Does the mantle control the maximum thickness of cratons?

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The incorrect version of Figure 4 was published in the original version of the manuscript:

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Below is the correct version of this figure.

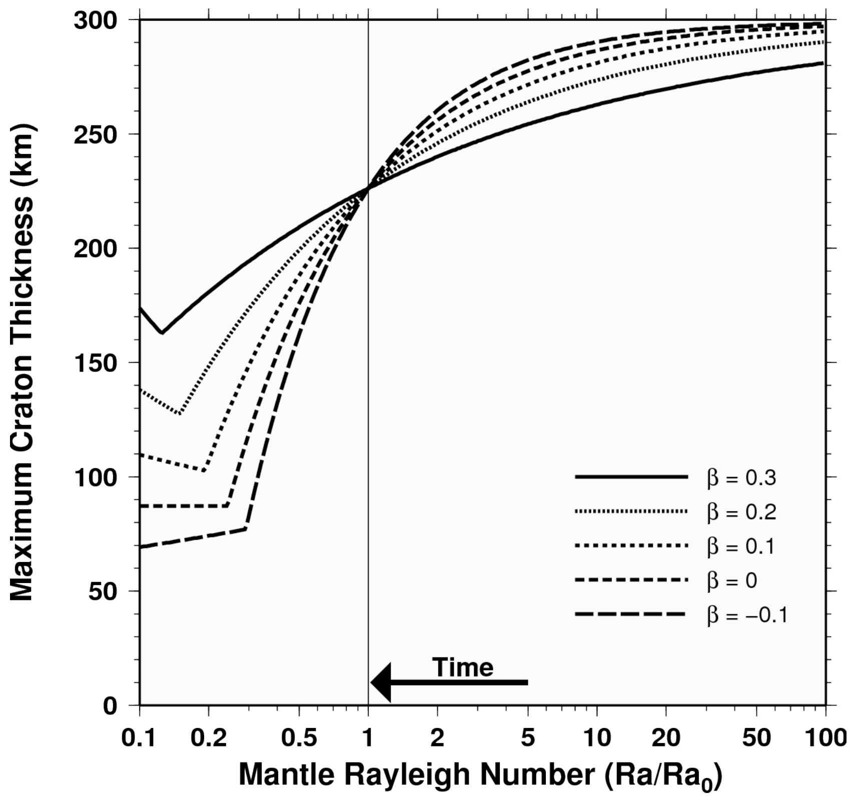

Figure 4. The maximum craton thickness, estimated using the curves of Fig. 3 (and similar ones for varying β using Eq. 9) as described in the text, as a function of the Rayleigh number. Note that regardless of β, Ra/Ra_0 decreases with time as the earth cools, so the mantle's state should move from right to left along this graph (i.e., $Ra/Ra_0<1$ refers to future conditions and $Ra/Ra_0>1$ to past conditions). Higher values of β indicate a larger sensitivity of heat flow to *Ra*, which means that mantle temperatures are effectively buffered and *Ra* changes slowly over time [e.g., *Christensen*, 1985]. This promotes a relatively stable maximum cratonic thickness. For smaller values of β, and in particular negative values [*Korenaga*, 2003], the buffering of mantle temperatures is diminished and more rapid changes in mantle temperature, and thus *Ra*, are expected. In this case, maximum cratonic thickness decreases with time more rapidly. As Ra/Ra_0 decreases, the craton thickness trends toward zero for sufficiently small Ra/Ra_0. In this case, standard boundary layer theory, where $h \sim Ra^{-\beta}$, will determine the thickness of the boundary layer, as it does for oceanic systems. Thus, we have plotted $h \sim h_0\,(Ra/Ra_0)^{-\beta}$ for small Rayleigh numbers where the oceanic-style thermal boundary layer is thicker than the continental-style cratonic root. At this point (denoted by the kink in the curves), the cratonic root should have destabilized completely.