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Protolith age and role in tectonic significance of the Eastern Ghats Domain, east India

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DECLARATION

I declare that the contents contained in this thesis are the result of my own research. It does not contain any previously published, written or produced material from another person except where referenced in the following text.

Signed……………………….

Date………………………….

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Fitzsimons (2000) model of East Gondwana at 500 Ma, showing three Grenville age provinces; The Maud, the Rayner and the Wilkes Provinces, all with different ages of high grade, collisional tectonism. These provinces are juxtaposed by two Pan African Orogens; 1. the East African Orogen, including Central Dronning Maud Land, with reworked Grenville aged crust at the margins of the orogen and 2. The Prydz-Denman-Darling Orogen, which includes the Pinjarra Orogen. The Pinjarra Orogen was included as Grenville age basement in previous East Gondwana models, but here Fitzsimons (2000) has grouped it with Pan African age.

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CL images of zircons from EG9_61:

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EG9_04

a. U/Pb concordia plot for EG9_04
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b. Relative probability density plot showing peak U/Pb ages at approximately 930 Ma

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ABSTRACT

U/Pb age analyses were conducted on detrital zircons from Khondalites in the Eastern Ghats Belt (EGB) in eastern peninsular India. This study was aimed at determining detrital ages to help understand the nature of the protolith to the meatasedimentary rocks. These khondalite terrains make up the most extensive terrains in the EGB yet they are poorly understood. They are important because they help constrain timing of tectonism in the Mesoproterozoic and the formation of Rodinia and Eastern Gondwana. There were very few detrital zircons in the samples collected from the EGB and age analyses could not be made from them. Metamorphic ages were recorded from metamorphic/metamorphically recrystallised zircons. The age of metamorphism recorded in these zircons is approximately 900 Ma. This age agrees with metamorphic ages predicted from previous studies. This metamorphism is a result of the collisional orogeny that amalgamated eastern India with eastern Antarctica in the Mesoproterozoic. A Pan-African overprint has been recorded in the zircon ages which range from 660-560 Ma. These are predicted to be from lead loss due to metamorphism and can be seen on the concordia plots for U/Pb age data.