BERYLLIUM-10 IN INDIVIDUAL AUSTRALASIAN MICROTEKTITES AND ORIGIN OF TEKTITES.

C. Koeberl[1], K. Nishiizumi[2], M.W. Caffee[3] and B.P. Glass[4]. [1]Univ. Vienna, Althanstrasse 14, 1090 Vienna, Austria, and Natural History Museum, 1010 Vienna, Austria. E-mail: christian.koeberl@univie.ac.at. [2]Space Sci. Lab., Univ. California, Berkeley, CA 94720, USA; [3]Purdue Univ., West Lafayette, IN 47907, USA; [4]Univ. Delaware, Newark, DE 19716, USA.

The formation of tektites is still a somewhat open question. It is clear that tektites form during hypervelocity impact events on Earth and their composition is identical to terrestrial surface rocks, with no or only very minor meteoritic admixture. In tektite samples from three of the four strewn fields, the cosmogenic radionuclide ^{10}Be, has been found. The nuclide forms by interaction of cosmic rays with nitrogen and oxygen in the atmosphere and is concentrated in the top of any sediment column. The ^{10}Be half-life is 1.36 Myr; thus, it can only be studied in relatively young impact structures and glasses, excluding the North American tektite strewn field and making detection in Central European tektites difficult. The average value of ^{10}Be in Australasian tektites is about 100×10^6 atoms/g [1]. This is comparable to ^{10}Be contents of near-surface source materials, e.g., soils or sediments (marine and land). Also, within the Australasian strewn field there is a correlation between the tektite type and the ^{10}Be concentration [1]. Aerodynamically shaped tektites (australites) found farther from the presumed impact site in southeast Asia have higher contents (on average about 136×10^6 atoms/g) compared to layered (Muong Nong-type) tektites, which have not been transported as far (on average about 59×10^6 atoms/g). This has obvious implications on the formation mechanism of tektites. Measurements by [2] show that ^{10}Be concentrations of Ivory Coast tektites (derived from the Bosumtwi impact structure) are consistent with formation from mostly near-surface sediments or soils. The presence of ^{10}Be in tektites indicates that these glasses are derived from near-surface target rocks.

Microtektites make an important part of each strewn field, being widely distributed and, in most cases, outlining the extent of the strewn field. It was suggested that microtektites form even before normal tektites in the earliest phase of the impact process. The first ^{10}Be measurements in microtektites were reported by our group a few years ago [3] on a composite samples of seven microtektites (this was necessary because of the small sizes of such measurements), with a total mass of 620.5 µg. The microtektite composite was found to contain $260 \pm 60\times10^6$ atoms ^{10}Be/g [3], higher than the abundances in the other tektite types. Recent improvements in analytical methods allowed the determination in 13 individual microtektites, all from the Australasian strewn field. The contents range from 90 to 1230×10^6 atoms ^{10}Be/g. These data confirm the earlier results, namely that the average content is about 2x that of splash-form (ablated) australites, and that microtektites have the highest ^{10}Be in a strewn field, indicating that microtektites are derived from the topmost surface of the target and that they are formed in the earliest phase of the impact process, well before crater formation.

References: [1] Ma P. et al. 2004. *Geochim. Cosmochim. Acta* 68, 3883-3896. [2] Serefiddin F. et al. 2007. *Geochim. Cosmochim. Acta* 71, 1574-1582. [3] Koeberl C. et al. *MAPS* 46, A127.