Supplement to
A strontium isoscape of southwestern Australia and progress toward a national strontium isoscape

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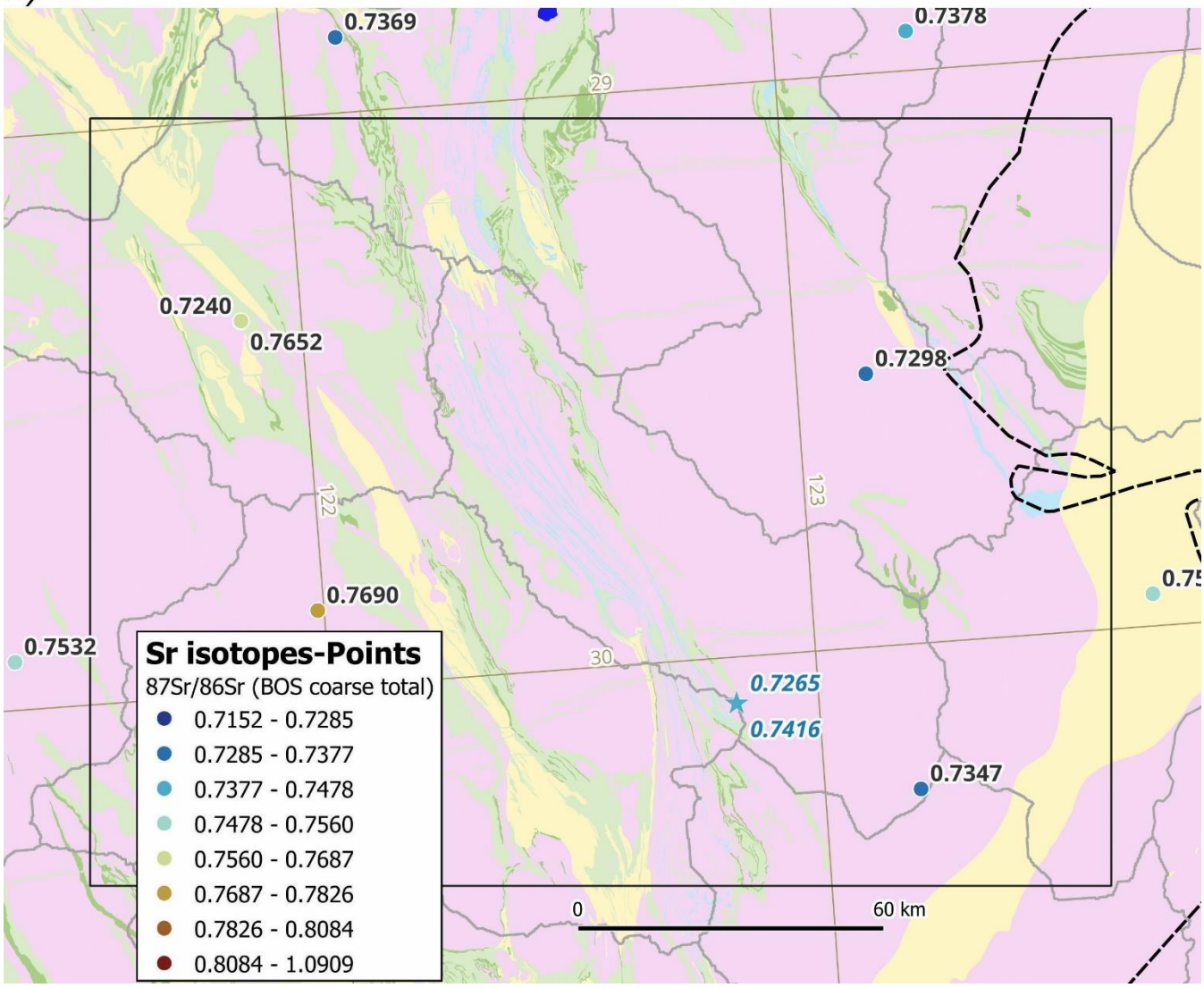
1 Area 1 validation

a)



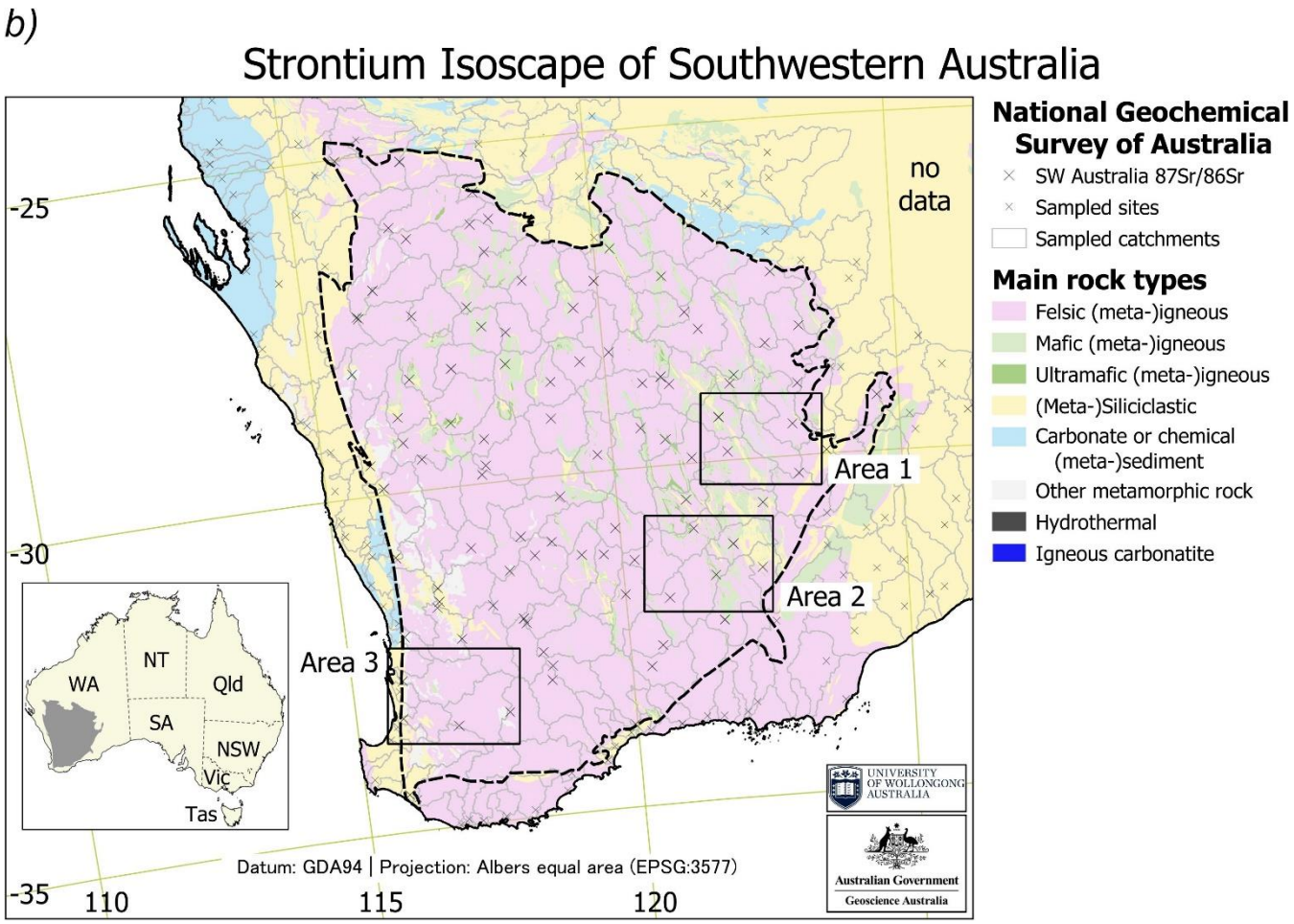


Figure S1. (a) Area 1 detail of the southwestern Australia Sr isotope study showing results from the present NGSA catchment sediment $^{87}Sr/^{86}Sr$ analysis (as coloured circles with values in black typeface) as well as $^{87}Sr/^{86}Sr$ values from the literature (as coloured stars with values in blue typeface; McCulloch et al., 1983) overlain on simplified main rock types (Cutten and Riganti, 2020). Coloured symbols represent $^{87}Sr/^{86}Sr$ values, as per inset legend. (b) Location map of Areas 1, 2, and 3 within the Yilgarn geological region overlain on simplified main rock types (Cutten and Riganti, 2020) coloured as per legend. Catchment boundaries are outlined in grey. The Yilgarn geological region is outlined in a stippled line.

2 Area 2 validation

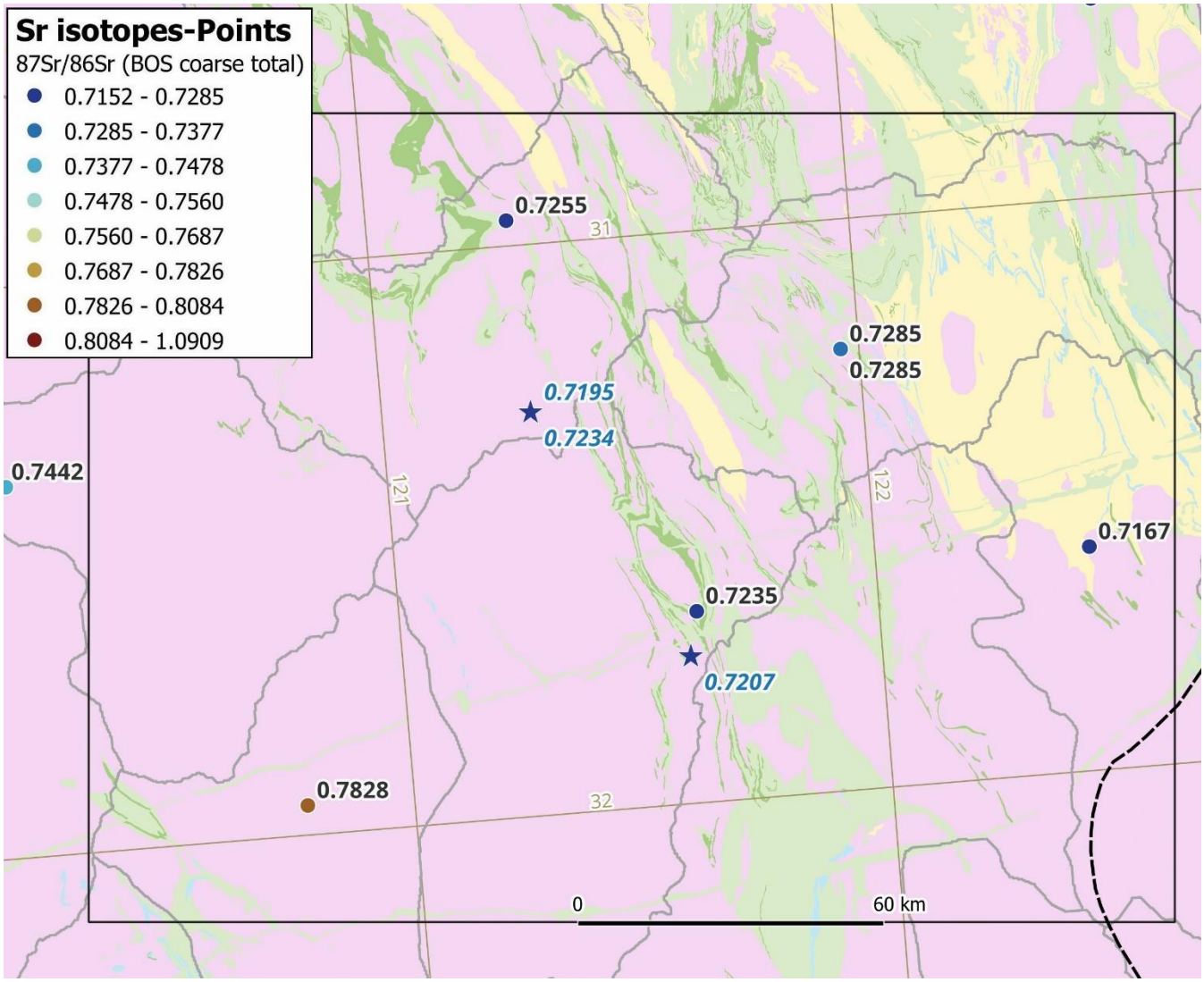


Figure S2. Area 2 detail of the southwestern Australia Sr isotope study showing results from the present NGSA catchment sediment $^{87}Sr/^{86}Sr$ analysis (as coloured circles with values in black typeface) as well as $^{87}Sr/^{86}Sr$ values from the literature (as coloured stars with values in blue typeface; McCulloch et al., 1983) overlain on simplified main rock types (Cutten and Riganti, 2020). Coloured symbols represent $^{87}Sr/^{86}Sr$ values, as per inset legend. Catchment boundaries are outlined in grey. Refer to Figures S1b for location within the Yilgarn geological region and main rock types legend.

3 Area 3 validation

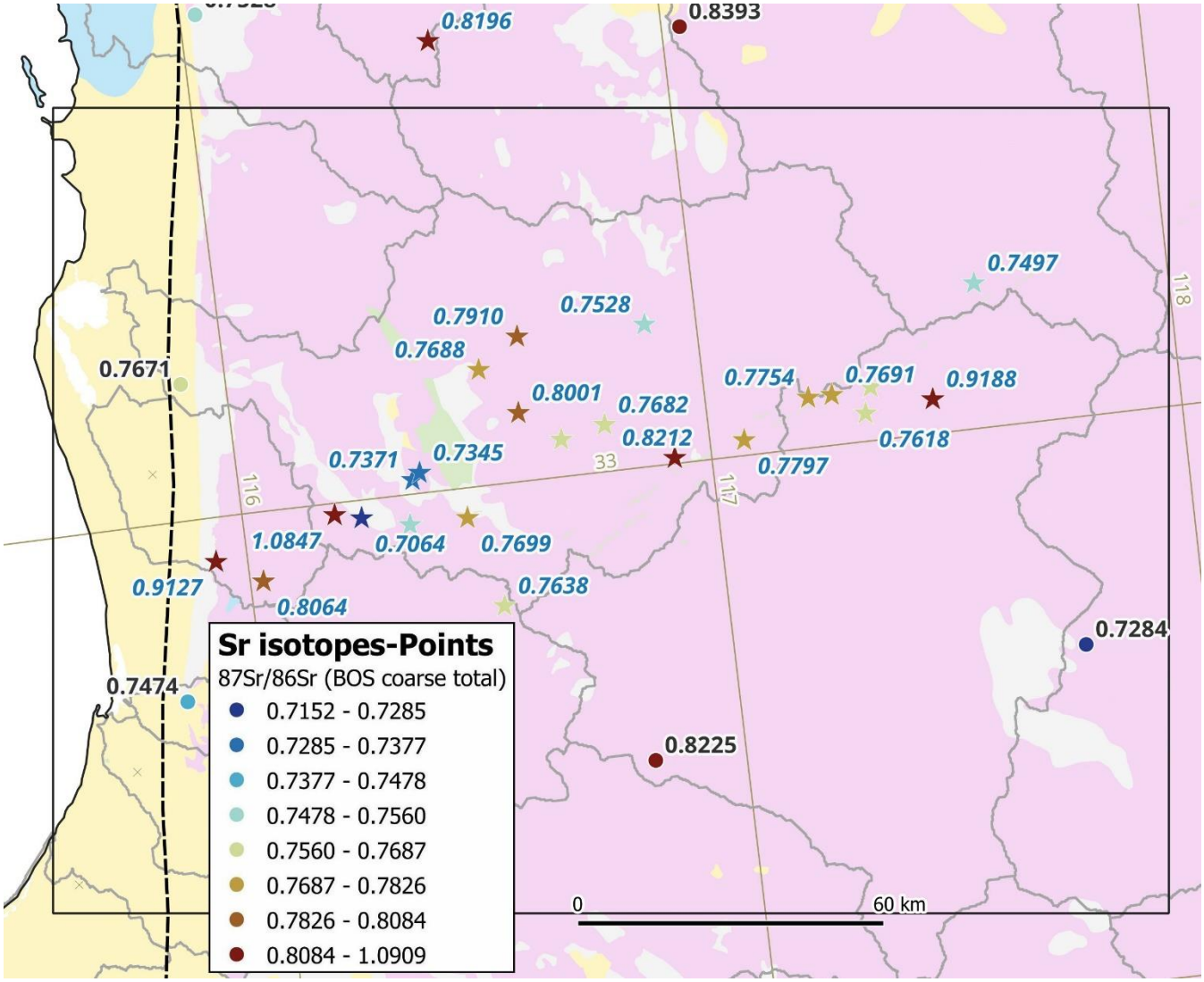
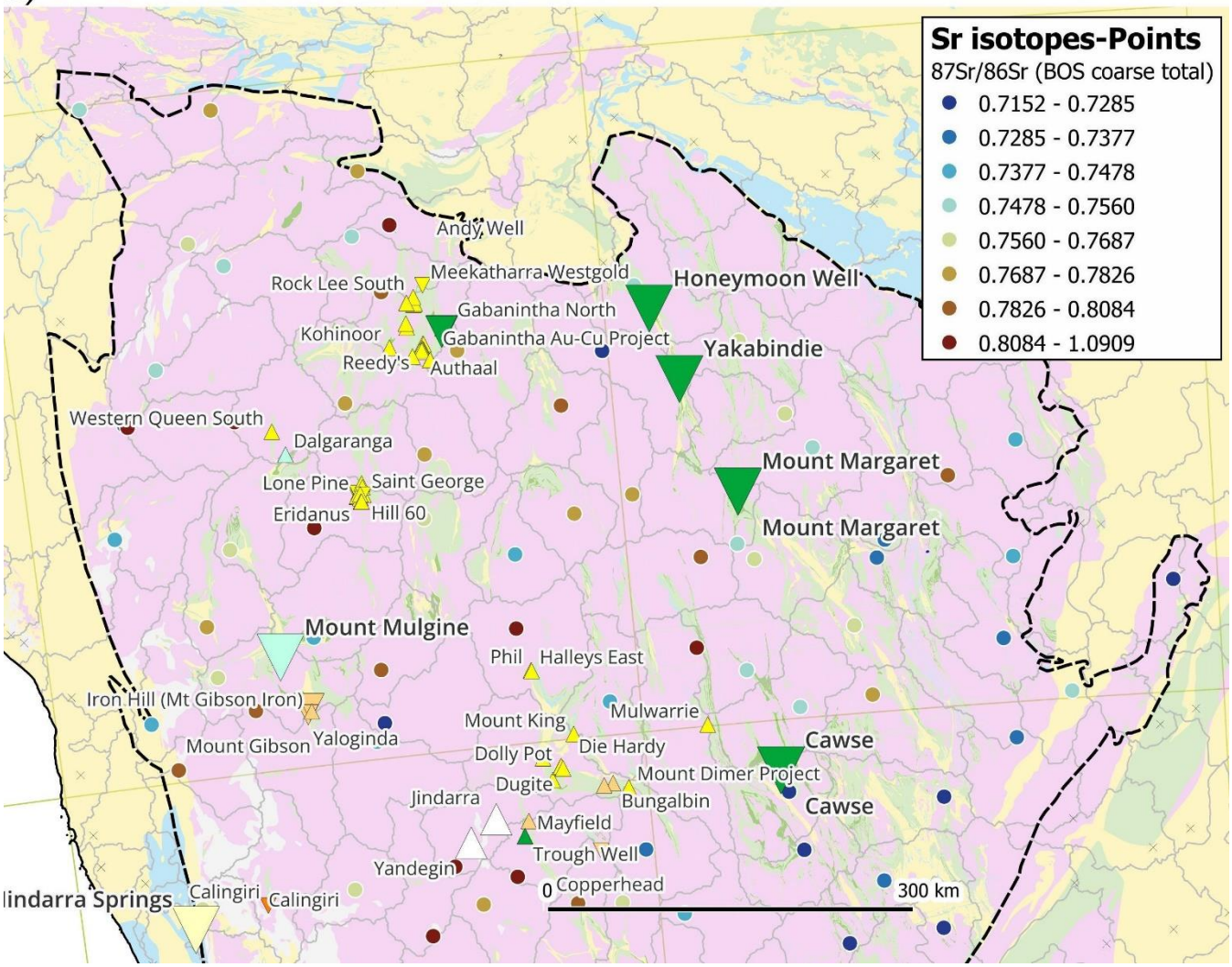
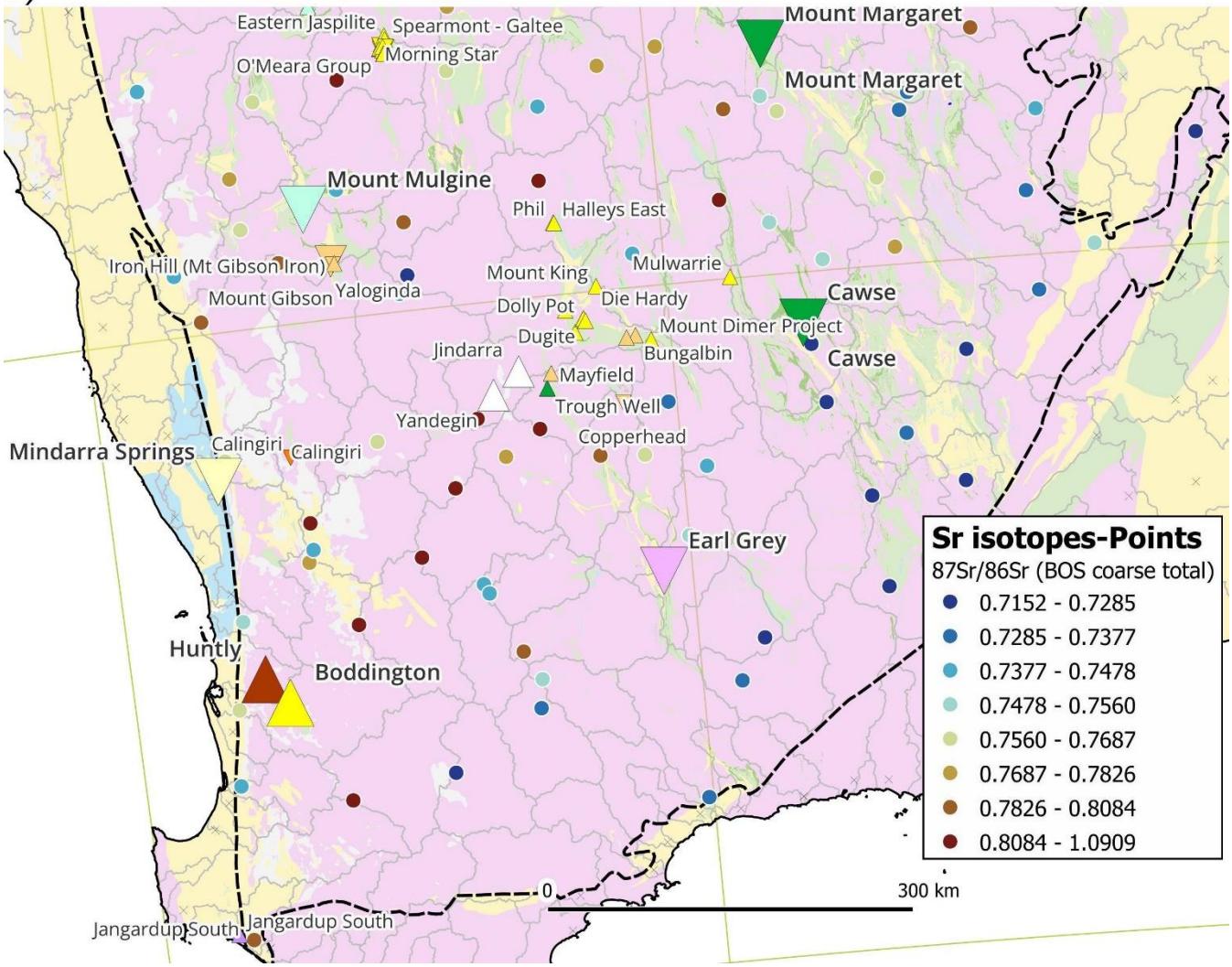


Figure S3. Area 3 detail of the southwestern Australia Sr isotope study showing results from the present NGSA catchment sediment $^{87}Sr/^{86}Sr$ analysis (as coloured circles with values in black typeface) as well as $^{87}Sr/^{86}Sr$ values from the literature (as coloured stars with values in blue typeface; De Laeter and Libby, 1993) overlain on simplified main rock types (Cutten and Riganti, 2020). Coloured symbols represent $^{87}Sr/^{86}Sr$ values, as per inset legend. Catchment boundaries are outlined in grey. Refer to Figures S1b for location within the Yilgarn geological region and main rock types legend.

a)


Sr isotopes-Points
87Sr/86Sr (BOS coarse total)
0.7152 - 0.7285
0.7285 - 0.7377
0.7377 - 0.7478
0.7478 - 0.7560
0.7560 - 0.7687
0.7687 - 0.7826
0.7826 - 0.8084
0.8084 - 1.0909
Andy Well
Meekatharra-Westgold
Rock Lee South
Honeymoon Well
Gabanintha North
Kohinoor
Gabanintha Au-Cu Project
Yakabindie
Reedy's
Authaal
Western Queen South
Dalgaranga
Mount Margaret
Lone Pine
Saint George
Eridanus
Hill 60
Mount Margaret
Mount Mulgine
Phil
Halleys East
Iron Hill (Mt Gibson Iron)
Mount King
Mulwarrie
Mount Gibson
Yaloginda
Dolly Pot
Die Hardy
Cawse
Mount Dimer Project
Dugite
Jindarra
Bungalbin
Cawse
Mayfield
Trough Well
Yandegin
Copperhead
0
300 km
lindarra Springs
Calingiri
Calingiri

b)


Eastern Jaspilite
Spearmont - Galtee
Morning Star
O'Meara Group
Mount Margaret
Mount Margaret
Mount Mulgine
Phil
Halleys East
Iron Hill (Mt Gibson Iron)
Mount Gibson
Yaloginda
Mount King
Mulwarrie
Dolly Pot
Die Hardy
Cawse
Mount Dimer Project
Dugite
Jindarra
Bungalbin
Cawse
Mayfield
Trough Well
Yandegin
Copperhead
Mindarra Springs
Calingiri
Calingiri
Earl Grey
Huntly
Boddington
Sr isotopes-Points
87Sr/86Sr (BOS coarse total)
0.7152 - 0.7285
0.7285 - 0.7377
0.7377 - 0.7478
0.7478 - 0.7560
0.7560 - 0.7687
0.7687 - 0.7826
0.7826 - 0.8084
0.8084 - 1.0909
0
300 km
Jangardup South
Jangardup South

c)

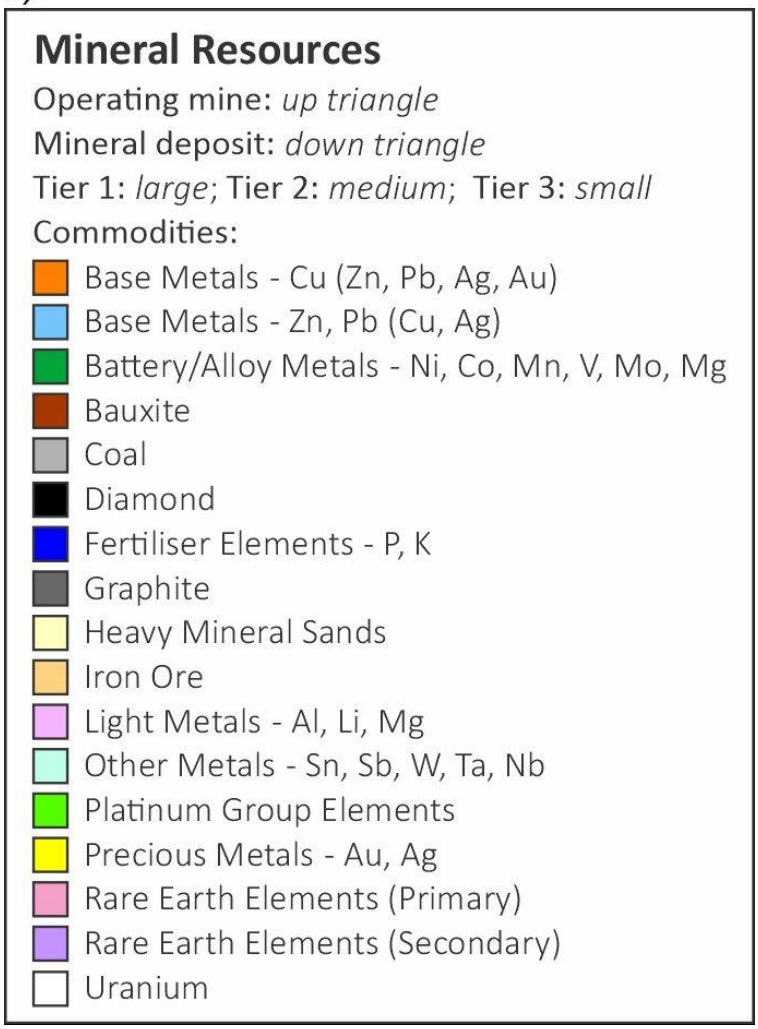


Figure S4. Map showing the location of selected mineral resources (triangles) in the northern Yilgarn (a), and southern Yilgarn geological region (b), from Senior et al. (2021). Mineral occurrences in catchments with a $^{87}Sr/^{86}Sr$ value (circles) greater than 0.8 are shown and labelled, as are 'Tier 1' mineral resources in the region. All mineral occurrences are shown in Figure 2 (Main paper). Key to mineral resource symbols detailed in (c). Catchment boundaries are outlined in grey. The Yilgarn geological region is outlined in a stippled line.

References

Cutten, H. N., and Riganti, A., (compilers): 1:500 000 State Interpreted Bedrock Geology of Western Australia, Geological Survey of Western Australia, https://dasc.dmirs.wa.gov.au/, 2020.

De Laeter, J. R., and Libby, W. G.: Early Palaeozoic biotite Rb-Sr dates in the Yilgarn Craton near Harvey, Western Australia, Aus. J. Earth Sci., 40, 445–453, https://doi.org/10.1080/08120099308728095, 1993.

McCulloch, M. T., Compston, W., and Froude, D.: Sm-Nd and Rb-Sr dating of Archaean gneisses, eastern Yilgarn Block, Western Australia, J. Geol. Soc. Aus., 30, 149–153, https://doi.org/10.1080/00167618308729242, 1983.

Senior, A., Britt, A., Summerfield, D., Hughes, A., Hitchman, A., Cross, A., Champion, D., Huston, D., Bastrakov, E., Sexton, M., Moloney, J., Pheeney, J., Teh M., and Schofield, A.: Australia's Identified Mineral Resources 2020. Geoscience Australia, Canberra, http://dx.doi.org/10.11636/1327-1466.2020, 2021.