

# The Curnamona Cube

Graham Heinson | 27<sup>th</sup> November 2025

University of Adelaide



**GEOLOGICAL  
SURVEY OF**  
South Australia

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**DISCOVERY DAY**



# AusLAMP

Illuminating Australia's deep earth

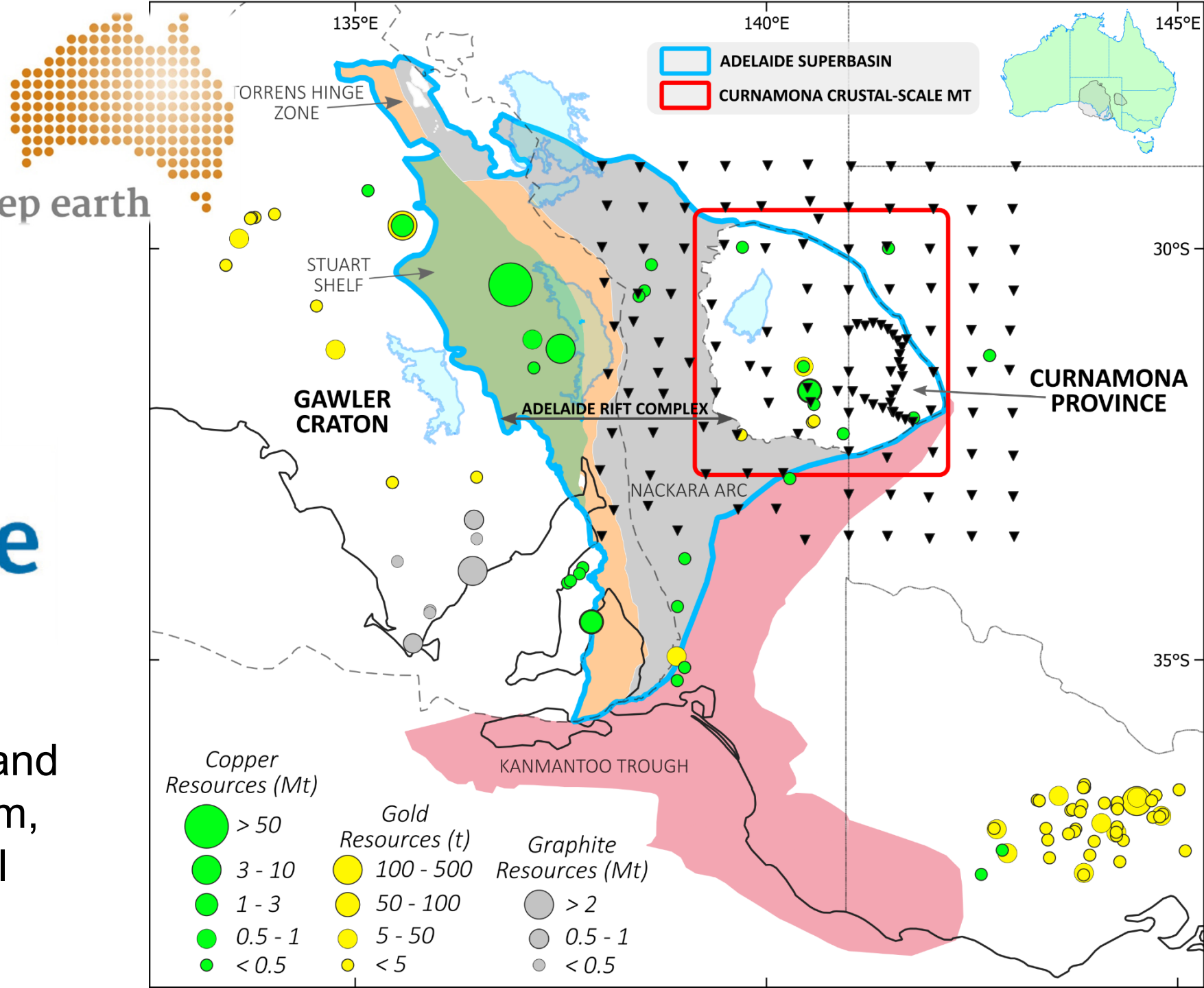


THE UNIVERSITY  
of ADELAIDE

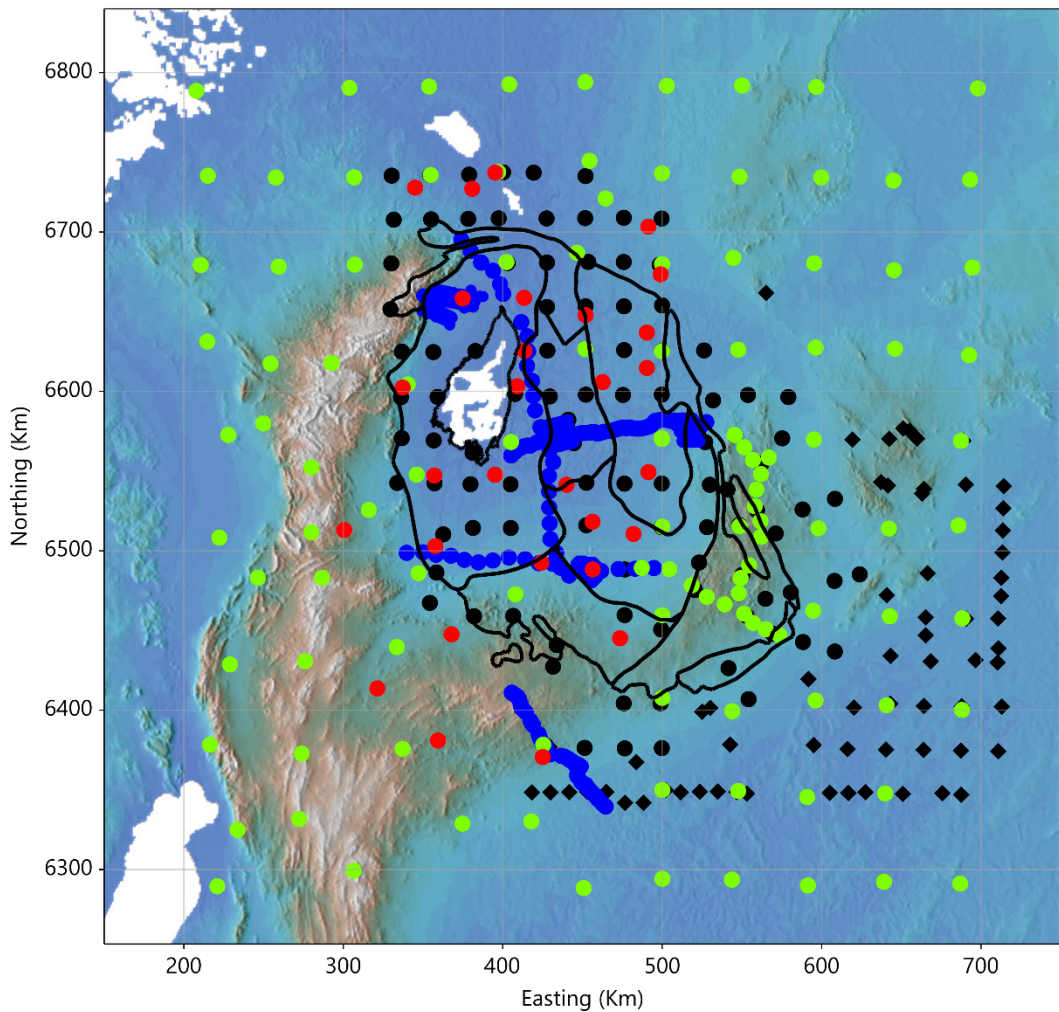


AuScope

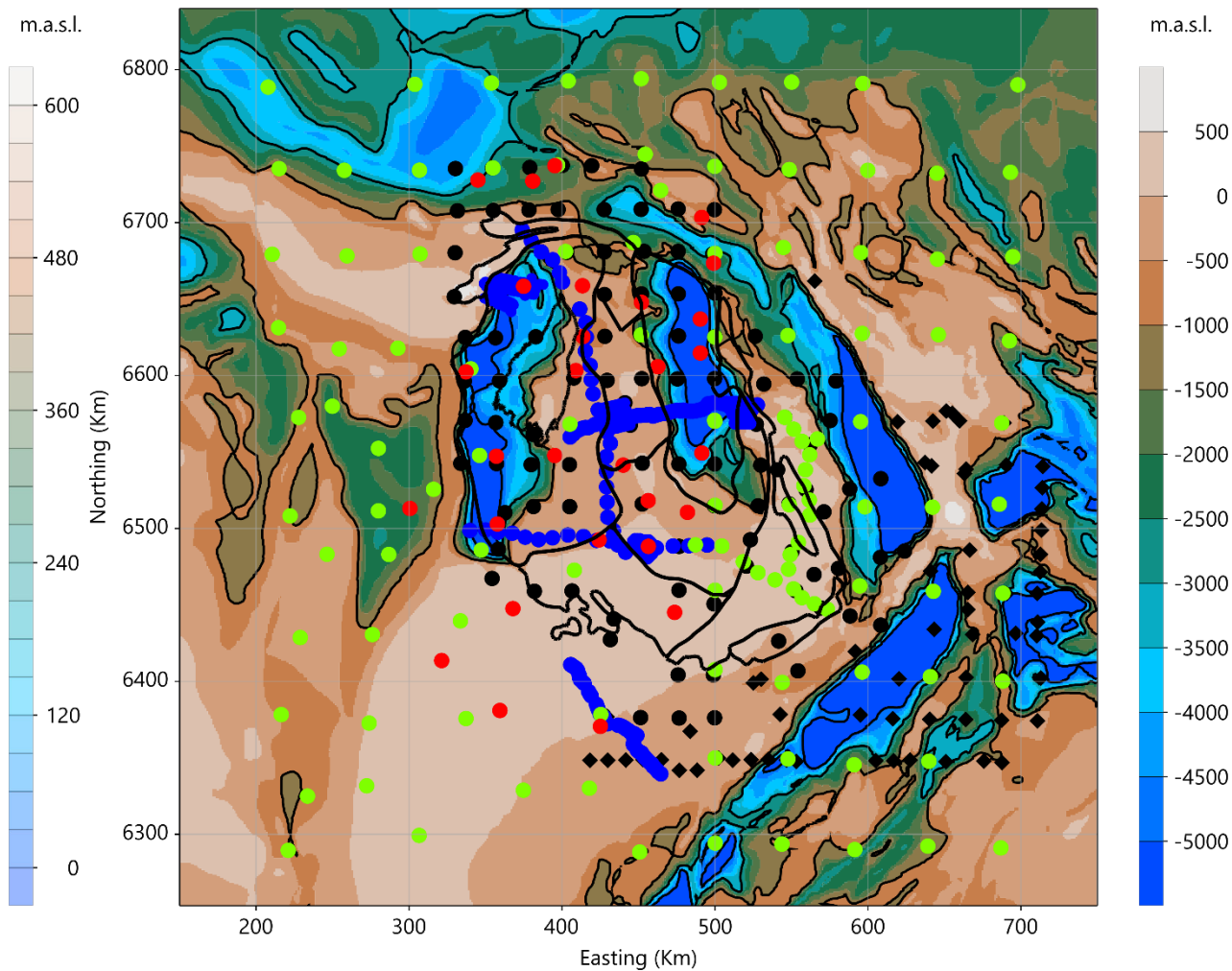
Geoscience Australia,  
Geological Surveys of SA and  
NSW, Havilah Res, Helifarm,  
Arkaroola, ANU, Traditional  
Owners, Landholders



### Elevation



### Depth to Proterozoic Basement

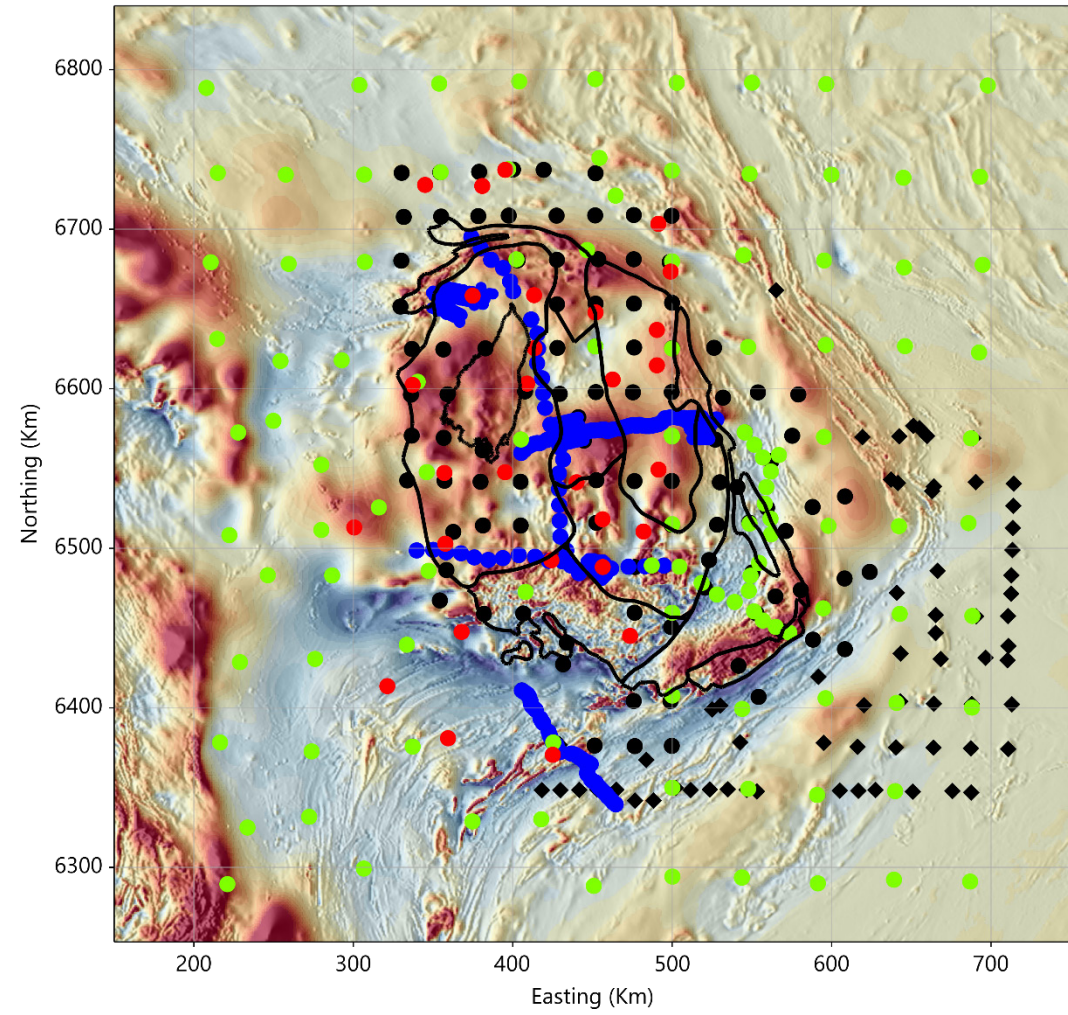


Green Circles : AusLAMP Long Period MT  
Black Circles: Broadband MT and Passive Seismics  
Black Diamonds: Curnamona Extension GA

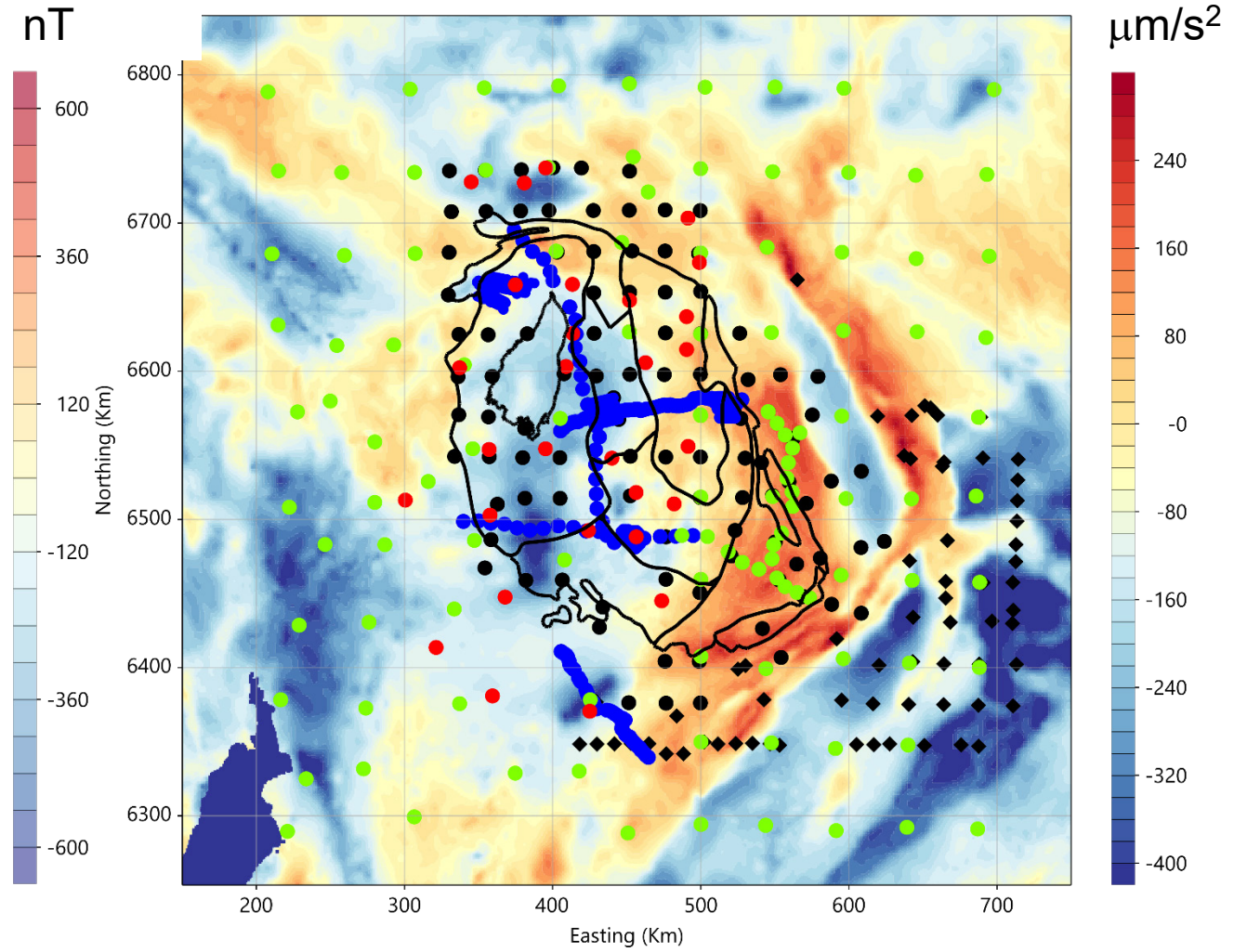
Red Circles : Geomagnetic Depth Soundings  
Blue Circles: Broadband MT Transects

MT Sites and topography

TMI



Gravity

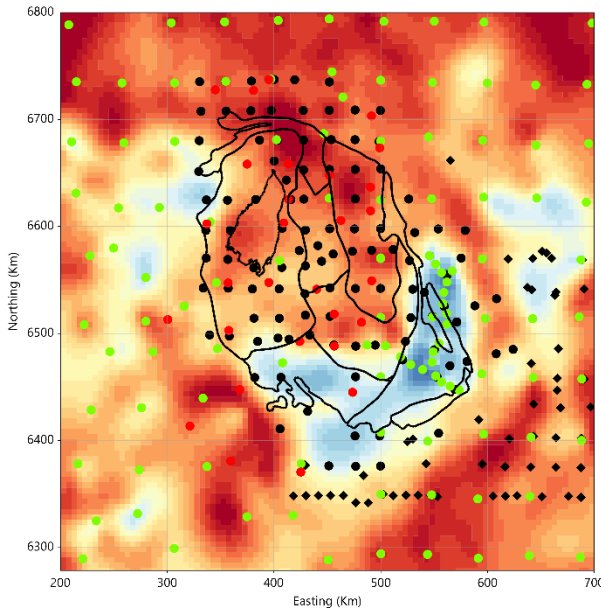


MT Sites + TMI + Gravity

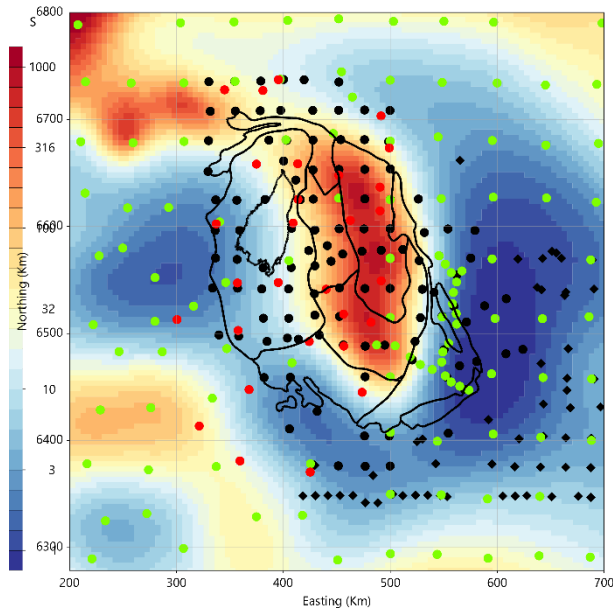
# Long-Period MT Model 10-10,000 s



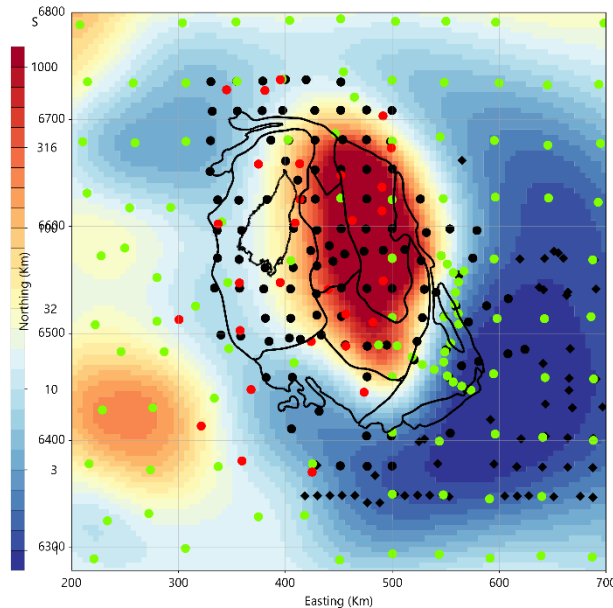
0-5 km



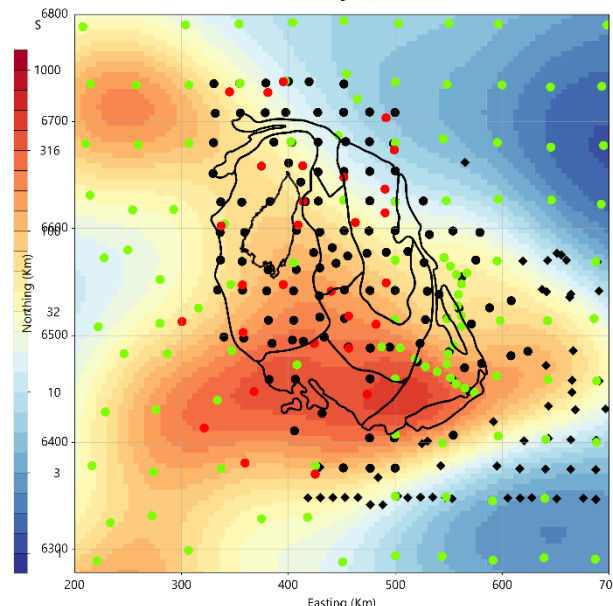
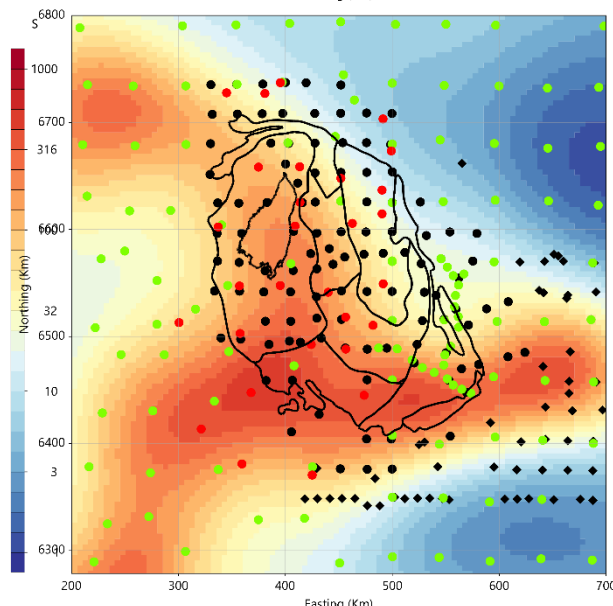
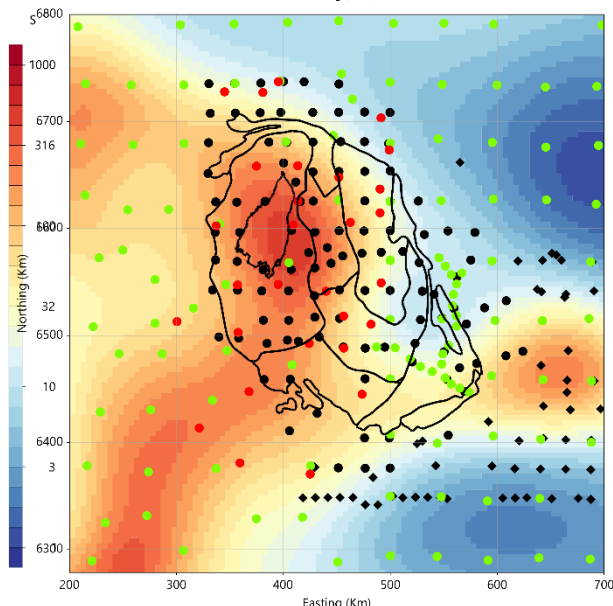
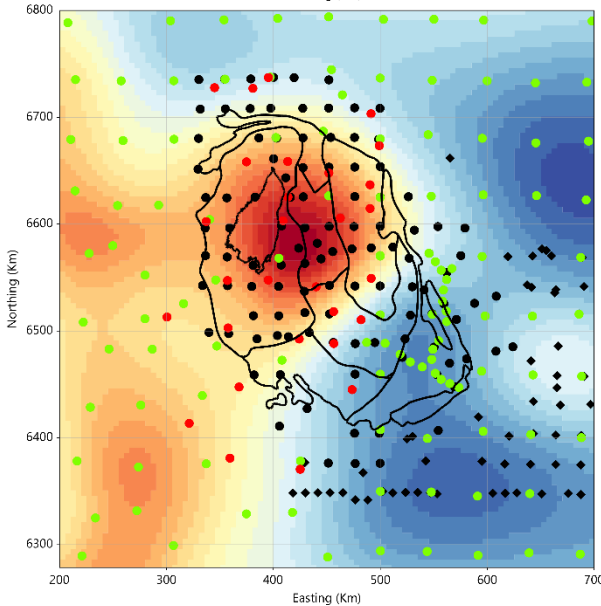
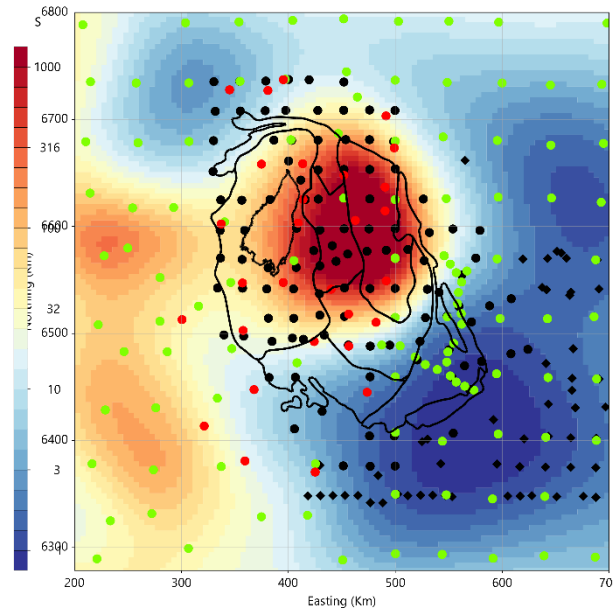
5-10 km



10-15 km



15-20 km



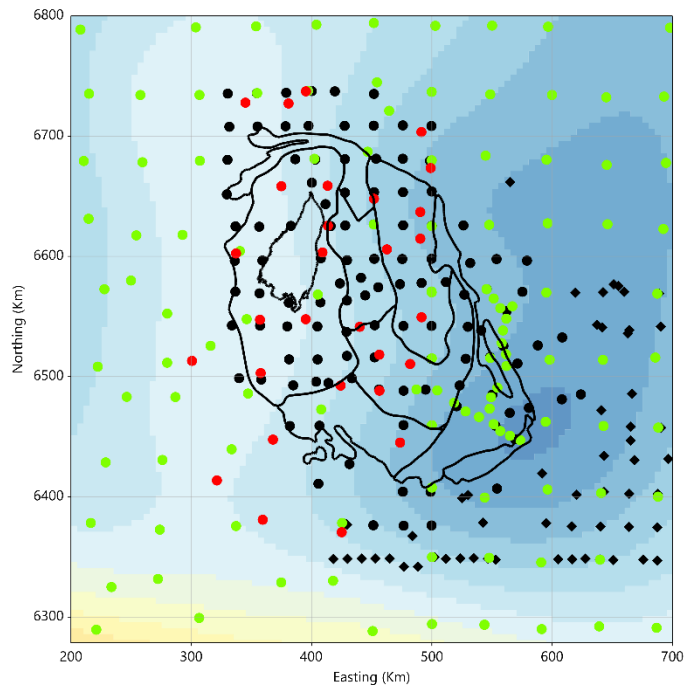
20-25 km

25-30 km

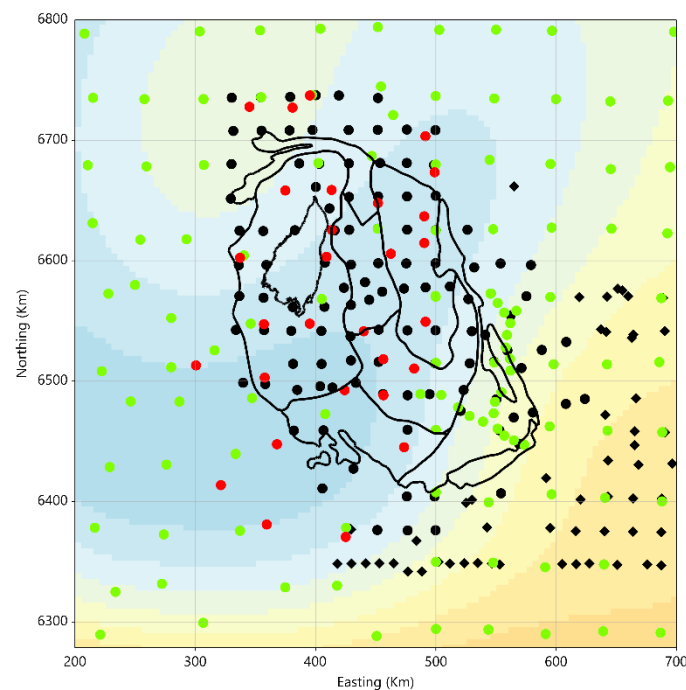
30-35 km

35-40 km

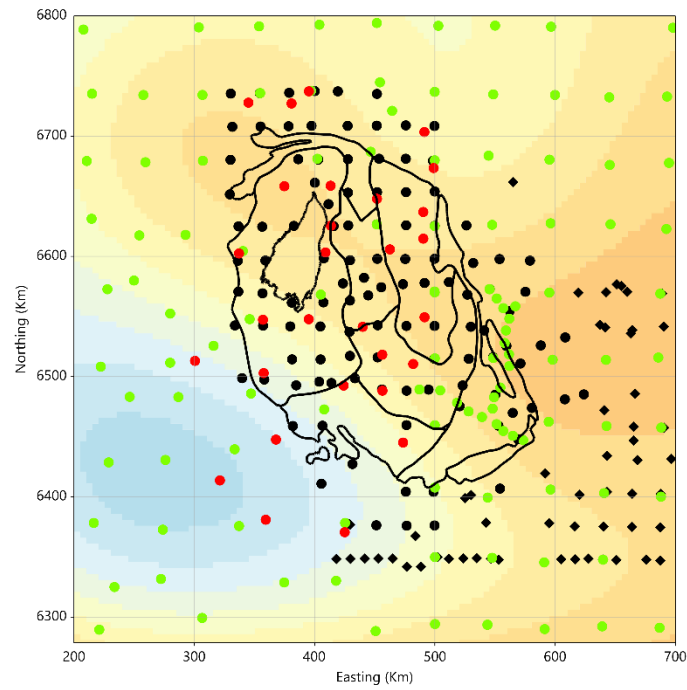
50-100 km



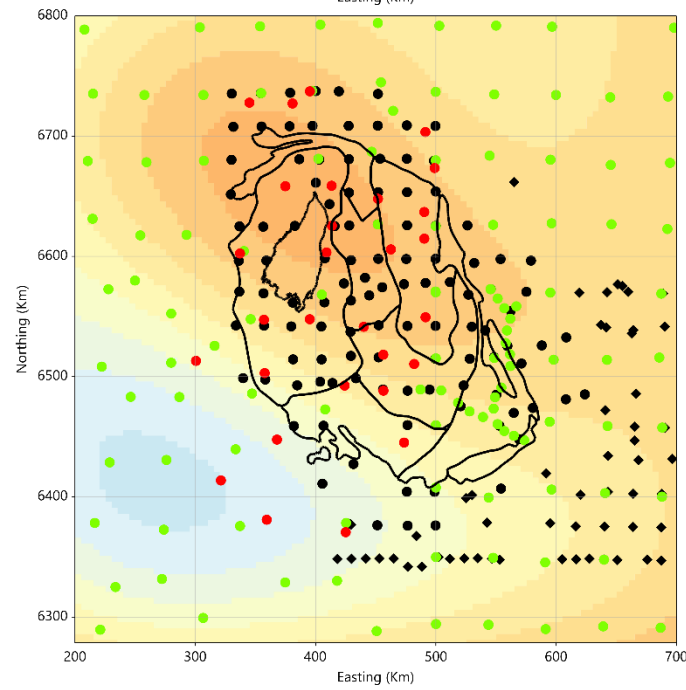
100-150 km



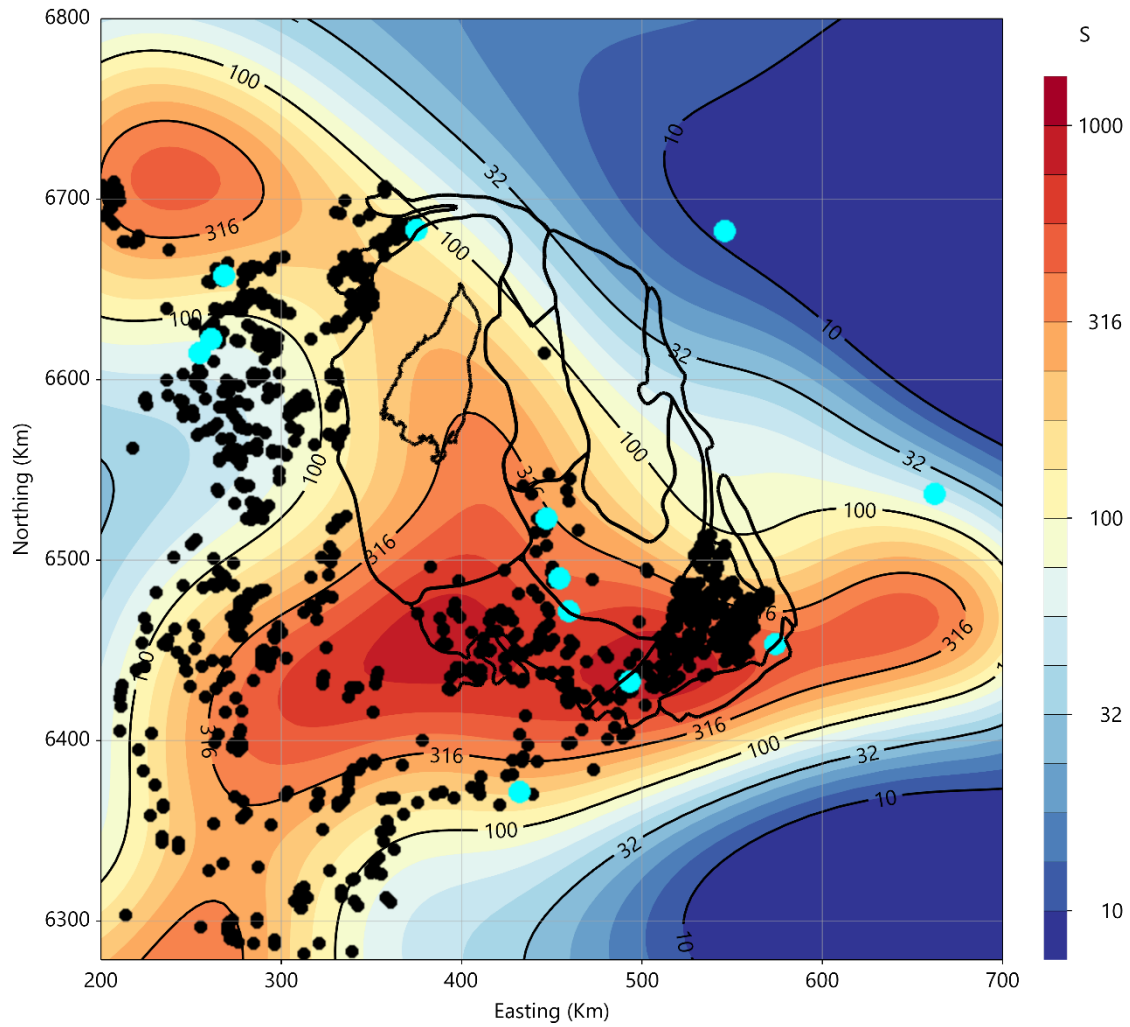
150-200 km



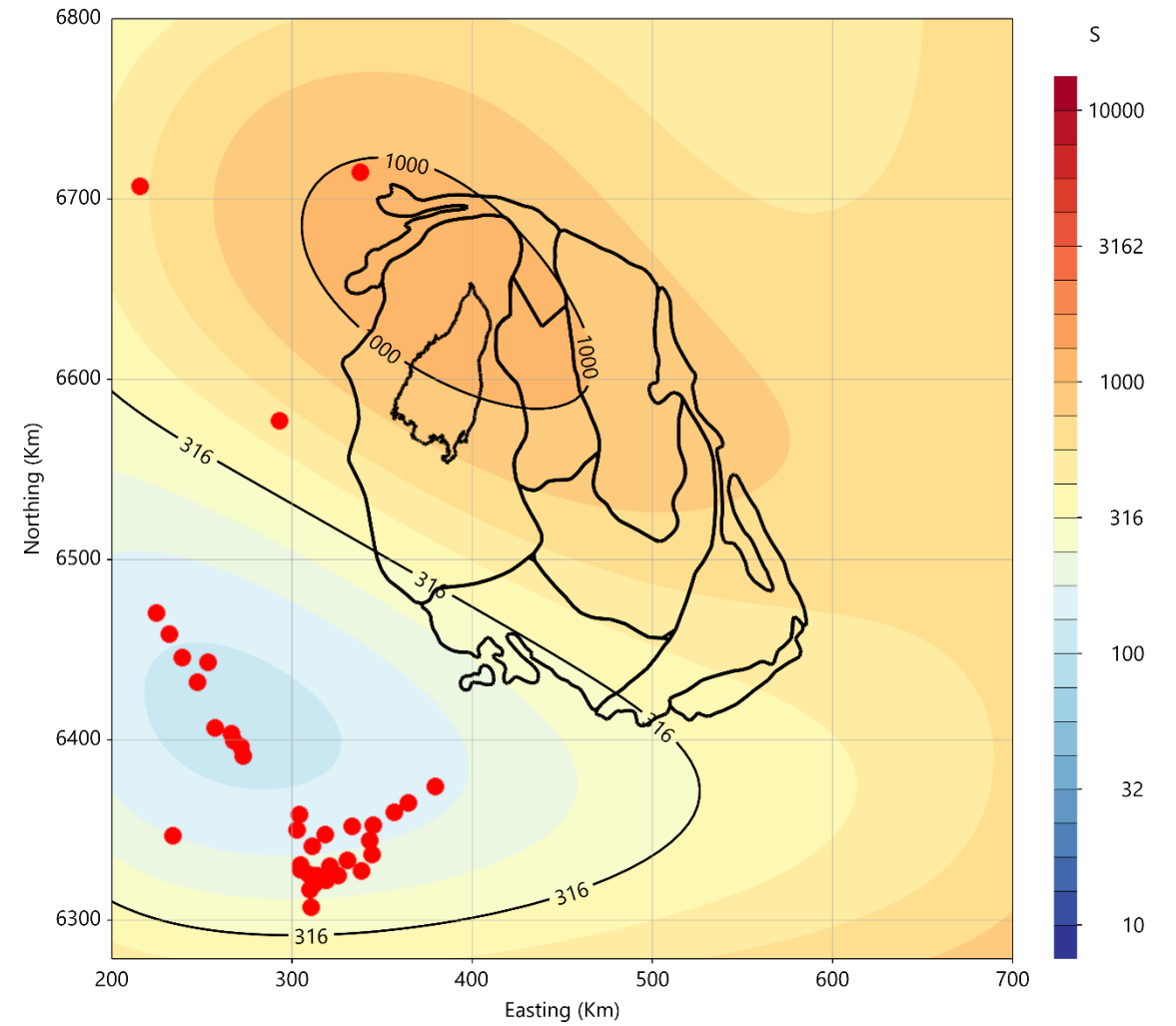
200-250 km



### 30-40 km Lower Crust and Copper



### 200-25 km Lithosphere and Diamonds



# Broadband MT Model 100 Hz -100 s

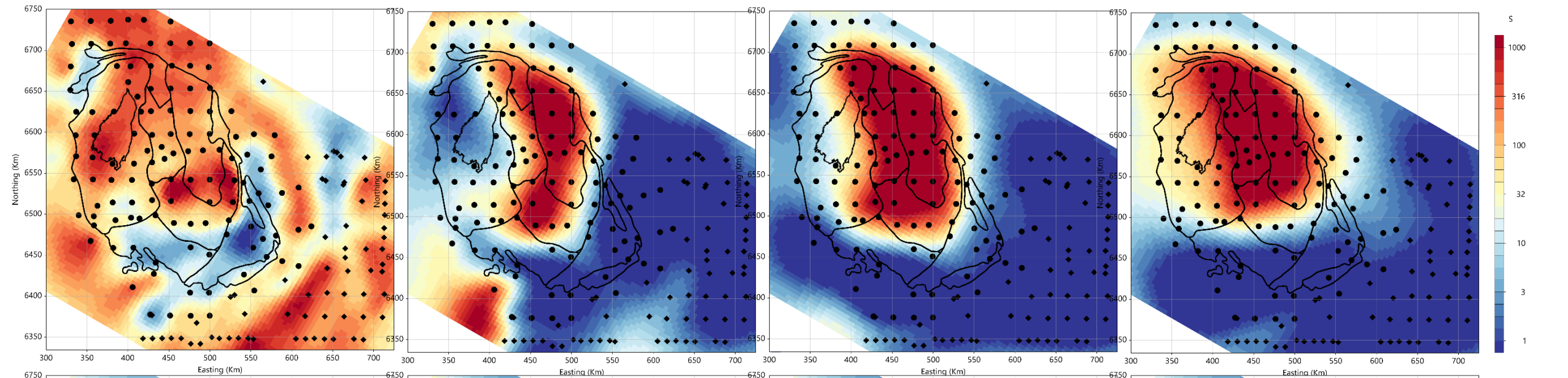


0-5 km

5-10 km

10-15 km

15-20 km

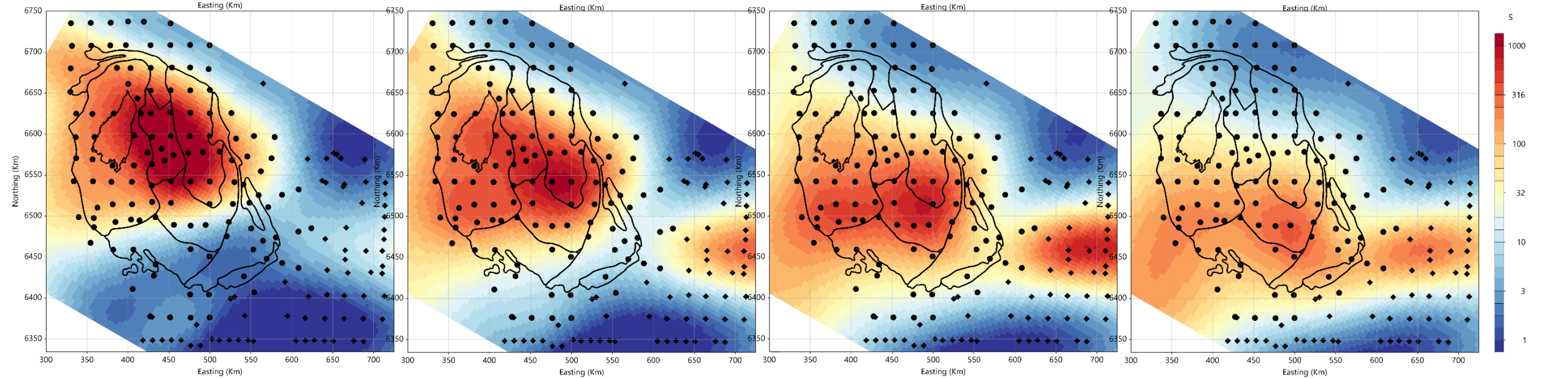


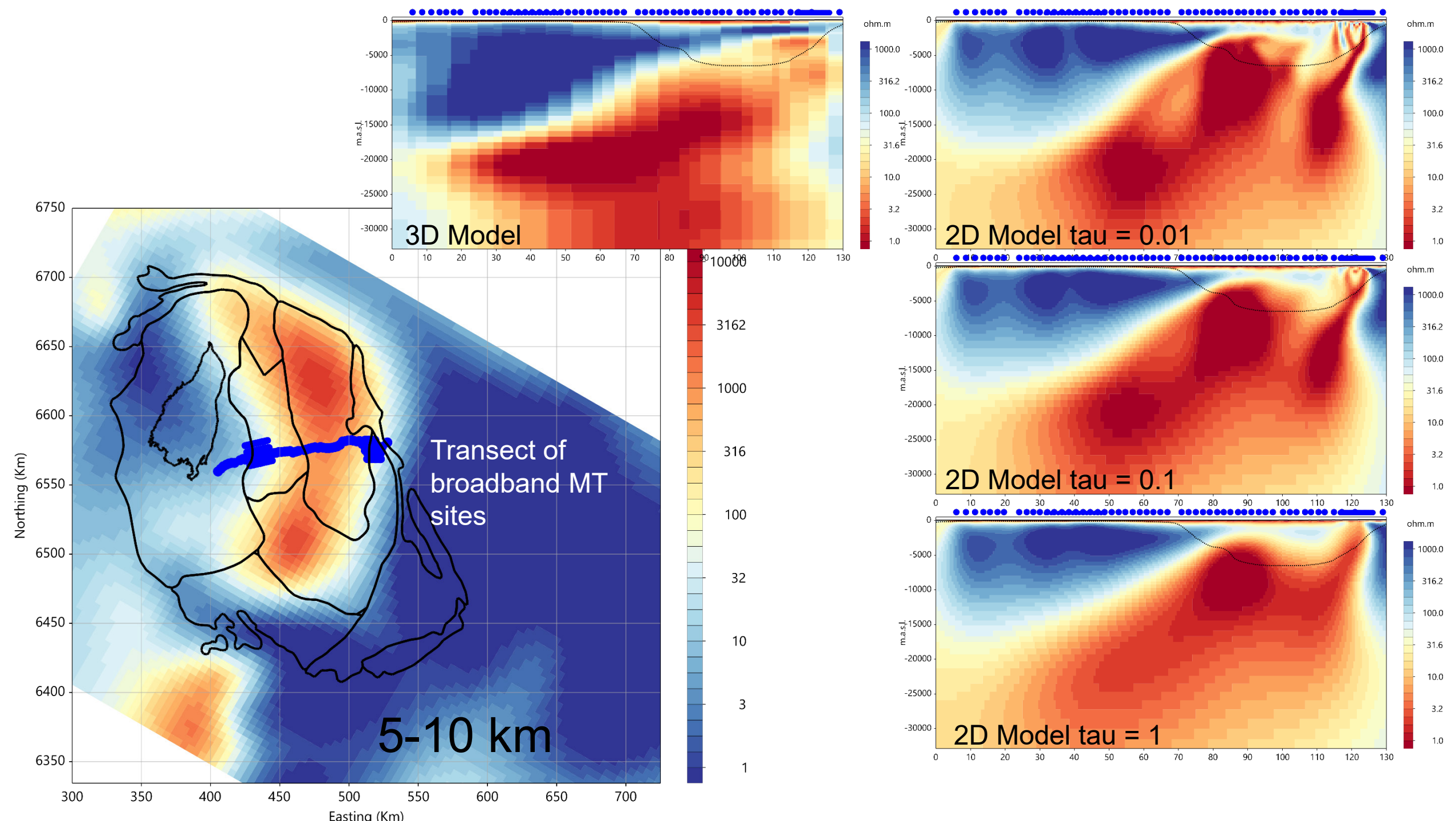
20-25 km

25-30 km

30-35 km

35-40 km

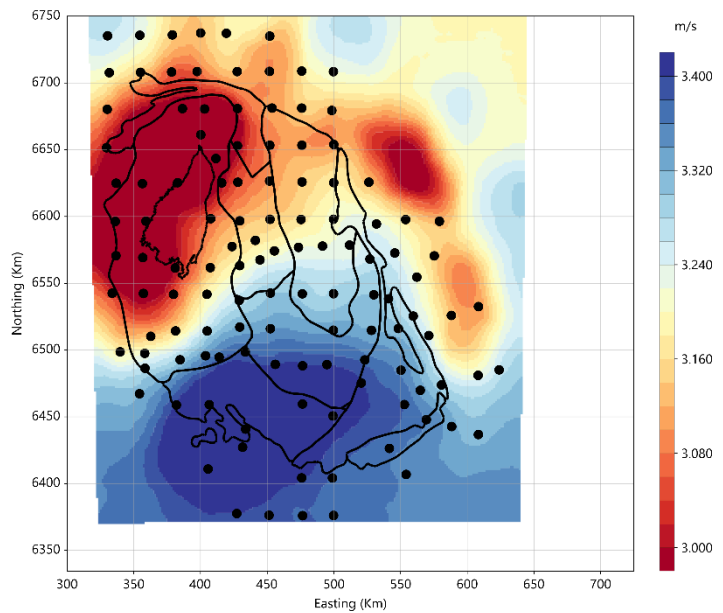




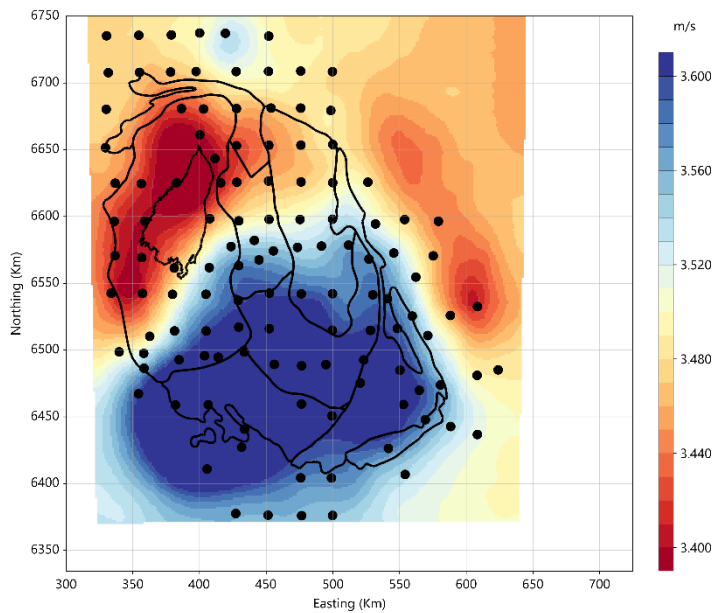
# Ambient Noise Tomography Model



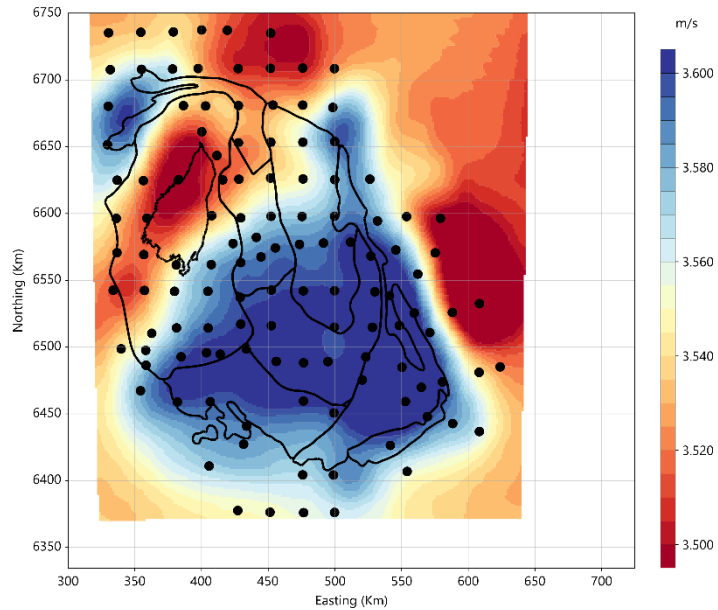
# 1 km



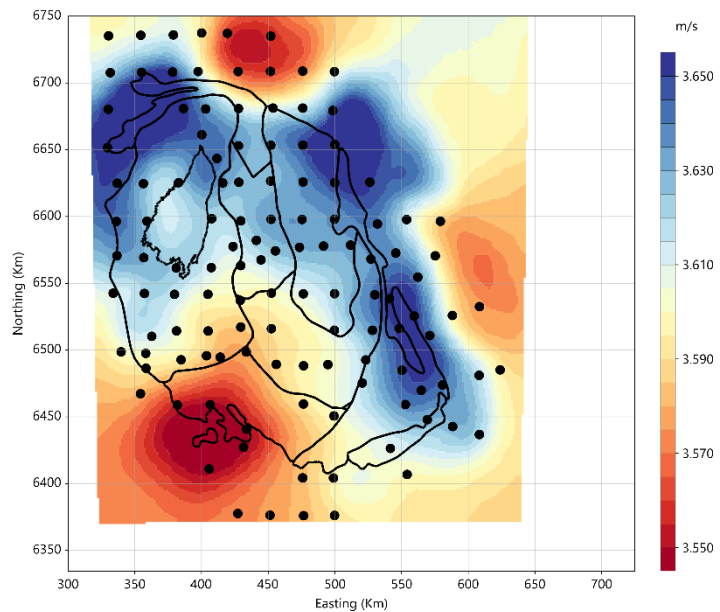
# 2 km



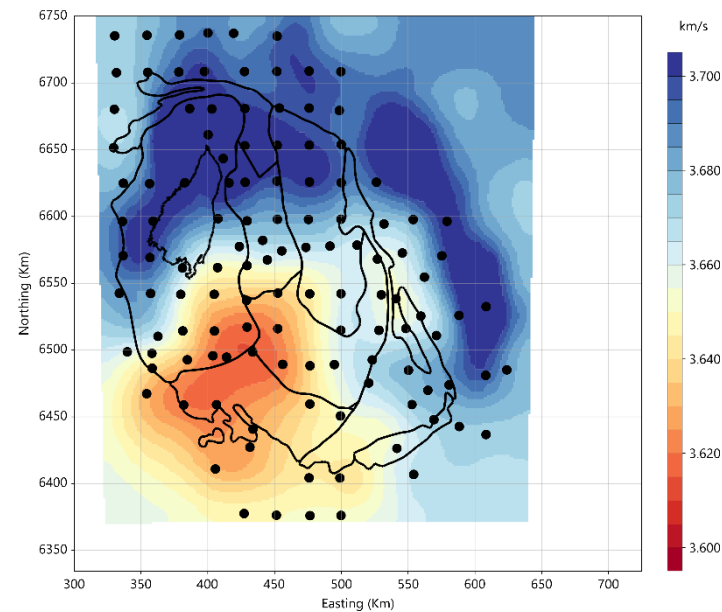
# 5 km

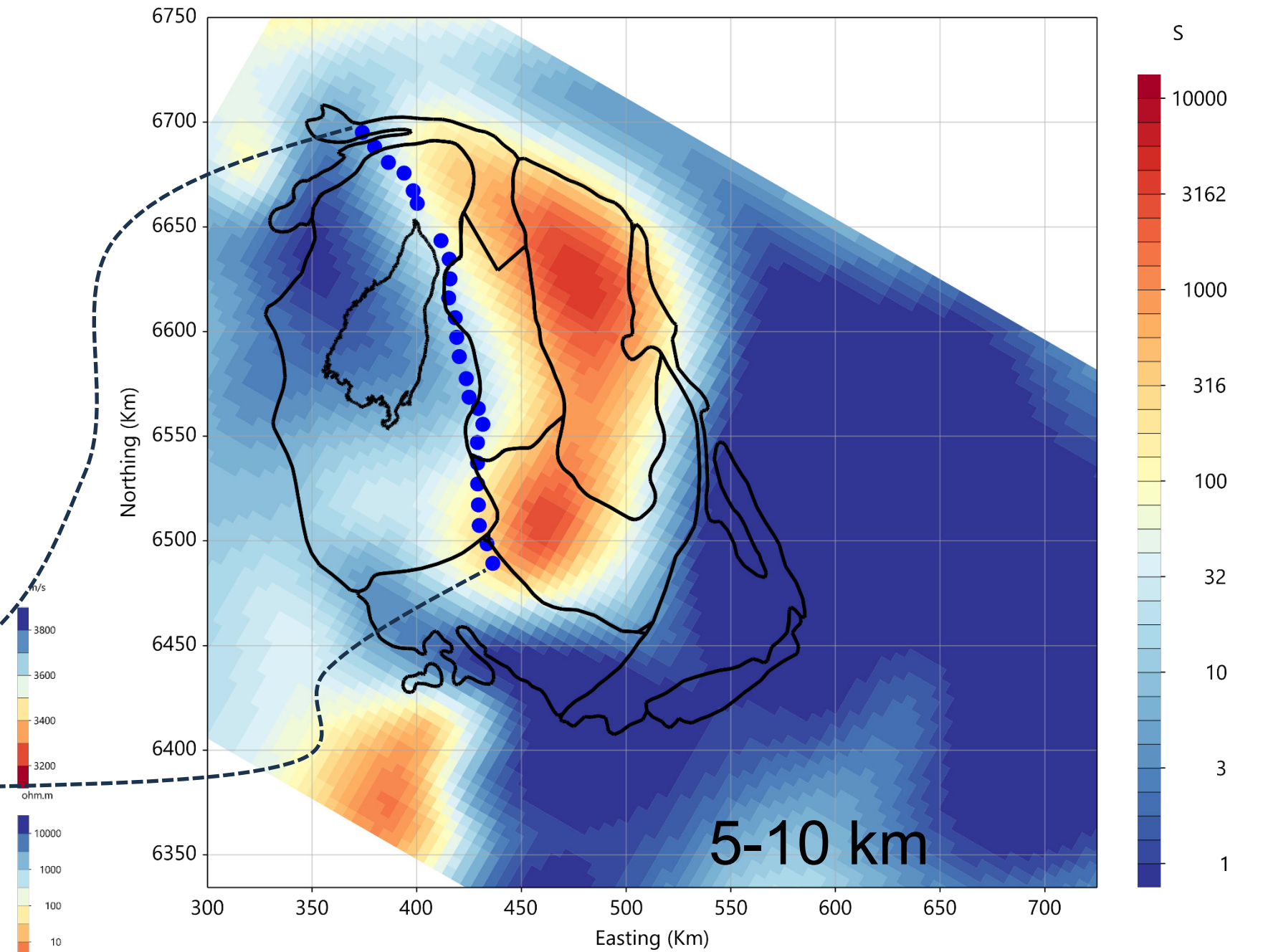
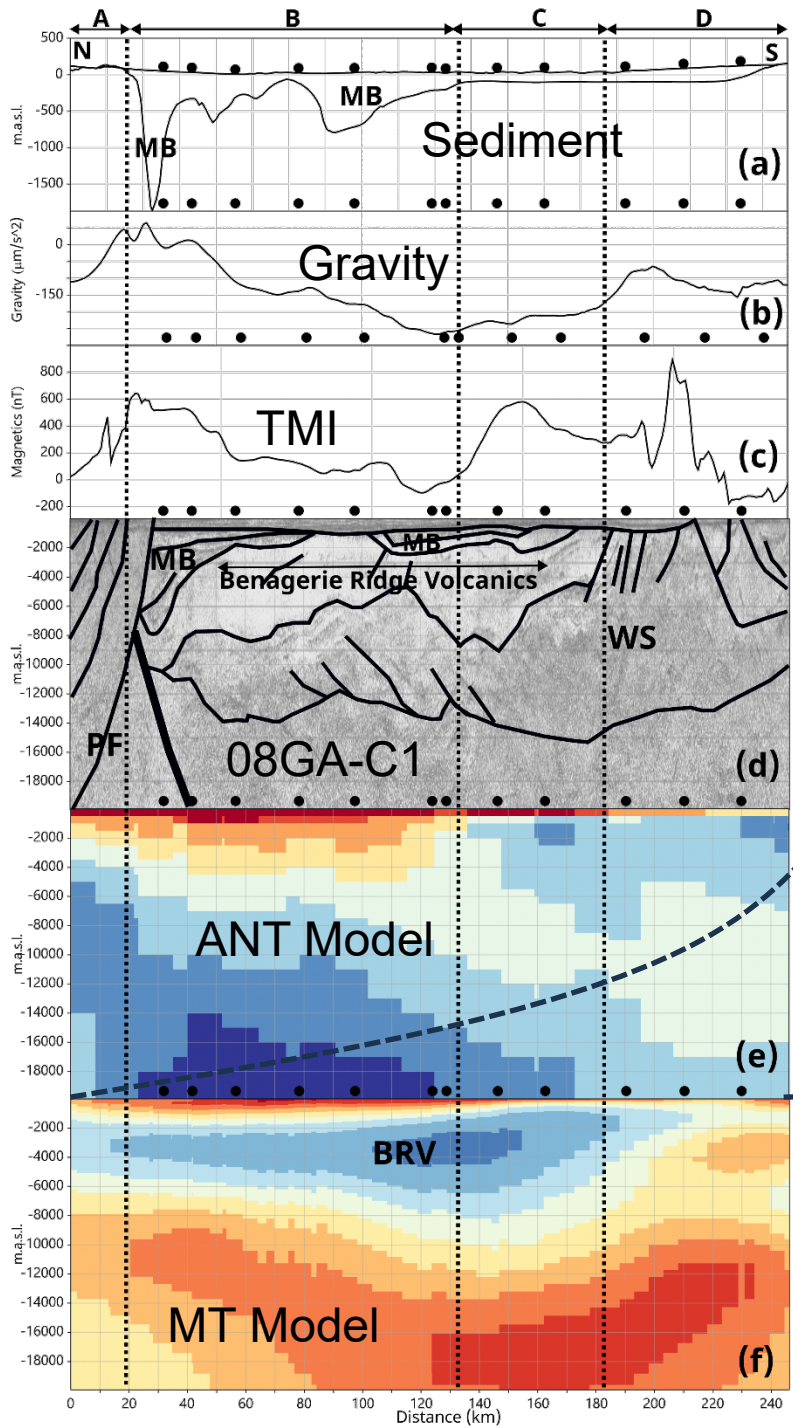


# 10 km



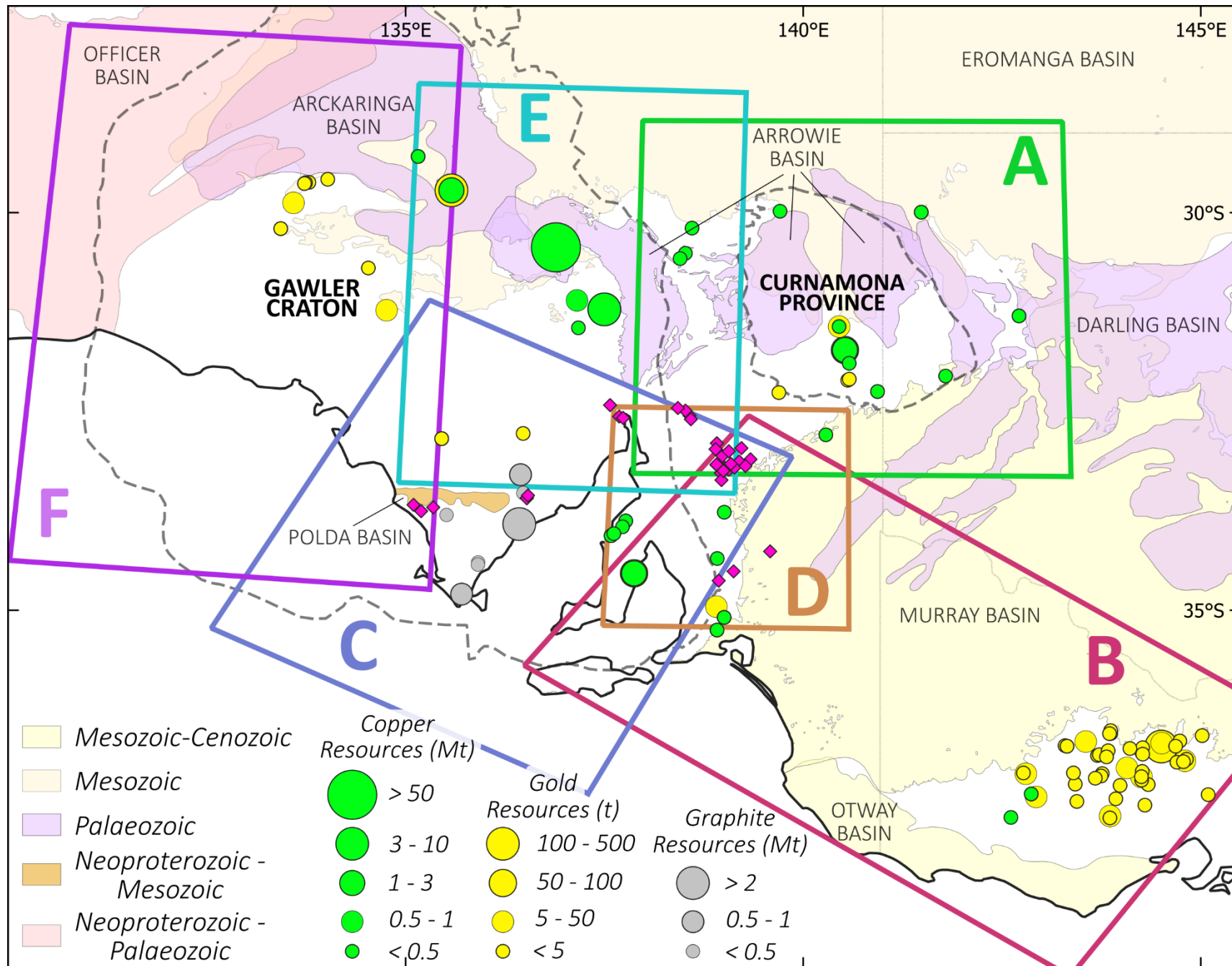
# 15 km

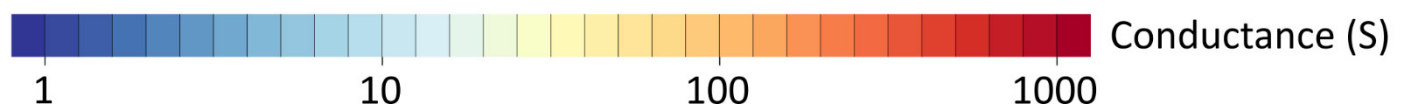
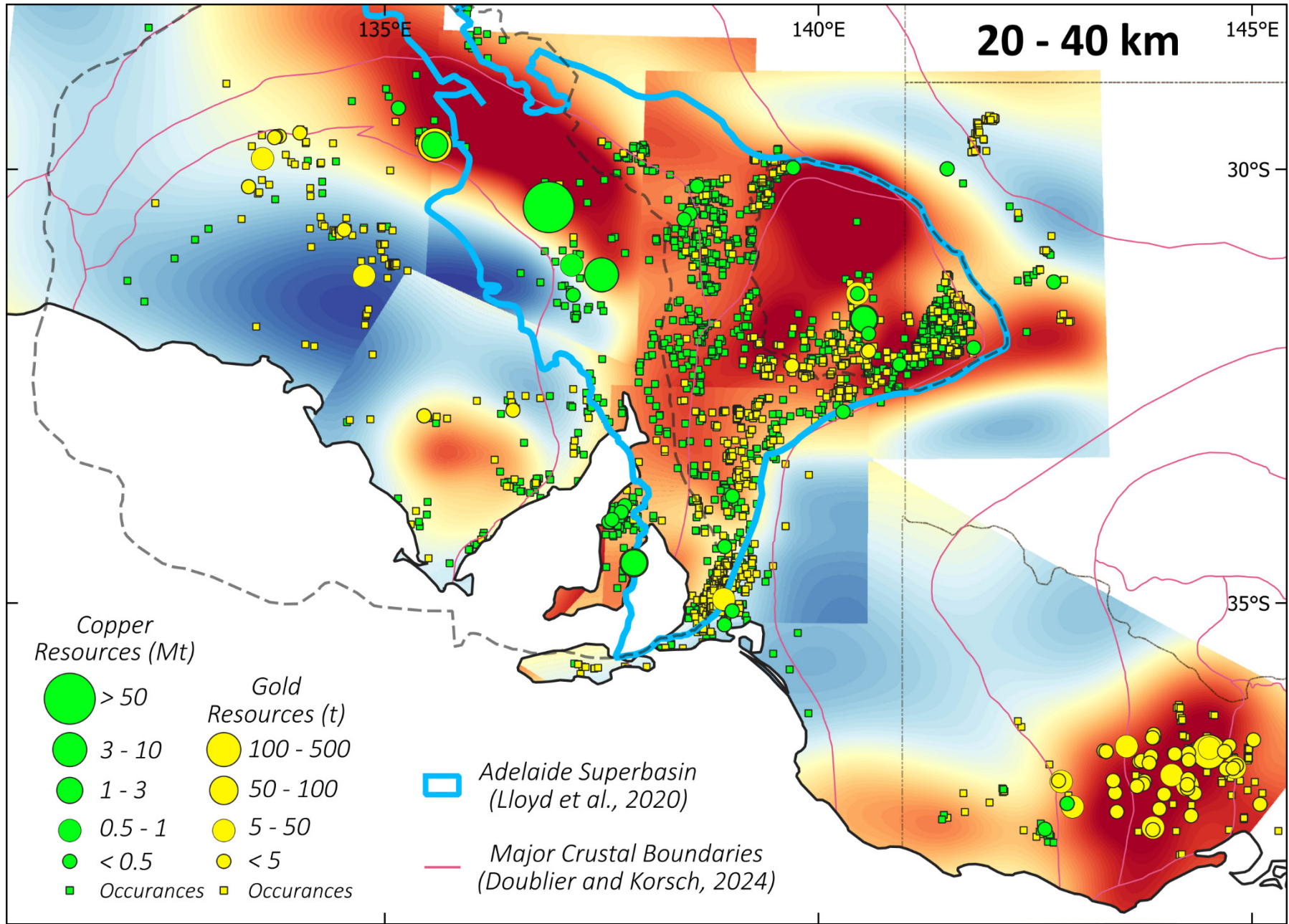


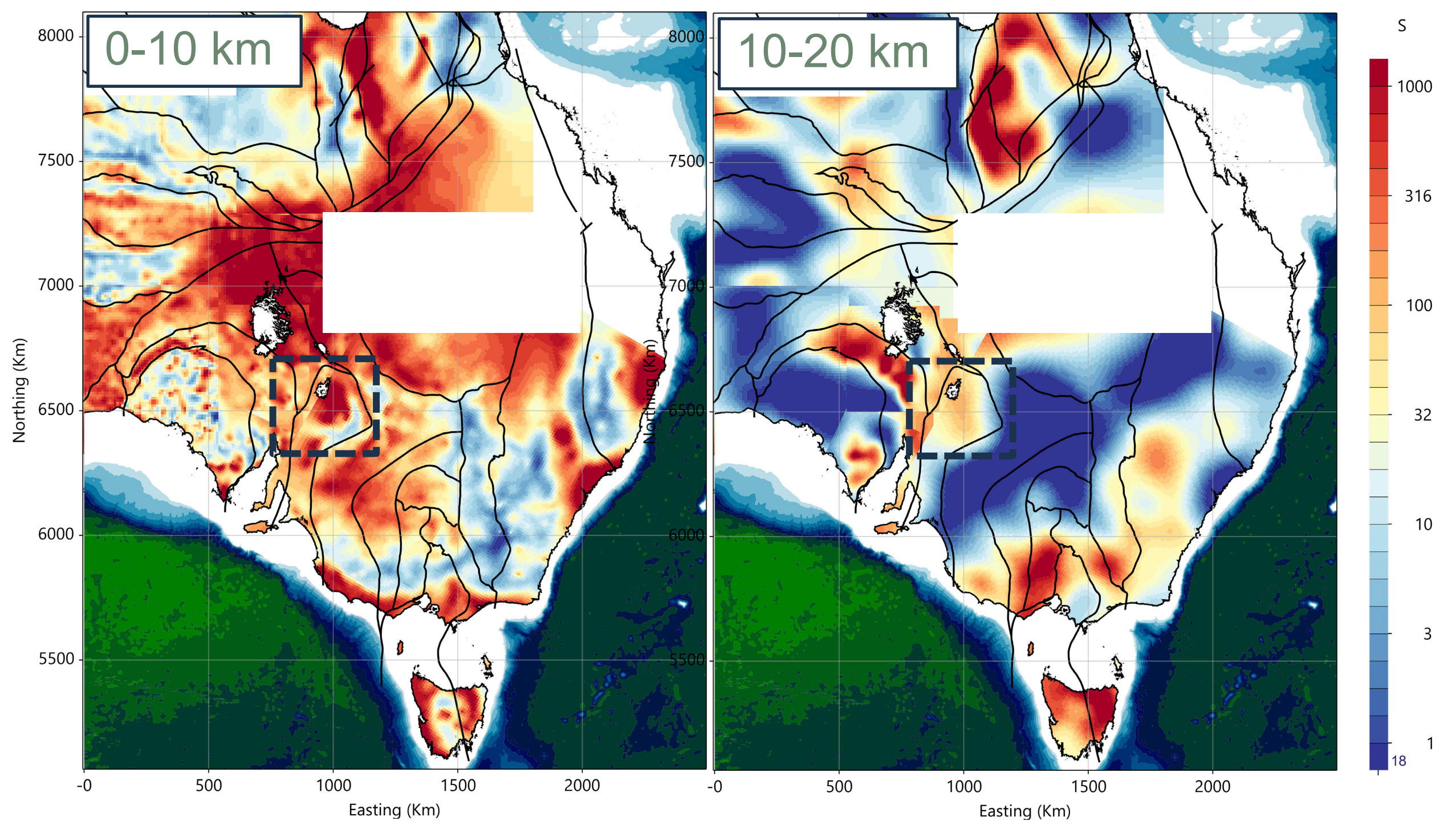


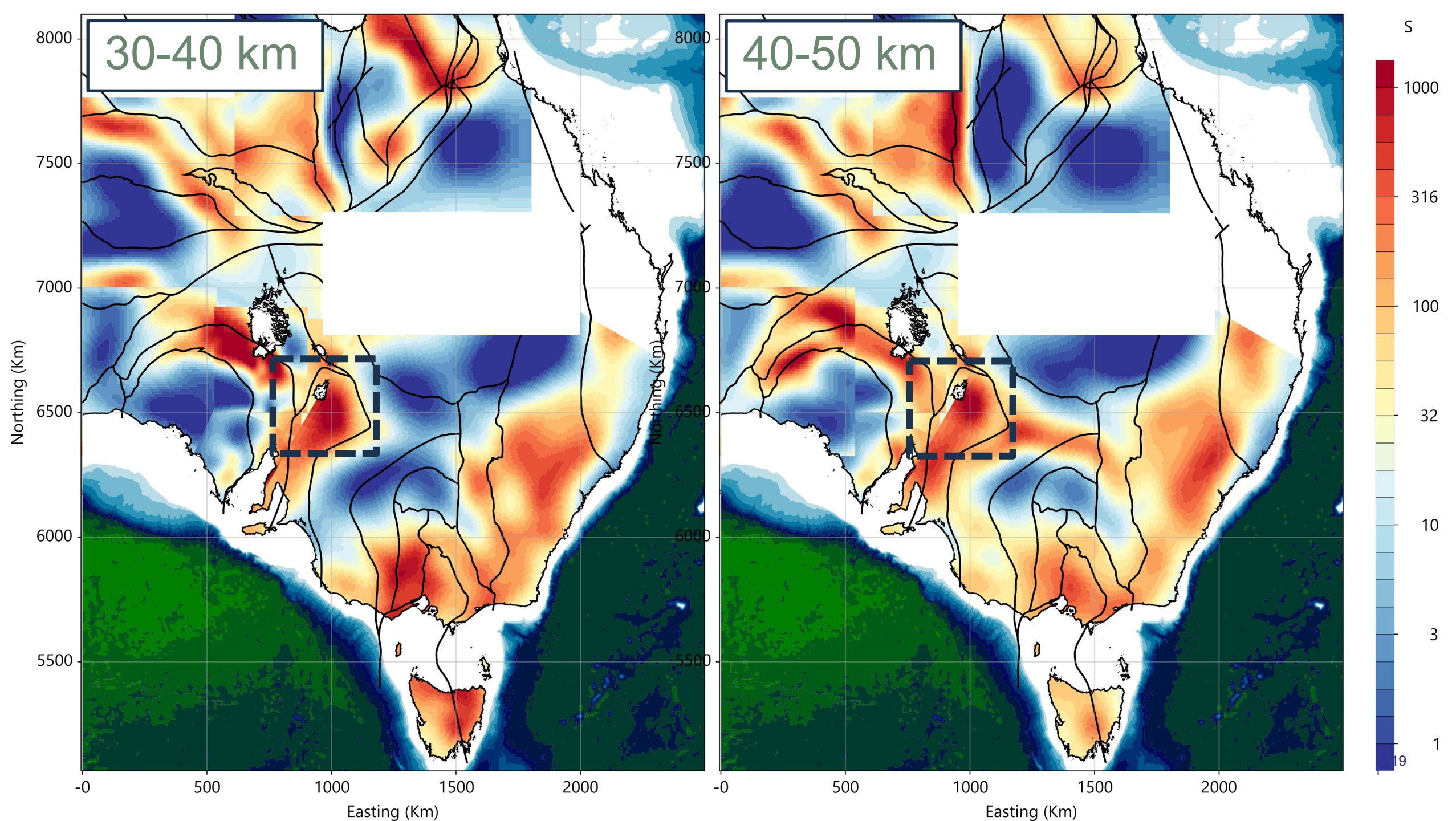
# Tectonic Setting













Contents lists available at ScienceDirect

## Gondwana Research

journal homepage: [www.elsevier.com/locate/gr](http://www.elsevier.com/locate/gr)



### Lithospheric architecture of the Curnamona Province, Australia

Ben Kay<sup>a,\*</sup>, Graham Heinson<sup>a</sup>, Goran Boren<sup>a</sup>, Ying Liu<sup>a,b</sup>, Kate Brand<sup>a,c,d</sup>,  
Stephan Thiel<sup>a,c,e</sup>, Helen Williams<sup>f</sup>

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- <sup>b</sup> Chinese University of Geoscience, Wuhan, China
- <sup>c</sup> Geological Survey of South Australia, Adelaide, Australia
- <sup>d</sup> Bureau of Meteorology, Adelaide, Australia
- <sup>e</sup> CSIRO, Adelaide, Australia
- <sup>f</sup> University of Auckland, Auckland, New Zealand



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journal homepage: [www.elsevier.com/locate/gr](http://www.elsevier.com/locate/gr)



### Crustal magnetotelluric imaging of a Paleoproterozoic graphitic suture zone, Curnamona Province, Australia

Ben Kay<sup>a,\*</sup>, Graham Heinson<sup>a</sup>, Kate Brand<sup>a,b</sup>

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- <sup>b</sup> Geological Survey of South Australia, Adelaide, SA 5001, Australia



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## Tectonophysics

journal homepage: [www.elsevier.com/locate/tecto](http://www.elsevier.com/locate/tecto)



### Crustal structure of the Curnamona Province in Australia by ambient noise tomography

Xin Tan<sup>a</sup>, Yingjie Yang<sup>a</sup>, Graham Heinson<sup>b,\*</sup>, Ben Kay<sup>b</sup>, Goran Boren<sup>b</sup>, Xiaozhou Yang<sup>c</sup>

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- <sup>c</sup> State Key Laboratory of Geological Processes and Mineral Resources, School of Geophysics and Geomatics, China University of Geosciences, Wuhan, Hubei 430074, China



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## Earth and Planetary Science Letters

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### Lithospheric reworking at the Proterozoic–Phanerozoic transition of Australia imaged using AusLAMP Magnetotelluric data

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