



A simple rule to determine which insolation cycles lead to interglacials

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The pacing of glacial-interglacial cycles of the Quaternary (last 2.6 million years) is attributed to astronomically-driven changes in high-latitude insolation. An enduring puzzle, however, has been how astronomical forcing translates into the observed sequence of interglacials. Here we show that before ~ 1 million years ago, interglacials occurred when caloric summer insolation exceeded a simple threshold, about every 41,000 years. After 1 million years ago, insolation peaks were skipped more frequently and glacials became longer. We also find that the propensity for deglaciation increases with time elapsed since the previous interglacial onset. A statistical model combining these observations correctly predicts every complete deglaciation of the last million years and also indicates what alternative histories might have arisen.