

Paper No. 15-6

Presentation Time: 10:20 AM-10:40 AM

**NEOPROTEROZOIC RIFTING IN THE SOUTHERN GEORGINA BASIN,
CENTRAL AUSTRALIA: IMPLICATIONS FOR CONNECTING AUSTRALIA
AND LAURENTIA IN RODINIA**

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Marked geologic similarities between western North America and Australia-Antarctica have led to a number of proposed reconstructions of the Proterozoic supercontinent Rodinia that place Australia adjacent to some portion of western Laurentia (e.g. SWEAT, AUSWUS, AUSMEX). New data from the southern Georgina Basin in central Australia give a more complete picture of Neoproterozoic rifting in Australia during the breakup of Rodinia, and provide constraints with which to test continental margins proposed to be conjugate to Australia.

A system of northwest-striking Neoproterozoic rift basins underlies Paleozoic strata in the southern Georgina Basin. Normal faults bounding these rift basins were selectively reactivated during the mid-Paleozoic Alice Springs Orogeny, and are now expressed as high-angle reverse faults that invert the pre-existing rift basins. Exhumed and eroded rift basin remnants are present in the hanging wall of the Oomoolmilla, Lucy Creek, Tarlton, and Toomba reverse faults. Major rift basins are interpreted to underlie Paleozoic strata in the Toko Syncline, and in the Burke River structural belt south of Mt Isa. Rift basin fill indicates 2 periods of extension: a major rift-forming episode between 700 and 650 Ma (coeval with Sturtian glacial deposits), and a second episode of extension at ca. 600 Ma (~ coeval with Elatina Fm "Marinoan" glacial deposits).

These results support work in other regions indicating that the Neoproterozoic continental margin of Australia (~ the Tasman Line) consisted of northwest-striking rift segments with right-stepping offsets along northeast-striking transform faults. Such a configuration is geometrically incompatible with a Laurentian continental margin consisting of northeast-striking rift segments with left-stepping offsets, and thus conflicts with reconstructions such as SWEAT and AUSWUS that match Australia with western Laurentia. In AUSMEX and some other reconstructions a conjugate margin to Australia is not identified, but any continental margin proposed to match with Australia should meet the constraints of rift timing and geometry described here.

[Cordilleran Section \(104th Annual\) and Rocky Mountain Section \(60th Annual\) Joint Meeting \(19–21 March 2008\)](#)
[General Information for this Meeting](#)

Session No. 15

[Proterozoic Tectonics of the Southwestern U.S.: Origin and History of the Lithosphere: From Continental Assembly, to Breakup, to Influence of Old Structures on Younger Tectonic Events.](#)

University of Nevada-Las Vegas: Student Union 213

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