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Antarctic micrometeorites as clues to the early Solar System and planetary evolution:

MICROMETA (micro-meteorites from Antarctica).

Of all the material reaching Earth from space (30,000 to 40,000 metric ton/year), only a small part will survive the heating and shock experienced upon entry in the atmosphere. The large majority of this material rains on Earth in the form of rounded extraterrestrial particles less than 2 mm in size, known as micrometeorites. Although meteorites in general provide us with essential information on the origin and evolution of the planets and the Solar System, micrometeorites that originate from the most primitive objects still remaining in the Solar System raise an even higher scientific interest. However, the difficulties in collecting and analysing micrometeorites hampered routine research so far. Two developments have changed this situation in recent years. The analytical possibilities tominimize the required amount of material for isotope analyses have significantly improved. Powerful isotope tracers (such as for example ^{53}Mn-^{53}Cr, ^{146}Sm-^{142}Nd, and ^{182}Hf-182W) can shed light on the terrestrial planets' accretion rate, on the timing of core formation and the evolution of the mantle and crust, while stable isotopes of lighter elements (O, Mg, Si, Fe, Cu, Zn) can provide important information on the source of the micrometeorites and on the processes they underwent in space. Secondly, only a few years ago huge quantities of very well preserved micrometeorites of various sizes and types were recovered in cracks of eroded granitic nunataks in the Frontier Mountains of Victoria Land in Antarctica, where they most likely accumulated for close to 1 million year. In these collections, the largest size fraction of more than 1 mm is very well represented and makes it possible for the very first time to carry out high precision isotope measurements. Combining these research developments and the existing Belgian cosmochemical capabilities with the unique location of the PE station in an area expected to yield important accumulations of micrometeorites in cracks, crevices, joints or fractures of the neighbouring lithologies, the emerging field of micrometeorites is a complemen-