Terragen 2™ Documentation

## Creating Your First Scene

Table of Contents

I: Introduction

Although you can theoretically build your scene in any order you choose, there is a basic logical approach that we will follow on this first outing to give a good start-to-finish overview of the available tools and functions. We'll begin by creating a terrain, then try a little surface mapping, add some water, adjust the lighting, work a bit with the atmosphere, and finish up by rendering our scene at high resolution and quality.

For this basic overview well touch on each of the layouts except for Objects and Cameras. Techniques and controls such as camera movement will be introduced once when first needed, after which the operation will be referenced without repeating the instruction. If you need further information or practice with any specific function or feature you can refer to the in-depth sections later in the User Guide.

II: Terrain

When you start TG2 it takes you to the Terrain layout by default. The world in TG2 is based around a full globe, which starts out completely smooth. To create your landscape you will use procedurals and heightfields, which are nodes that change the appearance of the surface of an object or some other part of the scene. Some nodes may add colour or texture to a surface, while others may change the shape of a surface through a technique known as displacement. TG2 supports both procedurals and heightfields (more on that in the next section) but by default there is a Heightfield generate in the scene with a Heightfield shader as its parent. Let's take a look at the generate node so we can start to create our world.
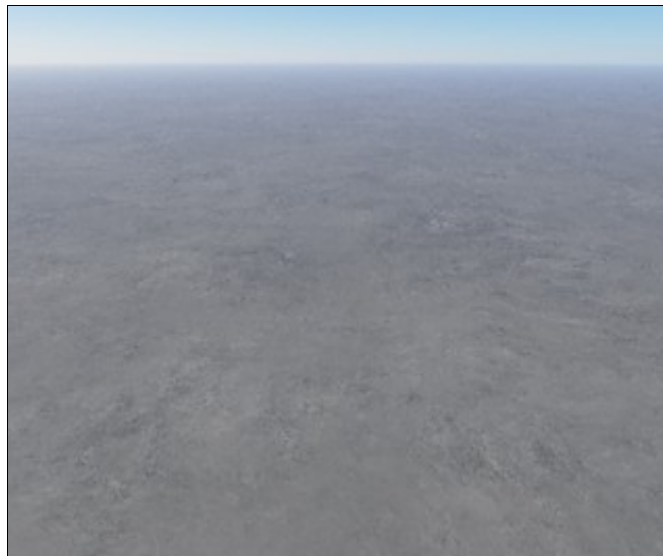
The default scene, a flat grey planet

Left-click on the *Heightfield generate* node to bring up its settings below. At the bottom of the *Heightfield generate* node settings you will see the 'Generate Now' button. Click it and wait for it to process – it should take less than a minute – and when it completes you should see the '3D preview' update with a view of the newly generated terrain. You'll notice that the terrain seems a bit far off, sloping down toward the camera in the foreground. Let's move the camera over there for a closer look.
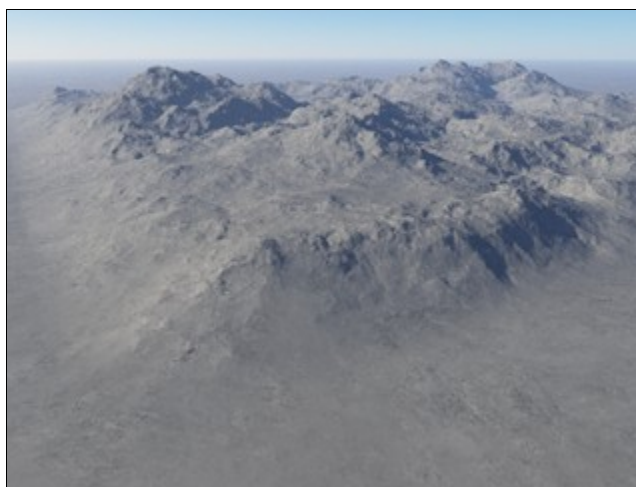
The heightfield has been generated

Now we'll move the camera a bit. Please refer to the 'Mouse and Key Settings' under the 'Help' menu for specific keys for your platform and settings. With the Windows defaults you can hold down the Alt button, Left-click and drag **upward** in the 3D preview to move your view **down**. You want to see just about half ground and half sky, but make sure you are still well above the surface of the planet itself. Now, still holding Alt, Middle-click and drag **down** to move your camera **forward**. Finally, Right-click and drag **up** to move the camera **down** into the terrain. You can fine-tune your view using these controls to find a perspective you like. Feel free to play with the camera, the specific position isn't important.

There is another method for adjusting your camera which provides more visual control, and it's new to Terragen 2. In the upper-right corner of the '3D preview' is a 4-pointed circle that opens the 'Navigation Controls' widget. Click on the icon and a full navigation panel will open up with controls that are very similar to many other terrain navigation applications. In the centre are the horizontal movement controls. Left-click-and-hold inside the circle to move in a given direction – clicking at the top of the circle will move forward, clicking in the left side will move left, etc. The closer to the centre of the circle your cursor is, the slower and more precise your movement will be. You can also drag the cursor while moving to adjust speed as needed. The fastest and slowest speed will be within a range set by the 'Movement speed' control at the bottom of the widget. At the bottom-left is a +/- for altitude control, above that on the left is a tilt control, and across from that on the right is a rotate left/right control. These are the most commonly used camera controls, but you can see that many other controls are provided. You can hover your mouse over these to reveal the tooltips and find out what each control does.

Once you have found a position you like, hit the 'Copy to Current Camera' button on the bottom-left of the '3D preview' toolbar to set the current camera position to this view. **If you don't press 'Copy to Current Camera' then the render will use the original camera position.** Press the 'Open Render View' button represented by a small capital R in the 'Top Toolbar' (or press F3) to bring up the 'Render View' then press the 'Render' button in the upper-left. You can also use Ctrl-R to bring up the 'Render Window' and begin rendering immediately. Congratulations, you are now rendering your first scene! First you will see the screen covered by "dots" - this is the Global Illumination (GI) pre-pass gathering information about the scene. The pre-pass is a normal part of rendering with GI enabled. Once the pre-pass is finished, you will see the full render pass take over and finalize the scene. It may take a few minutes to finish rendering. Wait for it to complete, then press the 'Save' button and specify a location and file type if you'd like to save it for posterity.
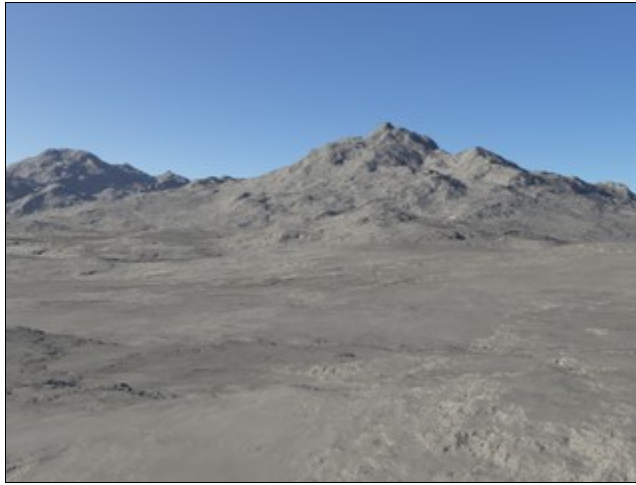
Not a bad view

Now let's get a different perspective on our scene. Use the rotation and other camera movement controls to move your view up to a position fairly high above the terrain. You will notice that the mountains end abruptly in the distance. This is fine if you stay hidden inside the mountains here, but it's clear there are limits to this heightfield we have created. What of the promise of full planets? This is where procedurals come in and if we want an endless horizon of terrain, they are the best way to achieve it. You can also use more than one heightfield or increase the size of your heightfields, but we will explore those options later. So let's get rid of this heightfield and start creating our global terrain.

The limitations of heightfields

Click on the *Heightfield shader* parent node in the 'node list' and then uncheck the checkbox next to 'Enable' in the top-left of the parameter pane. This will disable the *Heightfield shader*. You will see the preview update and we're back to a smooth world again. Now click the 'Add Terrain' button and choose 'Power Fractal' from the drop-down list. You should see a *Fractal terrain* node added to the 'node list' on the left, followed by an immediate update to the preview with your new terrain.

Let's take a moment to name our new terrain node descriptively so we can keep track of it later – a name like "Mountains" seems appropriate. To rename a node simply click on it in the 'node list' to bring up its settings then type the new name into the text box at the top, next to the 'Enable' check box.
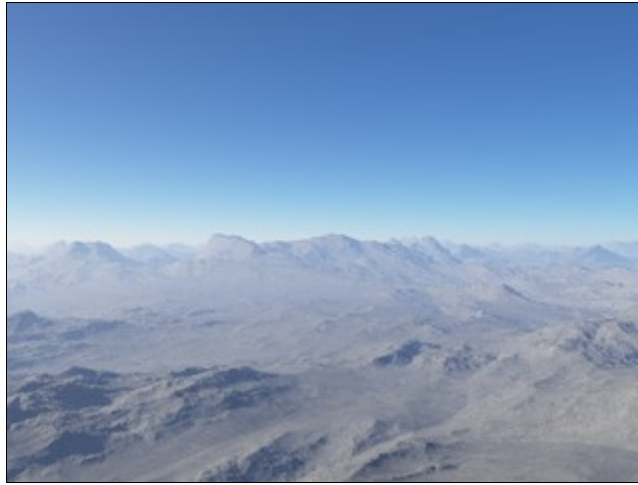
Mountains as far as the eye can see!

At this point you may find the '3D preview' isn't rendering properly, with the bottom of the terrain cut off, or odd strips floating in the middle of the view. This will occur if your camera is under the terrain, which is usually the result of changing the terrain shape or scale while your camera is close to the ground. To check for this problem and resolve it, hold down Alt and move your mouse over the '3D preview' then click and hold. Notice the 4 sets of numbers on the bottom of the preview window which we talked about earlier are now showing different values than before. 'Vx', 'Vy', and 'Vz' now refer to the current position of your camera in X, Y, and Z coordinates, relative to the coordinate origin (remember that Terragen 2 uses Y = up).

The important value to look at is 'Vheight' which gives you your height above the terrain. If it is a negative value then you are below the terrain. Move the camera up until the 'Vheight' value is no longer negative and press 'Copy to Current Camera' when you're done. Note that TG2 uses a variable camera movement speed that is tied to terrain proximity, meaning that your movement adjustments are on a smaller scale when you're close to the terrain. This makes it easier to make precise adjustments where it matters most. Once you've made those adjustments the '3D preview' should now be displaying properly and your camera is above the terrain where it should be. Next we'll move the camera to get a better view.

Tilt the camera's view down toward the terrain until you are looking more or less straight down, then begin zooming out by holding the Middle mouse button (or Alt+Shift and Left mouse button together) and dragging upwards. Do this a few times and soon you'll be high above your planet and, if you give the preview a moment to update, you can see your terrain covers the entire surface! This is the power of procedurals. Click the 'Select different view camera' button and choose 'Current render camera' to return to your previous view – that of the current camera.
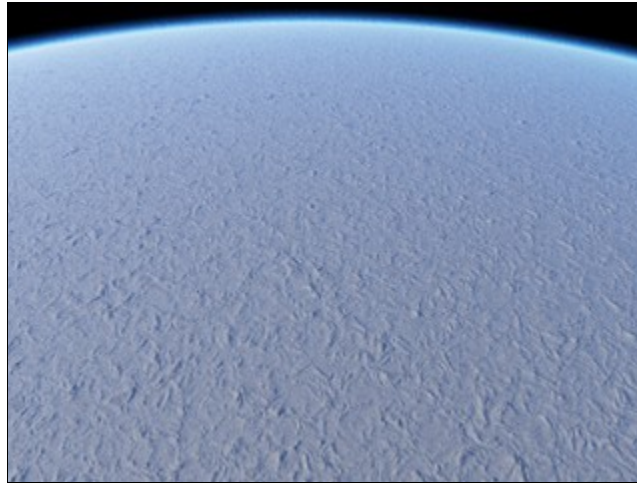
A procedural planet

Finally, let's find a good camera perspective from which to build and view the remainder of the scene development. You'll want to find a vantage point on or near a mountain or other high point of terrain, so that you can see a full range of altitudes for texturing, and also to provide a good location for placing our lake later in this tutorial. Look for a mountain with a valley or other depression below it, and a good long view of the terrain into the distance. You can choose whether you want to be close to the terrain, or simply raise your camera higher above the landscape to achieve this vantage point. Again, once you have found your desired camera position, **be sure to press the 'Copy to Current Camera' button.**

III: Texturing (Shaders)

Now that we have a terrain covering our world we need to give it some more interesting colour and texture. Click on the 'Shaders' layout button to access the texturing functions. In Terragen 2 texturing, or "surface mapping", is accomplished using "shaders". "Shader" in Terragen 2 is a general term for nodes which generate or manipulate data that can then be interpreted as colour, displacement, etc. This shader data is used to create features in your scene such as surface texture and colour.

You will notice there is a single shader node to begin, with which is logically named *Base colours*. This node will form the basis of most of your surface map systems. If you're familiar with Terragen Classic, this is similar to the "Surface Map" default layer, which was the basis for the Terragen Classic surface map tree. However, unlike the base layer in Terragen Classic, the *Base colours* node has somewhat different settings from a typical surface layer. Let's click on *Base colours* and examine its settings for a moment. For now, we will only be paying attention to the most important things - you may jump to a more detailed explanation of these settings in the **Surface Mapping** section if you wish.

The more complex nodes are arranged in tabs to logically separate various related settings. The first tab of the *Base colours* node is 'Scale'. Some of these controls behave differently in the *Base colours* node than in a normal *Surface layer*, so we'll leave the settings default for now. You can read more about the settings on this tab and others in the detailed **Surface Mapping** section.

The main thing we want to do is adjust the base colour of the ground so click on the 'Colour' tab and we'll see if we can create a more interesting and realistic base for our surface map. For the *Base colours* node there are two colours defined and you can adjust the way they interact or turn each one on

and off separately. They are called 'High colour' and 'Low colour', but their names may be a bit confusing. They do not correspond to the high and low points of the current terrain but rather to the "high" and "low" parts of the internal noise function used by the *Base colours* node. This is similar to the "fractal noise" setting in Terragen Classic, although you have far more control in this case. For the time being we'll leave the other settings at the defaults and simply change the colours.

The 'Apply high colour' and 'Apply low colour' check boxes control whether each colour will be applied to the surface map and they also identify each colour control group, with high colour on the top and low colour below it. The numbers next to each represents the **brightness** of the colour. The brightness value can be numerically edited here or adjusted with the slider. To select the actual colour, including adjustments for hue and saturation as well as brightness, you can use the 'Current colour' box on the far right to interactively pick from a colour palette or manually enter specific RGB or HSL values. Click on the coloured box for high colour and you will see the standard colour picker pop up.
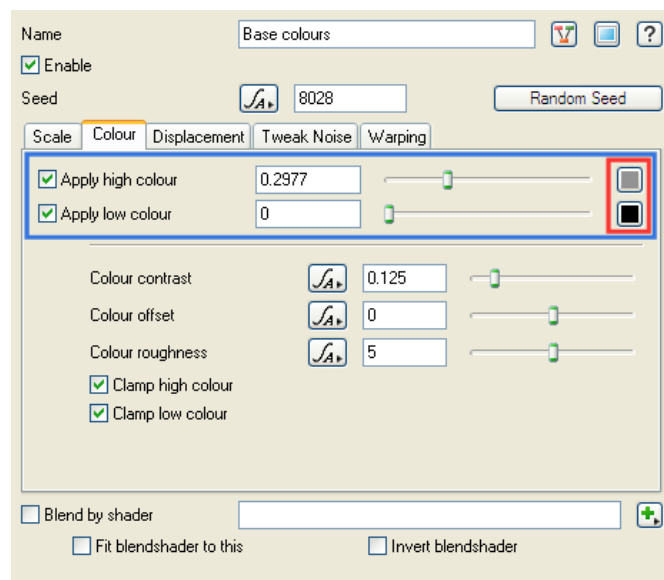
The 'Colour' tab of the *Base colours* node. The high and low colour setting boxes are outlined in blue. Click the colour boxes on the right, outlined in red, to bring up an interactive colour picker.
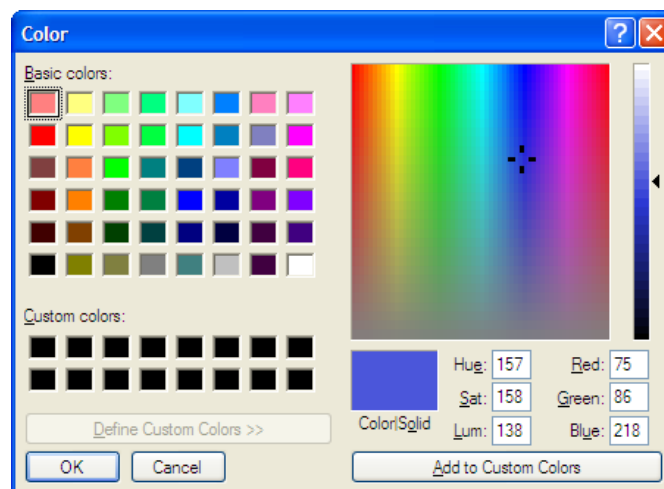
The Windows colour picker. The main colour swatch covers the full spectrum with highest saturation at the top and lowest at the bottom. The slider on the right adjusts brightness of the current colour.

Use the various controls to pick an appropriate colour, in this case a shade of brown to represent the dirt that forms the base of our surfaces, then click OK. You will see the preview update with your new colour choice. Continue adjusting the colours of each until you are satisfied, then we'll move on to adding additional surface layers.

Click the 'Add Layer' button at the top of the 'Node List' and select '*Surface Layer*' from the drop-down menu. *Surface layers* default to having full coverage and a middle-grey colour, so your terrain will immediately turn completely grey. Click on the *Surface layer* to bring up its settings, many of which will seem somewhat familiar if you are experienced with Terragen Classic. There are a lot of settings in a *Surface layer* but we want to keep things simple for now so first we'll adjust the colour and then the distribution to try to achieve a grass-like surface.

First let's change the name at the top to something descriptive, "Grass" for example. This will help us keep track of things when we add more layers later. Next we'll adjust the colour. The colour settings here work the same as in the *Base colour* node except that there is only one colour. Click the 'Current colour' box to choose a new colour and pick something greenish-yellow with low-medium saturation.

Now we'll move down to the additional settings tabs. Leave 'Coverage and breakup' the way it is for now and go to the 'Altitude constraints' tab. Turn on 'Limit maximum altitude' using the check box, then set 'Maximum altitude' to about 500 or until you start to see brown mountain tops in the preview. Change the 'Max altitude fuzzy zone" to about 100 – this will control the sharpness of the cut-off at the altitude constraint. Now move to the 'Slope constraints tab', turn on 'Limit maximum slope' and set the 'Maximum slope angle' to about 25 with the 'Max slope fuzzy zone' at about 10. Altitude and fuzziness settings are all specified in meters, slope settings are in degrees. Adjust these settings to your preference. You may wish to open the 'Render View' (F3) to test your settings in an actual render.

Although your grass surface is starting to look more natural now, you'll probably find it looks a bit too uniform. We will use 'Fractal breakup' to address this, similar to adjusting 'Fractal Noise' in Terragen Classic's surface map layers. Move back to the 'Coverage and breakup' tab. 'Coverage' controls the amount of the underlying surfaces that will be covered by this layer. When 'Fractal breakup' is enabled, values between 0.5 and 1 will control a blend between the full effect of 'Fractal breakup' and full coverage of the surface layer. 0.5 Coverage corresponds to the full influence of 'Fractal breakup' on the layer's distribution. Below .5 it will blend between zero coverage and full 'Fractal breakup'.

The strength of the 'Fractal breakup' setting itself can also be controlled. Values between 0 and 1 will tend to produce fairly natural results, with 0 being equivalent to turning off 'Fractal breakup' entirely and 1 being a smooth 'Fractal breakup' influence on the current layer's distribution. Values above 1 will make the effect sharper, very similar to turning up 'Fractal Noise' in Terragen Classic surface layers. For now we will aim for a nice blend with a value of .7 for 'Coverage' and 1.0 for 'Fractal breakup' itself.

Do a render of the current scene to get an idea of where we're at so far. Then, before we move on to adding water to the scene, add another surface layer on your own and try to make it look like snow. Imagine how you would use the controls you have learned to make a snow layer. Adjust it until you are satisfied with the effect, referring back to the other surface mapping paragraphs above as needed. Don't forget to give your snow layer an appropriate name. When you are satisfied, do another render and look at how far your scene has come already!

Now it's time to add one last major element to the landscape portion of our scene, and then we can move on to the atmosphere and final details.

IV: Water

You won't necessarily use water in every scene you create, but it can make a nice addition in many cases, so it will help to get introduced to it now. Water can be added to your scene in several different ways with Terragen 2. Since we are aiming for an overview of most of the major layouts, we'll use the standard *Lake* node in the 'Water' layout. So first, switch to the 'Water' layout by clicking its button on the top toolbar.

The Water layout is fairly simple. You can only add one type of water object which is the *Lake*. The *Lake* node is a flat, circular plane with a specified radius and altitude. The Lake object comes with a default *Water shader* attached for texturing, which provides waves and other surface effects, as well as realistic transparency and reflection.

Click on the *Lake* in the 'Node List' to bring up its settings. The first thing to adjust is the size and depth of the lake. The 'Max radius' defines the radius of the lake in metres. The 'Water level' defines the distance above the base surface of the planet sphere (not from the terrain itself). The actual water **depth** is therefore the difference between the 'Water level' and the altitude of the underlying terrain. So for example if your *Lake* is at the default 'Water level' of 100 metres, but the terrain under the lake has an altitude of 25 metres itself, then the depth of your lake will only be 75 metres (in other words the 'Water level' is at 100 metres , but this is only 75 metres above the terrain beneath it). Remember also that terrain can have a negative altitude, so the depth of your lake may actually be greater than the 'Water level' would suggest, for example at a value of 100 metres, over a terrain with a -150 metre altitude, the actual depth of the water would be 250 metres. For now the default 100 metre 'Water level' should be fine.

The *Lake* starts out with a very large radius of 100,000 metres, giving you plenty of lake area to work with. However the larger your lake area, the longer it will generally take to render, so it makes sense to limit it to the area you will actually see in your scene. The radius of the lake is also a factor in creating

a realistic lake effect in your scene. Since the *Lake* object is a flat, circular plane, the area of the lake is defined by its intersection with the high points of nearby terrain. As a result you will need to place it carefully in an appropriate place, something like a depression in the terrain, in order to achieve a realistic effect.

There are many ways to limit the area that a *Lake* object will cover, but we'll keep it simple for now by positioning our view at one edge of the lake and allowing it to recede into the distance. Making a properly self-contained lake is slightly more involved and is covered in the in-depth Water section. For now, first reduce the size of the lake to something more manageable, let's try 10,000 metres. This will give us plenty of area to work with, but help keep render time down and avoid covering our entire scene with water. Now we'll want to position the lake near the edge of our camera view, so we can either move the camera to the edge of the lake, or move the lake itself. We will probably need to move the lake in any case, so that its edge is not obvious in the foreground, so let's look at how to do that.

First we'll use a trick to roughly position the *Lake* object, and then fine-tune it with more specific controls. To start, think about where you want the lake to appear in your scene, preferably in a depression in your terrain, and in the middle-ground or even in the distance. We'll be positioning the centre of the *Lake* object, so remember that it's 10,000 metres in radius and pick a point that's a bit further away than you want the shore to be. Move your mouse cursor over the point you want the lake to centre on and right-click to bring up a context menu, then choose 'Copy coordinates'. Now click on the *Lake* node in the 'Node List' on the left to bring up its settings. Finally, click the clipboard icon to the right of the 'Centre' 'X, Y, Z coordinate boxes' and choose 'Paste'. This should replace the X, Y, Z coordinates with those from your chosen point, and thus re-centre the *Lake* object to that point. Note that you can do this with any object or other node with coordinates, as well as copying and pasting other data such as slope, and it can be a great time saver. Now do another test render and you'll probably see that the lake still need some adjustment to its position for better realism, so now it's time to fine-tune.

Lake edge is visible lower-right

When the *Lake* was added to the scene you may have noticed a white box that in the '3D preview' surrounding the new *Lake* object. This is the object's "bounding box", showing the edges of the object.

Clicking this box allows you to select an object and manipulate it. All objects have a bound box that allows you to interact with and adjust them in this way.

Move your mouse cursor over the box in the '3D preview' and you should see it turn yellow. If you left-click while the box is yellow, you will select it and new controls will appear in the '3D preview'. You should see 3 lines, each ending in an arrow, each a different colour – red, green, and blue - once the *Lake* is selected. These are movement controls corresponding to the 3 axis of the scene - the green arrow being vertical or "up" along the Y axis, and red and blue being horizontal, the X and Z axis respectively. When you hover the cursor over one of these arrows, it will highlight and if you click at this time and drag left-right, you will move the object along this specific axis. You can also click the centre point, where the 3 axis arrows meet, to drag the object freely without being limited to a single axis of movement.

For now we want horizontal movement only, so click the axis pointing roughly toward the camera and drag to move the lake edge to the middle-ground; not too close, so we don't see the lake edge in the foreground, but not too far so that we still see water. You may also want to drag along the other axis to move the lake to where you want it. Once you've found a good position, you may need to adjust the 'Water level" - you'll want it to be low enough that the edges are covered by the nearby terrain and you get a realistic shore. You should get something like this.

If necessary, adjust the 'Water level' further until any unrealistic edges are gone. Placement can be tricky, but with a little perseverance you should be find a good position. You'll find more information about working with water in the in-depth Water section.

V: Atmospherics and Lighting

We're moving on to the final elements of our basic scene here and it's time to work with some of the most exciting and impressive parts of TG2. Terragen 2's light model supports full, large-scale Global Illumination, and its atmosphere system includes a complete planetary atmosphere and fully 3D

volumetric clouds, all of which together can produce unparalleled levels realism. We'll start by making a simple lighting change, then make some minor adjustments to the default atmosphere and finally add some high-level volumetric clouds to show off TG2's capabilities a bit.

The first step is to adjust the light so we can test any atmosphere and cloud changes in the proper lighting environment. Although TG2's lighting functionality is fairly robust and versatile, our needs for this basic scene are quite simple. We'll just want to adjust the lighting so that it highlights our terrain nicely. So let's jump into the 'Lighting' layout (click the 'Lighting' tab at the top) for a moment and make a few changes.

The default scene uses a Global Illumination setup which has a *Sunlight* for primary illumination and an *Enviro* (Environment) *Light* for indirect lighting (such as that from the sky itself). Alternatively you can also use a group of fill lights to simulate indirect lighting, which can provide somewhat faster render time, and more consistent results in animation, however the Global Illumination model provided by the *Enviro light* is the most realistic option so you'll want to leave it enabled in most situations.

With Global Illumination active our lighting concerns are fairly simple. All we really need to do is adjust the sun angle to achieve the desired lighting. Click on the *Sunlight* node at the bottom of the list to bring up its settings. Standard light settings are simple. 'Heading' and 'Elevation' control the position of the light source relative to the coordinate origin and they are both measured in degrees – 360 degrees for the 'Heading' and 90 to -90 for the 'Elevation'. A setting of 90 for 'Elevation' corresponds to a light source directly overhead at the coordinate origin of 0,0, while -90 is directly below (and thus generally out of sight).
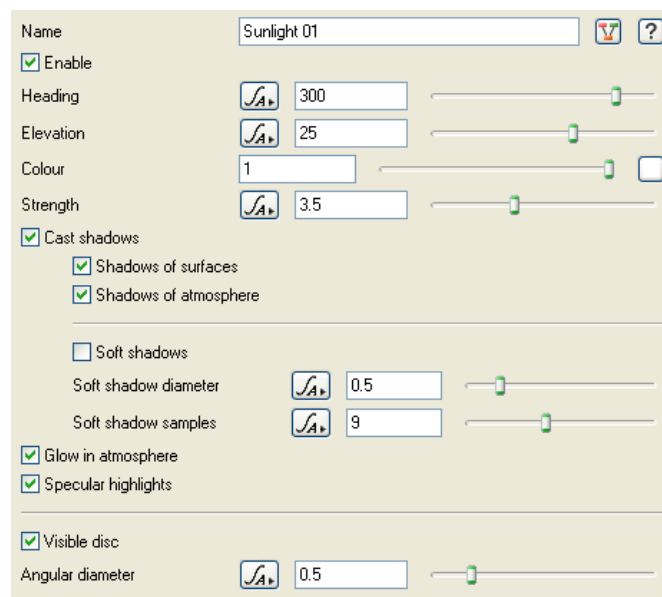

The sunlight settings panel

The lighting that works best for your particular terrain and camera angle will vary greatly, but I find a light behind and to the left of the camera often works fairly well. You may also want to reduce the sun elevation a bit. The heading of the *Sunlight* node is displayed in the small 'Compass' navigation aid in the upper-left of the '3D preview'. You can also adjusting 'Heading' and 'Elevation' and watch the '3D preview' as it updates to quickly get an idea of which direction you need to move the sun to get the lighting angle you want.

Once you're satisfied with the lighting, it's time to adjust the atmosphere. Let's move to the 'Atmosphere' layout and do some fine-tuning. In the 'Atmosphere' layout you'll see there is a single *Atmosphere* node by default. Click on it to bring up its settings. The *Atmosphere* settings can be some of the most difficult and most sensitive to change, so we'll just adjust a few things for now.

On the first tab 'Main' you'll find controls for 'Haze' and 'Bluesky' such as 'Density' and 'Colour', similar to Terragen Classic's 'Atmosphere' window. If you find your scene is a bit too hazy, you can reduce 'Haze density' here to increase clarity. Be aware however that this can also reduce the sense of depth, scale, and ultimately realism in your scene. I find the default TG2 atmosphere to be a bit too hazy for my taste so let's reduce it just a bit - a conservative value of 1.2 should do for now.
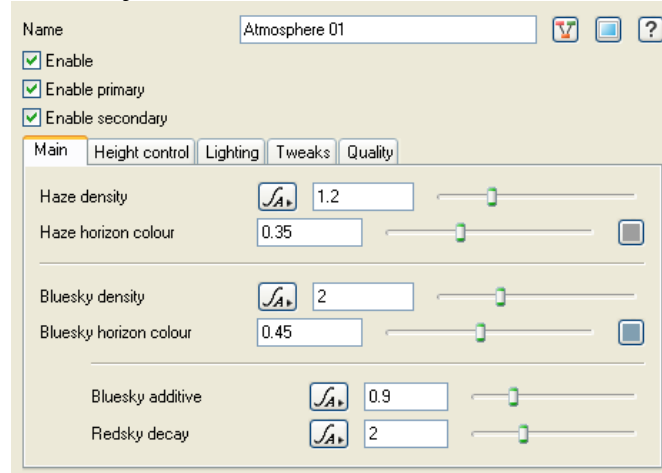

The atmosphere settings panel

Try adjusting the 'Bluesky additive' and 'Redsky decay' settings at the bottom in small amounts. You will notice very large changes in the scene and it will take you quite a while to get familiar with a good range of values for these controls. Also notice that each change to these settings affects another setting on this tab – the atmosphere controls are highly interdependent. 'Bluesky density' and 'Bluesky horizon colour' have similar effects on other settings when directly adjusted. For this simple daytime scene you will probably want to leave these at the defaults but you might want to play with them if you were working with the sun near or beyond the horizon, or were trying to create a more alien look to your landscape. You can use Undo (Ctrl-Z) or the settings in the image above to return to the defaults if desired.

Once you have a satisfactory look to your sky, let's finish up the scene by adding some nice clouds to add interest in our plain blue sky. Click on the 'Add Cloud Layer' button above the 'Node List' and select 'Mid-level: Altocumulus (3D/Volumetric)'. Your sky should immediately be covered in some scattered high altitude three dimensional clouds. Try a render to see how they look. You should get something like this.
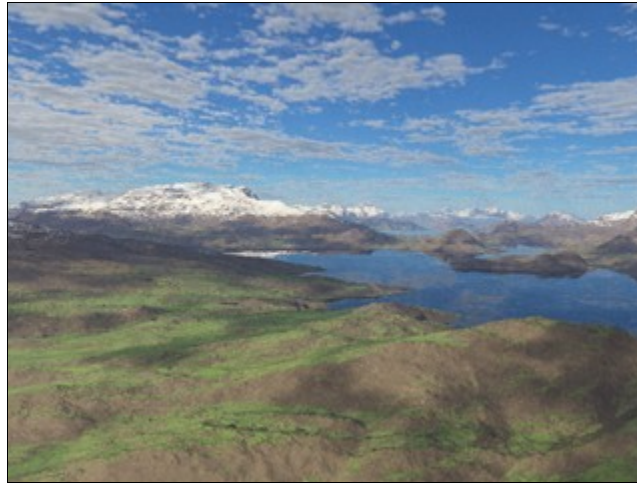
The defaults can look a bit flat, so let's adjust things a little for a more dramatic effect. Click on the newly created *Altocumulus layer* to bring up its settings. Although we'll only be adding one cloud layer for this exercise, it's still a good idea to name it descriptively, so take a moment to do that first. On the 'Main' tab you'll see 'Cloud altitude', 'Cloud depth', and several other significant controls. You'll notice the cloud depth is just 150 meters, realistic but a bit thin. Let's increase that to about 500 for some added impact. Try another test render and see what you think. In my scene cloud coverage was also a bit high so we'll adjust that parameter down near the bottom, just above 'Cloud colour'. Reduce 'Coverage adjust' to about -0.25 and render another preview. Finally, I find the default clouds to be rather grey, and I'd like to have a brighter, more cheerful appearance, so I'm going to adjust both the 'Cloud colour' and 'Scattering colour' to make them a tad lighter. One last render and we've got something like this.
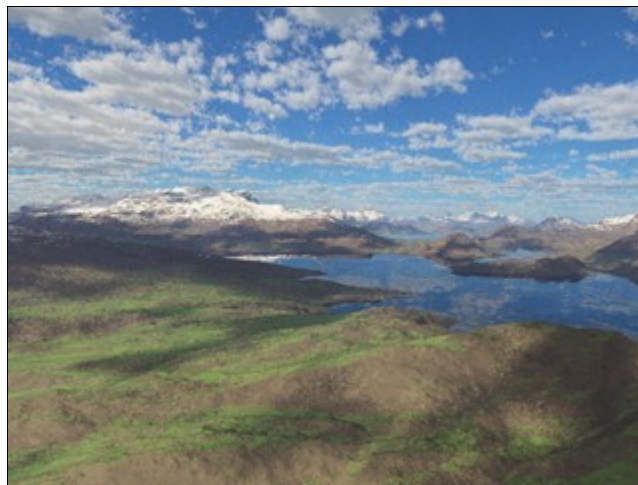
This is not bad, but perhaps there is too much foreground shadow. These shadows are being cast by our new clouds, so we'll need to adjust them to fix the problem. There are many ways to change the position and shape of clouds, but if you're not attached to the specific shapes, the easiest thing to do is simply try another random cloud pattern. To do this, click the 'Pattern' button at the bottom of the 'Node List'. If this button is greyed-out, make sure you have the cloud layer selected first, then try again. The 'Pattern' button should bring up a separate window of settings for the *Density fractal* of the current cloud layer. This is where you could adjust settings to control the cloud shape more precisely. For now

just press the 'Random Seed' button on the upper-right to get a different random cloud shape. This is a very hit-or-miss approach, but again if the specific shape of the clouds is not important, it can often be the quickest and easiest way to get a better cloudscape. Press the button a few times, until you find a pleasing distribution of cloud and shadow in the '3D preview'. You may have to wait a moment for the preview to update with enough detail to be certain. Once you've found a pattern you like, try another render.


That looks good to me, so let's finalize our scene!

VI: Render Nodes and Quality Settings

You may have noticed in your preview renders that the detail wasn't quite up to par or that some areas were a bit grainy. That's fine for these preview renders while we're putting together our scene since the lower detail facilitates faster renders and quicker feedback. Naturally we can expect higher quality images to take a bit longer, but it will be worth the wait. Let's take a brief look at the available detail settings to improve the look of our scene and then we'll render a high quality final image.

Click on the 'Renderers' layout and you will be presented with a list of *Render* nodes. A *Render* node works with a *Camera* node; it defines important render-related settings including image resolution and format, overall quality, gamma correction, and contrast. You can use multiple *Render* nodes to setup a variety of commonly used render types and settings and quickly switch between them. The two default *Render* nodes are good examples of this. The *Quick Render* is a low detail, fast rendering setup while the *Full Render* provides higher resolution and quality at the cost of additional render time. You have been using the *Full Render* by default but in the future you'll be able to get faster preview renders by using the *Quick Render* or a custom render node setup for this purpose.

We want to setup a high quality "final render" so we'll base it off the existing *Full Render*. Click on *Full Render* in the 'Node List' on the left to bring up its settings. First you'll notice the 'Image width' and 'Image height' which are set to 640 and 480 respectively. This is a standard render size but it's a bit small for our high quality final image so let's set that to 800 for the width and 600 for the height – just type the new values into the 'Image width' and 'Image height' fields. The rest of these settings you can leave alone, but you'll want to take a look at the 'Quality' and 'Anti-aliasing' controls at the top of the 'Quality' tab below.
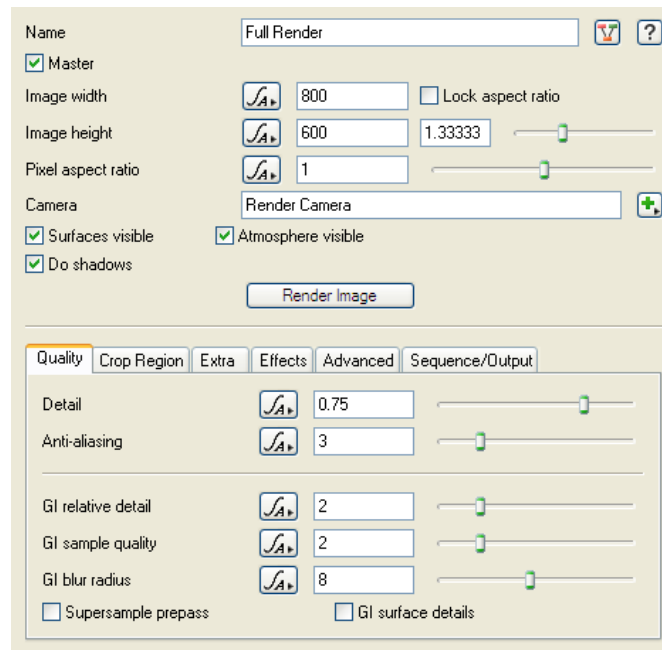
The *Render* node settings

In Terragen 2 the 'Quality' setting allows much finer control than in previous versions. It also allows higher detail than ever before, essentially eliminating the need for the "downsample trick" of Terragen Classic. You are likely to find that the default of 0.5 for 'Quality' is actually very nice looking. You will probably want to use up to 1.0 for final quality renderings, and you may rarely wish to use even higher settings for really complex scenes, but even 0.5 provides greater quality than non-downsampled images from previous versions. For now we'll increase 'Quality' to 0.75, striking a good balance between quality and render time.

Terragen 2 also gives you the ability to set a wide range of 'Anti-aliasing' values. Higher values give you smoother edges in your scene, but also increase render time. Many scenes will not need high levels of anti-aliasing, but if you are using imported objects such as vegetation, you will definitely want to increase this. The default of 3 will give you acceptable edge quality for a basic scene, but there is room for improvement. Let's set it to 6 for now in our 'Full Render' since we're aiming for better quality.

Now we want to test our new quality settings. But who wants to wait for an entire render to finish before you can find out if the new settings are doing their job? Terragen 2 includes a 'Crop' function that can easily facilitate the testing of new settings in small, faster rendering areas. Click on the 'Crop Region' tab and we'll setup a small crop area to test our changes. First check the 'Do crop region' box to turn the crop function on. You should see a red box appear around the borders of your '3D preview'. This red box indicates the boundaries of your crop region.

You can adjust the crop area using the 'Crop sliders', but it's much easier to simply drag the crop area boundaries in the '3D preview'. To adjust the crop area by dragging, move your cursor in the '3D preview' to the edge of the preview area where the red crop lines are showing. Once you're over a crop line that you can adjust, your cursor should turn to a two-sided arrow, corresponding to the directions in which you can adjust the box. Click and drag the box to change its size along this axis. You cannot drag the crop area outside of the overall render area. Drag the left, right, top, and bottom edges of the crop box to make a small box, then click the small square in the middle of it and drag to move the box itself. Move the crop box so that it incorporates both land and sky, preferably with some clouds included.

Render a test and see how the new detail settings look in your crop region.
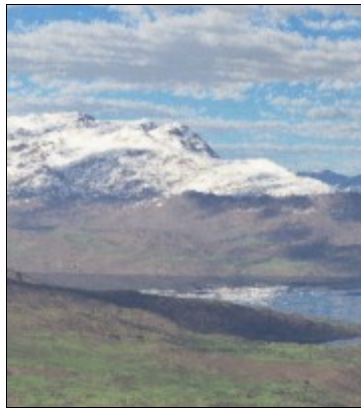
The default cloud detail settings will probably still be a bit grainy for a final render. The quality of clouds is actually defined in the cloud layer itself by the 'Number of samples' parameter. This allows different detail levels to be used for each cloud layer so that the detail can be used where it is most needed. For example taller cloud layers will tend to need more samples in order to be free of noise.

Click on the 'Atmosphere' layout and then on the cloud layer you created earlier and finally click the 'Quality' tab near the bottom. The Number of samples varies depending on the cloud preset that you use. The 'Altocumulus' defaults to 10, but since we increased the depth of the clouds we'll also need to increase the 'Number of samples'. Cloud samples affect both the appearance of noise within the cloud itself, and on its edges, but also in cloud shadows on the terrain.

Fortunately there is also a useful setting here that can help you decide how many samples you may need. The 'Quality' in the 'Quality' tab uses a basic understanding of cloud settings and their effect on quality vs. the need for increased samples to make an educated prediction of how many samples are needed. The 'Quality' setting will change when you make adjustments to other cloud settings, especially 'Depth' and 'Density'. You generally want to aim for a 'Quality' of 1, so let's make that change now. You'll notice that as you change the 'Quality' slider, the 'Number of samples' parameter also changes automatically, ending at somewhere around 32 for our chosen settings and a 'Quality' of 1. This adjustment, combined with the increased 'Detail' in the *Render* settings, should make for a great looking image, with cleaner clouds and shadows, as well as more detailed terrain and water. But let's make sure of that with another crop render before we start on the full final render.
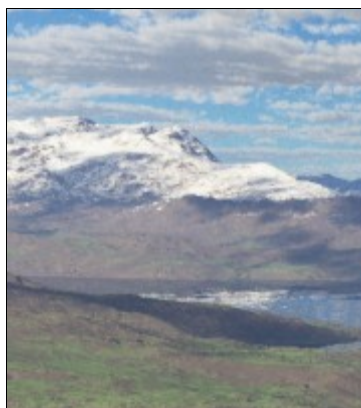
That looks pretty good so let's start the final image render. Go back to the 'Renderers' layout and click

on the *Full Render* node. Click on the 'Crop Region' tab and then uncheck 'Do crop region' so we can render the full image. Now we're ready to begin the final render. You can click the 'Render Image' button in the render node to begin a render immediately or start the render as you did before, with the 'R' button on the toolbar or F3. The render may take some time, depending on how fast your system is, up to 30 minutes or more on less recent systems, so may want to go grab a cup of coffee and perhaps a newspaper. But when you come back you'll have a great first image…

You should end up with something like this. Congratulations, you've just created your first Terragen 2 scene! With the fundamentals under your belt you're ready to experiment on your own and learn the secrets of this new world. Or, if you prefer, read on in the User Guide for more detail about specific functions.