

Summer Schools at Vulcano (2015-2018): A natural laboratory for marine, terrestrial and planetary science and technology

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Abstract

ROBEX was the Helmholtz Alliance for Robotic Exploration of Extreme Environments that brought together scientists and engineers from different communities of space sciences, polar and deep-sea research to jointly develop strategies and technologies for the exploration of diverse terrestrial, marine and planetary terrains. Funding for this alliance came to an end in 2017. Summer schools formed an important outreach element of this alliance. For the past 3 years, a two-week summer school under the auspices of ROBEX was held at Vulcano, Italy. This year, it was supported by DLR and Jacobs University on a shoe-string budget. The summer school focusses on bringing together scientists, researchers, students, technicians and policy makers, to provide field exposure and training on a variety of topics ranging from geology, volcanology, geophysics, oceanography to robotic, and the study of planetary analogues.

This presentation provides a brief overview of the various field activities and the educational concept developed for and during the summer schools at Vulcano, Italy. Vulcano is the third largest and southern most island of the Aeolian archipelago. The larger part of the island consists two main edifices built by strombolian to phreatomagmatic eruptions. Apart from the dry and arid climate, the surface morphology is similar to lunar and martian regions (see Fig. 1)

Drone photogrammetry, and optical infrared (IR) measurements show the the present day activity is stable. Seismic refraction and magnetic gradiometry mapping was used to map to extent of the regolith and surface / subsurface lave flows. Oceanographic work such as CTD, Ph and biological sampling indicate that in the vicinity of the underwater vents low Ph and acidification is prevalent. Finally marine crawler and terrestrial robotic traverses highlighted the need for further testing concepts and finding innovative solutions

for locomotion on diverse planetary terrains. The summer schools also highlighted the need to mix students with experienced researchers, scientists with engineers and politicians and administrators with academics, in order to get the optimum learning experience and networking opportunities.

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Figure 1: Various images from the past summer schools at Vulcano, Italy. The island offers excellent opportunity to study a variety of volcanic processes and provides unique planetary analog sites.