FIG WORKING WEEK 2025
AND Locate25 THE NATIONAL GEOSPATIAL CONFERENCE
Collaboration, Innovation and Resilience: Championing a Digital Generation
FIG Geospatial Council of Australia
Brisbane, Australia 6–10 April

Least Squares Collocation for Continental Scale Analysis Ready Gravity Data

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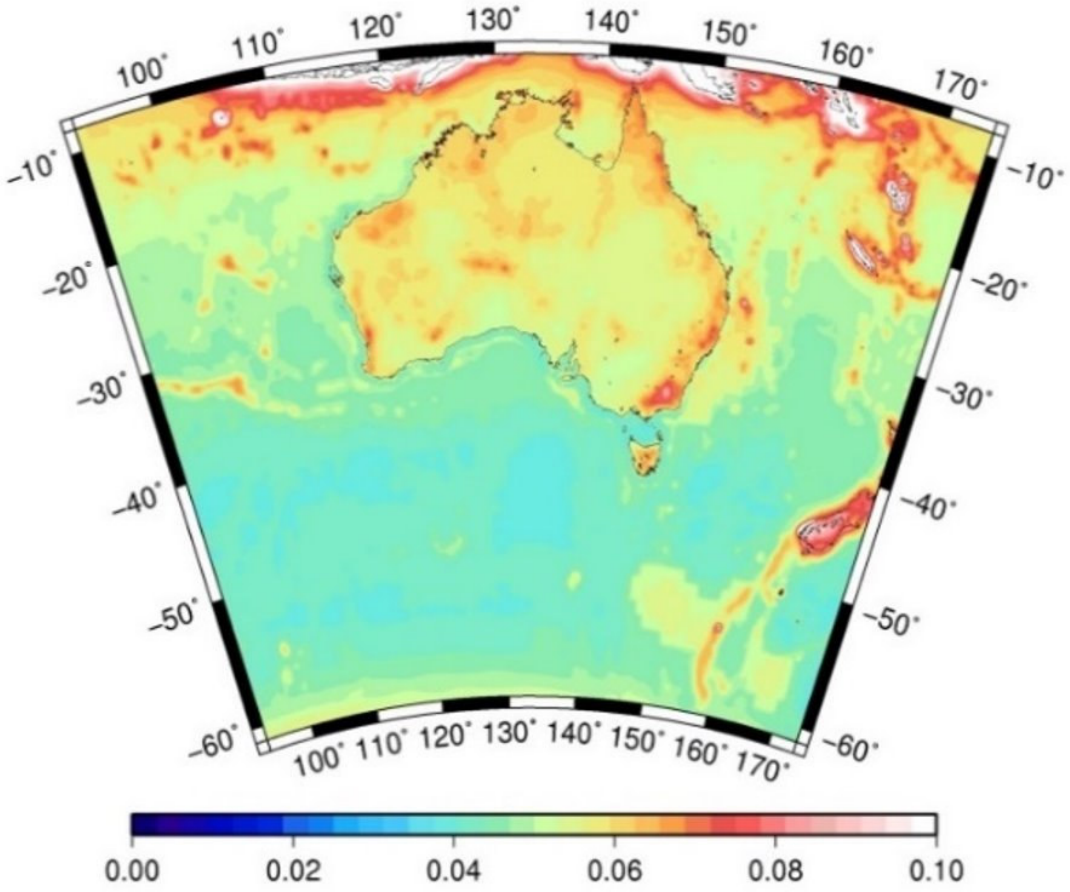
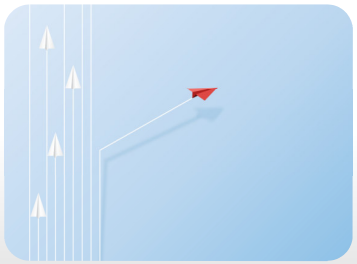
Accurate positioning requires a more accurate geoid.



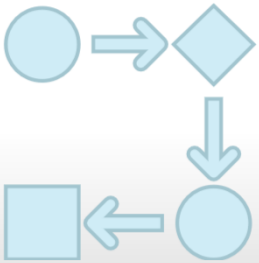
Featherstone et al. (2017), Journal of Geodesy

Australian gravimetric quasigeoid accuracy is 1 – 8 cm.

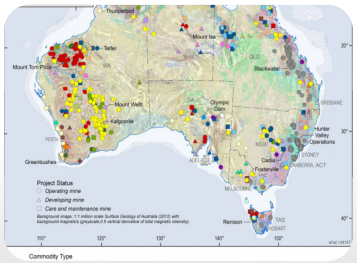
Enhancing positioning accuracy



Infill gaps with airborne gravity data.



Analysis ready gravity data workflow.

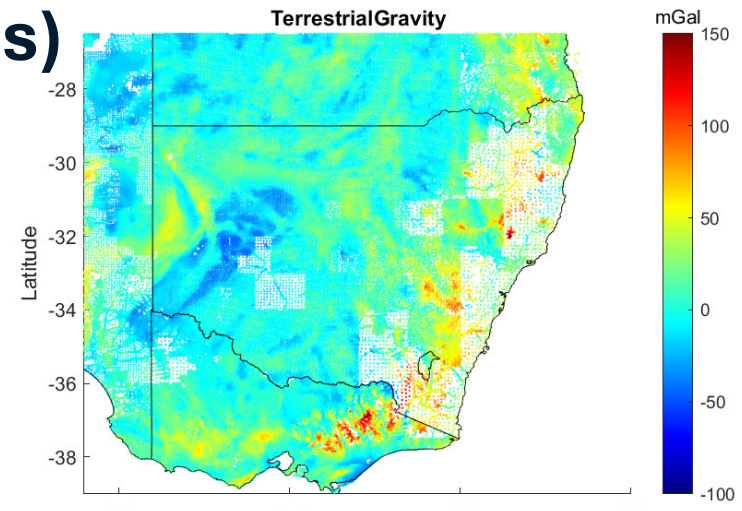


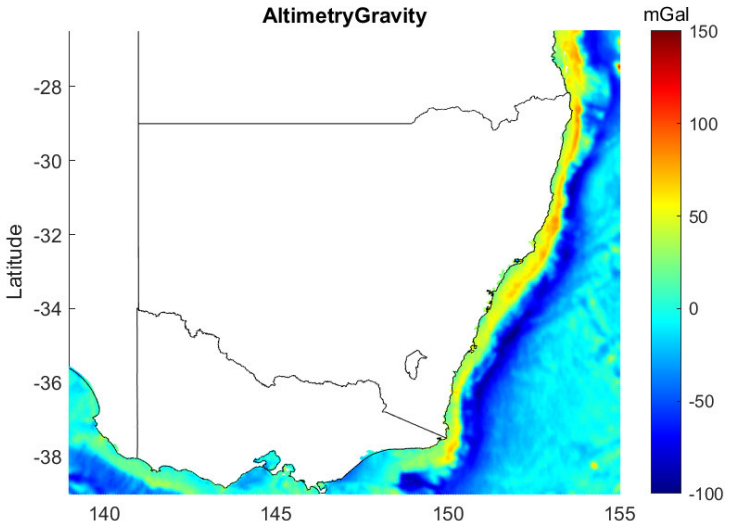
New gravity data benefit the resources sector.

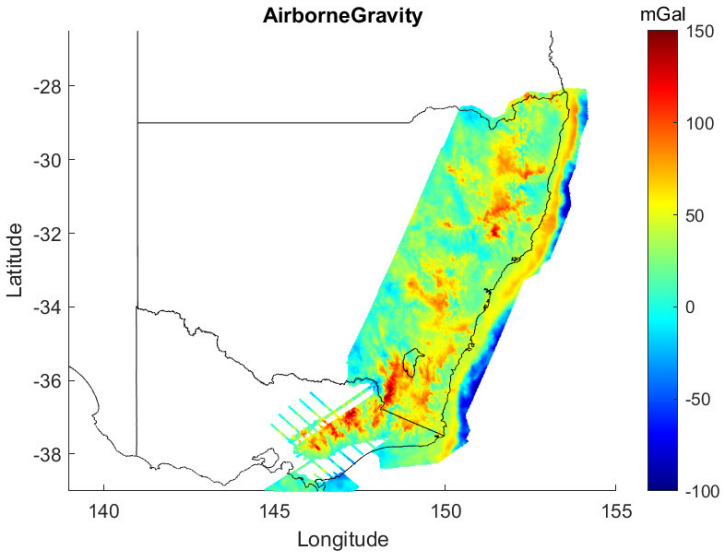
Airborne gravity data

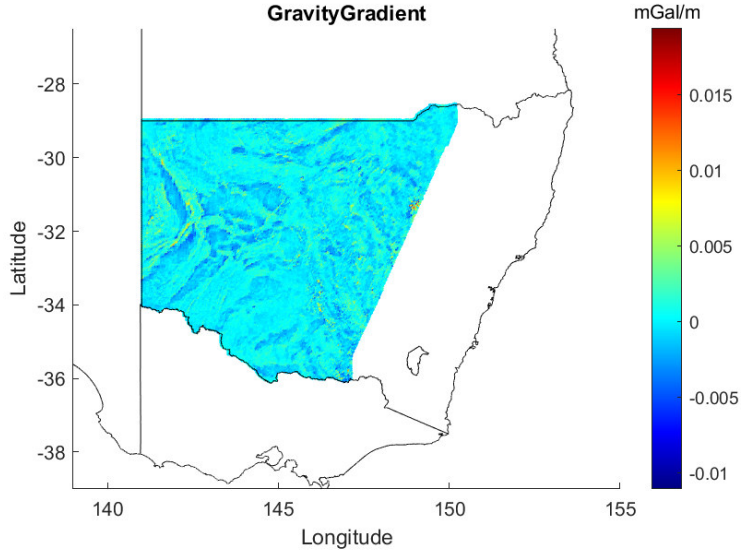
Photo credit : Surveyor-General Victoria.

Gravity data (multiple sources)

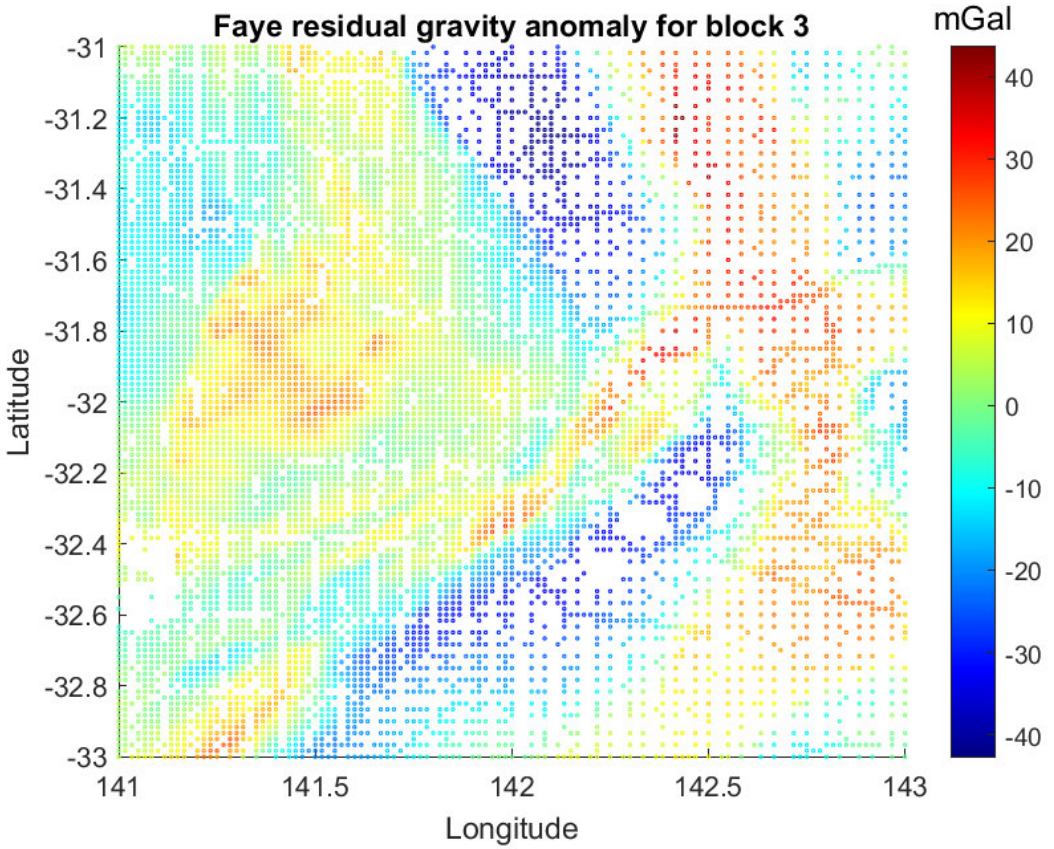


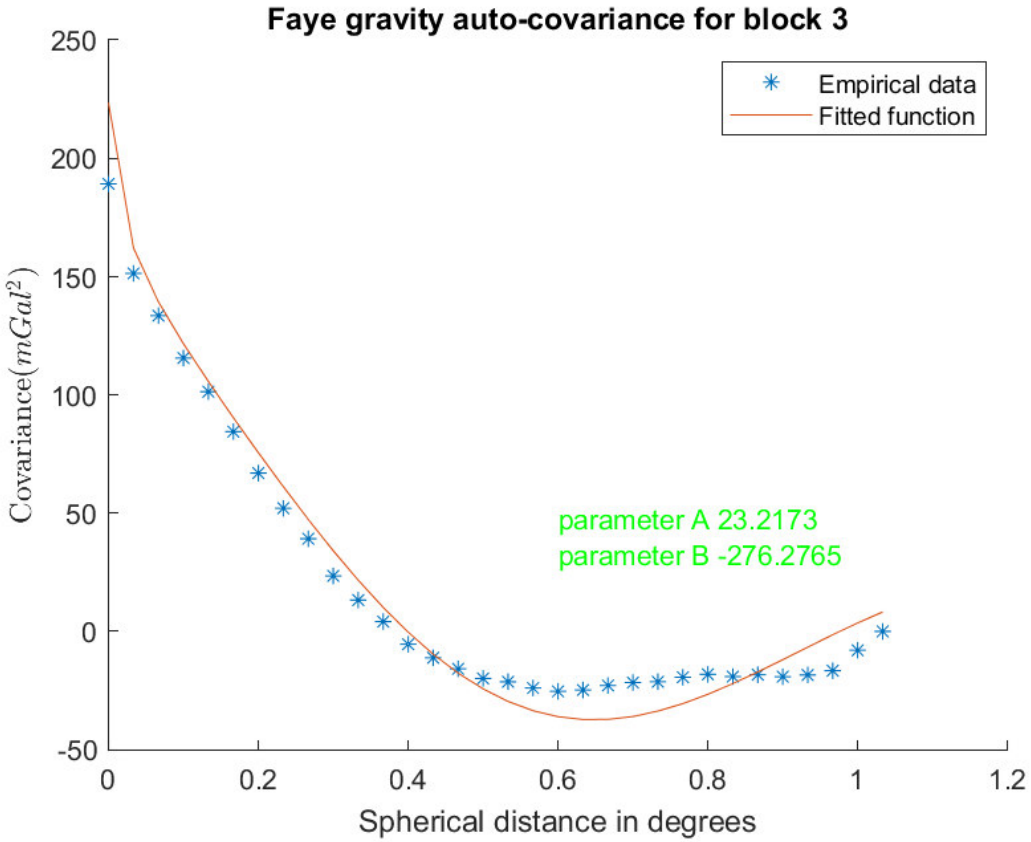




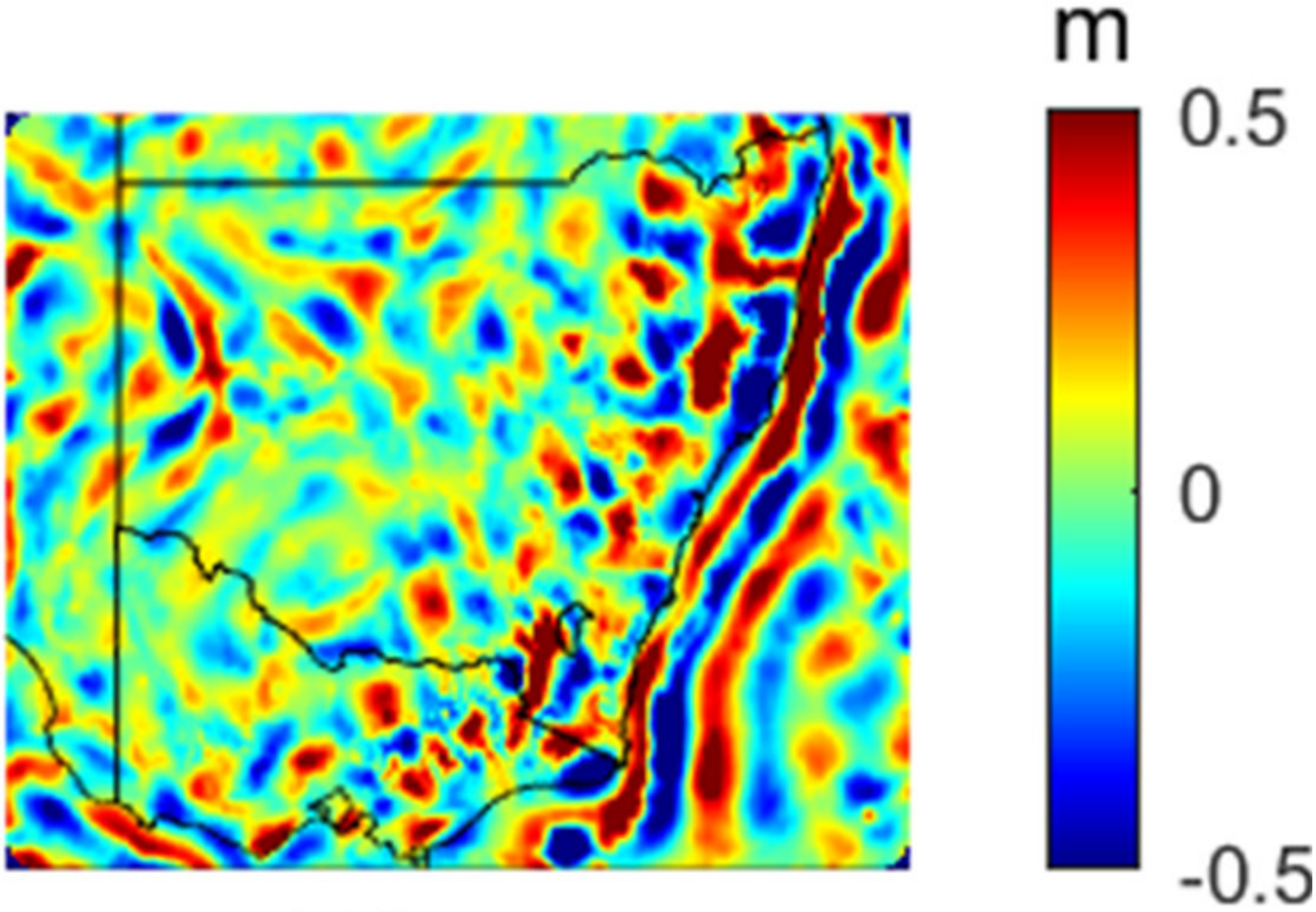


Least squares collocation to compute quasigeoid

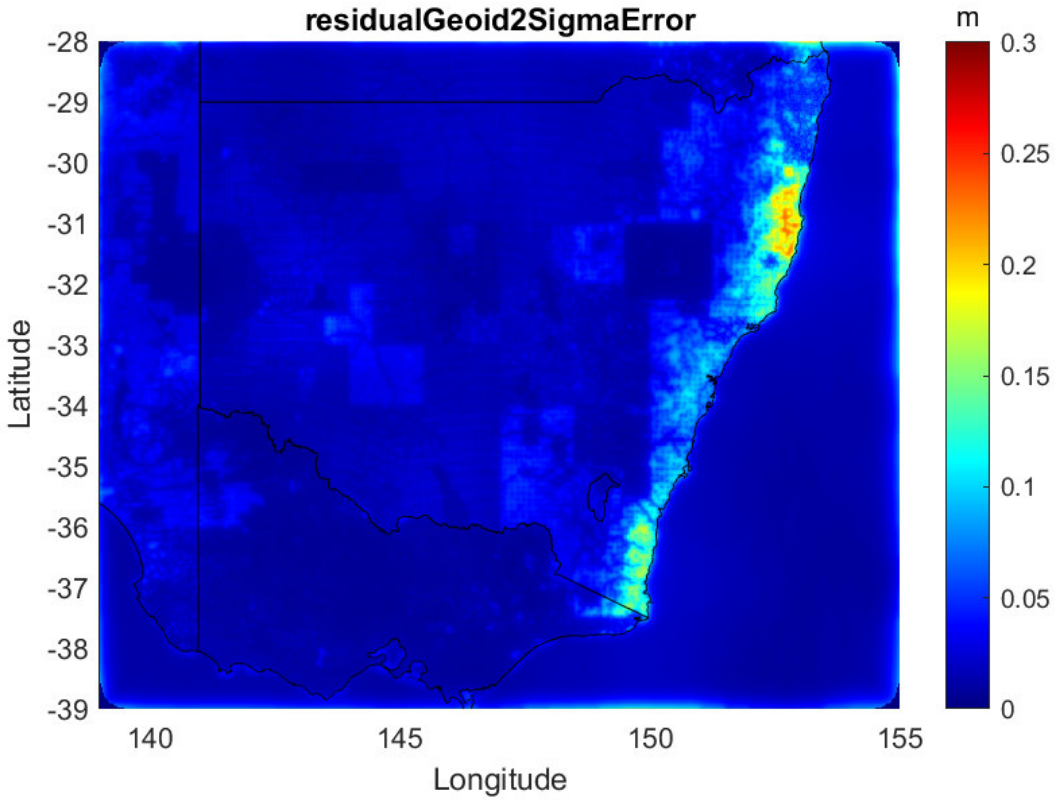




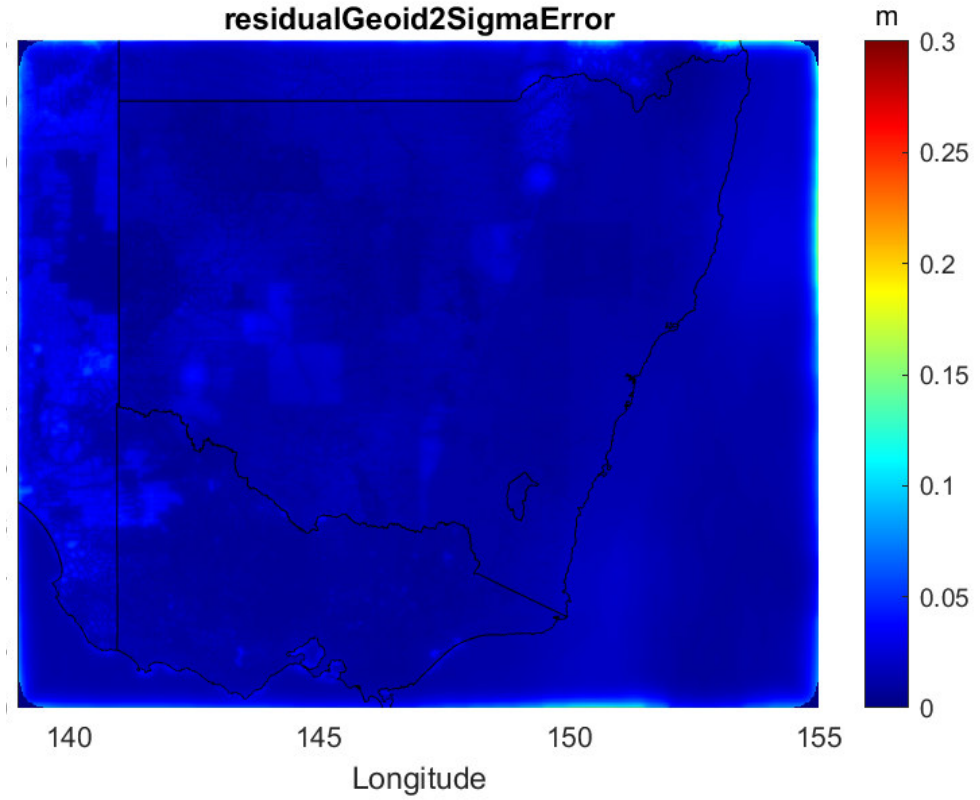
Gridded gravimetric quasigeoid



QuasiGeoid uncertainty



Without airborne data



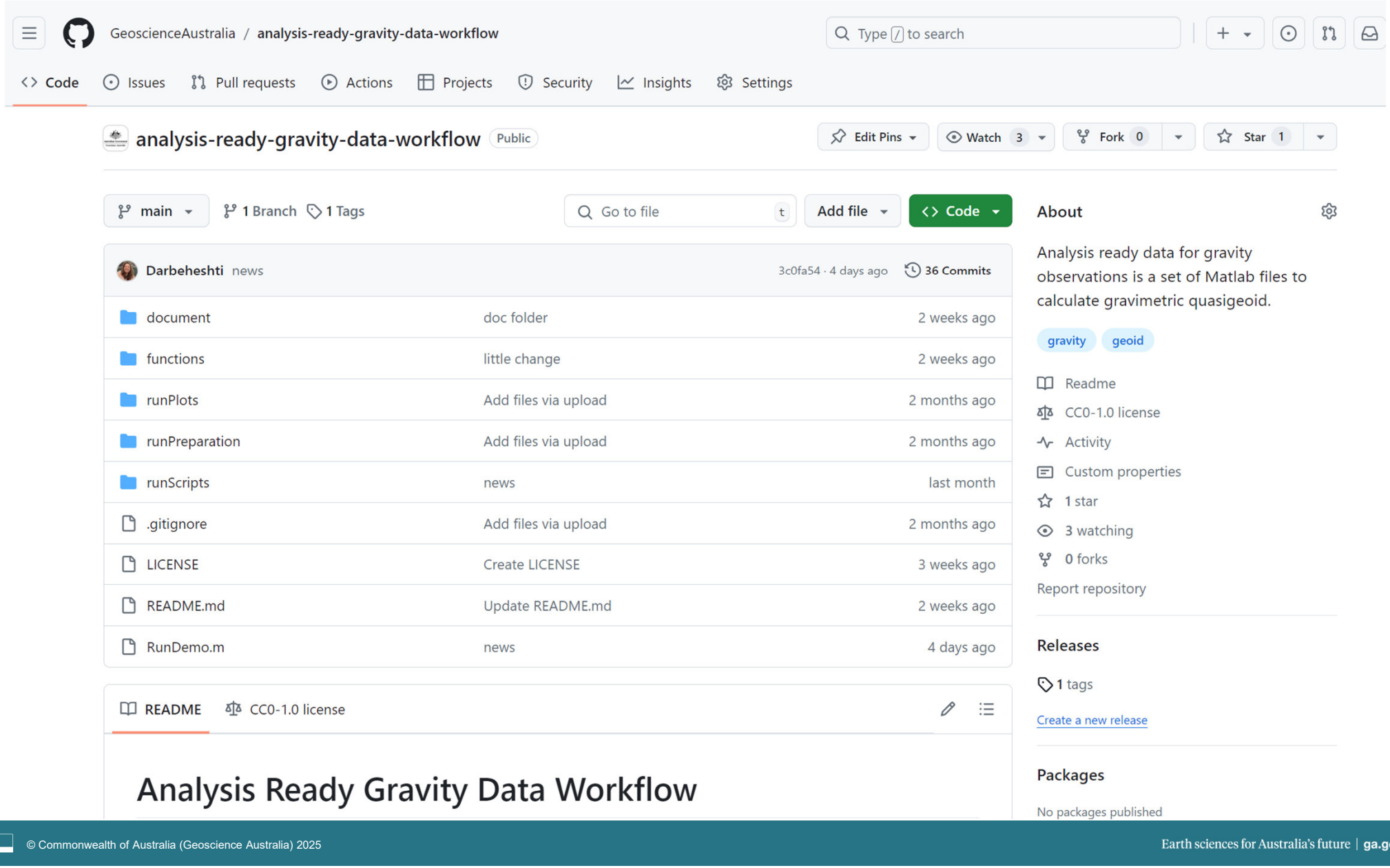
With airborne data

Mean geoid error reduced by 33.33%

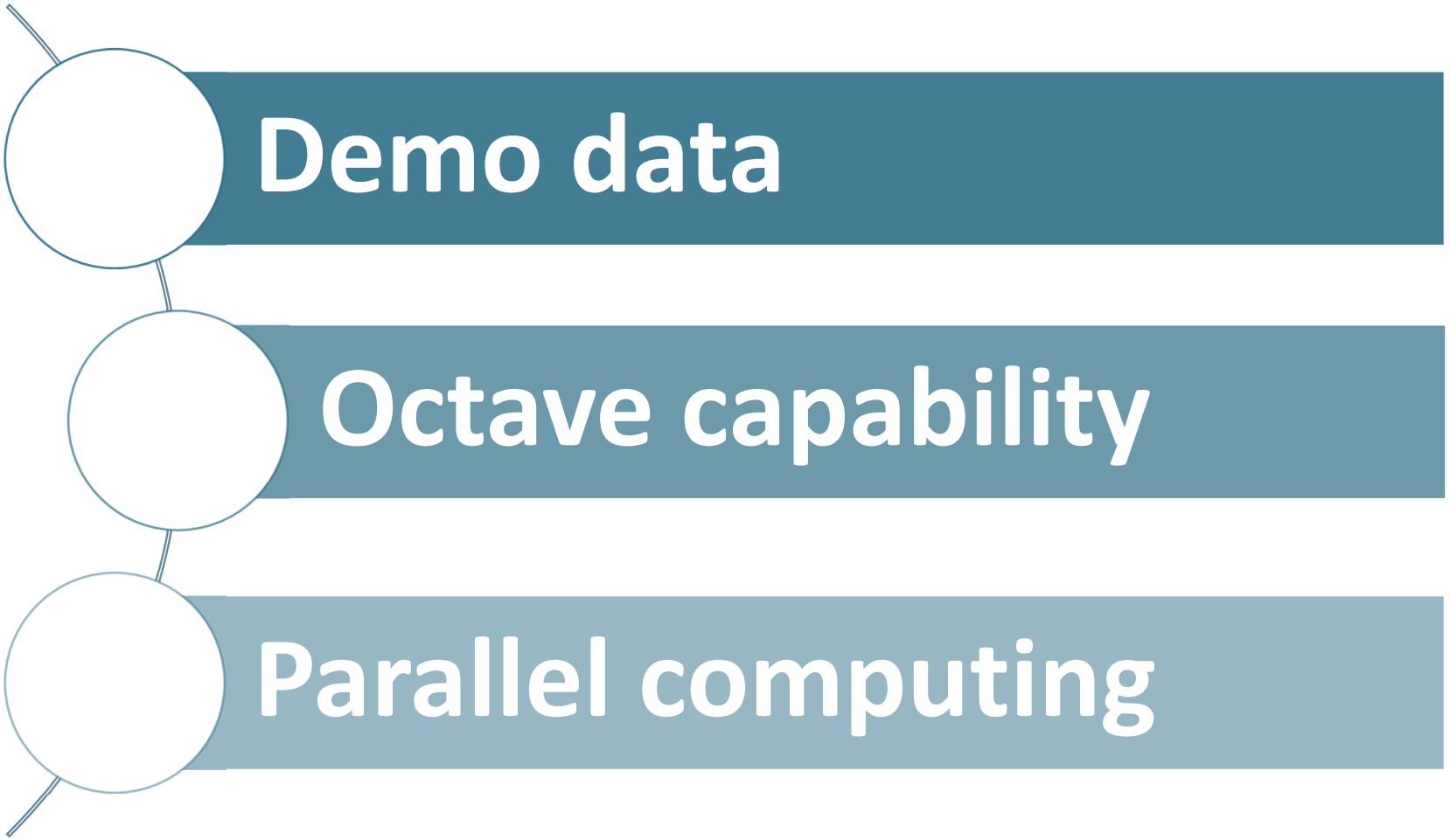
Geoid sigma error (m)	min	max	mean	std
Without airborne data	0.0026	0.1148	0.0114	0.0106
With airborne data	0.0009	0.0864	0.0076	0.0057

Computational statistics

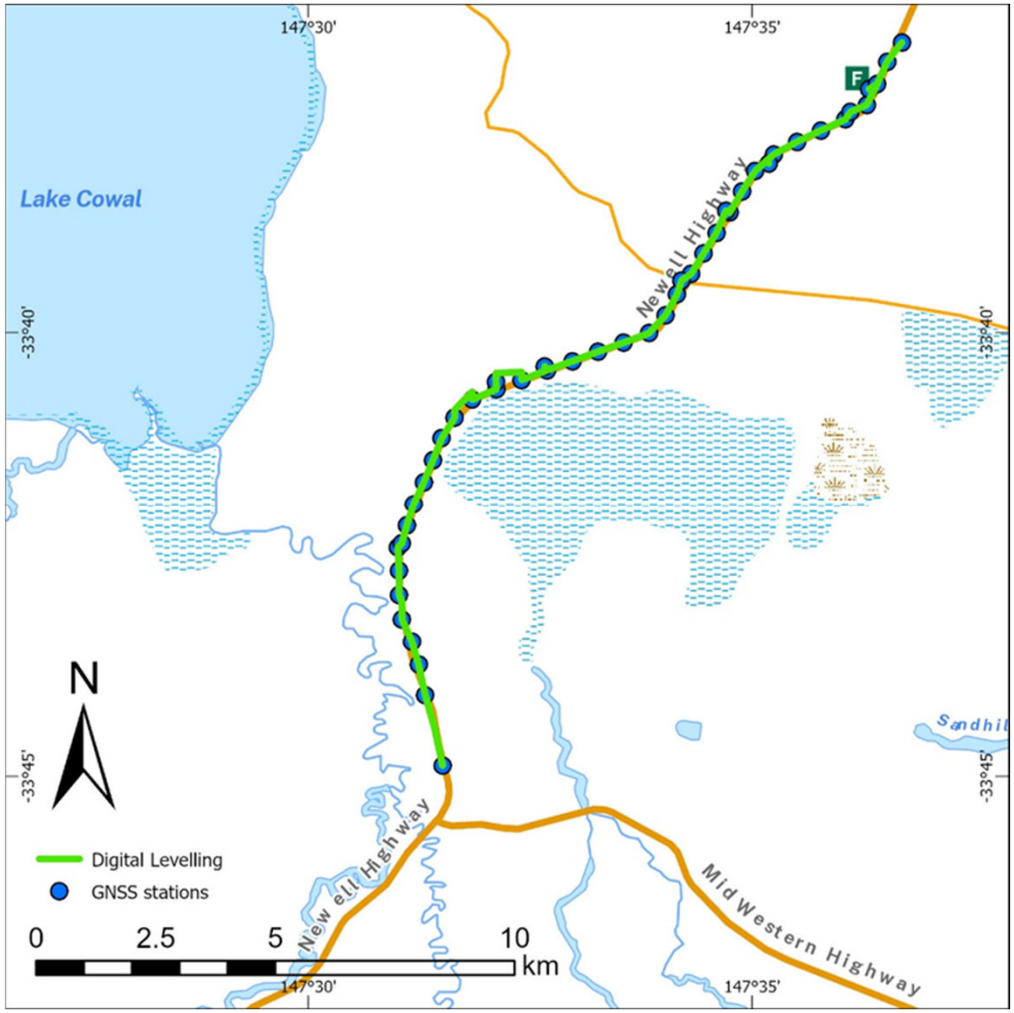
Number of Tiles	660
Computation Time per Tile	~ 3 minutes
Total Computation Time	~29 hours



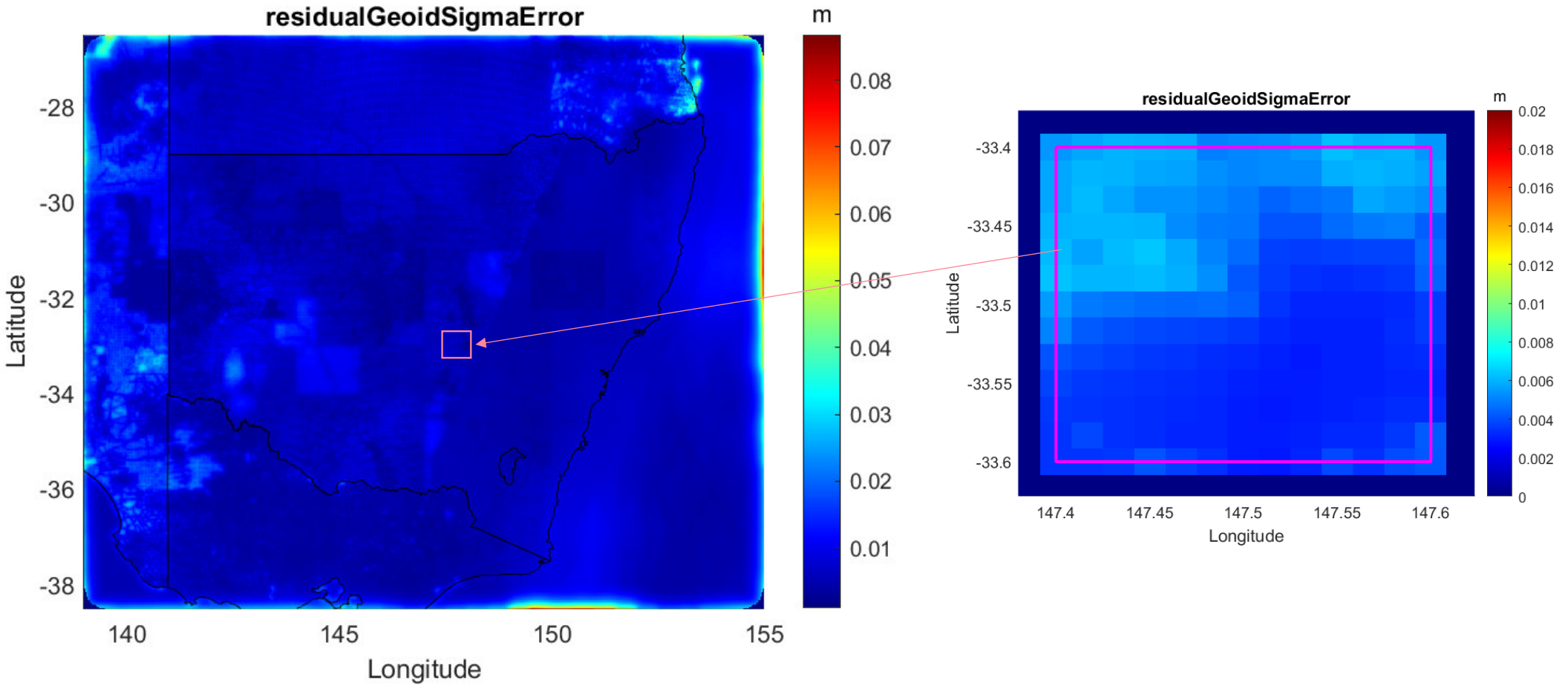
Key features of software



GNSS and Digital Levelling Along a 17 km Highway Section in Marsden, New South Wales



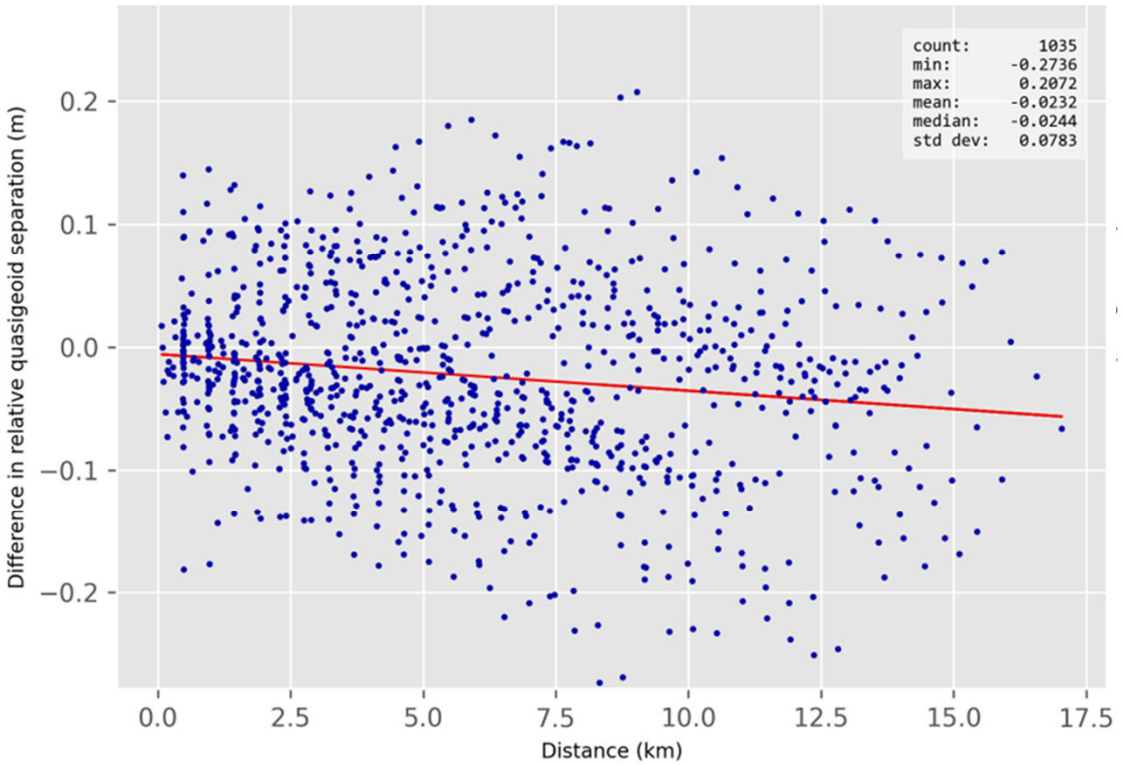
Study area for GNSS-levelling test



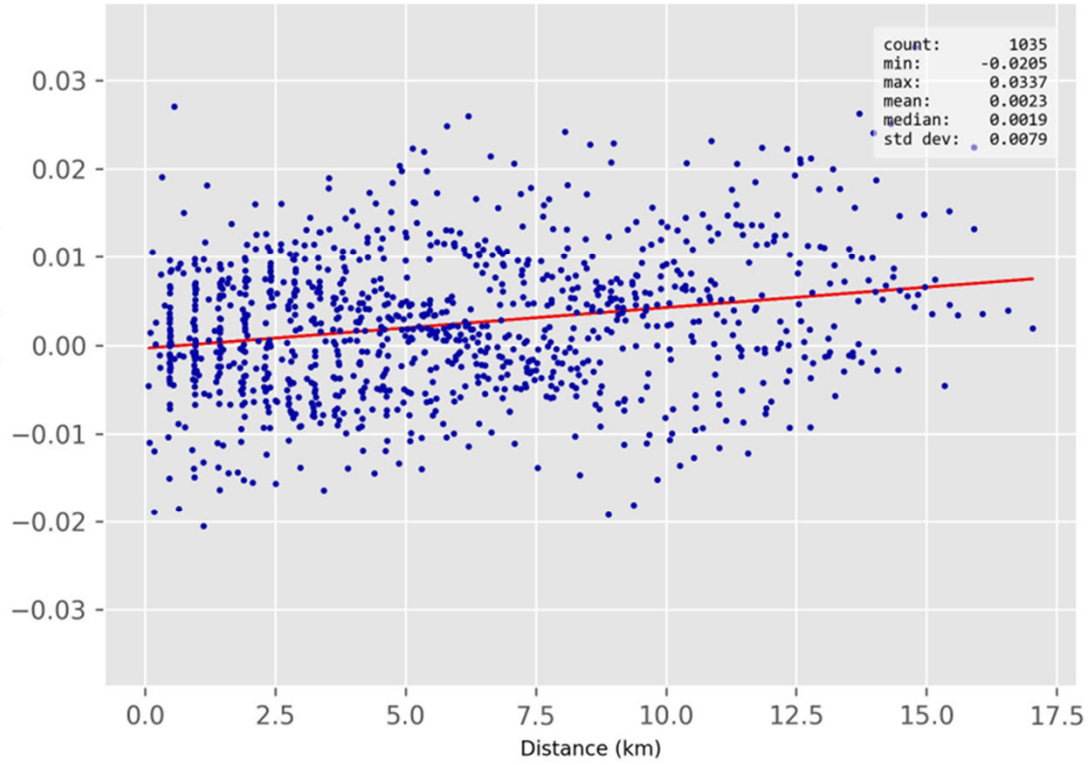
Slide nummer 14

JM1 Might be good to change the colour bar so the variation in the image is a bit more apparent.
Jack McCubbine; 2025-04-01T23:17:47.870

An Order of Magnitude Improvement Over Previous Versions of the AGQG



AGQG v20201120 (Without airborne data)



AGQG v20250102 (With airborne data)

Acknowledgment

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- AuScope and the Australian Government via the National Collaborative Research Infrastructure Strategy: auscope.org.au.

- New South Wales State Government Spatial Services for funding the airborne data collection.

- Victoria Geological Survey and the Department of Environment, Land, Water and Planning for funding the Victoria data collection.

The most relevant SDGs related to the presentation and theme of this session

1st relevant SDG

2nd relevant SDG

3rd relevant SDG

SUSTAINABLE DEVELOPMENT GOALS

International Federation of Surveyors supports the Sustainable Development Goals