Course Specifications

Valid in the academic year 2014-2015

Volcanology (C002671)

Course size


Credits  6.0  Study time  150 h  Contact hrs  60.0 h

Course offerings and teaching methods in academic year 2014-2015

A (semester 2)  lecture  30.0 h


seminar: coached exercises  30.0 h

Lecturers in academic year 2014-2015

Kervyn de Meerendre, Matthieu  WE13  lecturer-in-charge

del Marmol, Mary-Ann  WE13  co-lecturer

Offered in the following programmes in 2014-2015


Master of Science in Geology  6  A

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Teaching languages

English

Keywords

volcanology, magma rheology, eruption dynamics, lava flows, pyroclastic fall deposits, pyroclastic flow deposits, pyroclastic surges, debris avalanche deposits, lahars, volcano types

Position of the course

To acquire a knowledge of magmatic and metamorphic lithospheric processes and of resulting products (M. OBD.6). In particular:

A basic knowledge of the different types of volcanoes and how they form.

Elements of magma chamber dynamics, eruption triggering, mechanics of eruptions and volcano instability (eg. caldera formation, sector collapse, gravitational spreading and rift zone formation)

A basic knowledge of the different types of volcanic deposits and how they are emplaced.

Contents

Lectures:
- Historical eruptions
- Rheology of magmas. Elements of geological fluid mechanics.
- Magma ascent in fractures (dyke dynamics)
- Classification of eruption styles
- Lava flows
- Explosive volcanic eruptions
- Tephra fall
- Pyroclastic density currents
- Flank collapse and gravitational deformation
- Analogue modelling of volcanic processes
- Monitoring of volcanic processes
- Evaluation and management of volcanic risks
- Environmental effects of large magnitude volcanic eruptions

Practicals:
- Exercises on magma rheology and emplacement dynamics of Etna lavas
- Exercises on lava dynamics and application of the FLOWGO model
- Exercises on tephra fall
- Group lab session on deriving fundamental observations and data on clast textures and deposit characteristics

(Approved)
- Video film analysis - Study of eruptive activity types using Montserrat educational video. Introduction to volcanic hazards and monitoring
- Volcano-tectonic interpretation of volcano structure based on topographic information
- Lab session on the modelling of volcanic processes with analogue experiments
- Critical analyses of course-related literature. Students analysing articles critically, writing critical summaries and presenting orally. Group discussion of presented work under guidance of lecturer.

Initial competences
- Basic knowledge of English (course will be taught in English)
- Basic scientific knowledge of physics, chemistry and mathematics
- Basic knowledge of geomorphology, sedimentology, mineralogy and petrology

Final competences
- A knowledge of magmatic and metamorphic processes affecting the lithosphere and of the products that result from those processes (minerals, rocks) (M. OBD.6). In particular:
  - A knowledge of the different types of volcanoes and how they form.
  - A knowledge of the different types of magmatic and volcanic processes and of volcanic deposits and how they are emplaced
- Transferrable skills: literature and data analyses, and written/oral presentation skills

Conditions for credit contract
- Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract
- This course unit cannot be taken via an exam contract

Teaching methods
- Lecture, seminar: coached exercises

Extra information on the teaching methods
- About 30 hours of practicals used for exercises (calculations, problem-solving) and to make observations and measurements, become familiar with some standard techniques and to learn to analyse the data. They will also be used to critically study the literature around controversial topics related to the course, then to prepare written critical summaries and finally to present and discuss them orally during a seminar to the class.

Learning materials and price
- See 9/13. Estimated cost of photocopies of handouts and of research articles: 10-20 euros
- Cost: 15 EUR

References
- Parts of the following reference textbooks:
  - A dozen articles; some websites to consult

Course content-related study coaching
- Lecturer will be accessible to answer questions students may have, by email or in person.

Evaluation methods
- end-of-term evaluation and continuous assessment

Examination methods in case of periodic evaluation during the first examination period
- Written examination with open questions, oral examination

Examination methods in case of periodic evaluation during the second examination period
- Written examination with open questions, oral examination

Examination methods in case of permanent evaluation
- Assignment, report

Possibilities of retake in case of permanent evaluation
- examination during the second examination period is possible

Extra information on the examination methods

(Approved)
Continous assessment - lecturer will be attentive to students' learning. Lectures will be interactive to favour learning and immediate assessment of it.
A written examination with additional oral explanation will assess the students' understanding of the more theoretical concepts and also how they are able to apply them.

**Calculation of the examination mark**

- 15 % report practica
- 25 % oral presentation of literature assignment
- 60% oral exam with written preparation