ICE-VOLC PROJECT: UNRAVELLING THE DYNAMICS OF ANTARCTICA VOLCANOES

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Rationale

Melbourne and Rittmann are volcanoes located in the Victoria land, and display fumarolic activity. The most recent eruption of Melbourne dates back to 1841-1922. Melbourne was discovered in 1841 by James Clark Ross, Rittmann during the 4th Italian Expedition (1888/1889). Our knowledge on both volcanoes is really little.

Objectives

In order to get such objectives, the activities are structured in 6 Research Units (RU) comprising 26 technicians/researchers/technologists:

1. Dipartimento di Fisica e Geologia, Università degli Studi di Perugia, Italy. 2. INGV, Osservatorio Etneo – Sezione di Catania, Italy. 3. INGV, Sezione di Pisa, Italy. 4. INGV, Sezione di Palermo, Italy.

Methodology

The survey conducted as part of the research until 1841 during the XXXII Antarctic Expedition (Nov-Dec 2017) made possible the identification, mapping and geomorphological investigation of a large volume of fumarolic origin. Ten of these were at Rittmann and one at Melbourne volcanoes, where in most cases it was possible to capture and carry out gas sampling in the hotter part of the ground. Further gas sampling was also carried out in representative areas on the surface. A total of 66 volcanic gas samples were collected during the XXXII Expedition.

GEOCHEMISTRY

The following pictures show examples of seismic signals recorded in Tethys Bay, on Mt. Rittmann and on Mt. Melbourne.

The following figures show examples of volcanic gas samples collected during the XXXII Expedition.

XXXII Italian expedition

During 10 January – 4 February 2017, the following volcanological activities were carried out:

• Survey of Mt. Melbourne and Mt. Rittmann to identify and map the deglaciated areas.
• Description and measurements of tectonic sections.
• Collection of samples on the Mt. Rittmann crater rim.
• Collection of 30 samples of pumice, lavas, breccia, scoria from Mt. Melbourne.

SEISMOLOGY

The main purpose of the seismic activities during the XXXII expedition was to collect information to choose the site where a permanent station will be installed in the XXXIII expedition. Hence, during 10 January – 4 February 2017 the following activities were carried out:

• Recording of 51 days of data by two 24 sc sensors installed in different sites in Tethys Bay, 2 on Mt. Rittmann and 2 on Mt. Melbourne.

The following pictures show the seismic stations installed in Tethys Bay, on Mt. Rittmann and on Mt. Melbourne.

The following figure shows a map of the seismic stations installed in Tethys Bay, on Mt. Rittmann and on Mt. Melbourne.