

Changing Colours

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It has been updated by Behnam Sadeghi, using the latest Muller et al. (2019) plate reconstructions and GPlates 2.2 interface!

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Aim

This tutorial is designed to teach the user how to:

- 1) Experiment with the colours of features
- 2) Experiment with the fill colour options for different types of feature geometries

Screenshots have been included to illustrate how to complete new steps

within each exercise.

Included files

[Click here](#) to download the data bundle for this tutorial.

The tutorial dataset (1.3-Changing_Colours.zip) includes the following files:

Coastlines: Muller_etal_2019_Global_Coastlines.gpmlz

Mid ocean ridges: Muller_etal_2019_Ridges.gpmlz

Static Polygon files:

Muller_etal_2019_Global_StaticPlatePolygons.gpmlz

Dynamic Polygon files:

Muller_etal_2019_PlateBoundaries_DeformingNetworks.gpml

See <https://www.earthbyte.org/category/resources/> for additional EarthByte data sets.

This tutorial dataset is compatible with GPlates 2.2.

Background

Features in GPlates can be coloured according to their attributes or they can be assigned a single colour scheme. This functionality improves the user's ability to effectively view and analyse data, particularly multiple data sets.

Exercise 1 – Changing Feature Colours

In this exercise we will learn how to experiment with feature colours.

To begin this exercise, load into GPlates the Muller et al. (2019) Coastline File and the Muller et al. (2019) Global Mid Ocean Ridge File.

1. Open GPlates

2. File → Open Feature Collection... (Figure 1) → locate and select **Muller_et al_2019_v2_Global_Coastlines.gpmlz** and **Mid ocean ridges: Muller_et al_2019_v2_GeeK07_Ridges.gpmlz** from the '1.1-Loading_Saving_Data' bundle* → Open

*Hold down the Control (PC) or Command (Mac) key to select multiple files.

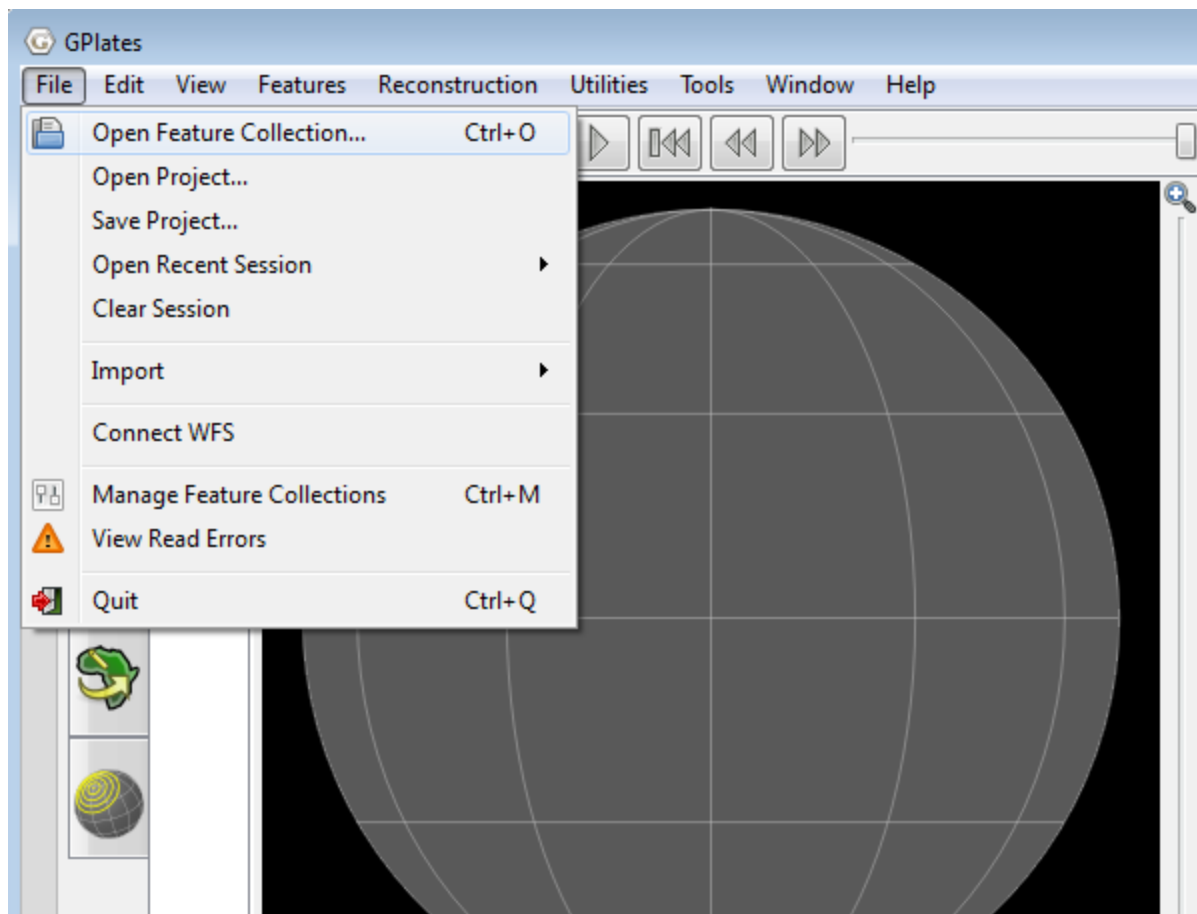


Figure 1. How to load a Feature Collection into GPlates from the menu bar.

The coastlines and spreading ridges of the world are now displayed on the globe. By default features are coloured by Plate ID (Figure 2).

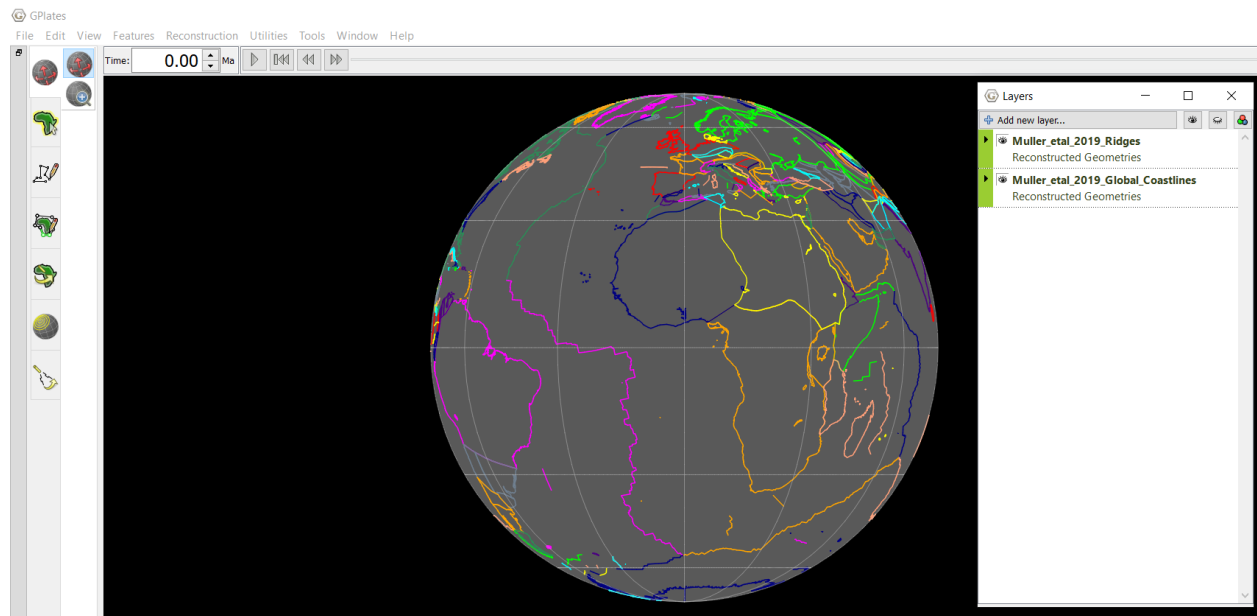


Figure 2. Coastlines and mid ocean ridges coloured by Plate ID.

Other colouring options include: Plate ID (by region), Single Colour, Feature Type and Feature Age. Note that you can only change the colour scheme for all features, not individual features.

As a first example we will colour our feature collections using a single colour, in this case blue.

1. Features → Manage Colouring (Figure 3) → select All from the Select Layer drop down menu (Figure 4) → Single Colour → Blue → Close (Figure 5)

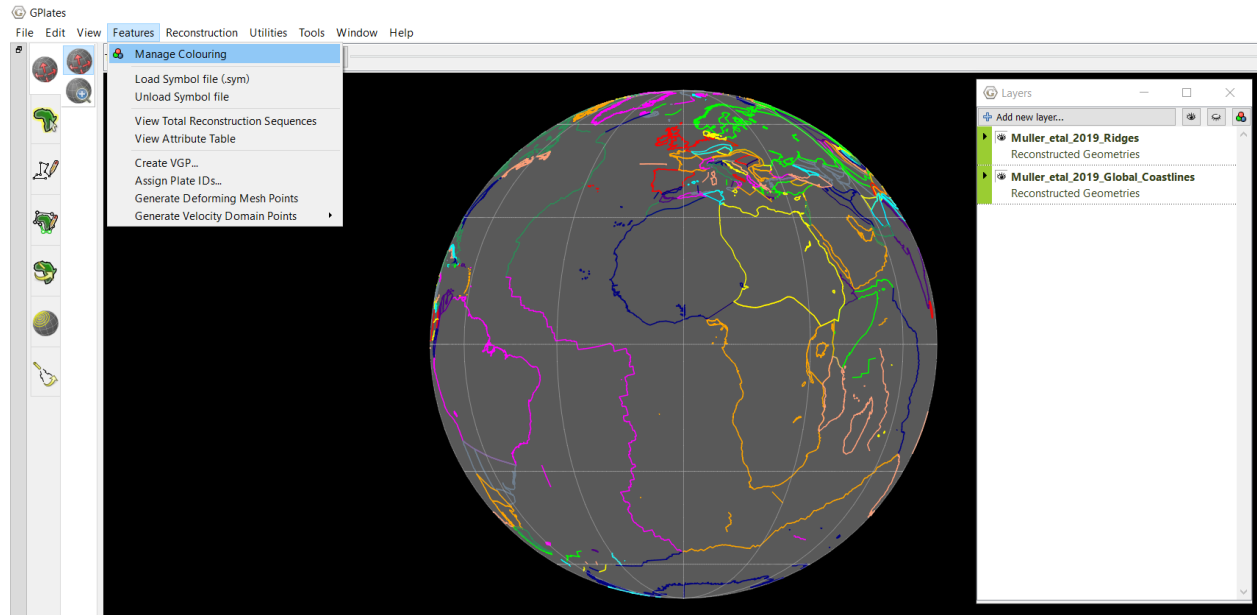


Figure 3. Select 'Managing Colouring' from the Features file menu. This will allow you to experiment with different feature geometry colours.

Selecting 'All' layers will change all feature collections currently loaded to the selected colour option you choose (Figure 4).

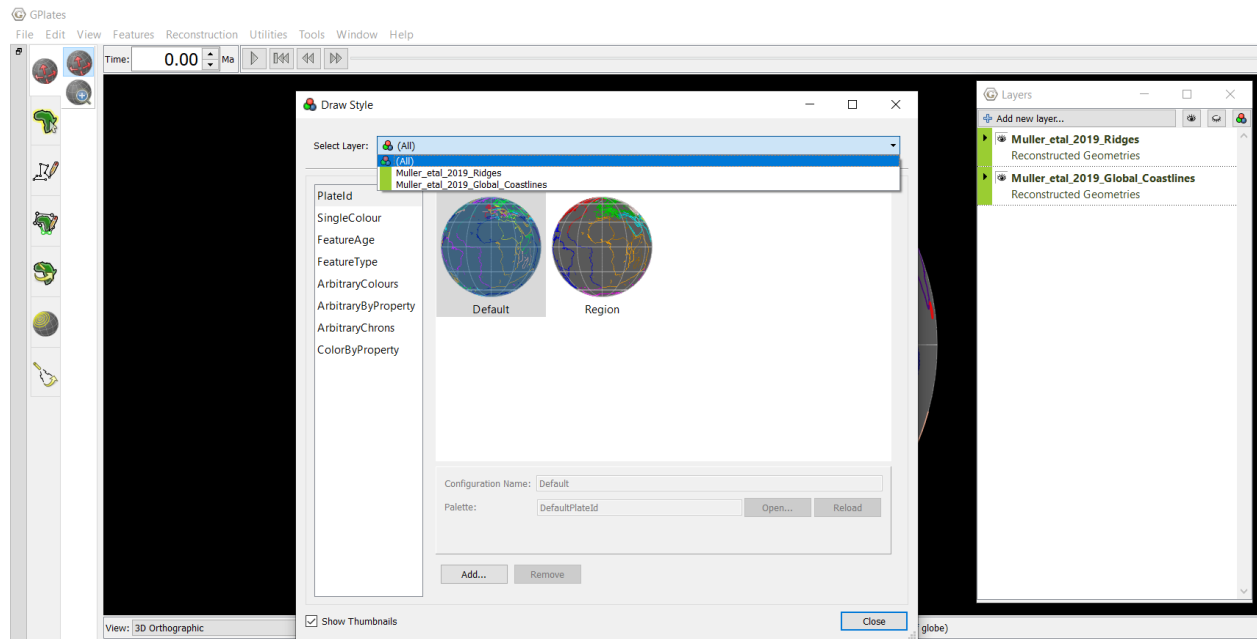


Figure 4. The Manage Colouring window. Select '(All)' layers from the Select Layer drop down menu. This will change all feature collections currently loaded to the selected colour option you choose.

Selecting the 'SingleColour' option will bring up a list of different colours available to colour your feature collections a single colour, rather than by individual properties such as feature age.

Select the 'SingleColour' option 'blue' and click Close (Figure 5).

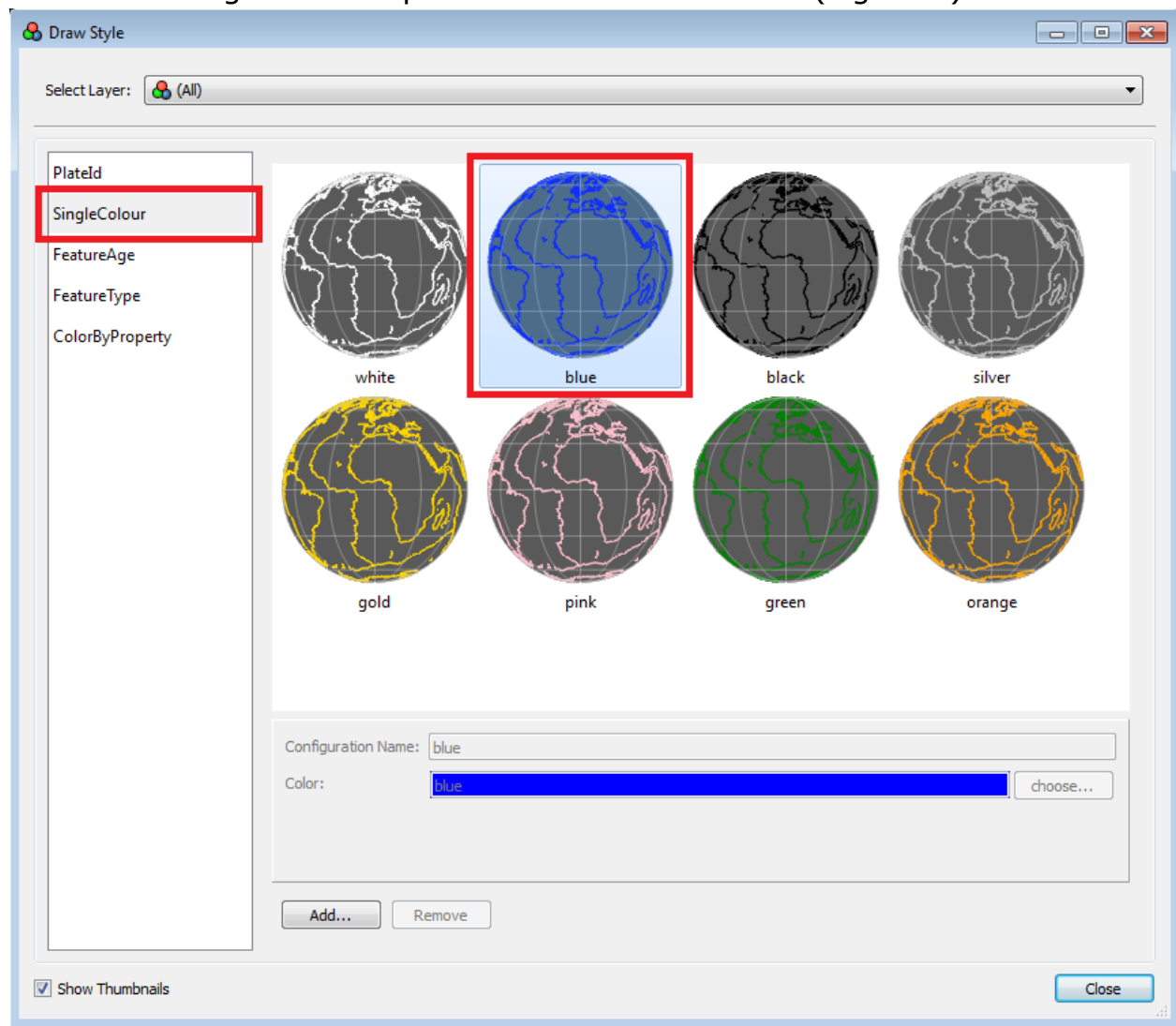


Figure 5. The Manage Colouring window. Make the coastlines and spreading ridges coloured blue using the 'Single Colour' option.

The coastlines and spreading ridges of the world are now displayed on the globe, but are all coloured blue instead of by Plate ID (Figure 6).

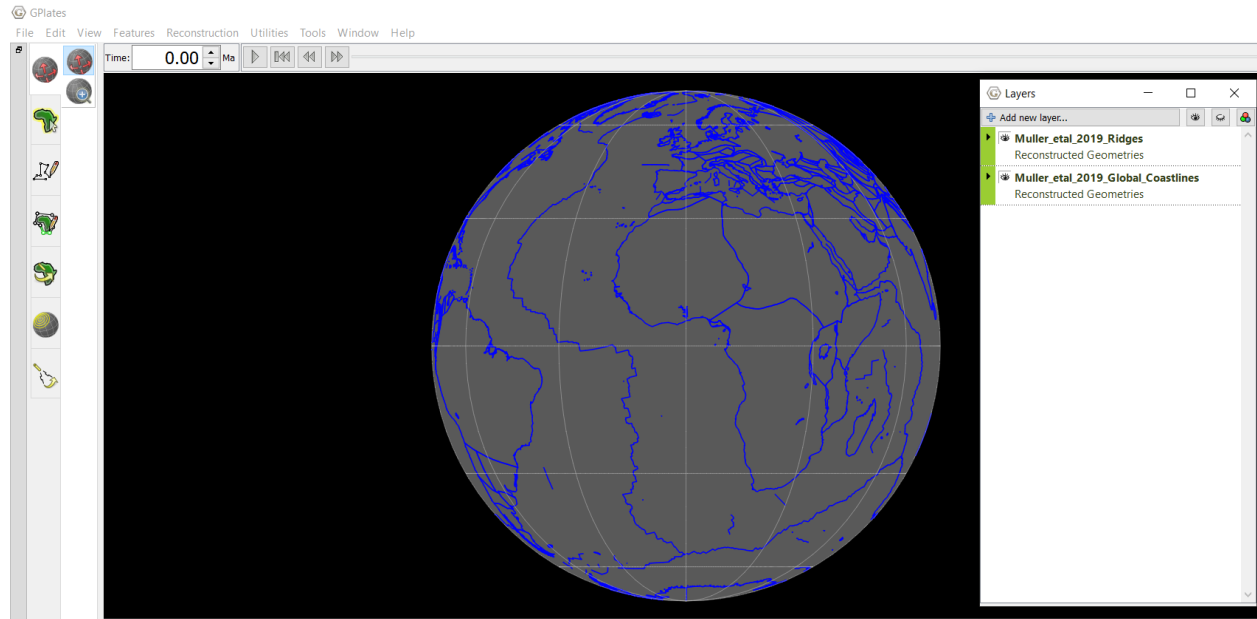


Figure 6. Coastlines and mid ocean ridges coloured blue.

GPlates also allows the user to colour data sets separately. That is, you can change the colour scheme individually for different feature collections.

In this example we will colour the Mid Ocean Ridge feature collection white while leaving the Coastlines blue.

2. Features → Manage Colouring (Figure 3) → select the mid ocean ridges file (Muller_etal_2019_Ridges.gpmlz) from the Select Layer drop down menu (Figure 7) → Single Colour → White → Close (Figure 8)

Selecting one layer at a time (and not 'All' layers) will change the colour of the selected feature collection to the new option you choose, while leaving all other feature collection colour schemes unchanged (Figure 7).

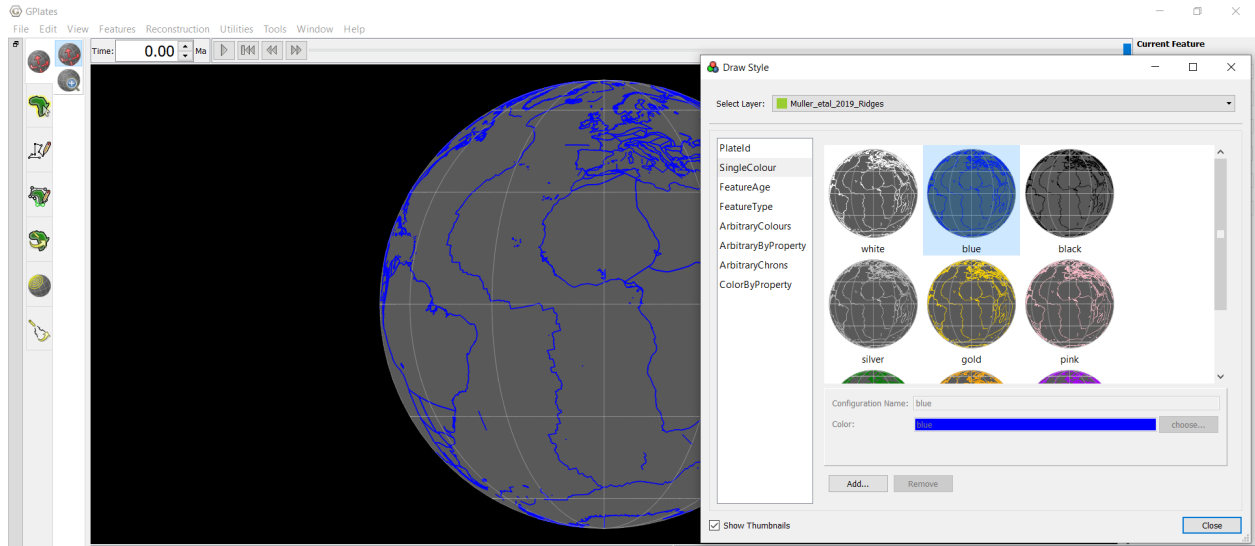


Figure 7. The Manage Colouring window. Select the mid ocean ridge layer 'Muller_et al_2019_Ridges.gpmlz' from the Select Layer drop down menu. This will change the selected feature collection to the new colour option you choose, while leaving all other feature collections unchanged.

Select the 'SingleColour' option 'blue' and click Close (Figure 8).

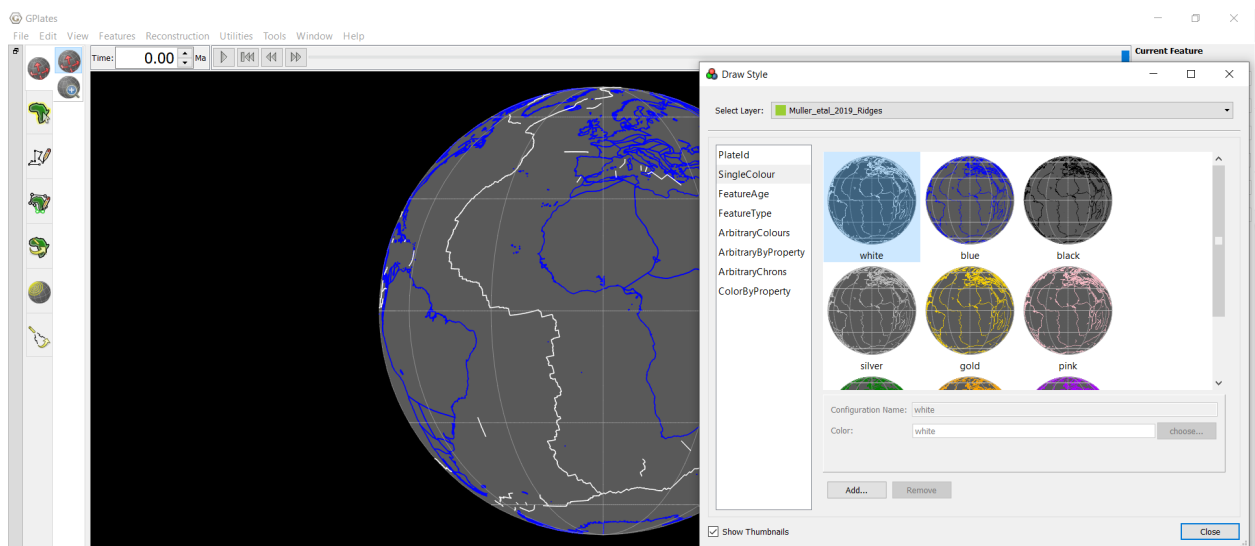


Figure 8. The Manage Colouring window. Make only the spreading ridges layer coloured white using the 'Single Colour' option.

The spreading ridges are now coloured white, and the coastlines blue (Figure 9).

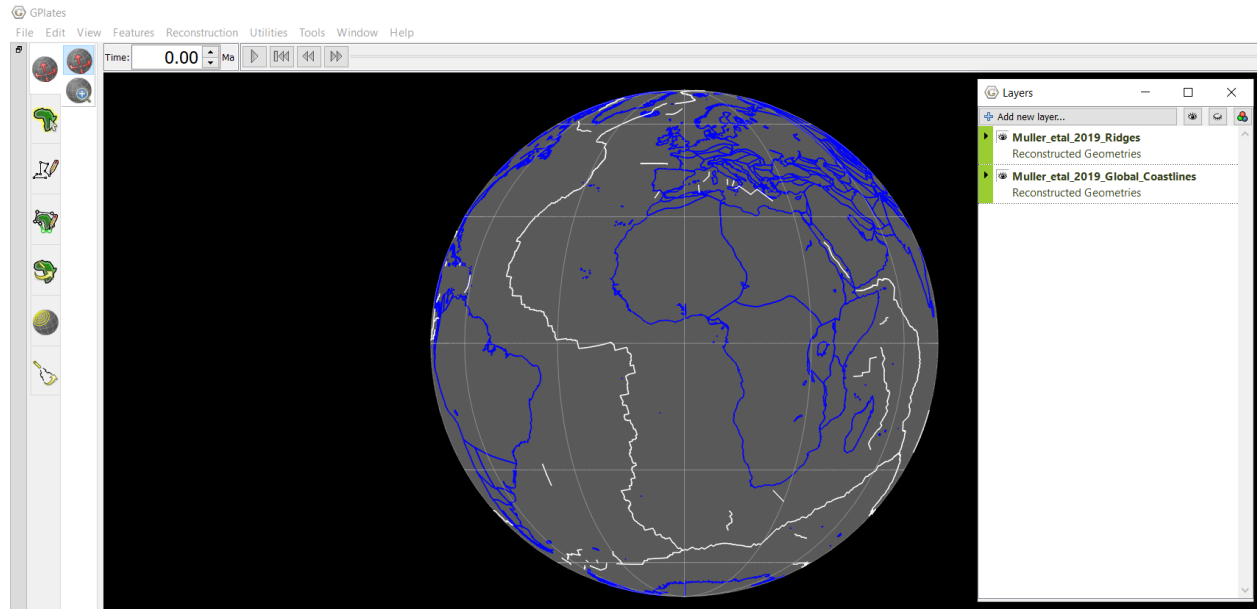


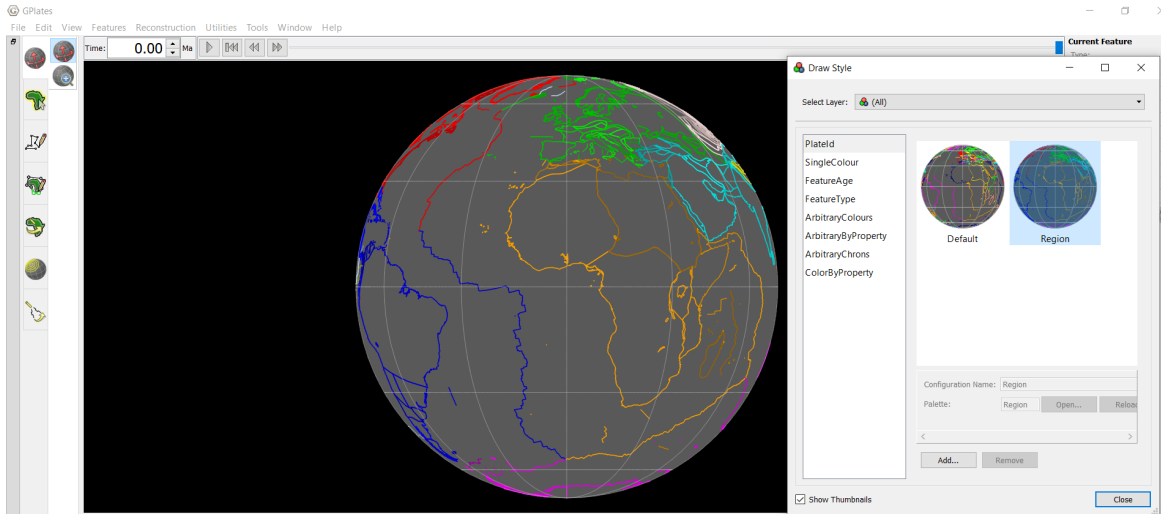
Figure 9. Coastlines coloured blue, and mid ocean ridges coloured white.

Again, note that you can only change the colour scheme for all features, not individual features.

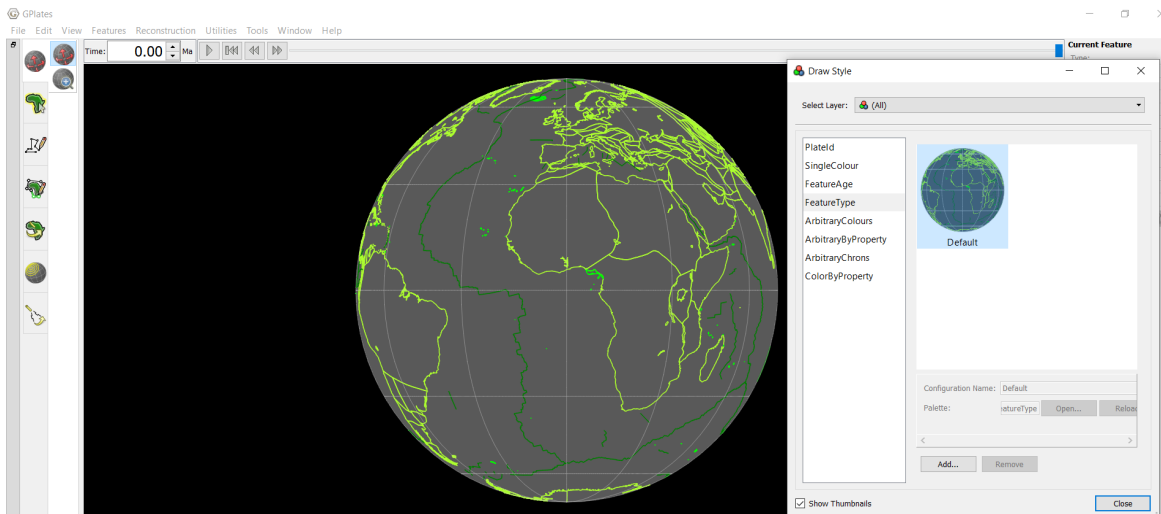
Now spend some time trying the different colouring options.

The following examples colour 'All' feature collections using the one colour scheme, including by Plate ID (by region) (Figure 10A), Feature Type (Figure 10B), Feature Age (by Default) (Figure 10C) and by a customised Single Colour (Figure 10D), i.e., (customised: Add → choose colour from colour wheel); The user can also change the color configuration name.

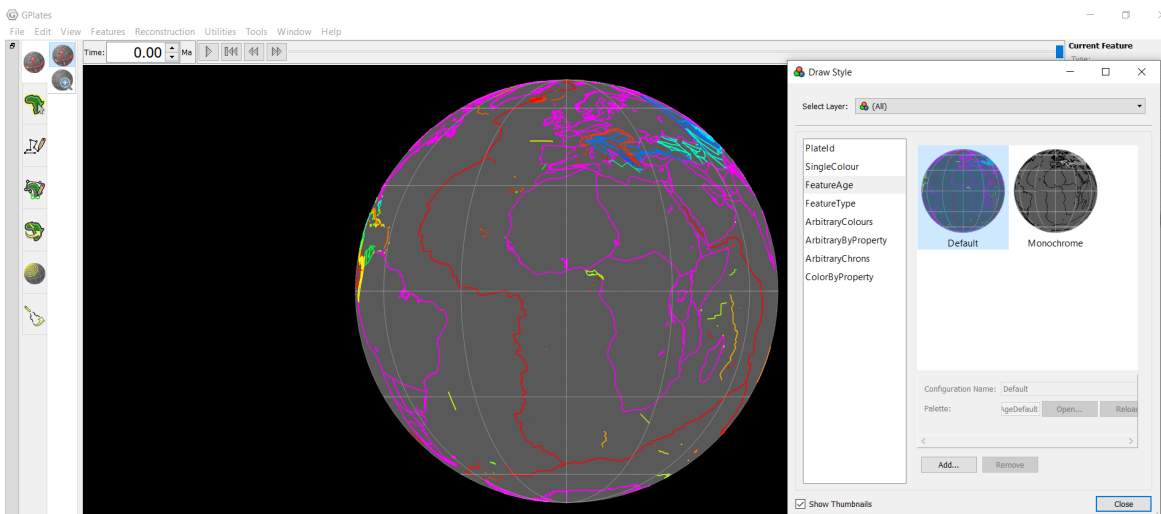
A.



B.



C.



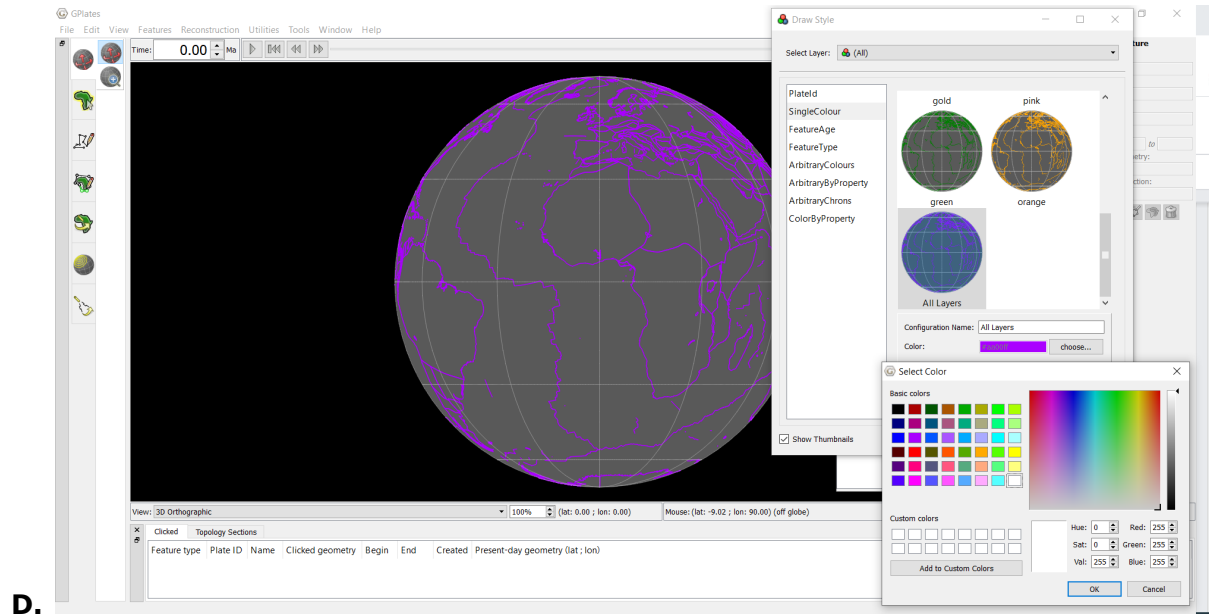


Figure 10. Globe coloured by: (A) Plate ID (by region), (B) Feature Type, (C) Feature Age (default) and (D) Single Colour (customised: Add → choose colour from colour wheel).

Try colouring individual layers as well, such as colouring the coastlines according to age using a monochrome colour scheme, and colouring the present-day spreading ridges according to plate ID (Figure 11).

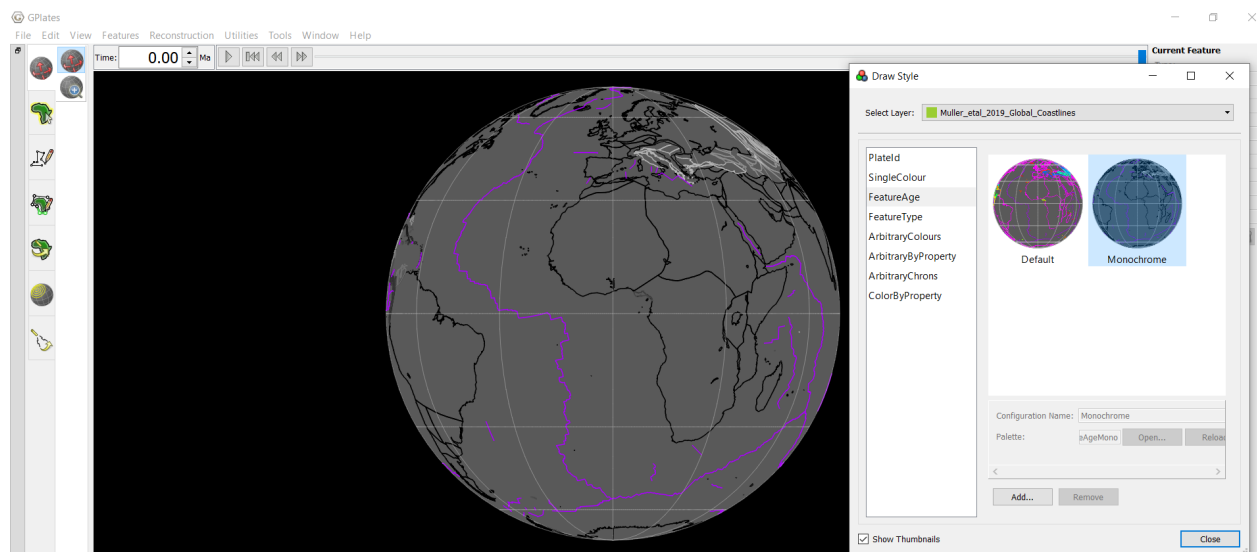


Figure 11. The coastlines are coloured according to age using a monochrome colour scheme, while the present-day spreading ridges are coloured according to plate ID.

To end this exercise we will unload all our data leaving the globe empty. The Manage Feature Collections window allows us to 'Unload' the data file.

3. File → Manage Feature Collections → Unload (click this icon for both data sets) → Close

Your globe now appears empty and no data files are loaded into GPlates.

Exercise 2 – Fill Colour Options for Reconstructed Geometries

In this exercise we will learn how to experiment with fill colour options for Reconstructed Polygon and Polyline Geometries.

GPlates allows the user to fill polygon and polyline features with colour according to their attributes or a single colour scheme. Fill opacity and fill intensity can also be adjusted.

A Reconstructed Geometries layer reconstructs features from one or more feature collections using the current reconstruction time. Typically for each input feature geometry there is a corresponding reconstructed geometry (a rotated version of present-day geometry). In the Layers window, feature collections classified as 'Reconstructed Geometries' will appear green.

For this exercise we will be loading into GPlates the Muller et al. (2019) Static Polygon File. These polygons represent the boundaries of present day plates as well as presently preserved palaeo-plate boundaries. Note that the Static Polygon file is composed of polygon features and not polyline features.

To load the desired datasets:

1. Open GPlates

2. File → Open Feature Collection... → locate and select **Muller_etal_2019_Global_StaticPlatePolygons.gpmlz** from the '1.3-Changing_Colours' data bundle → Open

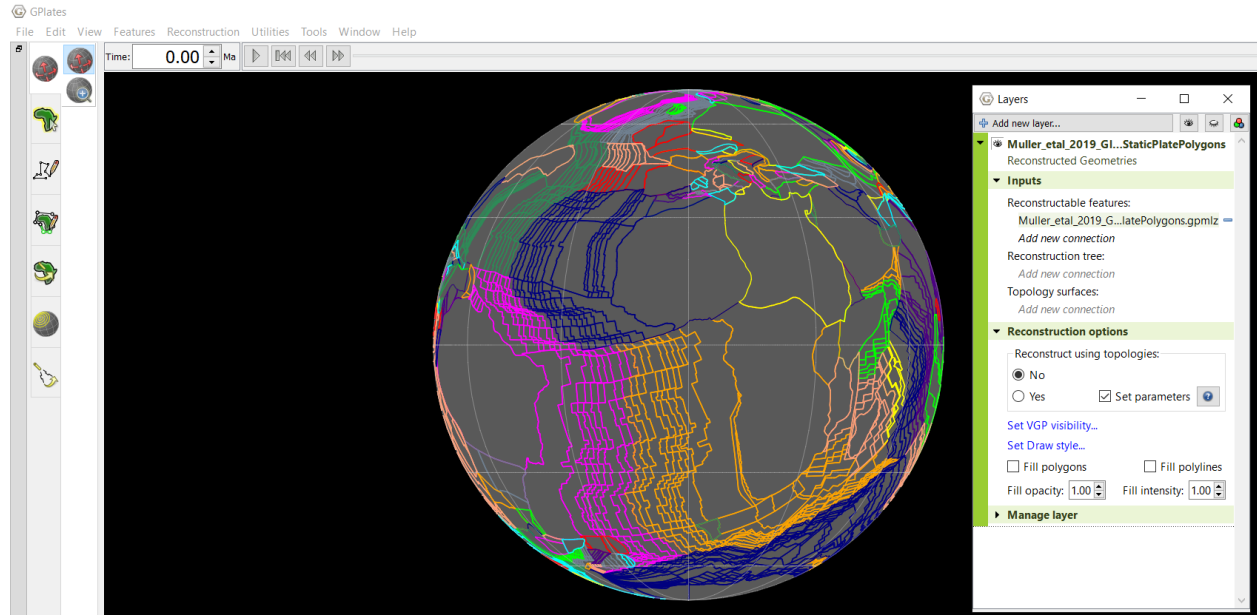


Figure 12. Static plate polygons coloured by Plate ID. In the 'Layers' window, the Static Polygons layer is expanded to enable a range of options including 'Reconstruction options'.

In the Layers window, expand the Static Polygons layer to see a range of options. To do this, click on the black triangle on the green background of the Static Polygons layer.

Notice that under the 'Reconstruction Options', there are a number of different options including 'Fill polygons' and 'Fill polylines'.

Try ticking the 'Fill polylines' box.

Notice that nothing changes. This is because the Static Polygons feature collection is composed of polygons, and not polylines.

Now try ticking the 'Fill polygons' box.

You will now see all the empty spaces within each polygon are filled with a colour corresponding to your chosen colour option, which by default is coloured by Plate ID (Figure 13).

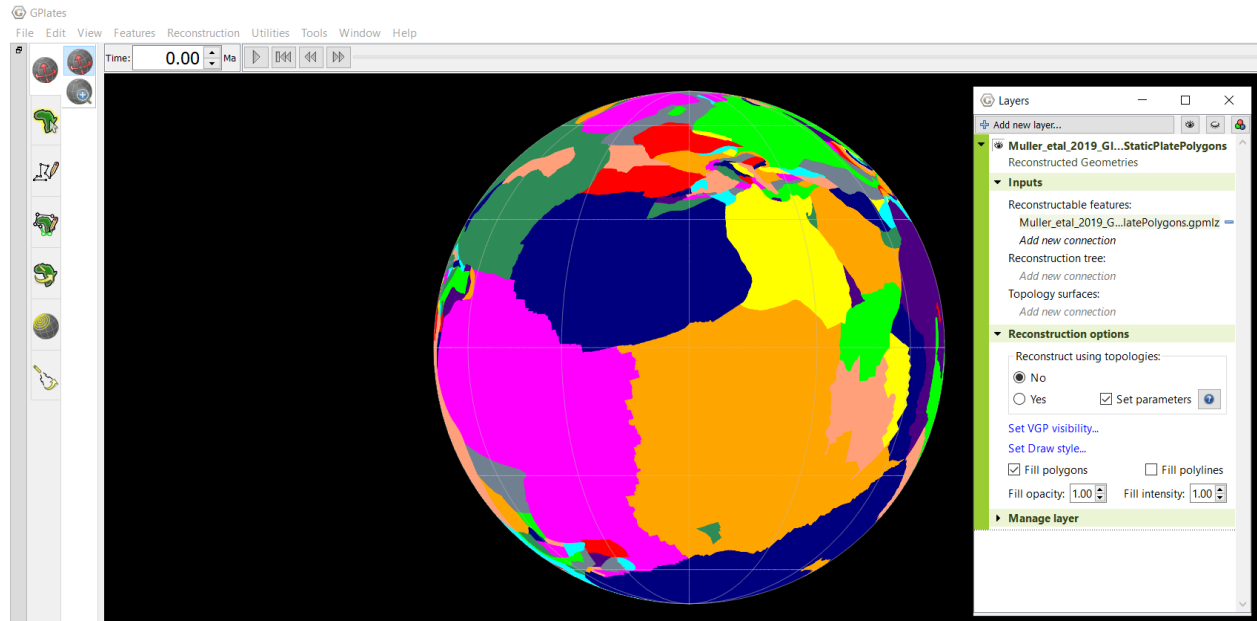


Figure 13. Static plate polygons fill-coloured by Plate ID. In the 'Layers' window, the 'Fill polygons' option is ticked.

In the same 'Layers' window, you can also adjust the fill opacity and fill intensity by either entering a value in manually, or clicking on the up and down buttons.

Experiment with the Fill opacity and Fill intensity. Try entering a fill opacity of 0.50 and a fill intensity of 0.50 (Figure 14).

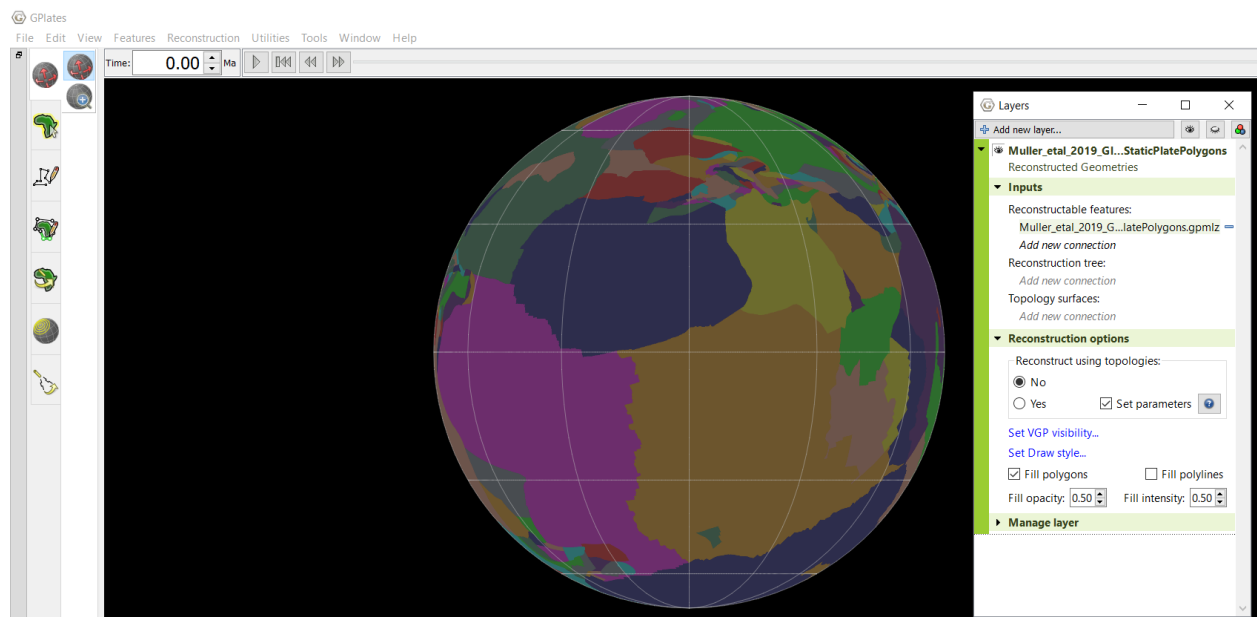


Figure 14. Static plate polygons fill-coloured by Plate ID. In the 'Layers' window, the 'Fill polygons' option is ticked. The Fill opacity is set to 0.50 and the Fill intensity is set to 0.50.

Now spend some time trying different colouring options from the 'Manage Colouring' window.

As an example, we will fill the static plate polygons with colour corresponding to the age of features.

Return the Fill opacity and Fill intensity values to 1.00, then use the 'Manage Colouring' window to colour the polygons by age.

2. Features → Manage Colouring → select the static plate polygon file (Muller_etal_2019_Global_StaticPlatePolygons.gpmlz) from the Select Layer drop down menu → FeatureAge → Default → Close (Figure 15)

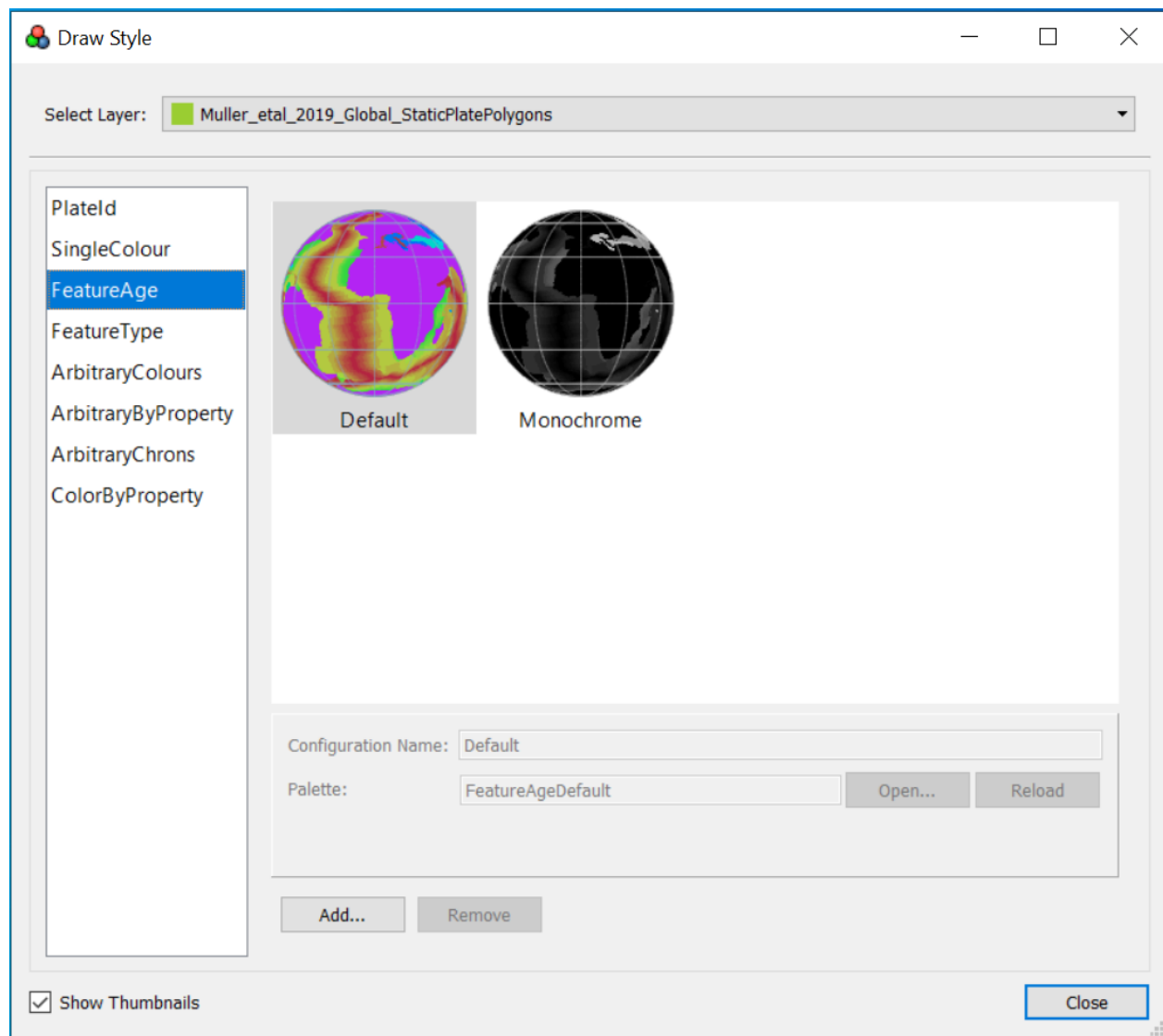


Figure 15. The Manage Colouring window. Make the static polygons layer coloured by feature age using the 'FeatureAge' option.

You will now see that all the empty spaces within each polygon are filled with a colour corresponding to its feature age, where red is the youngest (Figure 16)

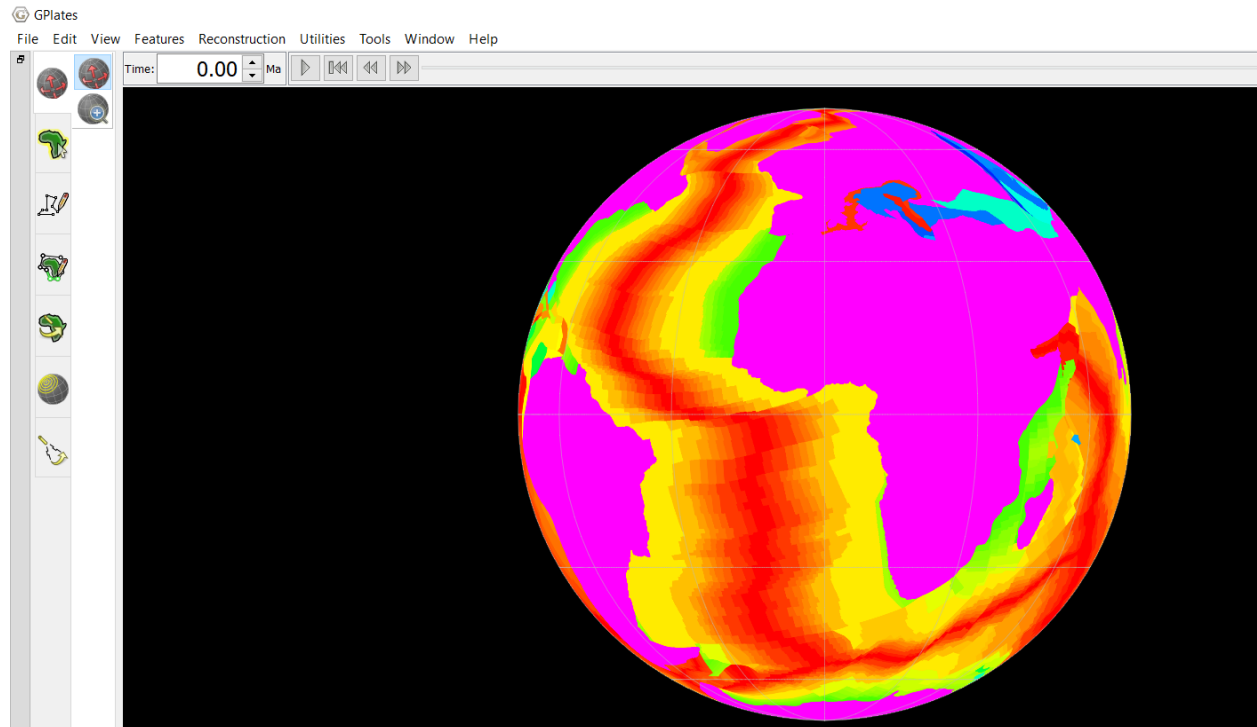


Figure 16. Static plate polygons fill-coloured by Feature Age. In the 'Layers' window, the 'Fill polygons' option is ticked. The Fill opacity is set to 1.00 and the Fill intensity is set to 1.00.

This time we will try to fill the colour of a Reconstructed Geometries layer composed of polylines. In the previous exercise, the Static Polygon file we dealt with was composed of polygons. The only difference is that you cannot tick the option 'Fill Polygons' in a polyline feature collection because it is not composed of polygons.

For this exercise we will be loading into GPlates the Muller et al. (2019) Dynamic Polygon File. These polygons represent continuously closing plates from 200 Ma to the present. Unlike the present day polygons listed above, these polygons dynamically change shape as the plate boundaries evolve. Note that the Static Polygon file is composed of polyline features and not polygon features.

To load the desired datasets:

1. Open GPlates
2. File → Open Feature Collection... → locate and select **Muller_etal_2019_PlateBoundaries_DeformingNetworks.gpml** from the '1.3-Changing_Colours' data bundle → Open

Turn off both the Static Polygon layer and the purple Resolved Topological Geometries of the Dynamic Polygon layer (Figure 17).

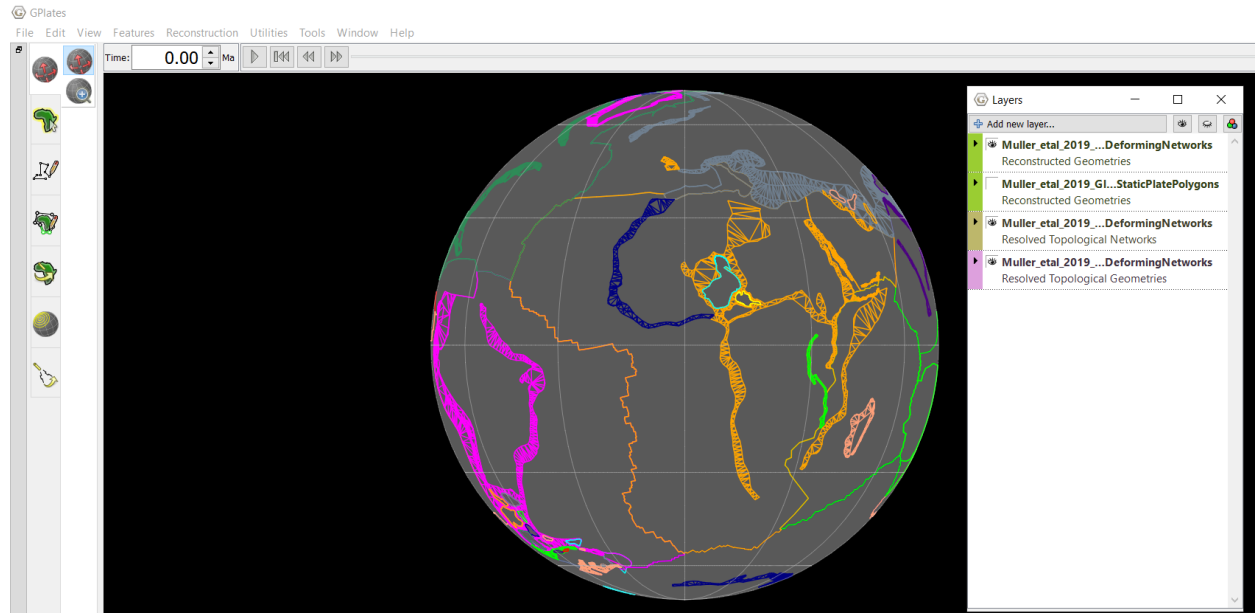


Figure 17. Dynamic plate polygons (reconstructed geometries) coloured by Plate ID.

In the Layers window, expand the Reconstructed Geometries of the Dynamic Plate Polygons (PP) layer to see a range of options. To do this, click on the black triangle on the green background of the PP layer.

Try ticking the 'Fill polygons' box.

Notice that nothing changes. This is because the Dynamic Polygons feature collection is composed of polylines, and not polygons.

Now try ticking the 'Fill polylines' box.

You will now see that each polyline is filled with a colour corresponding to your chosen colour option, which by default is by Plate ID (Figure 18).

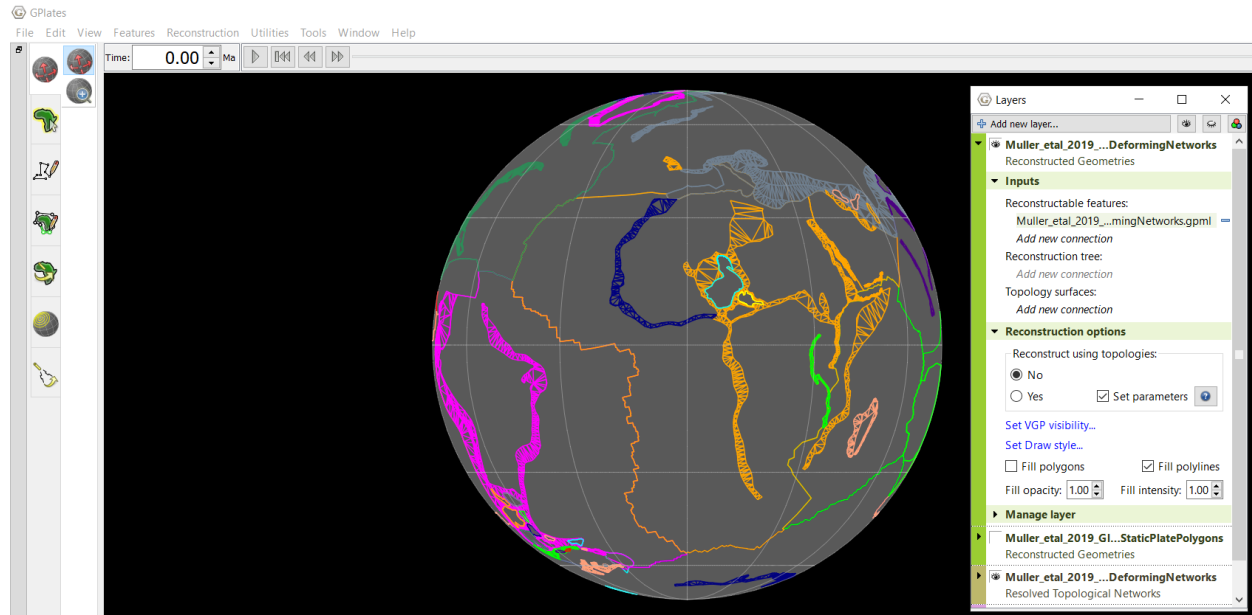


Figure 18. Dynamic plate polygons layer (reconstructed geometries) with polyline features fill-coloured by Plate ID.

Now spend some time trying different colouring options. Keep the layers loaded for the next exercise on Resolved Topological Geometries.

Exercise 3 – Fill Colour Options for Resolved Topological Geometries

In this exercise we will learn how to experiment with fill colour options for Resolved Topological Geometries.

A Resolved Topological Closed Plate Boundaries layer generates dynamic plate polygons by closing the plate boundary at each construction time. The plate boundary consists of a sequence of regular features whose geometry is reconstructed and then stitched together to form a closed polygon region for each plate polygon feature.

For this exercise, turn off the Reconstructed Geometries Dynamic Polygons layer and the Static Polygon layer.

In the Layers window, expand the Resolved Topological Geometries of the Dynamic Plate Polygons (PP) layer to see a range of options. To do this, click on the black triangle on the green background of the PP layer (Figure 19).

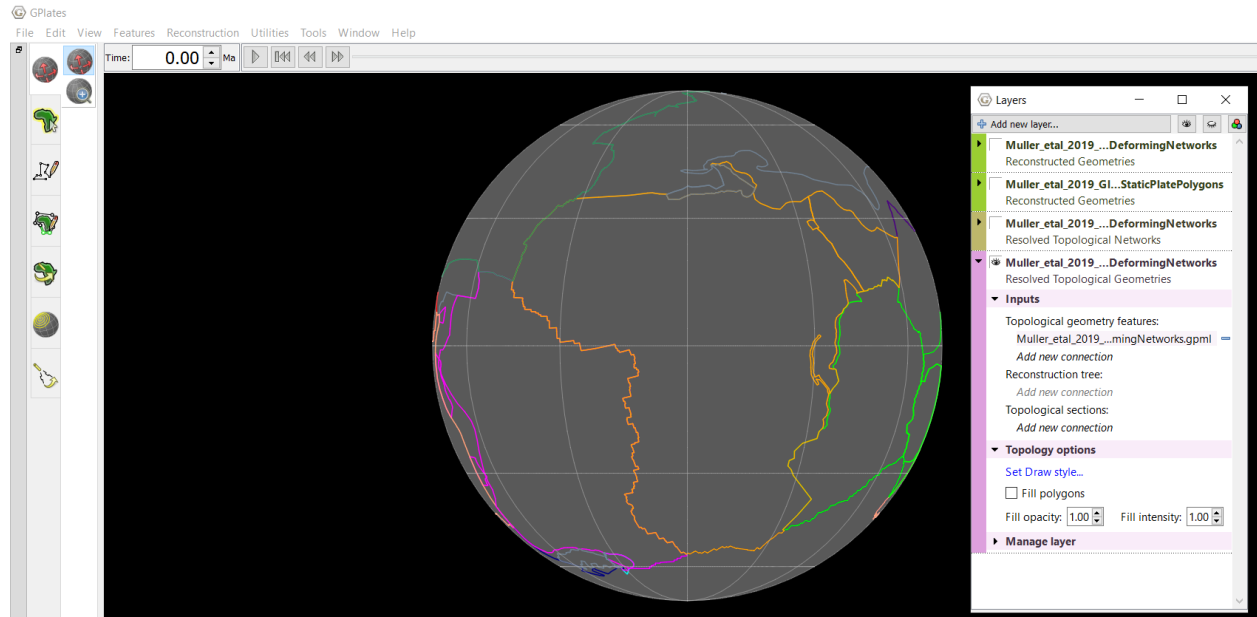


Figure 19. Dynamic plate polygons (resolved topological geometries) coloured by Plate ID.

Notice that in the topology options, only the 'Fill polygons' option is available. Topologies are themselves constructed from polylines and therefore will never have the option for 'Fill polylines'. Also notice that Fill opacity and Fill intensity are also unavailable to be adjusted.

As an example, we will fill the dynamic plate polygons with colour corresponding to the Plate ID by region.

Tick the 'Fill polygons' option in the expanded Layers window.

Then navigate to the 'Manage Colouring' window, select the purple dynamic plate polygon file and colour by PlateID → Region

3. Features → Manage Colouring → select the dynamic plate polygon file (Muller_et al_2019_PlateBoundaries_DeformingNetworks) from the Select Layer drop down menu → PlateID → Region → Close
You will now see that each polygon is filled with a colour corresponding to its Plate ID by region (Figure 20).

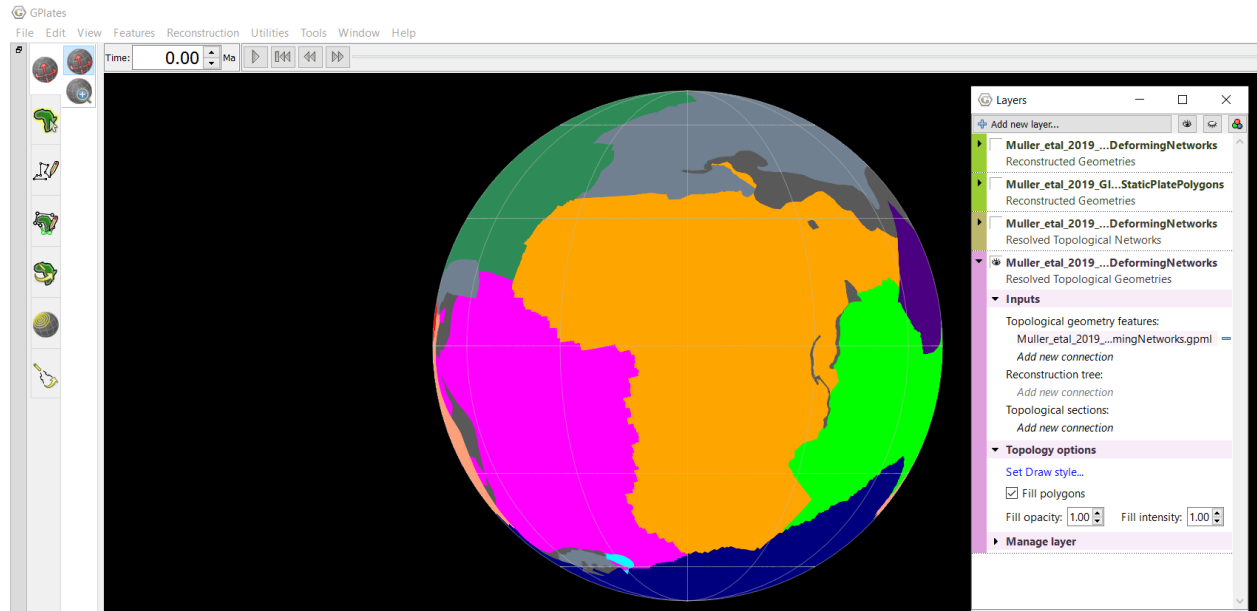


Figure 20. Dynamic plate polygons (resolved topological geometries) fill-coloured by Plate ID (region).

Now spend some time trying different colouring options.

To end this exercise we will unload all our data leaving the globe empty. The Manage Feature Collections window (Figure 2) allows us to 'Unload' the data file.

3. File → Manage Feature Collections → Unload (click this icon for both data sets) → Close

Your globe now appears empty and no data files are loaded into GPlates.