

WASANT PALAEOVALLEY MAP

MERCATOR PROJECTION Central Meridian: 126°E Standard Parallels: 26°S Geocentric Datum of Australia

This map of palaeovalleys in arid and semi-arid parts of Western Australia (WA), South Australia (SA) and the Northern Territory (NT), shows the interpreted distribution of palaeovalleys including those obscured beneath desert dunefields. The map extent is defined by the Köppen-Geiger classification of arid and semi-arid zones of WA, SA and NT (Figure 1). This map was produced as part of the 'Water for Australia's arid zone - identifying and assessing Australia's palaeovalley groundwater resources project' (termed the 'Palaeovalley Groundwater Project') that was funded by the National Water Commission (NWC) and led by Geoscience Australia, with support from respective state and territory government agencies. The four-year project (2008-2012) aimed to provide information about the role of palaeovalleys as aquifers in widespread regions where groundwater resources are scarce or need to be investigated for the future.

EXPLANATORY NOTES:

The map was compiled using national-scale datasets (including Digital Elevation Models and geological maps), existing geoscientific data and reports in combination with expert knowledge. New information was obtained through demonstration studies in selected sites (Figure 2); examples of palaeovalley cross sections from these sites are shown on the left-hand column of the map. The methodology used to produce the map is described in the companion project summary report by English et al. (2012), cited below. This broad-scale map is intended to enhance our knowledge of Australian arid zone palaeovalleys as widespread but little understood geologic elements and potentially contribute to an improved understanding of palaeovalley aquifers. The palaeovalleys shown on the map do not necessarily correspond with underlying groundwater resources or indicate prospective borehole sites. Rather, the map serves as a guide for more detailed future hydrogeological investigation in areas of interest.

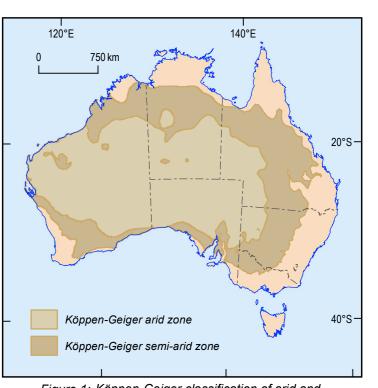


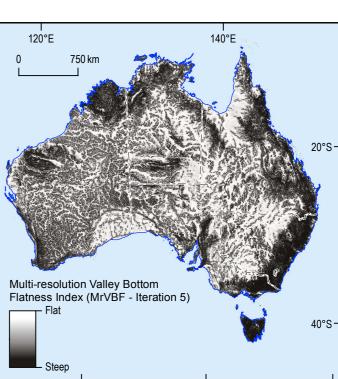
Figure 2: Palaeovalley demonstration sites.

Figure 1: Köppen-Geiger classification of arid and

semi-arid zones (reference 4 below).

CROSS SECTION NOTES:

- 1. Examples of cross sections shown in the left-hand column illustrate the heterogeneity and complexity (in terms of size, shape, structure
- and sediment infill) of palaeovalleys within the arid and semi-arid zone. 2. Most palaeovalleys shown on the map are now infilled with variably thick sequences of Cenozoic sediments, although some contain older
- (Mesozoic and Paleozoic) sequences, such as the Permian glacial-derived sediments in the Paterson Province (WA). 3. The infill sequences depicted in these sections range from unconsolidated sediments to fully lithified sedimentary rocks. For consistency,
- the lithologic descriptions used here refer to the primary sediment type regardless of the degree of lithification. 4. The sediment infill sequences are variably affected by chemical weathering. In places this has overprinted the original sediment
- compositions and also destroyed much of the primary sedimentary fabric. 5. In most cases relatively thin (less than two metres) deposits of regolith and aeolian sands blanket the uppermost palaeovalley sediment
- layers, although dunes up to 20 metres high may occur in desert regions. These cover sequences were not deposited by fluvial or lacustrine processes associated with the palaeovalleys so have not been shown.
- 6. To maximise the display of information the cross sections have inconsistent scales, conveying the significant variations in palaeovalley



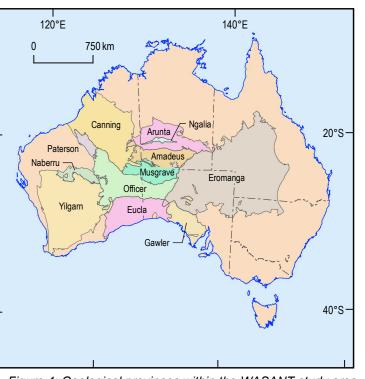


Figure 3: Multi-resolution Valley Bottom Flatness Index (MrVBF) Digital Elevation Model (Gallant and Dowling, 2003).

Figure 4: Geological provinces within the WASANT study area.

- 1. English, P.M., Lewis, S.J., Bell, J.G, Wischusen, J.D.H., Woodgate, M.F., Bastrakov E.N., Macphail, M.K., and Kilgour, P.L., 2012. 'Water for Australia's arid zone – identifying and assessing Australia's palaeovalley groundwater resources: Project summation.
- National Water Commission: Waterlines Report Series', August 2012. 2. Gallant, J.C. and Dowling, T.I., 2003. 'A multi-resolution index of valley bottom flatness for mapping depositional areas', Water Resources Research 39 (12): 401-413.
- 3. Hou, B., 2004. 'Kingoonya palaeochannel project South Australia. Department of Primary Industries and Resources. Report Book', 2004/1. 4. Köppen-Geiger classification of arid and semi-arid zones: http://www.bom.gov.au/climate/environ/other/koppen_explain.shtml

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BIBLIOGRAPHIC REFERENCE:

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