The National Collaborative Research Infrastructure Scheme (NCRIS) funded from 2007-2011 the AuScope Program for infrastructure development to better understand the "Structure and Evolution of the Australian Continent". A national facility magnetotelluric (MT) equipment and data facility is being established at the University of Adelaide (in close collaboration with Geoscience Australia and the ANU) which will be available to the wider scientific community to address geological problems of scales ranging from 100's of metres to 100's of kilometres. The equipment pool, which is under construction, will consist of about 25 broadband (0.001 to 100 seconds period-bandwidth) and up to 40 long-period (1 to 100,000 seconds period-bandwidth) MT land instruments. Broadband instruments use magnetic induction coils, and the bandwidth will typically provide conductivity information in the depth range of 100 m to 50 km. Long-period instruments use fluxgate sensors and have optimal resolution between 5 and 500 km. Thus, a combination of broadband and long-period instruments can yield images of two- and three-dimensional conductivity structures from the regolith to the transition zone. We also anticipate making available up to 8 long-period marine MT instruments in collaboration with Flinders University for shallow (~100 m) to deep-water (<5000 m) deployment. Instruments will be available through proposal to AuScope and will typically include some technical training, potentially some field assistance and basic processing of time series to the industry-standard electrical data interchange (edi) format for MT responses. Additionally, legacy data from previous MT surveys across Australia will be archived and made available where possible, either as time-series and/or as processed MT response files in edi format.

In this presentation, we will outline the capabilities of the national MT facility, and examples of the how large-scale MT transect and arrays can be used to image the properties of the Gawler Craton in southern Australia.

State Survey Initiatives: What have we learnt from PACE?

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The PACE initiative was set in train in 2004 with an initial funding of $15 million for five years.

Early success encouraged government to double the investment and extend the programme.

Exploration investment in South Australia has increased ten fold between 2003 and 2007, a result achieved by a combination of record commodity prices, one of the world's largest drill-out programmes at Olympic Dam and a considerable upturn in exploration success with a direct contribution from PACE funding particularly through drilling collaboration. This theme is now being replicated in other jurisdictions. Other critical themes and some welcome unexpected consequences will also be discussed.

Accretion of a Late Ordovician island arc terrane into the northern Tasmanides and its implications for orogenesis.

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Siluro-Devonian tracts of the northern Tasmanides largely consist of accretionary complex rocks which formed outboard of forearc and arc elements. For the Broken River Province, the accretionary complex consists mostly of poly-deformed turbidites, extensively disrupted by melange, with minor components of MORB – type basalt and chert. However, Late Ordovician volcanics and marine strata form a distinctive terrane located on the inboard margin, the oldest part of the accretionary complex, faulted against pre-Silurian basement and subjacent to an extensive forearc assemblage.

This distinctive Late Ordovician terrane includes Everetts Creek Volcanics consisting mainly of basalt and andesite and Carriers Well Formation which is mainly sedimentary in character. The two units show gradational contacts suggesting a close temporal association and Carriers Well limestones are of Late Ordovician (Ashgil) age. Trace element geochemistry shows the volcanics to be of oceanic island arc affinity. The assemblage represents subduction-related volcanism which built relief on ocean crust allowing the development of shallow marine sedimentary facies including carbonate shoals.

Strata within the terrane are steeply dipping and generally west facing but some internal folding is indicated by facing reversals. Zones of mélange are well represented, and the distribution of limestone as scattered pods and lenses ranging from metre to kilometre scale in length are indicative of internal disruption and zonal shear. We interpret the structural character of the terrane as due largely to subduction accretion. A basement-cover unconformity beneath the subjacent forearc sequence is attributed to Early Silurian (~430 Ma) contraction on the basis of the age assigned to a thick basal conglomerate interval of syntectonic origin. This contractional episode has regional expression in pre-Silurian rocks of the northern Tasman Orogenic Zone. Its likely cause was impact of the Late Ordovician oceanic island arc assemblage against the then continental margin in the initial stage of subduction complex development.