

## New data on geological investigations at Einstein Telescope site of Sardinia (Italy)

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In the framework of the SAR-GRAV and FdS-2021 projects, new investigations in the area comprised within the potential vertexes (Bitti-Lula-Mamone) limiting the ET triangle have been performed with the aim to assess the geological, structural and neotectonic, and hydrogeological conditions. For this purpose, we adopted a multidisciplinary approach involving detailed structural, geological and petrological investigations, and groundwater sampling and analysis (both water chemistry and stable isotopes  $\delta D$ ,  $\delta^{17}O$  and  $\delta^{18}O$ ).

Compared to the maps published so far, new field data show a more complex geological setting of the study area, characterized by a higher variability of the outcropping lithologies, including for example a recurring interlayering of gneiss and mica-schist, and the presence of granite veins of variable thickness from a few to tens of meters, never mapped until now. The main structural features are the SE-dipping schistosity affecting the metamorphic rocks of the Variscan basement, and strike-slip faults with a predominantly NE-SW orientation, often paired with granite veins. Preliminary petrological data confirm previous works, and will be supported by new P-T-t estimates in the near future. Geological structures strongly control geometry of aquifers and groundwater potential in the area. Chemistry of groundwater, in agreement with the lithologies of aquifers, varied from Cl-Na compositions to Ca-Mg-bicarbonates, in some samples, the concentration of trace elements (Al, Fe, Mn) become relevant. Stable isotope of groundwater lay close to the SIMWL (South Italian Meteoric Water Line) indicating a meteoric origin of water, whereas evidence of fractionation processes was not detected.

All data collected has been organised in a shared database through GIS platform. These preliminary results will be the base to implement a 3D geological model of the area and assess the underground fluid circulation.

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