

**HIGHLIGHTS AND BREAKTHROUGHS**

**When was the Earth's conveyor belt set in motion?**

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**Abstract:** The start of plate tectonics on Earth is one of the most controversial issues in modern geology, with proposed timings covering almost the entire history of our planet. On page 2387 of this issue (vol. 100, 2015), Blichert-Toft and co-authors report Sm-Nd and Lu-Hf isotopic and lithophile trace element data for early Archean komatiites from the Barberton Greenstone Belt (GB) in South Africa, and argue for the onset of plate tectonics on Earth as early as 3.5 Ga. The studied komatiites show a large decoupling of the two isotopic systems and lithophile trace element signatures that are most consistent with deep-water, pelagic sediments being present in the lower-mantle source of these lavas. Their conclusions have far-reaching implications for advancing our understanding of how the Earth system operated in the distant geological past. **Keywords:** Plate tectonics, Barberton GB komatiites, Sm-Nd and Lu-Hf isotope systematics, Nd-Hf decoupling, subduction