HYDROTHERMALLY-ENHANCED MAGNETIZATION AS A SOURCE OF THE CENTRAL MAGNETIC ANOMALY OF THE HAUGHTON IMPACT STRUCTURE, CANADA.

W. Zylberman[1,2], J. Gattacceca[2], Y. Quesnel[2], P. Rochette[2], G.R. Osinski[3], F. Demory[2], M. Uehara[2].
[1]Institut Polytechnique LaSalle Beauvais, 19 rue Pierre Waguet, 60026 Beauvais, France. E-mail: zylberman@cerege.fr. [2]CEREGE, Université d'Aix-Marseille, CNRS, IRD, UM34, 13545 Aix-en-Provence, France. [3]Centre for Planetary Science and Exploration, Departments of Earth Sciences & Physics and Astronomy, University of Western Ontario, 1151 Richmond Street, London, Ontario, Canada N6A 5B7.

The Haughton impact structure, located on Devon Island in Nunavut (Canada), is a mid-size impact structure (23 km) [1] characterized by the unique combination of a negative gravity anomaly with a positive, km-size magnetic anomaly which reaches a maximum intensity of 900 nT over the crater central uplift [2,3]. The source of the magnetic anomaly has been shown to extend almost to the surface where a magnetization of 2.3 A/m is necessary to account for the superficial part of the anomaly [3].

As the origin of the magnetic anomaly remains unclear, a new field expedition was conducted in 2013. This campaign, focused on the center of the crater, led to the acquisition of a new geophysical dataset (ERT, magnetic mapping) as well as three subsurface drill cores down to 13 m depth. These cores revealed clast-rich impact melt rocks with strong evidence for hydrothermal alteration (*e.g.* gypsum veins) within the core drilled above the magnetic anomaly.

Rock magnetism measurements as well as reflected-light microscopy, magneto-optical imaging, SEM and XRF analyses were performed on the sampled impact-melt rocks and clasts to give new clues on the origin of the magnetic anomaly. Preliminary results show that the hydrothermally-altered core is four times more magnetized than non-altered materials both from core and surface. This observation supports the hypothesis that intense post-impact hydrothermal processes enhanced the magnetization of impact melt rocks within Haughton central uplift.

References: [1] Osinski G. R. et al. 2005. *Meteoritics & Planetary Science* 40:1859–1877. [2] Pohl J. et al. 1988. *Meteoritics & Planetary Science* 23:235–238. [3] Quesnel Y. et al. 2013. *Earth and Planetary Science Letters* 367:116–122.