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Barberton drilling project – Buck Reef Chert core BARB3

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As part of the ICDP-sponsored Barberton drilling project a single drill core (BARB3) with a total length of 899 m was obtained from the c. 3.4 Ga old Buck Reef Chert (BRC). The BRC is an unusually thick (up to 350 m) sequence of predominantly black-and-white banded chert and banded ferruginous chert that are steeply dipping. It overlies a shallow intrusive to extrusive sequence of dacitic volcanic rocks of the Hooggenoeg Formation and is separated from ultramafic lapillistone of the Kromberg Formation by a >150 m thick ultramafic sill. Drilling commenced in the ultramafic sill at an angle of c. 45° and c. 200 m of serpentinized peridotite were intersected. The remaining c. 700 m of the core include a great variety of chert lithofacies and minor intrusive mafic to intermediate igneous rocks. The base of the BRC was not intersected. Geophysical logging was done up to a depth of 847 m and included acoustic televiewer, gamma ray, resistivity, magnetic field and caliper logs. Stratigraphic and geophysical logs will be presented that will form the basis of follow-up studies on the BARB3 core. Abundance of organic matter, sulphides and Fe-bearing carbonates in specific intervals or associated with specific facies of the chert succession reflect changes in the oceanic, environmental and/or hydrothermal conditions in a shallow marine early Archaean setting. Evaluating the different processes will require a combined sedimentological, mineralogical, and geochemical approach that will provide insights into the habitat of early life, geochemical cycles and marine/hydrothermal conditions.