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The role of eccentricity in determining the spacing between interglacials

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In a recent paper Tzedakis et al (2017) described a simple rule that predicts, using only caloric summer half-year insolation as input, which insolation cycles lead to the onset of an interglacial. The rule is based on an energy threshold, one of whose characteristics is that it reduces with time since the last interglacial onset, reflecting increased fragility of glacial climate as ice sheets get larger. The rule correctly predicts every complete deglaciation of the past million years, a period in which interglacial onset skips both precession and obliquity cycle maxima. This then raises the question to what extent the approximate 100 ka period observed in the last million years is due simply to internal dynamics rather than to the period of eccentricity present in the insolation record. Here we will test this by creating synthetic insolation curves from which eccentricity (or other orbital components) have been removed. We will then use the proposed rule to test to what extent eccentricity influences the spacing of interglacials. We will also assess the impact of other orbital components and the impact earlier in the Quaternary when the energy threshold was lower.