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Statistical characteristics of micrometeorites extracted from Antarctic snow (Concordia and Korean collections)

LUCIE DELAUCHE[1], JEAN DUPRAT[2], CECILE ENGRAND[1], EMMANUEL DARTOIS[3], MARIE GODARD[3], FRANCK FORTUNA[3], SILVIN HERVÉ[1], JULIEN ROJAS[4], ELENA DOBRICĂ[5], TOMOKI NAKAMURA[6], JONG IK LEE[7], SANGBUM PARK[7], CHANGKUN PARK[7], LAURE BEJACH[1] AND MATTHIEU GOUNELLE[2]

[1]IJCLab, CNRS/Univ. Paris-Saclay
[2]IMPMC/MNHN, CNRS, Sorbonne Univ., IRD
[3]ISMO, CNRS/Univ. Paris-Saclay
[4]ICP, CNRS/Univ. Paris-Saclay
[5]Hawai'i Institute of Geophysics and Planetology, School of Ocean and Earth Science and Technology, University of Hawai'i at Mānoa
[6]Tohoku University
[7]Korea Polar Research Institute (KOPRI)

The Concordia micrometeorite (MM) collection is gathered in Antarctic snow near the French-Italian station Concordia at Dome C. Six field expeditions were performed from 2000 to 2019 (hereafter DC00 to DC19). Trenches were dug in the snow, about 2 km north-west upwind of the station, to minimize contamination from the station. The snow was melted on site and filtered on nylon filters with openings of 30 µm (DC00, DC02 and DC06) and 20 µm (DC14, DC16 and DC19). Filters were dried and sealed under dry nitrogen conditions and brought back to France. In the laboratory, the particles (3844 extracted so far) are hand-picked from the filters under a binocular microscope in an ISO7 cleanroom dedicated to micrometeorite handling and curation at IJCLab. The Korean MM collection was obtained from 2850 kg of snow collected in Antarctica during 6 annual field expeditions from 2013 to 2018. The snow was brought back to KOPRI, Korea and melted on filters with openings of 1µm.

The MMs are classified according to their degree of heating during atmospheric entry: Cosmic spherules (**CS**) are usually fully melted micrometeroids, while scoriaceous MMs (**Sc**) are partially melted. Unmelted MMs are divided into 4 types: i) fine-grained fluffy MMs (**FgF**) are porous aggregates of mostly anhydrous sub-micrometer minerals in organic matter; ii) fine-grained compact MMs (**FgC**) contain compact aggregates of hydrous and anhydrous sub-micrometer sized minerals and organics; iii) coarse-grained MMs (**Cg**) consist of large anhydrous minerals; iv) ultracarbonaceous Antarctic MMs (**UCAMMs**) are dominated by organic matter mixed with a small proportion of minerals.

The proportions of the different MM types in the Concordia collection are represented in **Figure 1**. In the Korean collection, a large fraction of the particles is below 20 µm (**Figure 2**), a size range not recovered in the Concordia collection. Abundant Fe oxide spherules of unidentified origin were collected in both sites with sizes ~ 50 µm in Concordia and ~ 20 µm in the Korean collection. The proportions of melted/unmelted extraterrestrial particles are comparable in both collections.

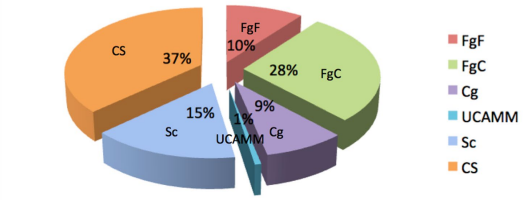

Fig. 1: Textural types of Concordia micrometeorites collected at Dome C from 2002 to 2019.

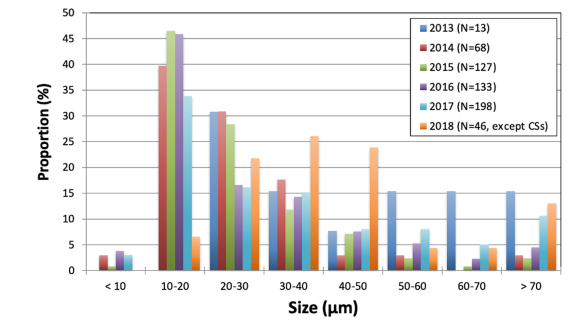

Fig. 2: Size distribution of micrometeorites in the Korean collection from 2013 to 2018. FeO oxide spherules were not taken into account in this plot.