

Deep carbon in CAMP and the T-J mass extinction: new perspectives on LIPs through melt inclusions

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A multidisciplinary study on melt inclusions (MIs) has been carried out on basaltic rocks from throughout the Central Atlantic Magmatic Province (CAMP [1]) in order to investigate the volatile C species degassed during the emplacement of this Large Igneous Province (LIP). The CAMP (ca. 201 Ma) is one of Earth's largest LIPs and it is synchronous with the end-Triassic mass extinction [2]. We combined optical microscopy, Raman micro-spectroscopy, EDS-SEM and EMP analyses to study the C compounds within gas exsolution bubble-bearing MIs. These bubbles are a direct proxy for the volcanic degassing of C into the hydrosphere-atmosphere system during the magmatic activity. CO₂-bearing bubbles are entrained in clinopyroxene crystal clots probably derived from mid-crustal mushes. Episodes of CO₂ fluxing of the crystalline mushes probably triggered eruption of the basaltic magma during volcanic pulses. The C within these MIs was entrapped at lower or intermediate crustal depth, and may derive from the mantle and/or be assimilated by the magma from metasediments. Hence, a process of assimilation from shallow level sedimentary strata is excluded as the source of the volcanic degassed C preserved in the studied MIs.

[1] Marzoli *et al.* (1999), *Science* **284**, 616-618. [2] Davies *et al.* (2017), *Nature Communications* **8**, 15596.