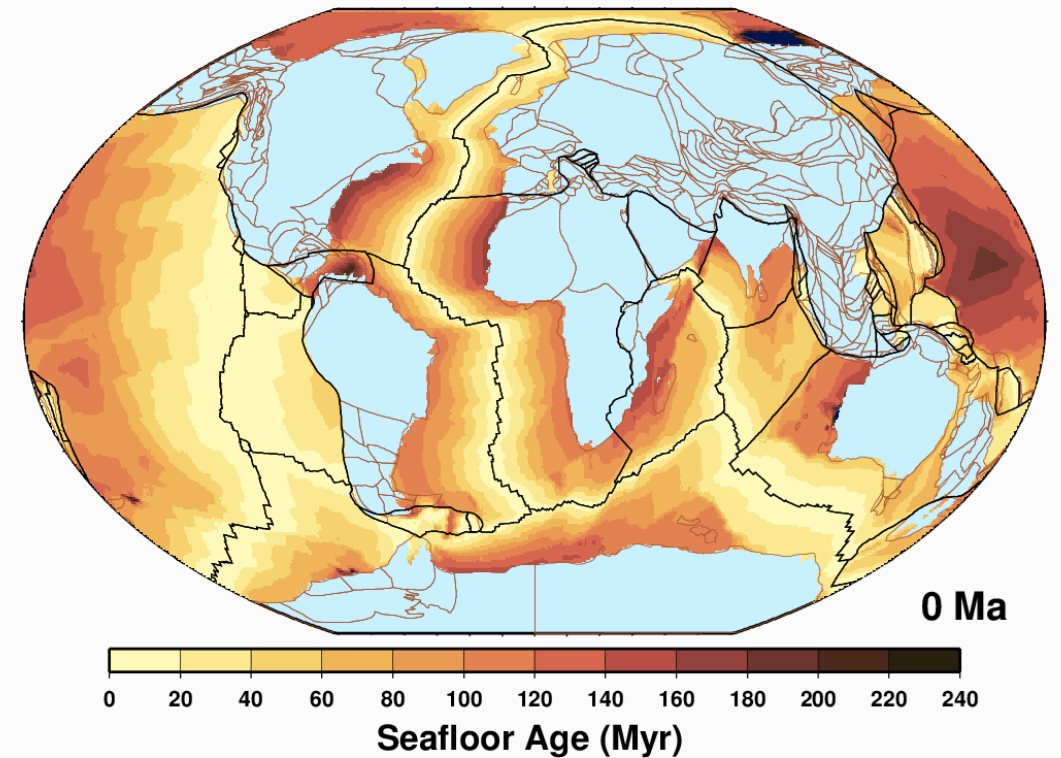


Earth's Structures and Planetary Processes

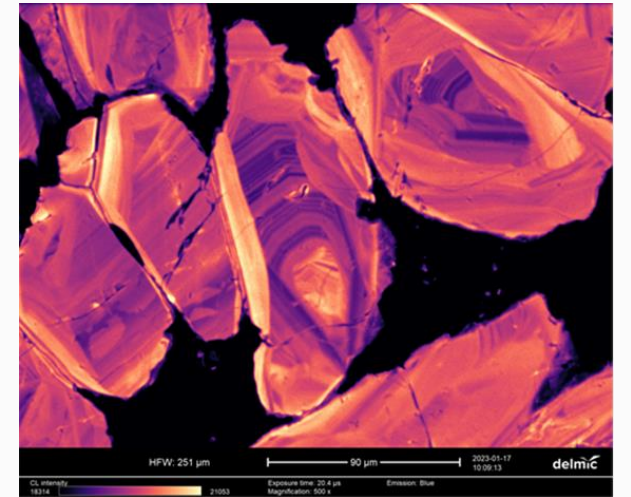
From the grain-scale to the planetary scale



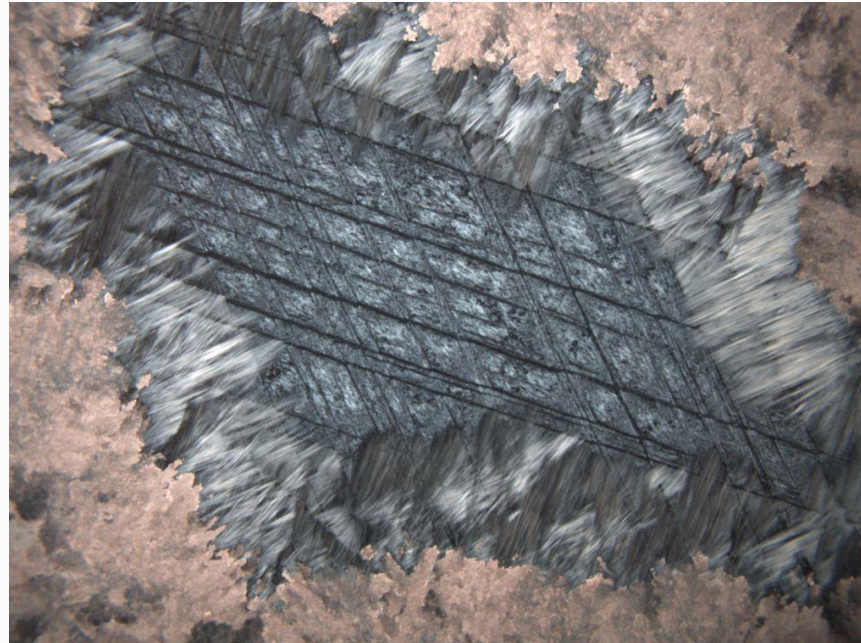
Topics

Mineral reactions solving societal issues

- How do rocks, minerals, and melts form and evolve?
 - How do magmatic rocks trace processes through Earth's history?
 - What concentrates chemical elements in the Earth's crust, and where?
 - What can we learn from natural processes to address societal issues?
- Field work, optical and electron microscopy, chemical and isotopic analyses, geochronology



**Petrology
Geochemistry
Mineralogy**

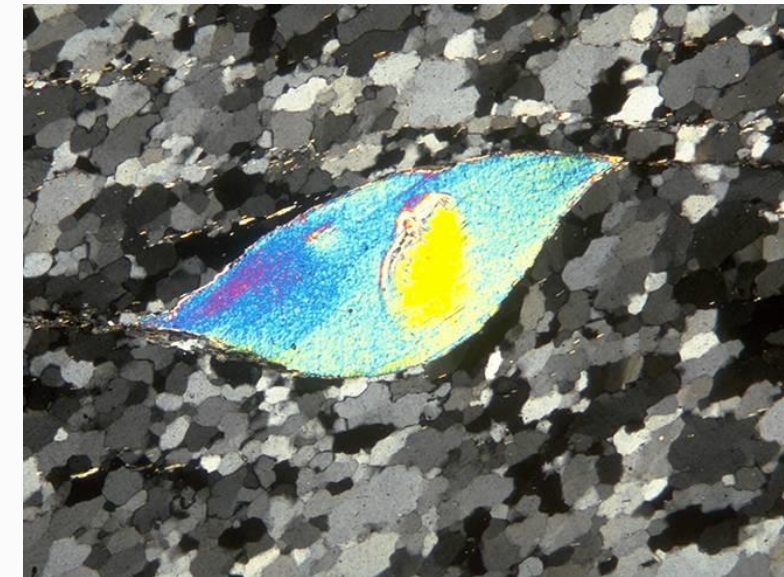
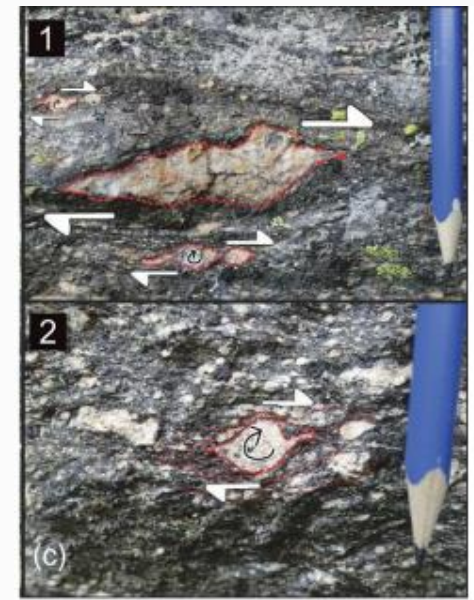
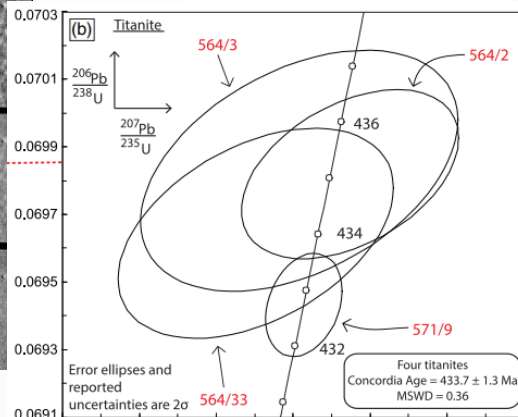
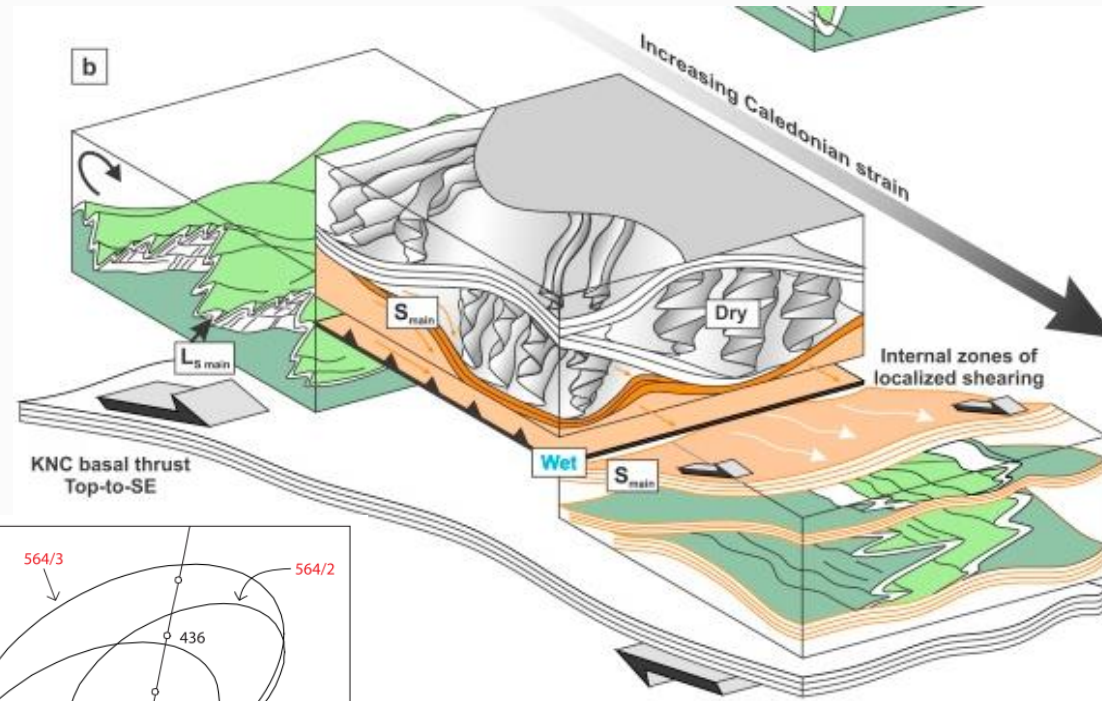
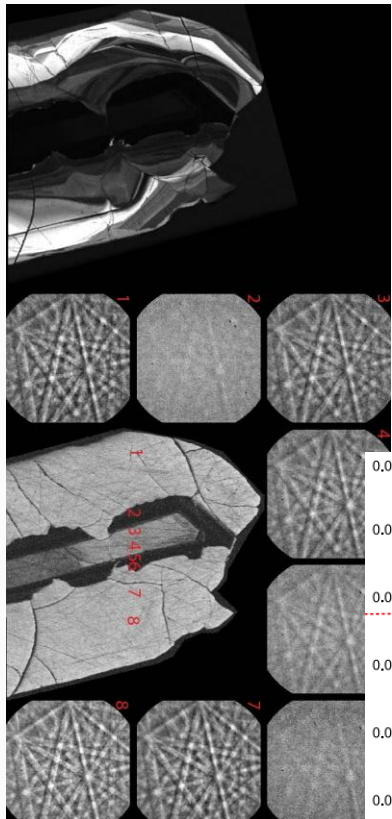


Topics

Deformation histories of minerals, rocks, and tectonic plates

How do minerals, rocks, and tectonic plates deform?

- Field work, optical and electron microscopy, chemical and isotopic analyses, geochronology



Structural Geology
Tectonics
Geochemistry

Topics

Earthquakes and volcanoes

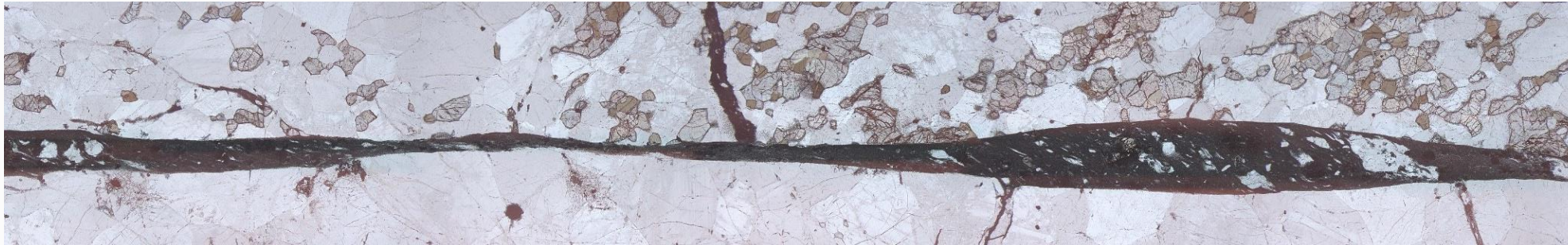
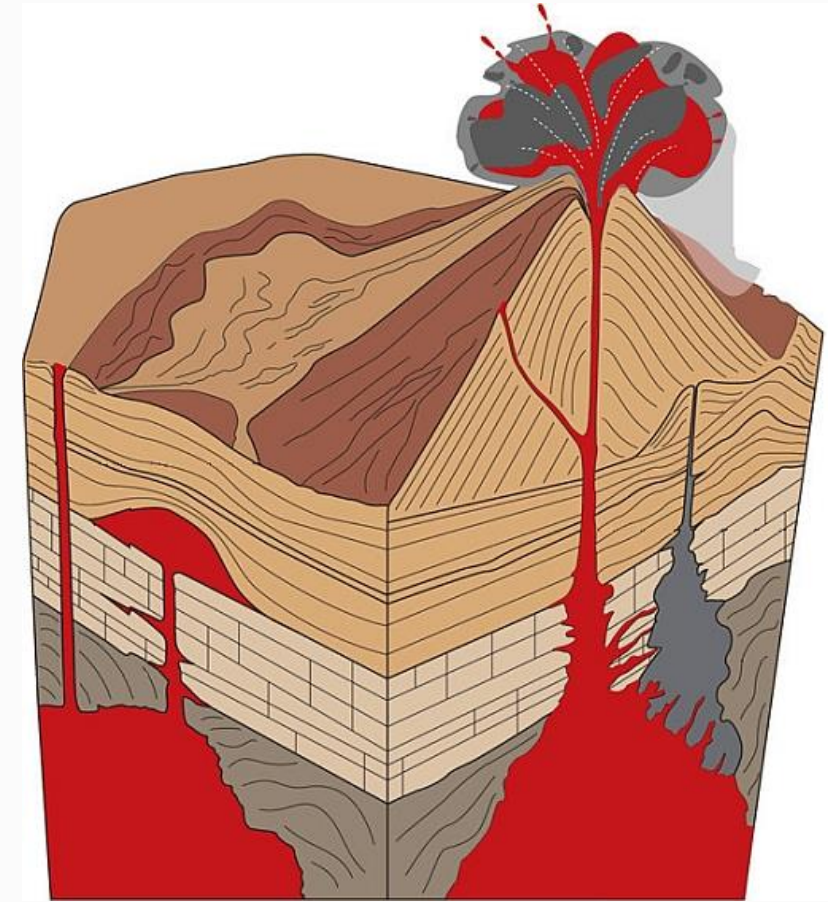
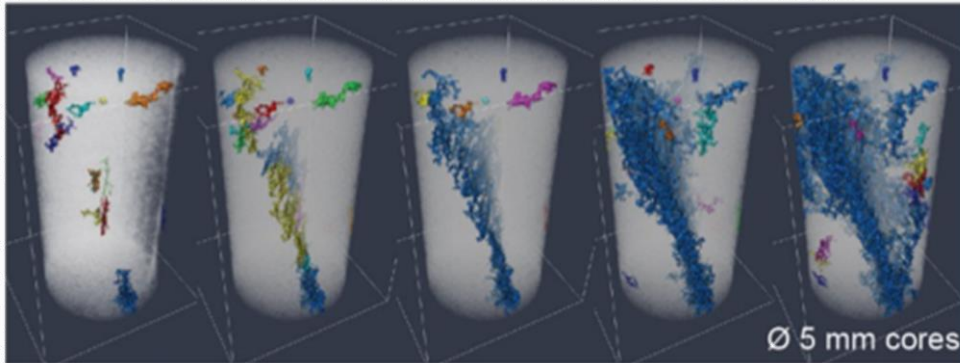
How do earthquakes start and end?

How does magma travel through solid rock?

What effect does the hot magma have on its surroundings?

➤ Experiments, numerical modelling, fieldwork, microscopy

Fracture growth:
sandstone at simulated conditions of 1 km depth



Geomechanics
Tectonics
Petrology

Topics

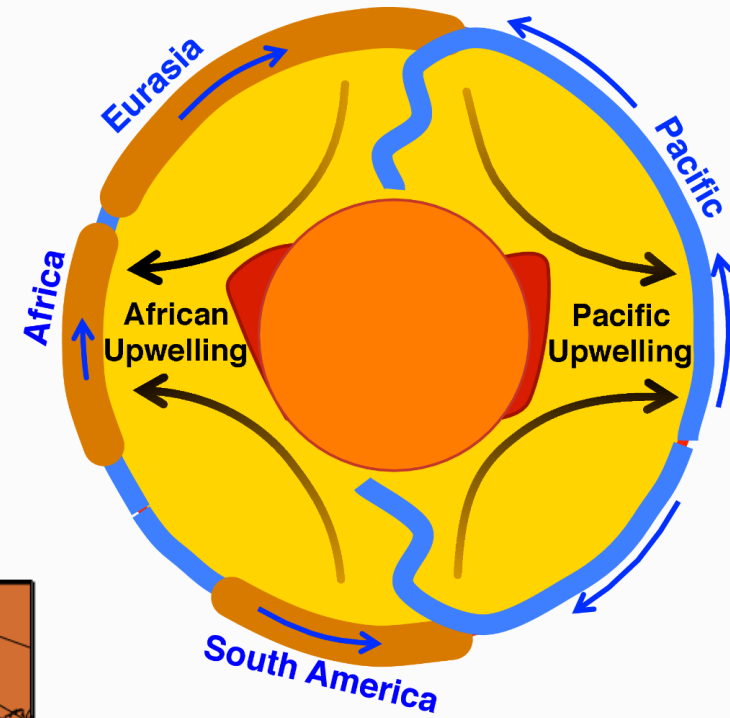
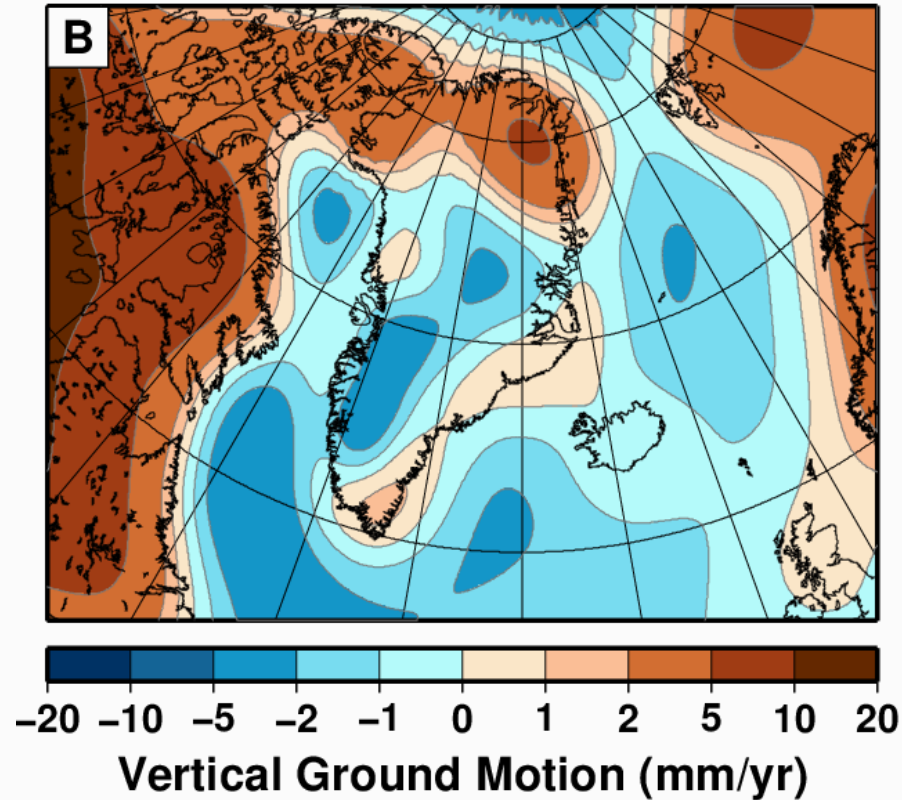
Geodynamics and plate tectonics

How do tectonic plates move?

What happens in the deep mantle and core?

How does the solid Earth adjust to change?

- Numerical modelling, seismology, analyses of physical rock properties, paleomagnetism



Tectonics
Geodynamics
Geophysics

Topics

Structure, formation, and behaviour of planets

- Remote sensing, analogue field work, numerical modelling, experiments, mineralogy, geochemistry, geophysics, satellite data analysis, meteorology, structural geology

Comparative Planetology

Knowing about the diversity of planetary processes helps understanding our own planet Earth.

What makes Earth unique?
Is Earth the only planet with life?

Which rocks do we find on Mars?

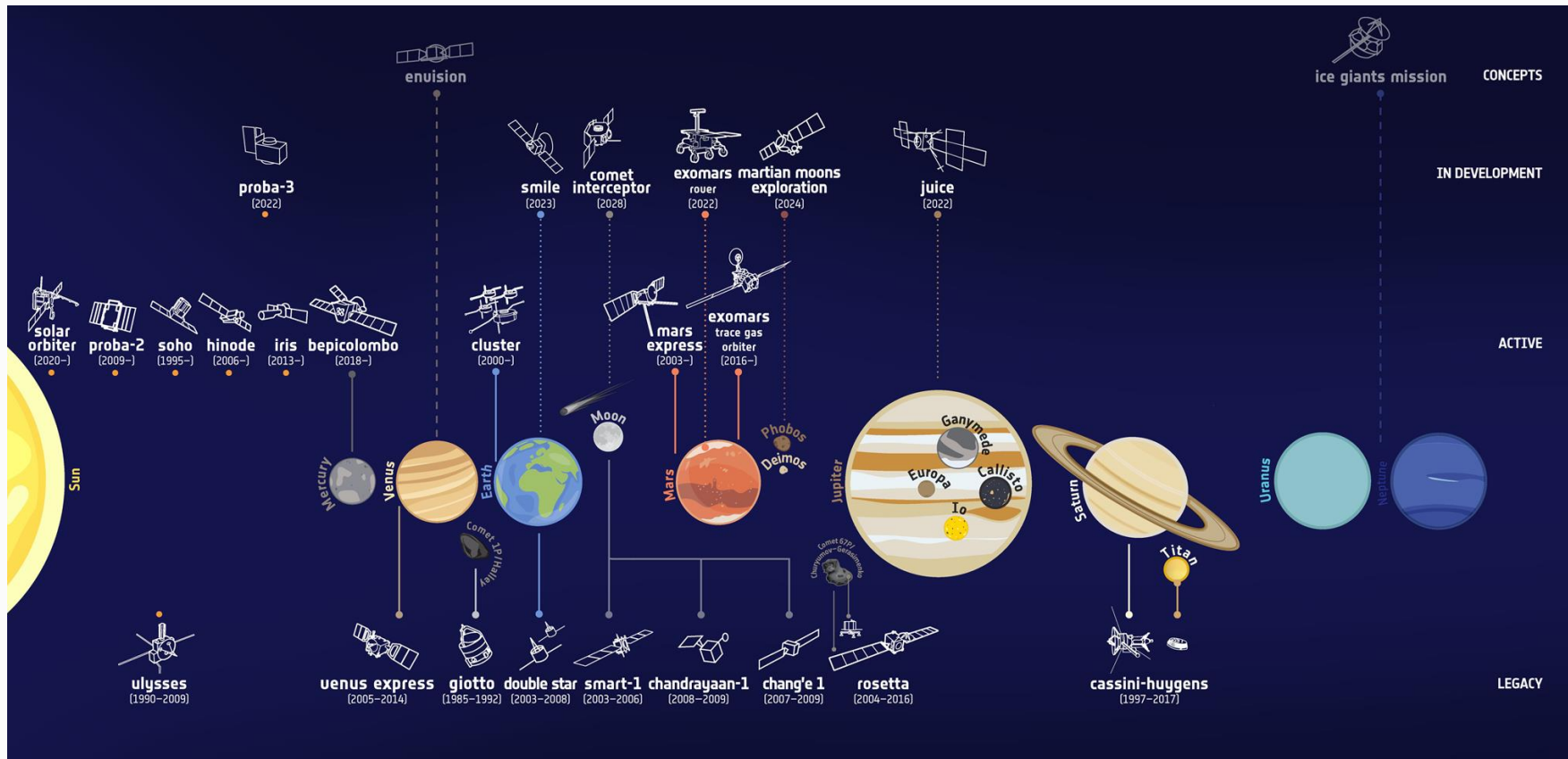
How old is the surface of the Moon?

Why does Venus lack plate tectonics?

Why does Venus rotate backwards?

Is a magnetic field important?

What about exoplanets?



Master thesis projects

Some projects are on the [website](#). Many others are possible depending on your interests!

Section/Group	Supervisor	Topics	Methods
NHM	Axel Müller	Felsic magmatism, magmatic-hydrothermal processes, mineral resources	Fieldwork, optical microscopy, electron microscopy, XRD
Crustal Processes	Henrik Svensen	Large igneous provinces, paleoclimate, mass extinctions, contact metamorphism and gas generation, black shale, the carbon cycle and proxies, the Oslo Rift	Fieldwork, core studies, petrology, electron microprobe, geochemistry, stable isotopes
	Lars Eivind Augland	Magmatism, effects in the stratigraphic record, chronostratigraphy and initiation and evolution of volcanic provinces	Fieldwork, geochronology and isotope-geochemistry
Crustal Processes - Njord	Kristina Dunkel	Mineral-fluid interaction, metamorphism and deformation, lower crustal earthquakes, CO ₂ sequestration in basalt	Optical and electron microscopy, microstructural analyses, geochemistry, fieldwork
	Luca Menegon	Rock deformation, shear zones and faults, earthquakes in the lower crust, metamorphism and deformation	Microstructural analyses, electron microscopy, fieldwork, tectonics, structural geology
	Olivier Galland	Volcanic plumbing systems, geothermal energy	Fieldwork, analogue modelling, photogrammetry, numerical modelling
CEED/PHAB	Mat Domeier	Paleogeography, tectonic plate motions, the history of Earth's geomagnetic field (paleomagnetism)	Fieldwork, rock and mineral magnetism, magnetic anisotropy, plate tectonic modelling
	Clint Conrad	Plate tectonics, mantle flow, volcanism, sea level change, Earth's deformation	Geodynamic modelling, numerical modelling, data analysis
	Valerie Maupin	Earth's seismic structure at small to global scale	Seismology
	Stephanie Werner	Comparative (Exo-)Planetary Sciences	Remote sensing, numerical modelling, terrestrial analogue studies

Careers

- Exploration (minerals, oil and gas)
- Consulting (roads, construction, environment)
- Material characterization for projects with industrial and societal relevance (CCS, green economy, geohazards, etc.)
- Bedrock geology and mapping
- Research
- Teaching/outreach/museums

Direktoratet for mineralforvaltning
PGS
PhD-student (UiO, GFZ, Glasgow...)
Mandalay Resources
Frugo
LKAB
NGI
Sibelco Nordic
Bane Nord
De Beers Group London
Imreys Maastricht
Fornebubanen
Energigass Norge...