BRAIN-be
Belgian Research Action through Interdisciplinary Networks

AMUNDSEN

Antarctic Meteorites cUratioN, Digitalization and conSErvatioN

DURATION
15/12/2015 – 15/03/2018

BUDGET
256 115 €

PROJECT DESCRIPTION

Over the last 5 years, joint Belgian-Japanese missions in Antarctica (VUB-ULB, SAMBA project) have recovered more than 1200 pristine and unique meteorite samples. The arrival of these new samples strongly stimulates the curation of meteorite collections in Belgium, supported by the BELAM project (2012-2018, funded by BELSPO). The BRAINS project AMUNDSEN expands and refines the existing expertise in meteorite curation.

The AMUNDSEN project is dedicated to the conservation, classification, valorisation and digitalization of meteorites at the RBINS with the goal to improve the maintenance of this fragile collection, develop best practice meteorite curation protocols, provide the most appropriate sampling procedure and stimulate and facilitate the scientific usage of the collection by the international research community. Three multidisciplinary approaches, highlighted below are proposed.

(1) The first part of this project relates to the most troubling problems of meteorite conservation: their rapid alteration, which even in the case of this freshly collected collection, is already observed within some of the specimens. To better constrain the rate of this weathering process and optimize the conservation conditions, a set of alteration/oxidation experiments are planned, with the aim to propose possible remediation processes. First, the current conservation state of the collection will be carefully accessed, and the most “at risk” specimens identified. The approach selected is to experimentally reproduce in accelerate the alteration processes by taking ambient conditions (humidity and temperature) to extreme levels. Experiments must be conducted over a certain amount of time to obtain significant results in terms of best temperature and humidity conditions. The changes of regulations at the RBINS following the implementation of the ISO9001 norm entail the obligation to provide optimal conditions of preservation for the collections.

(2) We aim to provide on-line broaden access to rare and unique meteorite by digitizing thin sections of the most outstanding samples (achondrites and specific types of ordinary chondrites), providing directly online a navigable images obtained with the optical microscope and coupled to a detailed chemical map of the area at high-resolution, as produced by micro-X-ray Fluorescence. Such digitized thin sections will contribute to the study of RBINS meteorites, avoiding excessive handling, and will help requesters in their sample selection.

(3) As a curation center recognized by the Meteoritical Society, the RBINS is committed to provide the best curation procedures possible. We plan to improve and advance the existing meteorite classification procedure already in use, e.g. by using working with thick sections instead of thin sections, when possible and possibly testing the use of Raman and micro-X-Ray Fluorescence (µ-XRF) procedures. Therefore, efforts will be devoted to defining and calibrating these new techniques using selected specimens recovered in Antarctica, in comparison with the classification work ongoing at the National Institute of Polar Research (NIPR, our Japanese partner). In addition, the procedure implemented at the RBINS during the BELAM project can still be improved and the AMUNDSEN project will seek, by meeting other curators, by visiting other curation centers by attending curation meeting in order to improve service towards the scientific community.

The different partners contribute their individual specialties, interpret the results, and combine them into an integrated model. The coordinator at the Royal Belgian Institute of Natural sciences (RBINS) focuses on the mineralogical characterization of the meteorites. The partners from the ULB and the VUB bring their expertise in the fields of meteorites and geochemistry.

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The AMUNDSEN project clearly encourages a responsible, long-term protective curation program for meteorites at the RBINS. This project supports the preservation and, through its research output, the valorization of Belgium museum collections and national heritage. The proposed research offers a unique opportunity for a multidisciplinary approach (petrology, mineralogy, and geochemistry) and international collaboration using state of the art techniques. Finally, the results of this project will be integrated within the HORIZON 2020 COMPET-8-2014 program, which includes an implementation of a European extra-terrestrial sample curation facility. The ultimate goal of the project is to bring the curation of extra-terrestrial samples in concordance with the new regulation procedure for sample conservation to be implemented at the RBINS in the frame of the new ISO9001 norm.

CONTACT INFORMATION

Coordinator

Sophie Decrée
Royal Belgian Institute of Natural Sciences (KBIN-IRNSB)
Sophie.decree@naturalsciences.be

Partners

Vinciane Debaille
Université Libre de Bruxelles (ULB)
Laboratoire G-Time
vdebaill@ulb.ac.be

Philippe Claeys
Vrije Universiteit Brussel (VUB)
Analytical, Environmental and Geo-Chemistry
phclaeys@vub.ac.be

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BELGIAN SCIENCE POLICY OFFICE
Louizalaan 231 Avenue Louise • B-1050 Brussels
Tel. +32 (0)2 238 34 11
http://www.belspo.be/brain-be/ • Email : BRAIN-be@belspo.be