COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF NATIONAL DEVELOPMENT

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

RECORD No. 1962/192

CHILDARA/GAIRDNER AIRBORNE MAGNETIC AND RADIOMETRIC SURVEY, SA 1961

by

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SUMMARY

In March and April 1961 the Bureau of Mineral Resources made an airborne magnetic and radiometric survey of the territory covered by most of the Childara and Gairdner and part of the Tarcoola 1:250,000 map areas, in South Australia.

The operation and equipment used are described in this Record. The preliminary magnetic and radiometric results are shown on a regional geological map of the survey area.

1. INTRODUCTION

At the request of the South Australian Mines Department, the Bureau of Mineral Resources made an airborne magnetic and radiometric survey of the territory covered by most of the Childara and Gairdner and part of the Tarcoola 1:250,000 map areas, in South Australia.

The survey was flown with the DC.3 aircraft VH-MIN between 8th March and 12th April 1961. The Bureau of Mineral Resources personnel engaged in the survey were G.A. Young (party leader), J.E.F. Gardener, A. Drage, P.B. Turner, C. Braybrook, D. Park and K. Mort. The TAA staff concerned were Captain G.G.B. Close, First Officer D. Baker and Aircraft Maintenance Engineer W. Briggs.

The survey area lies in the northern part of Eyre Peninsula between latitudes 30° 45' and 31° 45' and longitudes 133° 30' and 136° 30'.

The object of the survey was to delineate magnetic anomalies produced by magnetite-rich rocks with a view to the detection of potential iron ore deposits. All survey records were handed over to the South Australian Mines Department for reduction and subsequent production of an aeromagnetic contour map of the area.

2. METHOD

Variations in the total intensity of the magnetic field, and in the level of gamma radiation, were measured continuously as the aircraft was flown along a series of east-west flight-lines over the survey area. These lines were spaced one mile apart.

The proposed lines were drawn on shingled aerial photographs, which formed the basis of navigation. During the operation, the aircraft's track was continuously recorded by a vertical 35-mm strip camera. The height of the aircraft was maintained at 500 (± 100) ft above ground level.

A system of north-south tie-lines, spaced at 15-mile intervals, was flown to enable reduction of the magnetic records to a common datum level for the construction of a magnetic contour map.

3. EQUIPMENT

An MFS-4 saturable-core fluxgate magnetometer, with the detector head mounted in a boom projecting from the tail of the aircraft, was used to measure the variations in the magnetic field. These variations were recorded graphically on a 'Speedomax' chart recorder, and in a digital coded form on 5-hole punched paper tape.

The radiometric equipment consisted of two modified twin-crystal MEL scintillation detector heads, mounted within the aircraft, feeding into a BMR-type ratemeter. In addition, a plastic phosphor scintillation detector was contained in a 'towed bird' suspended 290 feet below the aircraft; the output of this detector was fed into a second BMR-type ratemeter. The outputs of the two ratemeters were recorded graphically on Kelvin & Hughes chart recorders.

An STR30B radio-altimeter was used to measure ground clearance of the aircraft. The altitude profile was recorded on a Kelvin & Hughes chart recorder.

An 'Aeropath' 35-mm strip camera recorded the aircraft's track. An air-position indicator unit was operated to supplement position control in subsequent plotting.

Correlation of chart, tape, and film records was provided by an electronically-controlled fiducial marker system.

4. GEOLOGY

Regional geology of the area surveyed, based on the Tectonic Map of Australia published by the Bureau of Mineral Resources in 1960, is shown in Plate 1. No detailed geological maps are available.

Beneath a covering of Cainozoic deposits, Precambrian rocks with igneous intrusions of Precambrian to Lower Palaeozoic age comprise the geology of most of the area.

West of Lake Gairdner, the rocks consist of Archaean metasediments and granite, with some large areas of granite and porphyry of Precambrian to Lower Palaeozoic age. Upper Proterozoic sediments are exposed on the eastern side of Lake Gairdner, and the underlying Archaean rocks crop out in the south-eastern corner of the Gairdner 1:250,000 map area.

The geology of the area generally is similar to that of the central and southern parts of Eyre Peninsula, with the addition of extensive granite and porphyry of the Gawler Range.

5. RESULTS

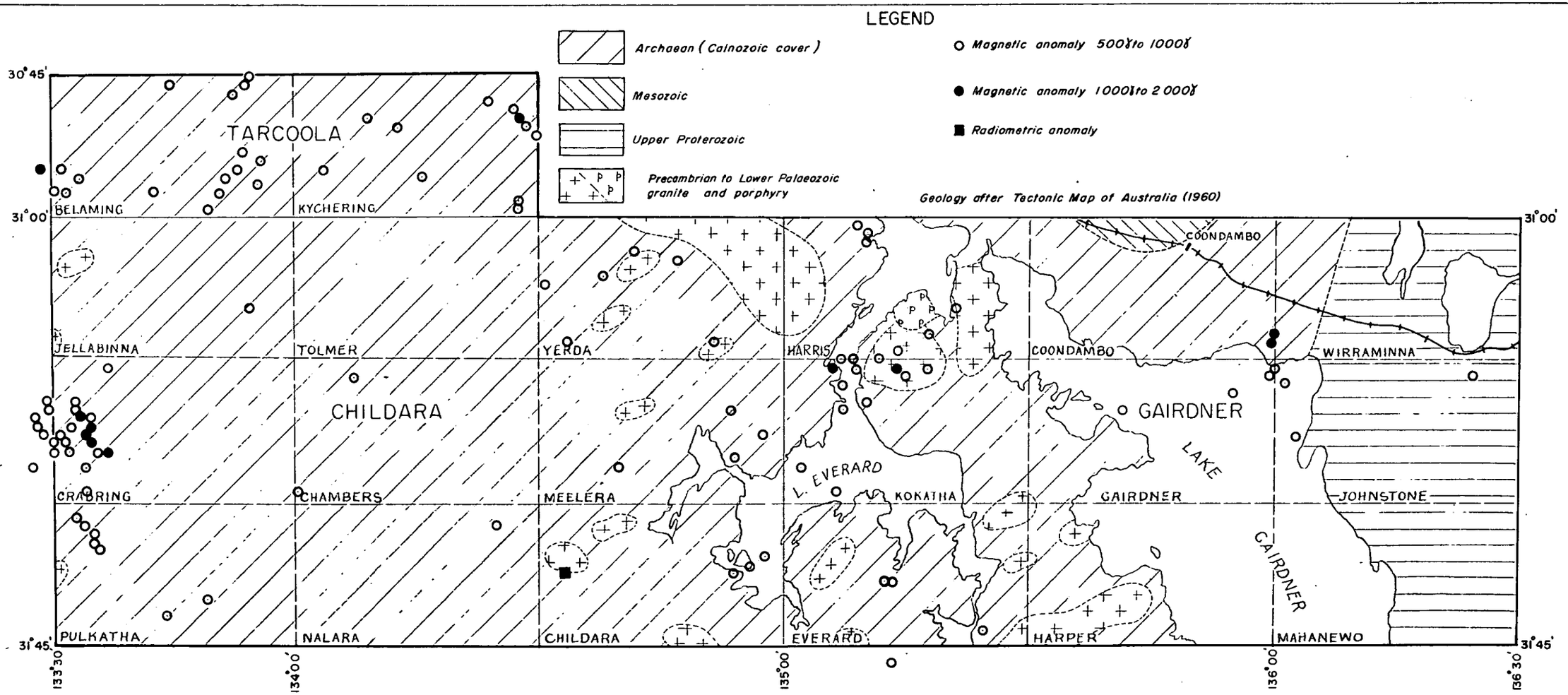
Magnetic results

The locations of the more intense magnetic anomalies recorded are shown in Plate 1. They have been classified in two groups, one group containing those anomalies with intensities between 500 and 1000 gammas and the other group containing anomalies with intensities between 1000 and 2000 gammas.

Greatest density of anomalies is located on the western boundary of the Childara area. Another area with high anomaly density lies on the shores of the northern arm of Lake Everard, and a smaller group of anomalies is found on the north-eastern shore of Lake Gairdner. The rest of the recorded anomalies lie evenly scattered over the north-eastern part of the survey area.

Radiometric results

One scintillograph anomaly was recorded near the western boundary of the Childara 1-mile area (Plate 1).



PRELIMINARY MAGNETIC AND RADIOMETRIC RESULTS AIRBORNE SURVEY, CHILDARA/GAIRDNER S A, 1961

SCALE

miles 10 0 10 20 30 40 50 60 70 miles

PLATE I

Geophysical Branch, Bureau of Mineral Resources, Geology and Geophysics H 53/B1-2
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