

## **Hadean detrital zircons record crustal diversity but no evidence for fully-formed Phanerozoic-style continental crust**

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The nature of Earth's crust and whether continents existed in the Hadean remains a major issue in Precambrian geology. Most of our knowledge about this time period originates from detrital zircon from a single area, the Jack Hills and Mount Narryer region in Western Australia. The discovery of a new site in the Barberton Greenstone Belt, South Africa, that has yielded Hadean detrital zircons as old as 4.2 Ga has made it possible to examine the evolution of the early Earth through a second lens. The Hadean detrital zircons are located in the Green Sandstone Bed (GSB) that was deposited at  $3,306 \pm 8$  Ma. Although metasomatism and lower greenschist-grade metamorphism subsequently affected the GSB, sedimentary structures and primary mineral grains are well preserved and provide insights into Earth's earliest history.

The geochemistry of the Hadean zircons of the GSB reveals the presence of two zircon populations: Group I's zircon geochemistry is consistent with crystallization from less evolved and Group II from more evolved parental magmas. Zircons representing a depleted mantle source have not been found. The geochemistry of the Hadean zircons is distinct from zircon from Phanerozoic continental crust, indicating that either modern-style continental crust was not present in the Hadean source terrane or that early continental crust formed through different tectonic processes.