between active tectonic processes and crustal growth, because we have the oceanic and continental record to combine into a coherent, whole-Earth geodynamic model. Such integrated models might then be applied to the Precambrian with some confidence. Phanerozoic orogenic systems can be grouped into two broad types: *accretionary* (circumPacific) and *collisional* (Alpine-Himalayan in Mesozoic-Cenozoic; Appalachian-Variscan in Paleozoic). These two systems reflect the effects of simple, long-term (500 Ma) mantle convection involving two global cells separated by the circumPacific subduction zone (Collins 2003, EPSL 205, p.225). Accretionary orogens form in the "Panthalassan" cell, where diverging Pacific Ocean crust prevents entry of continental fragments into that cell, thereby creating a stable, long-lived subduction zone, and equally long-lived, circumPacific orogenic system. In contrast, collisional orogens form in the "Pangean cell, which is traversed by a single subduction system (Alpine-Indonesian). This system is intrinsically unstable because continental fragments exist on the subducting plate. The instability causes MOR- and trench-jumps in the Indian Ocean, which have combined to progressively fragment and transfer Gondwana northward into Asia. Arrival of Gondwanan fragments at the subduction zone completes the Wilson cycle, which characterizes most Phanerozoic collisional orogenic systems.

Crustal growth is more likely to occur in accretionary systems, as collisional systems are largely continental transfer. However, exceptions occur in both. For example, the Andes seem to record little or no net crustal growth over almost 500 Ma. Rapid crustal growth seems to be confined to accretionary systems where large oceanic backarcs fill with turbidite, then are reworked into continental crust during alternating advance and retreat of the outboard subduction zone. The Paleozoic Tasmanide orogenic system of eastern Australia is an excellent example. The processes described above suggest that crustal growth mainly occurs by backarc opening and closing, not by crustal accretion at the arc front, which is borne out by the isotopic record of zircon growth on the Australian continent.

The AuScope Far North Queensland Survey.

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The Australian Government's National Collaborative Research Infrastructure Strategy (NCRIS) initiative awarded AuScope (http://www.auscope.org.au/) $42.8 million to support geoscience. AuScope will establish world-class infrastructure to characterise the structure and evolution of the Australian continent in a global context, from surface to core in space and time; and provide better understanding of the implications for natural resources, hazards and environment. The Earth Imaging and Structure (ANSIR) component of AuScope is focused on providing 3D databases of geologically important regions, which will be achieved through the collection of GeoTransects. AuScope will collaborate with, and use the services of ANSIR to achieve this.

In August 2007, the Far North Queensland (FNQ) Tasman Line project became the first AuScope Traverse to be acquired. This survey links with the GA/GSQ Isa-Georgetown-Charters Towers survey and together, provide an exceptional opportunity to image this important region of Australia crust in three-dimensions. FNQ best preserves the Tasman Line, which is the boundary between the Precambrian craton of Australia, and the Phanerozoic Tasmanides to the east.

The correlation between the lithospheric-scale structures evident in the seismic tomography images with mapped surface structures from observed geology suggests that this region is ideal for investigating the relationship between major upper crustal province boundaries and major features observed in geophysical images.

The FNQ AuScope Reflection Traverse will address important questions regarding the nature of continental growth in eastern Australia. The raw field stack indicates a significant change in Moho depth on either side of the Tasman Line, considerable coherent reflectivity within the middle crust and evidence of shallow mid-crustal structures. However, the seismic imaging does not indicate the presence of a single major structure that corresponds with the Tasman Line. The data now requires processing to enhance the seismic image within the upper crust.

Trace Elements In Sphalerite: Concentration Levels And Mode Of Incorporation.

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Sphalerite from >20 ore deposits has been analysed by LA-ICP-MS for Ag, As, Bi, Cd, Co, Cu, Fe, Ga, Ge, In, Mn, Mo, Ni, Pb, Sb, Se, Sn and Tl. The suite included samples with wt.% levels of Mn, Cd and In. The aim was to better constrain solid solution ranges in the context of crystal chemistry and phase relationships, distinguish between solid solution and microscale inclusions, and to identify