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Building Australia's 'downward looking telescope' – an opportunity to develop international collaboration through strategic integration of observational and data infrastructures

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In 2018 the Australian Academy of Science released a national Decadal Plan for Geoscience. This document outlines the key geoscience questions and highlights some of the likely challenges and opportunities for our science over the next 10 years in Australia.

The plan recognises that increasing pressure on the environment from human activity and changing resource and energy requirements will necessitate new innovative approaches to sustainable use of our earth resources. Geoscience data, research developing a predictive geoscience capability, to support informed policy development, will be critical.

In addition, the Chief Scientist of Australia has produced a National Research Infrastructure Roadmap and Investment Plan to guide future research infrastructure investment across all areas of science. These documents identify investment in research infrastructure that supports creating a 'downward looking telescope' to provide a better understanding of the evolution of the Australian Plate and unlock its undiscovered resource potential, particularly in regions beneath transported cover.

AuScope will play a key role developing this infrastructure by building on its existing observational, data and computational infrastructure programs, in collaboration with partners at Australian universities, Geoscience Australia, CSIRO, state based geological surveys, and other National Collaborative Research Infrastructure Strategy (NCRIS) capabilities such as the Australian Research Data Commons (ARDC) and the National Computational Infrastructure (NCI).

Specifically, we will continue to:

- acquire new national geophysical, geospatial, geochemical, petrological, hydrogeological and atmospheric datasets
- establish a geochemical capability based on a collaborative array of new generation instruments providing mineral imaging and in situ geochemical analysis facilitating national geochemical-tomography surveys
- deliver these datasets as machine accessible FAIR data products
- where possible integrate national datasets with international equivalents from the Europe, America, Asia and Africa
- develop virtual research environments that link relevant tools online to data sources and various computational environments.

It is our hope that these distributed facilities will deliver the Australian node of a future global solid earth observational network, linking groups such as AuScope, EPOS, ENVRI FAIR, ESIP, USArray, and EarthCube, as well as International data groups such as RDA and OGC, to support international collaboration on global-scale geoscientific challenges.