



## Geosciences education manifesto

On 13 and 14 May, 2023, the representatives of several organisations affiliated with geoscience and science education gathered together in Barcelona, Spain, to discuss the current state of geoscience education in Europe. This meeting was co-ordinated by the Education Committee of the European Geosciences Union (EGU), in response to the alarming decrease in the uptake of geoscience options at all levels of education in several countries.

To focus the attention of geoscientists and educators on this issue, the following manifesto was drafted at the meeting, and endorsed by the organisations in attendance.

---

### BARCELONA MANIFESTO FOR THE TEACHING OF GEOSCIENCES

The geosciences provide relevance for many studying basic science subjects. Geoscience fundamentals underpin teaching in key aspects of school curricula, but it is rarely taught as a stand-alone subject. Apart from university degrees where most future professionals are trained, the importance of the role of geosciences in building citizenship is currently insufficiently recognised by policy makers and educational authorities.

The Barcelona Manifesto recognises the specific value of geosciences education at secondary level, as including, but not limited to:

- Making it possible to describe, analyse and interpret the scientific evidence for an integrated vision of Planet Earth's systems' past, present and future and extend this to other planets.
- Offering a unique perspective of the deep interactions and interdependencies among the different terrestrial subsystems: rocks, water, air and life.
- Providing an objective interpretation of materials and processes and their evolution throughout geological time.
- Providing a methodological and practical approach that enhances critical scientific skills such as observation, description, critical thinking, the formulation of questions and hypotheses and argumentation.

An understanding of the geosciences also plays a primary role in many issues that are of critical social, economic or environmental relevance for all citizens, such as:

- Geological resources (e.g., minerals, rocks, water, soils, hydrocarbons) and the impact of human activity on their efficient and sustainable exploitation.
- Climate change and global warming.

- Natural hazards (e.g., earthquakes, volcanic eruptions, tsunamis, landslides, floods).
- The need to know, value and preserve our geological heritage as a witness to the past processes that have shaped the planet and the evolution of life.
- The 17 Sustainable Development Goals (SDG) promoted by the United Nations, of relevance such as sustainable agriculture, water, energy, oceans, ecology, climate change, heritage preservation and disaster reduction.

This manifesto therefore recognises that it is essential to ensure that in every country an appropriate level of the geoscience education is included from early childhood to upper secondary level (approximately 6 to 18 years old). To achieve this, a definition, based on international proposals, of several key principles and ideas for geoscience literacy that can work as a reference for the inclusion and sequencing of content in curriculum design, must be composed.

The manifesto calls on European countries to recognise the opportunities afforded by the practical aspects and uniqueness of field and laboratory work that characterises the geosciences, and encourage, through the delivery of geoscience content in secondary education, the interest of the next generation in the range of geoscientific careers that will be necessary to fulfil society's present and future demands.

This requires educational strategies to ensure the scientific and didactic competences of teachers dealing with geoscientific concepts in pre-university level education.

As a result of these actions, we envisage that students accessing university geoscience degrees will have sufficient background to enable them to carry out their studies successfully and that those university courses leading to geoscience careers offer an appropriate level of training.

Consequently, we invite institutions, associations, organisations, and individuals who share these values to join us in this manifesto, to disseminate it among their fellow citizens, and to share it especially with the policy makers and educational authorities in their countries.

Barcelona, Spain, 14 May, 2023