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Limited Retreat of the Wilkes Basin Ice Sheet during the Last Interglacial.

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The response of the marine sectors of the East Antarctic Ice Sheet to future global warming represents a major source of uncertainty in sea level projections. If greenhouse gas emissions continue unbridled, ice loss in these areas may contribute up to several meters to long-term global sea level rise. In East Antarctica, thinning of the ice cover of the George V and Sabrina Coast is currently taking place, and its destabilization in past warm climate periods has been implied. The extent of such past interglacial retreat episodes cannot yet be quantitatively derived from paleo proxy records alone. Ice sheet modelling constrained by paleo observations is therefore critical to assess the stability of the East Antarctic Ice Sheet during warmer climates. We propose that a runaway retreat during the Last Interglacial of the George V Coast grounding line into the Wilkes Subglacial Basin would either leave a clear imprint on the water isotope composition in the neighbouring Talos Dome ice-core record or prohibit the preservation of an ice core record from the Last Interglacial altogether. We test this hypothesis using a dynamic ice sheet model and infer that the marine Wilkes Basin ice sheet remained stable throughout the Last Interglacial (130,000-120,000 years ago). Our analysis provides the first constraint on Last Interglacial East Antarctic grounding line stability by benchmarking ice sheet model simulations with ice core records. Our findings also imply that ambitious mitigation efforts keeping global temperature rise in check could safeguard this region from irreversible ice loss in the long term.