

# Provenance of Hadean to mid-Archean detrital zircons from siliciclastic metasedimentary rocks of the Illaara and Maynard Hills Greenstone Belts, Western Australia

E.R. THERN<sup>1\*</sup> AND D.R. NELSON<sup>2</sup>

<sup>1</sup> Department of Imaging and Applied Physics, Curtin University, Perth, WA, Australia (\*eric@thern.org) (\* presenting author)

<sup>2</sup> School of Natural Sciences, University of Western Sydney, Australia

SHRIMP U-Pb dating of >1000 detrital zircons from twelve samples within ca. 3.0 Ga siliciclastic metasedimentary rocks of the Illaara and Maynard Hills Greenstone Belts of the Yilgarn Craton, Western Australia, reveal detrital zircon ages up to 4372 Ma [1]. Sedimentary structures are rare and upper-greenschist to middle-amphibolite facies metamorphism and shearing has obscured primary relationships between greenstone sediments and provenance and stratigraphic relationships must be inferred from detrital zircon age spectra and compositional characteristics. Depositional ages are currently constrained by the youngest zircons from Mt. Alfred's eastern (3318±6 Ma) and western (3264±7 Ma) horizons, and Maynard Hills ca. 3060 to 2960 Ma analyses; and a minimum depositional age of ~2940 Ma by Ar/Ar plateau ages from a cross-cutting quartz-tourmaline vein [2].

Increasing age complexity and 'younging' are seen across the East (almost exclusively 3700-3780 Ma) to West (3300-3700 Ma and >3800 Ma) outcrop horizons at the Mt. Alfred locality. The western-most horizon at Mt. Alfred contains abundant >3800 Ma zircons, but lacks the prominent 3500 to 3300 Ma ages common to Jack Hills Hadean-zircon bearing metasedimentary rocks. This horizon at Mt. Alfred is most similar in detrital zircon age characteristics to the metasedimentary rocks at Mt. Narryer, however without the younger zircon ages (of Eurada and Dugel gneiss affinity; 3480-3300 Ma) found in abundance at Mt. Narryer [2,3]. This makes Mt. Alfred a unique source for detrital Hadean zircons.

The detrital zircon age similarities within the metasedimentary rocks of the Illaara, Maynard Hills and Gum Creek Greenstone Belts of the Southern Cross Terrane, the Jack Hills and Mt. Narryer of the Narryer Terrane, and the Toodyay Lake Grace Domain within the South West Terrane strongly suggest a shared provenance of these >2940 Ma metasedimentary rocks throughout the Yilgarn Craton [3]. It is therefore likely they were deposited contemporaneously between ca. 3300-2940 Ma, later separated by multiple younger ca. 2950-2630 Ma granite-greenstone formations during rifting and collision episodes, and occur today as 'rafts' within younger ca. 2730-2640 Ma granite-greenstones.

[1] Thern and Nelson (submitted) *Precambrian Research* [2] Thern et al. (2011), abstract: *Goldschmidt Conf.* [3] Thern & Nelson (in press) *Precambrian Research*