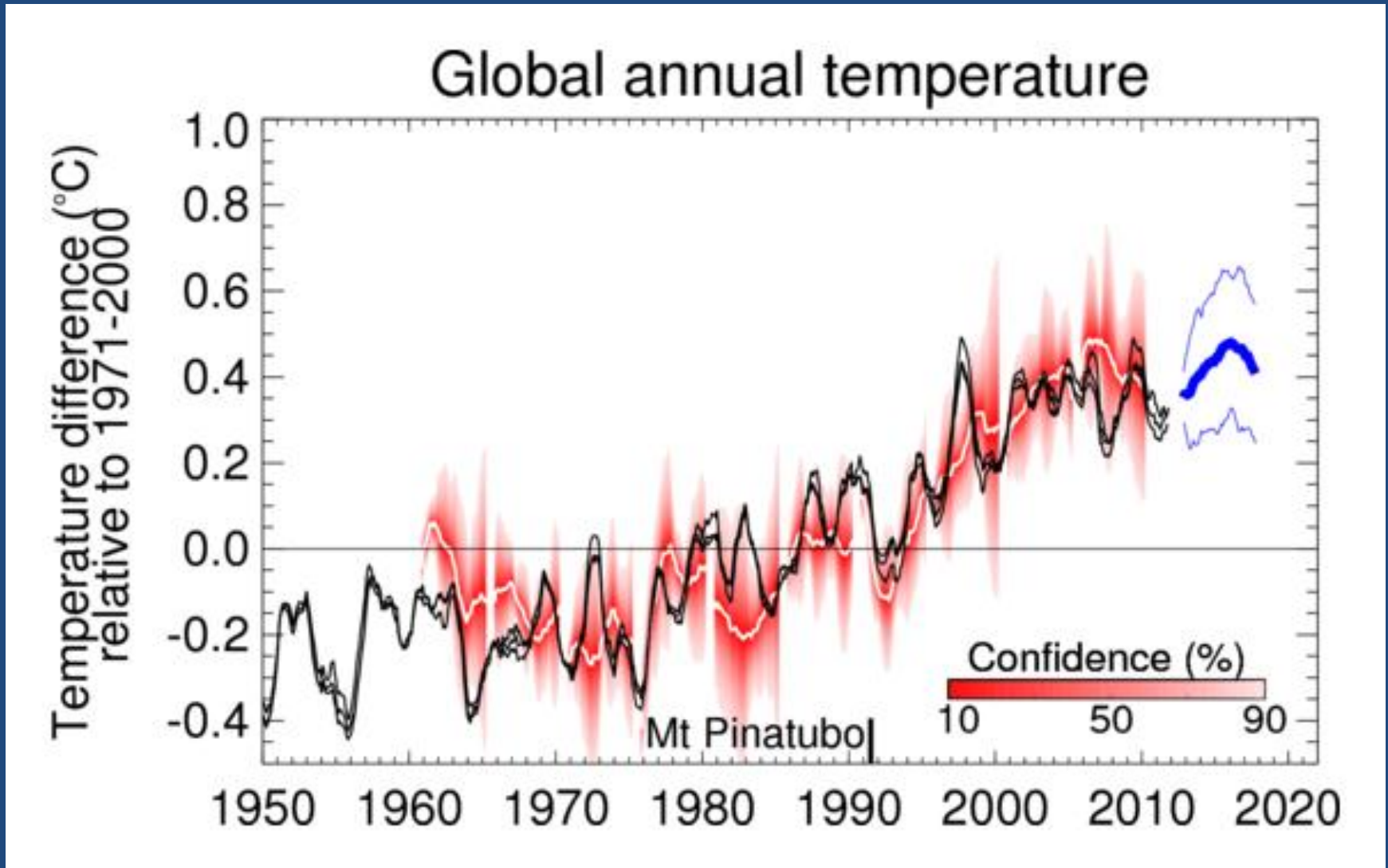


Kvenolden and Lorenson, 2010

Global production of natural gas in 2010

2.4 Gt
(Wikipedia)

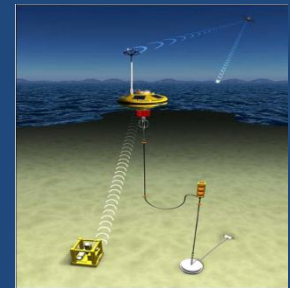
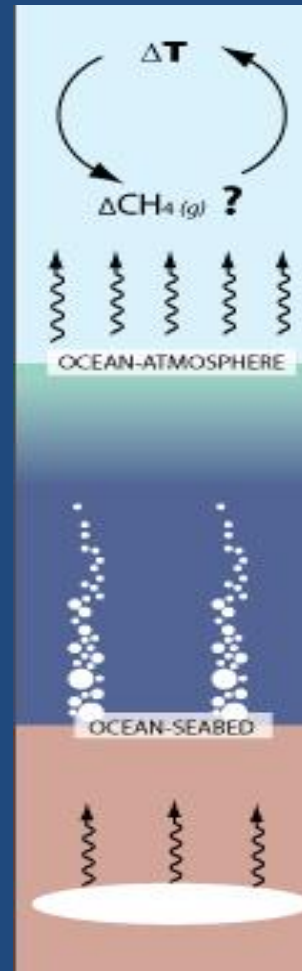
Example 6: *CAGE*



METoffice, UK (2012)

Example 6: *CAGE*

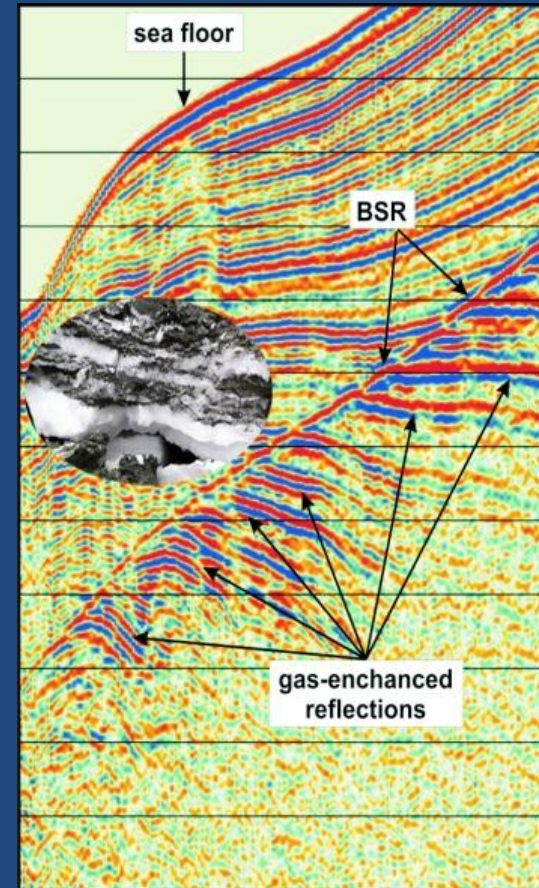
- (1) The amount of methane hydrate
- (2) The types of methane and geological leakage systems
- (3) The methane leakage history by applying proxy-recorders
- (4) The present-day release trend and future predictions using long-term seafloor observations.



Example 6: *CAGE*



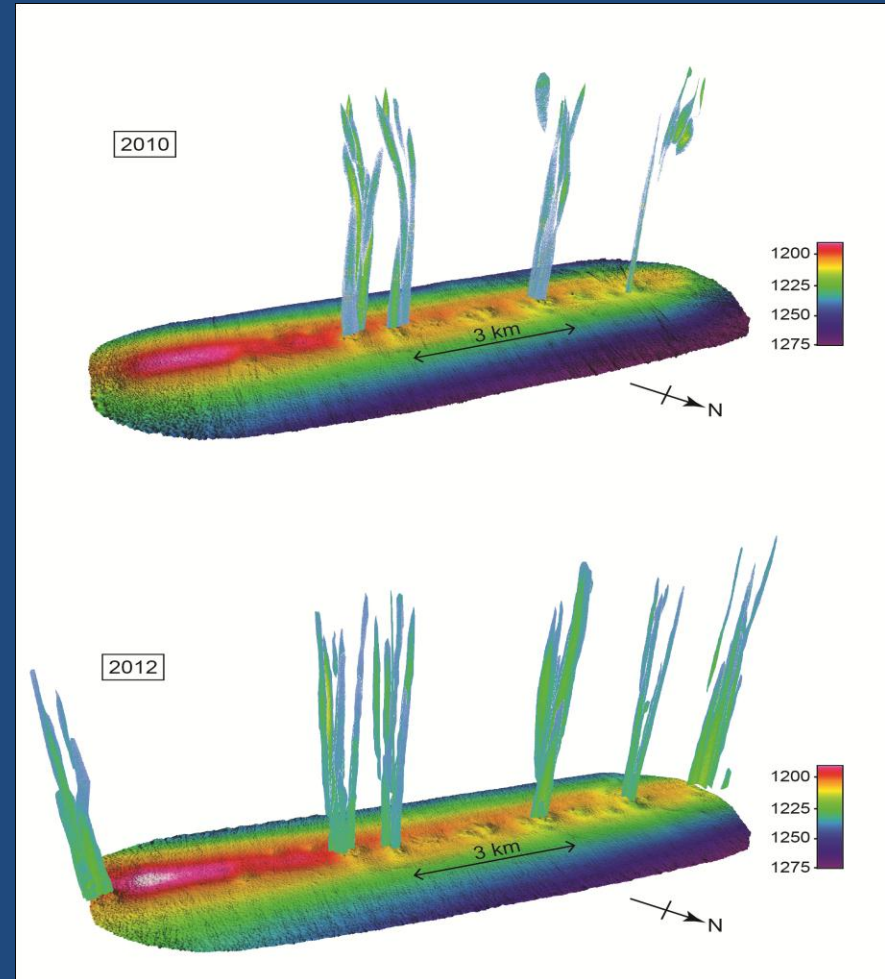
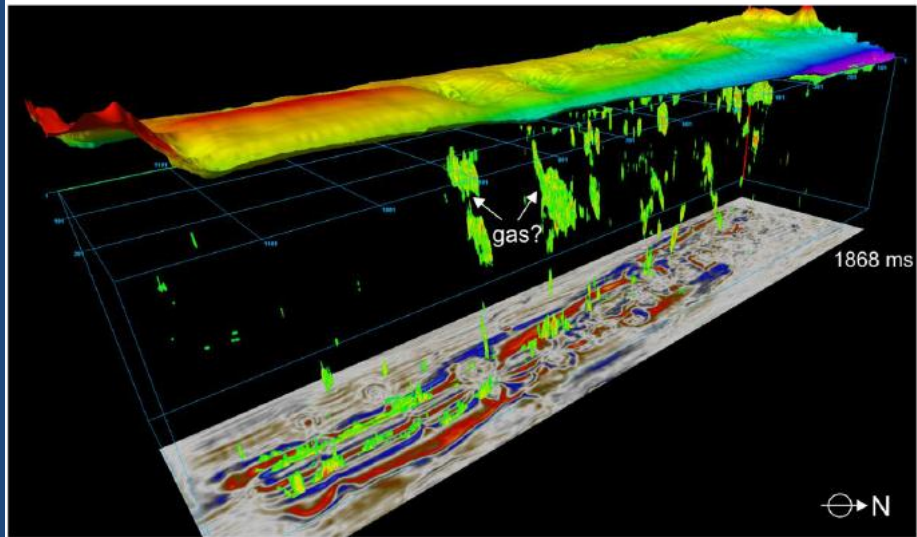
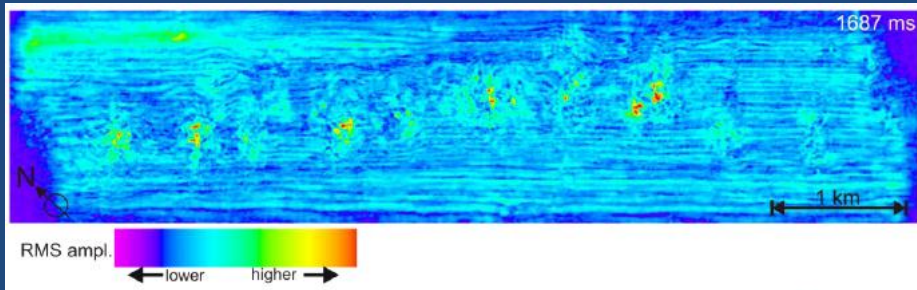
Subseabed - Methane hydrate and free gas reservoirs using portable drilling



Example 6: *CAGE*



Seabed: Methane release and benthic faunal response using time lapse studies



Example 6: *CAGE*



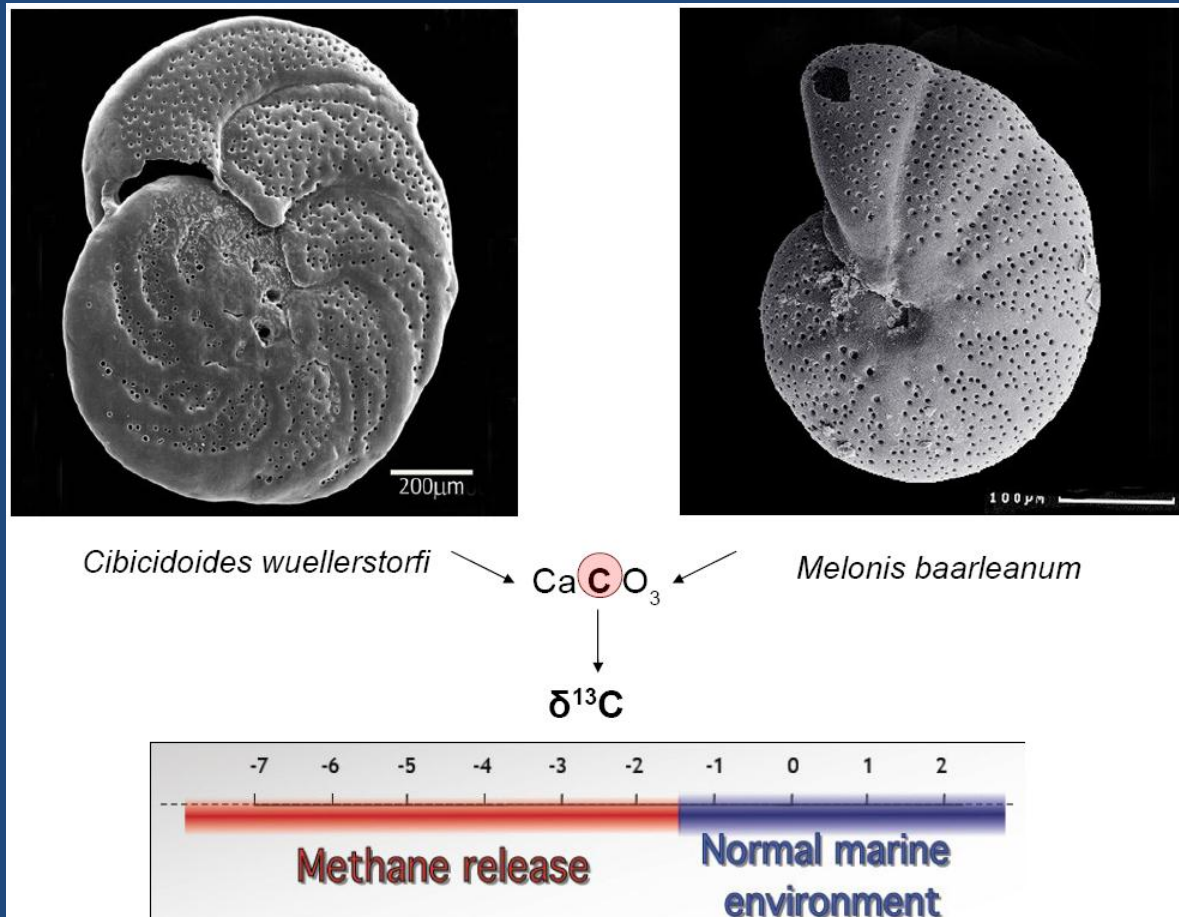
Water column: Methane release and gas quantification using sensor technology



Example 6: *CAGE*

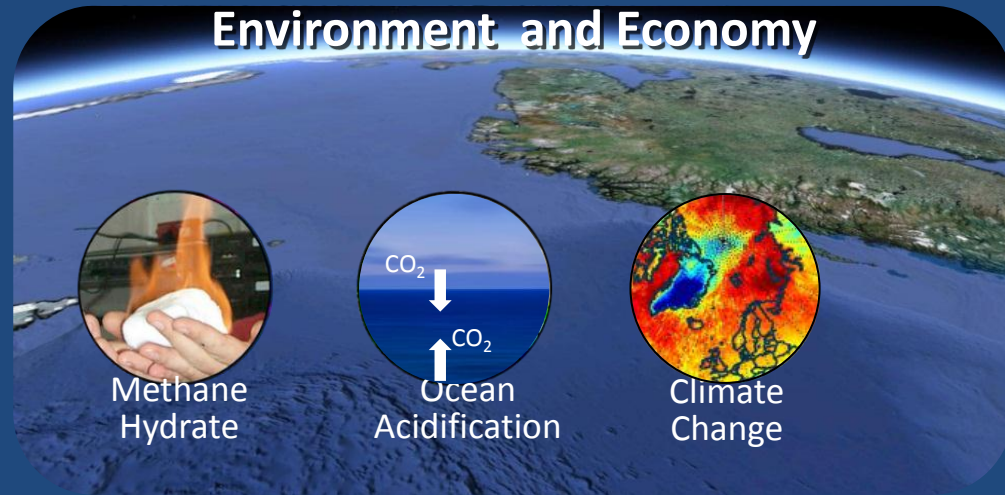


*Paleo-methane history through the Neogene-Pleistocene
using biosensors*



Example 6: *CAGE*

- Global Implications
- Funding ~ 10 years
- 20-30 new positions
- Expert fellowships



Example 7:

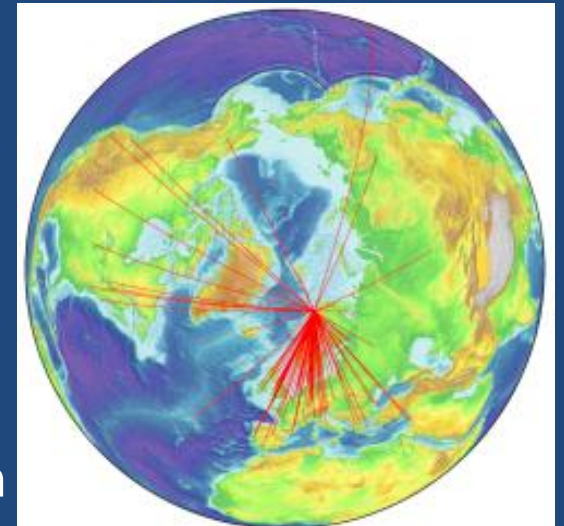
Gas hydrates and energy



March 2013, offshore Japan, nytimes

Looking ahead:

- Improve national and international cooperation models for very expensive infrastructures (ROV, Ocean Observatories, Satellite Surveillance)
- Develop and take leadership in Barents Sea and Arctic geoscience field-based research/education in cooperation with geological institutes, industry, Russia, U.S., Canada, and other concerned countries
- Establish new positions and new strategic research fields
- Improve industry cooperation in areas of Arctic frontier research
- Continued financial support for research/student funding in forefront areas



Texas Fulbright student's view...

- A growing department with an Arctic focus and strong ties to industry
- Wide range of research projects relevant to industry and academia
- Many opportunities to collaborate with industry in the future
- Budding relationships with international collaborators (e.g. Russia, U.S.A., E.U.)



➤ Thank you for your attention

➤ Questions?

➤ Institute leader, Jurgen Mienert: jurgen.mienert@uit.no

