

Department of Earth Science

Tor Arne Johansen
Professor GEO/UiB & Prof II UNIS



UNIVERSITY OF BERGEN

Outline:

- Department structure and education
- Some ongoing projects
- New initiatives



Faculty of Mathematics and Natural Sciences

7 departments (from 2018):

Department of Biological Sciences (BIO)

Department of Earth Science (GEO)

Geophysical Institute

Department of Physics and Technology

Department of Chemistry

Department of Mathematics

Department of Informatics



Research groups

1. Geodynamics
2. Basin and Reservoir Studies
3. Geochemistry and Geobiology
4. Quaternary Earth Systems

Technical groups

- Field & Cruise activities
- Laboratories

Host or partner of several **research centre**



Department of Earth Science (GEO)

Staff:
~160

- Professors & ass.prof: 35
- Prof.II: 2
- Active emeriti: 6
- Technical: 25
- Administrative: 8 (+ common economy/HR)
- Post docs & Researchers: ~80

Students:
~ 300

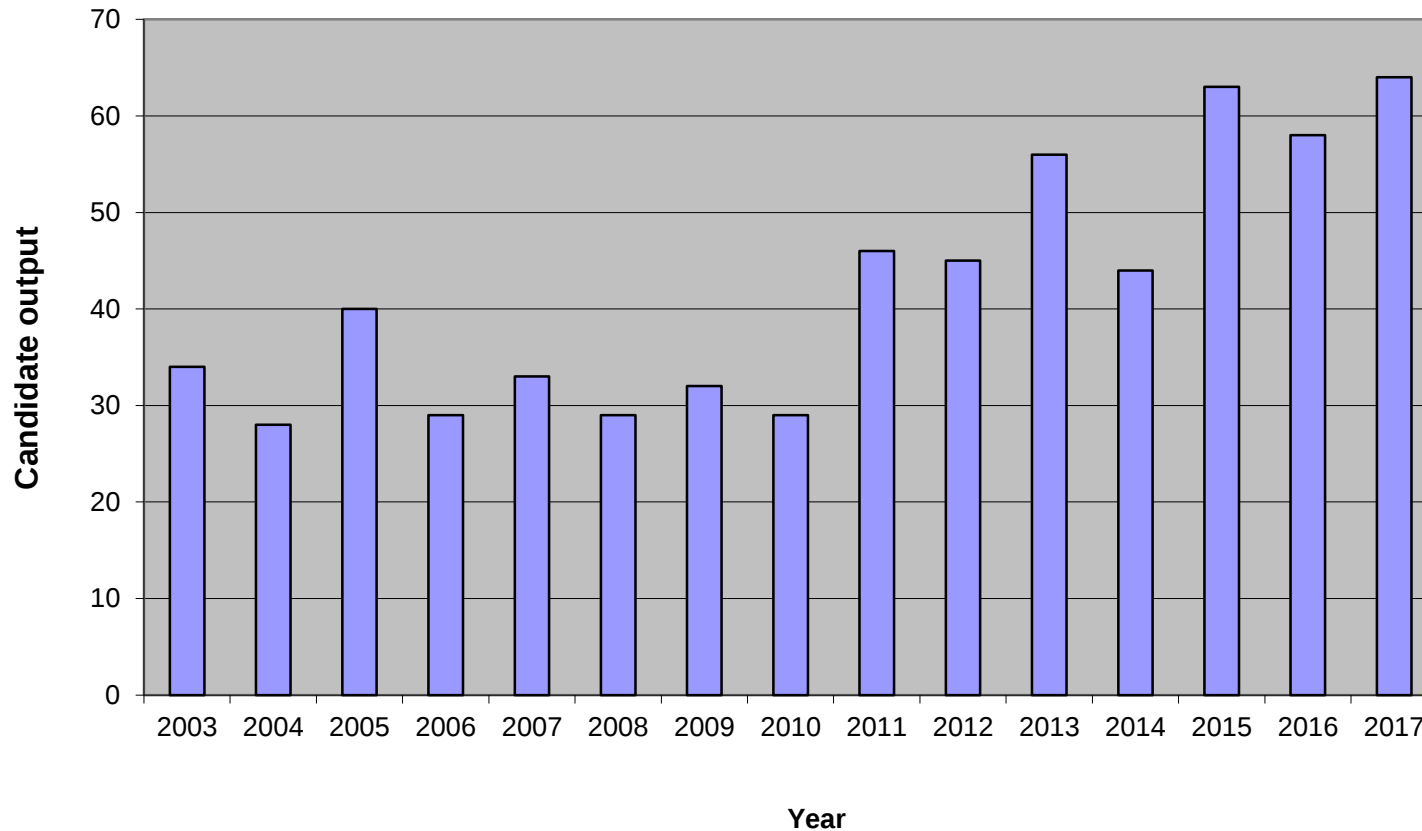
- PhD: ~ 60
- Master students: 106
- Bachelor students: 191

Budget:

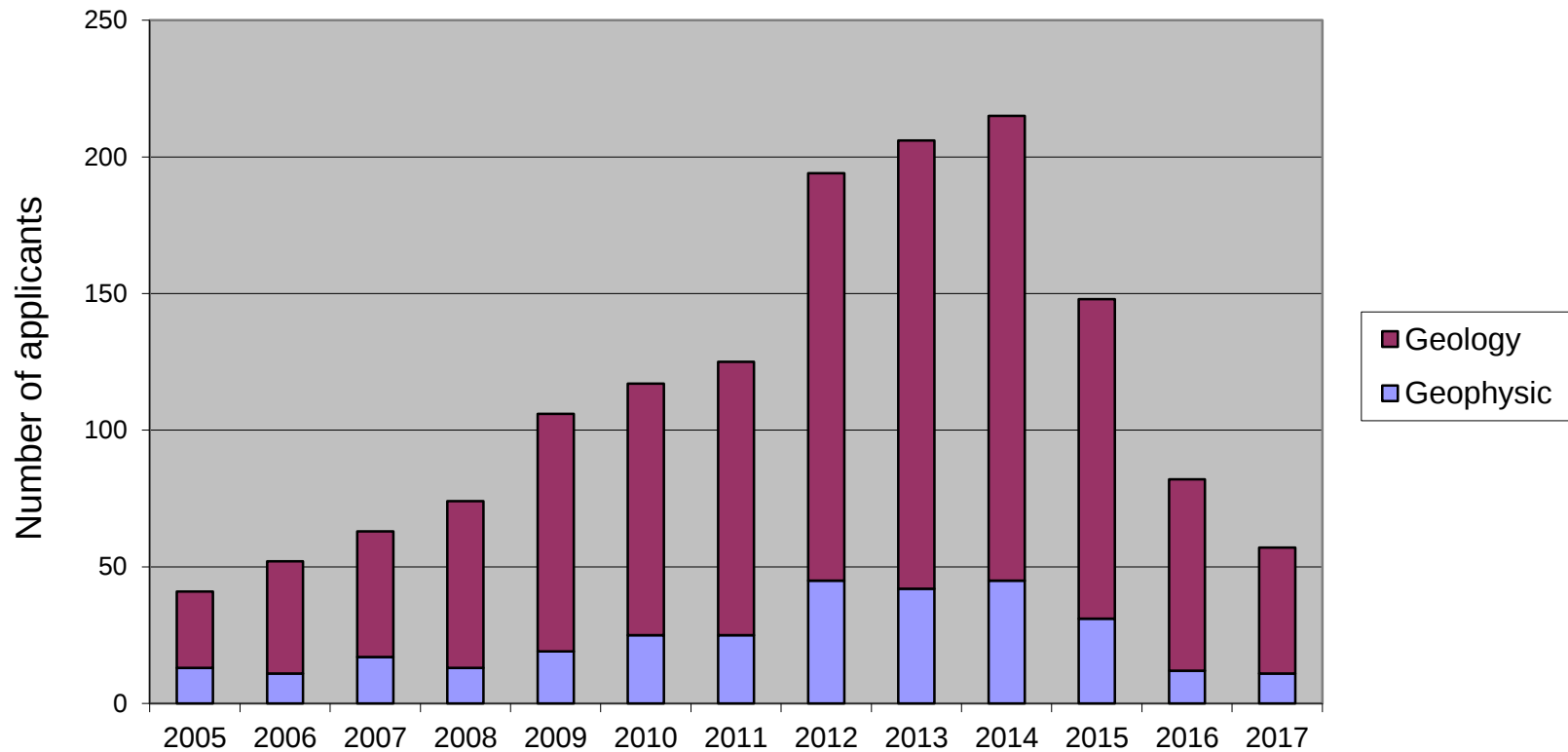
- Department budget ~100 MNOK
- External funding: ~100 MNOK



MSc – annual candidate output:



Batchelor's program in Earth Science:



Key research areas - Basin and Reservoir Studies



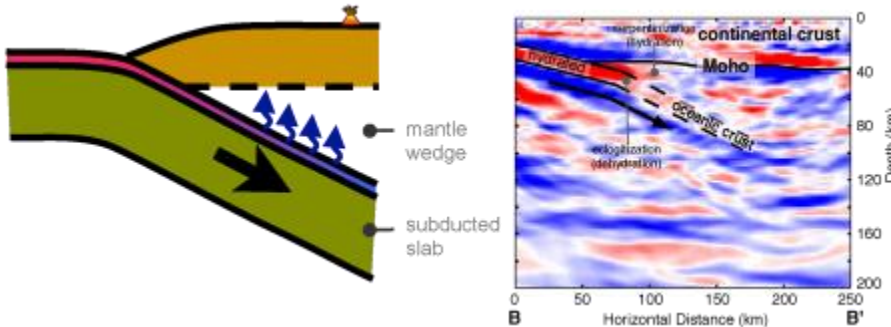
10 prof / assoc. prof
17 postdocs/researchers
13 PhD candidates
44 MSc students



- Sedimentary and tectonic processes, and architecture
- Seismic: modelling, processing, inversion, rock physics, interpretation, reservoir characterization
- Subsurface mapping of energy potentials (hydrocarbons and heat) and possible sequestration of greenhouse gases
- Facilitation of a large scale arctic seismic laboratory
- ... and more.



Key research areas - Geodynamics group



12 Profs / Assoc. Profs

23 post doc's / PhD's

12 MSc students

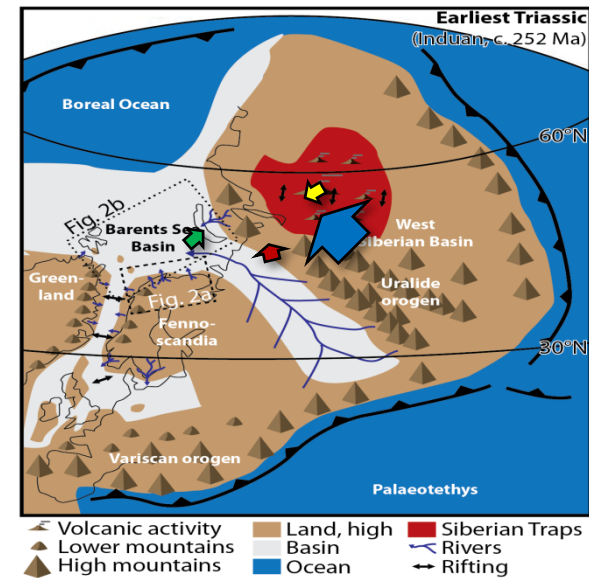
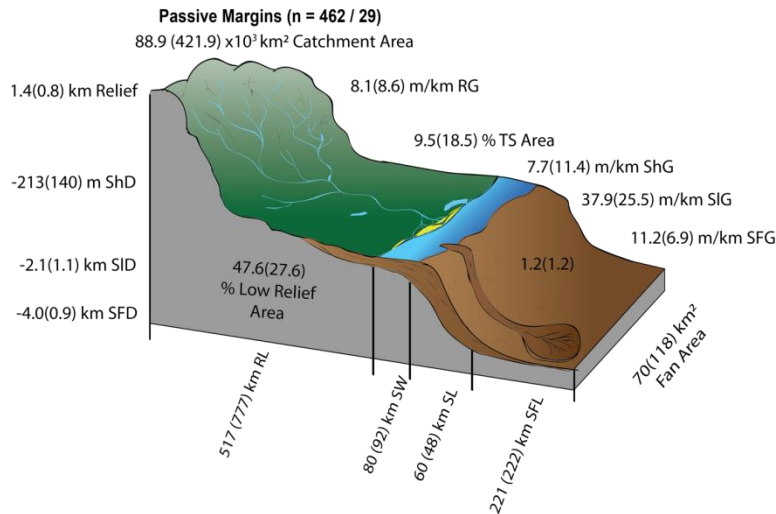
- Passive margin research
- Marine geophysics – passive margins
- Orogenic belts and exhumation histories
- Modelling lithosphere tectonics
- Tectonic morphology
- Seismology
- Norwegian national seismic network



Ongoing projects:

Source-to-Sink of the Triassic Barents Sea

William Helland-Hansen and Christian Haug Eide - Petromax



Statoil: Source-to-Sink scaling Relationships

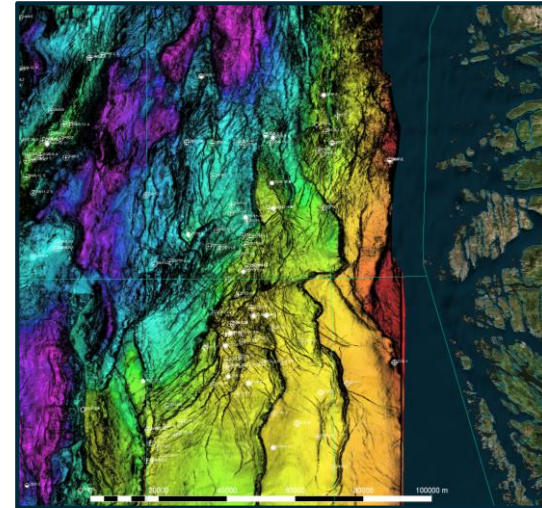
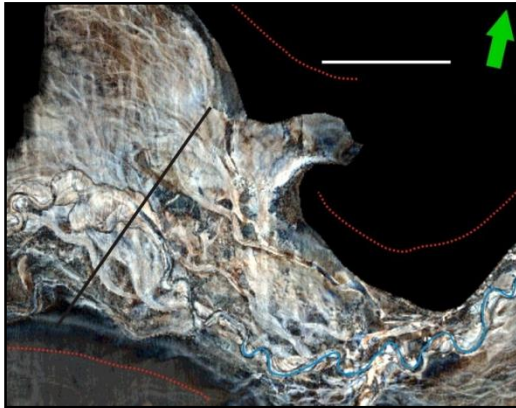
William Helland-Hansen and Rob Gawthorpe - Statoil



Ongoing projects:

Tubidites, Topography and Techtonics - T³ project

Gawthorpe et al. - Statoil



Syn-Rift Systems Project

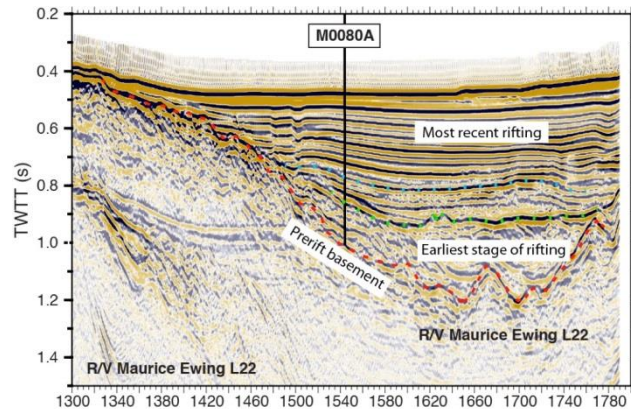
Rob Gawthorpe - Petromaks



Ongoing projects:

IODP Expedition 381: Corint rift development

UiB participants: Rob Gawthorpe, Casey Nixon, Sofia Pechlivanidou

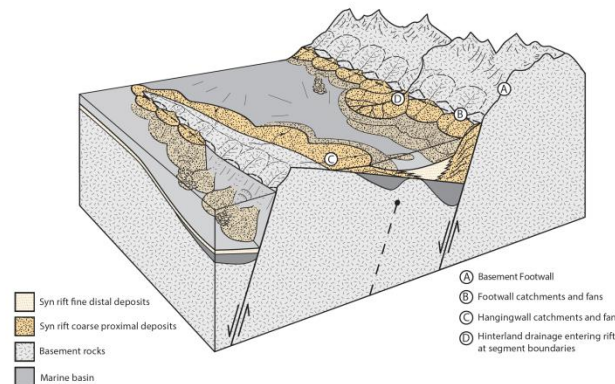
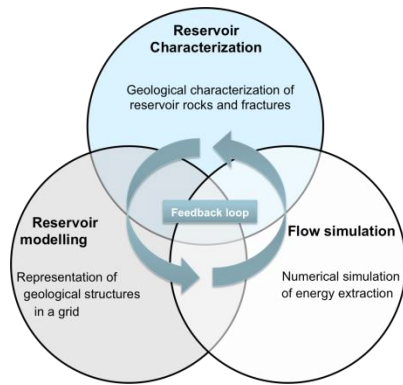


- **New proposed project** - building on IODP core, focusing on deep-water syn-rift depositional systems and factors controlling them based on acquisition of multi-beam bathymetry and high resolution seismic data

Ongoing projects:

Characterization & modelling of geothermal reservoirs

Atle Rotevatn et al. – Norwegian Research Council, BKK, Statoil



Structure and evolution of normal faults in rifts

Atle Rotevatn et al. – Norwegian Research Council and industry

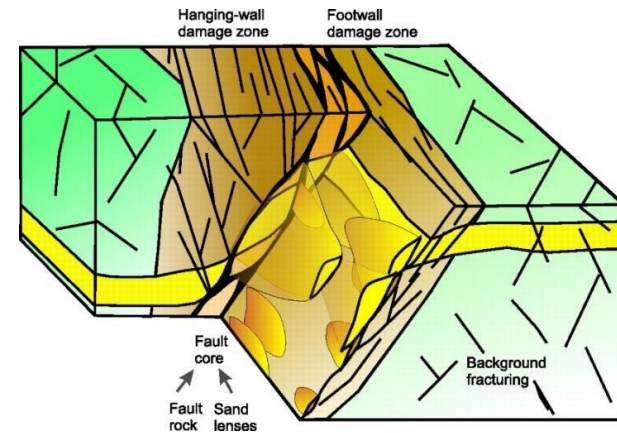
Deformation bands as reservoir heterogeneity

Atle Rotevatn et al. – Norwegian Research Council and industry

Ongoing projects:

Faults, fractures and fluid flow in carbonate rocks

Atle Rotevatn et al. – VISTA and industry



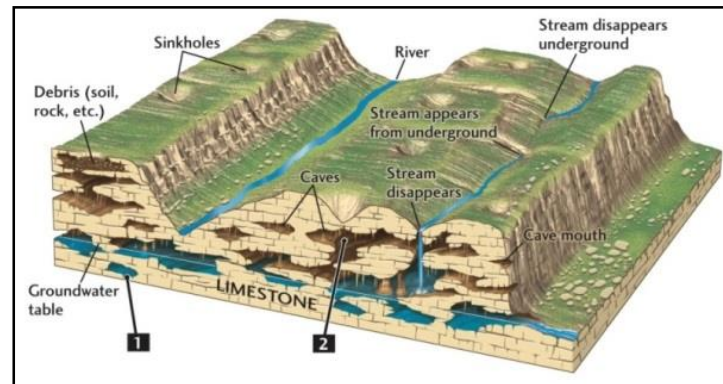
Key controls on HC seal and leakage in the Barents Sea

Atle Rotevatn et al. – DEA

Ongoing projects:

Forecasting architecture, seismic characterization and flow behaviour in paleocarst reservoirs

Jan Tveranger (UniCIPR), Stein-Erik Lauritsen and Isabelle Lecomte
- Norwegian Research Council



Ongoing projects:

Electromagnetic geophysical methods for exploration, geosteering and IOR

Morten Jakobsen, IRIS – part of KNP project, industry

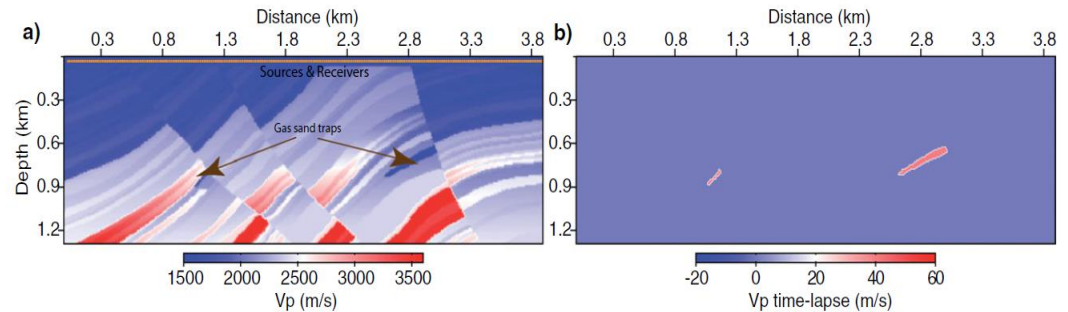
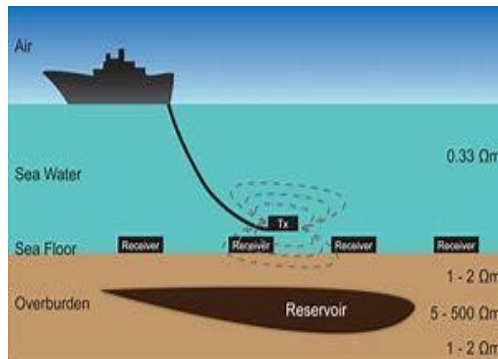


Figure 4 (a) The true V_p baseline model selected from the Marmousi model and the acquisition geometry; (b) the true time-lapse model.

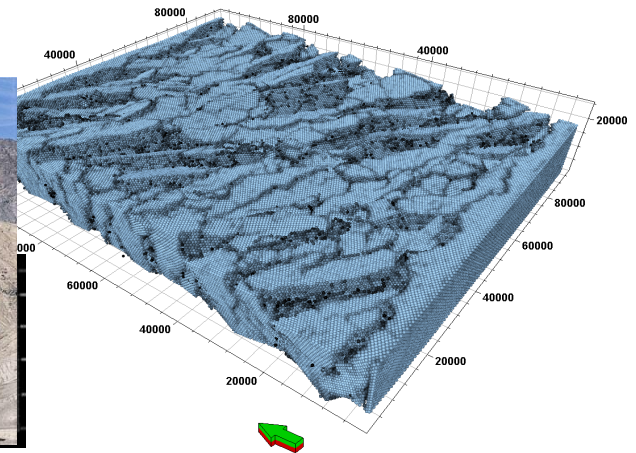
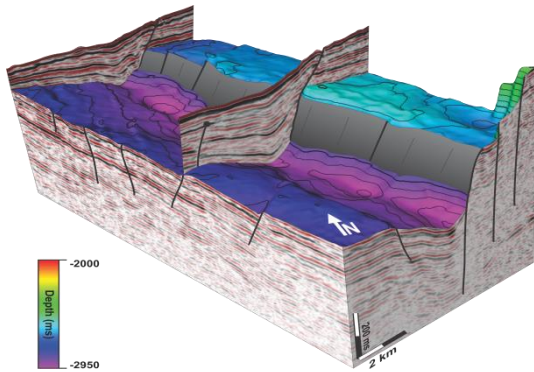
Bayesian inversion of 4D seismic waveform data for quantitative integration with production data

Morten Jakobsen, IRIS - Petromaks

Ongoing projects:

Subsurface studies: North Sea structure

(d) Phase I - 14.0%



Field analogue studies: Suez Rift, Egypt

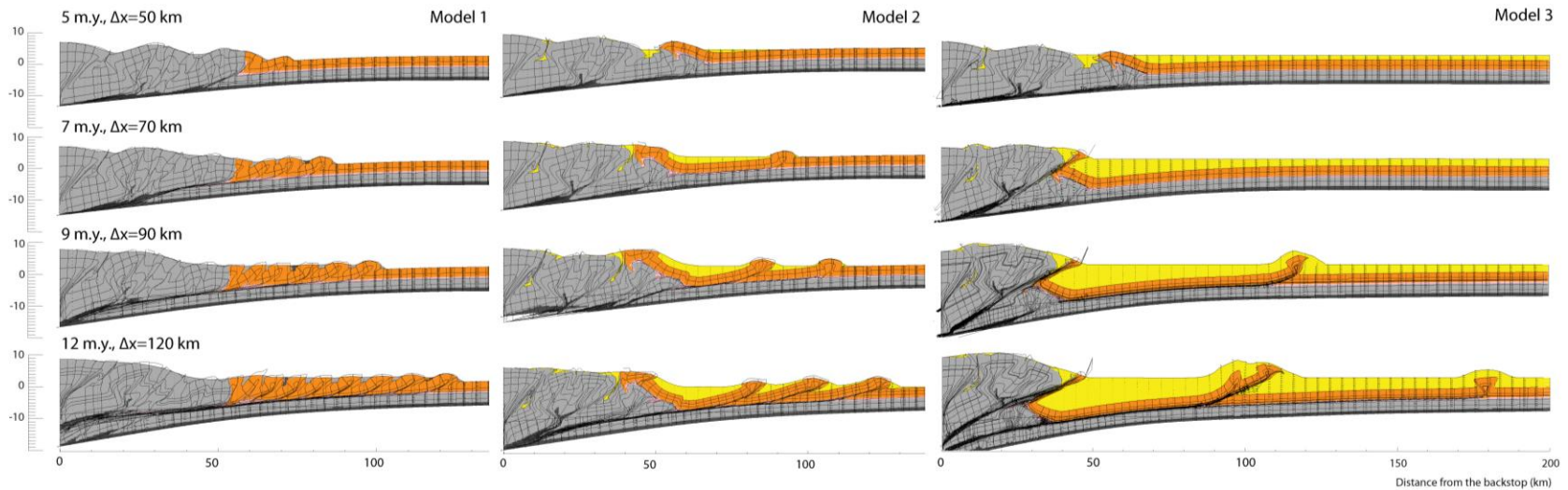
Numerical modelling studies: Fault geometry and density

R. Huismans et al.



Ongoing projects:

Geodynamic modeling mountain belt formation and sedimentation R. Huismans et al.



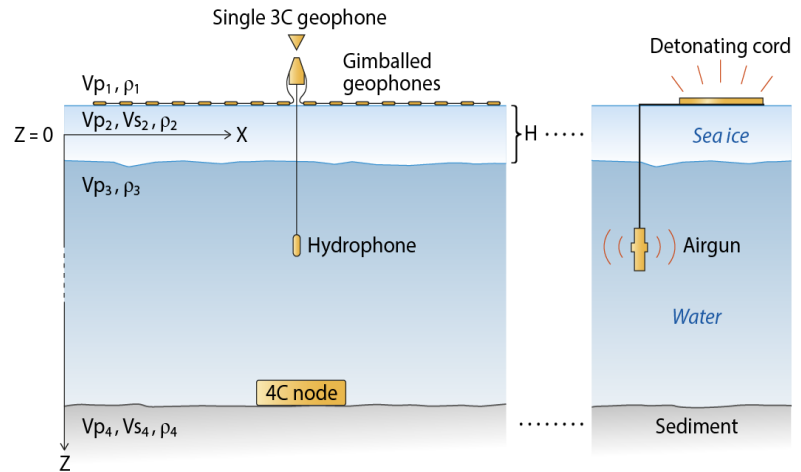
Ongoing projects



Ongoing projects :

Arctic Geophysical Laboratory

Tor Arne Johansen et al. ENI, Statoil, ARCEX, Norwegian Research Council



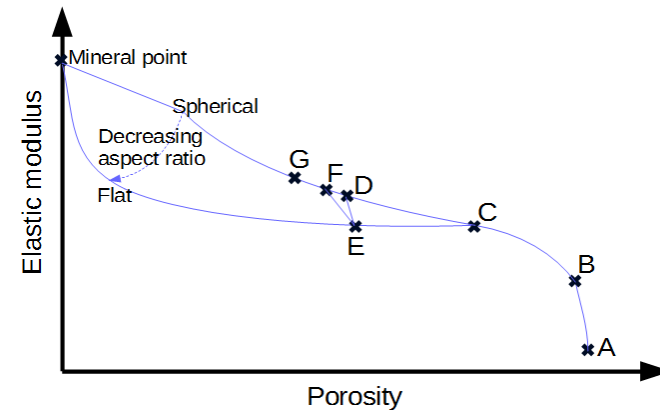
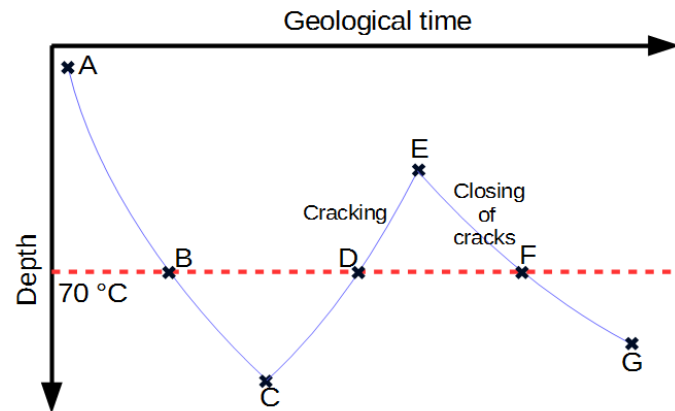
ARCEX – WP4: New environmental-friendly exploration methods

Tor Arne Johansen et al & NTNU – NRC, ARCEX-sponsors



Ongoing projects :

CASE v1.0 National consortium for CASE-based Research and Education – Lundin, Total and VNG



Geophysical signatures of burial and uplift
(The Barents Sea)

Tor Arne Johansen et al. – OMV – ARCEX WP4



New initiatives – GEO competence areas

- Sedimentology
- Structural geology
- Seismic
- Electromagnetics
- Integrated methods

aiming for

- Improved G&G exploration models
- Static and dynamic reservoir characterization
- Improved education (SFU, digital learning,...)



New initiatives:

SFI initiative:

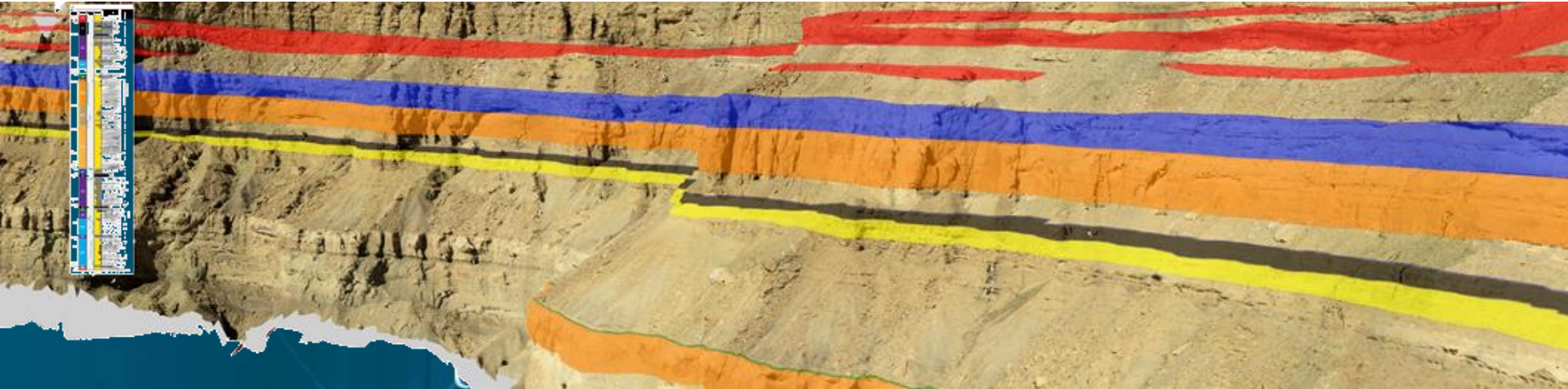
Centre for Spatial Innovation in Earth Science

Lead by Simon J. Buckley^{1,2} and Jostein Bakke²

¹Uni Research AS, N-5020 Bergen

²Department of Earth Science, University of Bergen

Email: simon.buckley@uni.no



VOG

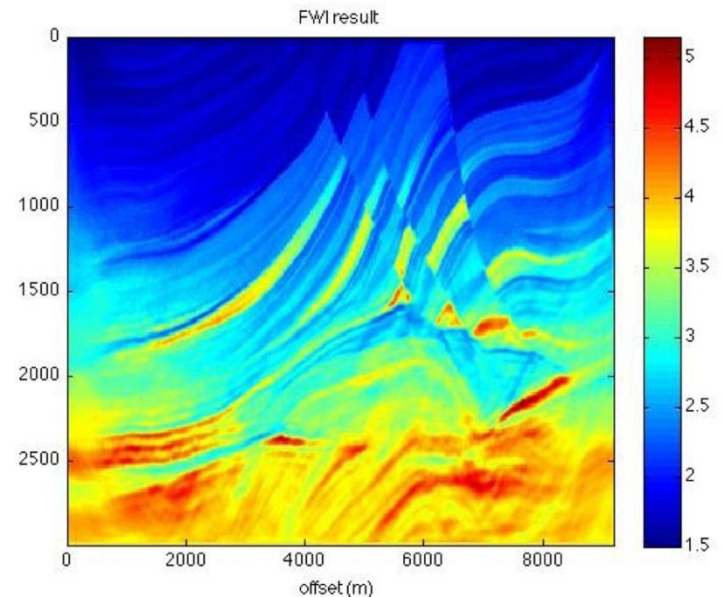
GEO Partner Seminar 08 February 2018

New initiatives:

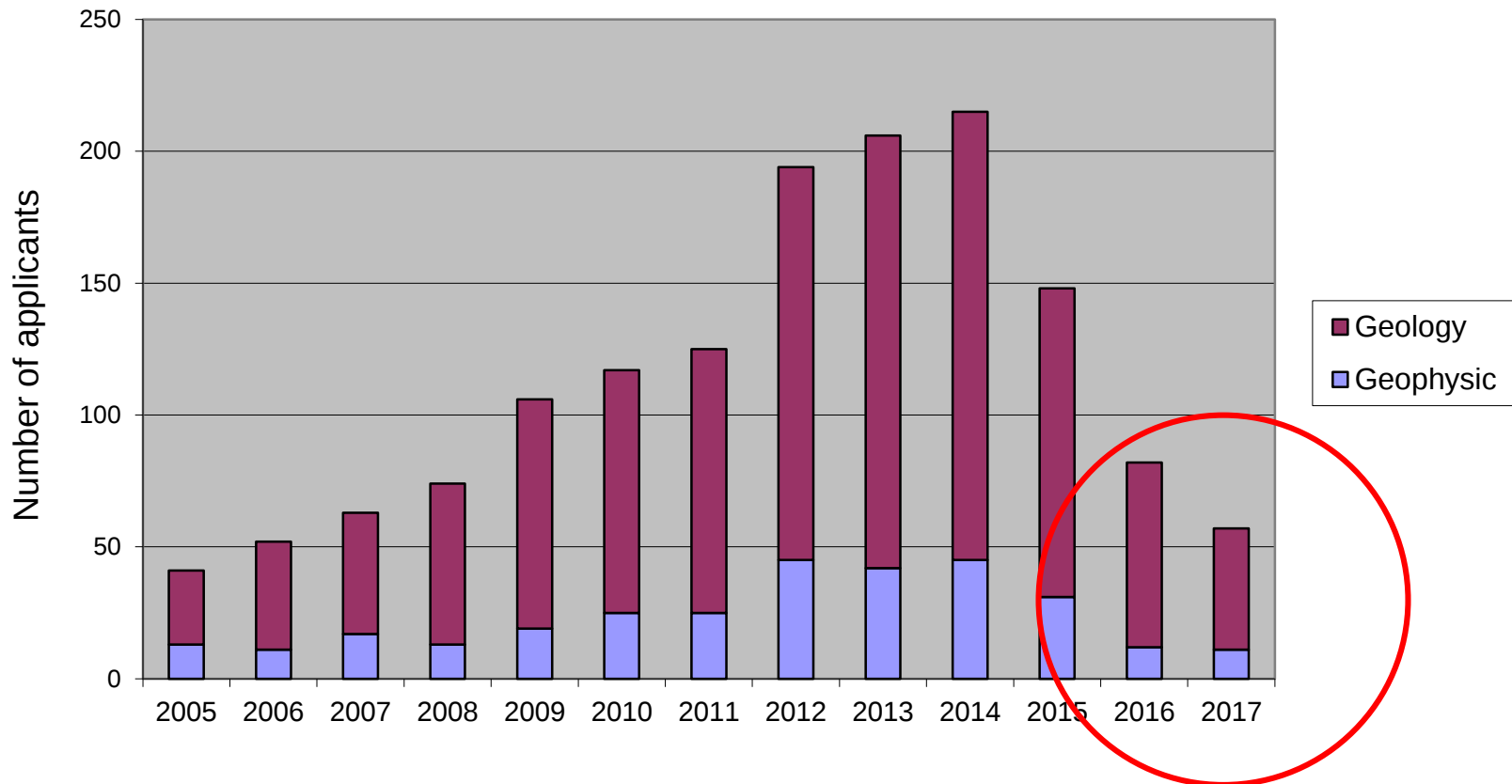
Full Waveform Inversion (PhD) project at UiB

Henk Keers, UiB – invites for sponsors

- Develop and compare two fast full waveform inversion algorithms
- Sensitivity study of waveform inversion algorithm (uncertainties in velocity model, noise in data etc.)
- Applications include sub-salt imaging (for example in Barents Sea)



Reminder:



Some causes:



- Lower activity
- Status of petroleum science is downgraded
- Most successful G & G field course Svalex closed
- Field course in Marine Geophysics closed
- Has G & G integration gone to far (in academia)?

!!!!

Faximile geo365 16 april 2018



Instituttleder Egil Tjåland ved Institutt for geovitenskap og petroleum, NTNU. Foto: Ronny Setså

Lurer ungdommen

Egil Tjåland ved Institutt for geovitenskap og petroleum ved NTNU leder i verste fall ungdom inn på et studium som gir svært få jobber.

🕒 16.04.2018

👤 Halfdan Carstens

🏷️ Olje og gass



Challenge - Environmental issues



Picture from <http://www.earthsky.org>

Challenge - Environmental issues



Picture from <http://www.dailymail.co.uk>

Challenge - Environmental issues



Picture from <http://www.dailymail.co.uk>

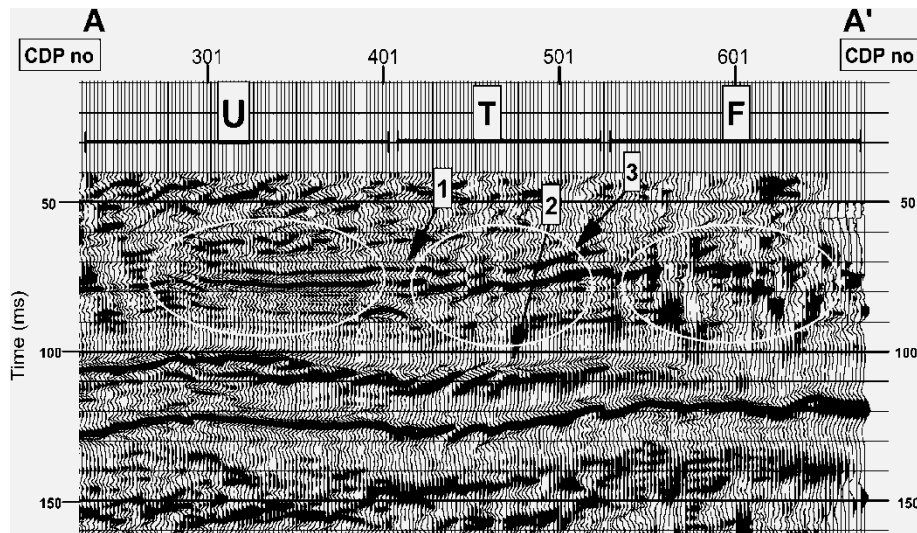


Picture from <http://www.dagbladet.no>

Example



Photo: Njål Gulbrandsen



New initiative:

CASE 2.0 Consortium for Arctic Seismic Exploration:



“Research, education and innovation on use of geophysical methods for exploring a wider range of subsurface properties of specific importance for geoscience in Arctic”

Field and data driven geophysical research focusing on

- geophysical signatures of geological processes
- technology
- heat flux monitoring
- integration of EM, GPR, seismic data

Toolbox: Infrastructure of Arctic Seismic Laboratory and ongoing master/PhD education at UNIS

Sponsors who has signed in: Lundin, Total, AkerBP – several about to enter



More to be discussed during panel sessions tomorrow!

