MICROTEKTITES FROM THE TRANSANTARCTIC MOUNTAINS.

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Microtektites were discovered on top of Frontier Mountain during the 2003 PNRA expedition. They were found in the micrometeorite traps described by [1] and [2]. These are joints and decimetric-sized pot-hole cavities of flat, glacially eroded granitic surfaces filled iwith fine-grained bedrock detritus. During the 2006 PNRA expedition, microtektites were also found in two other glacially eroded granitic summits of the Transantarctic Mountains in northern Victoria Land: Miller Butte and an unnamed nunatak in the Timber Peak area, ~30 km and ~100 km due north and south of Frontier Mountain, respectively. A total of ~130 microtekites have been so far separated from the host detritus (along with thousands of micrometeorites) in the 400-800 μm size fraction. Their concentration is in the order of 1 particle per 100 g of detritus. Preliminary observations revealed microtektites also in the 200-400 μm size fraction.

Description: Microtektites are pale-yellow, transparent, glass spheres. Rare exceptions have oblate to button shapes. Rare particles contain one or two microbubbles. The external surfaces is typically smooth and clean, although some particles are partially covered by Fe,K- and Ca-sulphate deposits. Eleven particles analysed by syncrotron X-ray diffraction at the BM8 GILDA beamline (ESRF Grenoble) resulted completely amorphous.

Bulk composition: EMP major element composition of 37 particles defines a single coherent population of microtektites. The silica content varies from 64.4 to 77.7 wt%. All major element oxides, except K_2O, show negative correlation with SiO_2. The total alkalies (Na_2O+K_2O) are very low (0.90 – 1.85 wt%) and the K_2O/Na_2O is always >1 (2.7 – 4.4). The trace element composition of 6 particles by LA-ICP-MS appears to be homogeneous, and most elements match the average Upper Continental Crust composition defined by [3].

Age: Preliminary laser fusion ^{40}Ar-^{39}Ar analyses of the largest particles define a peak in the age distribution of 8.8 ± 0.4 Ma (weighed mean age, 6 particles). This age is distinct from those of the other known microtektite strewn fields, i.e. the North American (35 Ma), Ivory Coast (1.1 Ma) and Australasian (0.8 Ma) strewn fields (e.g. [4], [5]).

Conclusions: Microtektites from the Transantartic Mountains in northern Victoria Land identify a new microtektite strewn field associated with an impact on Earth's continental crust in the Late Miocene. The impact crater is yet to be located, but future studies of size distribution (and concentration) along the ~3500 km long Transantarctic Mountain range may help to predict the source crater location. In addition, the age of microtektites constrains the minimum age of the collection surfaces, with important implications on the Antarctic bedrock denudation history and the age of the micrometeorite traps in which they were found.

References: [1] Rochette et al. 2005. *LPSC XXXVI*, #1315. [2] Folco et al. 2006. *Meteorit. Planet. Sci.* 41:A56. [3] Taylor & McLennan. *Rev. Geophys.* 33:241-265. [4] Glass et al. 2004. *Geochim. Cosmochim. Acta* 68:3971-4006. [5] Montanari & Koeberl 2002. *Impact stratigraphy*. Springer. 364 pp.