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Design and construction of two boreholes for seismometers installation in support of ET seismic characterization in Sardinia

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One of the key activities in the context of seismic and environmental noise characterization has been the installation of two borehole seismometers in proximity of potential ET triangle corners. The design has been completed in July 2020, the boreholes excavation with relevant surface works between April and August 2021 and the sensors installation in September 2021.
The measurement station for each site is composed by the following main elements: a) a steel lined boreholes for the installation of the borehole seismometer; b) a surface seismometer located inside an inspection pit; c) an electronic box containing the DC power supply, the DAQ systems of seismometers and magnetometers and the UMTS modem for data transmission; d) photovoltaic panels.
The first measurement station (borehole named P2) is located in the Bitti municipality at about 770 m a.s.l. and it is excavated in ortogneiss up to about 270 m from the ground level to locate the sensor at a depth of 264 m. The second measurement station (P3) is located in the Onanì municipality at about 720 m a.s.l and it is excavated in granitoids up to about 260 m from the ground level; the sensor is located at a depth of about 252 m.
The boreholes excavation has also allowed to perform different investigations (cutting analysis, geophysical logs, acoustic camera BHTV) and consequently to obtain preliminary information on the quality of the rock mass that will host the underground works planned for the construction of the ET detector.
The first part of talk focuses on the design of the instrumented boreholes with particular attention to the following main issues: selection of the optimum location, borehole drilling requirements (dimensions, verticality, etc.), excavation techniques and construction material selections. The second part illustrates the construction activities, the final configuration of the works, final construction time and cost.

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