

2006 Philadelphia Annual Meeting (22–25 October 2006)

Paper No. 119-1

Presentation Time: 1:30 PM-5:30 PM

**DRILLING INTO THE BOSUMTWI IMPACT CRATER, GHANA:
INVESTIGATING THE CRATER FILL OF A WELL-PRESERVED COMPLEX
IMPACT STRUCTURE**

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The 1.07 Ma old Bosumtwi impact structure, Ghana, with a rim-to-rim diameter of 10.5 km, is a well-preserved complex impact crater with a pronounced rim and small central uplift. The Bosumtwi crater was drilled in 2004 as part of the International Continental Scientific Drilling Program (ICDP), and two drillcores through impactite crater fill were recovered, LB-07A and LB-08A, in the deep crater moat, and on the outer flank of the central uplift, respectively. The LB-07A core covers the 333.38-545.08 m depth interval and consists of approximately 80 m of polymict lithic breccia and suevite. This is underlain by monomict lithic breccia, followed by metasediments, with local occurrences of suevite dikes. The LB-08A core, from 235.6 to 451.33 m depth, comprises approximately 25 m of polymict lithic breccia and suevite overlying fractured/brecciated metasediment. Six suevite dikes have been also observed in the metasediment/bedrock. Metasediment from both cores displays a large variation in lithology (from shale to schist) and grain size (fine-grained to gritty). The lithic clast content in the breccias is dominated by greywacke and various fine-grained metasediment lithologies, besides quartzite and other minor clasts populations. Quartz grains display PFs and PDFs (1, 2, or rarely 3 sets per grain), some of which are decorated. Rare feldspar grains display shock fractures or polysynthetic twinning displaced along micro-faults. Diaplectic quartz glass is rare; it is observed in core LB-08A only in the uppermost 5 m of suevite. Suevite from both cores 7A and 8A differ from suevites outside of the northern crater rim by the absence of ballen quartz and principally by the size ranges of melt particles (up to 2 cm in core LB-07A and 1 cm in LB-08A, vs. up to 40 cm in suevite from outside the crater). Melt particles in both cores are mostly devitrified and subrounded to irregular in shape. Sequentially different, LB-07A and LB-08A boreholes display many similarities in terms of petrography and shock effects in minerals. With regard to the general nature of the crater fill, it is noted that coherent melt rock seems to be totally absent and the amount of melt in the breccias is limited. This has important implications regarding crater formation in water-rich target rock.

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