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Horizontal ice-core sites, where ancient ice is exposed at the glacier surface, offer unique opportunities for paleo-studies of trace components requiring large sample volumes. Following previous work at the Pakitsoq ice margin in West Greenland, we use a combination of geochemical parameters measured in the ice matrix (delta O-18(ice)) and air occlusions (delta O-18(atm), delta N-15 of N-2 and methane concentration) to date ice layers from specific climatic intervals. The data presented here expand our understanding of the stratigraphy and three-dimensional structure of ice layers outcropping at Pakitsoq. Sections containing ice from every distinct climatic interval during Termination I, including Last Glacial Maximum, Bolling/Allerod, Younger Dryas and the early Holocene, are identified. In the early Holocene, we find evidence for climatic fluctuations similar to signals found in deep ice cores from Greenland. A second glacial-interglacial transition exposed at the extreme margin of the ice is identified as another outcrop of Termination I (rather than the onset of the Eemian interglacial as postulated in earlier work). Consequently, the main structural feature at Pakitsoq is a large-scale anticline with accordion-type folding in both exposed sequences of the glacial-Holocene transition, leading to multiple layer duplications and age reversals.

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