7. Jährlicher DAbG Workshop



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Vulcano (Italy): a planetary analog and training site with high astrobiological potential.

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The volcanic settings of the Eolian Islands, Italy, offer access to various types of volcanic terrains, with diverse morphology and mineralogy. The current signs of volcanic activity on the island of Vulcano, whose last eruption is dated to 1890, include e.g. the presence of large fumarole fields on ground and underwater. The dry landscape and easy access to layers of older and more recent volcanic material, in addition to the possibility of investigating secondary minerals, make this site a very promising analog for our neighbor planets: Mars and Venus. The active and acidic fumarolic sites could also be considered for early-Earth/Mars potential. For these reasons, Vulcano is a remarkable training site to test instruments, rovers, or data processing techniques for planetary exploration by comparison of field and lab data collected during this and previous field campaigns. In the frame of the DLR SaiNSOR project, our main objectives for the 2023 campaign were the spectral characterizations of diverse lithologies and volcanic materials (from Venus to Mars analogues) with different field instruments: visible near infra-red (VNIR) reflectance, Raman spectroscopy, laser induced breakdown spectroscopy (LIBS), hyperspectral cameras, and drones. We also combined the spectral measurements with Integrated Positioning System (IPS) data - a multi-sensor system for localization, 3D reconstruction and inspection in unknown terrains –, a field documentation, and data pre-processing tools in order to produce a combined dataset of measurements to be reproduced in the lab and further integrated in a combined instrument concept. We also revisited sites measured in 2019 and 2022 to monitor changes and explored new localities on the Aeolian islands.

Finally, these extreme environments have a high astrobiological potential pertaining to the questions of life detection, using spectroscopy techniques, and habitability, looking at microbial colonization. Indeed, the identified extreme and unique environments present at Vulcano inform us on strategies and protocols on how to detect life elsewhere by applying a combined spectroscopy approach in the field, much like a rover would on another world, and comparing with lab measurements.

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