

### A POSSIBLE IMPACT CRATER IN BASALT AT MESETA DE LA BARDA NEGRA, NEUQUEN, ARGENTINA.

A.C. Ocampo<sup>1</sup>, A.C. Garrido<sup>2</sup>, J. Rabassa<sup>3</sup>, M.C.L. Rocca<sup>4</sup>, J.C. Echaurren<sup>5</sup>, and E. Mazzoni<sup>6</sup>. <sup>1</sup>NASA-Jet Propulsion Laboratory, Pasadena, CA, USA, [adriana.c.ocampo@jpl.nasa.gov](mailto:adriana.c.ocampo@jpl.nasa.gov). <sup>2</sup>Museo Carmen Funes, Av. Córdoba 55 (8318) Plaza Huincul, Neuquén, Argentina. <sup>3</sup>CADIC, Ushuaia, Tierra del Fuego, Argentina. <sup>4</sup>Mendoza 2779-16A, Ciudad de Buenos Aires, Argentina. <sup>5</sup>Codelco, Chuquicamata, Chile. <sup>6</sup>Universidad Nacional de la Patagonia Austral, Río Gallegos, Santa Cruz, Argentina.

**Introduction:** Recent efforts to identify additional impact craters in Argentina, making use of LANDSAT imagery and aerial photographs, have identified a possible new example in this category at Neuquén province, Patagonia. The identified structure is an isolated crater (1.5 kilometers in diameter) located in the southwestern extreme (S 39° 10', W 69° 53')[1] of a large relict basaltic plateau named Meseta de la Barda Negra. The aerial photographs interpretation allow to show close similarities with Barringer's meteor crater (Arizona, USA). The crater even resembles Barringer's in small details as the little squareness of its shape. The depression is surrounded by a raised rim which is mainly developed in the southwestern area. The rim is composed by angular blocks and wide boulders, possibly corresponding to an ejecta blanket. Stratigraphically the crater affects two units, the Basalto Zapala (olivinic basalt flow) which age was established by radiometric data as between  $8,6 \pm 0,4$  and  $2,3 \pm 0,3$  million years (Later Miocene – Early Pliocene) [2]; and the underlie Collón Cura Formation (cineritic tuffs and tuffites) attributed to Middle Miocene [3]. The hole is partially covered by modern eolian sand and colluvial deposits. In the bottom, small expositions of thin diatomitic levels are present (Tula mine). In situ research revealed possible shatter cones and breccias in the middle and highest part of the slope. According to the geological context of the area, the estimated age of Barda Negra's crater is youngest than Lower Pliocene.

If this crater is in fact a new meteorite impact site then it would be very important and interesting as the second simple-type impact crater in basaltic rocks on Earth. To date, Lonar Lake's crater in India, (1.8 km), is the only simple-type terrestrial impact crater in basalt known in the world [4]

A mathematical model for the impact was applied in quantum formalism, polynomial elements and Korteweg-DeVries (KDV) soliton theory [5], using a HP 49g, which is a Scientific Programmable Graphing Calculator with 1.5 Mb in RAM. For the impact event are used the following parameters: diameter ~ 1.5 Km, circular shape, basement composition ~ basaltic. According this model the asteroid diameter is ~ 48.65 m, with a velocity and impact angle of ~ 17.91 km/s and 41.78° respectively. The number of rings are calculated in ~ 0.37 with a initial crater profundity of ~ 156.52 m. The total energy in the impact is calculated in ~ 1.01E24 Ergs, i.e., ~ 23.97 megatons. Further investigation of this crater is in progress.

**Acknowledgements:** This research project is being funded by The Planetary Society, Pasadena, California, USA. **References:** [1] Rocca M.C.L. (2004), *Meteoritics and Planetary Science*, 39(8), Supplement: A89. [2] Valencio, D.A., Lineres, E., and Creer, K.M. (1969), 4° Jornadas Geológicas Argentinas 2: 397-415. In Spanish [3] Leanza, H.A and Hugo, C.A. (1997), *Hoja Geológica 3969-III-Picun Leufu*, Boletín SEGEMAR Nr. 218. In Spanish. [4] Fredriksson K. et al. (1973), *Science* 180: 862-864. [5] Echaurren J., and Ocampo A.C., (2003), EGS-AGU-EUG Joint Assembly.