

ANTARCTIC METEORITES AT THE NATIONAL INSTITUTE OF POLAR RESEARCH: EXPEDITIONS AND CURATION.

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Meteorites are one of the most important extraterrestrial material to explore the evolution of the solar system. Now the sample return missions recover samples from moon, asteroid, and comet. Comparison of meteorites with such returned samples is now significant.

The National Institute of Polar Research (NIPR) has the second largest meteorite collection in the world, since the discovery of Yamato meteorites in 1969. Here, we report the current situations of curation of Antarctic meteorites in NIPR and future Antarctic expedition projects.

Since 1969, 23 meteorite expeditions have been conducted by Japanese Antarctic Research Expedition (JARE) including subordinate of geology and glaciology missions, and six international joint expeditions (with US from 1976-1979, and Belgium from 2009-2013). Before 2002, meteorite expeditions were performed by wintering parties (1.5 years stay in Antarctica) due to the difficulty of access to the Syowa station. We recently started using airplanes (DROMRAN; Dronning Maud Land Air Network) which significantly reduce the time of expeditions. About 17,000 meteorites have been collected, and about 60% of the meteorites have been classified and are ready for research.

All meteorites recovered by JARE are processed and stored at the NIPR curatorial facility. The facility consists of four parts: meteorite storage and processing rooms, an electron microprobe analyzer (EPMA) and a thin section preparation laboratories. The meteorite storage room is a class 10,000 clean room, and is kept at 22 °C for temperature and <50 % for humidity. The meteorite processing room is kept at a positive pressure and has one clean bench for chipping and three diamond wire saws.

The initial classification process for meteorites is as follows;. After macroscopic observations (descriptions of outer surfaces, measurements of weights and sizes, photographing etc.), chips of meteorites are separated using diamond wire saws and/or chisels. Classification is made using both compositions of minerals obtained by EPMA and petrographic observations under optical microscope. Some meteorites may require additional analyses (e.g., bulk chemical and oxygen isotopic analyses). We are attempting to analyze siderophile elements in iron meteorites with laser ablation inductively coupled plasma mass spectrometry (LA-ICP-MS). Classifications of meteorites are presented as Meteorite Newsletters and the database at NIPR as well as Meteorite Bulletins issued from the Meteorite Society.

We plan to conduct meteorite search on the bare ice field around the Yamato Mountains and micrometeorites from other areas in the Phase IX of JARE planned from 2016 to 2021 (JARE 58-63).