

AUSTRALIAN PROTEROZOIC MAFIC-ULTRAMAFIC MAGMATIC EVENTS (Sheet 1 of 2)

Mafic-Ultramafic Magmatic Events

Magmatic Events (ME) are defined from the published ages of mafic and ultramafic rocks in each province and shown in the Time-Space-Event Chart (accompanying Sheet 2). Time-equivalent magmatism in different provinces does not necessarily imply co-genetic magmatism. The informal event names are taken from dated examples.

Dominantly mafic-ultramafic rock units are shown with bold colours.

Subordinate mafic-ultramafic rocks of the same age within a regional rock package are shown with pale colours.

Note that the presence of mafic and ultramafic rocks in some areas is interpreted only from geophysical data. Further occurrences of these rocks may exist under cover.

The Early Cambrian Kalkarindji Event is included owing to the importance of this large magmatic event.

Dominant	Subordinate	Event Age ± 10 Ma
		ME 30 (m): -520 Ma (Kalkarindji Event)
		ME 29 (mu): -575 Ma (Skipworth Event)
		ME 28 (m): -755 Ma (Mundine Well Event)
		ME 27 (m): -775 Ma (Boucaut Event)
		ME 26 (m): -825 Ma (Gairdner Event)
		ME 25 (mu): -975 Ma (Elizabeth Hills Event)
		ME 24 (mu): -1070 Ma (Warakurna Event)
		ME 23 (mu): -1135 Ma (Mordor Event)
		ME 22 (m): -1180 Ma (Pitjanjatjara Event)
		ME 21 (m): -1210 Ma (Marnoo Moom Event)
		ME 20 (mu): -1310 Ma (Fraser Event)
		ME 19 (mu): -1415 Ma (Loongana Event)
		ME 18 (m): -1465 Ma (Bangemall Event)
		ME 17 (m): -1530 Ma (Saxby Event)
		ME 16 (mu): -1680 Ma (Curramulka Event)
		ME 15 (mu): -1635 Ma (Andrew Young Event)
		ME 14 (m): -1655 Ma (Lane Creek Event)
		ME 13 (m): -1680 Ma (Woman-in-White Event)
		ME 12 (m): -1720 Ma (Onepilli Event)
		ME 11 (m): -1750 Ma (Lunch Creek Event)
		ME 10 (m): -1780 Ma (Hart Event)
		ME 9 (m): -1810 Ma (Mount Hay Event)
		ME 8 (mu): -1830 Ma (Edmirringee Event)
		ME 7 (mu): -1850 Ma (Sally Malay Event)
		ME 6 (m): -1870 Ma (Bow River Event)
		ME 6 (m): -1910 Ma (Ding Dong Downs Event)
		ME 4 (m): -2015 Ma (Stag Creek Event)
		ME 3 (m): -2210 Ma (Tures Creek Event)
		ME 2 (mu): -2420 Ma (Widgiemotha Event)
		ME 1 (mu): -2455 Ma (Weeli Wolf Event)
		Undeclared Event (Age Unknown)

Isolated occurrence of dated Magmatic Event with no defined extent (e.g., from drillhole)

(m) mafic rocks only

(mu) mafic and ultramafic rocks

General map comment

Magmatic Event 26

Inferred distribution of gabbroic intrusions under cover

Local modifications

Crustal Domains from Shaw et al. (1995) Australian Crustal Elements 1:5 000 000 map, with local modifications

Major Crustal Element boundary

Province boundary | dashed where uncertain

Isolated occurrences of dated Magmatic Events

- Kalkarindji Event ME 30 -520 Ma 505 ± 19 Ma preliminary zircon U-Pb ages hybridized mafic rock in basement underlying Canning Basin, petroleum well DDH Murno 1, Great Sandy Desert
- Saxby Event ME 17 -1530 Ma 1577 ± 4 Ma Saxby Granite, part of the 1550-1500 Ma Williams batholith suite, has minor associated gabbro and dolerite intrusions, near Cloncurry
- Gairdner Event ME 26 -825 Ma 837 ± 6 Ma combined zircon and baddeleyite U-Pb ages unnamed NW-trending dolerite dyke, near Mount Webb
- Elizabeth Hills Event ME 25 -975 Ma 976 ± 3 Ma combined zircon and baddeleyite U-Pb ages unnamed NNW-trending dolerite dyke, near Mount Webb
- Woman-in-White Event ME 13 -1680 Ma 1689 ± 8 Ma N-trending unnamed dolerite dykes within Strangways Metamorphic Complex, near Alice Springs
- Tures Creek Event ME 3 -2210 Ma 2028 ± 10 Ma unnamed dolerite sills and dykes, Tures Creek Syncline, near Paraburdoo
- Stag Creek Event ME 4 -2015 Ma 2008 ± 16 Ma unnamed dolerite sills and dykes, Paraburdoo Iron Mine, Hardey Syncline, near Paraburdoo
- Pitjanjatjara Event ME 22 -1180 Ma 1170 ± 4 Ma unnamed basaltic gabbro intrusion, western Champ-de-Mars, near Tomkinson Ranges, and associated minor mafic granites of Undeclared Event
- Gairdner Event ME 26 -825 Ma 824 ± 4 Ma unnamed quartz dolerite dyke, western Champ-de-Mars, near Tomkinson Ranges
- Mount Hay Event ME 9 -1810 Ma 1800 ± 4 Ma unnamed mafic sill associated with unnamed coeval 1799 ± 2 Ma felsic volcanics, near Oodnadatta
- Curramulka Event ME 16 -1590 Ma 1597 ± 4 Ma Recogitobro, Peculiar Knob North Iron ore prospect, DDH PK 1, 1694 ± 5 Ma amphibolite, Ecopetra DDH BSEV 20, 1591 ± 4 Ma metagabbro-Engineers DDH 86EV 27, all near Cooper Bay
- Weeli Wolf Event ME 1 -2455 Ma 2461 ± 5 Ma gabbro-norite of the Blackfellow Hill Pyroxenite, Blackfellow Hill DDH 1, near Tarcoba
- Curramulka Event ME 16 -1590 Ma 1597 ± 4 Ma metagabbro dyke, Snake Gully prospect, DDH SGD 4, near Andamooka
- Lunch Creek Event ME 11 -1750 Ma 1764 ± 12 Ma anorthositic gabbro from BIA's Lookout prospect, DDH BL1, near Andamooka
- Skipworth Event ME 29 -575 Ma 577 ± 22 Ma mafic eclogite, Attunga eclogite, Woodstreet Mine, near Alburga
- Onepilli Event ME 12 -1720 Ma 1727 ± 8 Ma gabbro, Cobon DDH 43, near Colona
- Woman-in-White Event ME 13 -1680 Ma 1683 ± 5 Ma unnamed gabbro, Round Hill, 1674 ± 9 Ma unnamed amphibolite, Clevedale, 1686 ± 13 Ma unnamed amphibolite, Clevedale, 1691 ± 9 Ma unnamed amphibolite, Clevedale, all near Broken Hill
- Gairdner Event ME 26 -825 Ma 827 ± 9 Ma gabbro and mafic dykes of the Little Broken Hill gabbro, Huonville, near Broken Hill
- Mount Hay Event ME 9 -1810 Ma 1798 ± 8 Ma dolerite dykes of the Tourmatorf Dyke Swarm, McLaren Point, Eyre Peninsula

Sheet 1: 1:5 000 000 Map of Proterozoic Magmatic Events
Sheet 2: Time-Space-Event Chart
1:10 000 000 Map of Mineral Deposits and Occurrences
1:10 000 000 Map of Proterozoic Large Igneous Provinces

General map comments

- Onepilli Event ME 12 -1720 Ma Undeclared basalt horizons in Katherine River Group and correlatives (McArthur Basin) are >1710 Ma and tentatively assigned to ME 12, coeval with 1723 ± 4 Ma Onepilli Dolerite
- Undeclared Event younger than 1685 Ma Undeclared Murrumbidgee Dolerite intrusions <1685 Ma sedimentary rocks
- Curramulka Event ME 16 -1590 Ma Yamba Metamorphics include mafic granulite in the Chelmsford Gneiss with 1586 ± 4 Ma magmatic crystallisation age
- Sally Malay Event ME 7 -1850 Ma Subordinate gabbro component to -1850 Ma Tennant Creek granites
- Undeclared Event Mount Isa region is extensively intruded by suites of undeclared dolerite dykes and gabbro intrusions of unknown event affiliation
- Lunch Creek Event ME 11 -1750 Ma, Mordor Event ME 23 -1135 Ma 1140-120 Ma Lunch Creek Gabbro and associated 1142 ± 5 Ma Lakeview Dolerite and associated late NE-trending dolerite dykes
- Hart Event ME 10 -1780 Ma Mount Isa Western Succession voluminous basalt lavas in Eastern Creek Volcanics and associated felsic units; other undeclared mafic units may belong to younger magmatic events
- Curramulka Event ME 16 -1590 Ma North-trending dolerite dykes locally emplaced axial-planar to the -1590 Ma Snake Creek Anticline
- Edmirringee Event ME 8 -1830 Ma Subordinate metabasite and metabasalt within widespread Lander Package and Tennant Group sedimentary units, -1830 Ma or older
- Undeclared Event Undeclared Whiteduck and other E-trending dolerite dykes
- Woman-in-White Event ME 13 -1680 Ma Mount Isa Eastern Succession voluminous basalt lavas in Toole Creek Volcanics and associated sills which intrude underlying stratigraphy
- Kalkarindji Event ME 30 -520 Ma Numerous mafic and ultramafic units of this event or younger Phanerozoic ages
- Mordor Event ME 23 -1135 Ma 1133 ± 5 Ma plagioclase pyroxenite in the Mordor mafic-ultramafic intrusion
- Skipworth Event ME 29 -575 Ma Proterozoic Serpentine hosts SE 2, 22 Ma (Din-Nil) gabbro and dolerites; other similar -N-trending fault-bounded ultramafic-mafic complexes throughout eastern Australia may be Neoproterozoic to Early Cambrian or younger in age
- Warakurna Event ME 24 -1070 Ma, Gairdner Event ME 26 -825 Ma Two ages of dolerite dykes with different orientations (Alcurra, Gairdner, Armatia), not distinguished on map and all shown as Undeclared Event
- Undeclared Event Distribution of inferred gabbroic intrusions under cover, interpreted by Geological Survey of Western Australia from magnetic anomalies
- Skipworth Event ME 29 -575 Ma Basaltic units of Mount Arrowsmith Volcanics comagmatic with associated 566 ± 7 Ma rhyolite and mafic-ultramafic intrusions in Kara beds
- Undeclared Event Most undeclared dykes and sills concentrated around the margins of the Victoria Craton interpreted from aeromagnetic data are dolerite and gabbroic bodies of the ME 21 -1710 Ma Marnoo Moom Event; other dykes and sills shown are likely to include the ME 2 -2420 Ma Widgiemotha Event, ME 24 -1070 Ma Warakurna Event, and also some of Archaean and Phanerozoic age
- Loongana Event ME 19 -1415 Ma 1415 ± 7 Ma metagabbro on Loongana intrusion which is in basement covered by sedimentary rocks of the Eucla Basin
- Undeclared Event Reversely magnetised bodies under cover, tentatively interpreted by Primary Industries and Resources, South Australia as mafic-ultramafic intrusions equivalent to Giles Complex ME 24 -1070 Ma Warakurna Event; shown here as Undeclared
- Woman-in-White Event ME 13 -1680 Ma Subordinate mafic rock components from several bimodal felsic-mafic magmatic suites including -1683 Ma Symons Granite, Engenna Astarmella, iron equivalents of -1680-1670 Ma Tunabula Suite, also -1590 Ma Hibba Suite and Gairdner Range Volcanics, -1620 Ma St Peter Suite, and -1730 Ma mafic ultramafic intrusions
- Andrew Young Event ME 15 -1635 Ma Subordinate mafic rock components in bimodal felsic-mafic magmatic suites -1620 Ma St Peter Suite and -1630 Ma Nuyts Volcanics-St Francis Suite
- Undeclared Event Seven types of undeclared Neoproterozoic to Neoproterozoic mafic intrusions, flows, dykes, and sills in Clary-Broken Hill region, including ME 26 -825 Ma Gairdner Event, ME 13 -1680 Ma Woman-in-White Event, and undeclared amphibolites of Mrotophenite Metabasalt complex by Primary Industries and Resources, South Australia with 1715-1707 Ma Basalt Suite. Also some metadolerite dykes are possibly younger than -825 Ma
- Sally Malay Event ME 7 -1850 Ma Subordinate 1849 ± 4 Ma quartz gabbro-norite intrusions in bimodal felsic-mafic -1850 Ma Donnington Suite
- Undeclared Event Mafic-ultramafic units shown as Undeclared in Victoria are inferred Neoproterozoic to Early Cambrian age; serpentine of the Hummocks Serpentine near Hamilton, gabbro of the Carras Gabbro near Geelong; basalt at West Point on southern Phillip Island
- Skipworth Event ME 29 -575 Ma 578 ± 16 Ma gabbro and basalt of Skipworth Subgroup, King Island; basalt of Spinks Creek Volcanics, Benalla Volcanics, and correlatives, all of Roolby Cape region. Other mafic ultramafic rocks of western Tasmania are dominantly Neoproterozoic to Early Cambrian and are shown as Undeclared Event

Inset 1
WESTERN AUSTRALIA

Inset 2
NORTHERN TERRITORY

Inset 3
WESTERN AUSTRALIA

Australian Government
Geoscience Australia

Scale 1:5 000 000

0 200 400 600 800 1000 Kilometres

Lambert Conformal Conic Projection, Central Meridian 134° E, Standard Parallels 16° S and 36° S
Geocentric Datum of Australia 1984

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Other maps in this series:
This map is the third and final part of a Geoscience Australia series showing the geographic extent and time-space relationships of Proterozoic mafic-ultramafic magmatism and associated mineral deposits across the Australian continent.
Part 1: Western Australia was published in October 2006 and documents 15 Proterozoic mafic-ultramafic magmatic events. Copies of the Part 1 map are available free online at http://www.ga.gov.au/mag_cache/GA8798.pdf in pdf format
http://www.ga.gov.au/mag_cache/GA8797.jpg in jpg format
Part 2: Northern Territory-South Australia was published in July 2007 and documents 19 Proterozoic mafic-ultramafic magmatic events. Copies of the Part 2 map are available free online at http://www.ga.gov.au/mag_cache/GA1064.pdf in pdf format
http://www.ga.gov.au/mag_cache/GA1064.jpg in jpg format

The geological and geochronological information accompanying this map series is summarised in Geoscience Australia Report 2008 (Geological Number 66524) Australian Mafic-Ultramafic Magmatic Events: Sheets 1 and 2 (1:5 000 000 and 1:10 000 000 scale maps). Geoscience Australia, Canberra
It is recommended that this map be referred to as: Houston, D.M., Clauak, J.C., Javari, S.B., Mezzomo, G., 2008. Australian Proterozoic Mafic-Ultramafic Magmatic Events: Sheet 1 and 2 (1:5 000 000 and 1:10 000 000 scale maps). Geoscience Australia, Canberra
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Copies of this map can be obtained from:
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