

Why are the continents just so?

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An intriguing observation relevant to the long-term evolution of the continents is the approximate equivalence of gravitational potential energy of average continental lithosphere and the mid-ocean ridges suggesting the existence of a continental attractor state dictated by an ambient stress state within deformable regions of plate interiors. This paper explores the possibility that the emergence of a chemically-, thermally- and mechanically-structured continental lithosphere reflects such an attractor state subject to a set of thermally sensitive feedback mechanisms in response to an externally-imposed, oscillatory forcing about the ambient state induced by plate tectonics. One potentially testable implication of the hypothesis is that ancient crust relatively enriched in heat producing elements should have more concentrated distributions than less enriched crust. There is some supporting evidence that this is so.