

### “MISSION TO ROCHECHOUART” PROJECT: A REVIEW.

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**Introduction:** In 2019 the Rochechouart structure celebrates the 50<sup>th</sup> anniversary of its recognition as a meteoritic impact by François Kraut [1]. It is also the 5<sup>th</sup> anniversary of its “revival” with the launch of the project “Mission to Rochechouart” presented at the Meteoritical Society Meeting in Casablanca [2]. We focus on what has been achieved since its announcement, and what will be achieved in the future.

**Objective and means:** The general objective of the project was announced in 2008 at the LMI-IV Conference and published in [3]. The aim is valorizing the Rochechouart impact structure as an international natural laboratory for ground truth data mining of impact cratering and its collateral effects on planetary surfaces. Inspired by Apollo, the means proposed in Casablanca for mobilizing the community worldwide on Rochechouart was realizing the first drilling campaign within the geosite and making the targeted 300 m of cumulated cores available to the world community via a dedicated storage facility on site and an organisation to facilitate interactions and coordination [2].

**Results:** Thanks to the support of the local territories, the State and a number of scientists who endorsed these two complementary projects, the CIRIR (Center for International Research and Restitution on Impacts and on Rochechouart) was created in 2016 and the drilling program was undertaken in 2017-2018. A total of 8 sites in the “Reserve Naturelle Nationale de l’Astroblème de Rochechouart-Chassenon” were drilled delivering over 540 m of core [4]. In parallel, the CIRIR has grown by associating individuals and organisations (currently over 60 scientists from a dozen countries) taking advantage of the geosite, the geomaterials, the facilities on site, and the group itself for carrying out projects of their own. They all contribute to the valorization of the impact geohéritage to the mutual benefit of the scientific community, the geohéritage, the Reserve, and the public at large. The combined effort forms the CIRIR program currently counting 60 research projects covering essentially all impact-related topics (details at [https://drive.google.com/open?id=1uy5BUqBil6qPhrzYTb\\_eEcqsI3h0OUj](https://drive.google.com/open?id=1uy5BUqBil6qPhrzYTb_eEcqsI3h0OUj)). Projects unrelated to the cores and/or not requiring core samples have started (age, alteration, paleoenvironment, stratigraphic relationship between the diverse impactites, size and shape of the initial crater, etc...) and already resulted in a significant increase in the bibliographic record on Rochechouart within the last 5 years [4,6-12]. In parallel, the CIRIR facility has been installed at Rochechouart. It is composed of two units. One is designed for accommodating and managing the cores and the surface samples collected by scientists and by the public (participative science). It builds up a unique “dynamic” impact sample library made available to the community (“impact on shelf”) [5]. Beyond storage, it includes a laboratory for sample preparation and for optical studies. The second unit provides housing and office facilities (to be completed in late 2019) for up to 10 visiting scientists, students and professionals coming to take advantage of the sample library and/or the field itself and/or the presence of CIRIR members for their research and/or training. A linked lodge unit located 12 km from Rochechouart can accommodate up to 50 people in 16 chalets. These facilities are maintained by public money and are available at no charge as part of a “world public service” for promoting the Rochechouart geosite and impact science in general.

**Current developments and perspectives:** Most of the outcomes of the drilling campaign are still to come. The first series of samples requested by CIRIR PI’s will be delivered in the fall. The next call for samples is open and will close in Spring 2020. Until then the current CIRIR members have a priority for requesting samples. Yet new incomers and new projects are most welcome and encouraged. The site and the facilities are open to the community at large. Beyond research, the CIRIR program and teams expand into education and outreach including geoconservation and geotourism, for empowering the science achieved on Rochechouart and on impact cratering in general and the human adventure that goes with it, and make it profitable to the public at large. Projects in these fields are most welcome too.

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**References:** [1] Kraut F. (1969) *Geologica Bavarica*. 61, 428–450. 77 [2] Lambert et al.(2014) *MAPS* 49 s1 Abstract #5171. [3] Lambert P. and Trumel H. (2010), in *Materials under extreme loadings: Application to penetration and impact*, John Wiley 1-44 [4] Lambert P. and al. (2019) *LPS 50th*, Abstract #2005 [5] Lambert P. et al.(2017) in *LPS 48th*, abstract #1936.pdf. [6] Sapers H.M et al. (2014), *Meteoritics & Planetary Science* 49, Nr 12, 2152–2168 [7] Horne A. (2016), *ASU Master Thesis*. [8] Simpson et al. (2017) *Earth and Planetary Science Letters* 460, 192–200. [9] Cohen, B. E. et al. (2017) *Meteoritics and Planetary Science*, 52(8), 1600-1611. [10] Rasmussen R. and Stockli D. F. (2019), *LPS 50th*, Abstract#2820. [11] Plan A et al. (2019) *MAPS*, abstract this conference. [12] Örmö et al. (2019) *LPS50th*, abstract #1785.