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Australian Government
Geoscience Australia

*Product News*

# Arunta's mafic-ultramafic intrusions *exposed*

Geophysical interpretation of Proterozoic mafic–ultramafic intrusions in the Arunta Region, central Australia is now available online.

This study by Geoscience Australia utilised magnetic and gravity datasets to 'see through' alluvial cover and define the total subcropping extent of 14 mafic–ultramafic intrusions. A further series of nine possible mafic–ultramafic bodies was also identified based on the bodies' geophysical signatures. Depth-to-magnetic source modelling indicated that the majority of the bodies subcrop beneath the alluvial cover at depths of less than 120 metres. The web record is viewable via http://www.ga.gov.au/rural/projects/NAP_results_products.jsp

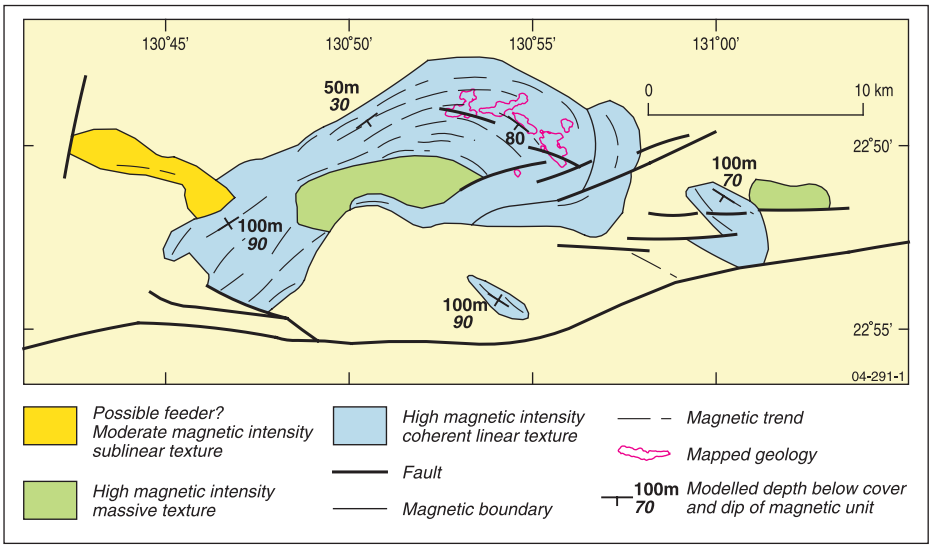


**Figure 1.** Geophysical interpretation of the total subcropping extent of the Andrew Young Hills mafic intrusion, showing that the intrusion's subsurface extent far exceeds the outcropping extent. Magnetic source modelling defines the intrusion as a broad inclined synform with a maximum depth of burial beneath alluvial cover of approximately 100 metres.

**For more information, phone Tony Meixner on +61 2 6249 9636 (email Tony.Meixner@ga.gov.au)**

# Plotting On-Line update

Geoscience Australia has updated Plot-it, the popular online geochemical plotting system.

The release of Plot-it Version 2 gives GA staff and clients an easily accessible and improved software application for retrieving and visualising geochemistry data and now geological drilling data.

Direct access to Plot-it has also been made available from the National Geochronology database website (www.ga.gov.au/oracle/ozchron/TOC.jsp), where plotting time–space diagrams is possible.

The application has been written in Java to run on a standard web browser through Geoscience Australia's intranet and over the internet (www.ga.gov.au/gda). Java Runtime Environment 1.4.2_05 or above is required in order to take advantage of all the features, and we recommend the latest JRE version 1.5 (available from www.java.com/en/index.jsp). For users who do not have this software, a simplified HTML-only version gives access to the geochemical data.

The system allows users to retrieve data from selected Geoscience Australia databases or to load files from a local file system. The data can be further queried or filtered, grouped and plotted as X–Y graphs, ternary diagrams, spidergrams and histograms. Overlays/classifications can be added to X–Y and ternary diagrams. Other features include lines of best fit, stacked/multiple plotting, logarithmic scales, zoom in/out, enlargement and reduction of graph size, and modification of symbol type and colour.

## New features

- Importing—import data from Linear Geology, Geoscience Australia's drillhole and sections database, from five categories: logs, geochemistry, alteration, lithology and grainsize; merge multiple files
- Filtering/grouping—filter rows using a query; group rows highlighted in stacked X–Y and triangle graphs
- Calculating/querying—new analytes and metadata query
- Saving/exporting—save stats reports as HTML files; save plots as high-quality PNG images
- Graphing—plotting section and downhole logs; reload plotted graphs with the plotting history; save and reload legends as .csv files; remove and restore legend points
- Stacked diagrams—zoom in, zoom out, enlarge and reduce stacked graphs simultaneously
- X–Y diagrams—gridlines and overlays are now available; both axes display logarithm values when selected; adjustable maximum and minimum values on both axes
- Spider diagrams—Y axis displays logarithm values when selected

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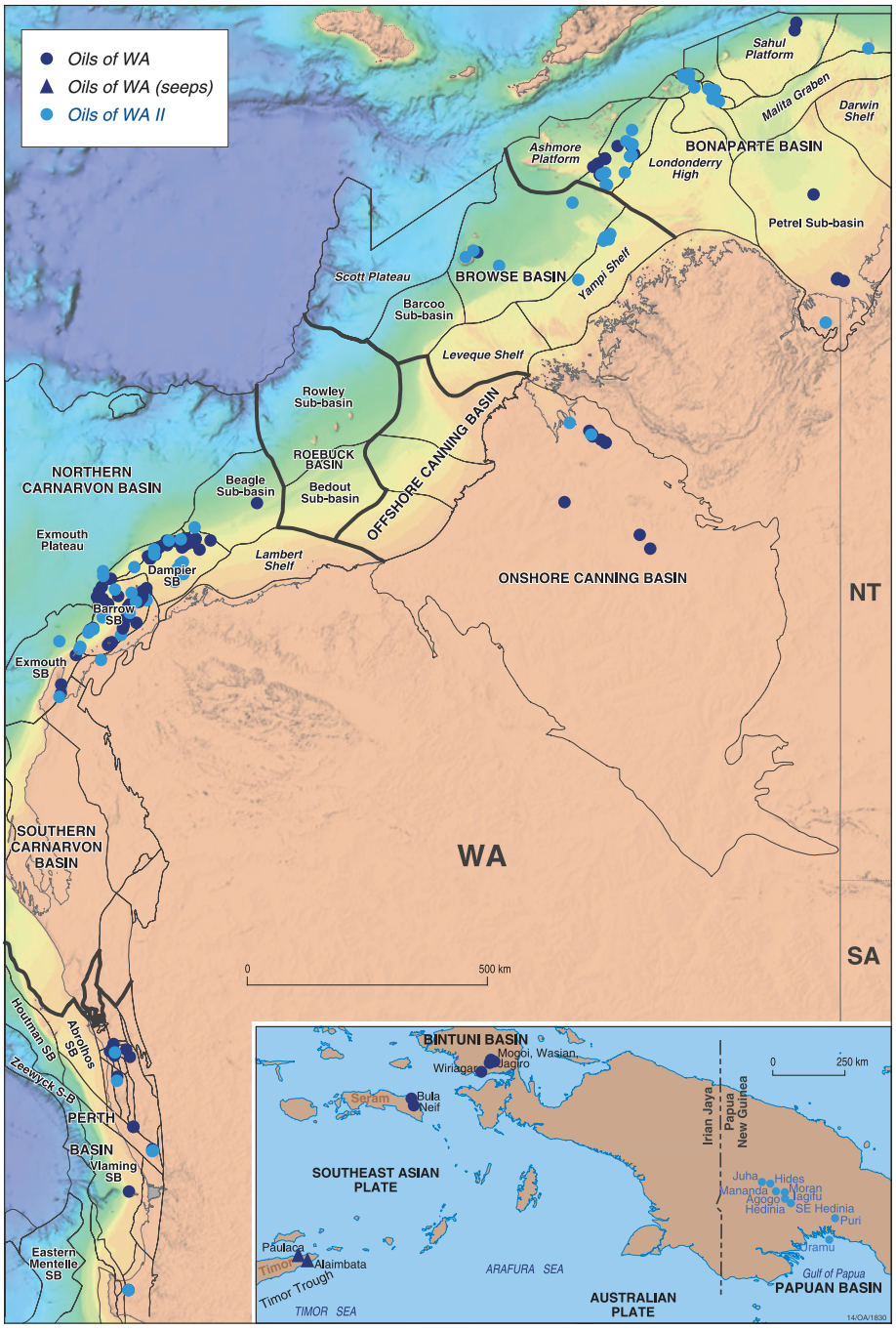
# New biomarker study of WA oils

The release of *The Oils of Western Australia II Study* completes a trilogy of reports on biomarker fingerprinting of Australia's oils and condensates produced by Geoscience Australia and GeoMark Research of Houston USA.

Previous regional studies in the series include *The Oils of Western Australia* (1996) and *The Oils of Eastern Australia* (2002).

The work has involved collaboration between Geoscience Australia's Petroleum and Marine Division and GeoMark Research to geochemically characterise Australia's petroleum accumulations into genetically related families. This data provides the exploration industry with an understanding of the petroleum systems operating in each basin, and indicates their importance to future exploration.

The new study was undertaken in response to the industry's continuing interest in WA and its continental shelf as a major petroleum province, with recent drilling occurring in deeper water and less explored portions of the Bonaparte, Browse, Carnarvon and Perth basins.




To better understand the origin of the oils and condensates in these basins, Geoscience Australia and GeoMark Research expanded the 1996 western Australian study by including an additional 141 samples from the Perth, Carnarvon, Canning, Browse and Bonaparte basins and 15 samples from the Papuan Basin, Papua New Guinea.

These samples (figure 1) were selected to infill and broaden the geographic range of the 160 oils analysed in the initial study, as well as accumulations discovered up to March 2000.

## Study outputs

The new study:

- determines the genetically distinct oil and condensate families in each basin/sub-basin (figure 2)
- maps their geographical distribution (figure 3)
- distinguishes families with a single source from those with multiple sources and more complex charge histories
- uses the geochemical characteristics of the families to determine the nature of their source facies, thermal maturity level and degree of preservation
- deduces the most likely source units for each family by comparing its geochemistry with published source rock information, regional stratigraphy, and hydrocarbon generation, expulsion and migration models.

**Figure 1.** Location map showing oil and condensate samples analysed in Study I (dark blue) and Study II (pale blue) in *The Oils of Western Australia* series.

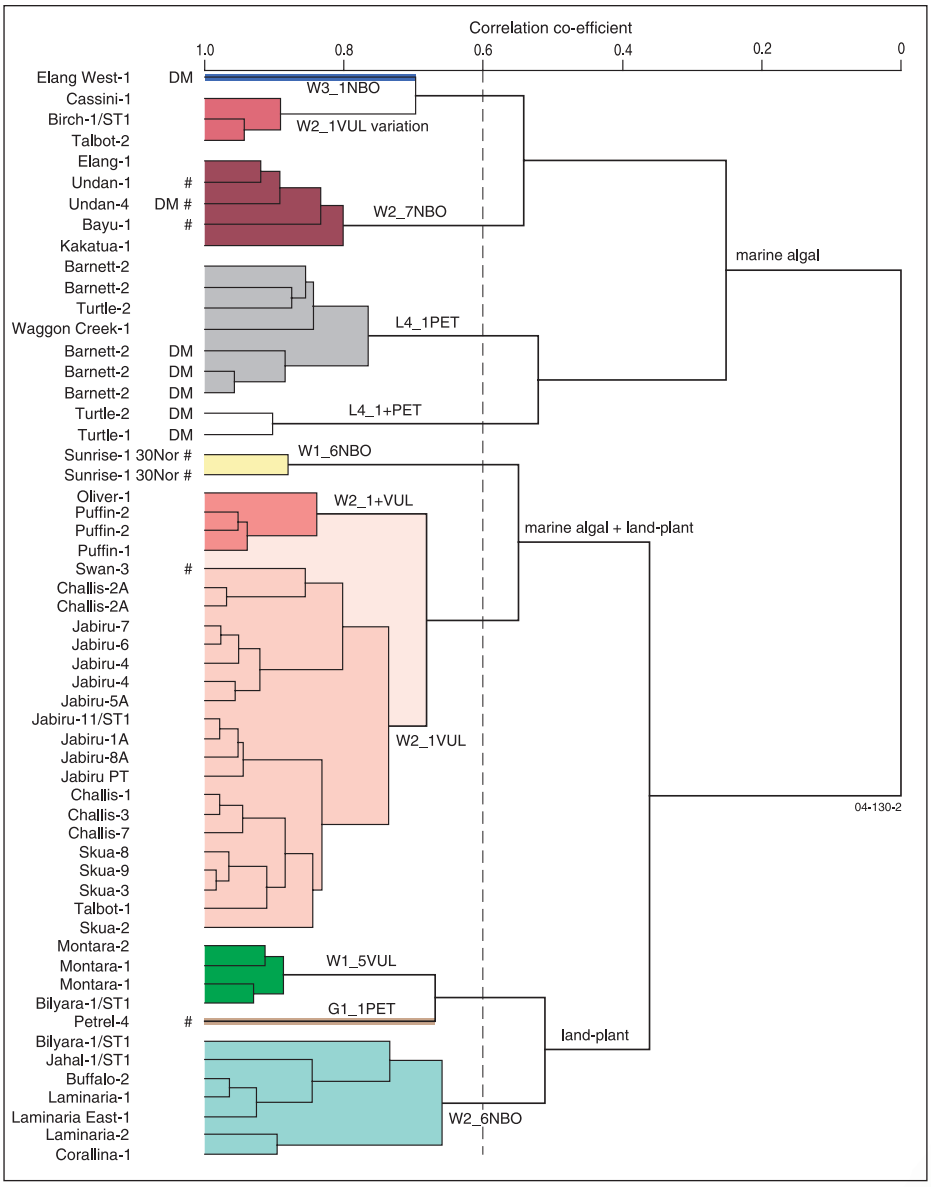



**Figure 2.** Dendrogram showing the oil and condensate families in the Bonaparte Basin.

## Study structure

*The Oils of Western Australia II Study* comprises a Microsoft Access™ relational database with basic geochemical data, an ESRI ArcView 3.2™ package georeferencing the petroleum wells and linking to a geochemical charting application, and a written report.

The report's first section gives an overview of the petroleum geology of the basins studied. The second section details the geochemistry of the oils and condensates, reviews the published geochemical studies of each basin, and interprets the newly acquired data together with data collected in the 1996 study.

*The Oils of Western Australia II Study* is priced at US$21,250. All three studies are available from GeoMark Research Inc.

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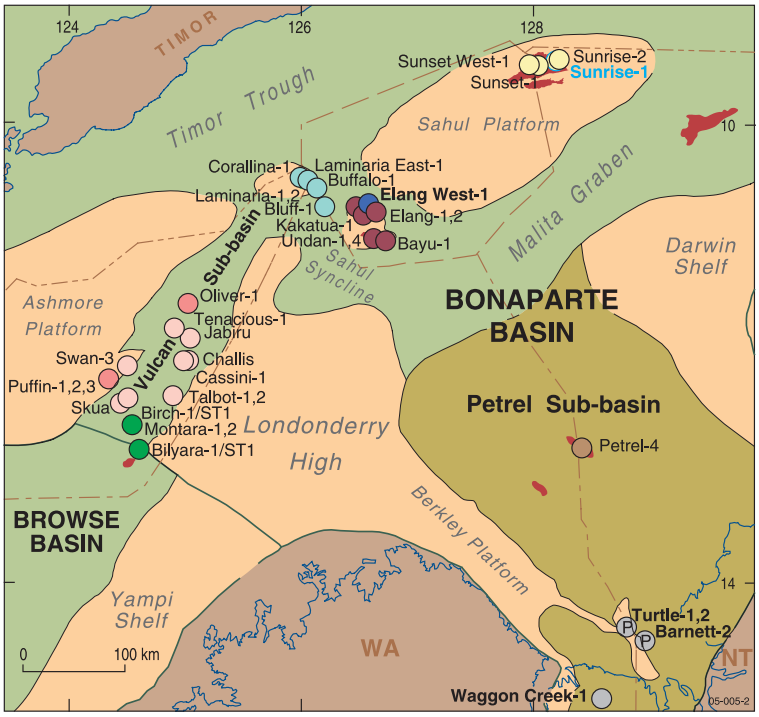


**Oil Family**

- Ⓟ Biodegraded/ Polyhistory
- 30Nor
- W2_1VUL
- W2_1+VUL
- W2_6NBO
- W2_7NBO
- W1_5VUL
- W1_6NBO
- G1_1PET
- L4_1PET

- Mesozoic Sub-basin
- Mesozoic Platform/Shelf
- Palaeozoic Sub-basin
- Precambrian Basement

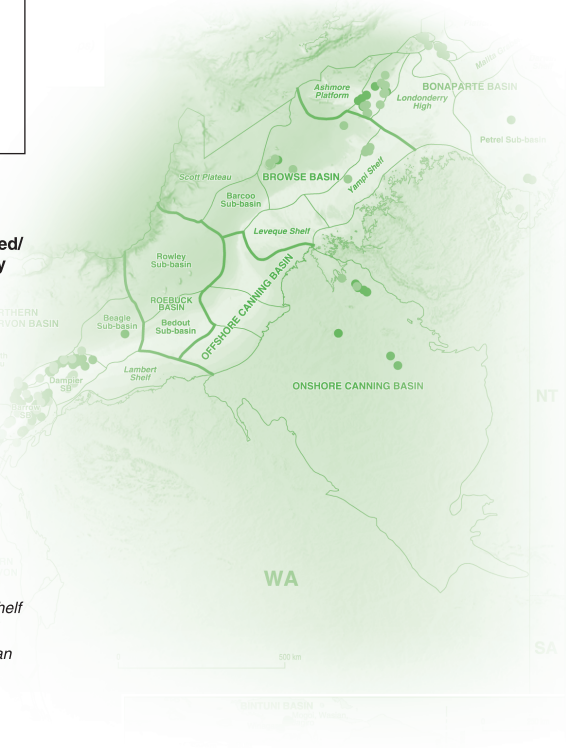


**Figure 3.** The geographic distribution of the oil and condensate families in the Bonaparte Basin.