EGU2020-10473, updated on 22 Oct 2020
https://doi.org/10.5194/egusphere-egu2020-10473
EGU General Assembly 2020

Rapid and intense CO_2 emissions into the atmosphere: Examples from the end-Triassic extinction

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The coincidence between mass extinction events and the emplacement of Large Igneous Provinces (LIPs) in the Phanerozoic geological record points to the magmatic CO_2 degassing as the potential trigger of rapid global-scale climatic and environmental changes. The Central Atlantic Magmatic Province (CAMP) is one of the Earth's hugest LIPs, and is coincident with the end-Triassic extinction, at ca. 201.5 Ma. Such LIPs emplacement and associated magmatic CO_2 degassing have traditionally been interpreted as occurring over periods much longer than those of anthropogenic CO_2 emissions, however our improving understanding of LIPs activity is reducing these timescales, with the latest estimates indicating CAMP magmatic pulses lasting approximately a few centuries each and characterized by high eruption rates [1; 2]. We employed a biogeochemical model to investigate the effects on ocean-atmosphere system and climate of these CAMP magmatic pulses, and to test whether such rapid and intense magmatic CO_2 degassing is consistent with the climatic, geochemical and palaeontological record of the end-Triassic. Hence, we compared the modern anthropogenic emissions (since the Industrial Revolution) with the pulsed magmatic degassing during CAMP emplacement, in order to evaluate the impact of rapid and intense events on climate and environment changes.

[1] Knight *et al.* (2004), *Earth Planet. Sci. Lett.* **228**, 143-160. [2] Marzoli *et al.* (2019), *J. Petrol.* **60**, 945-996.