MICROMETEORITES FROM THE SØR RONDANE MOUNTAINS, ANTARCTICA

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Micrometeorites are dust-sized (i.e., 10 to 2000 μm in size) extraterrestrial particles reaching the Earth's surface [1]. We report the discovery of hundreds of micrometeorites during the 2017-2018 BELAM (Belgian Antarctic Meteorites) expedition that took place in the south to south-east area up to 40 km away from the Belgian Princess Elisabeth Station (71°57′00″S; 23°20′49″E).

Two types of micrometeorite traps were targeted on the glacially eroded tops of Vengen, Walnumfjellet, Widerøfjellet, Svindland and Smalegga Mountains, consisting of 1/ seven samples of soils that have potentially been exposed for long periods of times (up to several Ma), similarly to samples collected in the Atacama Desert [2] and 2/ five samples of wind catchment areas, such as the base of large boulders or in cracks. The lee-sides of three lateral and supraglacial moraines were also sampled, totalling eleven samples. In all cases, the sampled material, weighing 80 kg, consisted of moderately sorted fine-grained rock detritus.

Preliminary results suggest that the distribution of micrometeorites varies according to the type of trap, with glacial moraines exhibiting the lowest concentrations, followed by wind-catchment areas and soils from the top of the glacially eroded summits of mountains. Samples exposed on the border of the Sør Rondane Mountains with the Antarctic Plateau exhibit concentrations one order of magnitude greater than in moraines. Similarly to the Larkman Nunatak micrometeorite collection [3], the micrometeorite accumulation mechanism in moraine and wind-catchment areas seems to be mainly controlled by wind. Conversely, direct infall of micrometeorites may contribute significantly as an accumulation mechanism in exposed soil samples, as evidenced by the presence of large micrometeorites (>400 μm in size). Thus, this new collection, comprising various sampling site types, may serve as the basis to understand micrometeorite distribution patterns in Antarctica.

References: [1] Rubin and Grossman (2010) MAPS 45, 114-122 [2] Van Ginneken et al. (2017) GCA 212, 196-210 [3] Genge et al. (2018) MAPS, accepted.