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Continental-scale wildfires during end-Triassic greenhouse warming

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Two-hundred-million years ago, the emission of an estimated 100,000 Gt of CO_2 during pulsed eruptions in the Central Atlantic Magmatic Province had dire consequences for the biosphere and resulted in the end-Triassic extinction. The exact causes for the extinction of organisms remain enigmatic, but a complex and drawn-out scenario is emerging that is in line with the pulsed activity in the CAMP. Palynological assemblages obtained from the immediate extinction interval from multiple locations exhibit a remarkable darkening of pollen and spores that is at odds with simple thermal maturation during burial. Here, we investigate this latest Triassic "dark zone", using the Palynomorph Darkening Index (PDI) obtained from trilete fern spores in the Schandelah-1 core (North Germany) and *Classopollis* pollen in drill cores from Denmark (Stenlille-4), the United Kingdom (ICDP Prees-2), and Luxemburg (Elvange). Coinciding with a collapse of forest vegetation and the spread of a pioneer fern vegetation, the fern spores' PDI reaches peak darkness in the uppermost Triletes Beds from Germany and equivalents elsewhere. This darkening event is mimicked in highest PDI values in *Classopollis* from the upper Lilstock Formation in the Prees-2 core and equivalent beds in the Elvange and Stenlille-4 cores. Controlled heating experiments of *Lycopodium* spores followed by PDI analyses suggest that latest Triassic darkening of palynomorphs is consistent with frequent surface fires carried in fern savannahs. The ensuing extreme soil erosion during wetter intervals resulted in mass removal of charred organic material in coastal sediments. The impact of continental-scale wildfires during the height of the end-Triassic mass-extinction suggests intense climate change exerting heat stress on vegetation as a major factor in the collapse of terrestrial ecosystems.