How-to guide: Geochronology & Isotopes Data Portal (Version 2)

Last updated June 2023.

This guide demonstrates how to use some of the functionality of the **Geochronology & Isotopes Data Portal**, which can be used to access the data contained in the Isotopic Atlas of Australia. The guide covers how to view and download datasets, share views with others, load a custom layer and information and use of the Geochronology and Isotopes Tools. These instructions will be updated as the web service continues to be developed.

The Geoscience Australia Portal (GA Portal) is a central location where agency-wide data and other publically available data sources can be accessed, and are freely available and downloadable. As well, a suite of analytical and multi-criteria assessment tools to maximise the value of the data is available for use within the portal, with the results able to be 'Clipped, Zipped and Shipped' for use externally e.g. Open Geospatial Consortium (OGC)-capable portals and GIS systems. The Help icons ⑦ throughout the GA Portal contain additional guides and videos on the Portal's general use and features.

As the GA Portal contains a large range of datasets, subsets are available via 'Personas'. A 'Persona' (👤) is a customised view of the portal that contains curated content of layers, reports and tools relating to the subject matter of the persona. For more information on Personas, watch this short video.

The Geochronology & Isotopes Data Portal (image below) is a Persona within the GA Portal. Here you will find the datasets pertaining to Geoscience Australia's Isotopic Atlas of Australia (Fraser et al., 2020).
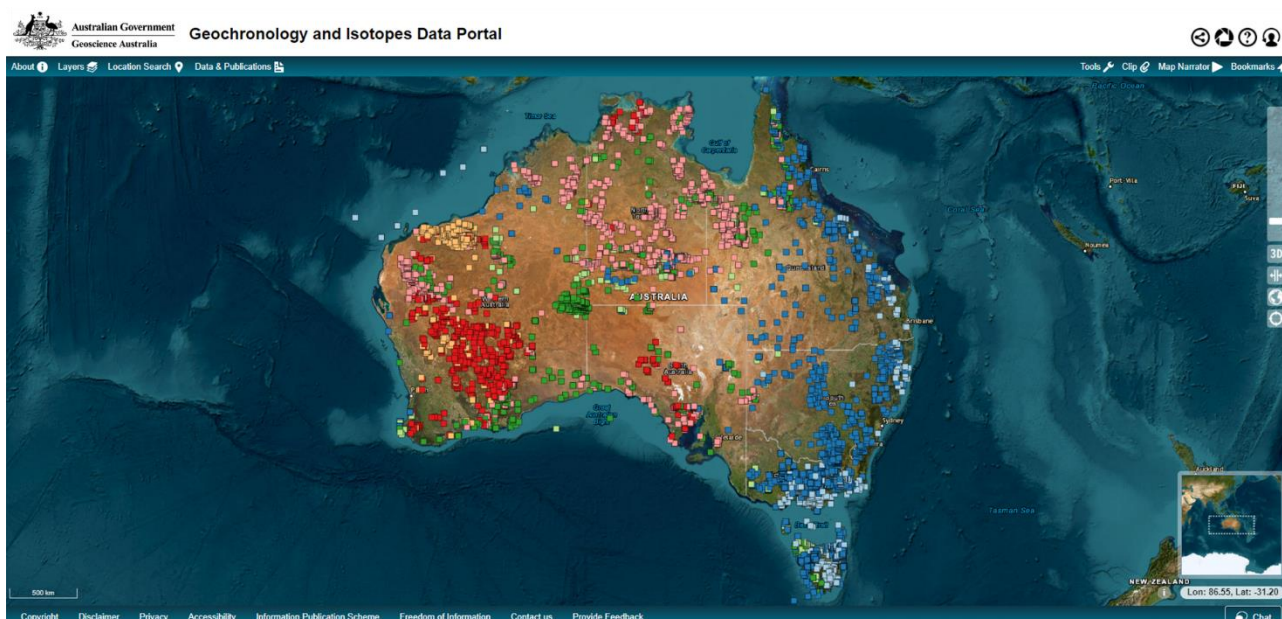
1 Viewing and downloading data

The layers within the Geochronology and Isotopes Data Portal/Persona can be found under the **Layers** tab (on the top left toolbar).

1.1 View/Browse data

To better understand the features of the GA Portal, here are 3 different ways to access the data for the Isotopic Atlas of Australia:

1. <u>Direct access:</u>

    a. The Geochronology and Isotopes Data Portal can be accessed by clicking here.

        i. The view presented is the Layer: *Geochronology and Isotopes — Geochronology — Geochronology – All*

2. <u>Via Persona:</u>

    a. Open the Geoscience Australia Portal here

    b. Click on the Persona icon 👤 on the top right

    c. Choose '**Geochronology and Isotopes Data Portal**' from the list of personas. The map view presented is the Layer: *Geochronology and Isotopes — Geochronology — Geochronology - All*

3. <u>Via Layers:</u>

    a. Open the Geoscience Australia Portal here

    b. Click '**Layers**' on the top left toolbar

    c. Open '**Map Layers**' — '**Geochronology and Isotopes**'

Once you have navigated to the Geochronology and Isotopes layers using one of the above methods, use these steps to add/change layers to the map:

    d. choose from the list of themed headers (Grids, Geochronology or Isotopes) — click on headers to view dataset layers within

    e. click on ⊕ to reveal information and options for the chosen layer

    f. Click '**Add to Map'**

    g. To remove a layer from the map, click on '**Remove'**

Point data: may be clicked to show available information for that point in the Inspection Tool panel. If there is more than one point near to the cursor, the information for each point will be displayed below each other. This information is the same as is available for <u>download</u> (see Section 1.2 below).

NOTE:

- multiple datasets may be added to the map view at the same time

- layers are added to the map in order of being clicked on e.g. if you want a layer containing points to be laid over a grid layer, 1st add the grid layer then add the points layer. Alternatively, use the '**Opacity'** slider (see next Section 1.1.1).

1.1.1 View other styles/legends

To change the style/legend of the data:

1. Go to the Geochronology and Isotopes Data Portal

2. Select '**Layers**' from the top left-side tabs

3. Choose a dataset layer under the 'Geochronology and Isotopes' headers (Grids, Geochronology, Isotopes). Expand out the menus by clicking on the headers.

4. click on to reveal information and options for the chosen layer

5. Click '**Add to Map'**

    a. To remove a layer from the map, click on '**Remove'**

Optional:

6. Click '**Legend'** to view the legend for that layer

7. Choose a different style from the '**Style'** dropdown menu

8. Change/adjust the opacity/transparency of the layers using the '**Opacity'** slider

1.1.2 Filter data

The '**Filter**' button allows the user to filter the data in a layer by certain attributes. Choose/enter the filters you would like, then press '**Apply Filter**' at the top of the filter panel. This is an optional feature within a layer.

To remove or reset the filter, click '**Remove Filter**'.

1.2 Download data

1.2.1 All datasets from a Map Layer

To download all the data from a layer under the Geochronology and Isotopes headers (i.e. Grids, Geochronology, Isotopes):

1. Go to the Geochronology and Isotopes Data Portal

2. Select '**Layers**' from the top left-side tabs

3. Choose a dataset layer under the Geochronology and Isotopes headers (Grids, Geochronology, Isotopes)

    a. click on to expose the information tools for that layer

    b. Click on '**About**' tab to expand information on the chosen dataset

    c. Click on the '**Download**' dropdown list — choose the format for the download. The file should begin to download immediately.

        i. Download format options are: **CSV**, **JSON**, **KML**, **Shapefile**, **XML**

1.2.2 Select Datasets (from a specified area)

This download option requires input of an email address to obtain results.

To download datasets from a selected area only:

1. Go to the Geochronology and Isotopes Data Portal

2. Select '**Layers**' from the top left-side tabs

3. Choose a dataset layer under the Geochronology and Isotopes headers (Grids, Geochronology, Isotopes)

    a. click on to reveal information and options for the chosen layer

    b. Click '**Add to Map'**

4. Select the '**Clip, Zip & Ship**' icon on the top right-side of the map.

5. There are two ways to select an extent on the map:

    a. '**Draw Extent**': draw a bounding box around an area of interest on the map –

        i. Click on the "Draw Extent" button.

        ii. Move the cursor to the map and click on the map to start the drawing of your extent.

        iii. Move your cursor and click again to complete the extent.

        iv. Optionally you can select the "Results Per Page" dropdown box, to select how many results will be displayed in the results table.

    b. '**Manual Entry**': enter chosen North, South, East, West coordinates

        i. Click on the '**Manual Entry'** button.

        ii. Enter a North coordinate in WGS84, EPSG:4326.

        iii. Enter a West coordinate in WGS84, EPSG:4326.

        iv. Enter a East coordinate in WGS84, EPSG:4326.

        v. Enter a South coordinate in WGS84, EPSG:4326.

        vi. Optionally you can select the "Results Per Page" dropdown box, to select how many results will be displayed in the results table.

6. Click on the '**Search**' button to retrieve all the datasets available in your chosen area/extent.

7. A Results Page will be returned

    a. Choose to '**Filter**' down the results by 'Primary' and/or 'Secondary' layers and/or theme e.g. 'Primary Theme: Geochronology and Isotopes', or search for a specific layer. Filters can be left blank in which case all layers on the map will be selectable – including the Base Map Layer(s).

    b. Click on the radio box to select which datasets you wish have packaged and delivered to your email.

    c. Select a Format from the dropdown box.

    d. Select a Projection from the dropdown box.

    e. Optionally select a Resampling method from the dropdown box, by default "near" is selected.

    f. Enter your email address and select the "Submit Job" button. The request will be sent to the servers for processing.

    g. You will receive an email once processing is complete and your data is ready for download.

1.3 Share view with others

Once you have selected the data layers, filtered and portrayed the data in the Portal, you can share this view with others by clicking the share ⬸ button in the top-right of the browser window. This will generate a unique link that others can use to get the same view of the portal information. This can be particularly useful when overlaying multiple datasets in a specific way to convey a particular message.

2 Loading a Custom Layer

The '**Custom Layer**' functionality allows you to add your own layers to the map that can then be used as a normal layer in the Portal.

Loading custom layers can be done by adding local data and/or adding data from the web.

2.1 Add Local Data:

1. Open the Geoscience Australia Portal here
2. Click '**Layers**' Layers on the top left toolbar
3. Open '**Custom Layers**'
4. '**Add Local Data**'
5. Select from the '**Select Service Type**' dropdown the file type you wish to upload
6. Select the '**Choose File**' button and select the file you wish to upload from your local drive

The following data files are able to be uploaded from your local drive:

      a. Comma-Separated Values (CSV)

      b. Esri Shapefile (Zip)

      c. GeoJSON

      d. GeoTIFF

      e. Geography Markup Language (GML)

      f. Keyhole Markup Language (KML)

      g. KMZ

      h. NetCDF

2.2 Add Web Data:

1. Open the Geoscience Australia Portal here
2. Click '**Layers**' Layers on the top left toolbar
3. Open '**Custom Layers**'
4. '**Add Web Data**'
5. Select from the '**Select Service Type**' dropdown the file type you wish to upload
6. Copy or type the url into the text box and paste into the '**Search**' bar. A list of available layers will appear, expand the layer using the "+" icon.to add other web map data.

The following web services are able to be loaded into the GA Portal:

      a. Comma-Separated Values (CSV)

      b. Esri ArcGIS Map Server

      c. GeoJSON

      d. Keyhole Markup Language (KML)

      e. KMZ

      f.   Web Map Service (WMS)

      g.   Web Map Tile Service (WMTS)

A video demonstrating the use of loading a Custom Layer can be found here or under the Help icon at the top right of the Portal. This Help page also contains additional guides and videos on the Portal's general use and features.

3 Geochronology and Isotopes Data Portal Tools

This section of the guide serves to demonstrate some functionality of the specific tools available to use within the Geochronology & Isotopes Persona. It covers accessing and using the following tools available within the Geochronology & Isotopes Data Portal:

1.　　　Distance Raster Generator Tool

2.　　　Elevation Profiles Tool

3.　　　Inspection Tool

4.　　　Geochronology & Isotopes Tool

5.　　　Measurement Tool

6.　　　Point Interpolation Tool

3.1 Distance Raster Generator Tool

The Distance Raster Generator Tool creates a raster proximity map indicating the distance from the centre of each pixel to the centre of the nearest pixel identified as a feature.

General instructions:

1. Make sure you are within the Geochronology and Isotopes Data Portal
2. Click "Tools" 🔧 on the right-hand menu pane
3. Select the **Distance Raster Generato**r tool
   a. **Draw Extent**: draw a bounding box on the map around an area of interest (double click to end) or,
   b. Select '**Manual**' and enter your own coordinates North, West, East, South
4. (mandatory) Select from '**Data Options**' a '**data layer**' and '**Property**' to examine from the dropdowns
5. Use '**Filter Options**' as desired or leave default options (all data in the selected layer)

3.2 Elevation Profile Tool

The Elevation Profile tool creates a cross-section of bathymetry and/or topography along a user defined transact. The Y-axis represents the elevation (Z value) for the datasets along the elevation profile, which is the X-axis. The cursor can be moved up and down the path on the map to visualise the correlation between the spatial location and the position along the graph.
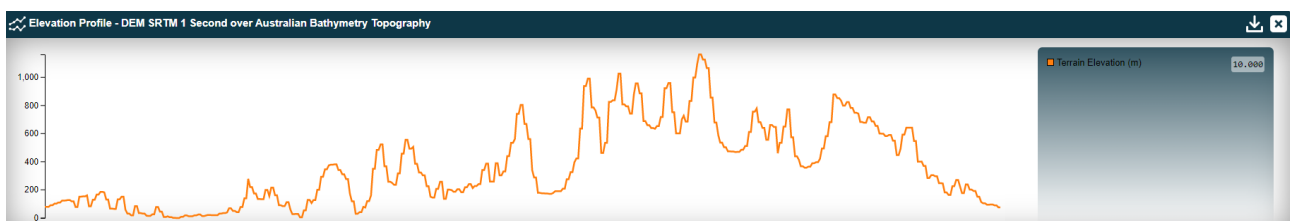
General instructions:

1. Make sure you are within the Geochronology and Isotopes Data Portal
2. Click "Tools" 🔧 on the right-hand menu pane
3. Select the **Elevation Profiles** tool

a. Select a layer to examine from the dropdown

b. Draw a path on the map OR select your own local shape, KML or JSON file to upload

c. Resultant elevation profile will pop up on the screen. This can then be downloaded using the download button on the top right side of the popup.

3.3 Inspection Tool

The Inspection Tool is an interactive tool to view feature information (points) and pixel values (grids) of active layers. Note: the '**Point'** selection option is always on by default and may be used at any time while in the Portal.

General instructions:

1. Make sure you are within the Geochronology and Isotopes Data Portal

2. Click "Tools" on the right-hand menu pane

3. Select the **Inspection Tool**

4. To query feature information/point data:

    a. '**Point'**: Click on the map to query a point, you may click again to select a different point

    b. '**Area'**: Draw an area on the map to query one or more features, you may clear and draw again to select different features

5. To query pixel values/grids (raster datasets):

    a. '**Statistics'**: Draw an area on the map and view statistics for pixel values in the chosen area. Resultant statistics will pop up on the screen

        I. (optional) '**Download'** the results in either CSV or JSON format

        II. (optional) '**Plot Graph'** to view the statistics in a histogram then 'Download' or 'Enlarge'

3.4 Isotopes and Geochronology Tool

An interactive data analytical tool for querying, downloading and plotting isotopes and geochronology data.
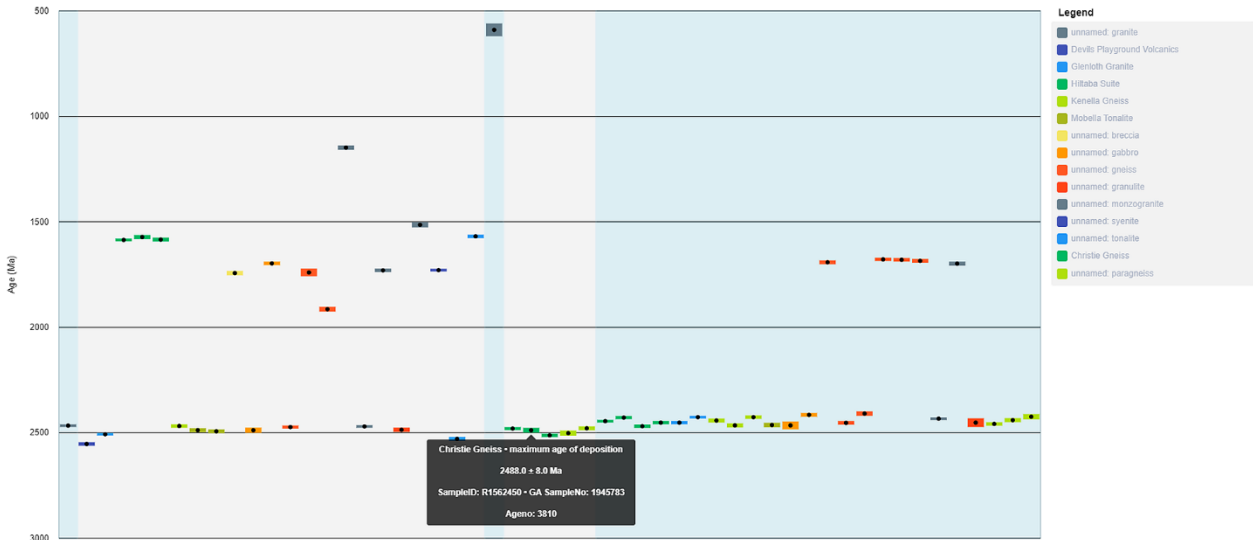
General instructions:

1. Make sure you are within the Geochronology and Isotopes Data Portal

2. Click "Tools" on the right-hand menu pane

3. Select **Isotopes and Geochronology** tool.

4. Layers: Choose the layer of interest.

5. Styles: Choose a style that best assists in filtering/subsetting the data.

6. Filters: apply filters to remove the data that is not of interest.

7. Apply a search to further filter the data:

    a. Spatial search:

        I. Draw Extent: Draw a polygon around the data of interest, or

        II. Manual Entry: enter spatial extents manually, or

        III. Load File: upload a file that defines the search space of interest.

    b. Database search: apply filters using a similar functionality as the "Filter Data" options outlined in section 1.1.2.

    c. Stratigraphic summary: another option for limiting results to particular stratigraphic units of interest.

    d. Import CSV data: upload external data source.

8. Click "**Search**" to see results.

The first page results shows the default view for the data. More graphs are available by pressing the "More Graphs" button.

3.4.1 Time-space-style age plots (Geochronology)

The Isotopes and Geochronology tool includes the ability to plot a selection of data in a time-space style – see below. The plot displays age information grouped by geological event (e.g., igneous crystallisation, metamorphism, max age of deposition). Mouse-over on a region of the plot displays the geological event, mouse-over on a error-box or data point gives extra information about a sample.

General instructions:

1. Make sure you are within the Geochronology and Isotopes Data Portal
2. Click "Tools" 🔧 on the right-hand menu pane
3. Click on the "Isotopes and Geochronology" tool.
4. Layers: select "All Geochronology"
5. Filters: apply filters if interested in a subset of the data.
6. Apply a search to further filter the data:
    a. Spatial search:
        I. Draw Extent: Draw a polygon around the data of interest, or
        II. Manual Entry: enter spatial extents manually, or
        III. Load File: upload a file that defines the search space of interest.
    b. Database search: apply filters using a similar functionality as the "Filter Data" options outlined in section 1.1.2.
    c. Stratigraphic summary: another option for limiting results to particular stratigraphic units of interest.
    d. Import CSV data: upload external data source.
7. Click "Search" to see results.

The first page result shows the default view for the data, but more graphs are available by pressing the "More Graphs" button.

8. Click '**More Graphs**' at the bottom of the page

9. Charts: choose '**Ages: time-space plot style**'
10. Below the plot is the ability to enlarge the plot window '**Enlarge**'

3.4.2 Isotope plots (Lu-Hf, Sm-Nd, Pb-Pb)

The Isotopes and Geochronology tool includes the plotting of isotopic data in common visual representations – see below for examples. A number of features are included: plot various parameters, adjust axis extents, various models overlays, heatmap functionality. Mouse-over on a data point gives extra information about that data.
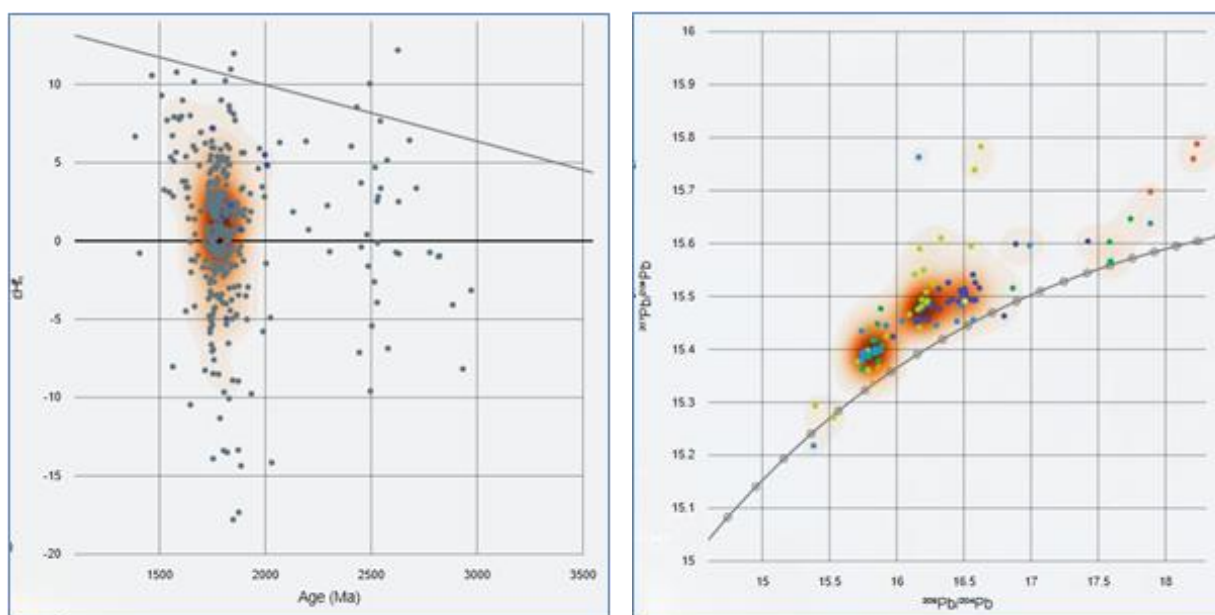
General instructions:

1. Make sure you are within the Geochronology and Isotopes Data Portal
2. Click "Tools" 🔧 on the right-hand menu pane
3. Click on the "Isotopes and Geochronology" tool
4. <u>Layers: select any of the isotopic data layers</u>
5. Filters: apply filters if interested in a subset of the data
6. Apply a search to further filter the data:
   a. Spatial search:
      I. Draw Extent: Draw a polygon around the data of interest, or
      II. Manual Entry: enter spatial extents manually, or
      III. Load File: upload a file that defines the search space of interest.
   b. Database search: apply filters using a similar functionality as the "Filter Data" options outlined in section 1.1.2.
   c. Stratigraphic summary: another option for limiting results to particular stratigraphic units of interest.
   d. Import CSV data: upload external data source.
7. Click "Search" to see results – this may take several second for large datasets like Lu-Hf All Data

The first page result shows the default view for the data, but more graphs are available by pressing the "More Graphs" button.

8. Click '**More Graphs**' at the bottom of the page
   a. Charts: choose from a number of different plots
   b. Group: colour-code the data points by a variety of categories
   c. Isotope-system-specific model curves and visualisation parameters are available – select from drop-downs or enter values
   d. Show Heat Map: underlay a heat-map on the graph based on data density
   e. Below the plot is the ability to enlarge the plot window '**Enlarge**'

3.5 Measurement Tool

The Measurement Tool measures the distance between two or more points or the area of a polygon on the map.

General instructions:

1. Make sure you are within the Geochronology and Isotopes Data Portal
2. Click "Tools" 🔧 on the right-hand menu pane
3. Select the **Measurement Tool**
   a. Choose from the dropdowns in the **Measurement Type** and/or **Unit**
   b. **Draw** the line(s) or area on the map

3.6 Point Interpolation Tool

The Point Interpolation tool creates a regular grid (raster) from the scattered point dataset. Input data is interpolated by the tool to fill grid nodes with values, you can choose from various interpolation methods.

This tool requires input of an email address to obtain results.

General instructions:

1. Make sure you are within the Geochronology and Isotopes Data Portal
2. Click "Tools" 🔧 on the right-hand menu pane
3. Select the **Point Interpolation** tool
   a. Draw polygon (**Draw Extent**) or set manual coordinates (**Manual**) to define extents of interpolation
   b. **Data Layer**: choose the layer of interest
   c. **Property**: choose the variable to interpolate
   d. **Filters**: Apply filters to remove the data that is not of interest
   e. **Algorithm Options**: set the options to create the interpolation
   f. Enter output settings width/height or metres per pixel (or leave blank to accept defaults)
   g. Enter email address to which the results will be sent
   h. Submit Job to start processing and send the results to the specified email once ready

Acknowledgement

Geoscience Australia acknowledges the State and Territory geological surveys for their contributions to the acquisition and compilation of geochronology and isotopic data. Similarly, we acknowledge the many university research groups that have acquired and published data over several decades, contributing to a critical mass of national coverage. We acknowledge the assistance of the information services teams at Geoscience Australia for the development of data infrastructure and web delivery services.