

Recent Climate Changes and Lessons from Earth's Rock Record

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Although recent rise in CO₂ levels from fossil fuel emissions has been altering natural climate patterns - contributing to global warming and regional hydroclimate shifts - Earth has remained in a deep icehouse throughout the Quaternary and into the present, a state that began with the gradual glaciation of Antarctica approximately 34 million years ago. Such icehouse conditions are a relatively less common and an ephemeral state. The last and potentially the only other time in Earth's history modern environments and biota witnessed similar icehouse conditions occurred during the Late Palaeozoic Ice Age spanning much of the Carboniferous period. Here, I present a new boron isotope-derived CO₂ and climate reconstruction from the Late Palaeozoic Ice Age (1), which reveals interesting parallels with the Quaternary. I will discuss its implications and offer insights into recent environmental and climate changes from a geological perspective.

(1) **Jurikova H.**, Garbelli C., Whiteford R., Reeves T., Laker G.M., Liebetrau V., Gutjahr M., Eisenhauer A., Savickaite K., Leng M.J., Iurino D.A., Viaretti M., Tomasovych A., Zhang Y., Wang W., Shi G.R., Shen S., Rae J.W.B., Angiolini L. (2025) Rapid rise in atmospheric CO₂ marked the end of the Late Palaeozoic Ice Age. *Nature Geosci.* 18, 91-97, <https://doi.org/10.1038/s41561-024-01610-2>.

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