Australian Government
Geoscience Australia

Australian Seismic and Magnetotelluric Surveys

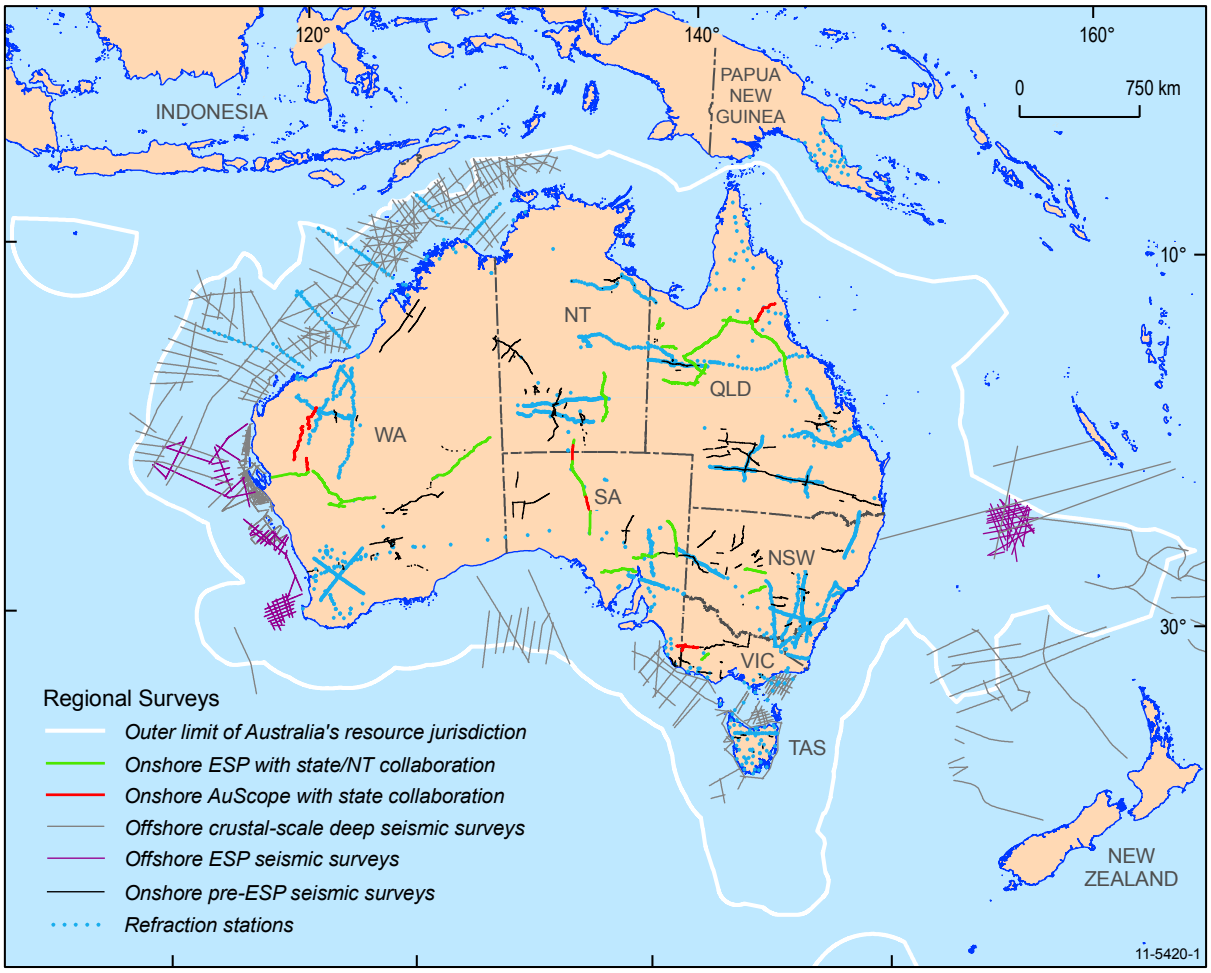

Figure 1. Map of Australia showing GA holdings of onshore and offshore deep-crustal seismic data. ESP, Energy Security Program.

Geoscience Australia (GA) has acquired land seismic data for more than 40 years, and since 1980 has acquired in excess of 15 000 km of onshore deep crustal seismic reflection data and numerous 2D seismic refraction profiles. Expertise in magnetotelluric (MT) data is being developed. Many kilometres of seismic reflection data have also been acquired across Australia's offshore regions.

Seismic coverage over onshore and offshore basins has recently been enhanced as part of the Australian Government's 2006–2011 Energy Security Program. As part of this program, GA has acquired more than 6000 km of additional onshore seismic reflection data and over 12 000 km of additional offshore seismic reflection data. These data are being used to provide fundamental datasets to assist in the ongoing evaluation of Australia's hydrocarbon, minerals, energy and geothermal resources.

ONSHORE

Since 2007, 13 seismic programs have been conducted onshore by GA (Figures 1, 2), and interpretations of data from these programs provide pre-competitive geoscience information associated with energy and mineral resources in selected provinces and basins across continental Australia.

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GA 11-5333

GA commenced a program of magnetotelluric (MT) data acquisition along onshore seismic acquisition lines in 2007. Both broadband and long-period MT data have been acquired at 522 sites along more than 3000 km of seismic lines with site spacings of either 5 km or 10 km. The electrical information obtained is a valuable inclusion into multi-disciplinary interpretations that incorporate seismic and other geophysical measurements such as magnetism and gravity (see example in Figure 4).

OFFSHORE

Offshore seismic data in the area of Australia's resource jurisdiction are dominated by seismic reflection data, mostly recorded by industry to meet exploration lease requirements. However, GA has acquired crustal-scale deep seismic reflection surveys around the margin, most recently over the frontier Capel and Faust basins offshore eastern Australia (2006/2007) and over deep-water basins off the southwest margin (2008/2009) (Figure 3). A number of seismic refraction profiles, mostly on the Northwest Shelf, have also been acquired.

Figure 2. Vibroseis trucks used to acquire onshore seismic reflection data for the Georgina Survey in the Northern Territory.

Figure 3. Vessel MV Duke used to acquire 2D marine seismic data for the southwest-margin survey.

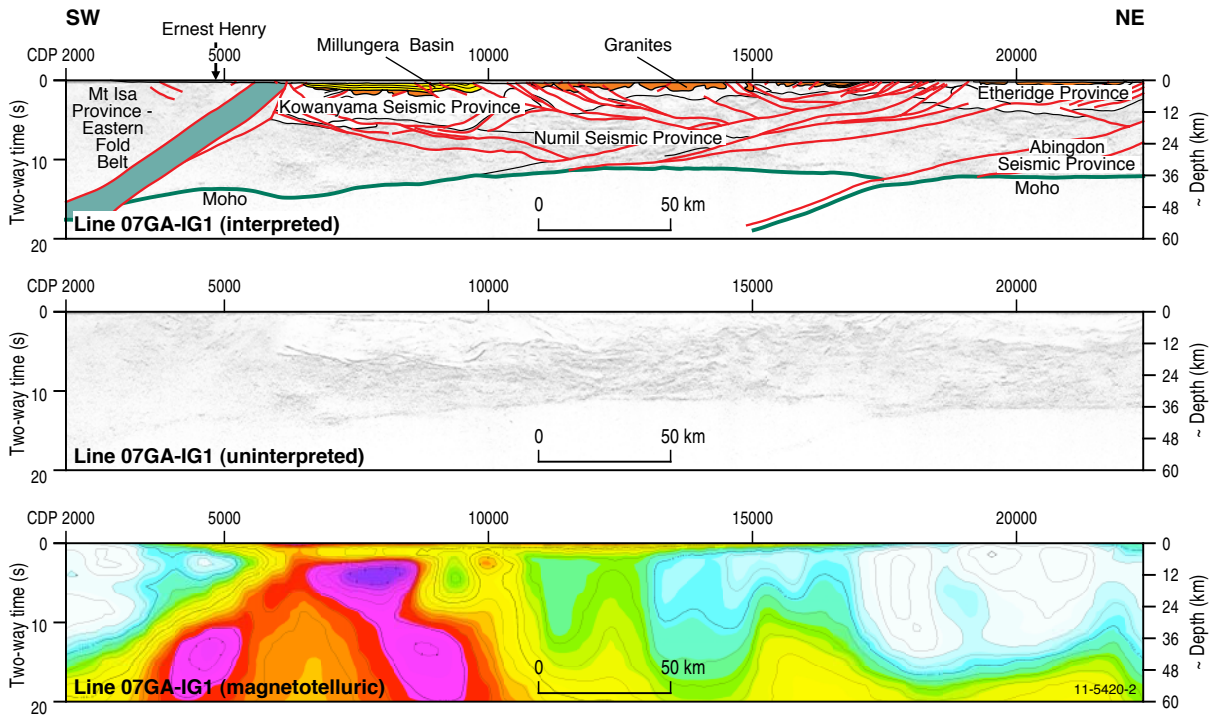

Figure 4. Uninterpreted (middle) and interpreted (upper) versions of North Queensland deep seismic reflection line 07GA-IG1, and the magnetotelluric model for the line (lower panel).