

New insights into the development of the South Nicholson Basin, northern Australia from SHRIMP U–Pb detrital zircon and authigenic xenotime

A. CROSS^{1*}, J. ANDERSON¹, N.KOSITCIN¹, C. LEWIS¹, C. CARSON¹, L. CARR¹ AND P. HENSON¹

¹Geoscience Australia, Cnr Jerrabomberra Ave & Hindmarsh Dr, Symonston, ACT, 2606, Australia

(*correspondence: andrew.cross@ga.gov.au)

The Mesoproterozoic South Nicholson Basin (SNB) in northern Australia extends across an area approximately the size of Tasmania. It is flanked by the resource rich Mt Isa Orogen and McArthur Basin. Limited outcrop and a dearth of drilling has hampered understanding of the evolution of the Basin, its relationship to other tectonic elements in northern Australia and its resource potential. The lack of any identified interbedded volcanic rocks within the studied sections has led us to concentrate on an extensive SHRIMP U–Pb detrital zircon geochronology program that so far exceeds 40 samples. In addition, we have undertaken SHRIMP U–Pb geochronology of authigenic xenotime.

Detrital zircon U–Pb maximum depositional ages (MDA) for the South Nicholson Group (SNG) are up to 100 My younger than previously reported [1]. The new MDA for the Constance Sandstone is ~1470 Ma and is the youngest so far recorded in the SNB. Additionally, it accords with an MDA for the underlying Crow Formation of ~1483 Ma. SHRIMP U–Pb xenotime analyses of authigenic overgrowths on detrital zircons from the Constance Sandstone gave an age of ~1266 Ma. This new data brackets the deposition of the SNG to between 1470 Ma and ~1266 Ma and provides the first evidence that the SNG is broadly contemporaneous with the 1500–1320 Ma Roper Group of the McArthur Basin. Using Multidimensional Scaling of the detrital age distributions has also added an extra dimension to our evolving understanding of the development of the SNB.

[1] Carson (2011) Queensland Geological Record **2011/03**.