Geophysical Research Abstracts,
Vol. 10, EGU2008-A-01782, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-01782
EGU General Assembly 2008

Investigations of suevite from the Eyreville drillcore, ICDP-USGS Chesapeake Bay impact structure deep drilling project, Virginia, USA.

K. Bartosova (1), C. Koeberl (1), R.-T. Schmitt (2) and F. Brandstaetter (3)

(1) Center for Earth Sciences, University of Vienna, Althanstrasse 14, A-1090 Vienna, Austria, (2) Mineralogy, Museum of Natural History, Humboldt-University, Invalidenstrasse 43, D-10115 Berlin, Germany, (3) Natural History Museum, Burgring 7, A-1010 Vienna, Austria (katerina.bartosova@univie.ac.at)

The 85-km-diameter late Eocene Chesapeake Bay impact structure is one of the largest and best preserved impact structures on Earth [1]. In 2005-2006 three boreholes were drilled as part of the ICDP-USGS Chesapeake Bay Impact Structure Drilling Project at Eyreville Farm in Northampton County, VA, USA. At Eyreville the crater fill comprises (from the top down) post-impact sediments, sediment clast breccias and sedimentary megablocks (interpreted as resurge breccias), a large granitic and a smaller amphibolitic megablock, gravelly sand, suevites and cataclasites, and granites/pegmatites and mica schists [1]. Suevite – a polymict, melt-bearing impact breccia – occurs between 1397 and 1551 m depth [2]. We present a petrographical and geochemical study of the suevite and focus on detailed description of the melt particles. Suevite has a grayish, fine-grained clastic matrix and consists of a variety of rock and mineral clasts, melt particles, as well as secondary minerals. Lithic fragments comprise sedimentary (siltstone, mudstone, shale, sandstone, and graywacke), metamorphic (schist, phyllite, gneiss, and quartzite), and igneous lithologies (granite, pegmatite, and dolerite). Mineral clasts include quartz, K-feldspar, plagioclase, muscovite, biotite, opaque (mostly pyrite) and other accessory minerals (incl. epidote, zircon, garnet, apatite, tourmaline). The SiO_2contents decrease, whereas the contents of some other major oxides (TiO_2, Al_2O_3, and Fe_2O_3)increase with increasing depth. Siderophile element contents are lower than crustal values. The proportion of ma-

trix (material <0.2 mm) varies from 7 to 67 vol%, and the amount of melt and partly melted material varies from about 1 to 77 vol% in our suevite samples (based on point-counting investigations of 27 samples). Melt particles are most abundant near the top of the suevitic unit (up to 34 vol% in the interval 1399-1422 m) and around 1450 m (up to 77 vol%). Millimeter- to centimeter-sized melt particles (up to 5 cm in size) are frequently ovoid to amoeboidal in shape and commonly show flow structures. Most of the particles are devitrified and altered; only at depths around 1415 m fragments of clear to brownish (or rarely greenish) non-altered glass were observed. There are several prominent types that can be distinguished on the basis of color, microtexture, and chemical composition: 1) clear, brownish, or greenish glass with high silica content, often with flow texture (dark and light colored schlieren); 2) brown melt, completely altered to finest-grained phyllosilicate minerals; 3) silica melt recrystallized to chert; and 4) melt with intersertal texture (with feldspar microlites). The composition of the melt particles was investigated with SEM/EDX and is distinct for each type of melt. Mixing calculations of proportions of rocks involved in formation of the melt particles are in progress.

Acknowledgments: The drilling at Eyreville was supported by ICDP, USGS, and NASA. The present work was supported by the Austrian Science Foundation FWF, project P18862-N10 (to C.K.).

References: [1] Gohn G. S. et al. (2006) *EOS* 87, 349 & 355. [2] Horton J. W. et al. (2007) *Geological Society of America Abstracts with Programs*, 39 (6), 314.