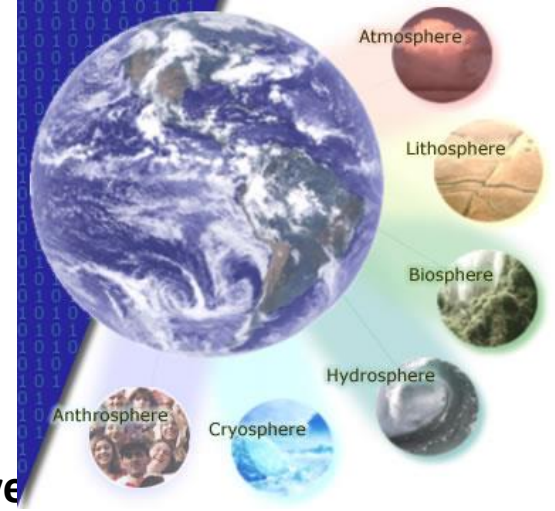
UiO : Department of Geosciences
University of Oslo

A brief presentation of the Department of Geociences, University of Oslo

Brit Lisa Skjelkvåle, Department Head

UiO : Department of Geosciences
University of Oslo

Department of Geosciences –
the broadest earth sciences department in Norway



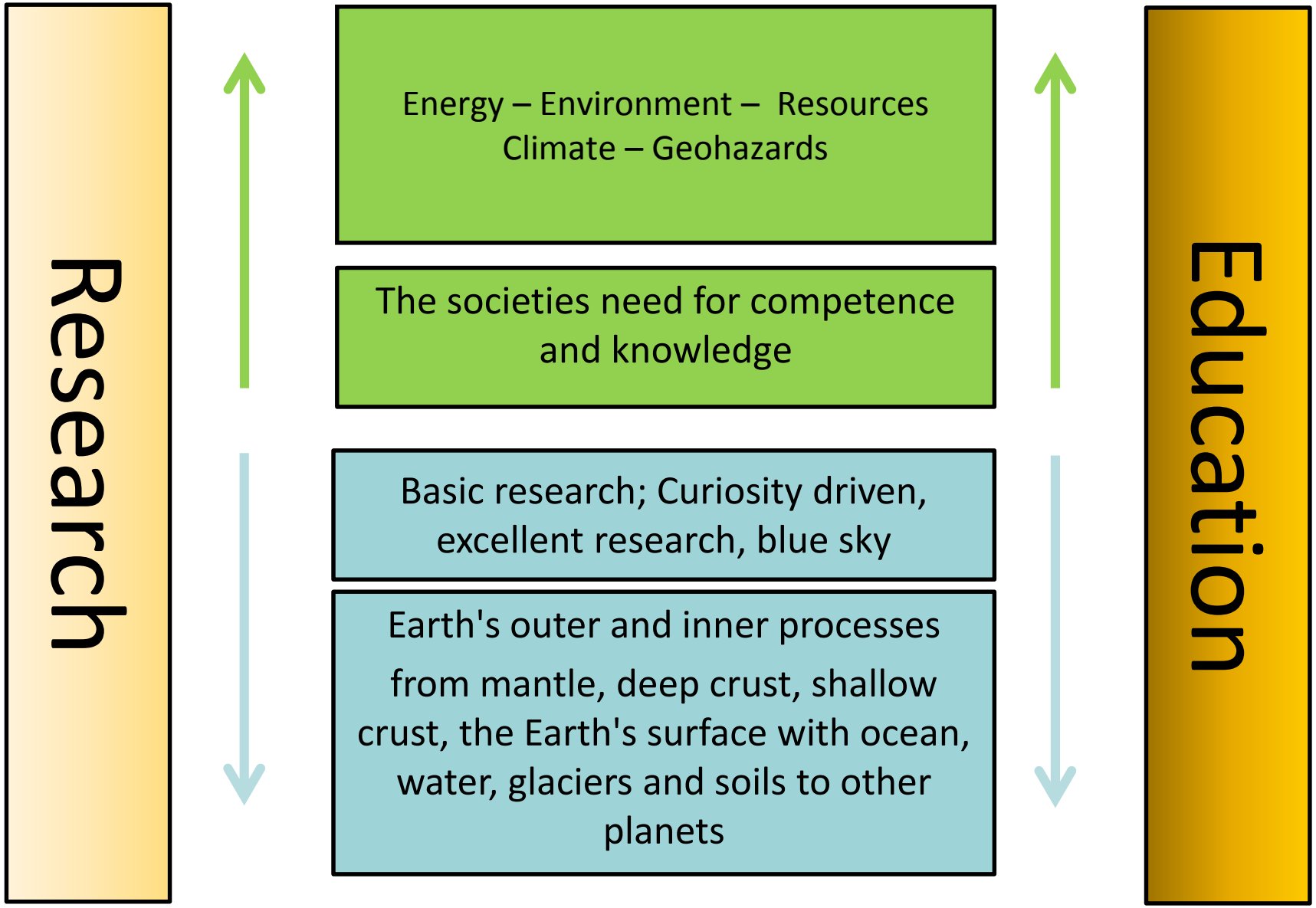
Cover

- Geology
- Geophysics
- Physical Geography
- Metorology
- Oceanography
- Hydrology

Staff: 230 – all inclusive

- 40 Professor and Associate Professor
- 60 PhD/Post. Doc
- 30 researcher fellows
- 30 technical and administrative staff




Research
Energy – Environment – Resources
Climate – Geohazards
The societies need for competence and knowledge
Basic research; Curiosity driven, excellent research, blue sky
Earth's outer and inner processes
from mantle, deep crust, shallow crust, the Earth's surface with ocean, water, glaciers and soils to other planets
Education

Forsiden - Institutt for geo

www.mn.uio.no/geo/

Forsiden UiO > Det matematisk-naturvitenskapelige fakultet > Institutt for geofag

UiO : Institutt for geofag
Det matematisk-naturvitenskapelige fakultet

Forsiden Geo | Forskning | Studier | Livet rundt studiene | Tjenester og verktøy | Om instituttet

Forskning

Svalbardfjell løser oljegåten i Barentshavet

Fjellene på Svalbard kan løse gåten om hvor oljen er i Barentshavet. Første steg er å beskrive hvordan havbunnen så ut den gangen fiskeøglene regjerte i havet.

Breene oppfører seg annerledes på Svalbard

Mange breer på Svalbard oppfører seg forskjellig fra andre breer i verden. De ekspanderer voldsomt i noen år, trekker seg kjapt tilbake – for så å stå stille i femti til hundre år – for så å ese ut igjen.

Geoforskere advarer: Permafrosten forsvinner

Klimaendringene og høyere temperaturer fører til at permafrosten tiner. Det kan føre til økte klimautslipp, større fare for skred i den norske fjellheimen og utsette oss for monsterbølger.

Gå til forskning →

Education

> 400 students

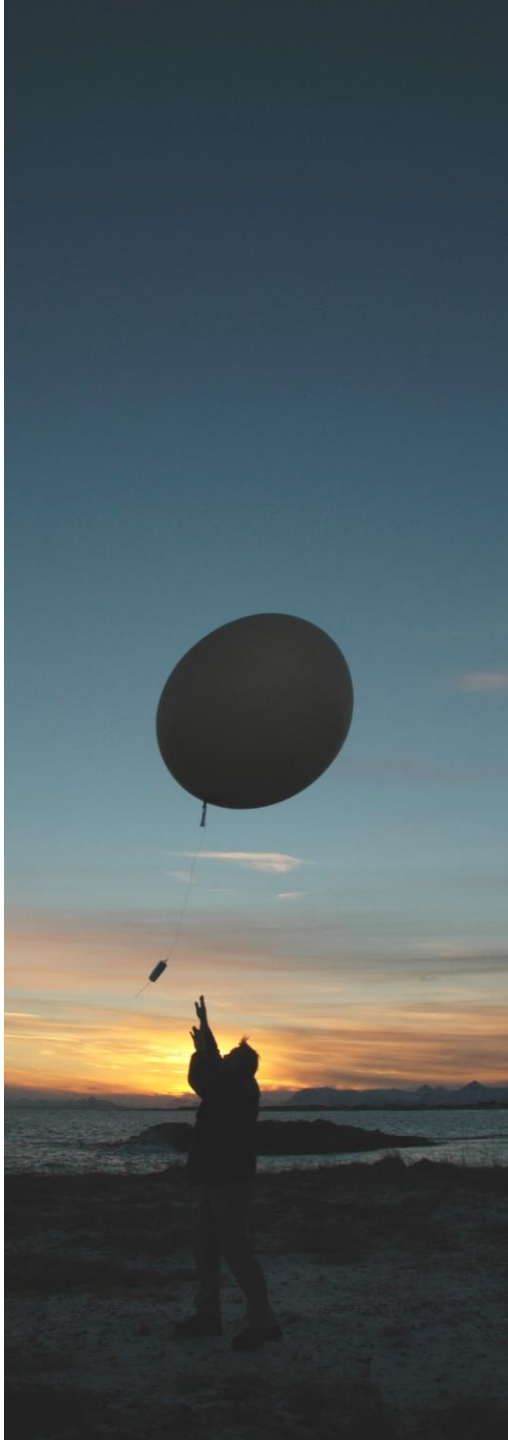
- 180 bachelor students
- 150 master students
- 50 PhD candidates
- 40 exchange students

Study programs

- **Bachelor program (3 years)**
  - Geoscience: Geology, geophysics and geography
  - FAM: Fysics, astrophysics and metorology

- **Masters degree program: Geoscience (2 years)**
  - Geology
  - Geophysics
  - Petroleum geology and petroleum geophysics
  - Meteorology and oceanography
  - Physical Geography and Hydrology
  - Environmental Geology
  - Geohazards

- **PhD Programme in Natural Sciences**



How many starts, and how many continues?

	2012-kullet	2013-kullet	2014-kullet	2015-kullet
Got an offer	108	121	120	134
Payed semester Fee 1. September	73	81	77	86
Active students by autumn 2015		58	60	86

Student statistics

Bachelor	2010	2011	2012	2013	2014
Geofag: geologi, geofysikk og geografi	12	24	23	47	34
Master					
Geophysics	2	3	1	3	4
Geology	4	10	11	12	19
Petroleum geology/geophysics	4	11	15	12	8
Environmental geology and geohazard	5	10	8	7	10
Physical geography, hydrology and geomatics	10	12	3	8	9
Meteorology and oceanography	10	13	5	3	4
Total master	35	59	43	45	54

Large scale restructuring of education at The Faculty of Mathematics and Science

- Our candidates shall succeed both academically and professionally
- Our education shall be characterized by :
  - Synergy between depth and breadth
  - Education in close relation to research
  - Integrated professional competence
  - Outstanding learning environment based on our values

One visible change: Computing in science education

CSE - Computing in Science Education

The goal of the CSE-project is to include computing as a natural tool for all science and engineering students from the first semester of their undergraduate studies. Not as a substitute for more traditional approaches, but as an extension of the classical toolbox.

Foto: Colourbox

Stronger focus on math and physics in the first semesters

Another visible change:
New structure of our programmes

Bachelor-programmes

- Geology and geography
- Geophysics and climate

Masterprogram (not yet decided)

1. Physical geography and Geomatics
2. Hydrology and Cryology
3. Meteorology and Oceanography
4. Geohazard and Geomechanics
5. Geodynamics and Seismology
6. Mineralogy, Geochemistry and Mineral resources
7. Structural geology and Tectonics
8. Environmental geology
9. Sedimentology, Paleontology and Stratigraphy
10. Petroleum geology and geophysics

Resources and petroleum

- Petroleum systems and basin development
- Imaging and interpretation of sedimentary systems on the continental shelf
- Sedimentary deposits and paleoenvironment
- Deformation of the reservoir and cap rock for flow of fluids
- Characteristics of reservoirs (tight / open)
- Chemical reactions in the interaction between fluids and bedrock
- Biostratigraphy

Foto: Nils Roar Sælthun

Climate and the environment

- Climate and the climate system
  - Earth system models
  - Climate feedback mechanisms
  - Glaciology and permafrost
- Atmospheric chemistry and Long.range transported air pollution
- Ozon
- Water reseources
- Transport of pollutants in soil
- Polloution of fjords
- CO2-storage

Foto: Nils Roar Sælthun

Geohazard

- Floding
- Avalancehs
- Earthquakes

Research in ploar areas – long traditions and many projects

- Geology, geophysics and resources
- Glaciology and permafrost
- Climate, meteorology, oceanography, atmospheric chemistry

Kronebreeen, Svalbard
Foto: Monica Sund

Excellence

- Centre for Earth Evolution and Dynamics - CEED (2013-2022)
- Physics of Geological Processes – PGP (2004-2013)

- Subsurface CO_2 Storage – SUCCESS (2009-2017)
- Stability and Variations of Arctic Land Ice - SVALI
- Research center for petroleum activities in the High North and the Arctic (ARCEx)

- Global Glacier Mass Continuity (ICEMASS) ERC Advanced Grant (2013-2018)
- Beyond plate tectonics ERC Advanced Grant (2011-2016)
- LUSILAB ERC Startup Grant (2012-2017)
- DIME Disequilibirum Metamorphism of Stressed Lithosphere - Advanced Grant 2016-2020

Norwegian Centre of Excellence

CEED
The Centre for Earth Evolution and Dynamics

PGP PHYSICS OF GEOLOGICAL PROCESSES

success
SUbsurface CO2 storage- Critical Elements and Superior Strategy

ARCEx

norden
Top-level Research Initiative

erc
European Research Council
Established by the European Commission
Supporting top researchers from anywhere in the world

Laboratories

- Electron microprobe (2002)
- Scanning Electron Microscope SEM (2015)
- Thermal ionization mass spectrometer (TIMS) – dedicated to U-Pb dating only (1990)
- MC Plasma source mass spectrometer with laser ablation microprobe (2004/2013)
- Q-ICPMS, 2013
- X-ray flourescence (2014)
- X-Ray Diffraction (2012)
- Organic geochemistry (updated continously up to 2014)
- Palynological Laboratory, 2013
- Mineral synthesis laboratory (2010)
- Geomagnetic lab
- Basic service facilities:

+ other facilities and equipment

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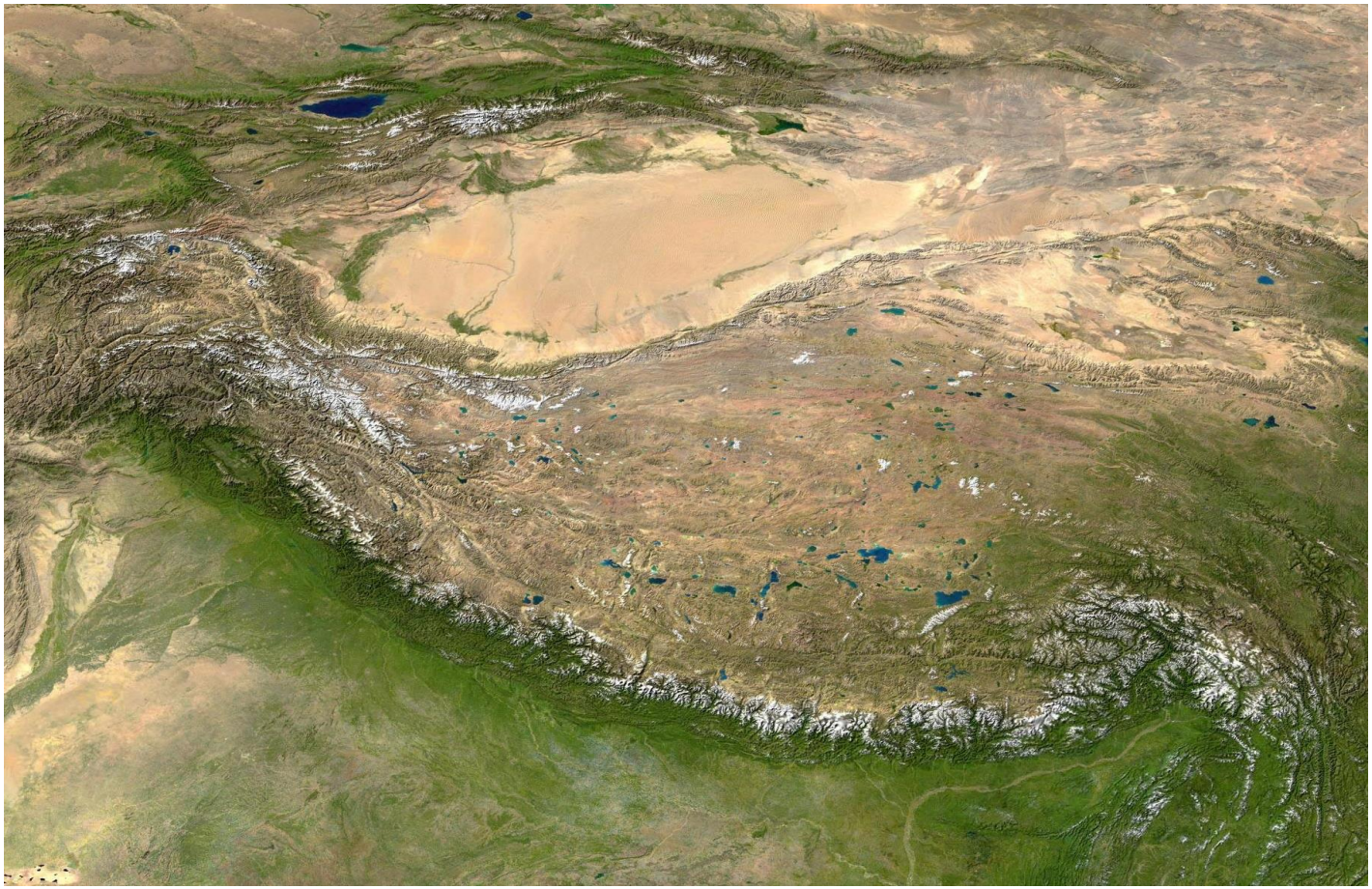
Global Glacier Mass Continuity (ICEMASS)

ERC Advanced Grant (2013-2018), Prof. Andreas Kääb

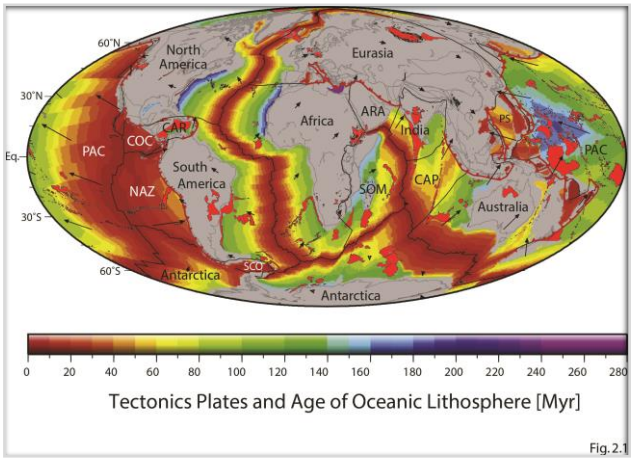
Measure and analyse for the first time glacier volume change,
and ice flow and its changes on a global scale



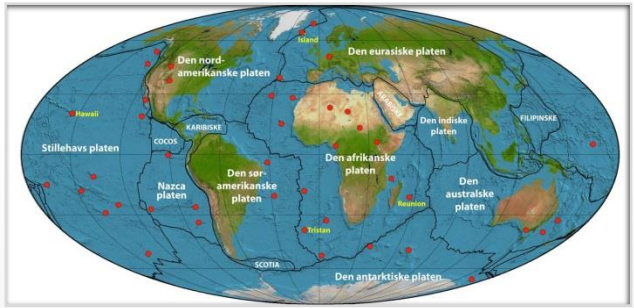
ERC Advanced Grant Proposal — Beyond Plate Tectonics

Principal Investigator: Professor Trond Helge Torsvik
Host Institution: Physics of Geological Processes (University of Oslo)
Proposal full title: Beyond Plate Tectonics
Proposal short name: BPT
Proposal duration in months: 60

Plate tectonics is a theory as fundamentally unifying to the Earth Sciences as *Darwin's Evolution Theory* is to Life Science.

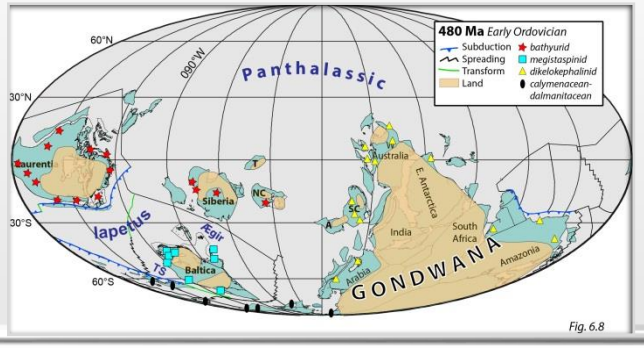


There is still no generally accepted mechanism that consistently explains plate tectonics in the framework of mantle convection, plumes and hotspots.



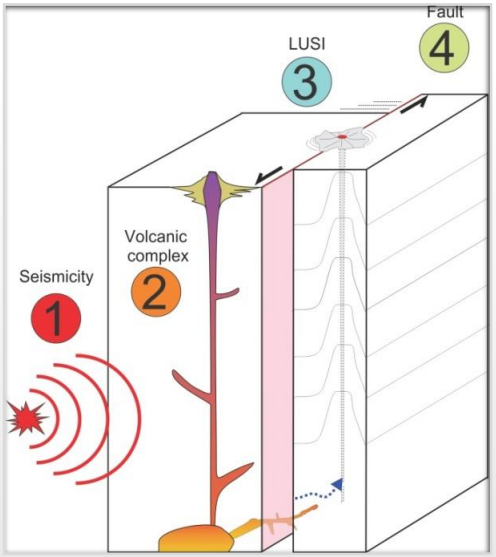
Prime aim:

Integrate plate tectonics into Mantle Dynamics and develop a new theory that explains plate motions quantitatively and dynamically
(4th revolution in geosciences)



Key aims/questions:

1) The origin of the fluids,
2) the ongoing mechanisms during the eruption, and
3) their possible interactions with volcanism, tectonics & seismicity.



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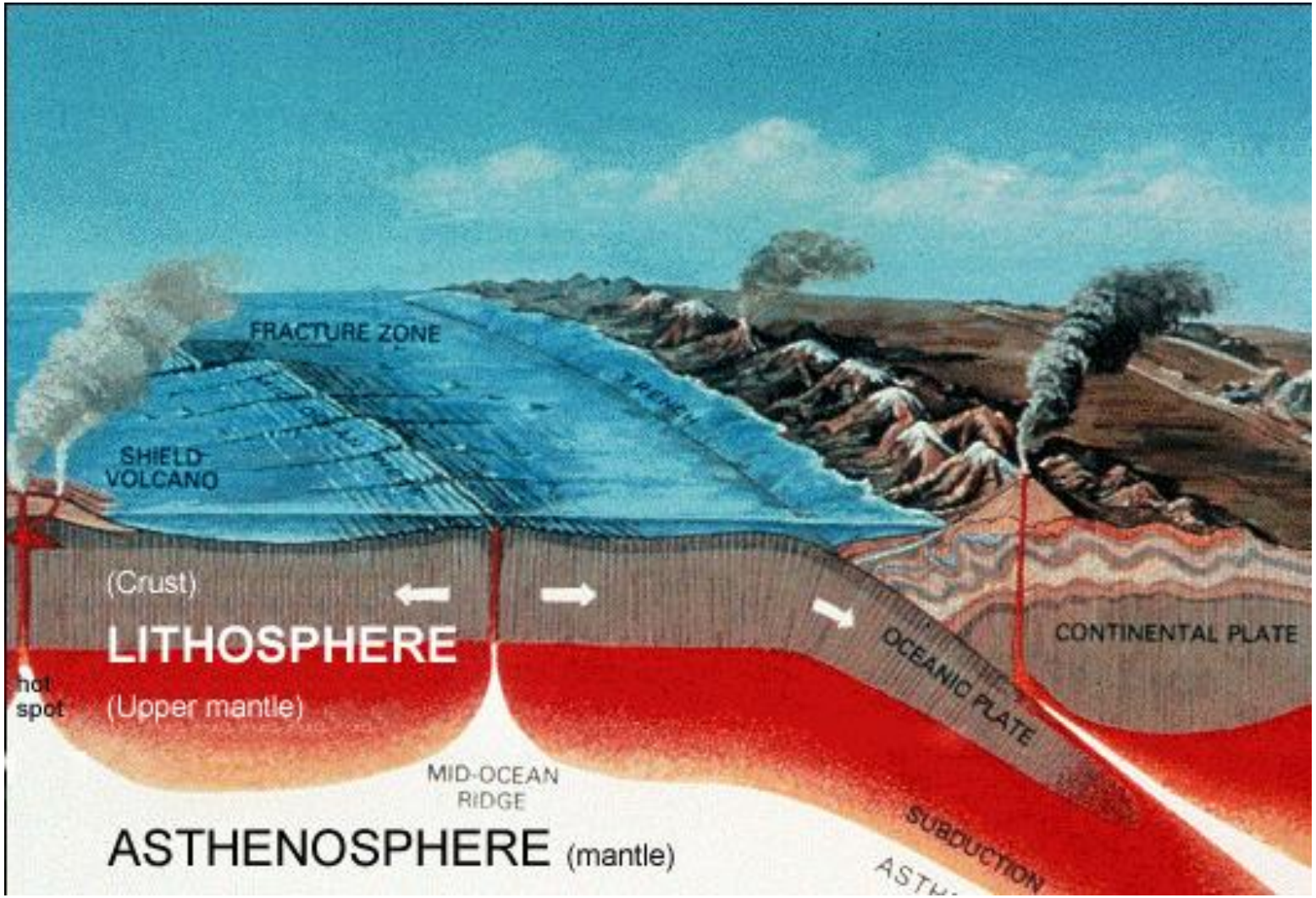
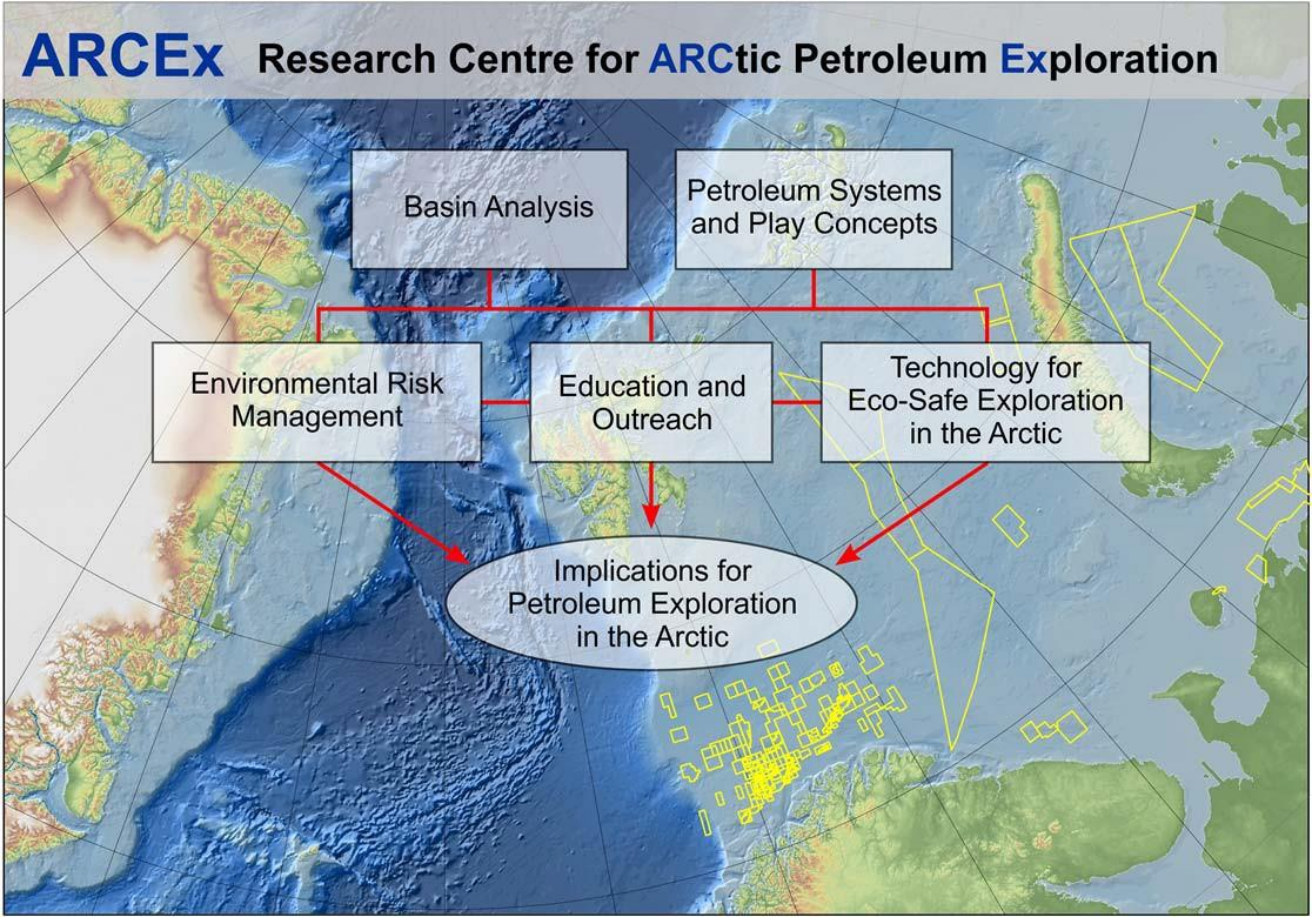
European Research Council
Established by the European Commission
Supporting top researchers from anywhere in the world

DIME - Disequilibirum connects processes across scales





ARCEx

National centre, based in Northern Norway Tromsø (2013-2021)

- **Aim:** improved knowledge of petroleum resources in northern and Arctic areas, with the complementary aim of providing essential knowledge and methodology for eco-safe exploration in the high north.
- 10 Academic partners - 9 Industry partners

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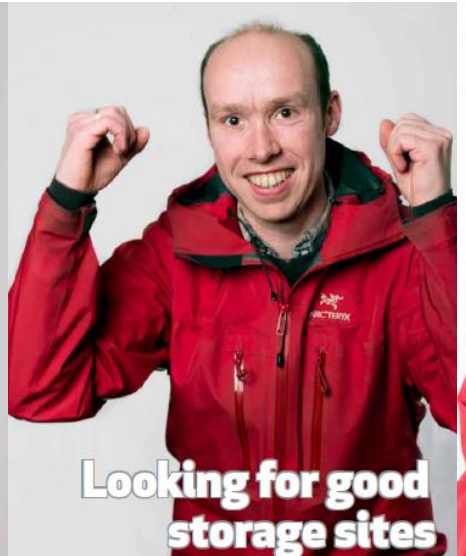
success
SUbsurface CO2 storage- Critical Elements and Superior Strategy

Subsurface CO_2 Storage – SUCCESS
Environmental friendly energy (2011-2018)

- Storage properties (chemical interactions)
- Sealing of storage
- Injection
- Impacts on marine life (in case of degassing of storage)



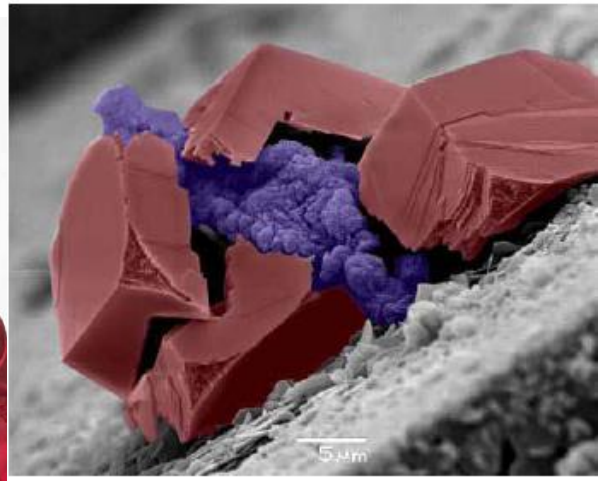


Photo from electron microscope shows early formed magnesite (red) being replaced by a more stable carbonate phase (purple).

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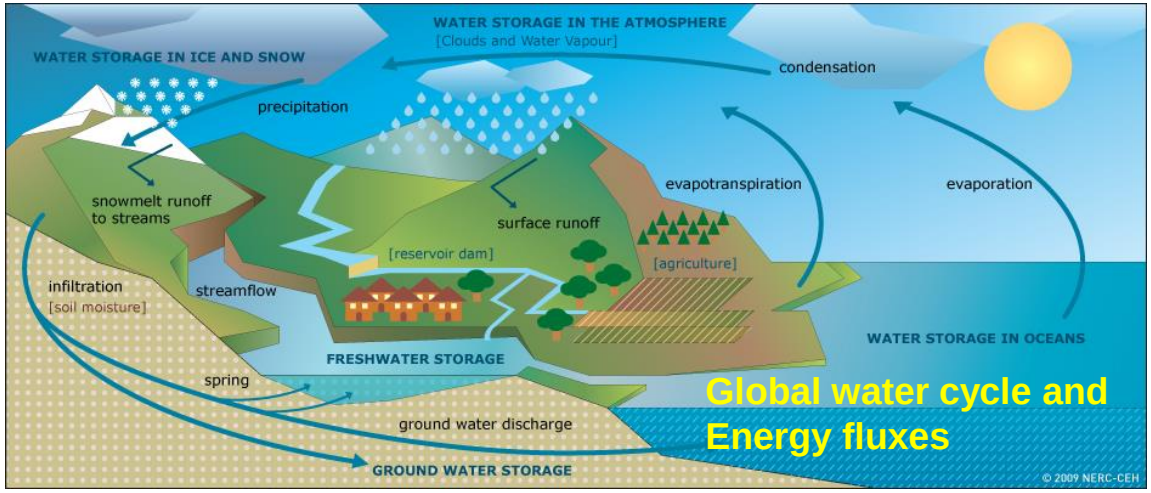
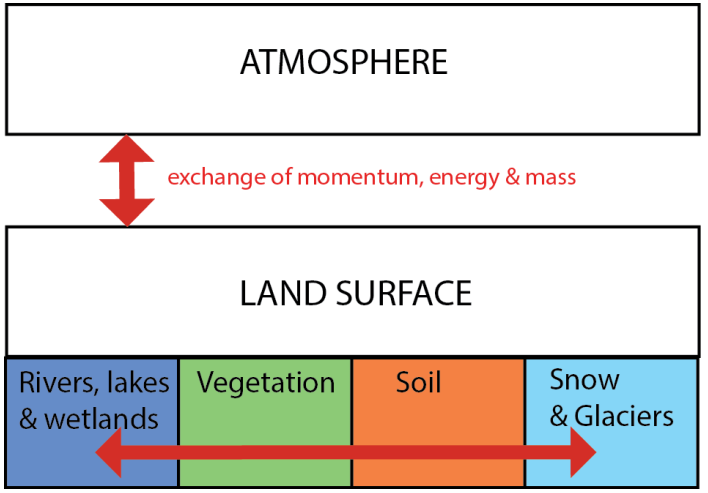
Strategic faculty programme

Land-Atmosphere Interactions in Cold Environments

LATICE





- Global change
- Land-Atmosphere interactions and regional climate
- Cold environments (snow, glaciers, permafrost, water)
- Observation and modeling based

→ process understanding, improved ESM (Earth System modelling)

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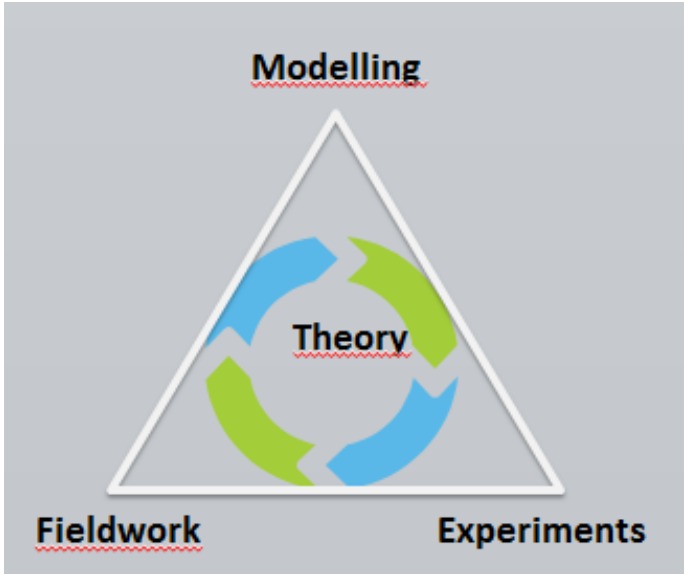
Strategic faculty programme II

EarthFlow - Interface dynamics during geophysical flows 2015-2020

The fluid-solid interface dynamics in flows on Earth; **geosphere** and the **hydrosphere**, the **cryosphere**, and the **atmosphere** and how the flows geophysical interact with different kind of surfaces.

Merging young talents for the future of Earth Systems Science
Involving Dept og Geosciences, Dept of Physics, and Dept of Mathematics



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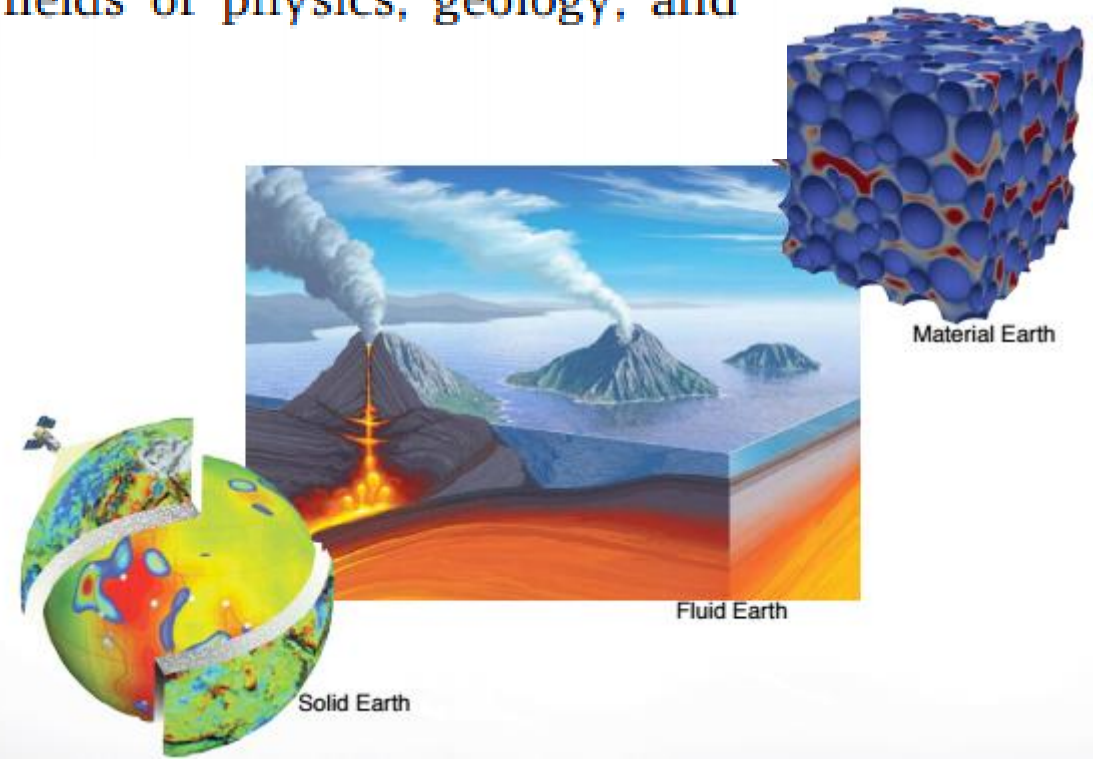
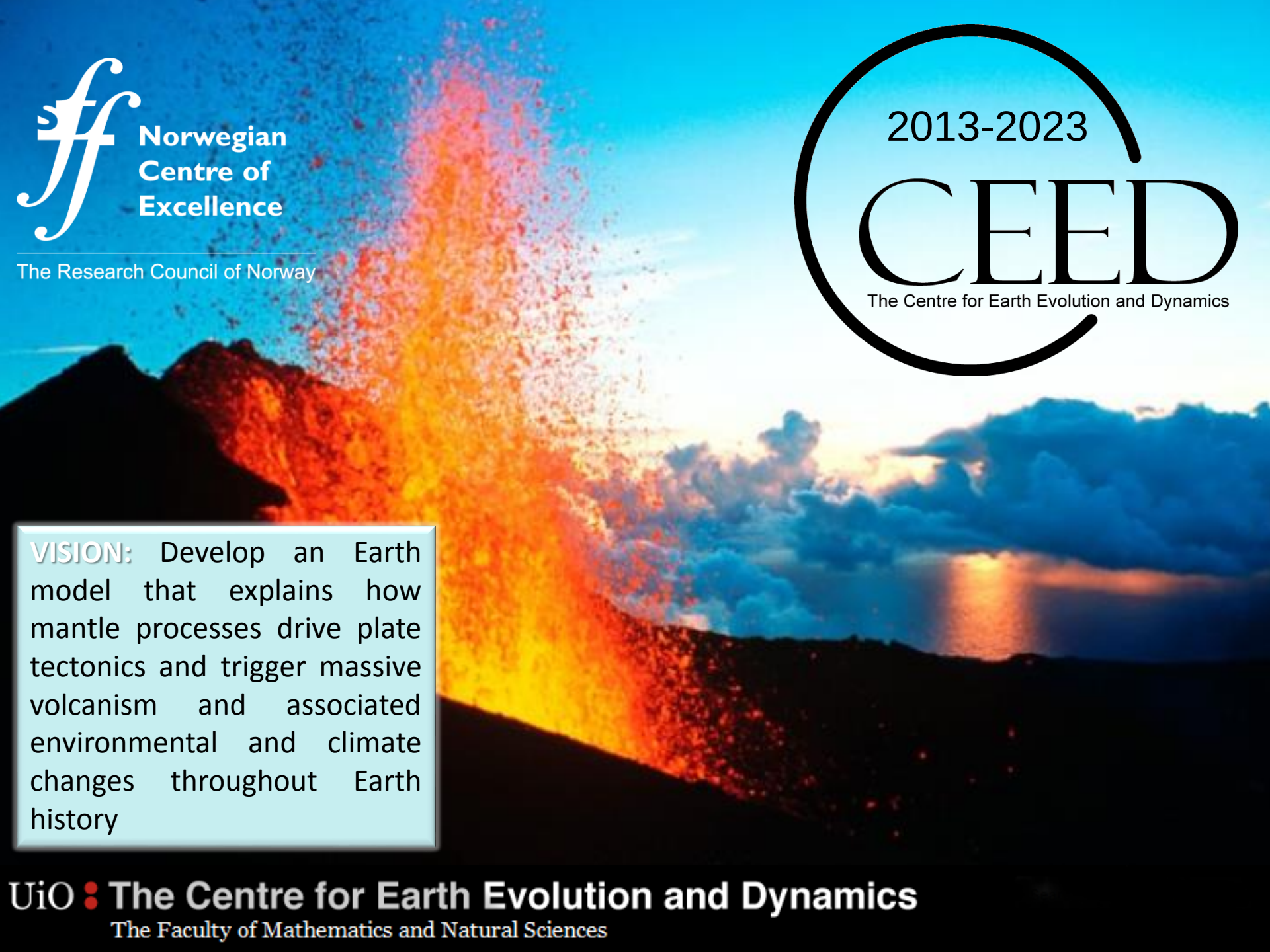
Centre of Excellence: Physics of Geological Processes (PGP) - 2003-2013

a fundamental and quantitative understanding of the Earth's complex patterns and processes

Our aim is to establish an interdisciplinary science centre that includes scientists from the fields of physics, geology, and applied mathematics



PGP PHYSICS OF GEOLOGICAL PROCESSES


Norwegian Centre of Excellence
The Research Council of Norway
2013-2023
CEED
The Centre for Earth Evolution and Dynamics
VISION: Develop an Earth model that explains how mantle processes drive plate tectonics and trigger massive volcanism and associated environmental and climate changes throughout Earth history
UiO : The Centre for Earth Evolution and Dynamics
The Faculty of Mathematics and Natural Sciences