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Introduction: Micrometeorites (MMs) are interplanetary dust particles reaching the Earth surface with size from ca. 10 to 500 µm. Research on MMs started in France about 4 decades ago with the pioneering work of M. Maurette and the financial and logistic help of the French polar institute (IPEV) [1, 2]. Since 2000, we perform MMs collections at the vicinity of the French-Italian (IPEV/PNRA) station Concordia located at Dome C (75° S, 123°E) [3]. The central regions of the Antarctic continent present major advantages to recover MMs with a minimal terrestrial weathering, providing asteroidal and cometary particles to compare with meteorites, data from in-situ spatial missions, and samples returned by spatial mission such as Stardust, Hayabusa 2, OSIRIS-REx and MMX [4, 5].

The Concordia collection: Within the last 2 decades, we performed 6 fields trips at Dome C and collected and melted several tens of m^3 of ultra-clean snow in 5-8 deep trenches. The filters were subsequently shipped back to France in dedicated dry containers (under N_2 atmosphere). The filters from MM collection are stored in a clean-room where particles are progressively extracted under a binocular microscope, and placed in a cavity glass or quartz slide. Every particle is documented (size, color, surface characteristics) and optical images are taken generating a first set of data for the particle. All particles (except the cosmic spherules - CSs) are then split in several fragments for multi-analytical purposes, which are then documented. One fragment of each particle, and whole CSs, are subsequently analyzed by scanning electron microscopy (SEM), generating a second set of data with secondary electron (SE) and back-scattered electron (BSE) images, and EDX spectra of the bulk particle and of regions of interest. The type of the particle is then determined following the criteria defined in [6-8]. Complementary fragments of each particle can be subsequently mounted on different types of supports (e.g. epoxy mounts, diamond cells, gold or indium foils, TEM grids…) to perform multi-technique analyses (e.g. electron microprobe, SIMS, µRaman, µFTIR, AFM-IR, STXM-XANES, TEM, …). The large number of MMs characterized also allows performing general studies on the global flux of MMs on Earth (see e.g. [9]).

The MicroMetBase : Since 2016, we store the data in a database: the MicroMetBase. This dedicated database was developed by S. Grégoire (software engineer) using a Mysql data management system and sorting data with PHP code and an html and css language for the user interface. The MicroMetBase contains the general characteristics associated to each particle and allows basic search with pre-defined criteria (e.g. the size, the type, the collection filter…). In September 2021, the database contains entries for 3200 individual MMs and CSs (most of the MMs being split into several fragments). The size of the database is about 30 Go, with 11.6 Mo just considering the metadata without the images.

The future curation center at MNHN: With the support of several institutions (CNES, CNRS, Universities), the National Museum of Natural History (MNHN) in Paris is currently planning to build a national facility for curation of extraterrestrial materials. This center will provide dedicated cleanrooms to preserve the MNHN national meteorite collection, the micrometeorite collection, analytical standards and analogues, and samples returned by spatial missions. A dedicated effort will be devoted to prepare the reception of samples from Phobos to be returned by the future MMX Japanese mission in 2029. In that perspective, we are planning to build a new database, including samples that will be located in the future curation center. The objective will be to catalog samples entering the center, to track in real-time their evolution and location, to provide to users with the history of each sample with the different analyses performed (possibly including some analytical data), and to grant open access to sample catalogues to facilitate sample requests.

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