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Investigation of ice-caves on Melbourne and Rittmann volcanoes (Antarctica)

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Thanks to the interaction between permanent thick ice layers and fumarolic hot gases, Antarctic volcanoes host very peculiar features called ice-caves. These are networks of passages melted into the base of the snowpack where geothermal heat and warm gases are supplied to the ice-rock interface. Recently, Antarctica ice caves have attracted the attention of scientists working on both geology and biology fields, since they can provide precious insights into degassing and heat release from volcanoes, as well as into organisms that thrive in physically extreme conditions inside the caves.
In the framework of the ICEVOLC project (www.icevolc-project.com) funded by the Italian PNRA, several activities focused on the investigation of ice-caves in both Melbourne and Rittmann volcanoes (Victoria Land) were carried out such as: i) identification of pinnacles and ice-towers, chimney-like ice formations indicating the entrance of the ice-caves; ii) identification and mapping of unexplored ice-caves on both volcanoes; iii) sampling of gases released by fumaroles within the ice-caves to get insights into volcano dynamics and its state of health; iv) thermal survey to investigate ice-cave microclimate and evaluate energy exchanges.