

Call for PhD candidates in Earth Sciences

Mineral patterns in extreme environments

Laboratorio de Estudios Cristalográficos (LEC)

Instituto Andaluz de Ciencias de la Tierra (IACT), CSIC, Armilla (Granada)

Summary

The PhD project is thematically focused on the processes that occur in two extreme environments (in terms of pH, composition and temperature) that are commonly proposed as current model systems for the study of geological problems. These environments are 1) the hyper-alkaline Soda Lakes of the African Rift in Kenya, where we propose to study the patterning of the Magadi cherts, used in geoscience as an analogue of the Precambrian cherts where the first signs of life on the planet were reported, and 2) the hyper-acidic Dallol hydrothermal system in the Danakil Depression in Ethiopia, which we have recently studied and where we have defined a previously unknown form of volcanism (salt volcanoes) that may be relevant to the geology and search for life on Mars. The patterns developed at both sites are 'biomimetic', with morphologies resembling microscopic organisms in the case of silica/carbonate composites, and macroscopic plant-like in the case of salt aggregates.



The project aims to study crystalline materials and mineral patterns as proxies for solving problems in the geosciences. In the geosciences, spatial and especially temporal scales limit or make impossible most in-situ observations and experiments. For this reason, much more than in other disciplines, we have to rely on observing the compositions, structures, patterns... resulting from the ongoing geological processes of interest to us, and trying to "decode" these patterns ("markers", "indicators", "proxies"...) in order to gain knowledge

about the geological processes inaccessible to us. Developing methods to decode geological patterns is a complex task involving field, experimental and computational work.

Requirements

- Degree in Earth Sciences, Chemistry or related disciplines
- Passion for research and ability to work effectively in a collaborative team environment
- Fluency in English

Appraised skills

- Motivation to develop a multidisciplinary topic
- Training or experience in crystallisation, geochemistry, etc.
- Writing and communication skills
- Data analysis, machine learning and programming skills
- Previous research experience

What we offer

- A four-year pre-doctoral contract (Spanish science law)
- Participation in an international geoscience research project in a rich context of international collaborations
- Learn and apply advanced technologies for the growth and characterisation of crystals and mineral patterns

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