

Orogenic Diversity of Rodinia: how do we probe global signals?

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Using accessory minerals to assess trends in global geologic processes, particularly the evolution of the continental crust, is now very commonplace. Assessment of global trends requires representative data; however, most datasets have a disproportionate density in time and space. Currently, more data exist for zircon than any other accessory minerals, and yet we have not overcome the issues relating to temporal and spatial biases. This can lead to the conflation of complex signals or the aggrandizement of regional signals. When evaluating global signals with other accessory phases such as rutile, apatite, titanite, or monazite, the problem is magnified. Although the emergence of new geologic processes can easily be tested with data from a single location, establishing global significance requires a test for global heterogeneity.

We present a multi-proxy approach to evaluate the orogenic diversity of the Mesoproterozoic Era. This period of time has been variably argued to be both a boring time (orogenic quiescence or single-lid tectonics) and a pivotal transition to the modern plate tectonic status quo. We show that compositional proxies for various geologic processes display unique signatures in specific orogenic systems. These demonstrate the geodynamic idiosyncrasies of specific regions and highlight how at present, global trends are compromised by contrasting records.