COMPARISON OF THE CHEMICAL COMPOSITION BETWEEN BOSUMTWI ROCKS AND IVORY COAST TEKTITES: SEARCH FOR A METEORITIC COMPONENT IN IMPACT BRECCIAS. X. Dai[1] and C. Koeberl[1], W. U. Reimold[2] and I. McDonald[3], [1]Institute of Geochemistry, University of Vienna, Althanstrasse 14, A-1090 Vienna, Austria (christian.koeberl@univie.ac.at), [2]Department of Geology, University of the Witwatersrand, P. O. Wits, Johannesburg 2050, South Africa, [3]School of Earth and Environmental Sciences, University of Greenwich, Chatham Maritime, Kent ME4 4A W, UK.

The Bosumtwi crater in Ghana, which has a rim-to-rim diameter of about 10.5 km and almost completely filled by Lake Bosumtwi, was inferred to be the source crater for the Ivory Coast tektites, based on the geographical proximity, the same ages (1.07 Ma) of the crater and tektites, similar chemical and isotopic compositions between the tektites and crater rocks [1]. This makes the Bosumtwi crater one of only three impact structures that have been identified as source craters of a tektite strewn field. The other two are the Chesapeake Bay impact structure (eastern coast of the U.S.A.), which is the source of the North American tektite strewn field, and the Ries crater in Germany, which is the source of the Central European tektite strewn field. In total, four tektite strewn fields are known; no source crater has yet been identified for the Australasian strewn field. Strewn fields are usually defined based on the geographic distribution of microtektites (in deep sea cores) and tektites (on land). All tektites represent distal ejecta. Besides tektites, there are several other distal ejecta layers known in the geological record. Some, such as the K/T boundary ejecta layer, are associated with significant siderophile element anomalies, which are thought to represent an extraterrestrial (meteoritic) contribution. On the other hand, none of the tektite strewn field seems to be associated with a significant meteoritic component. A minor Ir anomaly was discovered in a microtektite-bearing layer from the Australasian strewn field. Of the known tektites, only the Ivory Coast tektites were found to contain a distinct meteoritic component, which, based on Os isotopic studies, was determined to be slightly less than 1% [2]. Here, we try to compare the meteoritic component found in the tektites with the siderophile element anomalies in the target rocks and impact breccias at the Bosumtwi crater.

In 1997 and 1999, representative samples of impact breccias and target rocks were collected from the Bosumtwi impact crater, to conduct the petrographic, geochemical and paleomagnetic studies. In this work, the major and trace elemental composition, as well as the platinum group element (PGE) abundances, were analyzed in the selective target rocks (including shale, graywacke and two different types of granites) and suevite-derived impact glass samples. Major elements were determined by X-ray fluorescence spectrometry analysis (XRF), and trace elements (expect the PGEs) by instrumental neutron activation analysis (INAA). The PGEs were measured by ICP-MS after NiS fire assay [3] and by NAA after an anion resin preconcentration procedure.

Here, the major and trace element abundances in five suevite-derived impact glass samples at the crater were compared with Ivory Coast tektite and microtektite data [4]. The chondrite-normalized abundance patterns of the rare earth elements (REE) for all the impact glass samples were agree very well with those for the tektites. Meanwhile, the uniform content of lithophile elements (Sc, Rb, Sr, Zr, Ba, Hf, Ta, Th, U), the reduced content of siderophile elements (Cr, Co, Ni), and the increased content of volatile elements (Zn, As, Sb, Cs) for the impact glass samples were found, in comparison with the tektite and microtektite. Furthermore, the range of chemical composition of the target rocks is wider than that of the Ivory Coast tektites, but overlap the tektite compositions. Our data support the interpretation that the Bosumtwi structure and Ivory Coast tektites formed during the same impact event.

In the previous investigations [1,3], the geochemistry of target rocks and breccias from the Bosumtwi crater was studied for comparison with Ivory Coast tektites. However, another important line of research, which is necessary for the identification of a meteoritic component in impact breccias and melt rocks, namely the determination of siderophile elements (especially the PGEs) in the target rocks at the crater, has so far been somewhat neglected. Here, the contribution of meteoritic component will be also calculated in the light of the content of PGEs in the target rock samples, which will help to access the extraterrestrial component in the tektites.

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