CASE:
A national consortium for improved education and research in applied geoscience - based on case studies

UNIVERSITETET I BERGEN

NTNU
Kunnskap for en bedre verden

UNIVERSITETET I TROMSØ

UiO : Universitetet i Oslo

UNIS

Outline:

- Introduction
- CASE
- The way ahead

Introduction (1/3):

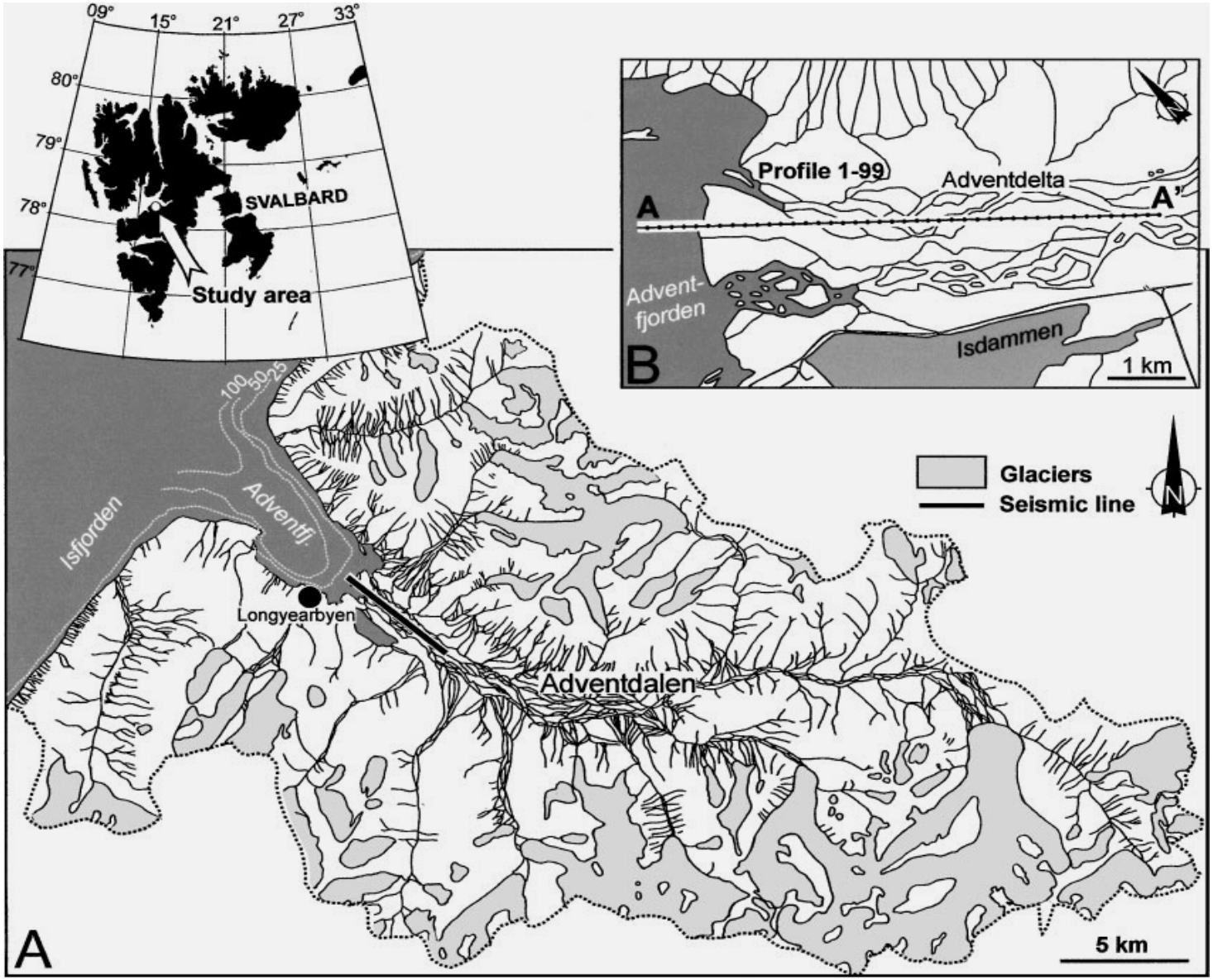
- Challenges for Academia:
  - Low oil prices makes studies in petroleum less relevant
  - Climate changes and the present «political focus» makes petroleum studies unpopular

- Consequences:
  - Less students means less funding for education and research

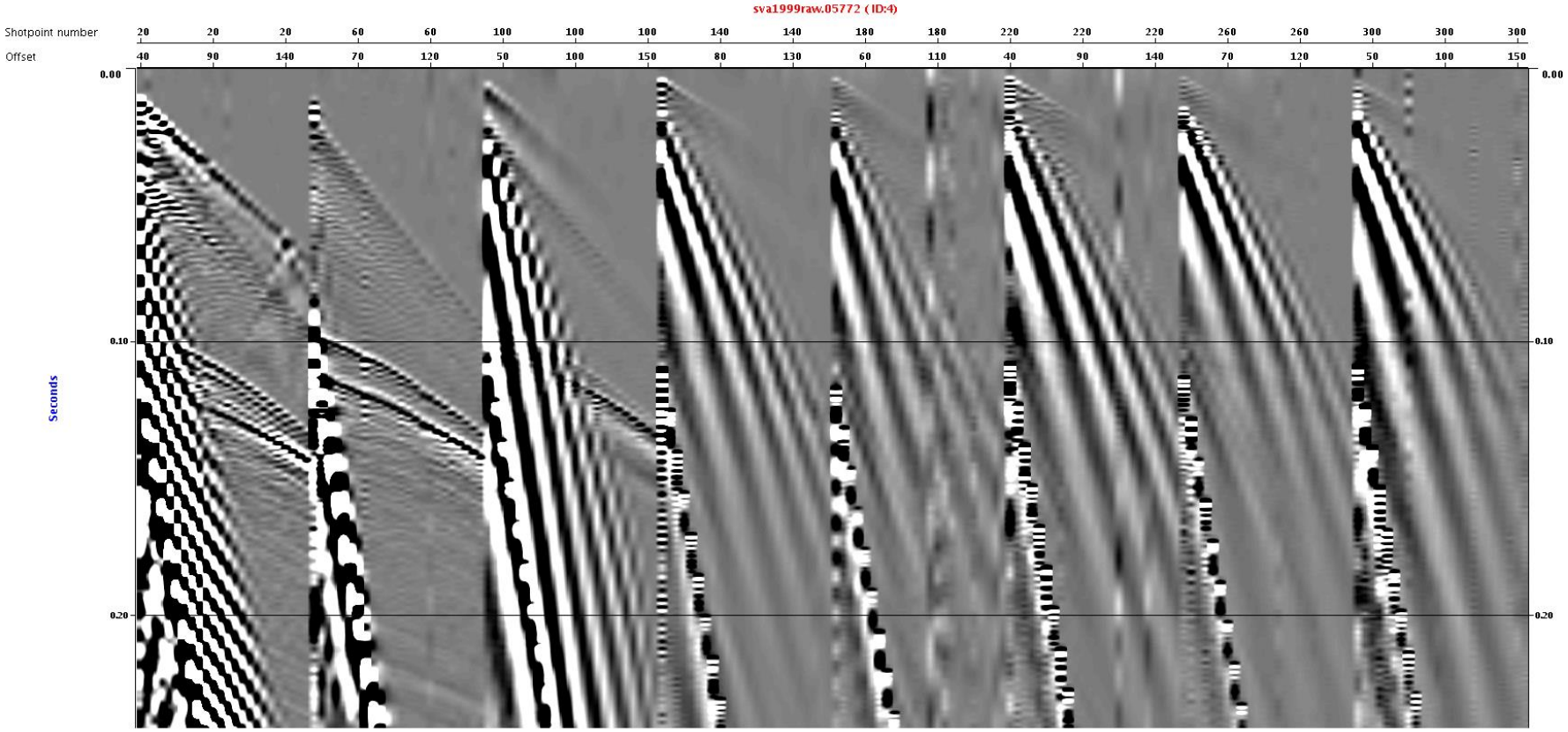
Introduction (2/3):

- Academia has a responsibility to emphasize the generic value of their education and research
- Academia has the benefit of doing research which might have a relevance

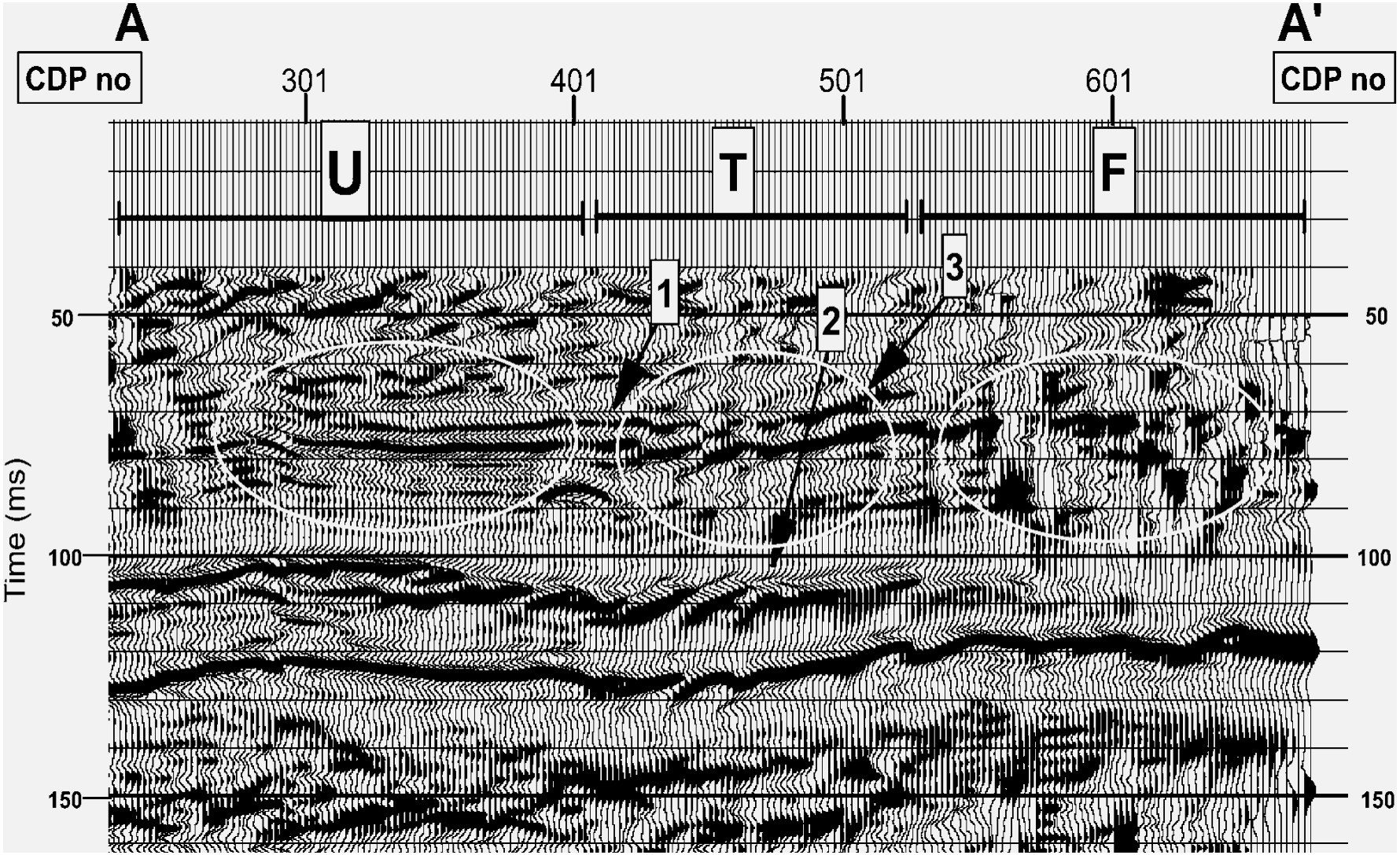

Crater 3 - Taymyr Peninsula
diameter 13ft (four metres)
Crater 1 - Yamal Peninsula
Diameter 98ft (30 metres)
Crater 2 - Taz district
Diameter 49ft (15 metres)
RUSSIA
KAZAHKSTAN


09°
15°
21°
27°
33°
80°
79°
78°
77°
SVALBARD
Study area
Profile 1-99
Adventdelta
A
A'
Advent-
fjorden
Isdammen
B
1 km
100
50
25
Isfjorden
Adventfj.
Longyearbyen
Adventdalen
Glaciers
Seismic line
N
A
5 km

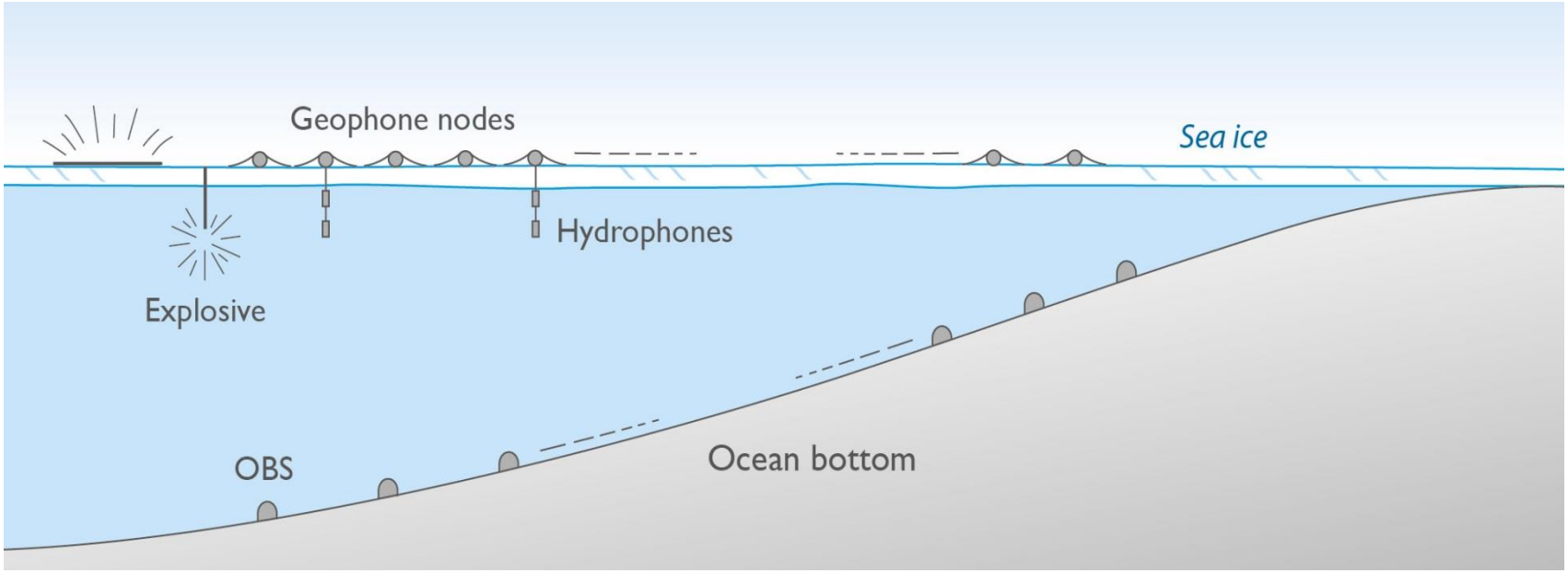
Shot gathers (high res., single geophones)



Note the changes in the surface wave and how it hides the reflections


A
A'
CDP no
CDP no
301
401
501
601
U
T
F
1
2
3
50
100
150
Time (ms)

Experimental setup – 2016, collaboration with ENI:



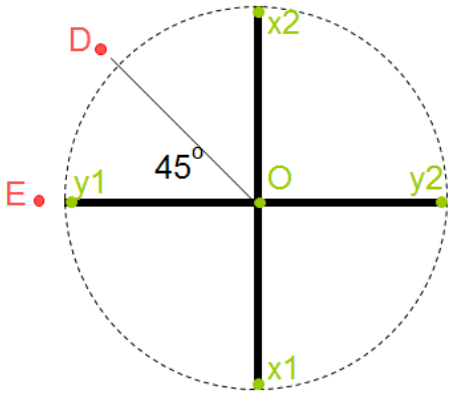
- Geophone nodes with geophone strings on top of the sea ice
- Hydrophone strings vertical below the sea ice
- Ocean bottom nodes at the sea bottom
- Various shooting configurations on top of the ice and within the sea

Experimental setup

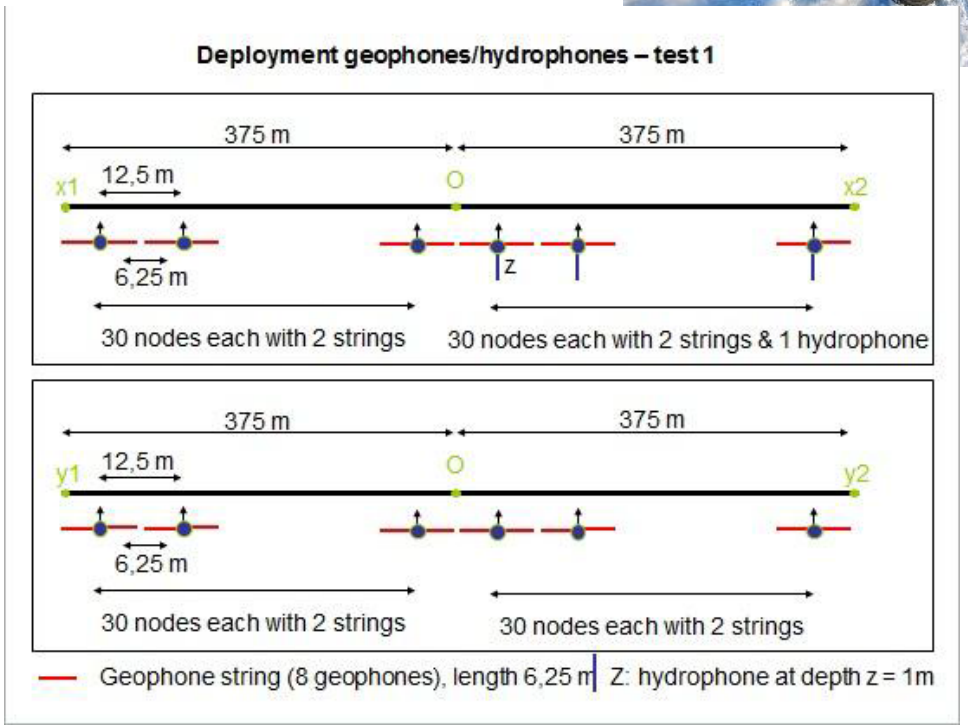
C-X2:
C 1025 m

B-X2:
B 525 m

A-X2:
A 25 m



O-y2: 375 m

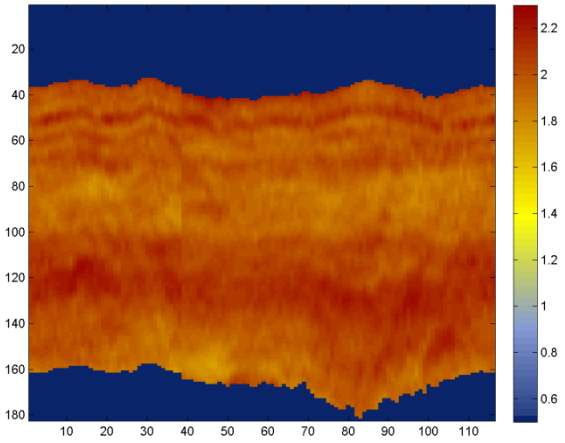



SKYTEKIØSE
007

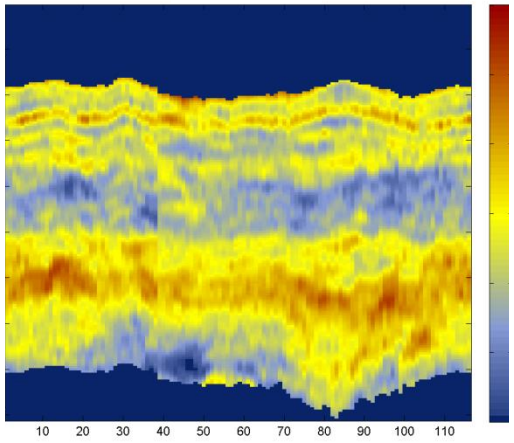
Pre CO2 injection

4D analyses – inverted data: pre injection

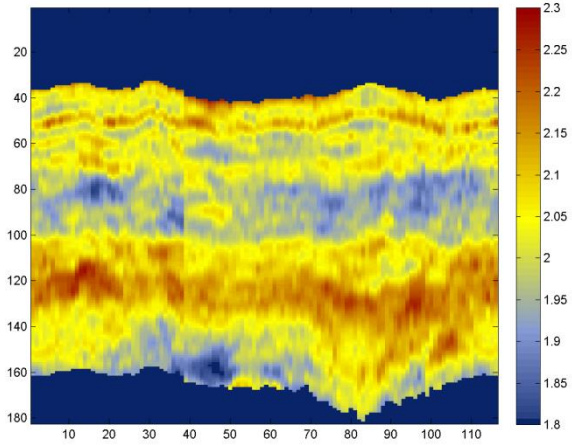
Vp [km/s]



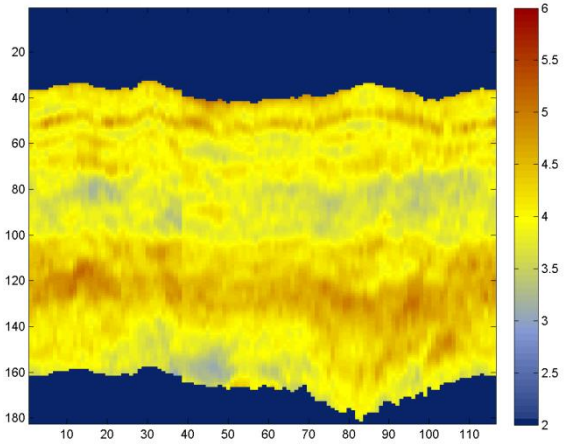
Vs [km/s]



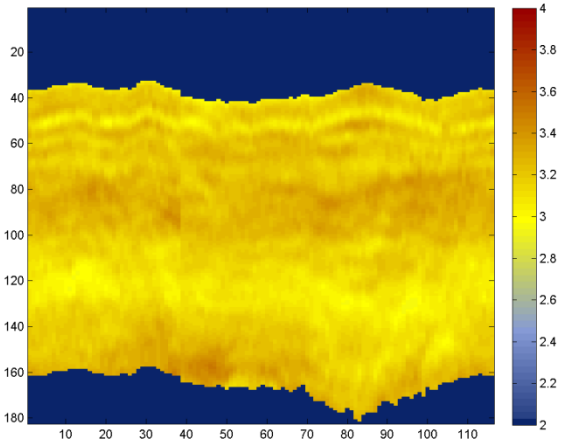
Density ρ [g/cm^3]



ρVp [g/cm^3 km/s]



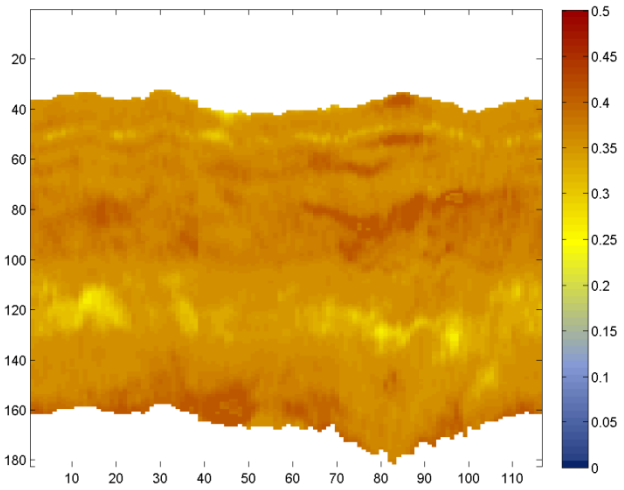
Vp/Vs []



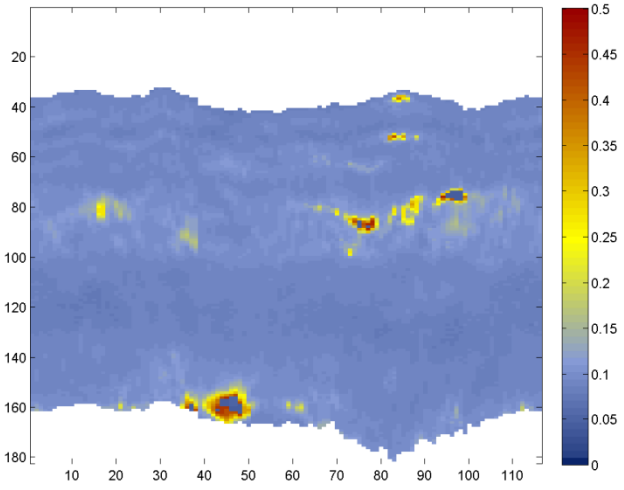
Pre CO2 injection

Estimated reservoir conditions: pre injection

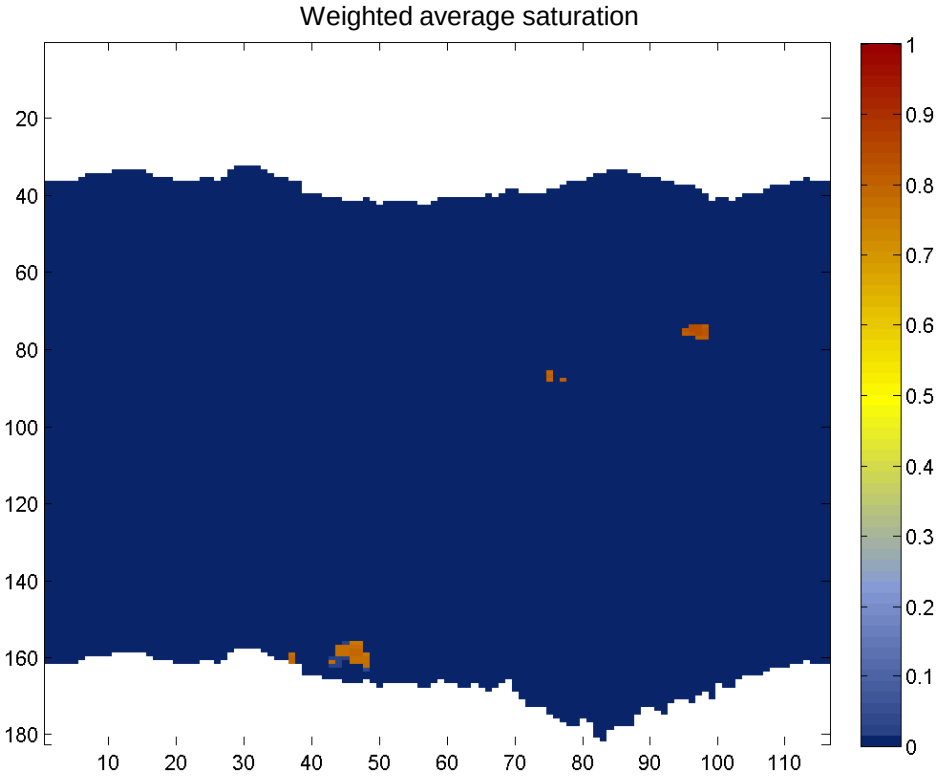
Weighted average porosity



Weighted average lithology



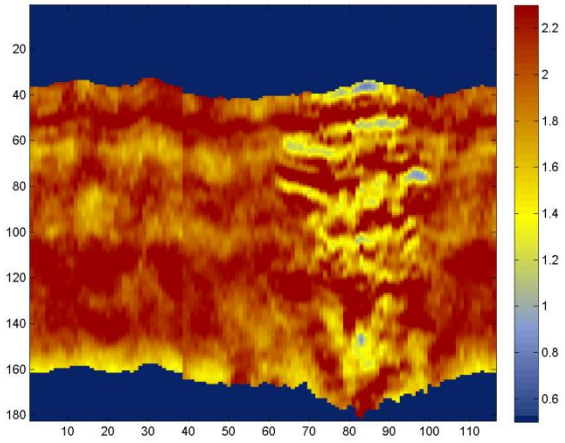
Weighted average saturation



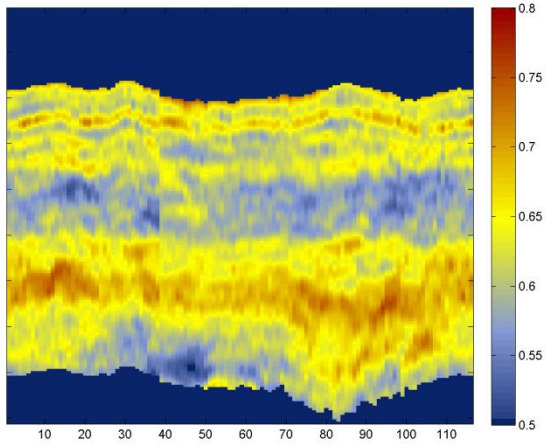
Post CO2 Injection 2006

4D analyses – inverted data: post injection

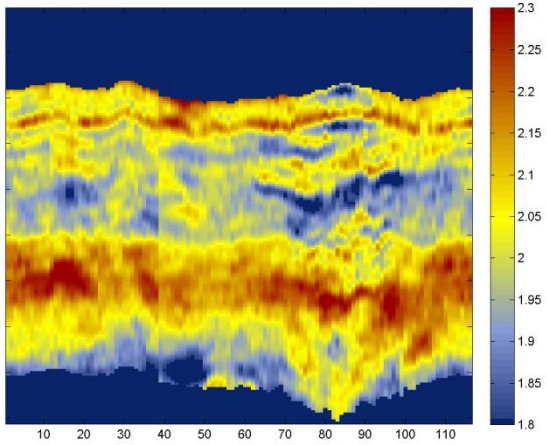
Vp [km/s]



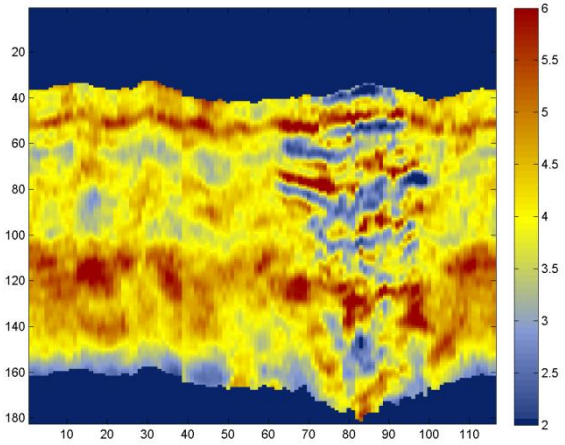
Vs [km/s]



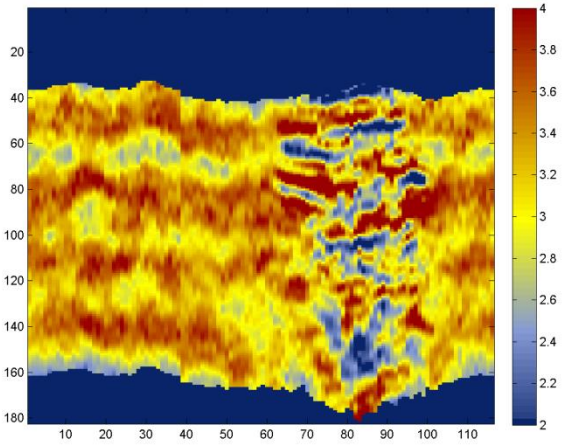
Density ρ [g/cm^3]



ρVp [g/cm^3 km/s]

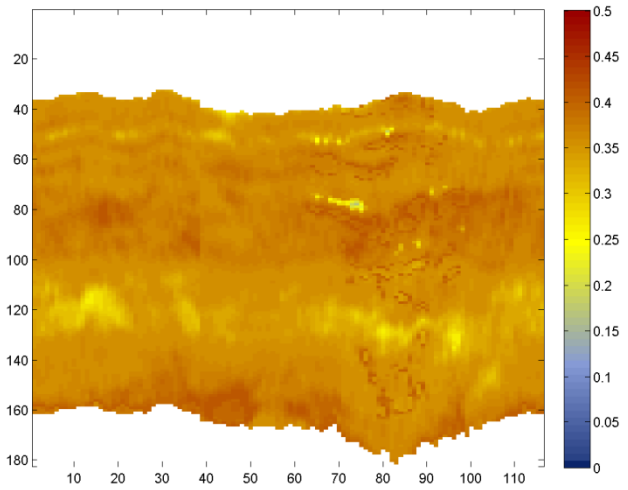


Vp/Vs []

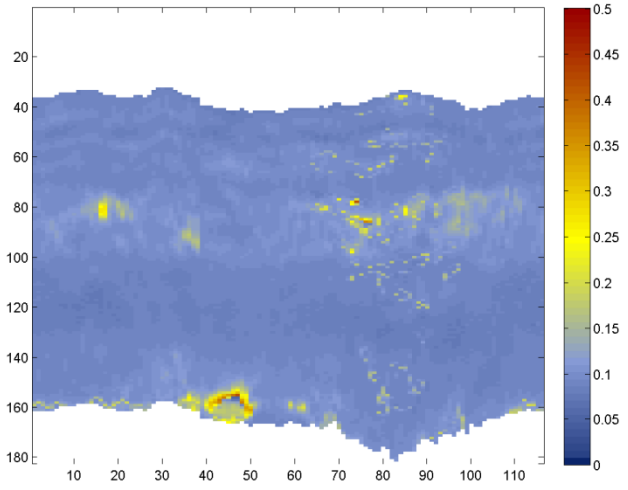


Estimated reservoir conditions: post injection assuming homogeneous saturation

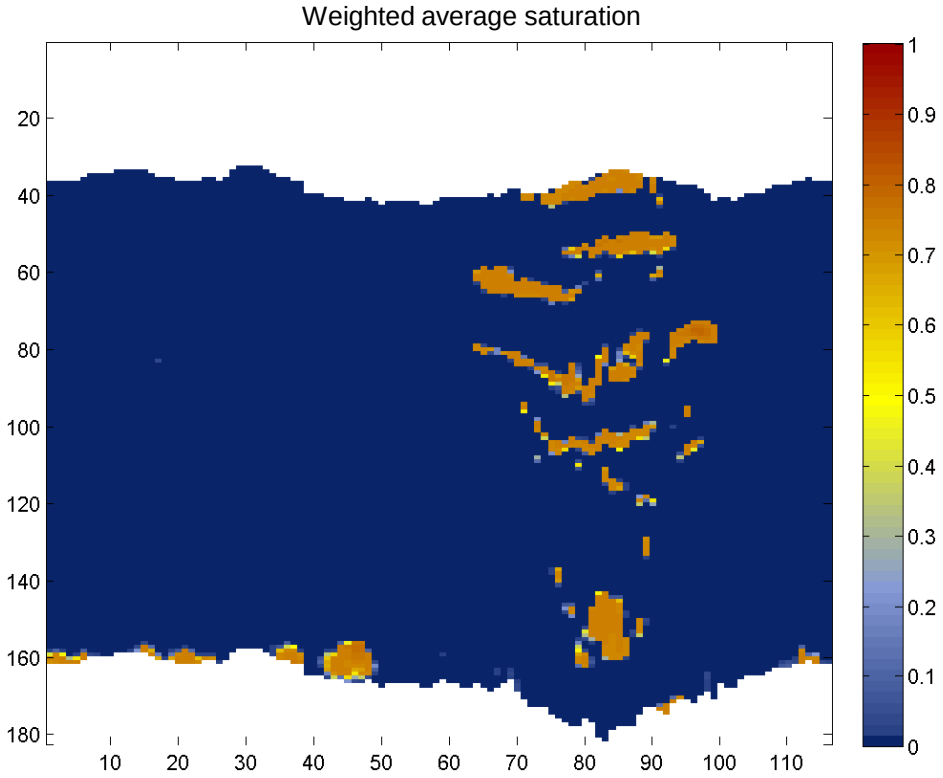
Weighted average porosity



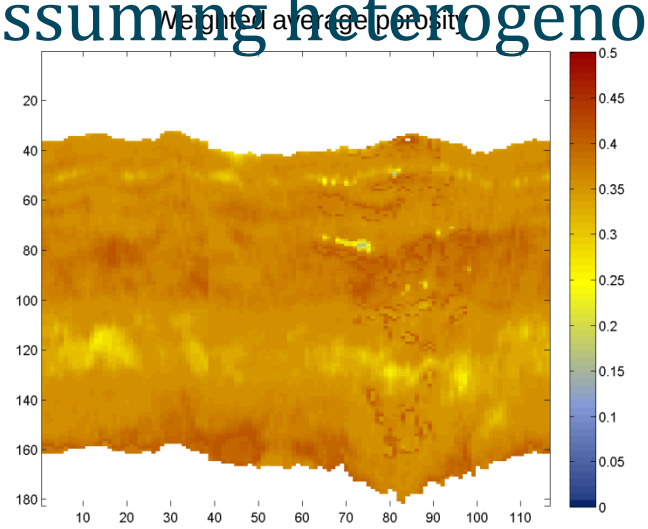
Weighted average lithology

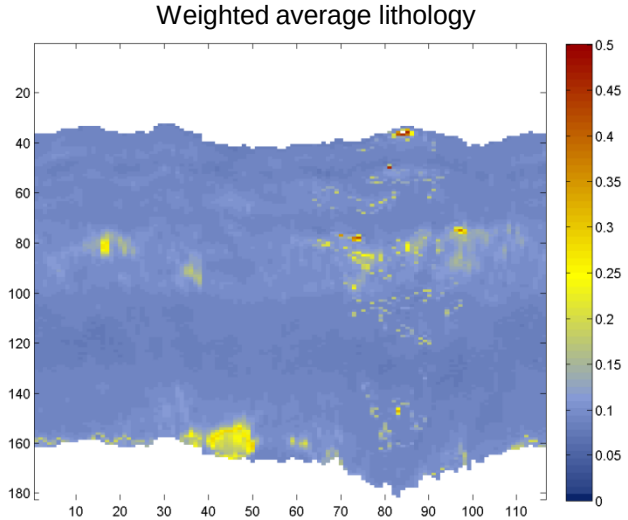


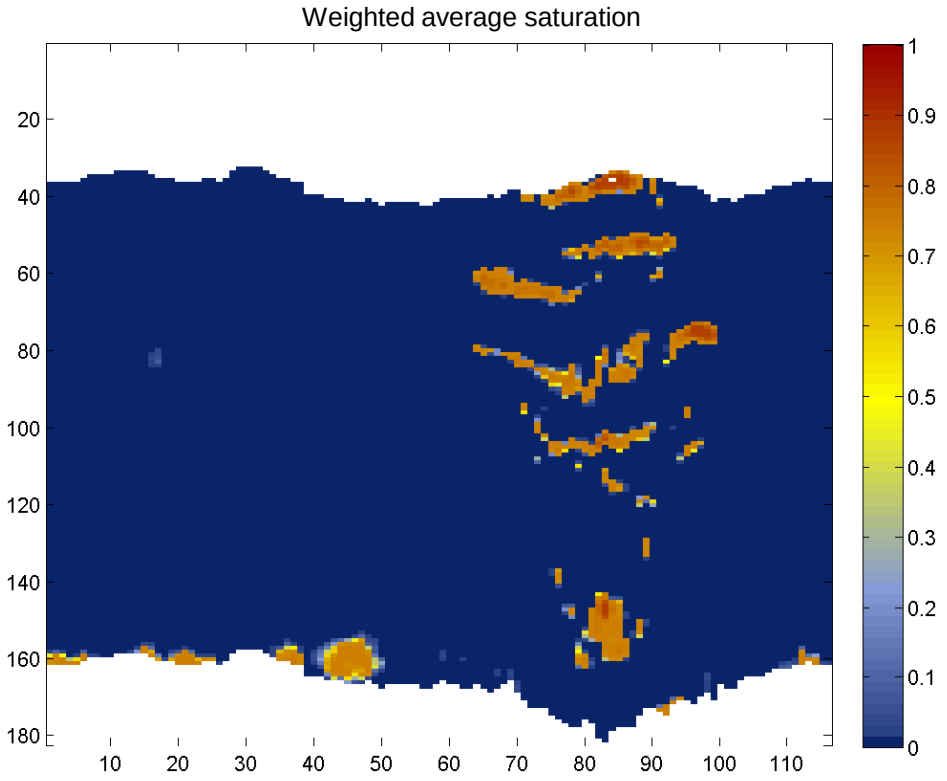
Weighted average saturation



Estimated reservoir conditions: post injection assuming heterogenous saturation







Introduction (3/3):

Evaluation reports of Academia in Norway:

- Join forces at the department level
- Join forces at University level –Centres of Excellence
- Join forces at national level – makes national teams in education and research

The CASE-consortium:

- Background and motivation
- Content CASE
- Milestones for the first year
- Sponsor benefits

Background and motivation (1/2)

- Follow-up plan for the Evaluation of Research in Earth Sciences
- Increased focus on geoscience competence building northwards – e.g. ARCEx
- Increased focus on integration of geosciences and integrated workflows
- The introduction of new geo-plays with increasing number of smaller oil companies
- Increased focus on stratigraphic traps

Background and motivation (2/2)

- Relative few persons in academia in Norway who have the responsibility of adapting the new geo-scientific challenges in teaching and research
- There is a need to get access to the good data examples
- How should academia present the prosperity of the various tools and workflows presented to the students?

Background and motivation (2/2)

- Relative few persons in academia in Norway who have the responsibility of adapting the new geo-scientific challenges in teaching and research
- There is a need to get access to the good data examples
- How should academia present the prosperity of the various tools and workflows presented to the students?

By this initiative, UiB, NTNU, UiO, UiT and UNIS has formed a strong national network in order to improve collaboration both in education and research.

Key words: common courses, students, data, projects

Content CASE:

- Together with the industry emphasize the knowledge areas where our students need to be better trained
- Together with the industry emphasize weaknesses and robustness of various methods and interpretations

  e.g. post mortem studies

  e.g. AVO – the good, bad and the evil
- Encourage students for in-depth and advanced learning
- Create easy access to teaching material and consortium results
- Create an arena where students and industry meet and where the best students can perform

Milestones – the first year:

- Establish the organization and main players from the universities and industry

  Lundin, Total, Tullow Oil and VNG
- Create common data resources
- Recruit students
- Arrange the first meeting during 2015, where a permanent board is selected

Sponsor benefits (1/2):

- Get opportunity to directly influence on topics addressed for education and research – sponsors will be offered adjunct positions
- Get opportunity to provide data, case studies and best practice solutions for the teaching curriculum and for master thesis research topics
- Get links to a broad range of external training opportunities
- Get networking opportunities with geoscientists with similar interests and backgrounds

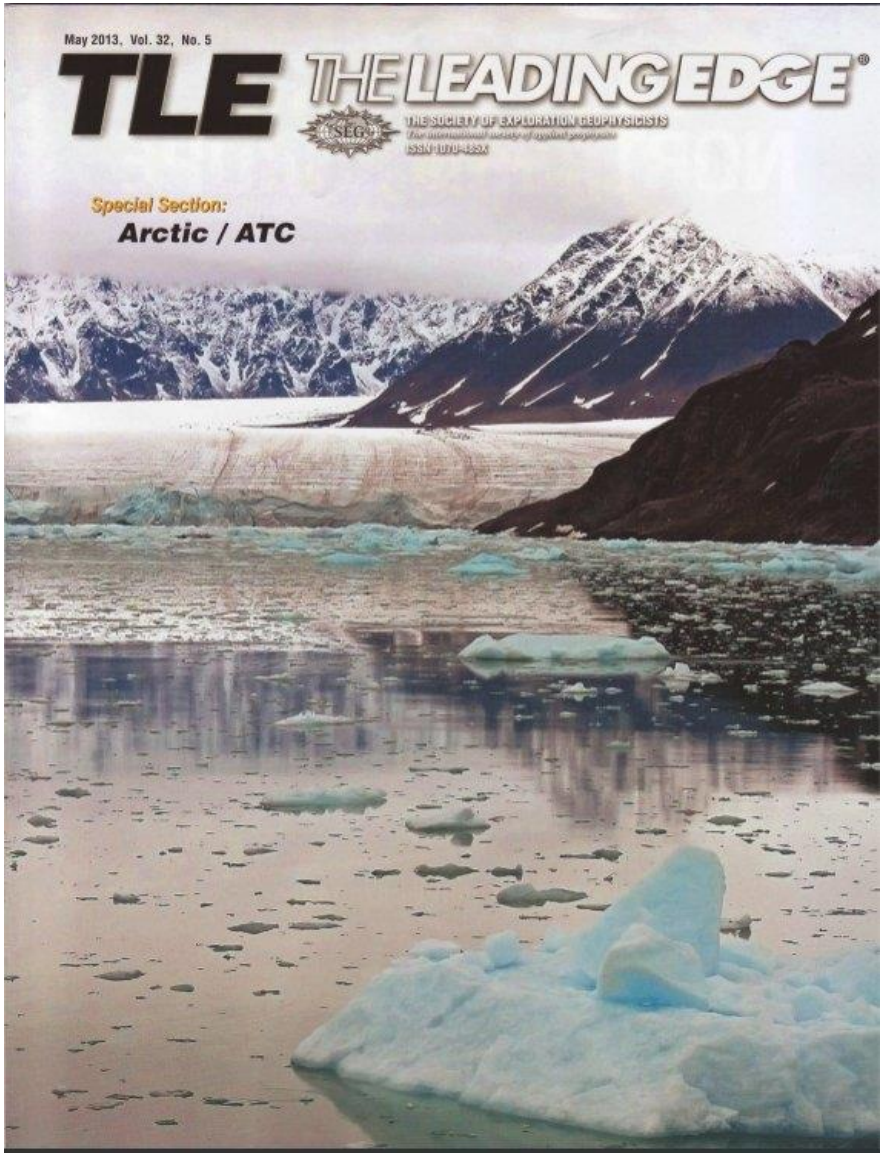
Sponsor benefits (2/2):

- Get access to the geoscience training system GeoCLASS, including the consortium's data base of case studies as for example processed and interpreted seismic data examples
- Be invited to join an annual 2-days springtime consortium meeting where case studies within selected topics are presented, and where industry members and master students from member universities meet and network
- Get access to petroleum geoscience courses held after the annual meeting
- Get access to course material database open for employees for self-study

CASE focus 2015-2017:

Activities related to CASE:

- Seismic signatures of burial and uplift
- AVO; pitfalls (ex from the Barents Sea, Hoop-area)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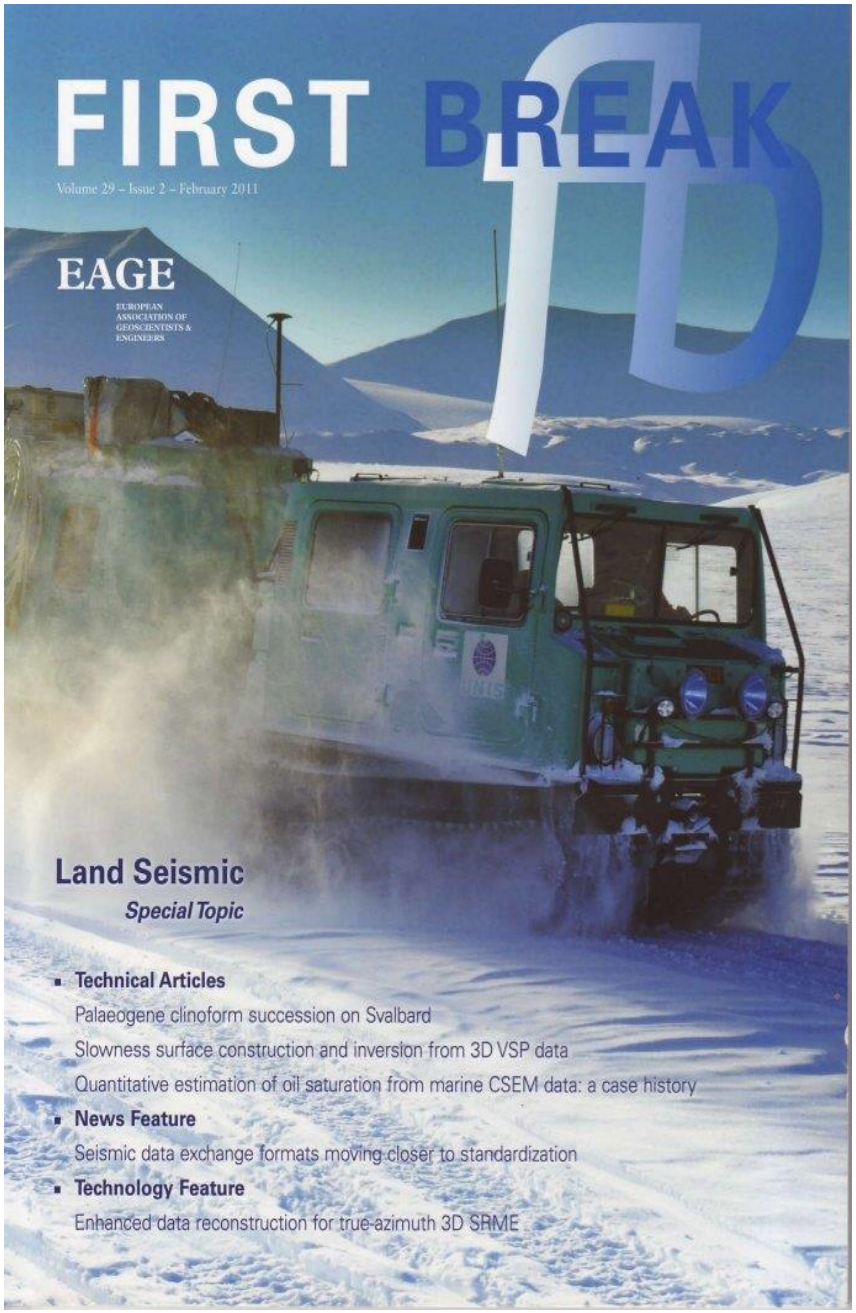
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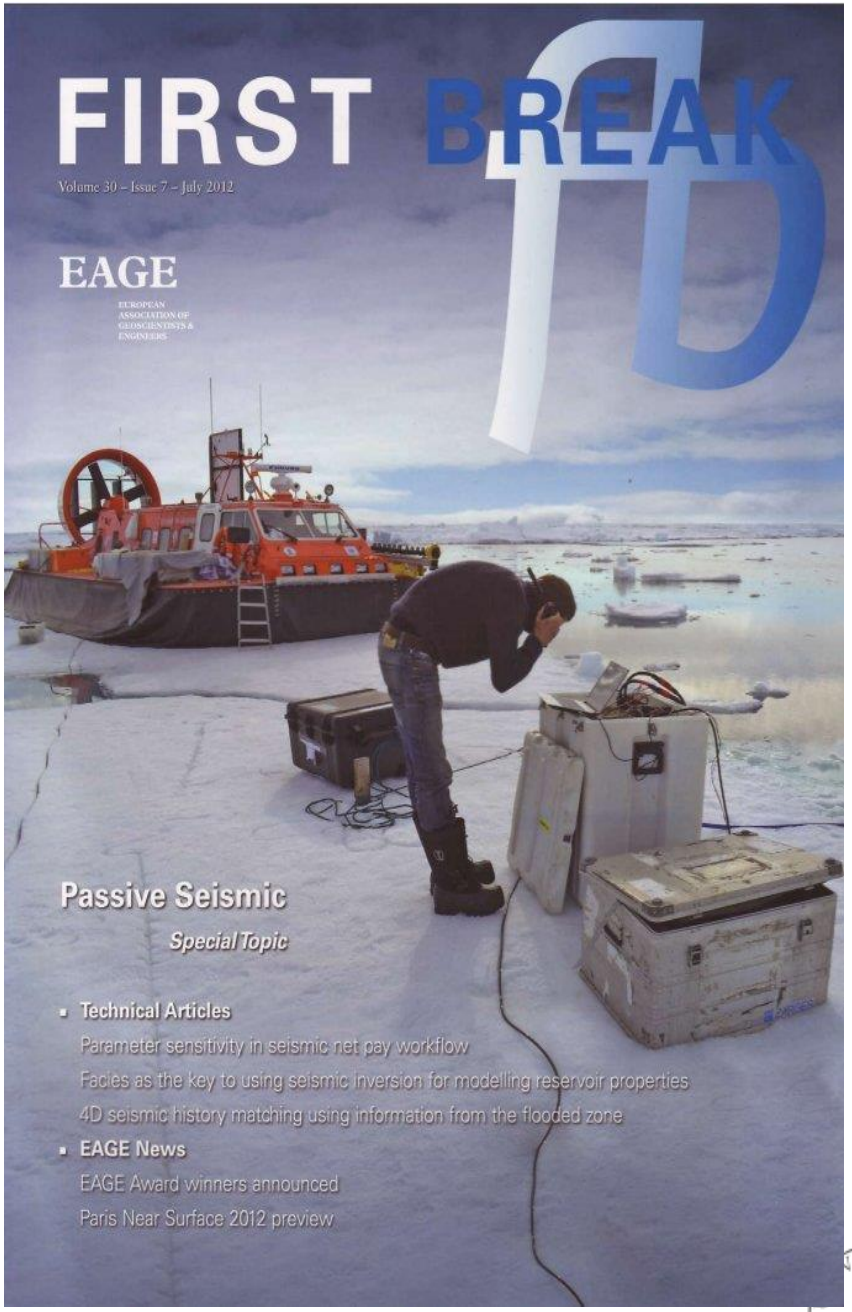
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