

## New Views of East Antarctica- from Columbia to Gondwana

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### Abstract

East Antarctica is a keystone in the Gondwana, Rodinia and the Columbia supercontinents. Recent aerogeophysical research, augmented by satellite magnetic, gravity and seismological data is unveiling the crustal architecture of the continent. This is helping comprehend the impact of supercontinental processes such as subduction, accretion, rifting and intraplate tectonics on its evolution. A mosaic of Precambrian basement provinces is apparent in interior East Antarctica (Ferraccioli et al., 2011, Nature). A major suture separates the Archean-Neoproterozoic Ruker Province from an inferred Grenvillian-age orogenic Gamburtsev Province with remarkably thick crust (up to 60 km thick) and thick lithosphere (over 200 km thick). The age of the suturing and its linkages with supercontinental assembly is debated with both Rodinia and Gondwana candidates being proposed. Further east, magnetic highs delineate a Paleoproterozoic to Mesoproterozoic Nimrod-South Pole igneous province (Goodge and Finn, 2010 JGR) that flanks a composite Mawson Continent- including the Gawler Craton of South Australia (Aitken et al., 2014 GRL). An over 1,900 km long magnetic and gravity lineament is imaged along the western flank of the Wilkes Subglacial Basin and is interpreted here as a major Paleoproterozoic suture zone linked to the collision of Laurentia and East Antarctica within Columbia. The proposed suture played a pivotal role helping localise Neoproterozoic Rodinia rifted margin evolution and forming a backstop for the Ross-Delamerian cycle of Gondwana amalgamation. Aeromagnetic and gravity imaging help determine the extent of a Keweenaw-age (ca 1.1 Ga) large igneous province in the Coats Land Block -isotopically tied with the Mid-Continent Rift System of Laurentia (Loewy et al., 2011 Geology). Imprints of Grenvillian magmatic arc accretion link together the Namaqua-Natal and Maud belts in South Africa and Dronning Maud Land within Rodinia. The aeromagnetically distinct Southeast Dronning Maud Land province (Mieth and Jokat, 2014 GR) may represent a separate 1000-900 Ma Oceanic Arc Superterrane (Jacobs et al., 2015 Prec. Res.). New geophysical views of the Shackleton Range suture lend weight to more complex collisional and indentation tectonic models for the Pan-African age assembly of Gondwana.