

Short course: **Earth and planetary materials and dynamics**

Lecture room V414 (CEED-PGP), Physics building, west wing, June 3-7, 2013

Unregistered people are welcome to attend parts of or the entire course sessions

Program

Colour code, instructors:

Reidar G. Trønnes, CEED and NHM, Univ. Oslo

Stephanie C. Werner, CEED, Univ. Oslo

Bernhard Steinberger, GFZ Potsdam and CEED, Univ. of Oslo

Chris E. Mohn, CEED / Dept. of Chemistry, Univ. Oslo

15 min student presentations

Time frame

M: Morning, 09-12	Tuesday: 0900-1130
Lunch: 12-13	1130-1215
A: Afternoon, 13-16	1215-16

Monday, June 3

M: 0845-0850: Short introduction of participants

0850-0910: Trond H. Torsvik, director, CEED:

A new Centre for Earth Evolution and Dynamics, Univ. Oslo

Introduction to comparative planetology

Star evolution and nucleosynthesis

Structure, composition and bombardment history of the solar system.

A: Planetary accretion and core segregation: processes and chronology

Compositional models for the Earth - Bulk silicate (crust + mantle) and core

Planetary heat flow and thermodynamics: convection and thermal boundary layers

Tuesday, June 4

M: Seismology and seismic tomography of the Earth

Erlend Morisbak Jarsve: Mantle geodynamics and plate tectonics

Nana Yaw Agyei-Dwarko: Mantle plumes and the origin of large igneous provinces

Planetary melting and crust formation – fundamental phase relations

A: Guest lecture: James Hammond, School of Earth Sciences, University of Bristol, UK:

Geodynamics of the Seychelles and Mascarene Basin

Marzena Kohut: Early mantle differentiation and the question about geochemically isolated reservoirs

Geochemical constraints on depleted and enriched mantle reservoirs: Earth, Moon and Mars

Wednesday, June 5

M: Dynamic topography

Geodynamic relations between subduction, plume generation, LLSVPs and true polar wander
Reference frames for plate motion and true polar wander

A: Veronica K.B. Olsen: Convective dynamics of the Earth's mantle

Relation between geoid, topography, volcanism and mantle dynamics, Earth and planets

Diego González: Moon formation and differentiation

Steven Mueller: New results from the Dawn mission to Vesta

Vesta - Earth: Upper mantle melting and crustal differentiation at low and high pressures

Thursday, June 6

M: Hermann Drescher: Petrological constraints on recycled oceanic crust in mantle plumes

Lotta Ternieten: Geochemical heterogeneities and mantle convection

Mineral physics: p-V-T equations-of-state and experimental techniques

Chris E. Mohn: Computational mineral physics: First principles molecular dynamics

A: Subsolidus mineralogy of peridotitic to basaltic compositions at 3-136 GPa

Melting relations of peridotitic to basaltic compositions at 3-136 GPa

Origin and composition of LLSVPs and ULVZs in the lowermost mantle

Friday, June 7

M: Core-mantle redox equilibrium (and non-equilibrium) in terrestrial planets

Fe-spin state in the lowermost mantle, conductive and radiative heat flow

Terrestrial planetary cores: phase relations and properties of Fe-dominated metal alloys

A: Volcanism and tectonics on the terrestrial planets

Recycled oceanic crust and continental mantle lithosphere in oceanic basalts

Guest lecture / wine seminar:

Galen Gisler (PGP): d'Alembert's Paradox reconsidered: Do we really need viscosity to calculate drag?