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Mineralogical and geochemical observations on core LB-O8A from the central uplift of the Bosumtwi impact structure, Ghana.

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The 1.07 Ma old, 10.5-km-diameter Bosumtwi impact structure in Ghana is a well-preserved complex impact crater with a pronounced rim and small central uplift [1-2]. Two boreholes (LB-O7A and LB-O8A) were drilled in the deep crater moat and on the outer flank of the central uplift, respectively, as part of the 2004 International Continental Scientific Drilling Program (ICDP) project [3]. Here we present observations on lithostratigraphy, mineralogy, shock petrography, and geochemistry of drillcore LB-O8A. This drillcore is composed of suevite, from 235.6 to 261.0 m, and of an alternating sequence of metasediment (meta-greywacke dominant), from 261.0 to 451.33 m (the final depth of the borehole) and a few suevite and granitoid dike intercalations. The breccia samples from this drillcore contain between 0.4 and 15 vol% of subrounded to irregular mostly devitrified melt particles (100 μm to 0.5 cm in size). The suevites have a fine-grained fragmental matrix and contain a variety of lithic clasts including greywacke (some with strong mylonitic fabric, others containing much altered feldspar), phyllite, mica schist, and well-laminated organic shale. Lithic clasts are irregularly distributed but dominated by greywacke throughout the section. Some quartz clasts have PFs and PDFs (1 or 2 sets), and other quartz clasts are transformed to diaplectic glass. Suevites from borehole LB-08A differ in their petrographic characteristics from suevites outside of the crater rim [4]. In the metasediment section (bedrock), meta-greywacke shows a large grain size variation (fine-grained to gritty); some samples display extensive (even penetrative) fracturing or local brecciation, and

some shock effects are seen in quartz. Post-impact alteration is indicated by the presence of calcite veinlets or pods, iron oxides, and pyrite aggregates throughout the core. Shock deformation of the metasediment (bedrock) changes throughout the core, but its amount is not correlated with depth. Geochemically the suevite samples show only minor variations of the major and trace element abundances, but a few samples have elevated Cr and Ni contents, which may be a first indication for the presence of an extraterrestrial component.

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