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Enhanced continental weathering and organic carbon burial following the end-Permian mass extinction

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The driving mechanism for the initiation and recovery of the end-Permian mass extinction, the largest extinction event in the Phanerozoic, remains highly controversial. It has been suggested that silicate weathering thermostat may have failed to regulate the warming climate during the end-Permian because of the continuous CO_2 degassing exceeds the amount of carbon being sequestered through weathering and organic carbon burial. However, the exact amount and duration of the carbon sequestration have yet to be quantified. Here we use lithium isotopes as a tracer for silicate weathering, and lithium cycle modeling (both box model and an Earth system model) to provide quantitative constraints on the carbon sequestration rate and duration across the end-Permian mass extinction. We find that both silicate weathering and organic carbon burial are significantly enhanced due to CO_2-induced warming, and that the early Triassic warming is maintained by slow, but extended emissions of CO_2 from the Siberian Traps volcanism and felsic volcanism in South China.