

WorldEngine GUI

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Introduction

GUI for WorldEngine

Hello and welcome to my GUI for WorldEngine (<http://world-engine.org/>).

Firstly, I'd just like to say a big "THANK YOU" to Bret Curtis and Federico Tomassetti, without whom we wouldn't have WorldEngine, and this GUI wouldn't exist! For those of you who aren't familiar with WorldEngine, don't worry, because this Help File will hopefully get you up and running in no time.

OK, that's enough rambling, let's get down to introducing the star of this particular show:

WorldEngine

WorldEngine is a fantastic piece of software that allows you to generate realistic worlds using various simulations, such as plate tectonics, rainfall, erosion, etc. It is mainly written in Python and can be run from the command line. But, who likes to use the command line nowadays? Not me! So, that's why I created this GUI in PyQt to allow you much more freedom to create your worlds.

As stated on the WorldEngine website:

"Worlds are generated using plate simulations, erosion, rain shadows, Holdridge life zones model and plenty of other phenomenon."

In fact, WorldEngine contains the following simulations of various real-world conditions:

- Elevation
- Oceans
- Temperature
- Precipitation
- Erosion
- Hydrology
- Irrigation
- Humidity
- Permeability
- Biomes
- Icecaps
- Wind

As you can see, the list is pretty comprehensive and will allow you to create some reasonably realistic worlds.

The Command Line version of WorldEngine allows you to create several **Maps** to show off various aspects of your world:

- [Ancient World](#) (this is a Map of your world drawn in a way that follows the old Asian Map traditions)
- [Elevation](#) (a colourful Map showing the various heights of the land in your world)
- [Precipitation](#) (a Map showing where rain is likely to fall in your world, and how much)
- [Temperature](#) (a Map showing the varying temperatures of your world)

- [Biomes](#) (a Map showing the different types of land in your world)
- [Ocean](#) (a Map showing the oceans of your world)
- [Icecaps](#) (a Map showing the ice caps of your world)
- [Rivers](#) (a Map showing all the rivers and lakes of your world)
- [Grayscale Heightmap](#) (very useful if you want to use your world in a game engine)
- [Satellite](#) (a Map showing your world as it would look from a satellite in orbit)
- [Scatter Plot](#) (a Map that shows a scatter plot of the humidity & temperature across your world)

To this list, I have also added the following:

- [Wind](#) (a Map showing the winds that blow across your world)
- [Permeability](#) (a Map showing the permeability of your world)
- [Humidity](#) (a Map showing the humidity across your world)
- [Normal Map](#) (a Normal Map of your world - for use in game engines)
- [Plates](#) (a colourful Map showing the Plates underlying your world)

To see examples of each of the Maps, just click on the links above, or go to the relevant Map page.

Well, I think that's enough of an intro, so feel free to select options in the Table of Contents to delve deeper into WorldEngine and this GUI.

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What's new

Major Update - 23/03/2017

Following feedback I have made some major changes to the layout of the UI and included the option to change the 'skin' as well.

To change the skin, simply press **Ctrl** and then one of the numbers **1 -> 8** for the following skins:

Ctrl + 1	Windows
Ctrl + 2	Windows XP
Ctrl + 3	Windows Vista
Ctrl + 4	Motif
Ctrl + 5	CDE
Ctrl + 6	Plastique (the default)
Ctrl + 7	Clean Looks
Ctrl + 8	Dark Orange

NB: The images in this Help File have been generated using the **Dark Orange** style.

NB2: Most of the images in this Help File were generated using an older version of the UI, but there shouldn't be any major differences (except the actual layout on the screen).

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Licences

Licences

WorldEngine

WorldEngine is available under the MIT License (see [LICENCE \(WorldEngine\).txt](#)).

Pi3D

Pi3D is available under the MIT License (see [LICENCE \(Pi3D\).txt](#)):

WorldEngine GUI

WorldEngine GUI is also available under the MIT Licence (see below and [LICENCE.txt](#)):

The MIT License (MIT)

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Icons

All Icons used in this GUI are from **cc mono icon set** from http://www.iconfinder.com/iconsets/cc_mono_icon_set by [Gentleface.com](http://gentleface.com) under [Creative Commons \(Attribution-Noncommercial 3.0 Unported\)](#), except for the 3D, & WINDOW icons which are attributable as follows:

"Icon made by Freepik from flaticon.com"

Stylesheet

The Qt stylesheet used in this GUI is a modified version of **Qt Dark Orange** from <http://tech-artists.org/forum/showthread.php?2359-Release-Qt-dark-orange-stylesheet> by LoneWolf.

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Getting Started

Getting Started

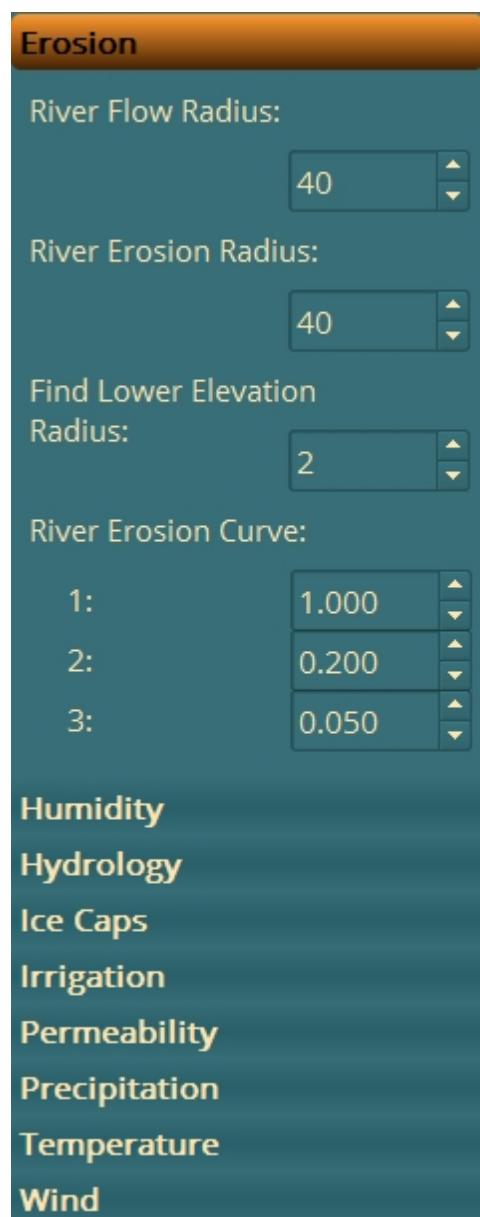
As I stated in the Introduction, WorldEngine can be run from the Command Line. There are several examples on the WorldEngine website, so I'll just show you one here:

```
worldengine world -s 1 -n seed1
```

As you can see above, it's pretty simple to generate a world. However, since there are over 10 possible options in the Command Line version, the text can get quite long and complicated.

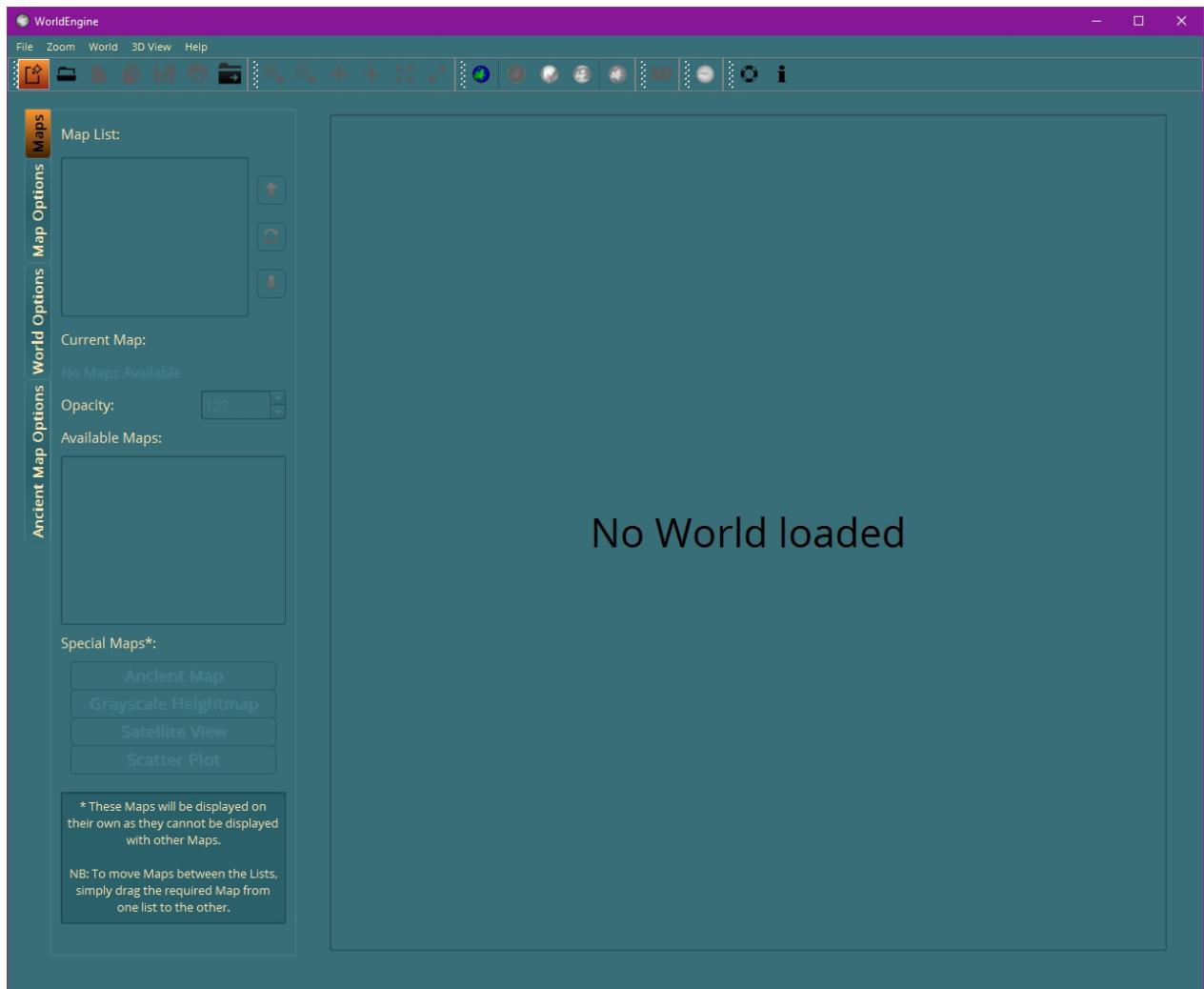
This is where my GUI comes in. Not only does it handle all of the Command Line options, but I have changed the WorldEngine code to allow access to many, many more options, which will enable you to create much more personalised worlds.

As an example, the options available for the Erosion Simulation are shown below (normally these would be hard coded into WorldEngine):



The best way to run my GUI is to download the prebuilt Windows (x64) files and simply click on the **we_gui_x64.exe** file. An alternative is to download the source, get hold of a copy of PyCharm Community

Edition (<http://www.jetbrains.com/pycharm/download/>) and load up the project from the source folder. Then it's simply a matter of clicking on **Run**, then **Run** and selecting the **main.py** file. This should run the GUI and you should now see this on your screen:



Hopefully this is a fairly standard Windows UI, so you should be familiar with how to use it and a lot of the available options. To go into more detail about the available menus, buttons and other options, please select the relevant heading in the **Table of Contents**.

The next step is to create a World.....

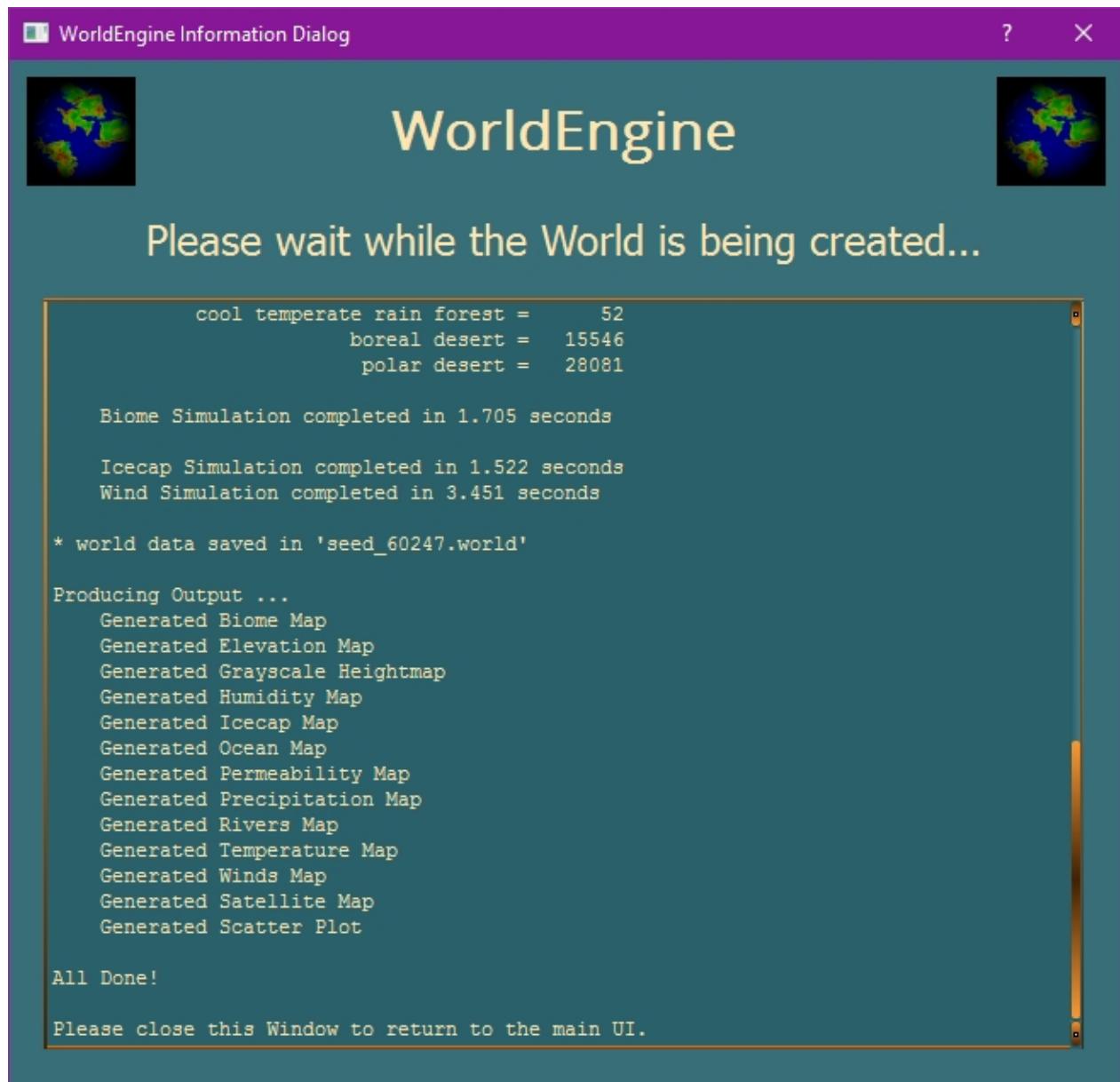
For the purposes of this quick intro, we won't be touching any of the options, but just going straight to creating a World. So, simply click on the **World Options** tab on the left hand side of the UI, enter a value of **60247** in the **World Seed** option, select **Yes** for the **Enable Verbose Messages?** option and then click on the button labelled **Generate World and All Maps**.

If everything is working correctly, then you should see a pop-up like this:

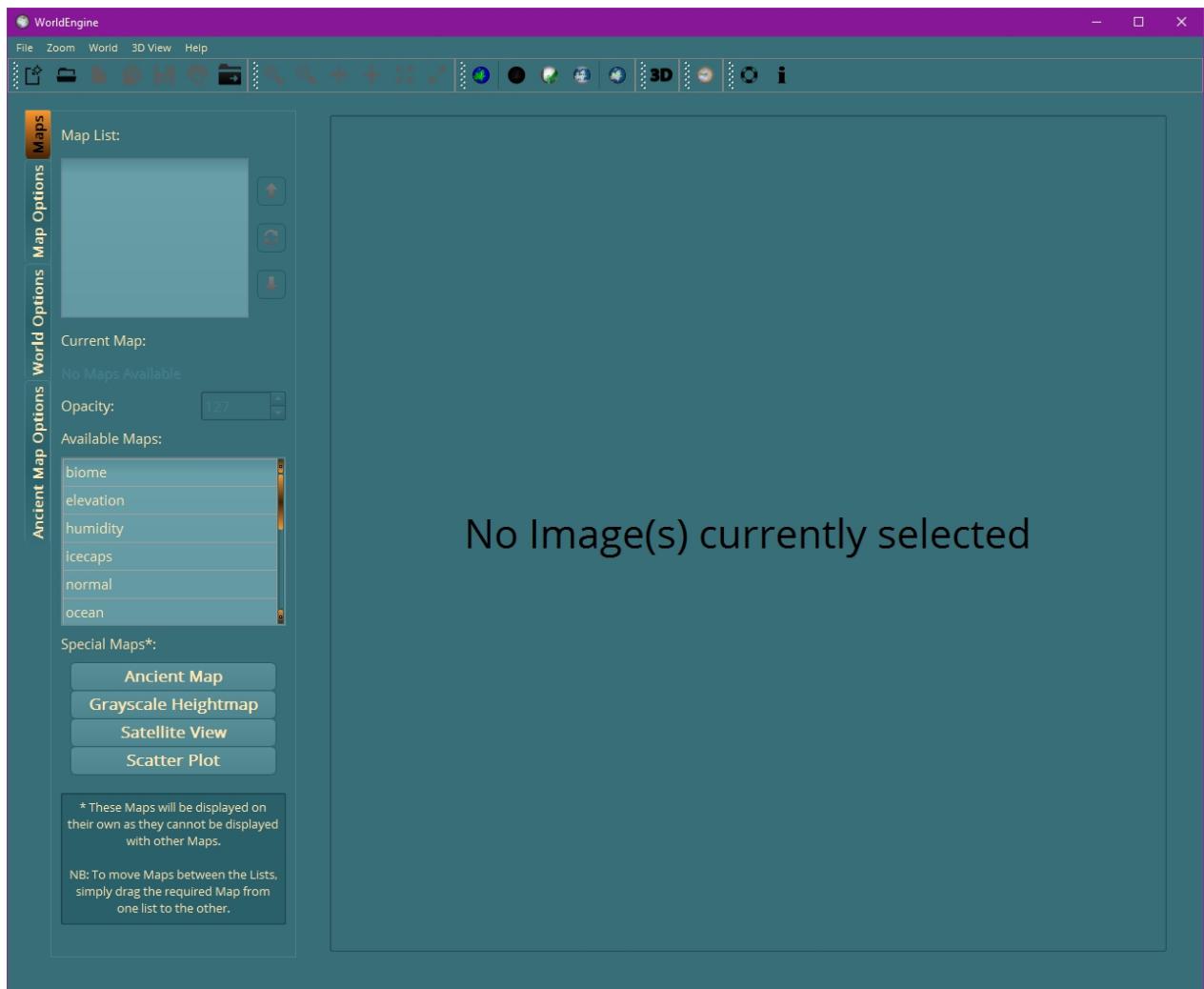


As you can see, this pop-up displays some basic information about the World you are creating and tells you that WorldEngine is now starting to work. NB: The UI will become unresponsive whilst the Simulations are running.

After a fairly long time (10+ minutes on my laptop with the above settings), you should see this in the pop-up:

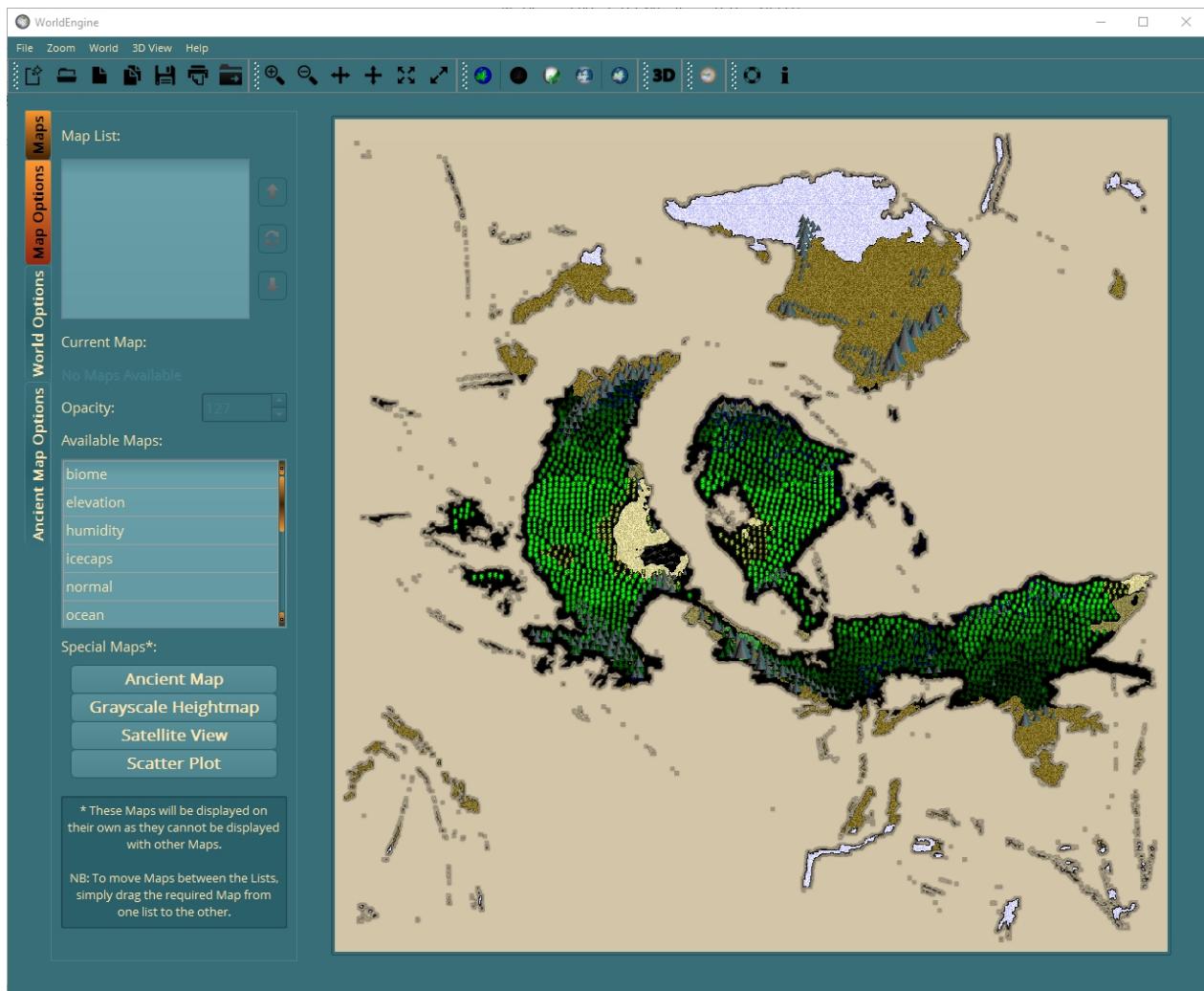


Now, simply click on the X in the top right of the pop-up and you should now see this in the Main Window:



As you can see, Creating (or Loading, as it's just the same) a World populates the **Available Maps** list and also opens up the **Special Maps*** buttons (if the relevant Map exists).

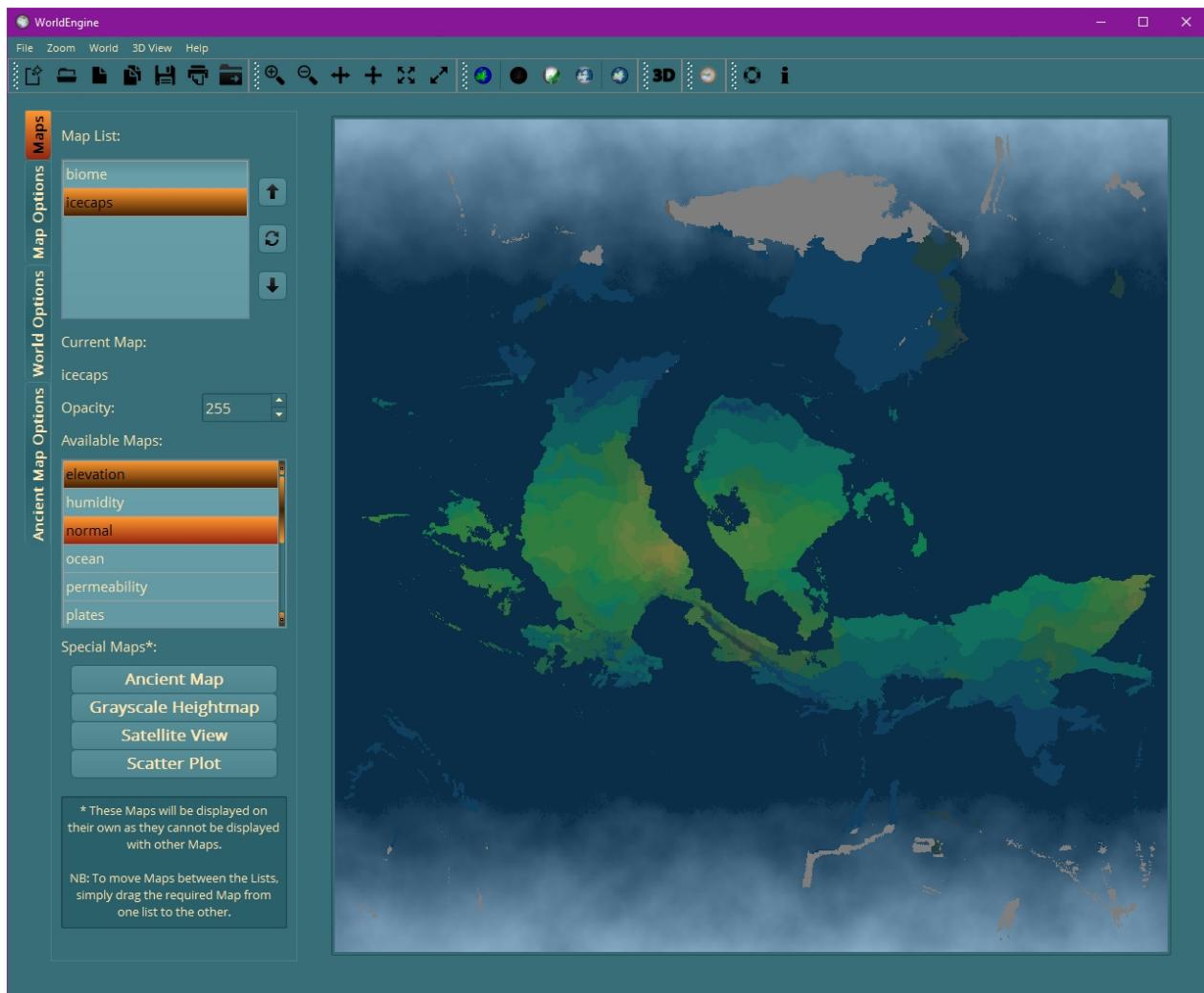
To view one of the **Special Maps***, simply click the button and you should see something like this:



To view the other Maps, you can simply drag and drop them between the **Map List** and **Available Maps** lists.

NB: There is an option to change the **Opacity** of each Map (the LOWEST Map in the **Map List** will ALWAYS have an **Opacity** of 255, and this doesn't apply to the **Special Maps***) so that you can build up unlimited different views in the Main Viewport.

Once you have moved one, or more, Maps to the **Map List**, simply click on the **Refresh** button (⟳) to regenerate the view in the Main Viewport:



Finally, to change the order of the Maps, simply select the Map and click on the **Up**, or **Down**, arrow immediately above/below the **Refresh** button.

Well, that's enough of an introduction, so have fun and if you have any issues, please let me know ([Getting Help](#)) and I'll try to assist as much as possible.

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System requirements

System Requirements

Now this is where it gets really interesting.....

There are two options:

- 1) Download the prebuilt Windows (x64) files and run **we_gui_x64.exe**; or
- 2) Download the source.

For Option 2, you will need at least the following installed on your machine:

Python	v2.7.9	NB: Python 3+ does not work AFAIK
--------	--------	-----------------------------------

and the following Python Libraries: NB Ensure they are for the correct version of Python

configparser2	v4.0.0
gdal	v2.1.0
h5py	v2.5.0
numpy	v1.11.0
noise	v1.2.2
pi3d	v2.18
pillow	v3.2.0
protobuf	v3.0.0b3
pyface	v5.1.0
pygame	v1.9.2a0
pyopengl-accelerate	v3.1.1
pyopengl	v3.1.1a1
pyplatec	v1.4.0
pypng	v0.0.18
pyqt4	v4.11.4
pywin32	v220
six	v1.10.0

If you are using PyCharm, then it will usually let you know if any required Libraries are missing.

Finally, you MUST also make sure that your **qt.conf** file (in your Python directory) contains something similar to the following:

```
[Paths]
Prefix = Lib/site-packages/PyQt4
Binaries = Lib/site-packages/PyQt4
Plugins = Lib/site-packages/PyQt4/plugins
```

The MOST important one (well, the one that is probably missing) is the line that starts "Plugins = ...". If this is NOT present then you will only be able to load png files.

Also, it's a good idea to check that you have the following imageformat dlls in your "?:\Python27\Lib\site-packages\PyQt4\plugins\imageformats" folder:

```
qgif4.dll
qico4.dll
qjpeg4.dll
qmng4.dll
qsvg4.dll
qtga4.dll
qtiff4.dll
```

Not all are required for this WorldEngine GUI, but it's better to be safe than sorry!

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Getting help

Getting Help

I know that there will be subtle bugs in this GUI, as anything of this size/complexity is very difficult for one person to fully test :(

But, there are a few ways to get help with both WorldEngine itself and this GUI.

For WorldEngine, you can check out it's [website](#), it's [GitHub page](#), it's [documentation](#) and also it's [Google](#)

[Group.](#)

As for the GUI itself, there is really only the [GitHub page](#) and the WorldEngine [Google Group](#) (which I do check occasionally).

Regards

Shando

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Maps Tab

Maps

Pretty much all of the **Maps** tab has already been covered in [Getting Started](#), so I won't go into any more detail here.



The Maps

Maps

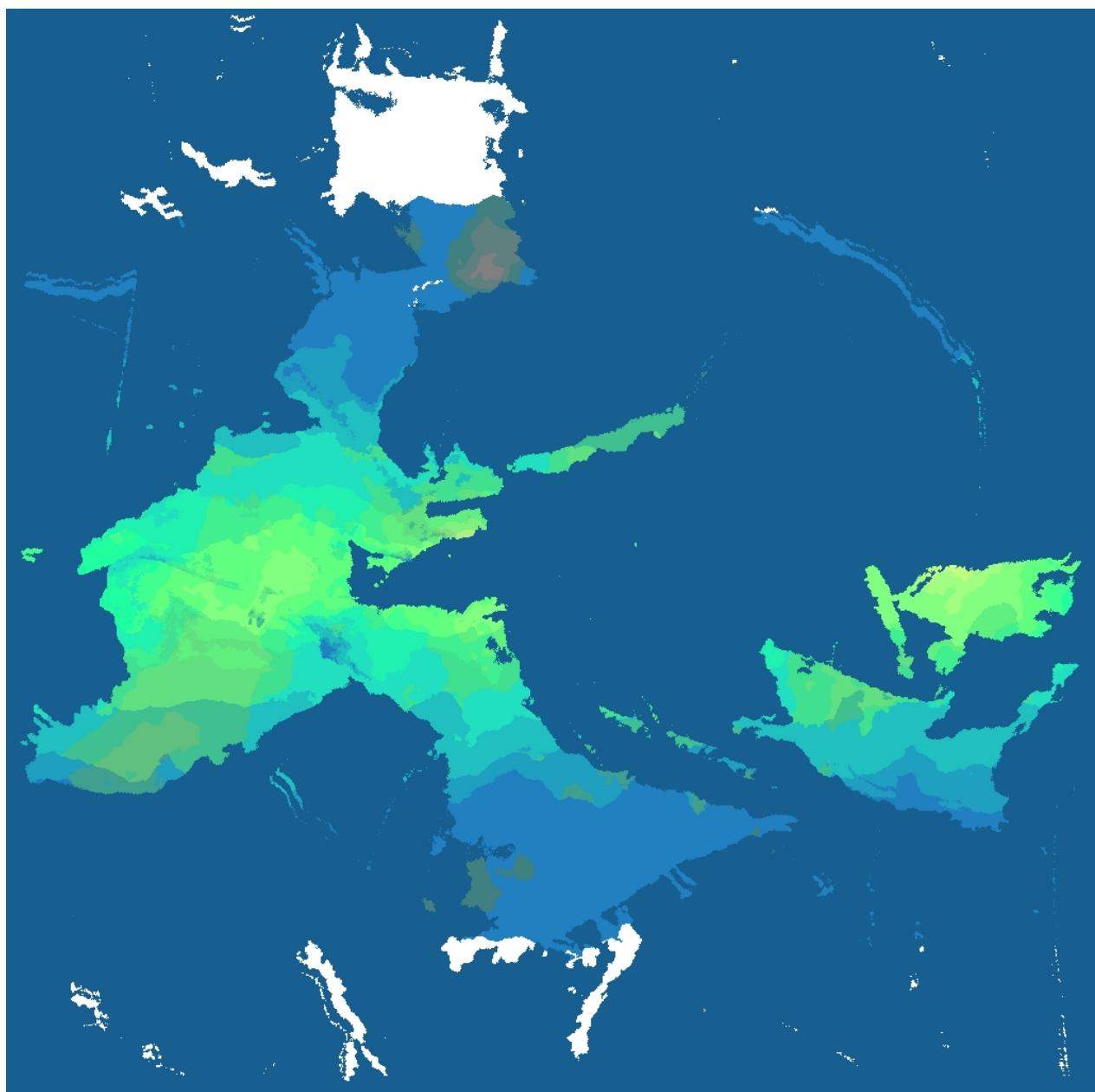
In total there are 15 Maps that can be generated from within the UI:

[Ancient World](#)
[Biomes](#)
[Elevation](#)
[Grayscale Heightmap](#)
[Humidity](#)
[Icecaps](#)
[Normal Map](#)
[Ocean](#)
[Permeability](#)
[Precipitation](#)
[Rivers](#)
[Satellite](#)
[Scatter Plot](#)
[Temperature](#)
[Wind](#)

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Biomes

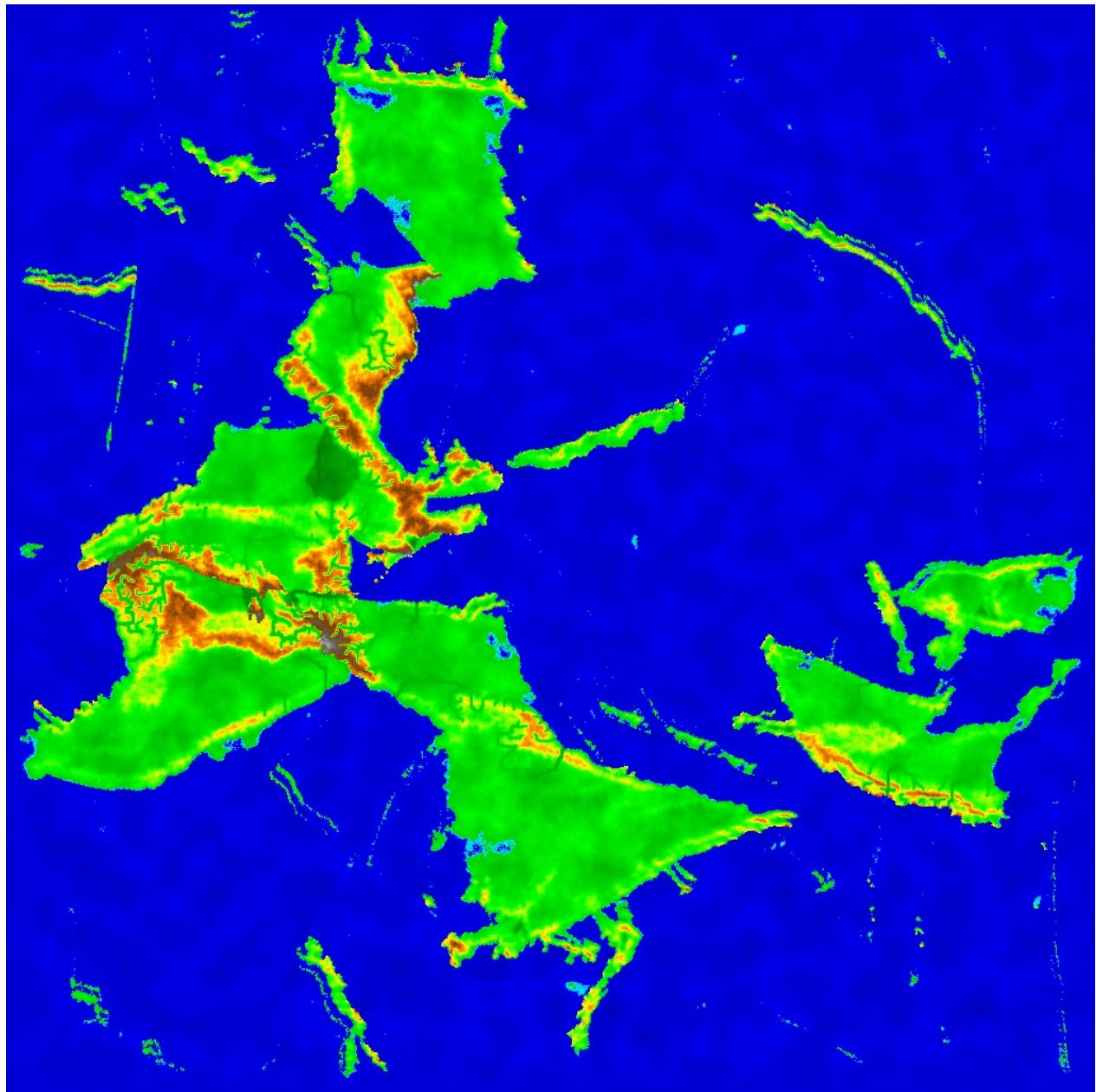
Biomes



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Elevation

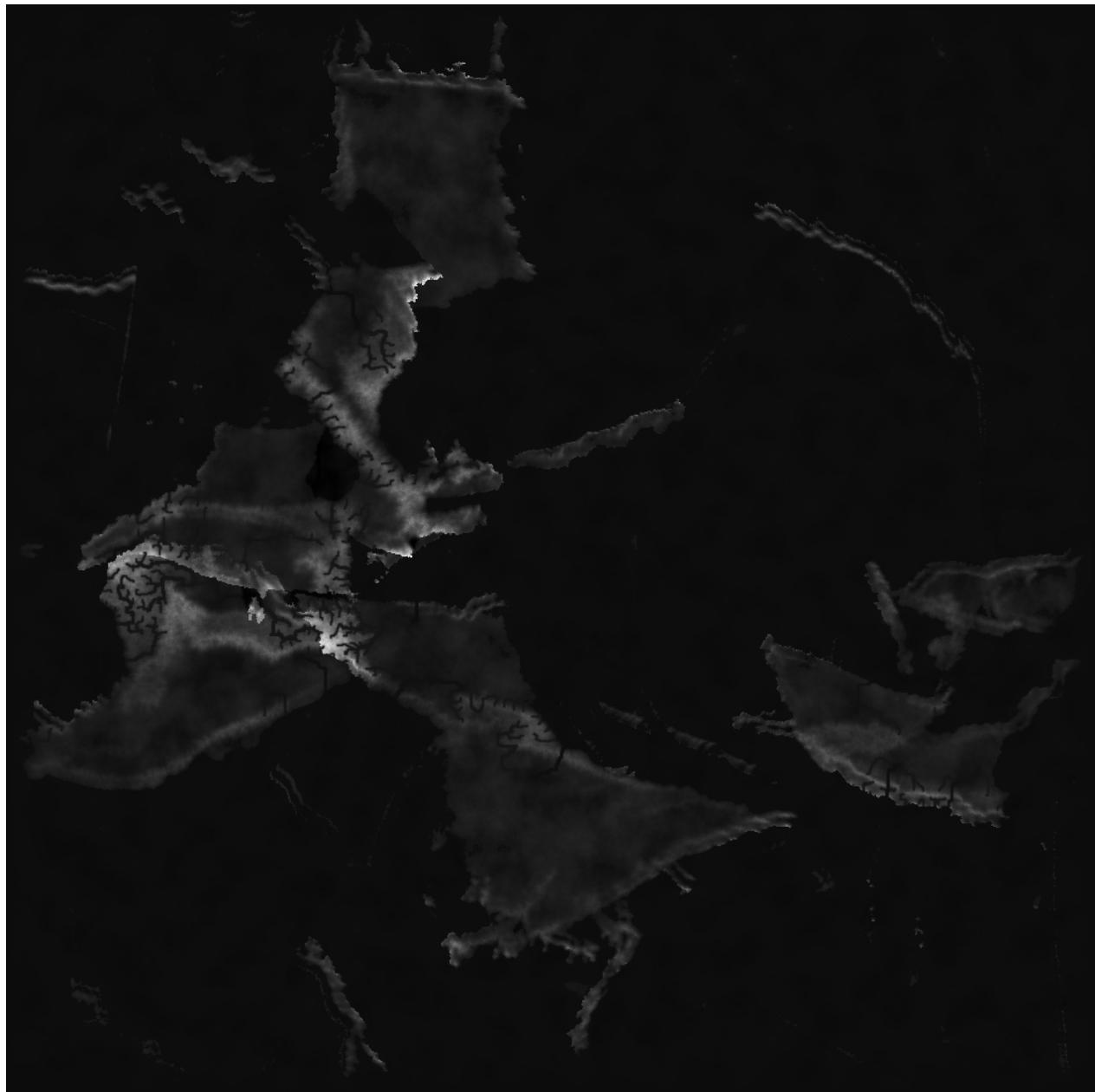
Elevation



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Grayscale Heightmap

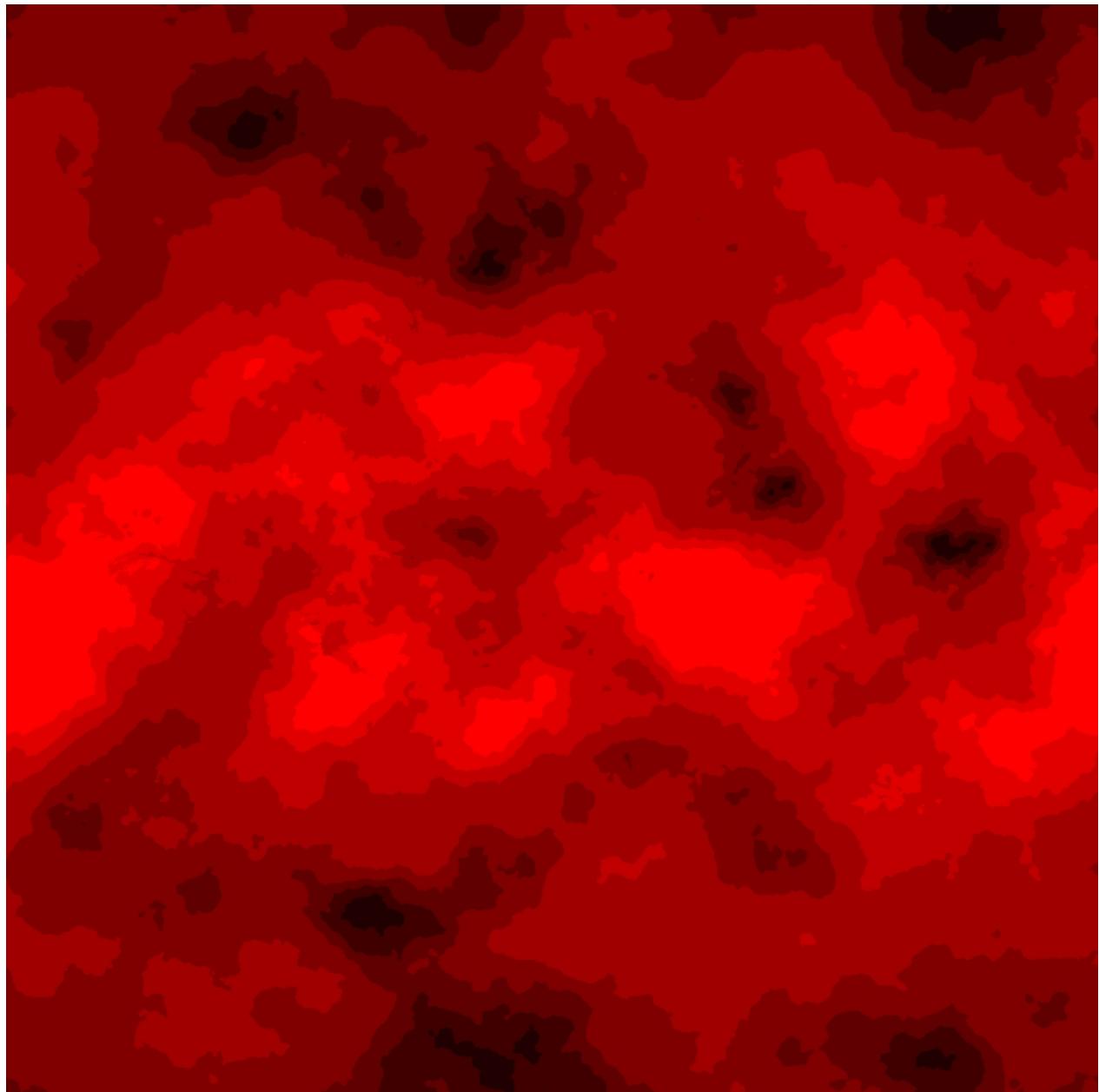
Grayscale Heightmap



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Humidity

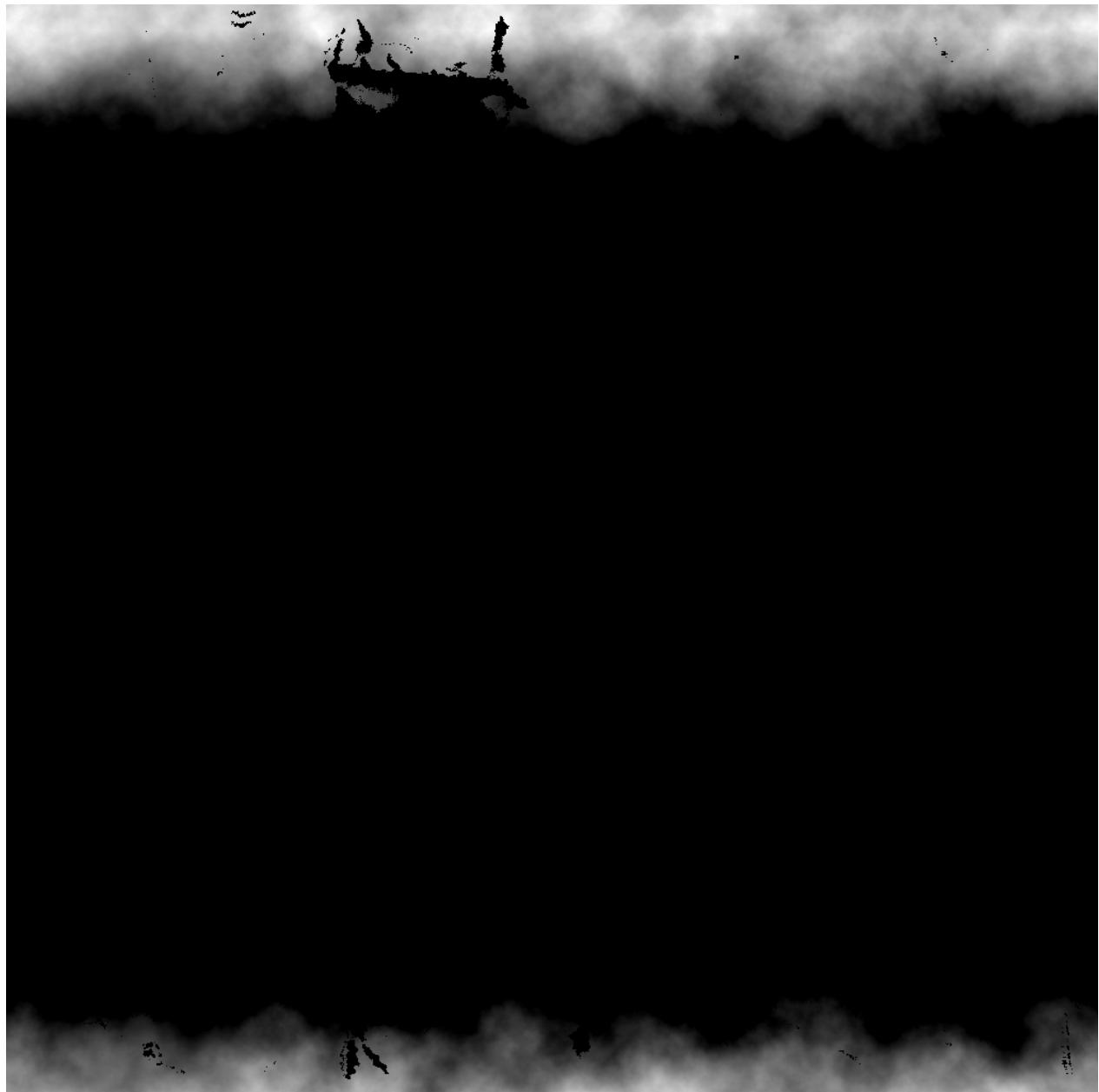
Humidity



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Icecaps

Icecaps



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Normal Map

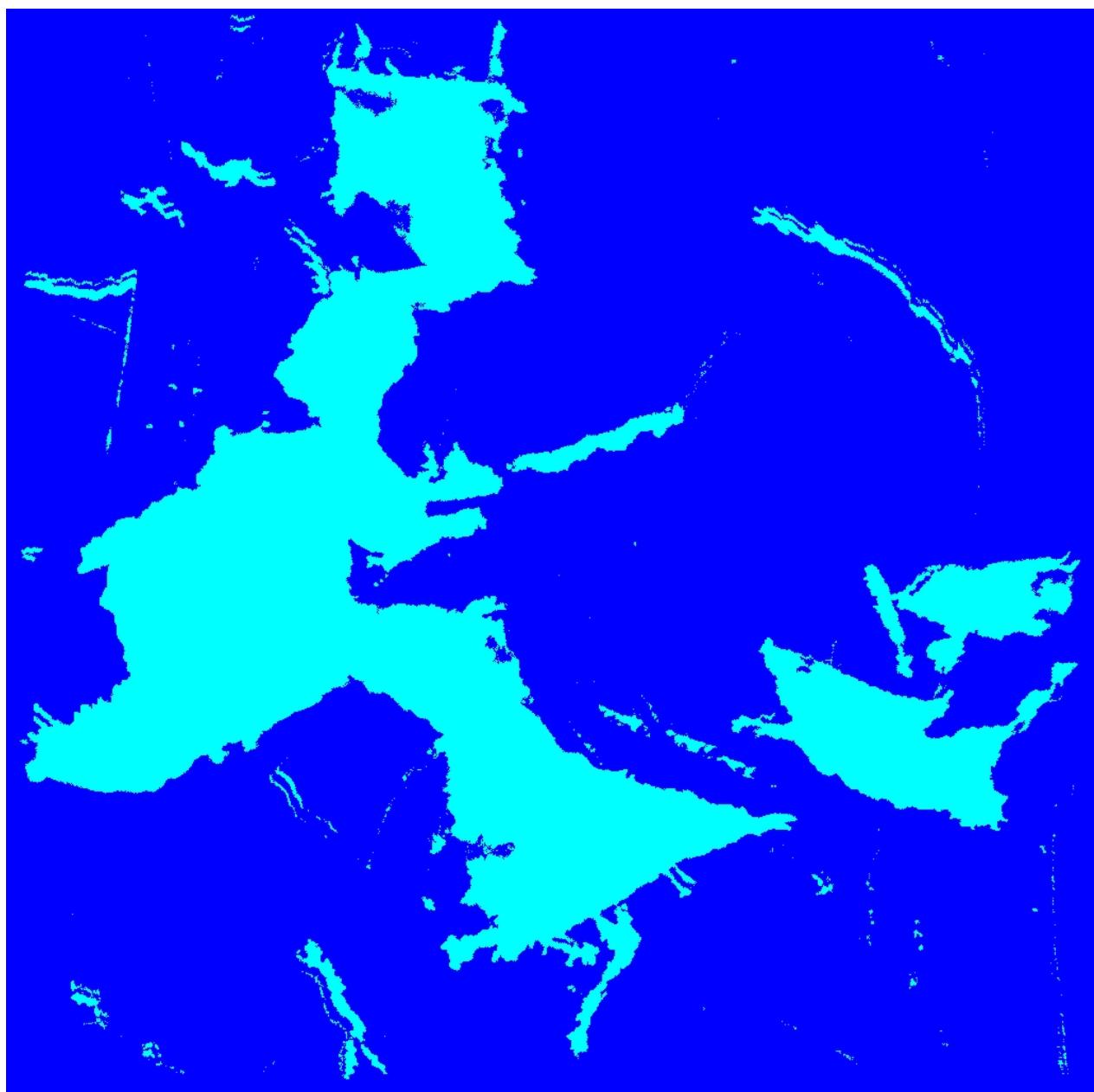
Normal Map



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Ocean

Ocean



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Permeability

Permeability



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Plates

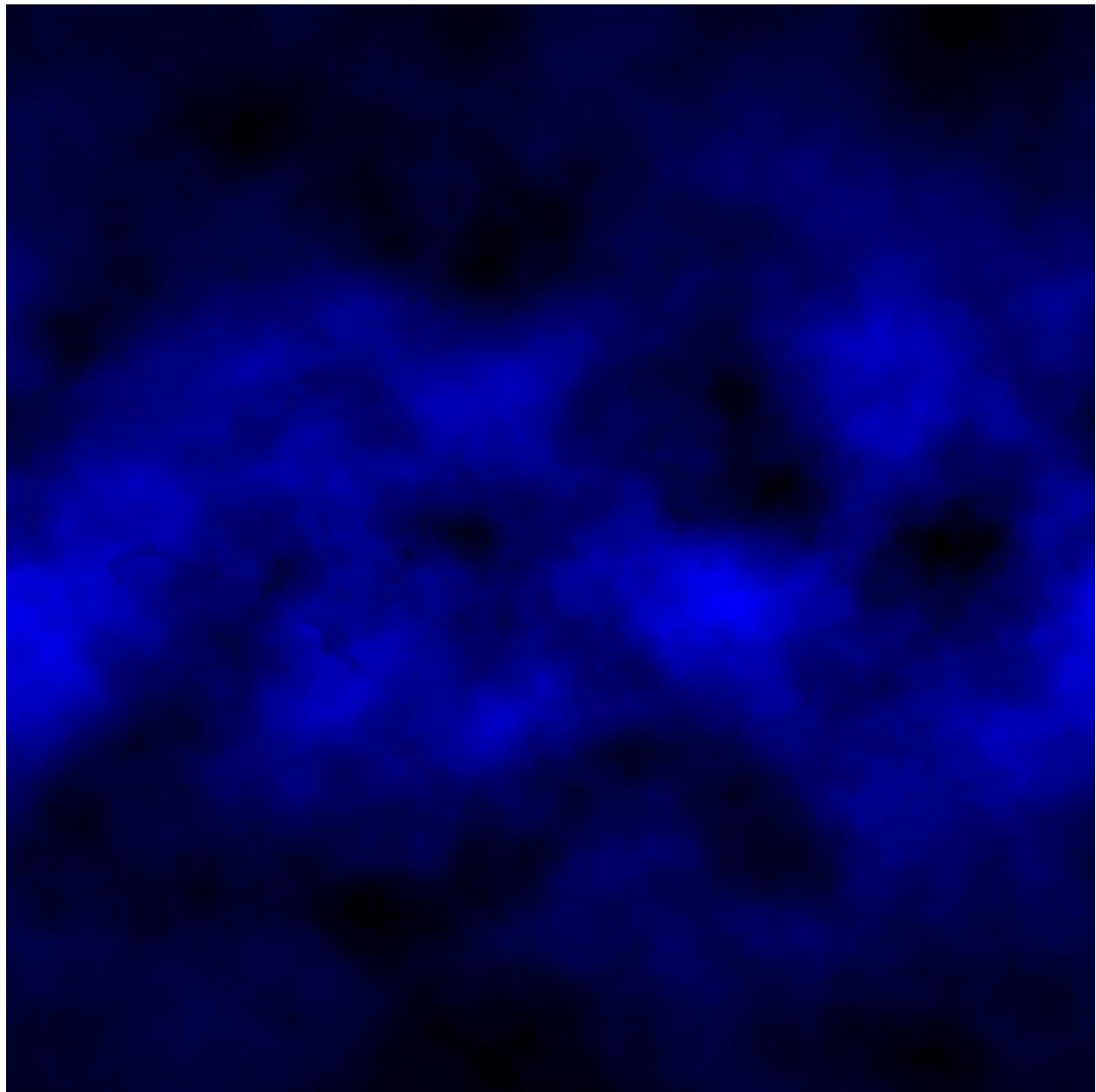
Plates



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Precipitation

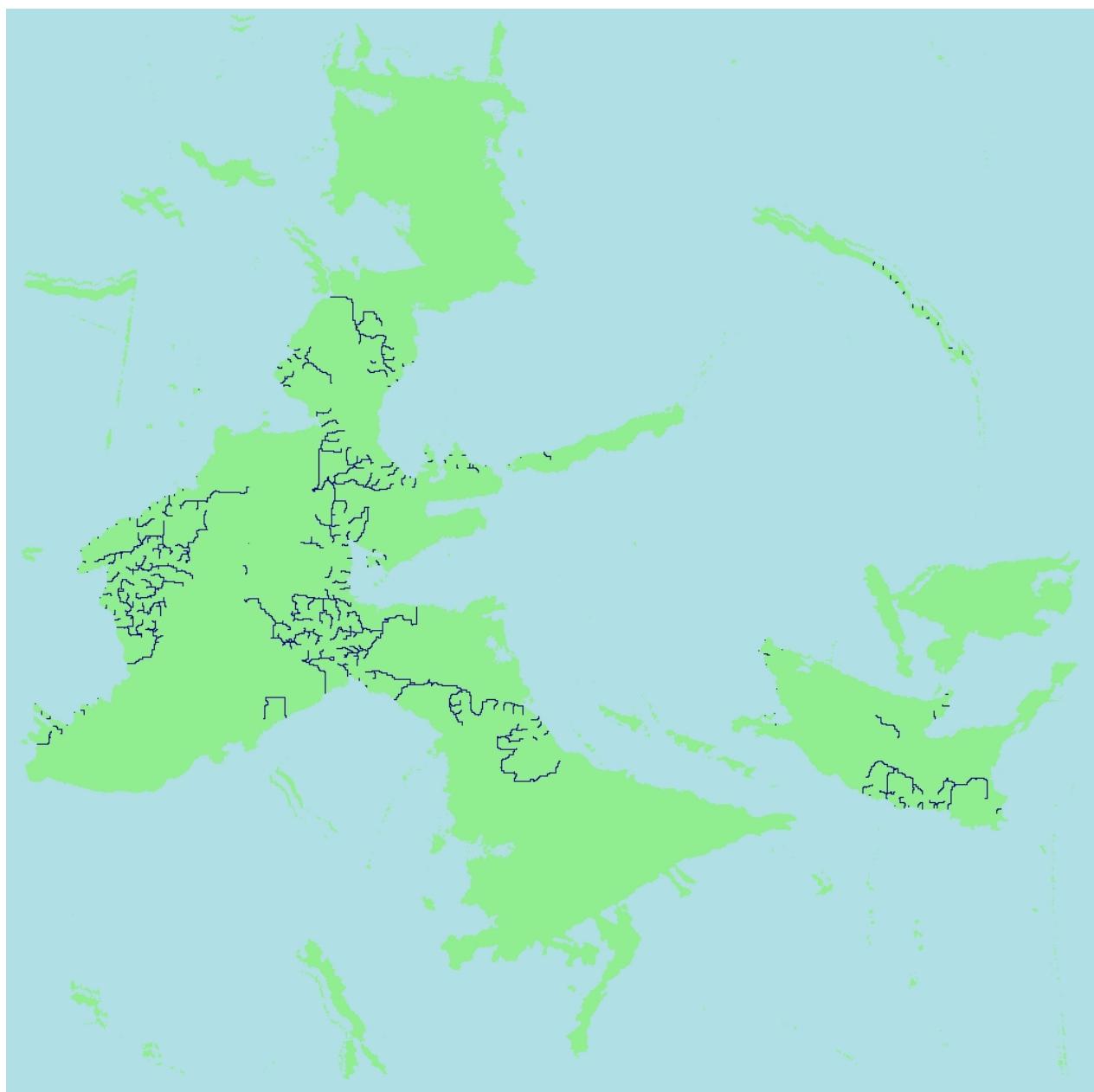
Precipitation



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Rivers

Rivers



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Satellite

Satellite

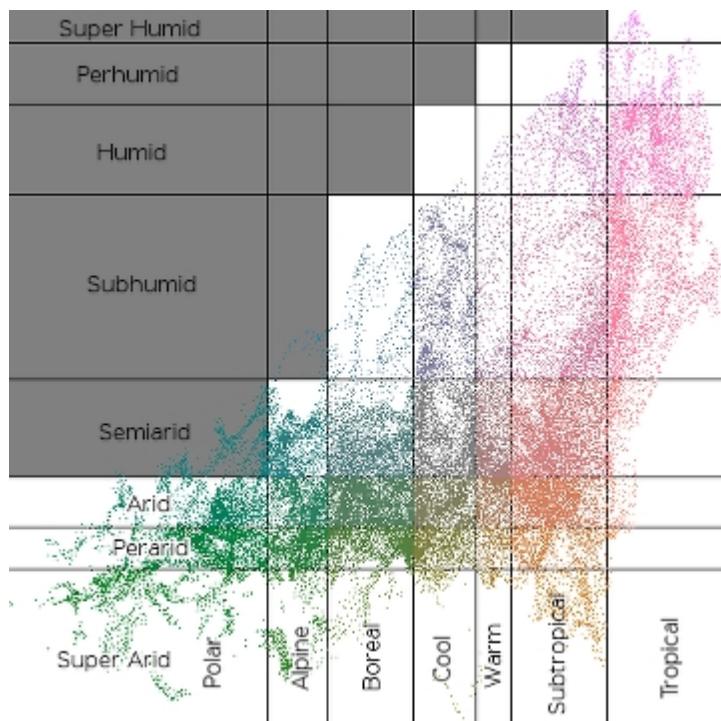


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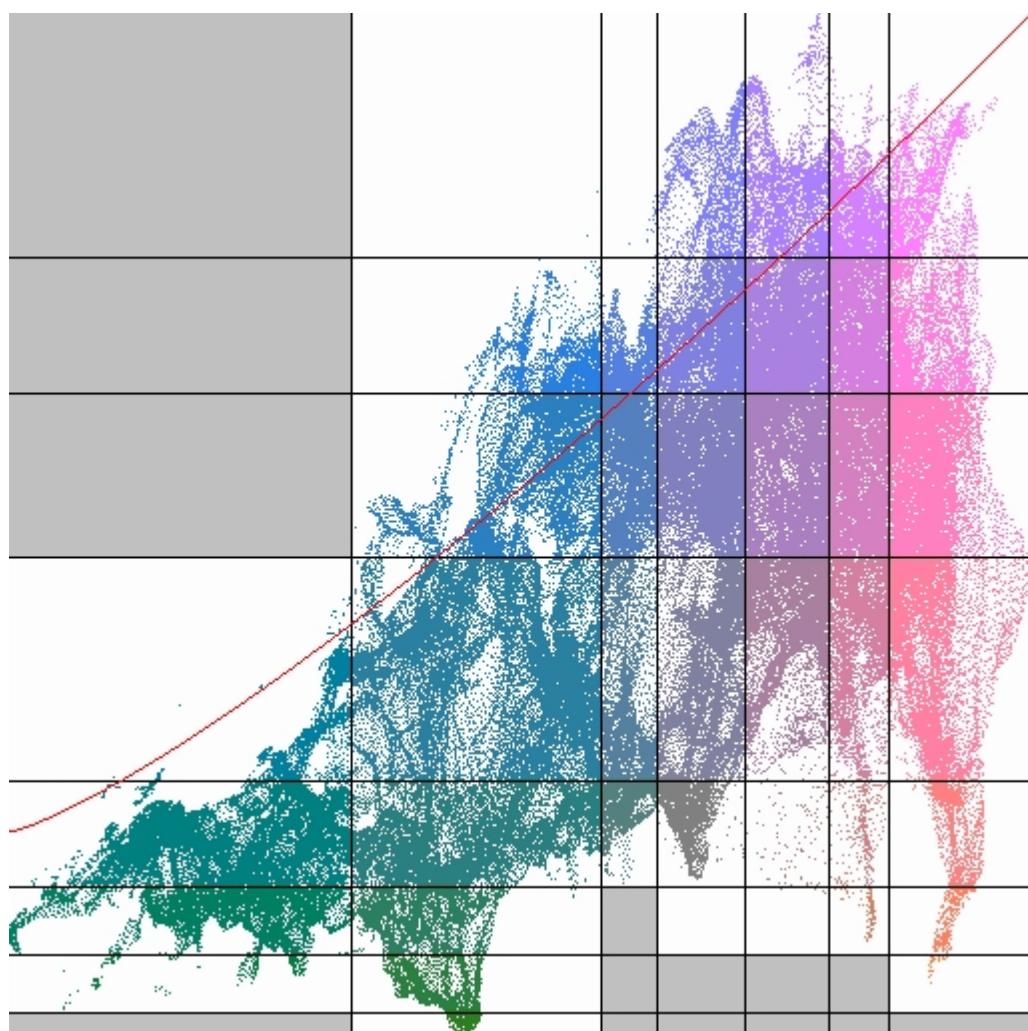
Scatter Plot

Scatter Plot

The Scatter Plot is different to the other Maps, as it shows a plot of Temperature vs Humidity:



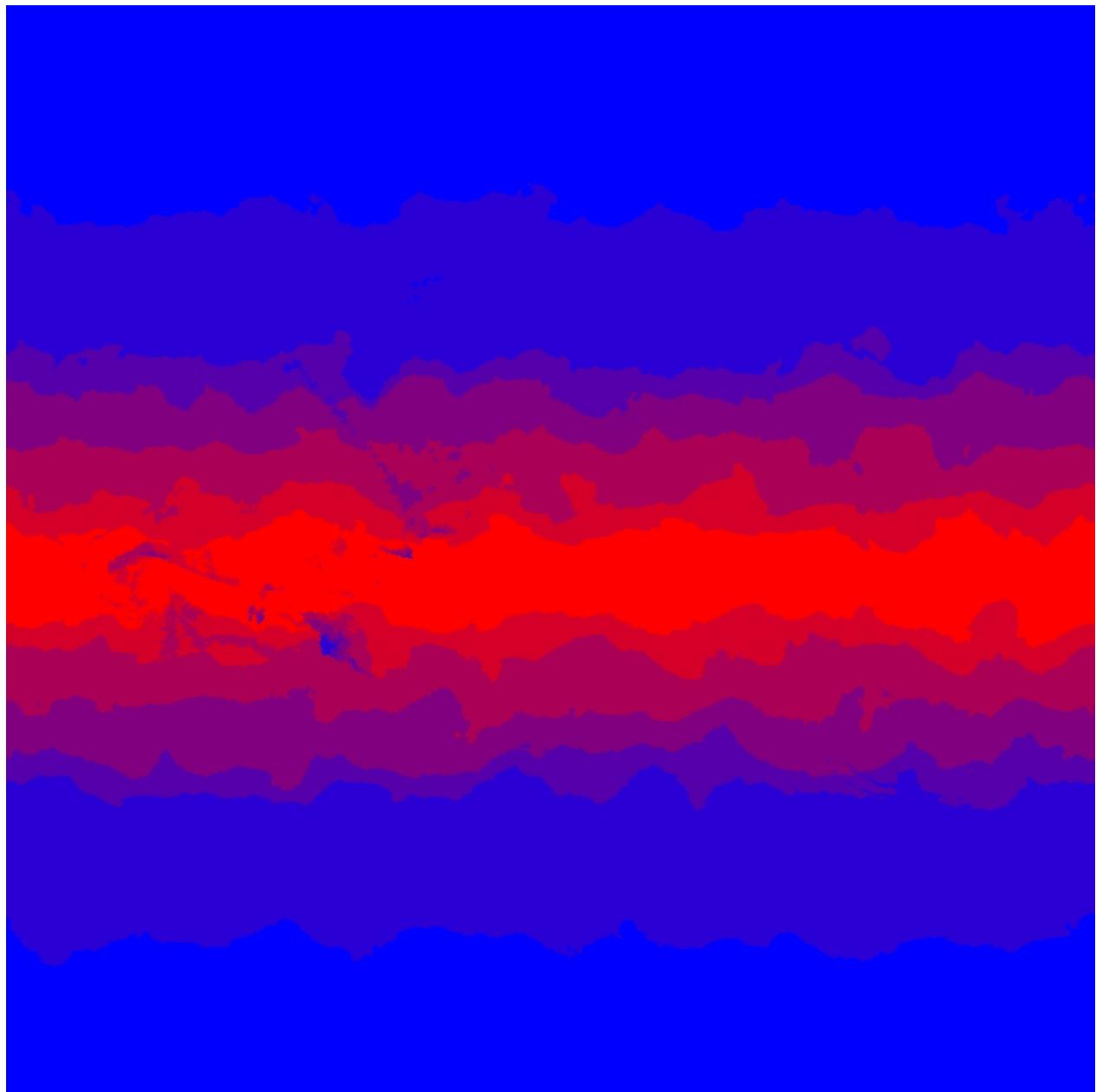
Where Temperature is the Xaxis getting hotter from Left to Right and Humidity is the Y axis getting more humid from bottom to top.



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Temperature

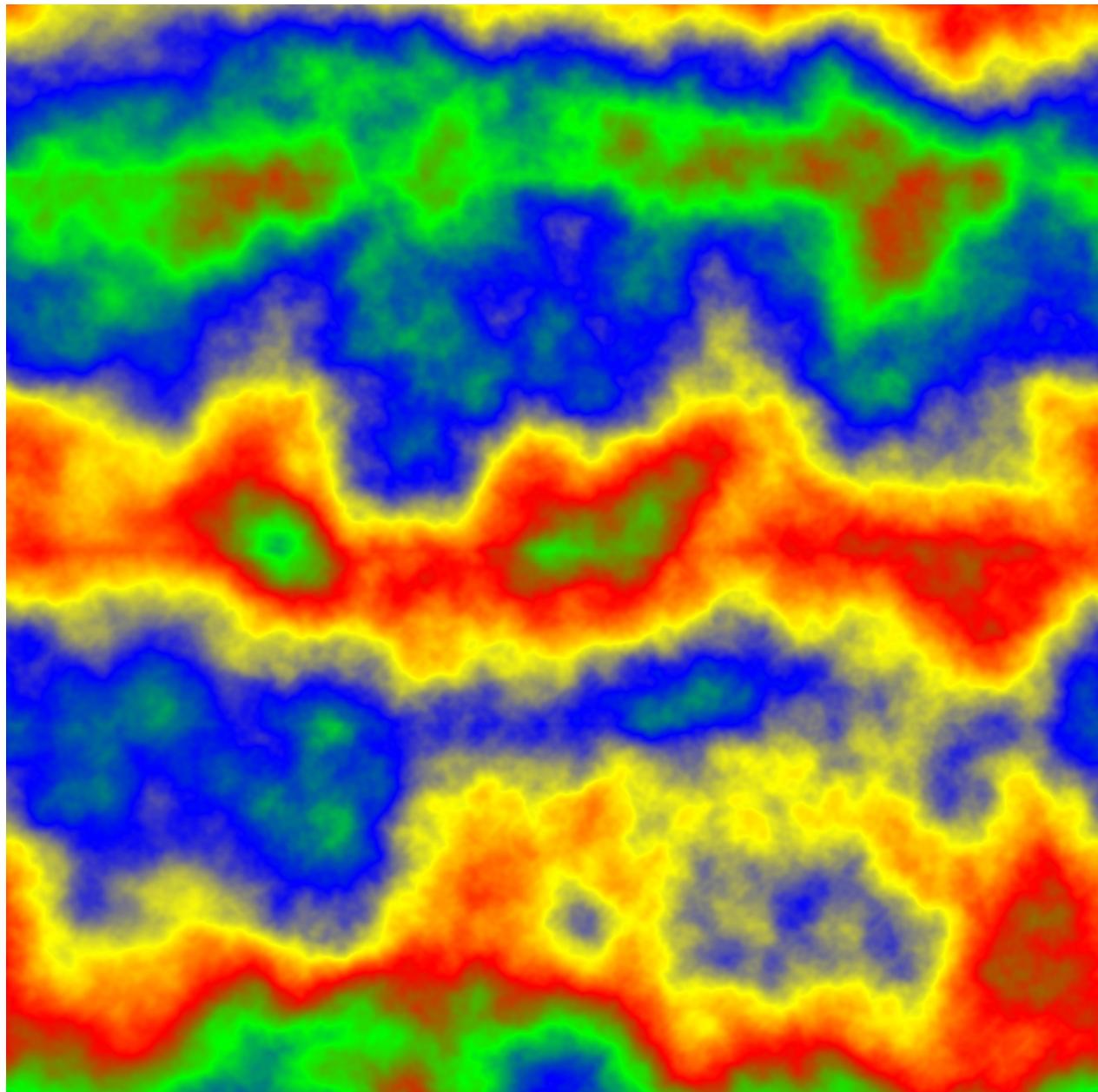
Temperature



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Wind

Wind

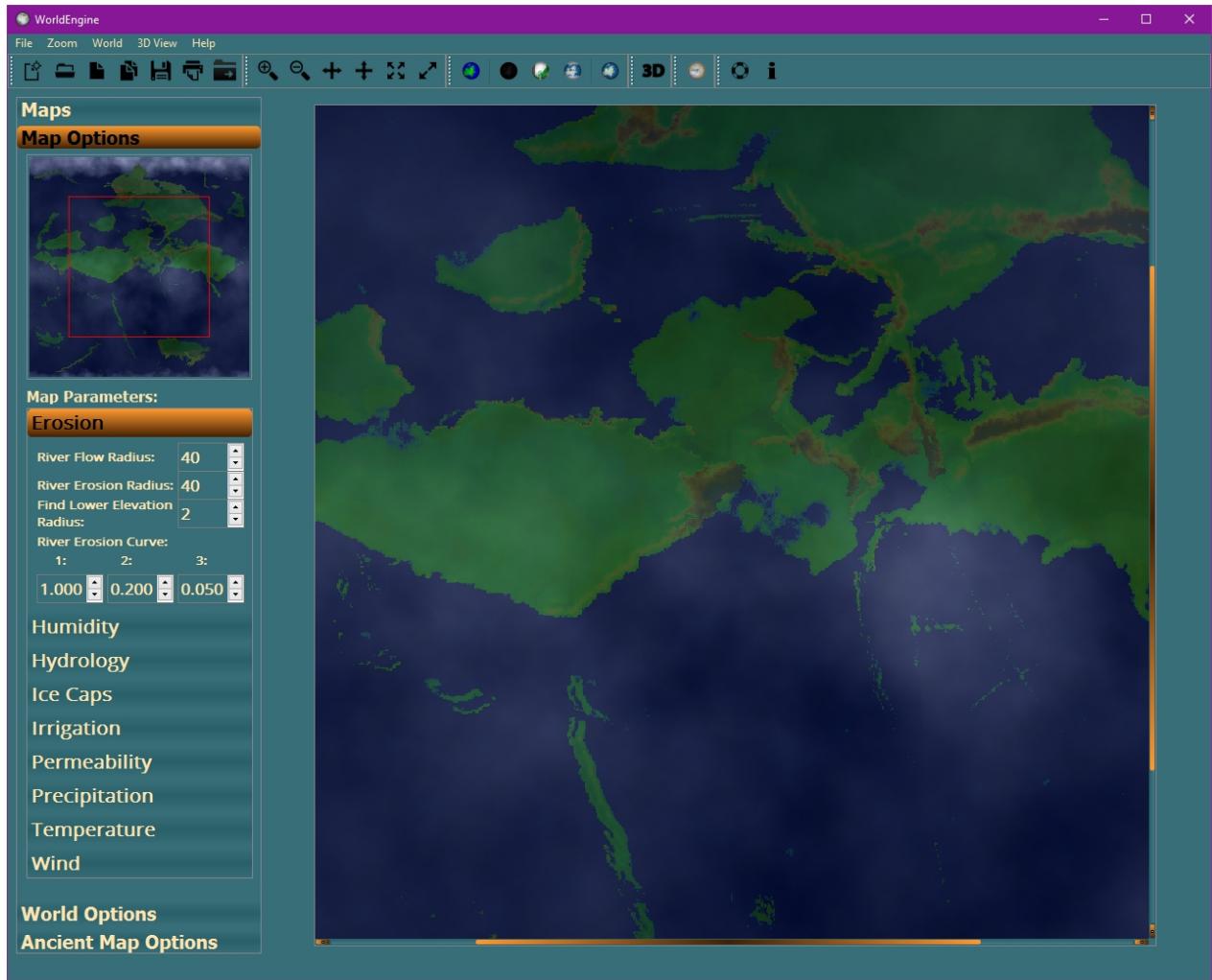


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Map Options Tab

Map Options

The **Map Options** tab consists of two parts. The uppermost part is what I call the MiniMap, which shows a smaller version of the Main Viewport. The main difference between the MiniMap and the Main Viewport (besides their respective sizes!) is that the MiniMap will ALWAYS show the whole Map, whereas the content of the Main Viewport can be zoomed in, moved, zoomed out etc.



The red rectangle visible in the MiniMap shows the area of the Map that is currently displayed in the Main Viewport.

The lower part of this tab displays the various parameters for the various Simulations. More information on these can be found [here](#).

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Map Parameters

Map Parameters

The **Map Parameters** part of the **Map Options** tab contains tabs for all of the Simulations that have parameters that can be changed:

- [Erosion](#)
- [Humidity](#)
- [Hydrology](#)
- [Ice Caps](#)
- [Irrigation](#)
- [Permeability](#)
- [Precipitation](#)
- [Temperature](#)

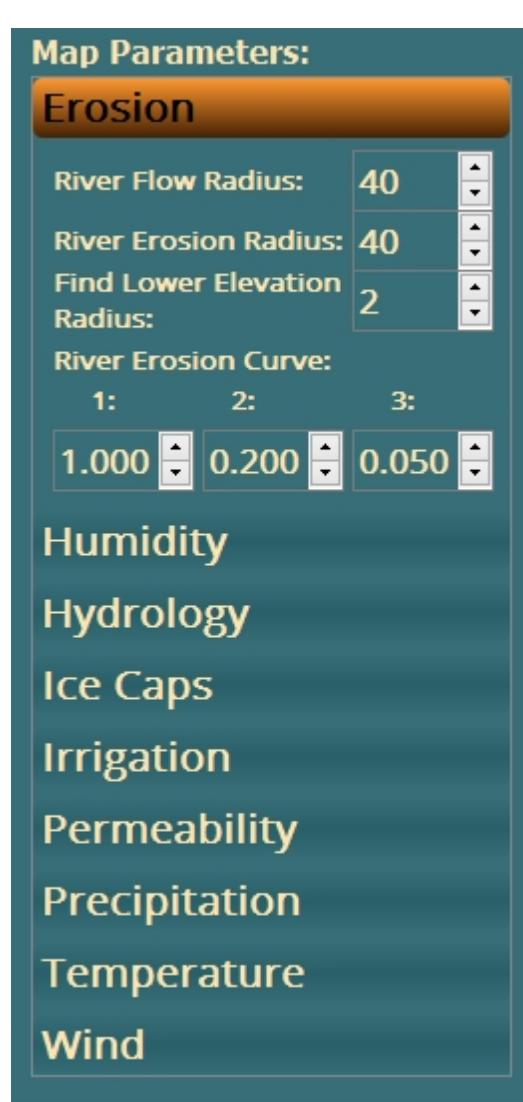
- [Wind](#)

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Erosion

Erosion

The **Erosion** tab has the following options:



River Flow Radius This is a number representing the Radius of Rivers etc. and is used when calculating the Flow of that River. It must be between **10** and **100**.

River Erosion Radius This is a number representing the Radius of Rivers etc, and is used when calculating the Erosion caused by that River. It must be between **10** and **100**.

Find Lower Elevation

Radius This is a number representing the Radius of a circle to be used to determine if a Lower Elevation exists when calculating the flow of the River etc. It must be between **1** and **100**.

River Erosion Curve This is a series of 3 numbers that set the limits for the amount of Erosion to be applied along the edges of the River. This enables the creation of more Erosion near the River and less further away from the River. Each number must be between **0.010** and **10.000**. NB: The numbers MUST be in **DESCENDING**

order.

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Humidity

Humidity

The **Humidity** tab has the following options:



Precipitation Weight This is a number representing the Weighting to be applied for Precipitation. It must be between **0.00** and **99.99**.

Irrigation Weight This is a number representing the Weighting to be applied for Irrigation. It must be between **0.00** and **99.99**.

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Hydrology

Hydrology

The **Hydrology** tab has the following options:



Creek Threshold This is a number representing the Threshold at which Water becomes a Creek. It must be between **0.000** and **1.000**.

River Threshold This is a number representing the Threshold at which Water becomes a River. It must be between **0.000** and **1.000**.

Main River Threshold This is a number representing the Threshold at which Water becomes a Main River. It must be between **0.000** and **1.000**.

NB: The above values MUST be in **DESCENDING** order.

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[Ice Caps](#)

Ice Caps

The **Ice Caps** tab has the following options:



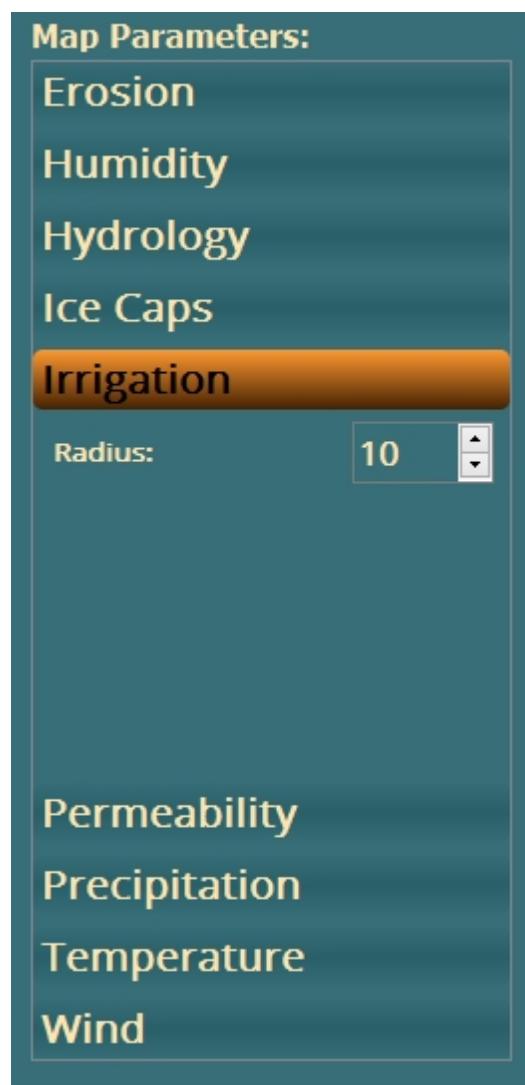
- Max. Freeze Percentage This is a number representing the percentage where only the coldest x% of the cold area will freeze. It must be between **0.000** and **1.000**.
- Freeze Chance Window This is a number representing the percentage where the warmest x% of the freezable area won't completely freeze. It must be between **0.000** and **1.000**.
- Surrounding Tile Influence This is a number representing a percentage chance to freeze a slightly warm tile when its neighbouring Tiles are frozen. It must be between **0.000** and **1.000**.

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Irrigation

Irrigation

The **Irrigation** tab has the following options:



Radius This is a number representing the Radius of a circle used to determine which areas of the Map are used in the Irrigation calculation. It must be between **1** and **100**.

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Permeability

Permeability

The **Permeability** tab has the following options:



Low Threshold This is a number representing the Threshold at which Permeability is Low. It must be between **0.000** and **1.000**.

Medium Threshold This is a number representing the Threshold at which Permeability is Medium. It must be between **0.000** and **1.000**.

Octaves This is a number representing the Number of Octaves used in the Noise generation part of the Permeability calculation. It must be between **0** and **99**.

Frequency This is a number representing the Frequency used in the Noise generation part of the Permeability calculation. It must be between **0.0** and **256.0**. NB: Preferably in steps of **8**.

NB: The Low Threshold MUST be a **HIGHER** value than the Medium Threshold.

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Precipitation

Precipitation

The **Precipitation** tab has the following options:



Low Threshold This is a number representing the Threshold at which Precipitation is Low. It must be between **0.000** and **1.000**.

Medium Threshold This is a number representing the Threshold at which Precipitation is Medium. It must be between **0.000** and **1.000**.

Octaves This is a number representing the Number of Octaves used in the Noise generation part of the Precipitation calculation. It must be between **0** and **99**.

Frequency This is a number representing the Frequency used in the Noise generation part of the Precipitation calculation. It must be between **0.0** and **256.0**. NB: Preferably in steps of **8**.

NB: The Low Threshold MUST be a **HIGHER** value than the Medium Threshold.

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Temperature

Temperature

The **Temperature** tab has the following options:



Distance to Sun
(HWHM)

This is a number representing the Distance between the Sun and the World. It must be between **0.000** and **1.000**. NB: An Earth-like planet = **1.0** and the realistic range should be between **~0.7** and **~1.3** (see https://en.wikipedia.org/wiki/Circumstellar_habitable_zone)

Axial Tilt (HWHM)

This is a number representing the Axial Tilt of the World. It must be between **0.000** and **1.000**. NB: The World will usually move around its star at an angle (see https://en.wikipedia.org/wiki/Axial_tilt) and a value of **0.5** here would refer to an angle of **90** degrees (Uranus-style - see <https://en.wikipedia.org/wiki/Uranus>). This value should usually be in the range **-0.15 < Axial Tilt < 0.15** for a habitable World.

Octaves

This is a number representing the Number of Octaves used in the Noise generation part of the Temperature calculation. It must be between **0** and **99**.

Frequency

This is a number representing the Frequency used in the Noise generation part of the Temperature calculation. It must be between **0.0** and **256.0**. NB: Preferably in steps of **8**.

NB: HWHM means "Half Width at Half Maximum" and is used in the Gaussian calculations.

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[Wind](#)

Wind

The **Wind** tab has the following options:



Octaves This is a number representing the Number of Octaves used in the Noise generation part of the Wind calculation. It must be between **0** and **99**.

Frequency This is a number representing the Frequency used in the Noise generation part of the Wind calculation. It must be between **0.0** and **256.0**. NB: Preferably in steps of **8**.

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World Options Tab

World Options

The **World Options** tab allows the setting of many parameters for the creation of the world.

It consists of 6 Sub-Tabs:

Basic Options - this Sub-Tab lets you set the following options:

Maps

Map Options

World Options

Basic Options

World Seed: 11111

Width: 1024

Height: 1024

No. of Plates: 10

Recursion Limit: 2000

Sea Level Elevation Cut Off: 1.000

GCC* Gamma Value: 1.250

GCC* Offset: 0.200

*GCC = Gamma Correction Curve

Advanced Plate Options

Temperature Range

Precipitation Range

Output Options

Advanced Export Options

Generate World and All Maps (ex Ancient Map)

Ancient Map Options

World Seed	This is a number representing the Base of the world. It must be between 1 and 65535 . You can use the Randomise button to generate a random number.
Width	This is a number representing the number of Pixels for the Width of the world. It must be between 256 and 8192 . NB: This should also be divisible by 8 .
Height	This is a number representing the number of Pixels for the Height of the world. It must be between 256 and 8192 . NB: This should also be divisible by 8 .
No. of Plates	This is a number representing the number of Tectonic Plates in the world. It must be between 1 and 100 . NB: A value of 1 will not really do much as there will be no plate collision.
Recursion Limit	This is a number representing the number of Recursive Loops to be carried out when generating the world. It must be between 1.000 and 10.000 .
GCC Gamma Value	This is a number that determines the Gamma Value for the Gamma Correction Curve. It must be between 0.000 and 99.990 .
GCC Offset	This is a number that determines the Offset Value for the Gamma Correction Curve. It must be between 0.000 and 0.999 .
Sea Level Elevation	
Cut Off	This is a number representing the level at which Sea becomes Land. It must be between 1.000 and 99.990 .

Advanced Plate Options - this Sub-Tab is for advanced users and lets you set the following options:

Maps

Map Options

World Options

Basic Options

Advanced Plate Options

Sea Level:

Erosion Period:

Folding Ratio:

Absolute Aggregation Ratio:

Relative Aggregation Ratio:

Number of Cycles:

Temperature Range

Precipitation Range

Output Options

Advanced Export Options

**Generate World
and All Maps
(ex Ancient Map)**

Ancient Map Options

Sea Level

This sets the percentage of dry land before any tectonic simulation has taken

place. It must be between **0.000** and **1.000**.

NB: A value of **0.000** indicates a world covered with water. Plate tectonics would bring forth islands that would later merge into continents.

A value of **1.000** indicates a world that's devoid of any oceanic crust, being completely filled with continents, and would cause plate tectonics to halt at the very first steps.

Erosion Period This sets the number of iterations (i.e. the number of consecutive calls to update method that should pass between sequential runs) of the erosion algorithm. It must be between **0** and **100**.

NB: A value of **0.000** indicates that erosion is never applied to the system.

Folding Ratio This sets the amount of crust that is moved from the source plate to the destination plate at the location where two plates overlap. It must be between **0.000** and **1.000**.

NB: A value of **0.000** indicates that nothing is transferred.

A value of **1.000** causes everything to be transferred immediately.

NB2: The destination plate is that which has a larger continent at the location of collision.

Absolute Aggregation Ratio This sets the minimum amount of surface area that one continent on a plate must overlap with another continent on another plate during that iteration before the two continents are merged into one continent that resides on either plate. The smaller continent will always be merged to the larger one. It must be between **0** and **10,000,000**.

Relative Aggregation Ratio This sets the minimum percentage of surface area of a continent that must overlap with another continent before they are merged into one continent. It must be between **0.000** and **1.000**.

NB: A value of **0.000** would cause two colliding continents to become merged immediately.

A value of **1.000** requires that the smaller plate is completely beneath the larger plate before they are merged together.

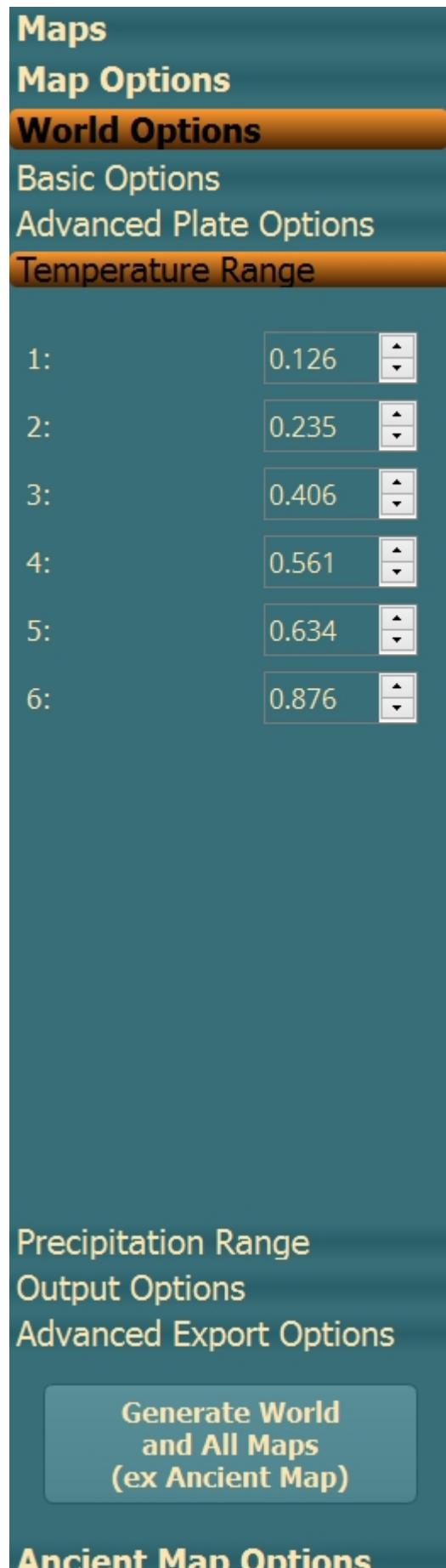
NB2: This parameter plays a central role when the rate of continental growth is adjusted.

Number of Cycles This sets the maximum number of times that the lithosphere is divided into plates. It must be between **0.000** and **1.000**.

NB: A value of **0.000** indicates that a new set of plates is generated instead of the old ones every time the sum of plate movement slows down too much.

These variables, along with the number of plates, control the behaviour of the Plates Model and will affect its outcome greatly.

Temperature Range - this Sub-Tab lets you set the following options:



Temperature Range

This is a series of 6 numbers that set the limits for the different Temperature Levels.

Each number must be between **0.000** and **1.000**. NB: The numbers MUST be in **ASCENDING** order.

Precipitation Range - this Sub-Tab lets you set the following options:

Maps

Map Options

World Options

Basic Options

Advanced Plate Options

Temperature Range

Precipitation Range

1:	0.059	▲ ▼
2:	0.222	▲ ▼
3:	0.493	▲ ▼
4:	0.764	▲ ▼
5:	0.927	▲ ▼
6:	0.986	▲ ▼
7:	0.998	▲ ▼

Output Options

Advanced Export Options

**Generate World
and All Maps
(ex Ancient Map)**

Ancient Map Options

Precipitation Range This is a series of 7 numbers that set the limits for the different Precipitation

Levels. Each number must be between **0.000** and **1.000**. NB: The numbers MUST be in **ASCENDING** order.

Output Options - this Sub-Tab lets you set the following options:

Maps

Map Options

World Options

Basic Options

Advanced Plate Options

Temperature Range

Precipitation Range

Output Options

Create B&W Images?

Yes No

Enable Verbose Messages?

Yes No

Use Protocol Buffer?

Yes No

Fade Borders?

Yes No

Export Format:

Portable Network Graphics (|)

Export Data Type: uint8

Advanced Export Options

Generate World
and All Maps
(ex Ancient Map)

Ancient Map Options

Create B&W Images? This is a simple Yes/No choice and determines whether some of the Maps should

be in Black & White or Colour.

Enable Verbose

Messages? This is a simple Yes/No choice and determines whether the pop-up shows more detail when generating the world.

Use Protocol Buffer? This is a simple Yes/No choice and determines whether to use the Google Protocol Buffer, or HDF5 to store the world data. NB: HDF5 generates a smaller world file.

Fade Borders? This is a simple Yes/No choice and determines whether to fade out the borders of the world.

Export Format This is a drop-down allowing the selection of the Format for the Maps. This contains the usual image formats (png, jpg, gif etc.) as well as many cartography formats (Erdas Image, ERMapper etc.)

Export Data Type This is a drop-down allowing the selection of the Data Type for the Maps. This contains many options from **uint8** (unsigned 8 bit integer) to **float64** (64 bit floating point).

Advanced Export Options - this Sub-Tab lets you set the following options:

Maps

Map Options

World Options

Basic Options

Advanced Plate Options

Temperature Range

Precipitation Range

Output Options

Advanced Export Options

Export Dimensions:

Width: 1024

Height: 1024

Export Normalised Min:

0

Export Normalised Max:

1024

Subset Start:

Width: 0

Height: 0

Subset Offset:

Width: 1024

Height: 1024

Resample Algorithm:

Cubic Spline

Export World

**Generate World
and All Maps
(ex Ancient Map)**

Ancient Map Options

The following options all refer to the export of the Heightmap of the World.

Export Dimensions:

Width This is a number representing the number of Pixels for the Width of the output. It must be between **256** and **8192**. NB: This should also be divisible by **8**.

Height This is a number representing the number of Pixels for the Height of the output. It must be between **256** and **8192**. NB: This should also be divisible by **8**.

Export Normalised

Min This is a number representing the minimum Normalised value of the output. It must be between **0** and **8192**. NB: This should also be divisible by **8** and be less than **Export Normalised Max**.

Normalised Max.

Export Normalised

Max This is a number representing the maximum Normalised value of the output. It must be between **256** and **8192**. NB: This should also be divisible by **8** and be greater than **Export Normalised Min**.

Normalised Min.

Subset Start

Width This is a number representing the start Width value for the Subset of the output. It must be between **0** and **8192**. NB: This should also be divisible by **8**.

NB: It must be less than the **Export Dimensions Width** of the output.

Subset Start

Height This is a number representing the start Height value for the Subset of the output. It must be between **0** and **8192**. NB: This should also be divisible by **8**.

NB: It must be less than the **Export Dimensions Height** of the output.

Subset Offset

Width This is a number representing the actual Width value for the Subset of the output. It must be between **0** and **8192**. NB: This should also be divisible by **8**.

NB: When added to the value entered in **Subset Start Width**, the total must be less than, or equal to, the **Export Dimensions Width** of the output.

Subset Offset

Height This is a number representing the actual Height value for the Subset of the output. It must be between **0** and **8192**. NB: This should also be divisible by **8**.

NB: When added to the value entered in **Subset Start Height**, the total must be less than, or equal to, the **Export Dimensions Height** of the output.

Resample Algorithm This is a drop-down allowing the selection of the Algorithm to be used to resample the data for the output. This contains the following options:

Nearest Neighbour, Bilinear, Cubic, Cubic Spline, Lanczos, Average and Mode.

Export World This is a button that performs the Export of the world.

As an example, using the following values, and assuming the original Heightmap had dimensions of 1024x1024:

Export Dimensions Width	2048
Export Dimensions Height	2048
Export Normalised Min	0
Export Normalised Max	2000
Subset Start Width	512
Subset Start Height	512
Subset Offset Width	1024
Subset Offset Height	1024

Resample Algorithm

Cubic Spline

will upscale the original Heightmap from 1024x1024 to 2048x2048 using the Cubic Spline algorithm, normalise the new data-set to between 0 and 2000 and export a subset of this new data with a range of (512, 512) to (1536, 1536).

Finally, beneath the Tabs there is a button labelled **Generate World and All Maps (ex Ancient Map)** which basically does exactly what it says, generates the World and ALL [Maps](#), with the exception of the Ancient Map.

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Ancient Map Options Tab

Ancient Map Options

The **Ancient Map Options** Tab provides several options that ONLY apply to the generation of an [Ancient World Map](#):



Resize Factor

This is a number that determines the Factor by which the [Ancient World Map](#)

should be Larger than the standard. It must be between **1.00** and **99.99**.

Sea Colour This is a choice between **Blue** and **Brown** to determine the colour of the Oceans of the [Ancient World Map](#).

Land Colour This is a choice between **Green** and **Brown** to determine the base colour of the Land of the [Ancient World Map](#).

Draw Biomes? This is a simple **Yes/No** choice and determines whether Biomes should be drawn on the [Ancient World Map](#), or not.

Draw Mountains? This is a simple **Yes/No** choice and determines whether Mountains should be drawn on the [Ancient World Map](#), or not.

Draw Rivers? This is a simple **Yes/No** choice and determines whether Rivers should be drawn on the [Ancient World Map](#), or not.

Draw Outer Land

Borders? This is a simple **Yes/No** choice and determines whether the Outer Land Borders should be drawn on the [Ancient World Map](#), or not.

Verbose Messages? This is a simple **Yes/No** choice and determines whether the pop-up should display more information when generating the [Ancient World Map](#), or not.

Export Format This is a drop-down allowing the selection of the Format for the [Ancient World Map](#). This contains the usual image formats (**png**, **jpg**, **gif** etc.) as well as many cartography formats (**Erdas Image**, **ERMapper** etc.)

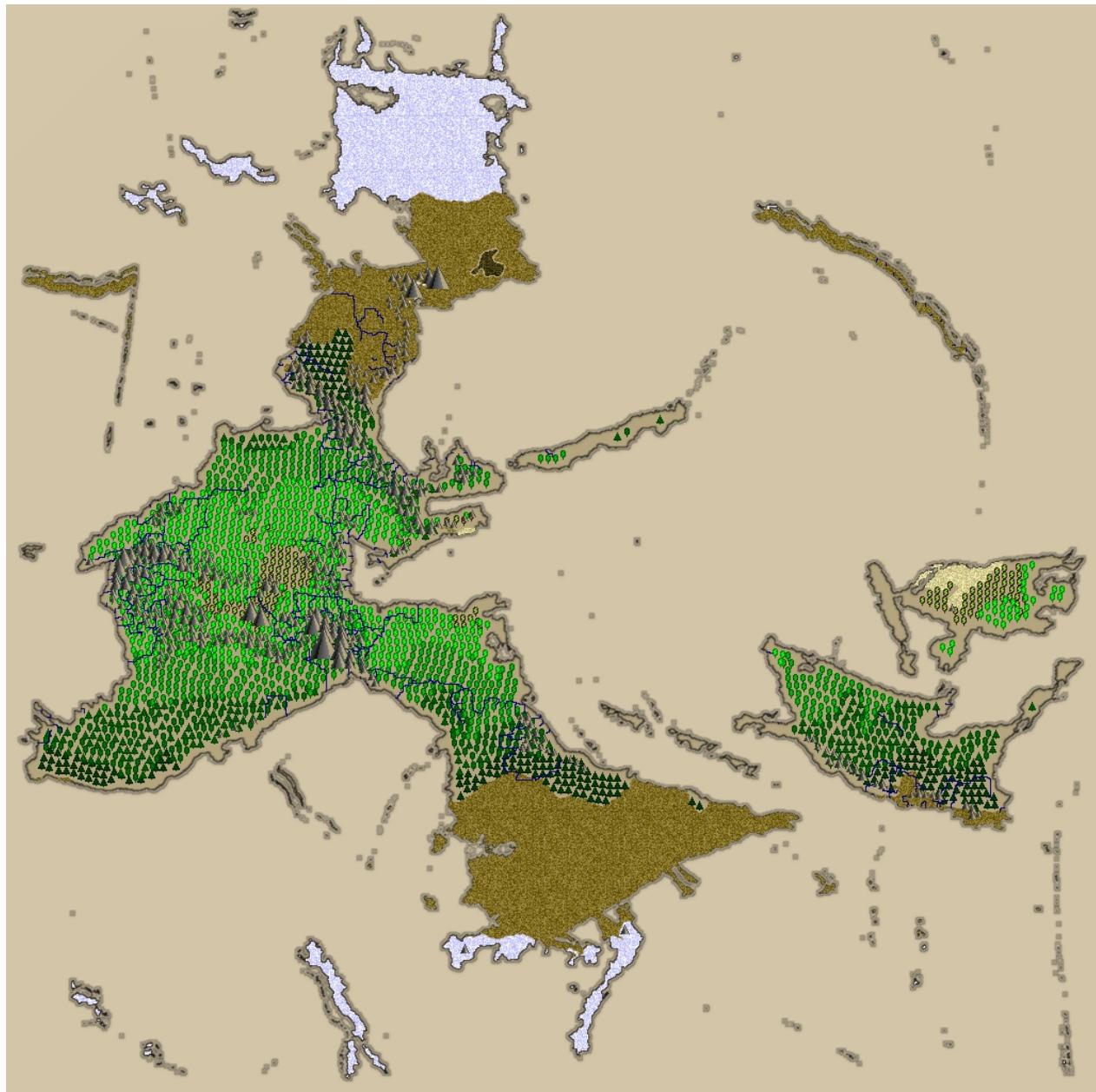
Export Data Type This is a drop-down allowing the selection of the Data Type for the [Ancient World Map](#). This contains many options from **uint8** (unsigned 8 bit integer) to **float64** (64 bit floating point).

Finally, there is a button labelled **Generate Ancient Map** which basically does exactly what it says, generates the [Ancient World Map](#)

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Ancient World Map

Ancient World Map



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Menus

Menus

There are several Menus available at the top of the UI:

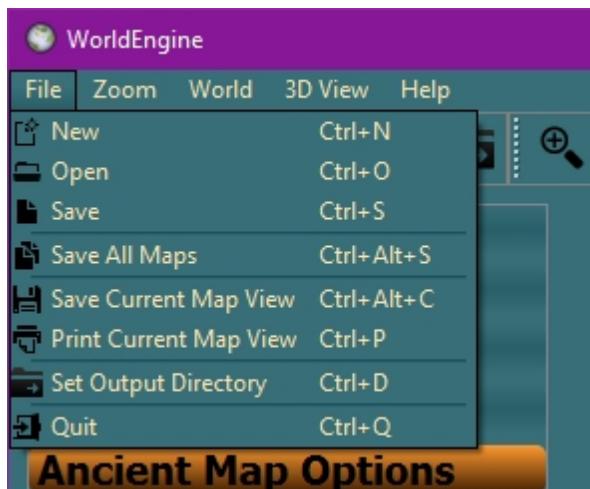
[File](#)
[Zoom](#)
[World](#)
[3D View](#)
[Help](#)

Note that all Menu options can also be accessed by a Shortcut Key combination. See the relevant Menu for full details.

File

File Menu

This is a fairly standard **File** Menu, so I'll only point out a couple of options.



Save Current Map View This allows the saving of the current view of the Map as displayed in the Main Viewport of the UI.

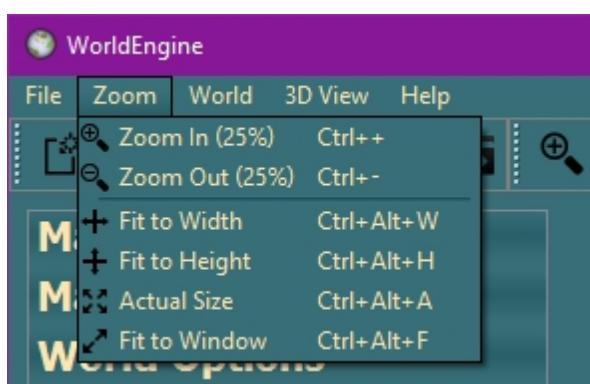
Print Current Map View This allows the printing of the current view of the Map as displayed in the Main Viewport of the UI.

Set Output Directory This allows the setting of the Directory to be used for ALL output (world, maps etc.).

Zoom

Zoom Menu

This menu contains several options for quickly changing how the map is displayed in the Main Viewport.

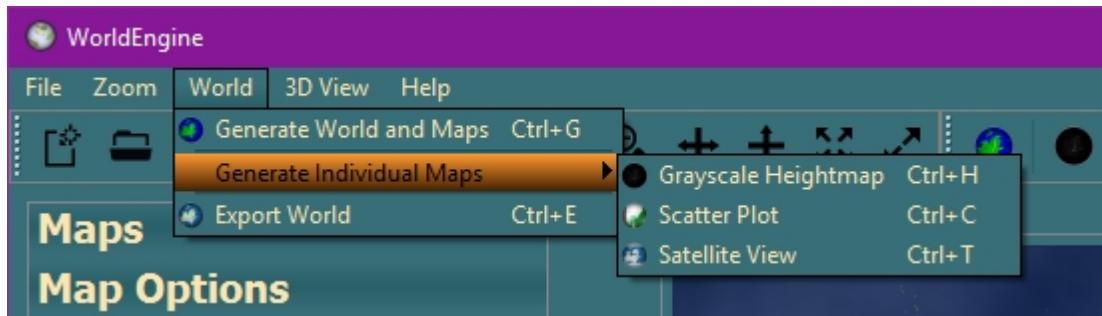


All of the options should be fairly self explanatory.

World

World Menu

This is a fairly self explanatory menu that allows several World options.



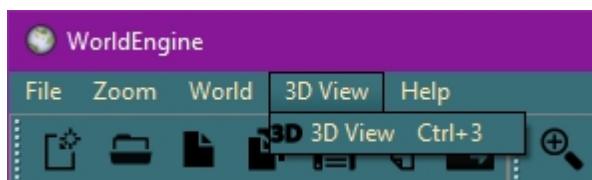
The only option I'll mention is:

Export World This option allows the current World to be exported using the selected Default Directory, Format and Data Type.

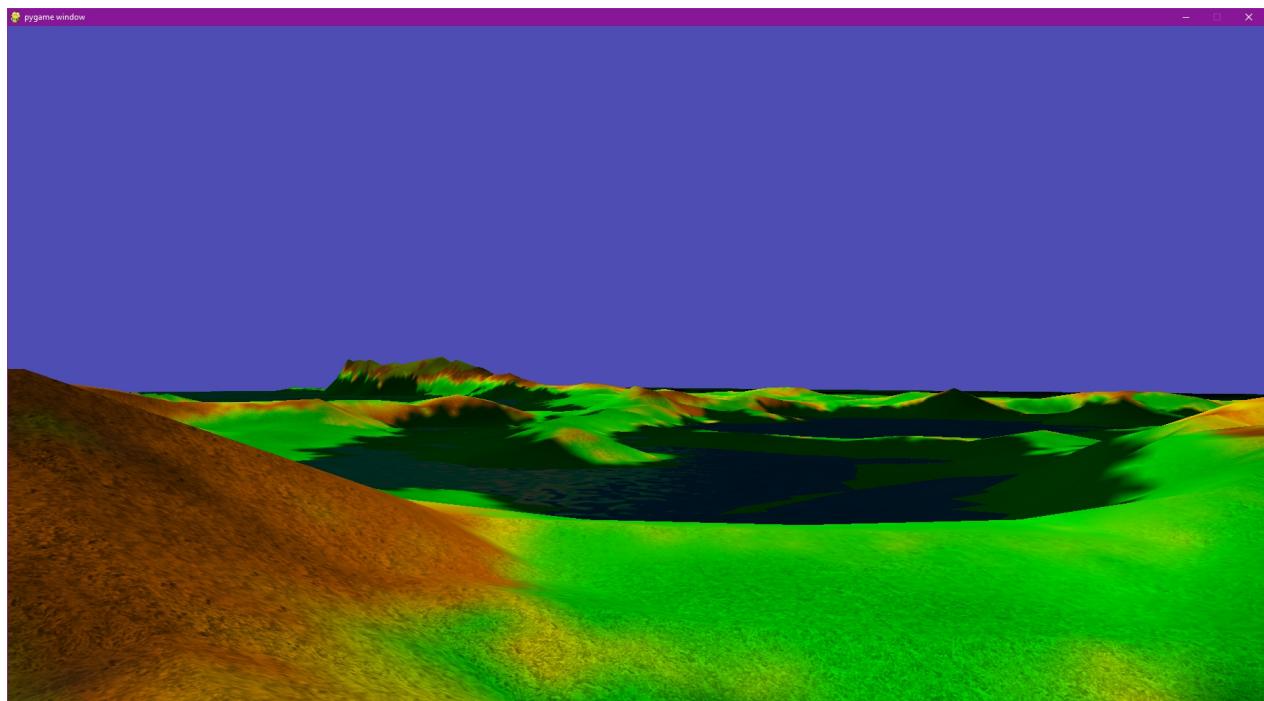
3D View

3D View Menu

This menu contains one option that opens up the 3D View of the World.



Once you have clicked on **3D View**, you will see another Window that contains a representation of your World in glorious 3D (courtesy of Pi3D - <http://pi3d.github.io/html/ReadMe.html> - with thanks to Tim, Paddy & Tom):



Note that this is extremely limited in that it only shows the one texture (If anyone is a whizz with Pi3D/PyGame, please feel free to add more textures to properly show Oceans, Rivers, Mountains etc.), but it does give you a general idea of what your World will look like.

To move around, use the following:

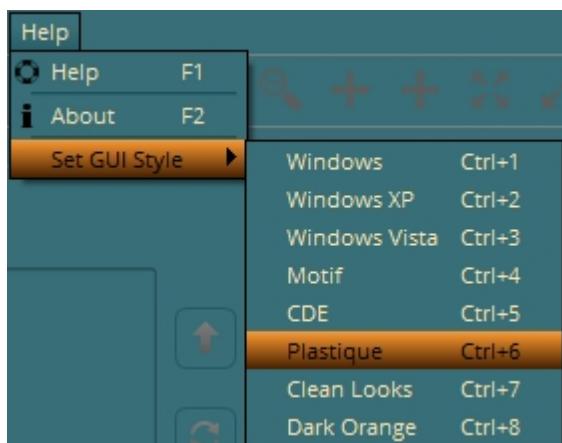
Mouse	To ROTATE RIGHT & LEFT and to LOOK UP & DOWN	
W Key	To move FORWARDS	
S Key	To move BACKWARDS	
R Key	To move UPWARDS	NB: Once you release this Key, you will slowly fall back to ground level.
T Key	To move DOWNWARDS	NB: This Key allows you to get back to ground level faster than normal.
O Key	To EXIT and return to the GUI	NB: The 3D View window will capture ALL Keyboard and Mouse inputs and restrict movement to within the bounds of the window. The only way to exit is to either use the o Key, or Ctrl-Tab to another window.

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Help

Help Menu

This is a standard **Help** Menu, with the usual **Help** and **About** options:



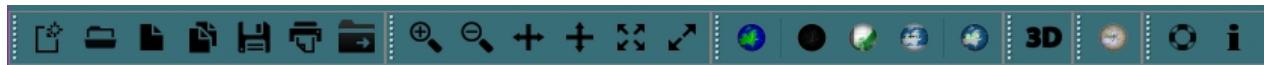
However, there is also a new sub-menu (**Set GUI Style**) that allows you to change the 'skin' of the UI from a selection of 8 different skins.

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Toolbars

Toolbars

Directly underneath the [Menus](#) are the Toolbars.



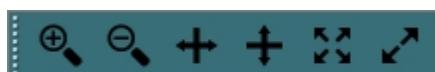
The options in the Toolbars basically mirror the options in the [Menus](#).

The first Toolbar is the **File Toolbar** and has the same options as the [File Menu](#), with one exception, there is no **Quit** option.



- New
- Open
- Save
- Save All
- Save Current Map View
- Print Current Map View
- Set Output Directory

The second Toolbar is the **Zoom Toolbar** and has the same options as the [Zoom Menu](#).



- Zoom In (25%)
- Zoom Out (25%)
- Fit to Width
- Fit to Height
- Actual Size

Fit to Window

The third Toolbar is the **World Toolbar** and has the same options as the [World Menu](#) with one exception, the **Ancient World** button has it's own Toolbar (see below).



Generate World and Maps
Generate Grayscale Heightmap
Generate Scatter Plot
Generate Satellite View
Export World

The fourth Toolbar is the **3D View Toolbar** and has the same option as the [3D View Menu](#).



3D View

The fifth Toolbar is the **Ancient World Toolbar**.



Generate Ancient World

The sixth, and final, toolbar is the **Help Toolbar** and has the same options as the [Help Menu](#).



Help
About

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