

Applied geophysics in Phase 1 of the Drilling the Ivrea-Verbano zone (DIVE) project

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The Drilling the Ivrea-Verbano zone (DIVE) project is an international collaboration partially funded by the International Continental Scientific Drilling Program (ICDP). DIVE has been established to answer long outstanding questions regarding the lower continental crust and the transition into mantle rocks. In DIVE Phase 1, two ca. 1,000 m deep boreholes will be drilled on the edges of Val d'Ossola, Italy, in close proximity to the Insubric Line, at the collision of the Adriatic and Eurasian Plates, where mantle rocks are known to be at their shallowest position. These boreholes are expected to penetrate metasedimentary, gneissic, gabbroic, pyroxenitic and potentially peridotitic rocks, which have highly contrasting physical responses to the overlying valley sediments. At various stages of the DIVE project applied geophysics has or will play an important role in achieving the scientific aims of DIVE. Seismic surveys were conducted in 2019 as part of the site selection and characterisation process, a necessary step in drill planning and a requirement for ICDP funding. More recently in April 2022, a multi-method geophysical campaign was conducted at the DIVE DT-1b drill-site to characterize the near surface, in order to refine the precise borehole position and avoid near surface drilling hazards. Finally, during the drilling phase (late 2022), borehole geophysics will be conducted to provide measurements of physical properties. This borehole geophysical campaign is funded by the FWF within the project "Origins of seismic reflectivity in lower crustal rocks", hosted at Chair of Applied Geophysics, Montanuniversität Leoben. The various applied geophysics programs will be briefly presented and discussed with relation to the practical and scientific objectives of DIVE.