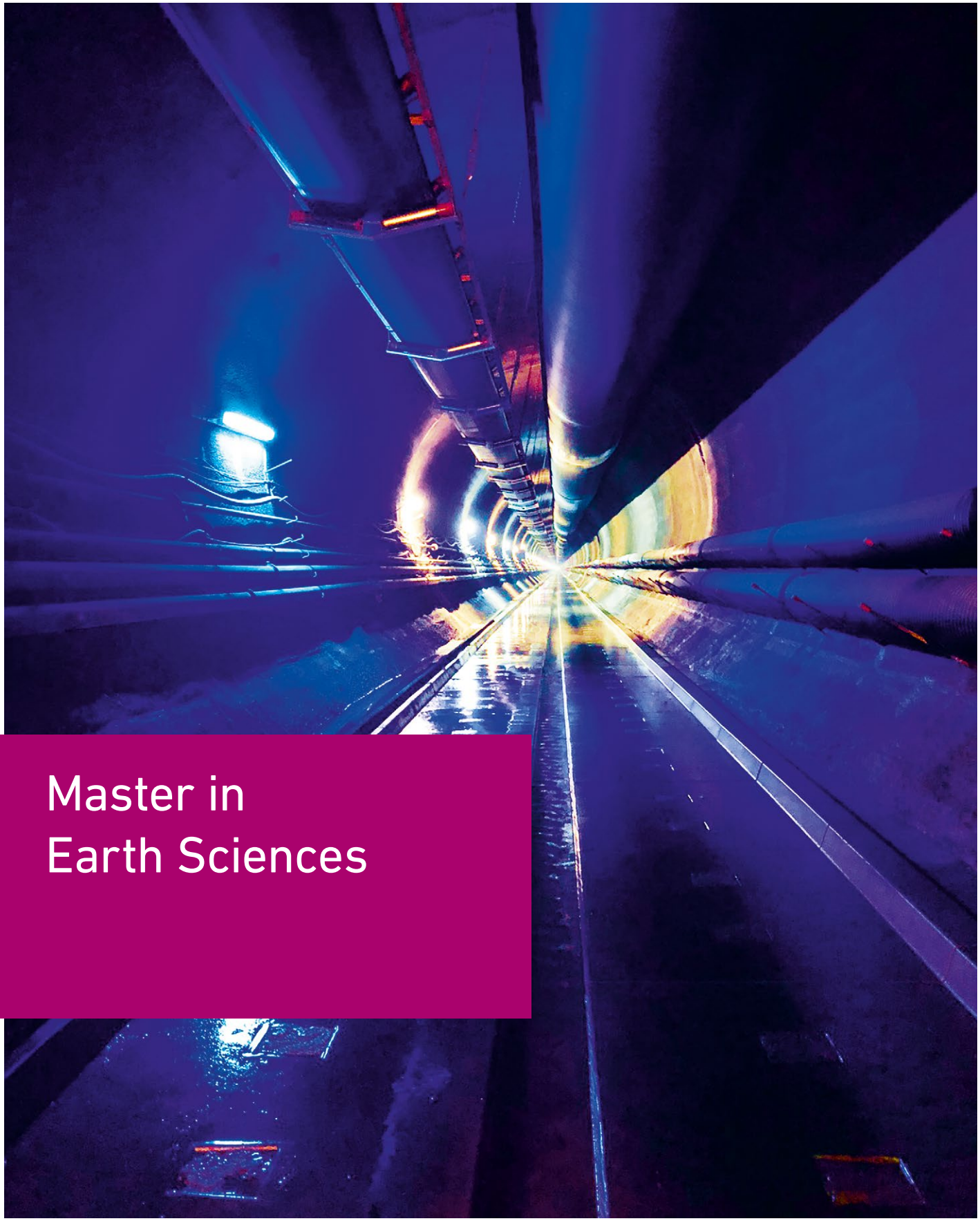
ETH zürich

Department of
Earth and Planetary Sciences



Master in Earth Sciences

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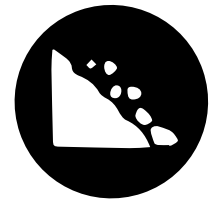
MASTER IN EARTH SCIENCES

The Department of Earth and Planetary Sciences at ETH Zurich has been repeatedly ranked as one of the world's leading Earth Science schools.

The Master programme in Earth Sciences combines class room teaching with computer exercises, laboratory and field work, e-learning, case study analyses as well as team work. The lecturers are drawn from diverse expertise within the Earth and Planetary Sciences department, other departments at ETH, as well as from the neighbouring University of Zurich. Some specialised courses are given by outside experts from academia and industry.

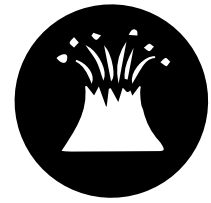
ENGINEERING GEOLOGY

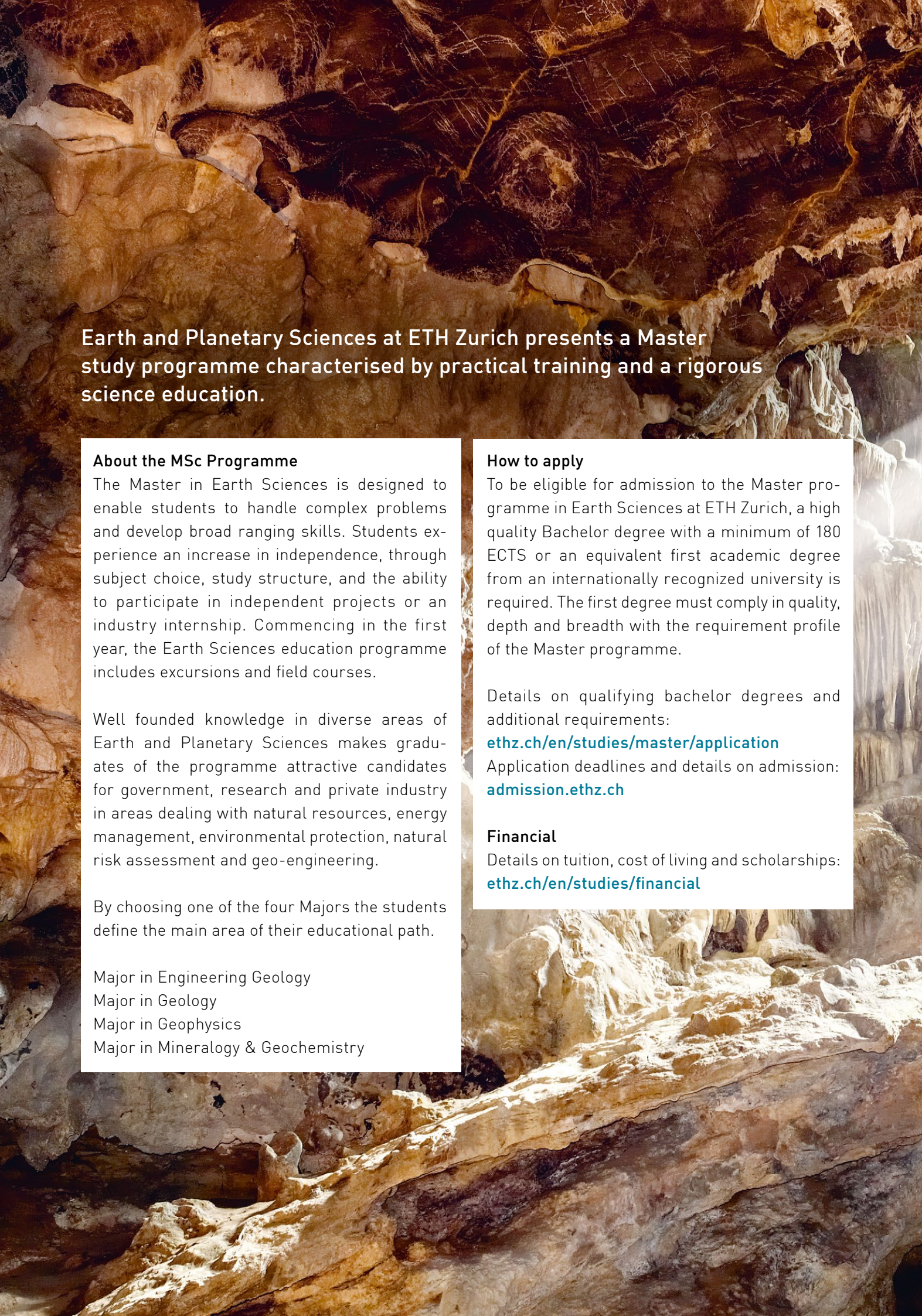


GEOLOGY

GEOPHYSICS

MINERALOGY AND GEOCHEMISTRY





Earth and Planetary Sciences at ETH Zurich presents a Master study programme characterised by practical training and a rigorous science education.

About the MSc Programme

The Master in Earth Sciences is designed to enable students to handle complex problems and develop broad ranging skills. Students experience an increase in independence, through subject choice, study structure, and the ability to participate in independent projects or an industry internship. Commencing in the first year, the Earth Sciences education programme includes excursions and field courses.

Well founded knowledge in diverse areas of Earth and Planetary Sciences makes graduates of the programme attractive candidates for government, research and private industry in areas dealing with natural resources, energy management, environmental protection, natural risk assessment and geo-engineering.

By choosing one of the four Majors the students define the main area of their educational path.

Major in Engineering Geology
Major in Geology
Major in Geophysics
Major in Mineralogy & Geochemistry

How to apply

To be eligible for admission to the Master programme in Earth Sciences at ETH Zurich, a high quality Bachelor degree with a minimum of 180 ECTS or an equivalent first academic degree from an internationally recognized university is required. The first degree must comply in quality, depth and breadth with the requirement profile of the Master programme.

Details on qualifying bachelor degrees and additional requirements:
ethz.ch/en/studies/master/application
Application deadlines and details on admission:
admission.ethz.ch

Financial

Details on tuition, cost of living and scholarships:
ethz.ch/en/studies/financial

MAJOR IN

ENGINEERING GEOLOGY

The interactions between geology and engineered structures.

Engineering Geology is concerned with understanding, characterising and predicting the behaviour of rocks and soils under near-surface loading conditions, typically encountered during surface excavations, and the construction of tunnels, dams, roads, buildings and bridges etc.

Students attain the ability to design and execute a targeted site investigation programme, learn how to assemble, interpret and synthesize diverse and often highly-fragmented geological data, and transfer such data into an appropriate and scientifically-valid geological-geotechnical model, which is required for engineering analysis and design. Learning the fundamentals and applied issues about geological waste disposal, for example nuclear waste, is a challenging topic facing society today.

Identification and characterisation of natural slope instabilities (e.g. landslides, and rock falls, etc.) is also an important topic in engineering geology, where students are equipped with the know-how to provide appropriate input for sound mitigation solutions.

eaps.ethz.ch/master/engineering-geology

MAJOR IN

GEOLOGY

The history of our planet, current state, and its development into the future.

The major in Geology is a general course of study dealing with solid earth processes along with their connections to the ocean, biosphere and atmosphere. Focal areas include tectonics, sedimentology, biogeochemical cycles and earth history, including the evolution of life and of the Earth's climate. The skills and methods learned centre on the analysis and significance of rock systems, importance of deformational structures, meaning of fossils and the history of life, climate proxies in the geologic record, and the use of numerical models in the study of physical and chemical processes in Earth Sciences.

The Geology programme introduces students to techniques for investigating various properties of rocks and minerals, the relationships between geological structures, forces and deformation rates due to tectonic activity, as well as the evolution of climate through geological time and its major forcing factors – orbital, atmosphere chemistry, and tectonics.

A major in geology provides a sound knowledge of the physical, chemical and biological processes working in sedimentary systems extending from the continents to the deep sea and explores the interactions between organisms and their physical and chemical environment on a wide range of spatial and temporal scales.

eaps.ethz.ch/master/geology

MAJOR IN

GEOPHYSICS

The state and structure of the Earth and other planets.

The major in Geophysics is devoted to processes and structures of the Earth`s interior, connecting geophysical modelling at the surface with concepts and modelling of physical processes and material properties within our planet.

Geophysicists seek to answer questions of global significance such as: What drives plate tectonics and how do lithosphere plates interact with the mantle? How does the magnetic field of the Earth originate? How, where and when do earthquakes form and how can the risks associated with earthquakes be diminished?

Geophysicists analyse the state and structure of planets by using methods originating in physics, mathematics and geology and by developing new instrumentation and computer techniques. They are also involved in the development of space probes to survey other planets. Industrial applications vary from practical investigations of environmental problems to the exploration for raw materials and the assessment of natural hazards. Our programme provides the necessary skills and knowledge to thrive in these fields.

eaps.ethz.ch/master/geophysics

MAJOR IN

MINERALOGY AND GEOCHEMISTRY

The composition, properties and significance of Earth and planetary materials.

The major in Mineralogy & Geochemistry focuses on the behaviour of elements in planetary reservoirs, the structure and properties of natural materials, and how both of these influence the functioning of Earth systems.

Students gain an understanding of the materials (rocks, minerals and fluids) that constitute the Earth and other planets, how their properties determine the dynamics and character of processes such as magmatism, mountain building and formation of energy and mineral resources, and how chemical and isotopic fingerprinting methods allow the reconstruction of geological and planet-forming processes, as well as the time scales and – sometimes extreme – pressure-temperature conditions at which they occur.

Students in Mineralogy & Geochemistry learn to interpret the textures of rocks and minerals, to analyse them with chemical and physical methods, to perform experiments to understand mineral- and rock-forming processes and to use computer tools to simulate planetary processes that take place over long time periods or cannot be investigated directly.

eaps.ethz.ch/master/mineralogy-geochemistry

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