

Western Australian Moho, 2021

by

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Abstract

The Western Australian Moho, 2021 is a depth contour map of the Mohorovičić (Moho) discontinuity between the crust and mantle as determined from seismological methods. The base map is from the AuSREM model (Salmon et al., 2012) at half-degree gridded intervals with additional data from deep crustal seismic reflection lines Yilgarn 1999 (Goleby et al., 2000), Eastern Goldfields 1991 (Goleby et al., 1993), Northeastern Yilgarn 2001, (Goleby et al., 2003), Tanami 2005 (Goleby et al., 2009), Capricorn 2010 (Johnson et al., 2012), Youanmi 2010 (Wyche et al., 2014), Yilgarn Craton – Officer Basin – Musgrave Province 2011 (Neumann, 2013), Albany–Fraser and Tropicana 2012 (Spaggiari and Tyler, 2015), Eucla–Gawler 2013 (Dutch et al., 2015), Kidson Basin 2018 (Doublier et al., 2020a,b), New Norcia 1992 (Middleton et al., 1993), deep refraction lines South West Yilgarn 1983 (Dentith et al., 2000), offshore and onshore line GA280 (Tassell and Goncharov, 2006) and receiver function data from passive seismic deployments SKIPPY (Reading et al., 2003, 2012; Reading and Kennett, 2003), ALFREX (Sippl et al., 2018), COPA (Dentith et al., 2018), CWAS (Zhao et al., written comm.) and SWAN (Yuan et al., written comm).

How to access

The **Western Australian Moho, 2021** data layer forms part of the **Critical minerals, 2021 Geological Exploration Package**, available via the DMIRS eBookshop.

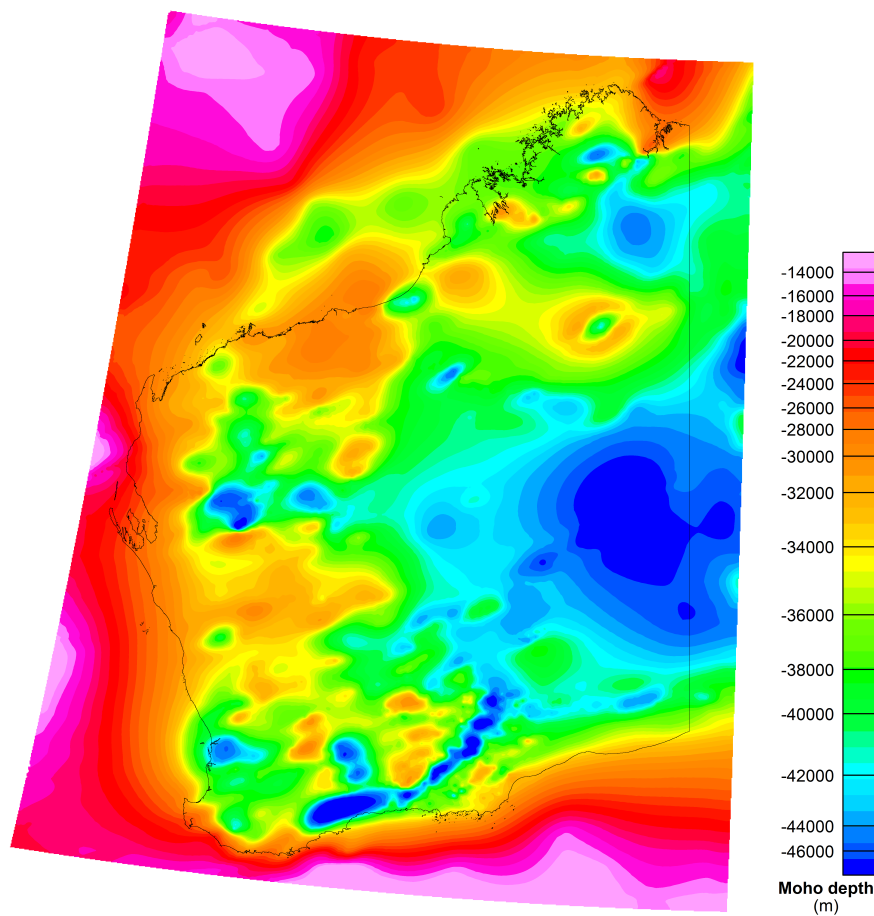


Figure 1. The Western Australian Moho, 2021 data layer

References

- Dentith, M, Yuan, H, Murdie, RE, Pina-Varas, P, Johnson, SP, Gessner, K and Korhonen, FJ 2018, Improved interpretation of deep seismic reflection data in areas of complex geology through integration with passive seismic data sets: *Journal of Geophysical Research: Solid Earth*, v. 123, no. 12, p. 10 810–10 830, doi:10.1029/2018JB015795.
- Dentith, MC, Dent, VF and Drummond, BJ 2000, Deep crustal structure in the southwestern Yilgarn Craton, Western Australia: *Tectonophysics*, v. 325, p. 227–255.
- Doublier, MP, Gessner, K, Johnson, SP, Kelsey, DE, Haines, PW, Howard, HM, Chopping, R, Smithies, RH, Hickman, AH, Martin, DMcB, Southby, C, Champion, DC, Huston, DL, Calvert, AJ, Gorczyk, W, Kohanpour, F, Moro, P, Costelloe, R, Formin, T, Yuan, H and Kennett, BLN 2020a, Basement interpretation of the Kisdon seismic survey 18GA-KB1 (1:500 000 scale): Geological Society of Western Australia, non-series map.
- Doublier, MP, Johnson, SP, Gessner, KT, Howard, HM, Chopping, R, Smithies, RH, Martin, DMcB, Kelsey, DE, Haines, PW, Hickman, AH, Czarnota, K, Southby, C, Champion, DC, Huston, DL, Calvert, AJ, Kohanpour, F, Moro, P, Costelloe, R, Fomin, T and Kennett, BLN 2020b, Basement architecture from the Pilbara Craton to the Aileron Province: new insights from deep seismic reflection line 18GA-KB1, *in* *Exploring for the future: Extended Abstracts* edited by K Czarnota, IC Roach, S Abbott, M Haynes, N Kositsin, A Ray and E Slatter, Geoscience Australia, Canberra, <www.ga.gov.au/eftf/extended-abstracts>.
- Dutch, RA, Pawley, MJ and Wise, TW (editors) 2015, What lies beneath the Western Gawler Craton? 13GA-EG1 Seismic and Magnetotelluric Workshop 2015 — extended abstracts: Department of State Development, South Australia, Report Book 2015/00029, 84p.
- Goleby, BR, Blewett, RS, Groenewald, PB, Cassidy, KF, Champion, DC, Jones, LEA, Korsch, RJ, Shevchenko, S and Apak, SN 2003, The 2001 northeastern Yilgarn deep seismic reflection survey: Geoscience Australia, Record 2003/28, 144p.
- Goleby, BR and Drummond, BJ 2000, The 1991 deep seismic survey, Eastern Goldfields, WA, in *Crustal structure and fluid flow in the Eastern Goldfields, Western Australia: Results from the Australian Geodynamics Cooperative Research Centre's (AGRCRC) Yilgarn deep seismic reflection survey and fluid flow modelling projects* edited by BR Goleby, B Bell, RJ Korsch, P Sorjonen-Ward, PB Groenewald, S Wyche, R Bateman, T Fomin, W Witt, J Walshe, BJ Drummond and AJ Owen: Australian Geological Survey Organization, Record 2000/34, p. 53–57.
- Goleby, BR, Huston, DL, Lyons, P, Vandenberg, L, Bagas, L, Davies, BM, Jones, LEA, Gebre-Mariam, M, Johnson, W, Smith, T and English, L 2009, The Tanami deep seismic reflection experiment: An insight into gold mineralization and Paleoproterozoic collision in the North Australian Craton: *Tectonophysics*, v. 472, no. 1-4, p. 169–182.
- Goleby, BR, Rattenbury, MS, Swager, CP, Drummond, BJ, Williams, PR, Sheraton, JE and Heinrich, CA 1993, Archean crustal structure from seismic reflection profiling, Eastern Goldfields, Western Australia: Australian Geological Survey Organization, Record 15, 54p.
- Johnson, SP, Thorne, AM and Tyler, IM 2012, Capricorn Orogen seismic and magnetotelluric (MT) workshop 2011: Extended abstracts: Geological Survey of Western Australia, Record 2011/25, 120p.
- Middleton, MF, Long, A, Wilde, SA, Dentith, M and Evans, BA 1993, A preliminary interpretation of deep seismic reflection and other geophysical data from the Darling Fault Zone, Western Australia: *Exploration Geophysics*, v. 24, no. 3-4, p. 711–717, doi:10.1071/EG993711.
- Neumann, NL (editor) 2013, Yilgarn Craton – Officer Basin – Musgrave Province seismic and MT workshop: Geoscience Australia, Record 2013/28, 210p.
- Reading, AM and Kennett, BLN 2003, Lithospheric structure of the Pilbara Craton, Capricorn Orogen and northern Yilgarn Craton, Western Australia, from tele-seismic receiver functions: *Australian Journal of Earth Sciences*, v. 50, p. 439–445.
- Reading, AM, Kennett, BLN and Dentith, MC 2003, Seismic structure of the Yilgarn Craton, Western Australia: *Australian Journal of Earth Sciences*, v. 50, no. 3, p. 427–438, doi:10.1046/j.1440-0952.2003.01000.x.
- Reading, AM, Tkaličić, H, Kennett, BLN, Johnson, SP and Sheppard, S 2012, Seismic structure of the crust and uppermost mantle of the Capricorn and Paterson Orogens and adjacent cratons, Western Australia, from passive seismic transects: *Precambrian Research*, v. 196–197, p. 295–308, doi:10.1016/j.precamres.2011.07.001.

- Salmon, M, Kennett, BLN and Saygin, E 2012, Australian Seismological Reference Model (AuSREM): Crustal component: *Geophysical Journal International*, v. 192, p. 190–206.
- Sippl, C, Tkalčić, H, Kennett, BLN, Spaggiari, CV and Gessner, K 2018, Crustal and uppermost mantle structure of the east Albany–Fraser Orogen from passive seismic data: Geological Survey of Western Australia, Report 177, 51p.
- Spaggiari, CV and Tyler, IM (editors) 2015, Albany–Fraser Orogen seismic and magnetotelluric (MT) workshop 2014: Geological Survey of Western Australia, Record 2014/6.
- Tassell, H and Goncharov, A 2006, Geophysical evidence for a deep crustal root beneath the Yilgarn Craton and Albany–Fraser Orogen, Western Australia, *in* Conference abstracts: Australian Earth Sciences Convention, Melbourne, Victoria, 2–8 July 2006: Geological Society of Australia, 6p.
- Wyche, S, Ivanic, TJ and Zibra, I (editors) 2014, Youanmi and southern Carnarvon seismic and magnetotelluric (MT) workshop 2013: Geological Survey of Western Australia, Record 2013/6, 180p.
- Yuan, H, Murdie, RE, Miller, M, Allen, T, Salmon, M and Whitney, J 2021 South West Australia Network, initial results: Written communication, February 2021.
- Zhao L, Yuan H, Tyler I, Gorczyk W, Murdie RE, Gessner K, Lu Y, Smithies RH, Li T, Yang J, Zhan A, Wan B and China – Western Australia passive seismic group 2021, Geophysical imaging of a 1.9 Ga hidden orogen in the northern West Australian Craton and implications for early cratonization: Written communication, April 2021.

Recommended reference

Murdie, RE and Yuan, H 2021, Western Australian Moho, 2021: Geological Survey of Western Australia, digital data layer.



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