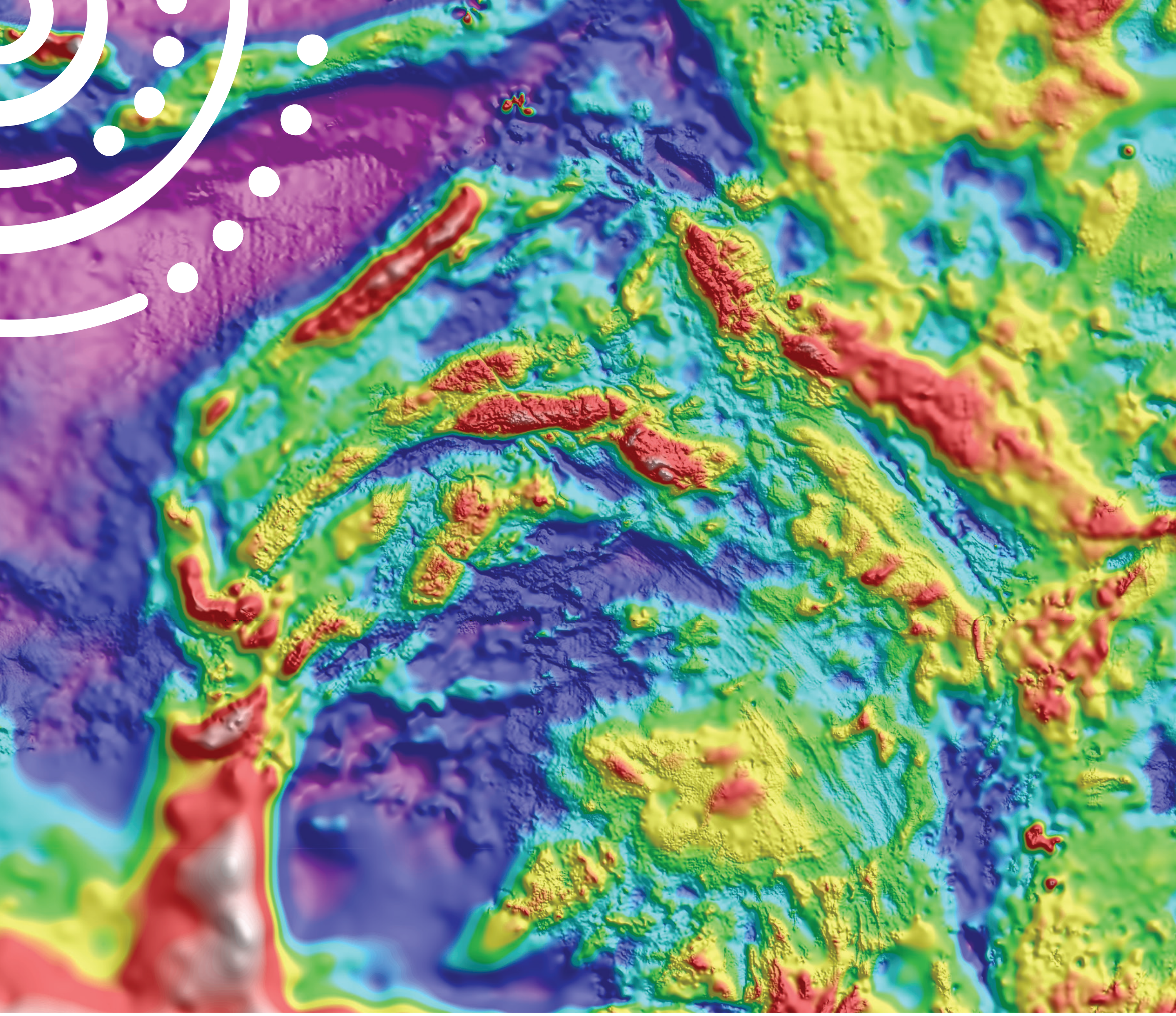

South Australia Gravity 2023 – statewide gravity dataset update

LF Katona and PJ Heath

SOUTH AUSTRALIA

Government of South Australia

Department for Energy and Mining

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Geological Survey of South Australia, Department for Energy and Mining

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South Australian Resources Information Gateway (SARIG)
SARIG provides up-to-date views of mineral, petroleum and geothermal tenements and other geoscientific data. You can search, view and download information relating to minerals and mining in South Australia including tenement details, mines and mineral deposits, geological and geophysical data, publications and reports (including company reports).
map.sarig.sa.gov.au

Acknowledgement of Country
The Department for Energy and Mining acknowledges Aboriginal people as the First Nations Peoples of South Australia. We recognise and respect the cultural connections as the traditional owners and occupants of the land and waters of South Australia, and that they continue to make a unique and irreplaceable contribution to the state.

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South Australia Gravity 2023 – statewide gravity dataset update

Laszlo F Katona and Philip J Heath

ABSTRACT

The 2023 gravity grid of South Australia was gridded from 802,178 ground gravity stations out of a total of 889,282 stations, extracted from the South Australian gravity database. Of the total stations included in the gridding process, 783,786 are within South Australian borders. The gridding utilised the supervised variable density gridding methodology (Katona 2017). Duplicate stations (repeats) and stations interpreted as unsuitable for gridding were not included in the processing. The SA Geodata 'grid flag' was updated for all stations in the database to enable stakeholders to filter out stations deemed unsuitable for regional gridding. The data package includes grids at 100m, 200m, 400m and 800m cell size, all clipped to the same extent as the 2022 TMI series of grids. Filtered grid products derived from the 100m grid include 1st vertical derivative (1VD), upward continuation of 1000m and a residual grid derived by subtracting the 1000m upward continued grid from the 100m gravity grid. The Bouguer anomaly calculation used a spherical cap model and the units of the grid are µm/sec^2.

INTRODUCTION

Following the 2017 edition of the South Australian gravity grid, a substantial number of new gravity surveys, including the Government funded surveys Coompana (2017A1), the Western Gawler (GP2 2022A01) and numerous private sector gravity surveys have been added to the South Australian gravity database, increasing the number of gravity stations suitable for inclusion in the statewide grid from around 530,000 to over 800,000. Figure 1 shows the locations of South Australia's gravity stations and highlights stations added to the new gravity grid since the 2017 edition of South Australia gravity.

In 2022, the gravity database received three significant updates, namely the inclusion of a station-level gridding flag; the inclusion of the spherical cap Bouguer calculation and the GDA2020 coordinate system update. The gridding flag allows individual stations to be tagged with 'Y' for inclusion in regional grids or 'N' for exclusion. The spherical-cap gravity calculation models the earth as a sphere (as opposed to a flat slab). Due to these changes, the entire gravity database was re-evaluated for its suitability for gridding through an iterative process that involved gridding the data at multiple resolutions to facilitate tagging the optimal cell size for gridding to all stations and an evaluation of the fitness of stations to be included in the gridding process, resulting in the grid flag being set to either Y or N.

After stations were tagged for inclusion in the gridding process and the appropriate, optimal gridding cell sizes were applied, the gridding process followed the supervised variable density gridding methodology (Katona 2017), using the Intrepid™ minimum curvature interpolator and ArcGIS Pro™ software. The resulting grids are in the SA Lambert Conformal Conic coordinate system of the GDA2020 Datum. For additional compatibility with some software platforms the ers format grids are provided in both GDA2020 and GDA94 coordinate systems.

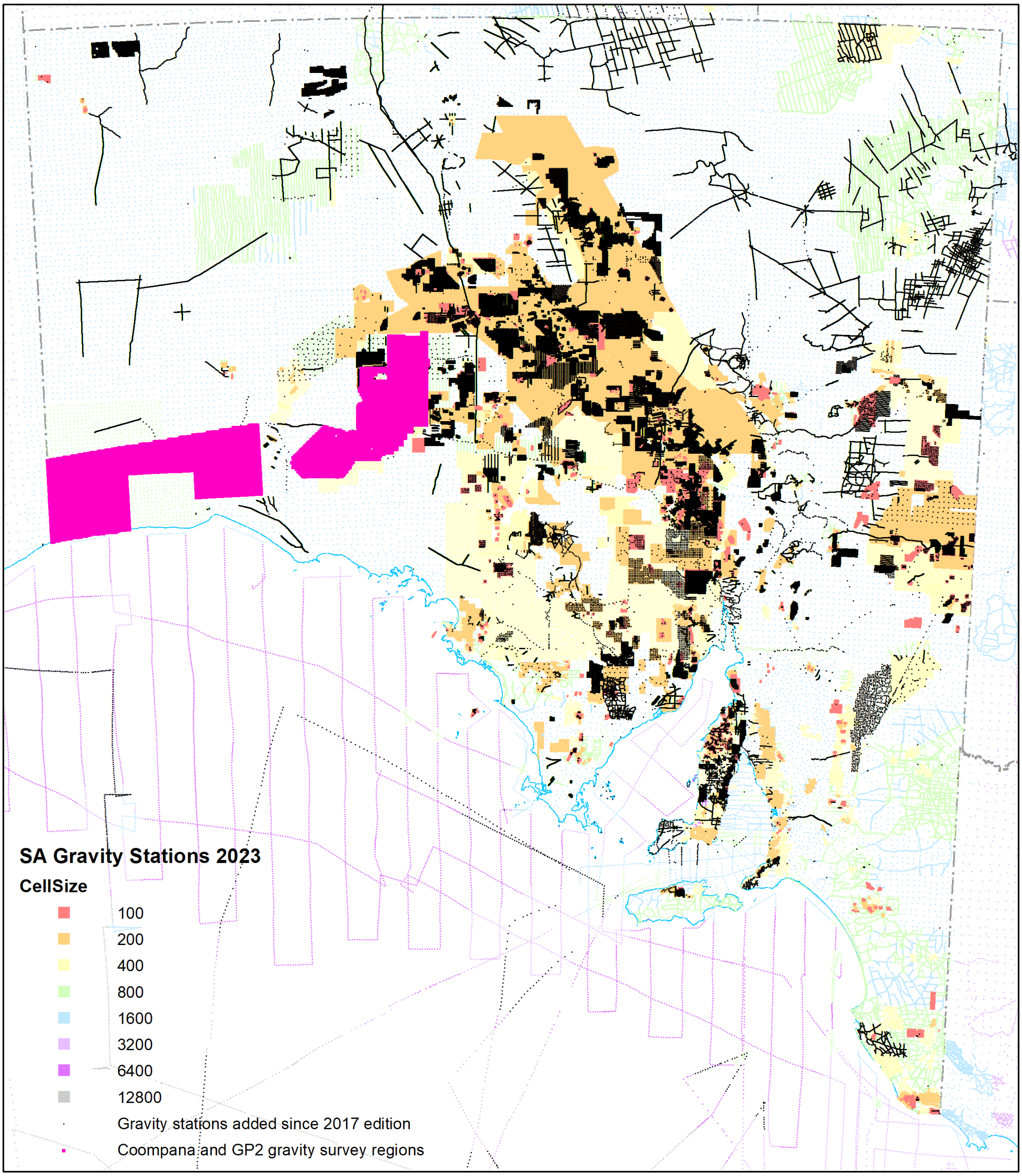

Figure 1. Gravity stations included in the 2023 Gravity dataset update. The stations and areas shown in black are stations added since the 2017 edition. The areas shown in magenta are the Government funded Coompana (2017) and GP2 (2022) surveys. Stations shown in colour were used in both the 2017 and 2023 editions.

METHODOLOGY

TAGGING STATION CELL SIZE AND GRID FLAG

The first task in producing the variable density gridding dataset was tagging each station with the optimal gridding resolution, and then tagging each point with the grid flag (Y or N) that would determine if the station was included in the set to be gridded. The target gridding resolution is determined by the spacing of stations in relation to adjacent stations. For minimum curvature gridding, the target resolution is around 1/5th of the station spacing. Because station spacing varies significantly across the state, tagging every point with the resolution attribute was not a trivial exercise, however, the method that facilitated a smooth and efficient workflow was to grid the full set of data at multiple resolutions starting at 100m, then doubling the cell size to a final cell size of 12,800m, using an interpolator that allows the interpolation distance to be controlled without filling holes where the station spacing exceeds the interpolation distance. This is illustrated in Figure 2, which shows how the contiguous parts of the grid guide the process of selecting and tagging gravity stations with the resolution attribute that is key to the supervised variable density gridding method.

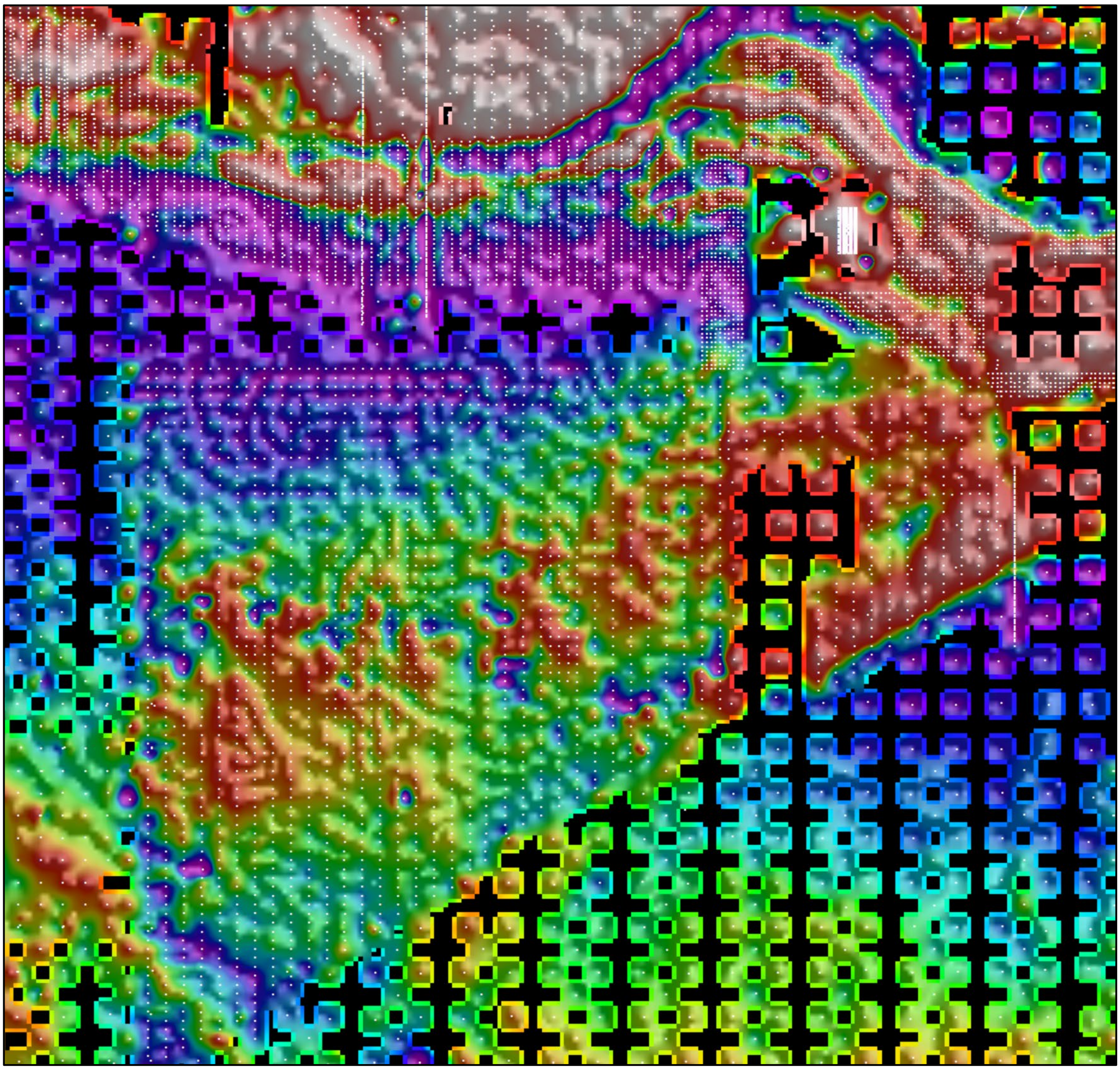

Figure 2. 1VD gravity gridded at 100m cell size, with interpolation distance of 3 cells. Gravity stations are shown as white dots. In the example above, stations overlying the contiguous (areas with no black voids) cells in the grid were tagged with a cellsize of 100m. Black areas indicate non-contiguous parts of the grid, not suitable for gridding at 100m. These stations were subsequently selected and tagged after overlaying the stations over grids with consecutively larger cell sizes.

The stations were gridded at 100, 200, 400, 800, 1600, 3200, 6400, 12800 metres, with an interpolation distance of 3 cells. A 1VD was generated for all grids and sun-shading was applied to all of the grids. Preparing the data this way served two purposes, illustrated in Figures 2–4.

At each of the gridded resolutions, stations that overlie contiguous parts of the grid could be selected in groups and tagged with the appropriate resolution. Stations or surveys that did not 'fit' the gravity 'fabric', displaying obvious discrepancy with the adjacent gravity data, were identified and tagged with the grid flag 'N' to be omitted from the gridding process. Using the sun-shaded 1VD was important for the interpretive part of the process because it shows the gridding 'busts' more clearly. The 1VD image in Figure 3 highlights an area where three rows of stations delineating gravity lows coinciding with the line direction crosscut a ridge of higher gravity values. It was very likely that these stations were not correctly tied into the fundamental gravity network and caused a spurious result in the gridding. Figure 4 shows the same region with the rows of bad stations removed.

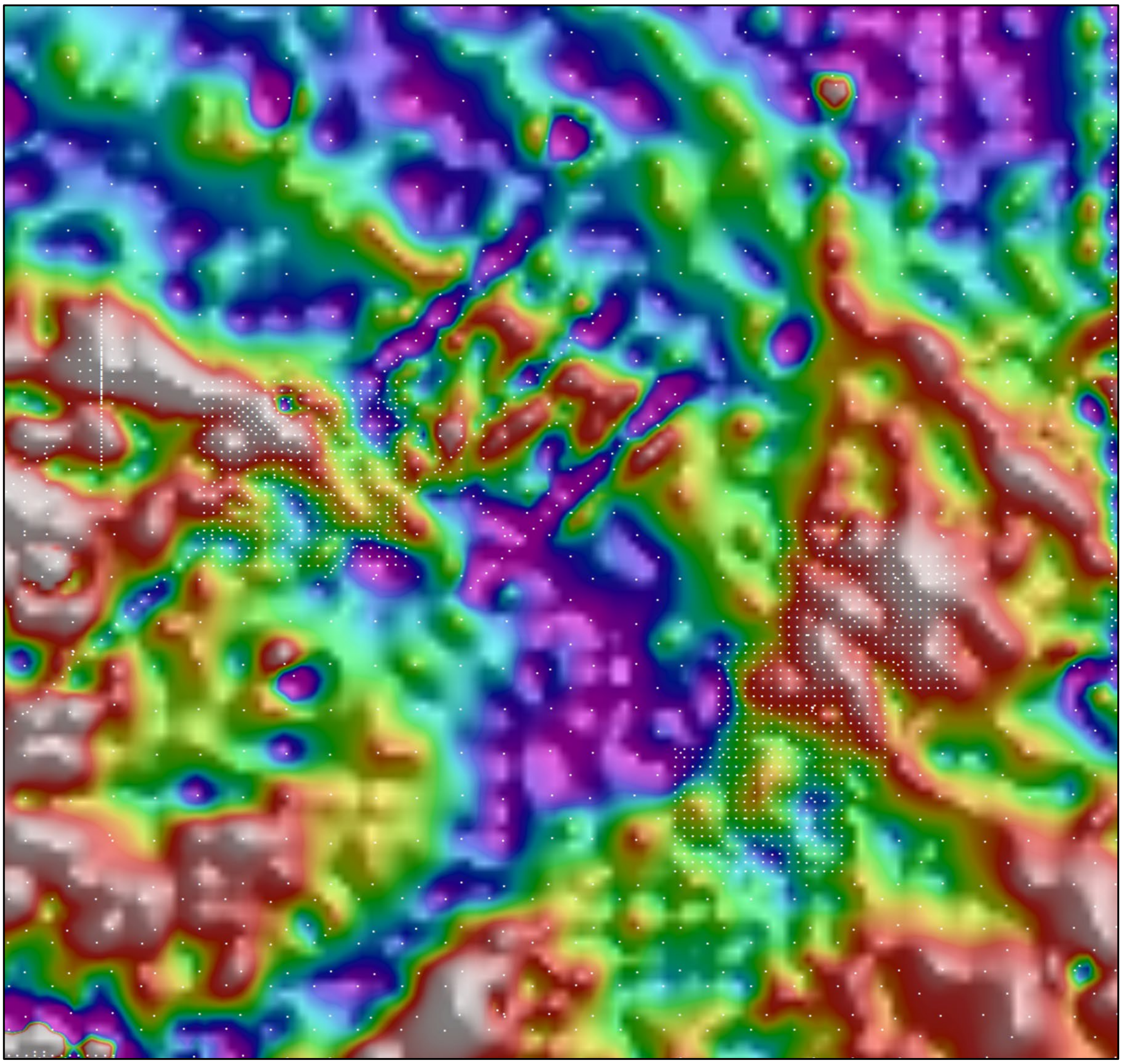

**Figure 3.	A number of areas where stations do not 'fit' the overall gravity fabric and introduce spurious regions.** These are identified visually, and the 'bad' stations are tagged to exclude them from gridding.

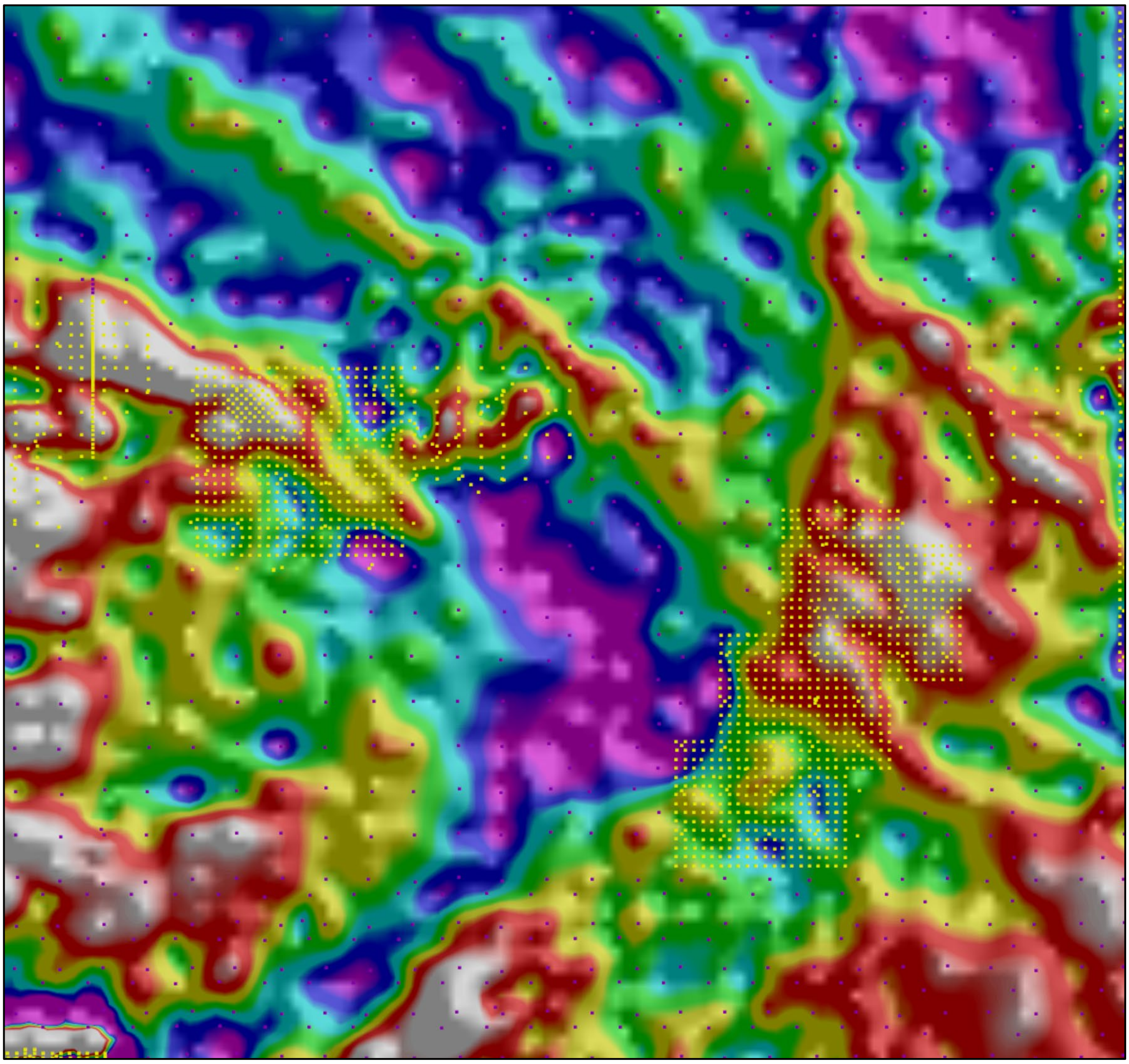

Figure 4. The same region as Figure 3, with bad stations removed (tagged) and regridded.

A further source of spurious stations were old, regional gravity surveys that have been superseded by more modern surveys. The old data points often interpolate as gravity lows within the more recent surveys or occasionally as point anomalies. Figure 4 also shows the result of removing these points and re-gridding. The authors' best guess as to why some stations and/or surveys have data quality issues most likely relates to the following:

- Quality of elevation measurements (barometric) and positioning during older surveys (pre-GPS), when instruments were not as precise as more modern methods.
- Incorrect procedures used for accurately tying a survey into the fundamental gravity network.
- Instrument drift or incorrectly calibrated gravity instrument.

These issues were not restricted to old gravity surveys. In some cases, more recent surveys were not correctly tied into the fundamental gravity network and appeared clearly spurious in the resulting grid. These surveys were omitted from gridding. The tagged and classified gravity stations are displayed in Figure 5.

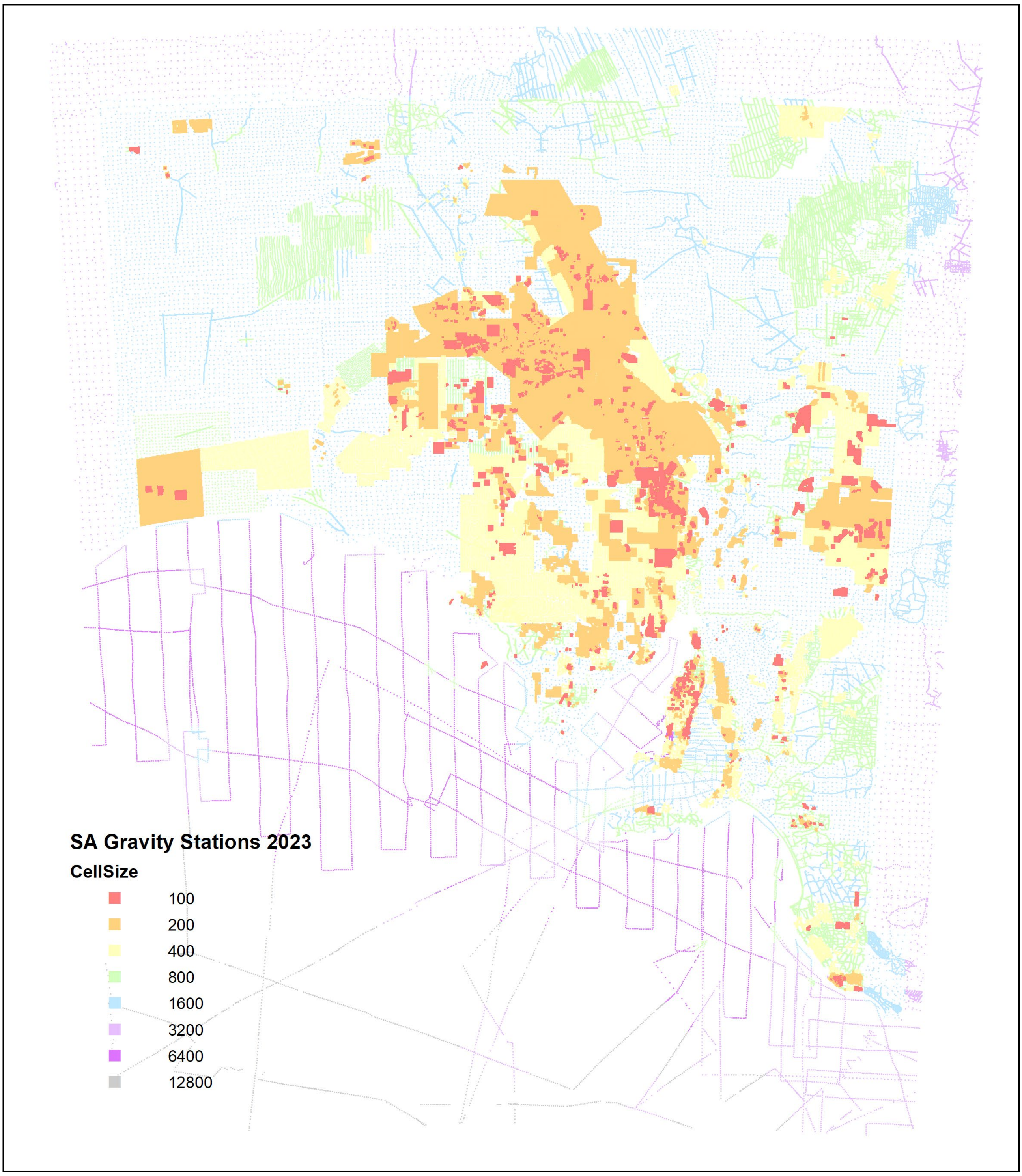

Figure 5. South Australia gravity stations tagged and classified for supervised variable density gridding.

PREPARING GRIDDING MASKS

After all stations were tagged with the gridding flag and optimal gridding resolution (cell size), the following set of ArcGIS Pro™ geoprocessing routines were performed in the order shown below, to convert the classified gravity stations into contiguous polygon areas.

- **Aggregate Points**: encloses points within a polygon with an aggregation distance. See Table 1 for key parameters.
- **Buffer**: creates the buffer around the aggregated points. Table 1, Buffer distance, shows the distances used for each cellsize. The buffered polygons clip the grids which are then used to generate pseudo-stations; the buffer distance provides space for the interpolator, between pseudo-stations and actual stations.
- **Dissolve Boundaries**: overlapping areas of the numerous buffered polygons are dissolved, generating cleaner buffered polygon shapes.
- **Eliminate Polygon Part**: removes small 'donut' holes within the buffered polygons that are caused by variations in station separation distance that cause the aggregate points step in the process to leave some holes in the polygons. Table 1, Eliminate Part area, shows the areas used to eliminate internal holes for each of the polygon masks.

Table 1. Aggregate, buffer and eliminate polygon part parameters for the polygon creation process.

Cell size (m)	**Aggregation distance** (m)	**Buffer distance** (m)	**Eliminate Part area** (sq m)
100	800	350	1000000
200	1600	700	1000000
400	4000	1400	3000000
800	8000	2800	5000000
1600	12800	5600	30000000
3200	50000	11200	Not required
6400	60000	22400	Not required

For the grid clipping process to be successful through all iterations of gridding the following combinations of aggregated polygons were required:

- 100m
- 100+200m
- 100+200+400m
- 100+200+400+800m
- 100+200+400+800+1600m
- 100+200+400+800+1600+3200m
- 100+200+400+800+1600+3200+6400m
- The first iteration of gridding at 12,800m uses all stations and doesn't require a clipping mask.

The result of the clipping masks is displayed in Figure 6, which is a merged set of all clipping masks used in the gridding process. The merged clipping masks have the added utility of providing a map of nominal station spacing. This dataset has been an important part of survey planning and analysis because it enables the user to immediately see the station spacing across the state.

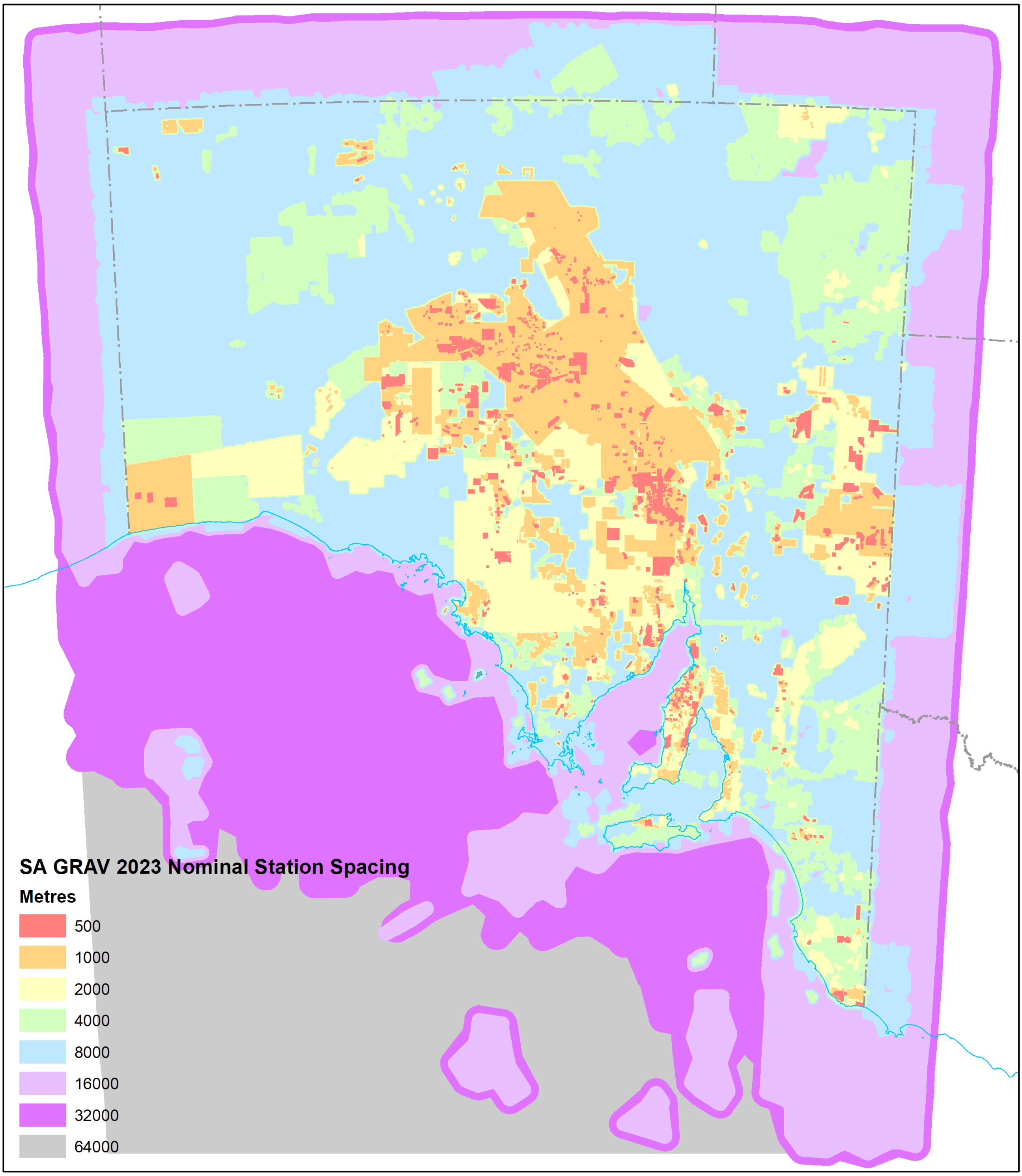

Figure 6. South Australia gravity nominal station spacing polygon dataset. This dataset is processed further to be used to clip gravity grids during the gridding process, but has value in survey planning and as a reliability dataset during analysis.

THE GRIDDING PROCESS

The gridding process followed the methodology in Katona (2017), briefly reviewed here as some of the geoprocessing tools used have been updated since 2017. The polygon masks shown in Figure 6 were created for the grid clipping process. Each of the polygon combinations shown above were used to 'erase' a reference polygon that covers the entire project area, thus generating the grid clipping masks.

The initial 12800m cell size grid was generated in Intrepid^{TM}. The minimum curvature gridding Intrepid^{TM} job files are given in Appendix 1. Table 2 displays the grid origin values for each iteration of supervised variable density gridding. Note that from iteration 3 onward, the grid origins are offset by specific distances, calculated to ensure that the total outer extent of the resulting grid cells fit precisely over the footprint of the previous iteration. The number of columns and rows in the grids is also manually adjusted to ensure that the grid extents are exactly matched to the previous grid extents. This is a critical aspect of the supervised variable density processing that prevents gridding artefacts.

Table 2. Origin values for each supervised variable density iteration.

Iteration	Origin_X	Origin_Y	Columns	Rows
1: 12800	295800	2777800	111	132
2: 6400	295800	2777800	221	263
3: 3200	294200	2779400	442	526
4: 1600	293400	2780200	884	1052
5: 800	293000	2780600	1768	2104
6: 400	292800	2780800	3536	4208
7: 200	292700	2780900	7072	8416
8: 100	292650	2780950	14144	16832

The processing of the initial 12800m grid and consecutive iterations followed these steps:

1. The grid coordinate system was set to GDA2020 Lambert for SA.
2. Statistics are calculated for the grid (ensures correct display of the grid).
3. The **Clip Raster** tool (ArcGIS Pro^{TM}) is run, using the relevant clipping mask. For iteration 1 this is the 100-6400m mask, which leaves only grid cells at the edges of the study area and areas correlating with the 12800m region in Figure 6.
4. **Raster to Point** converts the clipped grid to points (pseudo-stations), precisely located in the centroids of the cells of the clipped grid.
5. **Calculate Geometry Attributes –** performed to add the GDA 2020 Lambert for SA X and Y coordinates to the created points.
6. **Merge** is used to combine the pseudo-stations with the gravity stations, the latter filtered to omit the 12,800m stations, which are now replaced with the 12,800m pseudo-stations. The merge process requires the X and Y coordinates and gravity value to be retained in the merged dataset.
7. **Export Table** exports the X, Y and Z values of the merged dataset to an ascii file.
8. The exported table is imported into the Intrepid^{TM} gridding module for the second iteration of gridding at 6400. After the gridding parameters are set, the job file is saved and then edited to update the origins and number of columns and rows, before running the job file in the Intrepid Project Manager.
9. A 1VD of the resulting grid is produced and evaluated using a sunshade to check the grid extents and check for artefacts and possible busts.

These steps are repeated until the final gridding iteration of 100m is reached. The final 100m grid retains the detail of all prior iterations. This grid is shown in Figure 7. Figure 8 displays the 1VD of gravity and Figure 9 shows the UC1000m residual grid, computed by subtracting an upward continuation of SA Gravity from the SA Gravity grid.

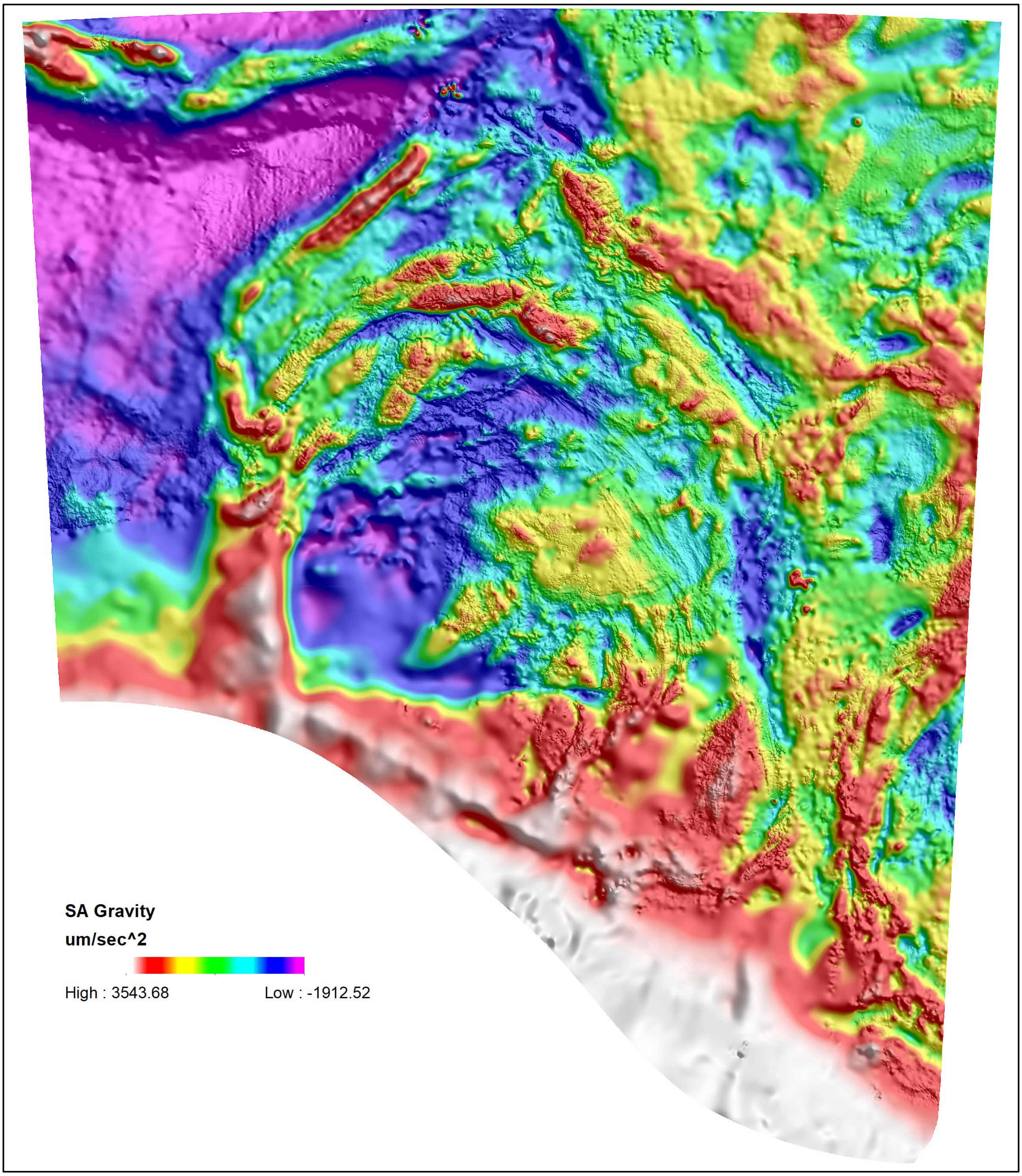

Figure 7. SA Gravity grid, 2023.

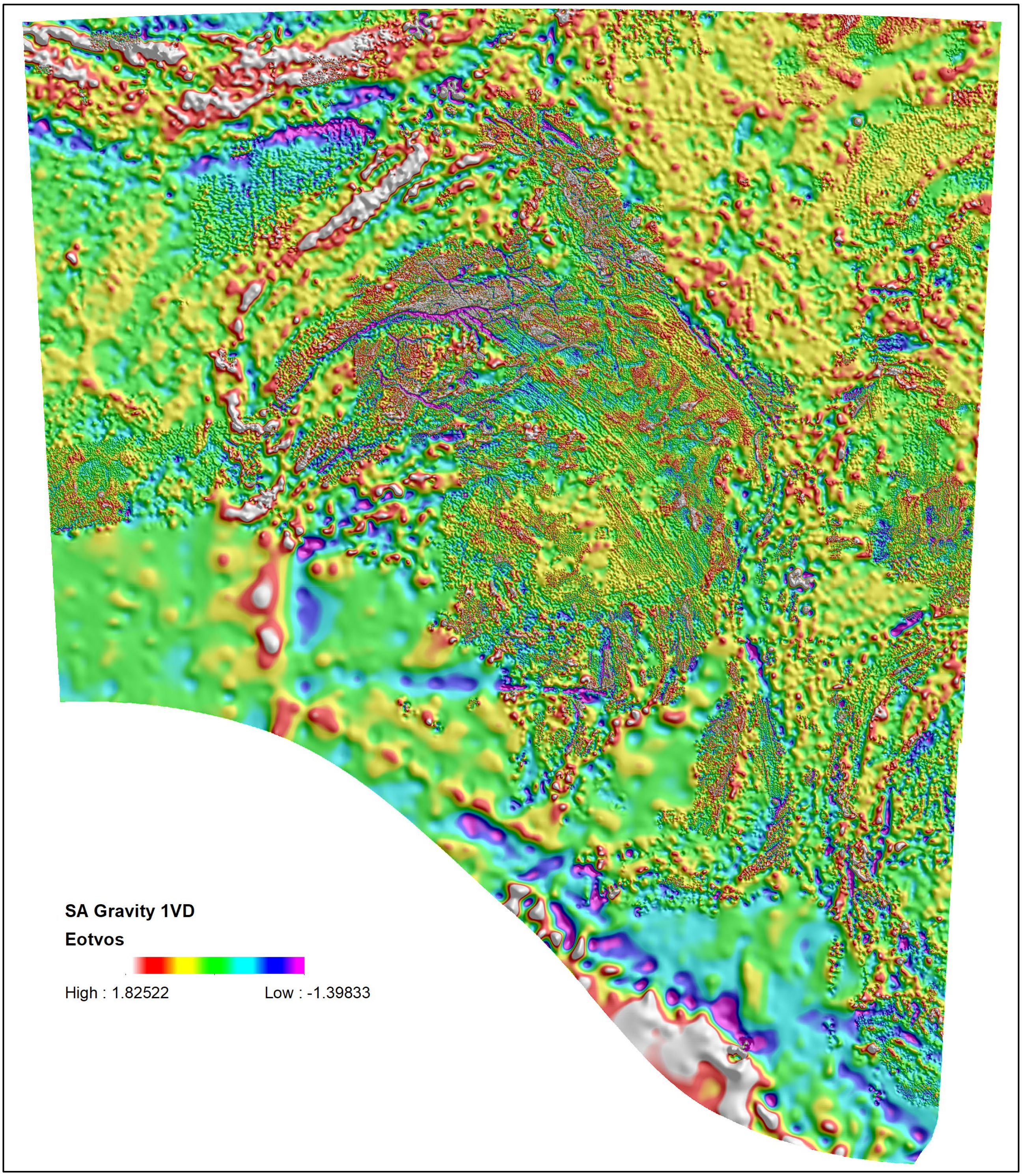

Figure 8. SA Gravity 1VD grid, 2023.

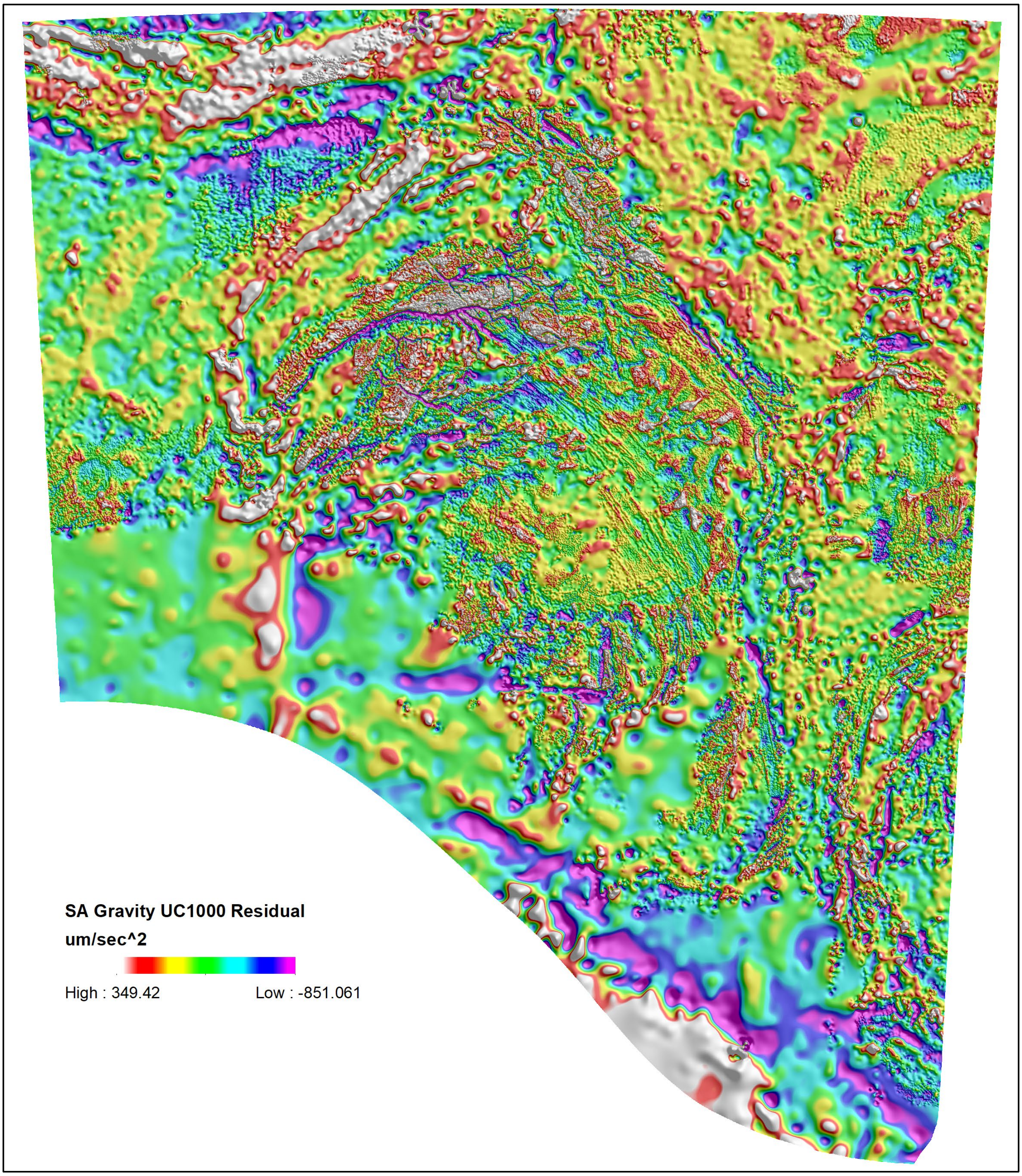

Figure 9. SA Gravity UC1000 residual grid, 2023.

THE DATA PACKAGE

The complete SA Gravity 2023 data package is available for download via the South Australian Resources Information Gateway (SARIG). The package contains the following datasets:

- Grids at 100m, 200m, 400m and 800m cell size, all clipped to the same extent as the 2022 series of SA TMI grids, in GDA2020 and GDA94 coordinate systems, Lambert Conformal Conic projection, ers format. The rationale of the coarse grids (200m – 800m cell size) is that they are suitable for regional analyses that require a lower resolution product.
- Filtered grid products derived from the 100m grid including 1st vertical derivative (1VD), upward continuation (1000m) and a residual grid derived by subtracting the 1000m upward continued grid from the 100m gravity grid. The residual grid has been shown to perform well in analyses targeting IOCG mineralisation in the Eastern Gawler Craton.
- A reliability surface that classifies the gravity station data into nominal station spacing and optimal gridding resolution. These dataset classifications are suitable for understanding the ground gravity coverage across South Australia and the classification of gravity data used for the gridding processing.
- Additional files enabling seamless use of the grids in a range of popular GIS software. These include layer files for ArcGIS™ Desktop, ArcGIS™ Pro and MapInfo tab files. Note that at the time of writing, there were minor compatibility issues with the ArcGIS Desktop and MapInfo packages that caused grids in the GDA2020 Lambert for SA coordinate system to not be recognised. To alleviate this issue, additional GDA94 Lambert for SA ers files and associated tab files are provided in the data package. Also note that the ers header files used EPSG codes for the coordinate systems, GDA2020 Lambert for SA is EPSG: 8059; GDA94 Lambert for SA is EPSG: 3107.
- The stations used in the gridding process are included in the package as an ESRI File Geodatabase feature class. These stations were those used in the gravity 2023 gridding process and exclude all stations in the gravity database flagged as 'N' in the grid flag attribute.

CONCLUDING REMARKS

The 2023 South Australian gravity products build significantly upon the previous version, released in 2017. The majority of gravity measurements added to the new edition were high resolution private sector surveys that were moved to open-file status since 2017. The introduction of the gridding flag prompted the re-evaluation of stations fit for gridding and this resulted in the addition of a number of gravity stations previously flagged as unsuitable for gridding. The process of evaluating the fitness of gravity stations for gridding is somewhat subjective and is ongoing.

REFERENCES

Katona L.F. 2017. *Gridding of South Australian Ground Gravity Data, using the Supervised Variable Density Method*, Report Book 2017/00012. Department of the Premier and Cabinet, South Australia, Adelaide.

APPENDIX

INTREPID^{TM} JOB FILES USED FOR THE GRAVITY 2023 GRID

Iteration 1:

```
INTREPID_QUADRANT_EXTENSION = 2
INTREPID_MINIMUM_QUADRANTS = 2
INTREPID_MINIMUM_WITHIN = 1
Process Begin
	Name	= GriddingPro
	Parameters Begin
		Input_Datasets Begin
			Input_Dataset_1 Begin
				Input_Dataset	=
D:\Projects\Gravity2021\Gridding\Try2\Iteration1_12800\SA_Grav_Gridding_Iteration1_imported..DIR
				Input_X	= LCC_X
				Input_Y	= LCC_Y
				Data	= BA_2007_UMS2_SCAP
				Band	= 1
			Input_Dataset_1 End
		Input_Datasets End
		Gridding_Method Begin
			Extrapolation_Limit	= 50
			Cell_Assignment	= Average
			Name	= Nearest_Neighbour
			Weight_Type	= Unity
			Save_Triangles = no
		Gridding_Method End
		Grid_Refinement Begin
			Fill_Holes	= yes
			Edge_Clipping	= Strict_Extrapolate_cells
			Laplace_Iterations	= 2
			Minimum_Curvature Begin
				Iterations	= 1000
				Max_Residual	= 0.0
				Tension= 0.0
				Relaxation_Factor	= 1.375
				Kernel_Size	= 49
				Honour_Original_Data	= 1
				Honour_2Cells	= no
			Minimum_Curvature End
		Grid_Refinement End
		Output_Grid Begin
			Output_Grid	=
D:\Projects\Gravity2021\Gridding\Try3\Iteration_1_12800\SA_Grav_Iteration1_BA_2007_UMS2_SCAP_128
00.ers
			Datum	= GDA2020
			Projection	= LAM_SAUST
			Cell_Size_X	= 12800.000000
			Cell_Size_Y	= 12800.000000
			Band	= 1
			Band_Name	= BA_2007_UMS2_SCAP
			Bands	= 1
			DataType	= IEEE4ByteReal
			Rotation	= 0.0
			Null_Value	= -99999.0
			Origin_X	= 295800.000000
			Origin_Y	= 2777800.000000
			Columns	= 111
			Rows	= 132
		Output_Grid End
	Parameters End
Process End
```

Iteration 2:

```
INTREPID_QUADRANT_EXTENSION = 2
INTREPID_MINIMUM_QUADRANTS = 2
INTREPID_MINIMUM_WITHIN = 1
Process Begin
	Name	= GriddingPro
	Parameters Begin
		Input_Datasets Begin
			Input_Dataset_1 Begin
				Input_Dataset	=
D:\Projects\Gravity2021\Gridding\Try3\Iteration_2_6400\SA_Grav_Gridding_Iteration2_DS..DIR
				Input_X	= LCC_X
				Input_Y	= LCC_Y
				Data	= BA_2007_UMS2_SCAP
				Band	= 1
			Input_Dataset_1 End
		Input_Datasets End
		Gridding_Method Begin
			Extrapolation_Limit	= 10
			Cell_Assignment	= Average
			Name	= Nearest_Neighbour
			Weight_Type	= Unity
			Save_Triangles = no
		Gridding_Method End
		Grid_Refinement Begin
			Fill_Holes	= yes
			Edge_Clipping	= Strict_Extrapolate_cells
			Laplace_Iterations	= 2
			Smoothing_Iterations	= 10
			Minimum_Curvature Begin
				Iterations	= 1000
				Max_Residual	= 0.0
				Tension= 0.0
				Relaxation_Factor	= 1.375
				Kernel_Size	= 25
				Honour_Original_Data	= 1
				Honour_2Cells	= no
			Minimum_Curvature End
		Grid_Refinement End
		Output_Grid Begin
			Output_Grid	=
D:\Projects\Gravity2021\Gridding\Try3\Iteration_2_6400\SA_Grav_Gridding_Iteration2_DS_BA_2007_UMS2
_SCAP_6400.ers
			Datum	= GDA2020
			Projection	= LAM_SAUST
			Cell_Size_X	= 6400.000000
			Cell_Size_Y	= 6400.000000
			Band	= 1
			Band_Name	= BA_2007_UMS2_SCAP
			Bands	= 1
			DataType	= IEEE4ByteReal
			Rotation	= 0.0
			Null_Value	= -99999.0
			Origin_X	= 295800.000000
			Origin_Y	= 2777800.000000
			Columns	= 221
			Rows	= 263
		Output_Grid End
	Parameters End
Process End
```

Iteration 3:

```
INTREPID_QUADRANT_EXTENSION = 2
INTREPID_MINIMUM_QUADRANTS = 2
INTREPID_MINIMUM_WITHIN = 1
Process Begin
	Name	= GriddingPro
	Parameters Begin
		Input_Datasets Begin
			Input_Dataset_1 Begin
				Input_Dataset	=
D:\Projects\Gravity2021\Gridding\Try3\Iteration_3_3200\SA_Grav_Gridding_Iteration3_DS..DIR
				Input_X	= LCC_X
				Input_Y	= LCC_Y
				Data	= BA_2007_UMS2_SCAP
				Band	= 1
			Input_Dataset_1 End
		Input_Datasets End
		Gridding_Method Begin
			Extrapolation_Limit	= 10
			Cell_Assignment	= Average
			Name	= Nearest_Neighbour
			Weight_Type	= Unity
			Save_Triangles = no
		Gridding_Method End
		Grid_Refinement Begin
			Fill_Holes	= yes
			Edge_Clipping	= Strict_Extrapolate_cells
			Laplace_Iterations	= 2
			Smoothing_Iterations	= 10
			Minimum_Curvature Begin
				Iterations	= 1000
				Max_Residual	= 0.0
				Tension= 0.0
				Relaxation_Factor	= 1.375
				Kernel_Size	= 25
				Honour_Original_Data	= 1
				Honour_2Cells	= no
			Minimum_Curvature End
		Grid_Refinement End
		Output_Grid Begin
			Output_Grid	=
D:\Projects\Gravity2021\Gridding\Try3\Iteration_3_3200\SA_Grav_Gridding_Iteration3_DS_BA_2007_UMS2
_SCAP_3200.ers
			Datum	= GDA2020
			Projection	= LAM_SAUST
			Cell_Size_X	= 3200.000000
			Cell_Size_Y	= 3200.000000
			Band	= 1
			Band_Name	= BA_2007_UMS2_SCAP
			Bands	= 1
			DataType	= IEEE4ByteReal
			Rotation	= 0.0
			Null_Value	= -99999.0
			Origin_X	= 294200.000000
			Origin_Y	= 2779400.000000
			Columns	= 442
			Rows	= 526
		Output_Grid End
	Parameters End
Process End
```

Iteration 4:

```
INTREPID_QUADRANT_EXTENSION = 2
INTREPID_MINIMUM_QUADRANTS = 2
INTREPID_MINIMUM_WITHIN = 1
Process Begin
	Name	= GriddingPro
	Parameters Begin
		Input_Datasets Begin
			Input_Dataset_1 Begin
				Input_Dataset	=
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				Input_X	= LCC_X
				Input_Y	= LCC_Y
				Data	= BA_2007_UMS2_SCAP
				Band	= 1
			Input_Dataset_1 End
		Input_Datasets End
		Gridding_Method Begin
			Extrapolation_Limit	= 10
			Cell_Assignment	= Average
			Name	= Nearest_Neighbour
			Weight_Type	= Unity
			Save_Triangles = no
		Gridding_Method End
		Grid_Refinement Begin
			Fill_Holes	= yes
			Edge_Clipping	= Strict_Extrapolate_cells
			Laplace_Iterations	= 2
			Smoothing_Iterations	= 2
			Minimum_Curvature Begin
				Iterations	= 1000
				Max_Residual	= 0.0
				Tension= 0.0
				Relaxation_Factor	= 1.375
				Kernel_Size	= 25
				Honour_Original_Data	= 1
				Honour_2Cells	= no
			Minimum_Curvature End
		Grid_Refinement End
		Output_Grid Begin
			Output_Grid	=
D:\Projects\Gravity2021\Gridding\Try3\Iteration_4_1600\SA_Grav_Gridding_Iteration4_DS_BA_2007_UMS2
_SCAP_1600.ers
			Datum	= GDA2020
			Projection	= LAM_SAUST
			Cell_Size_X	= 1600.000000
			Cell_Size_Y	= 1600.000000
			Band	= 1
			Band_Name	= BA_2007_UMS2_SCAP
			Bands	= 1
			DataType	= IEEE4ByteReal
			Rotation	= 0.0
			Null_Value	= -99999.0
			Origin_X	= 293400.000000
			Origin_Y	= 2780200.000000
			Columns	= 884
			Rows	= 1052
		Output_Grid End
	Parameters End
Process End
```

Iteration 5:

```
INTREPID_QUADRANT_EXTENSION = 2
INTREPID_MINIMUM_QUADRANTS = 2
INTREPID_MINIMUM_WITHIN = 1
Process Begin
	Name	= GriddingPro
	Parameters Begin
		Input_Datasets Begin
			Input_Dataset_1 Begin
				Input_Dataset	=
D:\Projects\Gravity2021\Gridding\Try3\Iteration_5_800\SA_Grav_Gridding_Iteration5_DS..DIR
				Input_X	= LCC_X
				Input_Y	= LCC_Y
				Data	= BA_2007_UMS2_SCAP
				Band	= 1
			Input_Dataset_1 End
		Input_Datasets End
		Gridding_Method Begin
			Extrapolation_Limit	= 10
			Cell_Assignment		= Average
			Name	= Nearest_Neighbour
			Weight_Type	= Unity
			Save_Triangles = no
		Gridding_Method End
		Grid_Refinement Begin
			Fill_Holes		= yes
			Edge_Clipping	= Strict_Extrapolate_cells
			Laplace_Iterations	= 2
			Smoothing_Iterations	= 2
			Minimum_Curvature Begin
				Iterations		= 1000
				Max_Residual	= 0.0
				Tension= 0.0
				Relaxation_Factor	= 1.375
				Kernel_Size	= 25
				Honour_Original_Data	= 1
				Honour_2Cells	= no
			Minimum_Curvature End
		Grid_Refinement End
		Output_Grid Begin
			Output_Grid	=
D:\Projects\Gravity2021\Gridding\Try3\Iteration_5_800\SA_Grav_Gridding_Iteration5_DS_BA_2007_UMS2_
SCAP_800.ers
			Datum	= GDA2020
			Projection	= LAM_SAUST
			Cell_Size_X	= 800.000000
			Cell_Size_Y	= 800.000000
			Band	= 1
			Band_Name	= BA_2007_UMS2_SCAP
			Bands	= 1
			DataType	= IEEE4ByteReal
			Rotation	= 0.0
			Null_Value	= -99999.0
			Origin_X	= 293000.000000
			Origin_Y	= 2780600.000000
			Columns	= 1768
			Rows	= 2104
		Output_Grid End
	Parameters End
Process End
```

Iteration 6:

```
INTREPID_QUADRANT_EXTENSION = 2
INTREPID_MINIMUM_QUADRANTS = 2
INTREPID_MINIMUM_WITHIN = 1
Process Begin
	Name	= GriddingPro
	Parameters Begin
		Input_Datasets Begin
			Input_Dataset_1 Begin
				Input_Dataset	=
D:\Projects\Gravity2021\Gridding\Try3\Iteration_6_400\SA_Grav_Gridding_Iteration6_DS..DIR
				Input_X	= LCC_X
				Input_Y	= LCC_Y
				Data	= BA_2007_UMS2_SCAP
				Band	= 1
			Input_Dataset_1 End
		Input_Datasets End
		Gridding_Method Begin
			Extrapolation_Limit	= 5
			Cell_Assignment	= Average
			Name	= Nearest_Neighbour
			Weight_Type	= Unity
			Save_Triangles = no
		Gridding_Method End
		Grid_Refinement Begin
			Fill_Holes	= yes
			Edge_Clipping	= Strict_Extrapolate_cells
			Laplace_Iterations	= 2
			Smoothing_Iterations	= 2
			Minimum_Curvature Begin
				Iterations	= 1000
				Max_Residual	= 0.0
				Tension= 0.0
				Relaxation_Factor	= 1.375
				Kernel_Size	= 25
				Honour_Original_Data	= 1
				Honour_2Cells	= no
			Minimum_Curvature End
		Grid_Refinement End
		Output_Grid Begin
			Output_Grid	=
D:\Projects\Gravity2021\Gridding\Try3\Iteration_6_400\SA_Grav_Gridding_Iteration6_DS_BA_2007_UMS2_
SCAP_400.ers
			Datum	= GDA2020
			Projection	= LAM_SAUST
			Cell_Size_X	= 400.000000
			Cell_Size_Y	= 400.000000
			Band	= 1
			Band_Name	= BA_2007_UMS2_SCAP
			Bands	= 1
			DataType	= IEEE4ByteReal
			Rotation	= 0.0
			Null_Value	= -99999.0
			Origin_X	= 292800.000000
			Origin_Y	= 2780800.000000
			Columns	= 3536
			Rows	= 4208
		Output_Grid End
	Parameters End
Process End
```

Iteration 7:

```
INTREPID_QUADRANT_EXTENSION = 2
INTREPID_MINIMUM_QUADRANTS = 2
INTREPID_MINIMUM_WITHIN = 1
Process Begin
	Name	= GriddingPro
	Parameters Begin
		Input_Datasets Begin
			Input_Dataset_1 Begin
				Input_Dataset	=
D:\Projects\Gravity2021\Gridding\Try3\Iteration_7_200\SA_Grav_Gridding_Iteration7_DS..DIR
				Input_X	= LCC_X
				Input_Y	= LCC_Y
				Data	= BA_2007_UMS2_SCAP
				Band	= 1
			Input_Dataset_1 End
		Input_Datasets End
		Gridding_Method Begin
			Extrapolation_Limit	= 5
			Cell_Assignment	= Average
			Name	= Nearest_Neighbour
			Weight_Type	= Unity
			Save_Triangles = no
		Gridding_Method End
		Grid_Refinement Begin
			Fill_Holes	= yes
			Edge_Clipping	= Strict_Extrapolate_cells
			Laplace_Iterations	= 2
			Smoothing_Iterations	= 2
			Minimum_Curvature Begin
				Iterations	= 1000
				Max_Residual	= 0.0
				Tension= 0.0
				Relaxation_Factor	= 1.375
				Kernel_Size	= 25
				Honour_Original_Data	= 1
				Honour_2Cells	= no
			Minimum_Curvature End
		Grid_Refinement End
		Output_Grid Begin
			Output_Grid	=
D:\Projects\Gravity2021\Gridding\Try3\Iteration_7_200\SA_Grav_Gridding_Iteration7_DS_BA_2007_UMS2_
SCAP_200.ers
			Datum	= GDA2020
			Projection	= LAM_SAUST
			Cell_Size_X	= 200.000000
			Cell_Size_Y	= 200.000000
			Band	= 1
			Band_Name	= BA_2007_UMS2_SCAP
			Bands	= 1
			DataType	= IEEE4ByteReal
			Rotation	= 0.0
			Null_Value	= -99999.0
			Origin_X	= 292700.000000
			Origin_Y	= 2780900.000000
			Columns	= 7072
			Rows	= 8416
		Output_Grid End
	Parameters End
Process End
```

Iteration 8:

```
INTREPID_QUADRANT_EXTENSION = 2
INTREPID_MINIMUM_QUADRANTS = 2
INTREPID_MINIMUM_WITHIN = 1
Process Begin
	Name	= GriddingPro
	Parameters Begin
		Input_Datasets Begin
			Input_Dataset_1 Begin
				Input_Dataset	=
D:\Projects\Gravity2021\Gridding\Try3\Iteration_8_100\SA_Grav_2022_100m_DS..DIR
				Input_X	= LCC_X
				Input_Y	= LCC_Y
				Data	= BA_2007_UMS2_SCAP
				Band	= 1
			Input_Dataset_1 End
		Input_Datasets End
		Gridding_Method Begin
			Extrapolation_Limit	= 5
			Cell_Assignment	= Average
			Name	= Nearest_Neighbour
			Weight_Type	= Unity
			Save_Triangles = no
		Gridding_Method End
		Grid_Refinement Begin
			Fill_Holes	= yes
			Edge_Clipping	= Strict_Extrapolate_cells
			Laplace_Iterations	= 2
			Smoothing_Iterations	= 2
			Minimum_Curvature Begin
				Iterations	= 1000
				Max_Residual	= 0.0
				Tension= 0.0
				Relaxation_Factor	= 1.375
				Kernel_Size	= 25
				Honour_Original_Data	= 1
				Honour_2Cells	= no
			Minimum_Curvature End
		Grid_Refinement End
		Output_Grid Begin
			Output_Grid	=
D:\Projects\Gravity2021\Gridding\Try3\Iteration_8_100\SA_Grav_2022_100m_DS_BA_2007_UMS2_SCAP_
100m.ers
			Datum	= GDA2020
			Projection	= LAM_SAUST
			Cell_Size_X	= 100.000000
			Cell_Size_Y	= 100.000000
			Band	= 1
			Band_Name	= BA_2007_UMS2_SCAP
			Bands	= 1
			DataType	= IEEE4ByteReal
			Rotation	= 0.0
			Null_Value	= -99999.0
			Origin_X	= 292650.000000
			Origin_Y	= 2780950.000000
			Columns	= 14144
			Rows	= 16832
		Output_Grid End
	Parameters End
Process End
```