DISTRIBUTION OF SHOCKED QUARTZ GRAINS WITH DEPTH IN CENTRAL UPLIFT OF THE BOSUMTWI IMPACT CRATER, GHANA.

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Introduction: During the 2004 ICDP drilling project at the 1.07 Ma Bosumtwi impact structure, Ghana, the LB-08A bore-hole with a final depth of 451 m below lake level was drilled into the central uplift [1-2]. This drill core consists of approximately 25 m of polymict, clast-supported lithic breccia intercalated with suevite, which overlies fractured/brecciated basement composed of metasediment (mainly meta-greywacke) [2]. Here, we report the results of a study of the distribution of shocked quartz grains (with planar fractures [PFs] and planar deformation features [PDFs]) in meta-graywacke samples. For this study, systematic analysis of ~9000 quartz grains in eighteen different samples (of comparable grain size) from the basement was carried out using an optical microscope and a 4-axis universal stage.

Results: Shocked quartz grains observed in meta-graywacke samples display PFs and PDFs (1, 2, or rarely 3 to 4 sets), some of which are decorated with numerous small fluid inclusions; some of the shocked grains show a “toasted appearance”. This study revealed an obvious decrease of the abundance of shocked quartz grains with increasing depth, from ~60 rel% shocked grains at 270 m, to ~20 rel% at 380 m, and just a few shocked quartz grains at around 450 m depth. Surprisingly, the relative abundance of quartz grains with 1 and 2 sets of PDF is relatively constant with depth, averaging about 68 and 32 rel%, respectively. The relative abundances of toasted quartz grains and of those with decorated planar features show a moderate, but significant correlation (R=0.64).

Discussion: The observed distribution of the shocked quartz grains reflects the variation of shock pressure in the uppermost part of the central uplift. Estimation of shock levels by measuring the PDF orientations in quartz grains is currently in progress and will be used to estimate the amount of shock-wave attenuation in the uplifted target rocks.

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References: [1] Koeberl, C. et al. 2007. *Meteoritics & Planetary Science* 42:483-511. [2] Ferrière, L. et al. 2007. *Meteoritics & Planetary Science* 42:611-633.