

EoI for PhD contract

ANEX to PIF2024-Leveraging Earth-Mars Analogues: Iceland as a Window into Martian Geology and Habitability (PID2023-146856NB-I00)

Expression of Interest associated to research project "Leveraging Earth-Mars Analogues: Iceland as a Window into Martian Geology and Habitability (MARS-GH)"

Project summary

The project "*Leveraging Earth-Mars Analogues: Iceland as a Window into Martian Geology and Habitability*" (MARS-GH) focuses on a comparative study of Martian geology and habitability using Iceland's unique geological features as analogues to Martian environments. The research aims to understand Mars' geological history and its potential for life by exploring Earth-Mars analogues. Core activities include extensive fieldwork to identify Icelandic regions that closely resemble Martian terrains, high-resolution mapping, and sample collection. The project also involves radiative transfer simulations, remote sensing data analysis, fieldwork, and laboratory experiments replicating Martian conditions. This interdisciplinary approach integrates planetary science, geochemistry, geology, astrobiology, and microbiology to deepen our understanding of Mars' past climate and assess its habitability, informing future space missions. MARS-GH also supports STEM education and promotes public interest in space exploration.

Title:

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Description

Training program planned in the context of the requested project

The PhD student will join the Doctoral Program in Physics and Space Sciences (University of Granada) and receive training through courses, seminars, and lectures. The plan includes: (i) Introduction to the topic, literature review, and specialized training in relevant techniques; (ii) Radiative transfer modelling in planetary sciences; (iii) Selection and characterization of study areas using Mars-like methodologies, satellite imagery, drone data, field mapping, and sampling; (iv) Mineralogical and geochemical sample characterization with PLM, XRD, SEM-TEM-EDS, FTIR, Mössbauer spectroscopy, etc.; (v) 1-3 month stays at international institutions: Natural History Museum (VNIR spectra analysis), ISOR-University of Akureyri (mapping, microorganism study), Middlebury College (correlation of sample analyses), University of Aberdeen (Mars atmospheric chamber); (vi) Seminars to present progress and discuss results; (vii) Presentation of results at national and international conferences (e.g., AGU, EGU, DPS, LPI, DPS,...); (viii) Publishing in peer-reviewed journals (e.g., JGR, Icarus, Nature Geosciences, Nature Astronomy, ...); (ix) Participation in outreach activities; (x) Writing and defence of the PhD thesis by early fourth year to apply for postdoctoral positions.

Keywords: Analogues of Mars, Habitability, Early Earth, Weathering, Geochemistry, Clay minerals, Basalts, Hydrothermal vents, Radiative Transfer, Remote sensing, Mars mineralogy