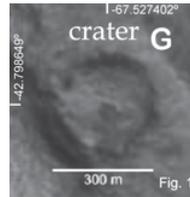


GROUND GRAVITY, MAGNETIC AND ELECTROMAGNETIC SURVEYS ON A CRATER ON BASALT OF BAJADA DEL DIABLO ASTROBLEME-STREWN FIELD

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Introduction: An impact origin has been proposed for the circular structures found in Bajada del Diablo (BdD), Patagonia, Argentina where impact cratering reach two different but contiguous lithostratigraphic units [1] and [2].

Methods: Total magnetic field was measured in and out of crater G (on a volcanic formation) (Fig.1), using a Geometrics 856 proton precession magnetometer. The obtained data were corrected for the diurnal variations in the Earth's magnetic field and the IGRF value was subtracted. 10 profiles were surveyed with a GEM-2 small broadband electromagnetic sensor using 5 different frequencies. Detailed crater topography was determined using a total station. Relative gravity measurements were made using a ZLS Burris Standard gravity meter, 51 stations were surveyed in crater G, with an equidistance of 15 m and a precision of 0.01 mGal. The survey was not tied to an absolute gravity station. The geographic location of each one of the measured gravity stations was determined with a total station. Current standards for reduction of observed gravity to Bouguer anomaly established by the U.S. Geological Survey (USGS) and the North American Gravity Database Committee were applied.



Results: The magnetic anomalies show a circular pattern with magnetic lows (-100 to 500 nT) in the crater's floor. Furthermore, in the crater's rims, high-amplitude, conspicuous and localized (short wavelength) anomalies, ranging between 2500 and -3000 nT, are observed. Such large amplitude and short wavelength anomalies are not detected out of the crater. For all used frequencies, the electromagnetic profiles show lower apparent electrical conductivities in the crater's floor, while the rims present notably higher values. The complete Bouguer anomaly presents a relative maximum value of ~ 1 mGal, which correlates with the crater's floor. This positive anomaly indicates the existence of a mass excess below the floor of crater.

Considering that all the geological formations described in the area of the crater correspond to basaltic flows, no density contrast due to lithological differences should be expected. Therefore, the positive complete Bouguer anomaly in crater G floor could only be satisfactorily explained by means of the anomalous accumulation of blocks of basalts in the rims of the crater. Such accumulation of angular blocks leaves many empty spaces between them, which are filled with air and sand, diminishing the density of the crater's rims with respect to the crater's floors.

Conclusions: Magnetic and Bouguer anomalies in the crater on basalt of BdD are characteristic of impact structures.

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References: [1] Acevedo et al. 2009 *Geomorphology*, 110(3-4): 58-67 [2] Acevedo et al. 2012 *Geomorphology*, 169-170: 151-164.