Trace elements as clue for understanding the origin of Lake Bosumtwi crater related glass (Ivory Coast tektites, microtektites, fall back particles, suevite glass)

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The origin of tektites (IVC; NAT), microtektites (IVC-MT), suevite glass (BOT 12), and fallback glass particles (FBG) from the Bosumtwi impact structure, Ghana (age 1.07 Ma, D~10.5 km) was studied by geochemical techniques (EMP, LA-ICP-MS, TIMS).

The four internally rather homogeneous groups of glass (IVC, IVC-MT, BOT 12, FBG) show variations in MgO and Na_2O, with marked calcium depletion in IVC and IVC-MT; we interpret this to reflect the composition of precursor lithologies. These were constrained by Sr-Nd systematics to greywacke, the most common target rock. Some greywacke samples have very high contents of Ni, Co, and Cr, reflecting contributions of the ore-bearing meta-volcanics in the Bosumtwi region. The IVC, IVC-MT, and BOT 12, yet not the FBG group have similar high abundances of "meteoritic tracer elements", obviously inherited from the target, that mask any possible contribution of the projectile to the impact glasses. Trace element patterns show little variations within each group of glass, but differences exist between the groups: only IVC samples show a minor Ce anomaly, pointing to alteration in the precursor material. Compared to the upper continental crust, moderately volatile elements are depleted in the glass to different degrees (in decreasing order Pb, Zn, As, Sb – Cu). These effects are most pronounced for IVC-MT, and IVC, followed by FBG, while they are absent in BOT 12. The totally dry IVC-MT and IVC homogenized at the highest T, evolved under reducing conditions [1], and followed a T path causing substantial loss of trace elements; this loss is less distincted in FBG. Suevite glass originated at much lower T, as indicated, for example, by mineral inclusions.

[1] Langenhorst *et al*. (2015) *MinMag, this volume*