Final project report

Project ID: 2002/3.11
Title: TIMM: Tectonics and Interior of Mt. Melbourne area
Principal investigator: Egidio Armadillo
Institution: DIPTERIS – Università di Genova
Email: egidio@dipteris.unige.it
Duration: 2 years
Assigned funding: € 25.000,00

Activities and results

The regional significance of Mt. Melbourne is high because of its key location at the transition between the uplifted Transantarctic Mountains and one of the largest, active(? continental rift systems in the world, the West Antarctic Rift System.

During the 2002-2003 Italian Antarctic campaign a high-resolution aeromagnetic survey over Mt. Melbourne volcano was performed. This helicopter-borne survey was flown at low-altitude and in drape-mode configuration (305 m above terrain) with a line separation less than 500 m. This is a pioneering high-resolution draped survey over the Antarctic continent.

More inland, a transect of 10 magnetovariational stations was carried out across the Deep Freeze Range, crossing the Priestley and David glaciers. Sample interval of the magnetic field was 3 seconds, spacing between stations about 50 km and mean occupation time about two weeks for each station.

Additionally, in the frame of the UK-Italian ISODYN-WISE project (2005-06), an airborne ice-sounding radar survey was flown over the Mt. Melbourne volcano to image the subglacial topography.

The data set was completed by considering the gravimetric stations deployed around the volcano and in its region during the 90’ for monitoring density variations.

All the data have been processed to obtain new high resolution magnetic and gravimetric anomaly maps of Mt. Melbourne. Magnetovariational data were inverted to obtain a 2D/3D image of electrical conductivity below the volcano.

Our new high-resolution magnetic maps reveal the largely ice-covered magmatic and tectonic patterns in the Mt. Melbourne volcano area. We combine the sub-ice topography with images and models of the interior of Mt. Melbourne volcano, as derived from the high resolution aeromagnetic data, land gravity and magnetovariational data. Our new geophysical maps and models provide a new tool to study the regional setting of the volcano.

Products

A – papers in scientific magazines

1. F. FERRACCIOLI, ARMADILLO E., A. ZUNINO, E. BOZZO, S. ROCCHI, P. ARMIENTI (in stampa). Magmatic and tectonic patterns over the Northern Victoria Land sector of the Transantarctic Mountains from new aeromagnetic imaging. TECTONOPHYSICS, ISSN: 0040-1951
4. ARMADILLO E., F. FERRACCIOLI, A. ZUNINO, E. BOZZO, S. ROCCHI, P. ARMIENTI. (2007). Aeromagnetic search for Cenozoic magmatism over the Admiralty Mountains Block (East Antarctica). In: ALAN COOPER,


B – book chapters

C - proceedings of international conferences

1. ARMADILLO E., M. GAMBETTA, F. FERRACCIOLI, H. CORR, E. BOZZO. New geophysical views of Mt. Melbourne Volcano (East Antarctica). In: American Geophysical Union - 2009 Joint Assembly

2. BOZZO E, ARMADILLO E., M.GAMBETTA (in stamapa). ELECTRICAL CONDUCTIVITY IMAGING OF CRUSTAL STRUCTURES IN NORTHERN VICTORIA LAND, ANTARCTICA. In: IAGA 2009


12. Armadillo E., E. Bozzo, G. Caneva, G. Tabellario. GDS investigations from the Rennick Graben to the western side of the Wilks subglacial basin, Antarctica. EGS Joint Assembly Nice, France, April 2004


D – proceedings of national meetings and conferences

E – thematic maps

F – patents, prototypes and data bases

G – exhibits, organization of conferences, editing and similar

H - formation (PhD thesis, research fellowships, etc.)

Research units

Egidio Armadillo DIPTERIS, Università di Genova
Fauso Ferraccioli British Antarctic Survey, Cambridge
Fulvio Merlanti DIPTERIS, Università di Genova
Massimo Verdoya DIPTERIS, Università di Genova
Stefano Urbini INGV, Roma
Giorgio Caneva DIPTERIS, Università di Genova
Giacomo Carenzo DIPTERIS, Università di Genova
Enzo Zunino DIPTERIS, Università di Genova

Date: 10/04/2009

Notes