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Isotopic investigation into weathering responses associated with the termination of the Late Paleozoic Icehouse in Thailand

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The Late Paleozoic Icehouse is the longest glacial interval of the Phanerozoic and of great interest as a source of comparison to modern Cenozoic glaciation. The end of this long-term glacial interval took place during the early to middle Permian in response to global warming, which was soon followed by multiple mass extinction events later in the Permian. Accordingly, this interval provides a unique opportunity to investigate Earth systems and life responses to extensive climatic warming from icehouse conditions. The chemical weathering of silicate minerals is a temperature-dependent process that sequesters CO_2 from the atmosphere, therefore highly related to major climatic changes. Thus, constraining the large-scale feedback between climate and silicate weathering with the terminal phase of the Late Paleozoic Icehouse may enhance our understanding of the resultant global environmental changes during the Permian and the relation between these two to Earth systems. Lithium isotopes are a relatively novel proxy that can aid such work through tracking global weathering processes due to Li being fractionated during secondary clay formation from weathered material. In addition, strontium isotopes are a long-standing proxy to track weathering source materials, particularly continental crust enriched in radiogenic ^{87}Sr. This study utilizes well-preserved Permian carbonate successions from north central Thailand (part of the low-paleolatitude Indochina terrane) and southern peninsular Thailand (part of the mid-latitude Sibumasu terrane) along with a combination of newly generated carbon, oxygen, lithium, and strontium isotopic data from biostratigraphically-constrained Cisuralian to Guadalupian age (early to middle Permian) strata to provide insights into weathering processes across the conclusion of the Late Paleozoic Icehouse. This work better links the climatic effects of warming to changes in weathering processes and expands our understanding of the Earth system, especially during major warming intervals.