**ROCK MAGNETIC INVESTIGATIONS OF IMPACTITES FROM DEEP DRILL CORES OF BOSUMTWI AND CHESAPEAKE BAY IMPACT STRUCTURES.** T. Elbra[1], A. Kontny[2] and L. J. Pesonen[1], [1]Department of Physics, P.O.Box 64, 00014 University of Helsinki, Finland, tiiu.elbra@helsinki.fi; [2] Institute of Geology, Hertzstraße 16, 76187 Karlsruhe University, Germany.

**Introduction:** The meteorite impact processes are fundamental mechanisms which have shaped the surface of the Earth and the bodies of our solar system. Currently the total of 174 impact structures are confirmed [1] on Earth, however, many of them are not exposed and cannot be directly studied. Thus it has become clear that the scientific deep drilling is essential to provide ground truth data of the subsurface properties of the impact structures and therefore give constrains for understanding the geological processes shaping the Earth.

Recently, the drillings have been extended to penetrate huge meteorite impact structures such as: Chicxulub (Mexico), Bosumtwi (Ghana) and Chesapeake (USA). Here we present and compare the results from rock magnetic investigations of the Bosumtwi and the Chesapeake Bay impact structures.

**Results:** The magnetic susceptibility indicates the dominance of paramagnetic minerals ($<400*10^{-6}$SI) and a very small, inhomogeneously distributed ferrimagnetic component in impactites from the Bosumtwi [2, 3] structure. In the Chesapeake Bay case, the results show a large variation of magnetic susceptibility. Lithic breccias in lower part of the section are characterized by low magnetic susceptibility ($<300*10^{-6}$SI). The upper part, however, consists of magnetically stronger (susceptibility up to 6000 $10^{-6}$SI) melt-rich suevites.

According to our rock magnetic investigations (including thermal behavior of magnetic susceptibility and magnetic hysteresis experiments), mainly pyrrhotite (Fig.1) but in some cases also magnetite, two main magnetic minerals creating crustal magnetic anomalies, are suggested as carriers of natural remanent magnetization [2-5] of impactites and impact modified rocks in both structures. The magnetic mineral pyrrhotite occurs in Chesapeake as single-domain size. Although the pyrrhotite from Bosumtwi shows a large grain size variations, the numerous shock-induced nanostructures are assumed to behave also as single-domain grains.

Magnetic minerals show a significant oxidation in the suevite and the lithic breccia unit of the Chesapeake Bay impact structure, indicating a strong degree of alteration. The observations have shown that Fe-oxides in the upper part of impactite unit show also strong resorption features and a porous texture, which indicate melting. In the polymict impact breccia from the Bosumtwi drilling [3], the twin lamellae of pyrrhotite show strong brittle to brittle-ductile deformation features. These and other results will be discussed.

**References:**

[1] http://www.unb.ca/passc/ImpactDatabase/

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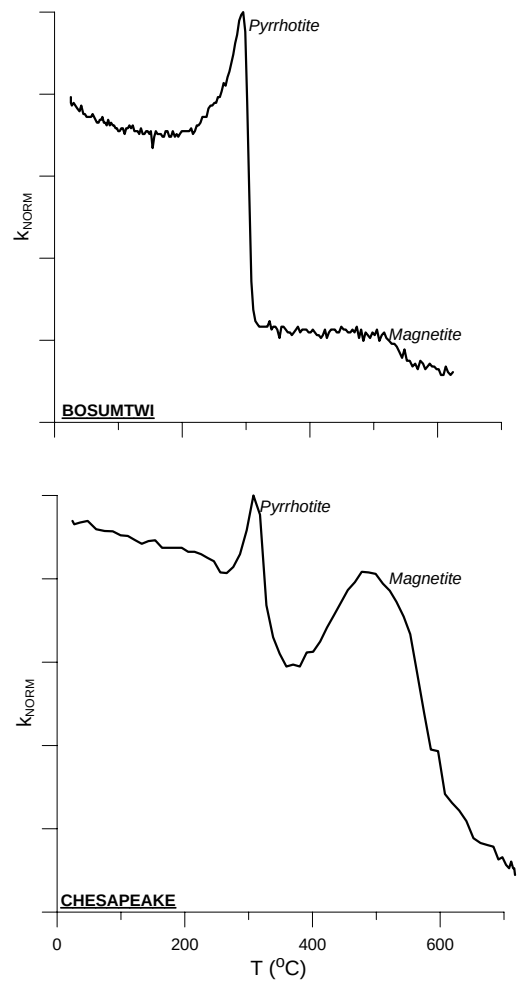


Figure 1. Normalized susceptibility as function of temperature of impactites from Bosumtwi and Chesapeake Bay deep drill cores.