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7. Groups
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1. Introduction

video version: <https://youtu.be/-PCZhtBaV2k>

Hello everyone!

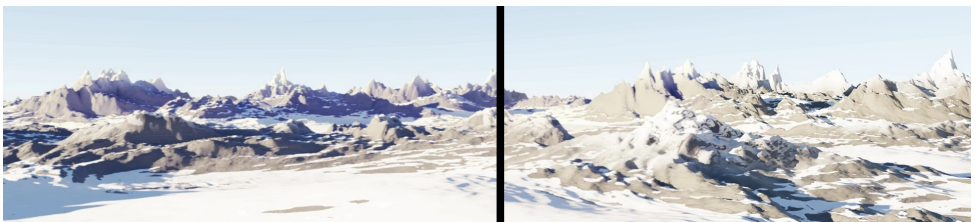
This is the first of a series of nine tutorials dedicated to **Atmospheric Perspective** in Blender 4.1 through Node Compositing in Post-production.

Aerial Perspective or **Atmospheric Perspective** refers to the decrease in **contrast** and **saturation** with distance in wide environments or backgrounds. Additionally, colors usually tend to **shift** towards the color of the background, which can be bluish during the day or reddish around sunset or sunrise.

It's also possible to **blur** the image with distance or add other effects; in any case, we need to obtain a mask based on the distance from the virtual camera, so that we can use that mask to implement the effects.

So, we'll be creating **a series of effects**, specifically blurring, blue tint, desaturation, and contrast reduction, in this order; however, note that you don't have to use ALL of these effects!

I'll showcase them one by one to make the series as comprehensive as possible, but you can choose to use only some or even just one of these effects, depending on your needs!



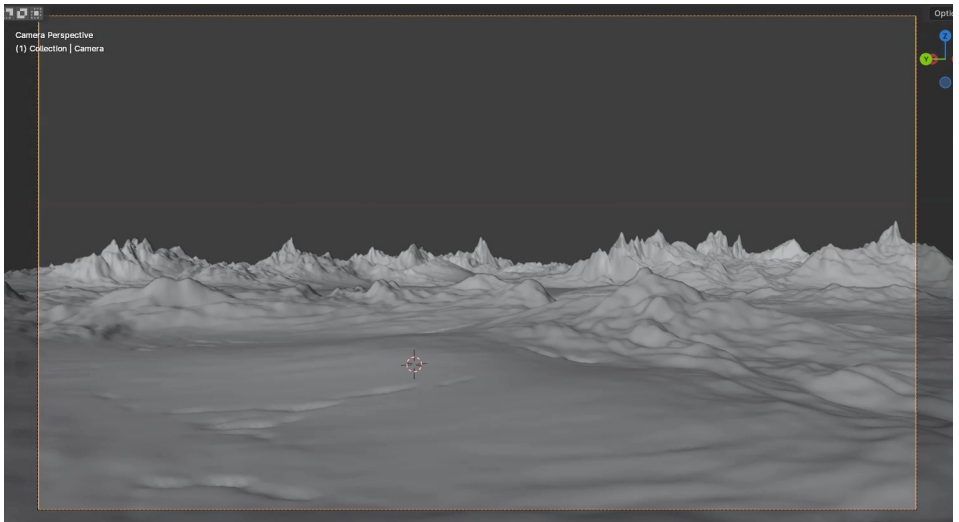
The scene you see was created in Blender 4.1 with the **TXAnt Landscape add-on**, which is a textured version of the Ant Landscape add-on.

I'll be making a tutorial on this topic soon.

The lighting is provided by the **Nishita Sky Texture** only, applied to World.

Blender 4.1 Compositing: Depth (Z) pass & Atmospheric Perspective series

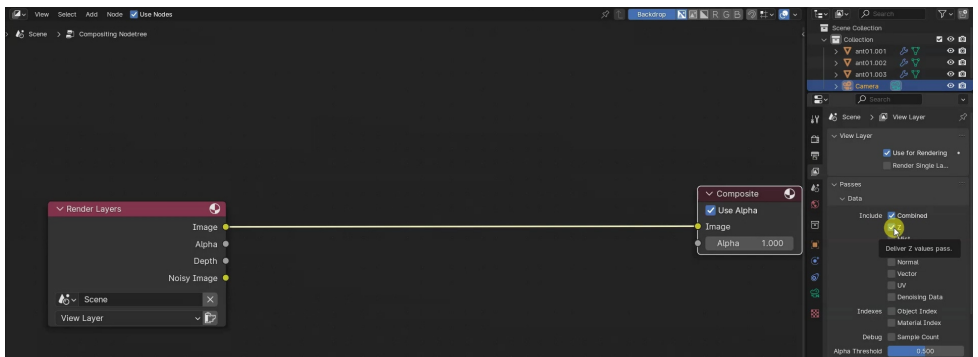
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To obtain information about the distance of objects from the camera, we can use the **Depth** information from **Render Layers**.

The **Depth Render Pass** is indeed active by default in the **Passes Data** tab of the View Layer panel, but in the Properties editor, it's called **Z**.

So, we don't need to remember to activate it before rendering, but we need to know that it's called differently here.



However, before starting the rendering and moving on to Compositing, we need to set a couple of parameters... which we'll see in the next chapter!

2. Clipping; Environment

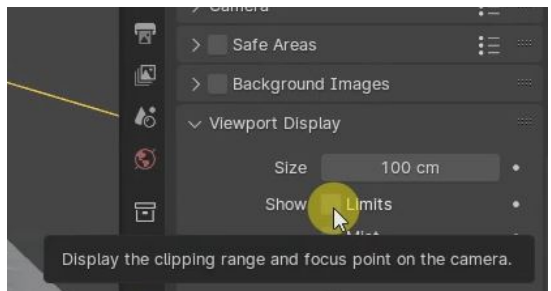
video version: <https://youtu.be/MEZf1AKdPac>

In this second episode of a nine-part series dedicated to Atmospheric Perspective in Compositing in Blender 4.1, we will perform a couple of preliminary operations before starting the rendering of the scene.

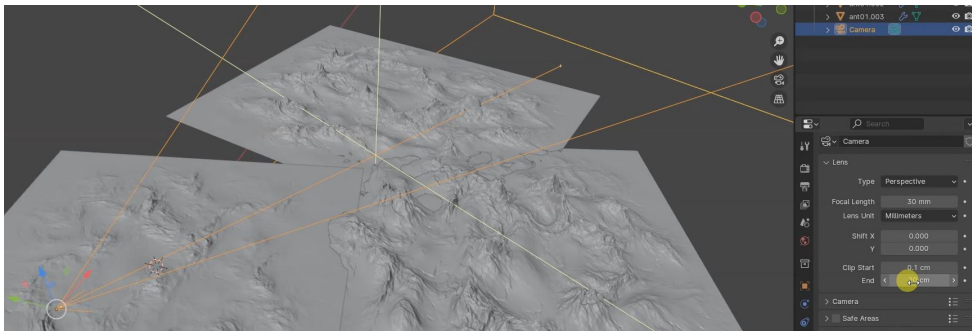
At the end of the previous episode, I mentioned that before starting the rendering, we need to address two aspects: the **Clipping End** of the Camera and the separation of the **virtual background**.

The mask provided by the Depth output of Render Layers will indeed show objects positioned at **Clip Start as black** and those positioned at **Clip End as white**. These settings can be found in the **Object Data tab of the Camera** object, but by default, they are not displayed in the 3D Viewport.

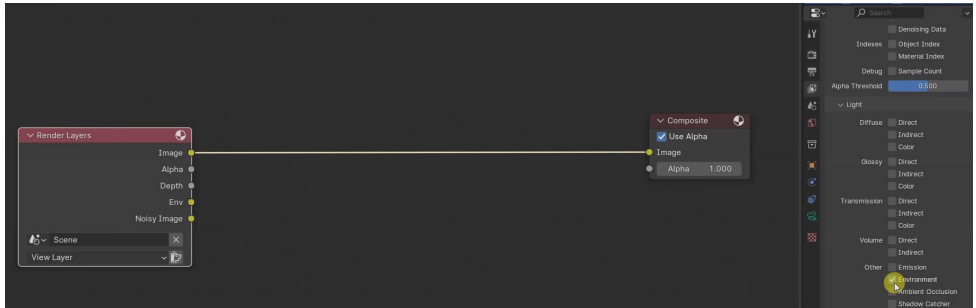
To display both the clipping points and the focus point in the 3D Viewport, let's open the **Viewport Display** section of the **Object Data tab of the Camera** and activate the **Limits** option.



Examining the information provided by Limits, we notice, for example, that the original **Clipping End** value is excessively high, so I can adjust it to just 20cm.



Another operation to perform before starting the rendering is **activating the Environment Render Pass** to isolate the background in Compositing.



Once the rendering is done, this Render Pass will return **only the background in color**, while the objects present in the scene will be rendered black.

At the end of the tutorial series, we will add the background to the complete rendering again.

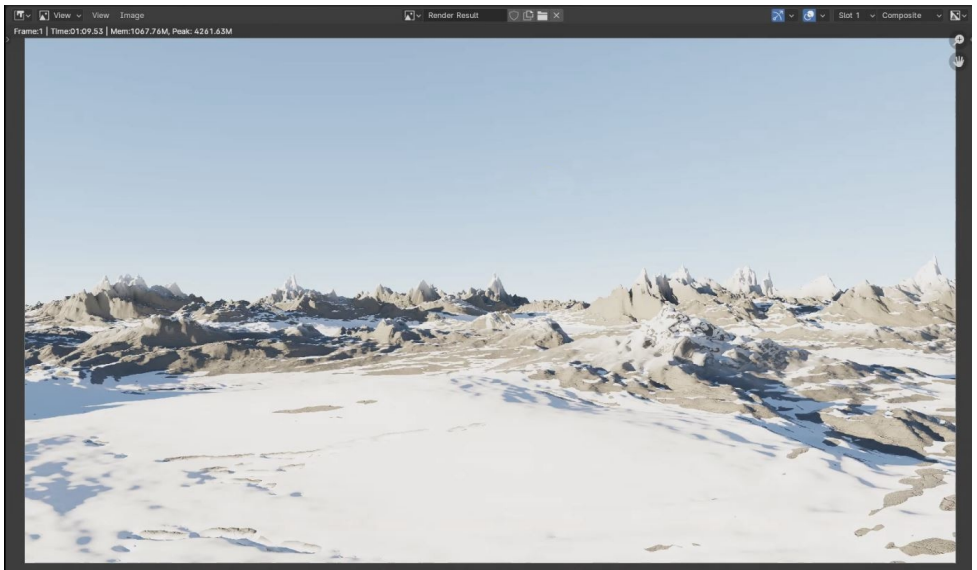
3. Normalizing Depth

video version: <https://youtu.be/KYtxJHUsqcc>

In this third episode of a nine-part series dedicated to Atmospheric Perspective in Compositing in Blender 4.1, we will discuss the information coming from the **Depth channel** of Render Layers and how to handle it to create various effects.

In the previous episode, we activated the Environment Render Pass and adjusted the Clipping End distance appropriately.

Let's proceed with rendering and then switch to a Compositor editor to move on to the post-production process.



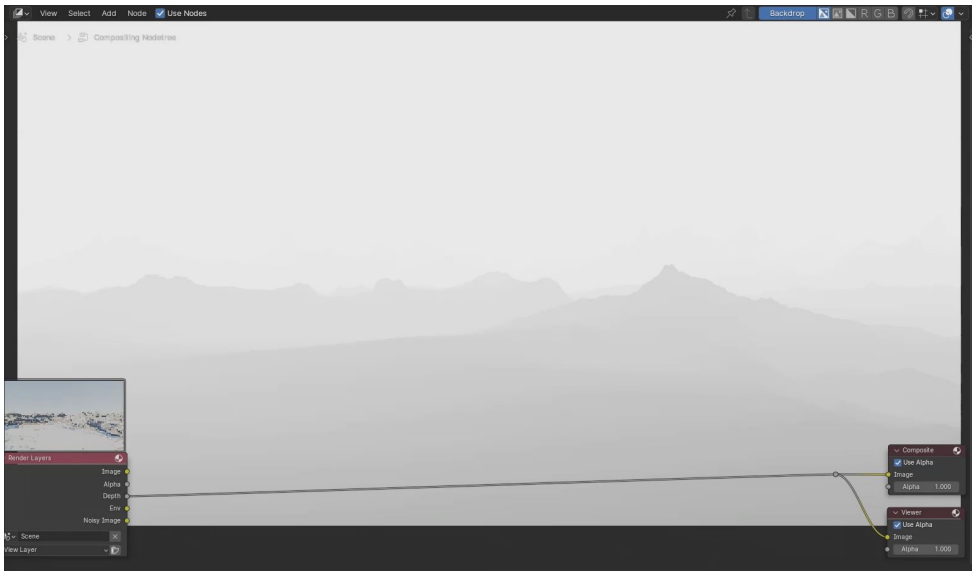
As mentioned in previous episodes, **the Depth output is available by default** in the Render Layers node.

To analyze it, we can **connect it to a Reroute node**, which is then connected to both the **Composite and Viewer** nodes.

This allows us to analyze the information in the backdrop of the editor.

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In this case, we can see the outlines of the mountains becoming lighter as the distance increases.

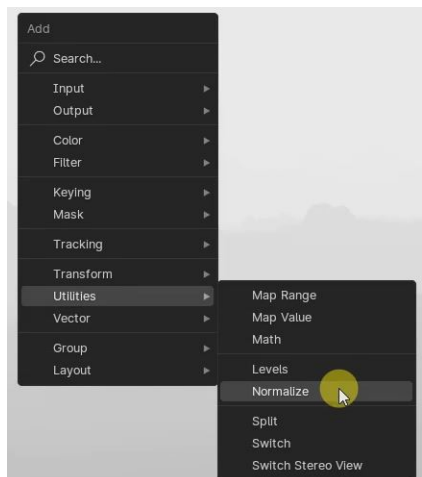
However, in some cases, the Depth channel returns masks that are **not in the correct range**.

Actually, even this mask is not in the correct range because objects in **the foreground should appear black**, and overall, the mask is **too bright**, so many landscape details are not visible.

To make this information easier to read and handle, **let's introduce a Normalize node** from the **Utilities** group into the setup.

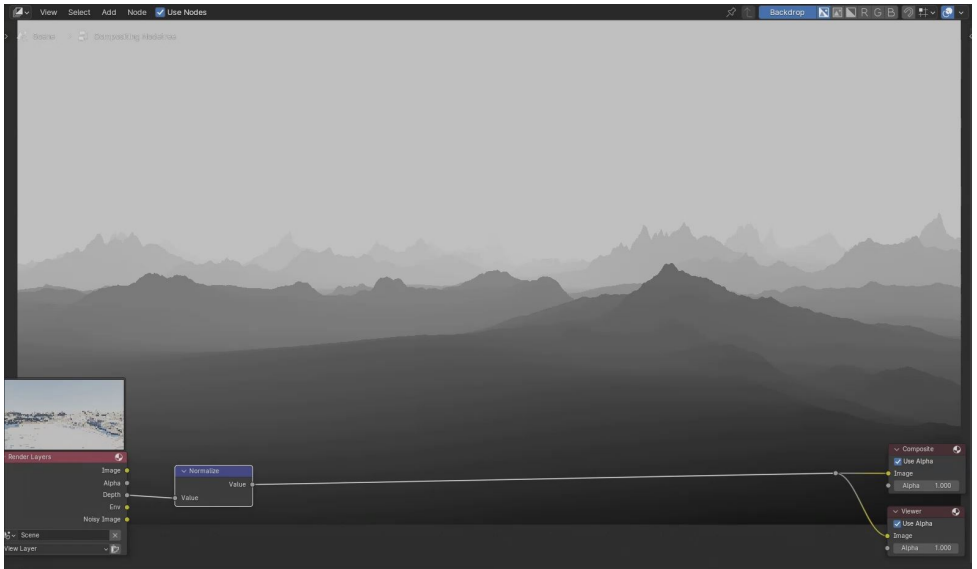
This node has the effect of bringing all the values it receives in input **into the range from 0 to 1**.

The effect is immediately visible in our case as well, as the foreground elements now appear black.



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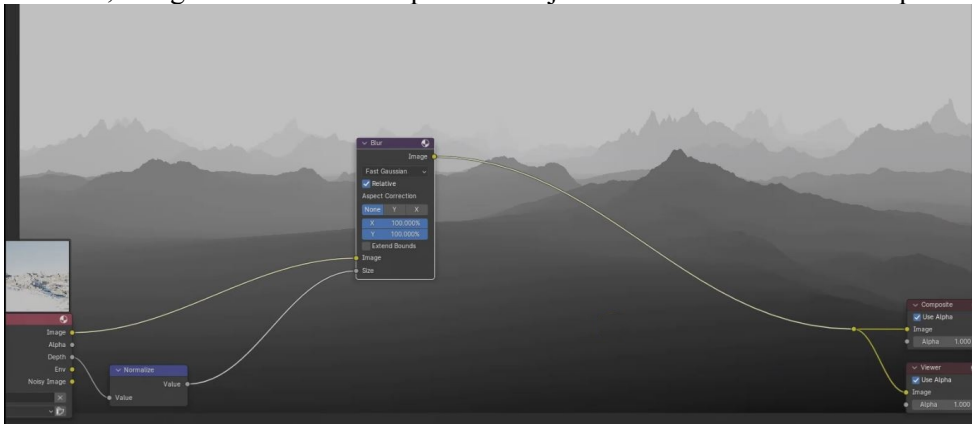
The information obtained in this way is therefore **a mask**, which can be used as it is or inverted to control the various effects that we will implement in the upcoming episodes.

4. Distance Blurring

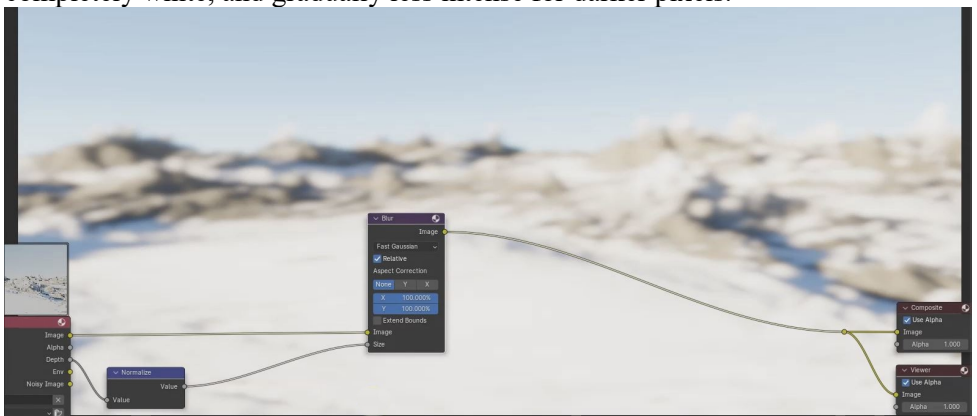
video version: <https://youtu.be/taonAy4FhyM>

In this fourth episode of a nine-part series dedicated to Atmospheric Perspective in Compositing in Blender 4.1, we will implement the first of the effects in this series: **distance blur**!

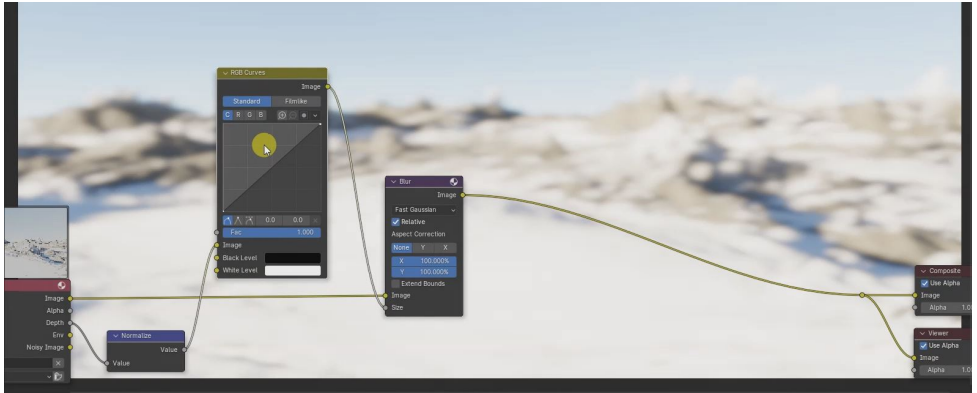
Regarding distance blurring, **we can use a Blur node** in Gaussian **Relative** mode at **100%**, using the **Normalize** output as an adjustment factor for the **Size** input.



Indeed, **we want more blur in the distance**, so the mask should be whiter where the elements are farther away. This type of **mask** is precisely what comes from the **Normalize** node. With the **Relative mode set to 100%**, the effect will be maximum only in pixels where the mask, delivered to the **Size parameter**, is completely white, and gradually less intense for darker pixels.



To **narrow down the range** of the effect to the farthest elements and, simultaneously, adjust the intensity of the effect, you can add an **RGB Curve** node between **Normalize** and the Size input of **Blur**.

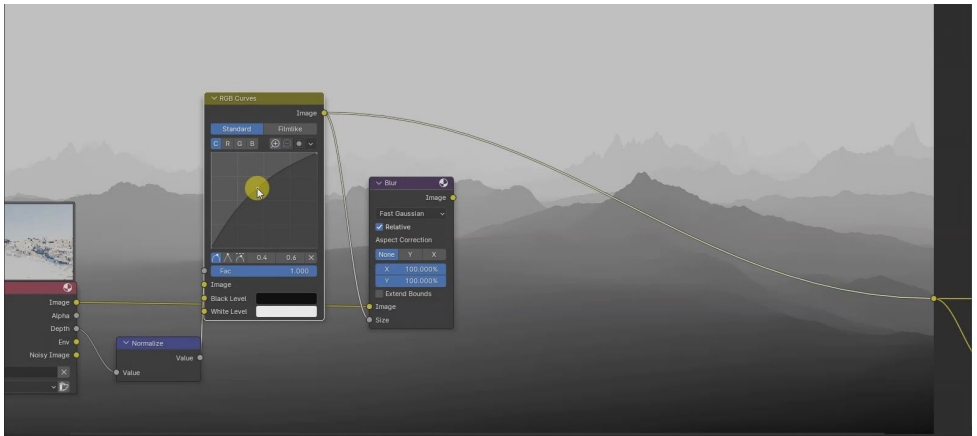


Let's adjust the **C curve of the RGB Curves node**, particularly by introducing a **control point** and moving it towards the bottom right corner of the graph, to assess the effects on the original rendering.

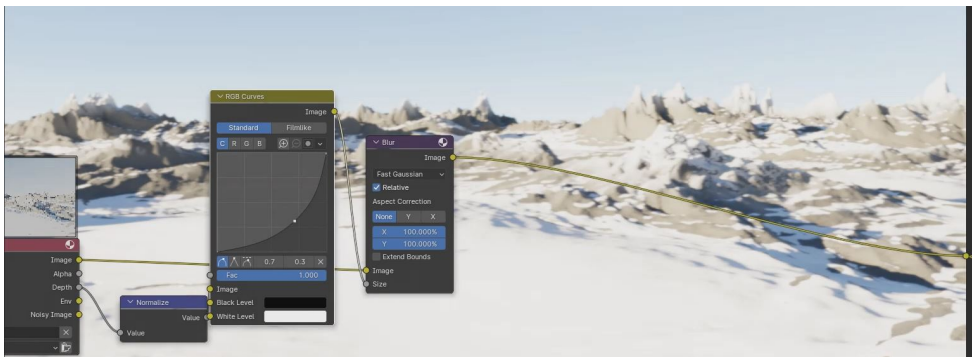


You can examine the changes introduced by the RGB Curves node on the Depth mask by **connecting the RGB Curves output directly to the Reroute node**.

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Then, adjust the curve until you achieve a result that satisfies you.

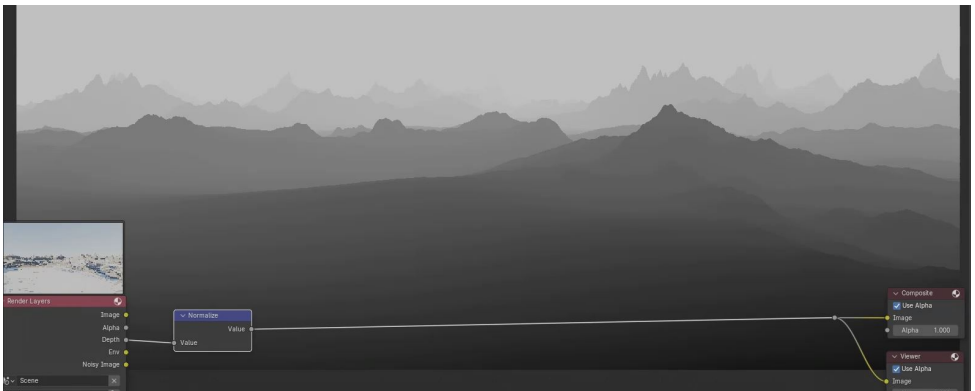


5. Blue Shifting

video version: <https://youtu.be/AXFrKgc7kCo>

In this fifth episode of a nine-part series dedicated to Atmospheric Perspective in Compositing in Blender 4.1, we will implement **the shift towards blue or other colors** of distant objects in the scene.

The shifting towards blue (or any other color) can be done using the output incoming from the **Normalize node as a mask**.



In this case, this information will be sent **to the Factor input of an RGB Curve node** that will act on the original image.

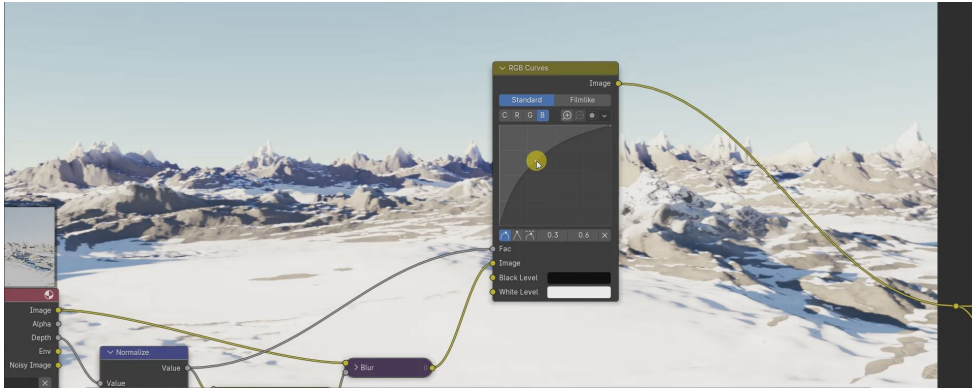
We then connect the output of the Blur node to the Image input of an RGB Curve node, then we connect the output of Normalize to the Factor input of RGB Curve.

Finally, we connect the output of the new RGB Curve node to the Reroute node.

We won't notice any difference in the rendering yet since we haven't modified the curves of the node.



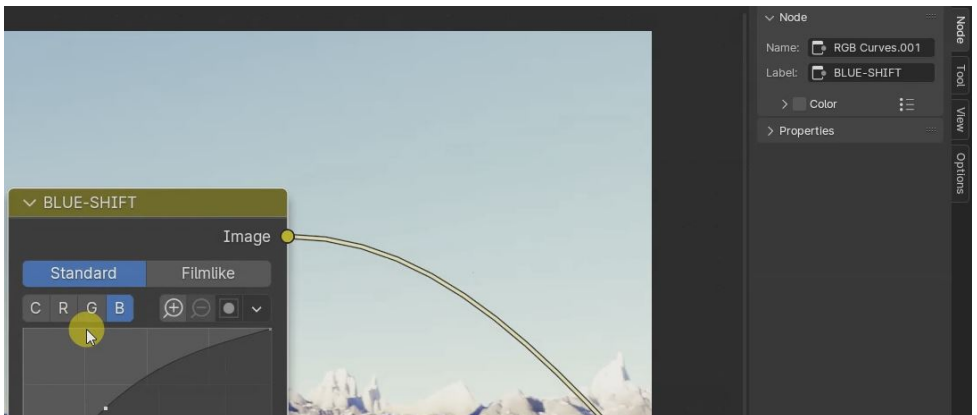
In this RGB node, **we'll need to modify the curve of the color** we're interested in (which, in this case, is **the blue channel**).



You can assess the extent of the effect by **selecting the RGB Curves node** and pressing the **M key multiple times**, which is the shortcut for **Mute**, to deactivate and activate again the node.

Don't worry if you see that **the color of the sky changes a lot**: we'll fix it in the last video of the series.

To distinguish this RGB Curves node from other nodes of the same type, we can **rename it to BLUE-SHIFT** in the **Label** section of the **Node** panel, which we can open by pressing the **N key**.



6. Desaturate

video version: <https://youtu.be/Y-jF5ectZZw>

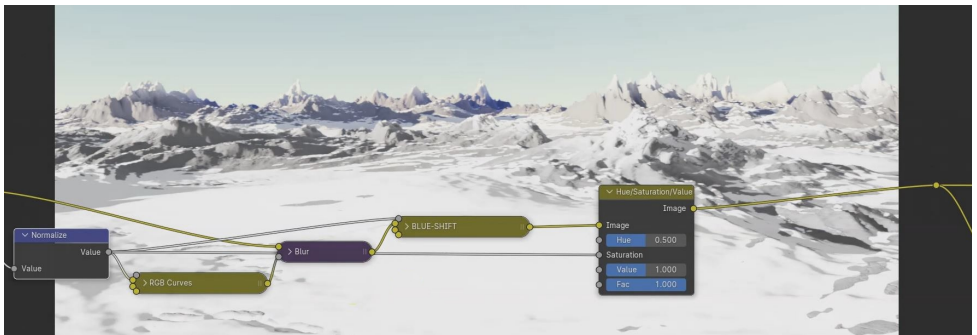
In this sixth episode of a series of nine dedicated to Atmospheric Perspective in Compositing in Blender 4.1, we will see how to **desaturate distant elements**.

To use this mask as a map to desaturate the original image, let's insert a **Hue Saturation Value** node from the **Color Adjust** group into the editor, connecting the output of BLUE-SHIFT to the Image input of Hue Saturation Value.

Then, let's connect the Image output of this new node to the Reroute object.



We then connect the output of the **Normalize** node to the **Saturation** input... immediately noticing a problem: since the mask is black for nearby objects and lighter for those further away, we are actually desaturating the nearby objects!

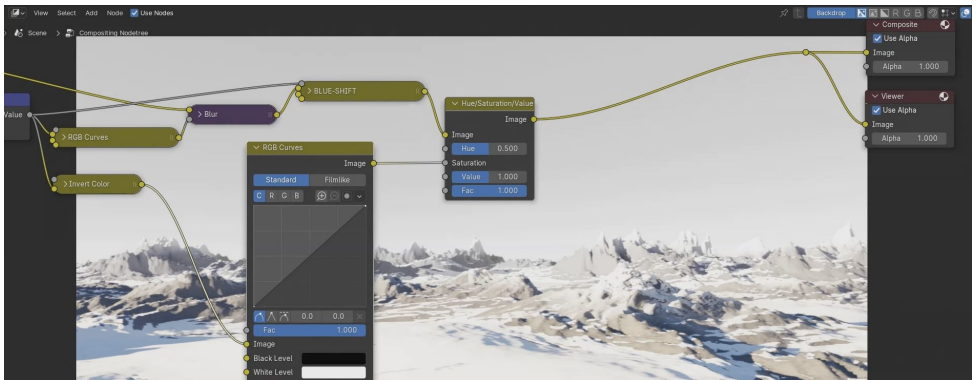


To solve this issue, simply insert an **Invert Color** node from the **Color** group between **Normalize** and the **Saturation** input.



Even now, however, the effect is not satisfactory, as it is **too intense**. By making the mask lighter, we can gradually reduce the intensity of the desaturation.

To modify the mask, we can insert an **RGB Curves** node or, for greater control, a **Color Ramp** node between **Invert Color** and **Hue Saturation Value**.

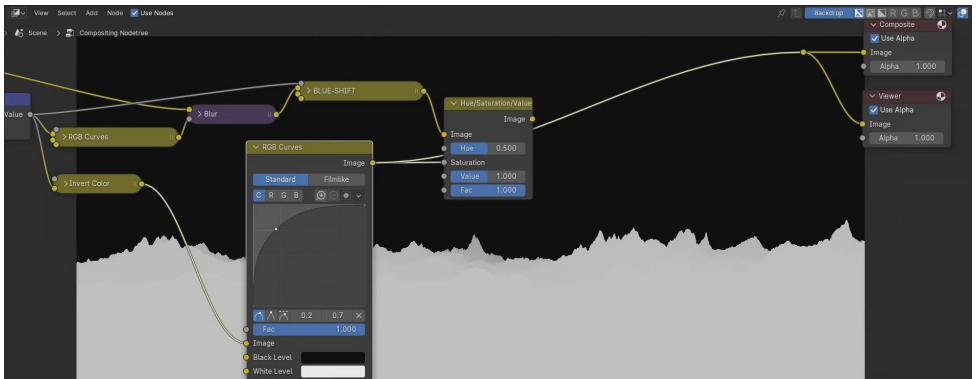


In the case of the **RGB Curves** node, we will need to modify the **C Curve** by adding an intermediate control point that this time will be moved towards the top left corner of the graph.

It can be useful to directly **visualize the mask** while making the changes before sending its result to Saturation.

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Adjust the curve until you achieve a result that satisfies you.



7. Groups

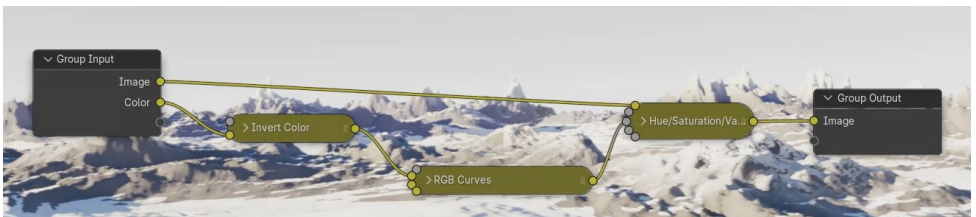
video version: <https://youtu.be/QCvUhzC-dDk>

In this seventh episode of a nine-part series on Atmospheric Perspective in Compositing in Blender 4.1, we will take a break from creating effects **to tidy up the nodes in the graph** and make some considerations about **Groups**.

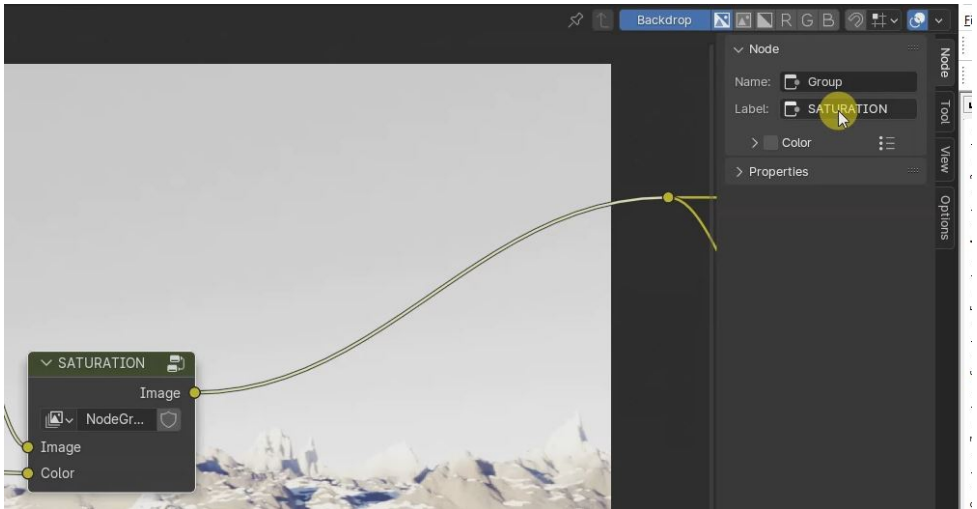
To tidy up the graph and easily identify the various effects, we can **group the Invert Color, RGB Curves, and Hue Saturation Value nodes** by simply selecting them (I'm using **B**, for Border Select) and pressing **CTRL G**.



To enter and exit the group, press the **TAB** key.



To rename the group, select it and write the name (for example, SATURATION) in the **Label** field of the **Node** tab, as we did for the BLUE-SHIFT node.



Similarly, we can group and rename the two nodes that blur distant elements, namely **RGB Curves** and **Blur**, which we can then place in a group called **BLURRING**.



Note that in the Group panel, available when we are inside a group, we can also **rename the input and output sockets of the group**.

For example, it can be useful to rename **the second input of the BLURRING** group to **DEPTH-MASK**, also changing its **socket type to Float**, so that we have **a gray-colored socket** and can more easily associate it with the Value output of the Normalize node.

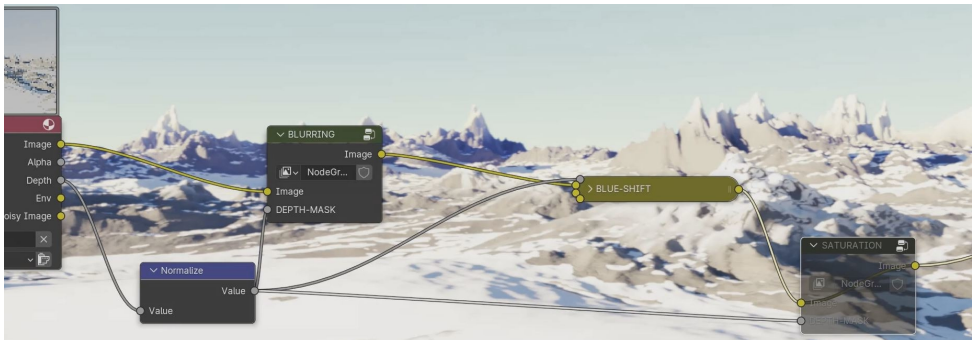
Let's perform the same operation for the second input of SATURATION, too.

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Another advantage of groups is that they allow you **to disable an effect with extreme ease**. In fact, it's sufficient to select a group and press the **M** key, which is the shortcut for the Mute function, once or multiple times, **to deactivate or reactivate it**. In the image below, the SATURATION group is muted.

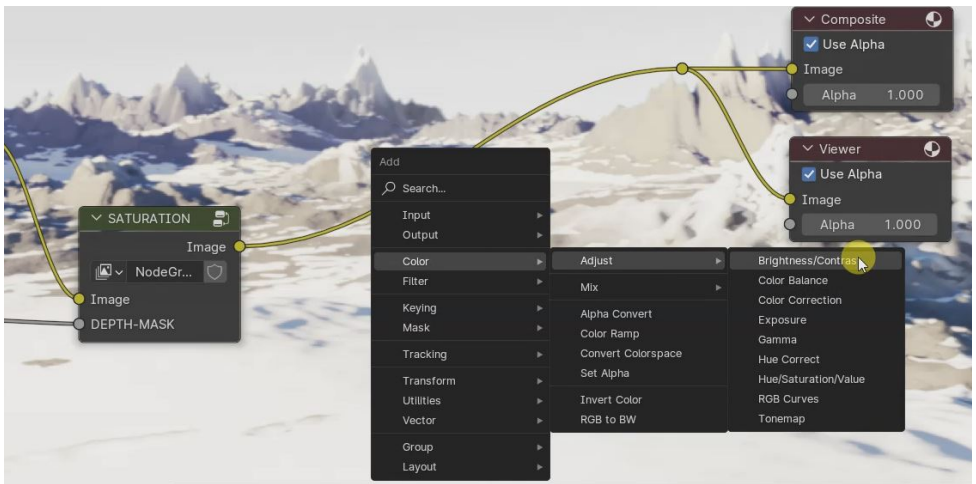


8. Contrast

video version: <https://youtu.be/CWOMfYWmq6o>

In this eighth episode of a nine-part series on Atmospheric Perspective in Compositing in Blender 4.1, we will see **how to decrease the contrast** of the image based on the distance from the virtual camera.

The contrast reduction can be achieved using a **Brightness Contrast** node from the **Color Adjust** group. Place this node between the output of the SATURATION group and the Reroute node.



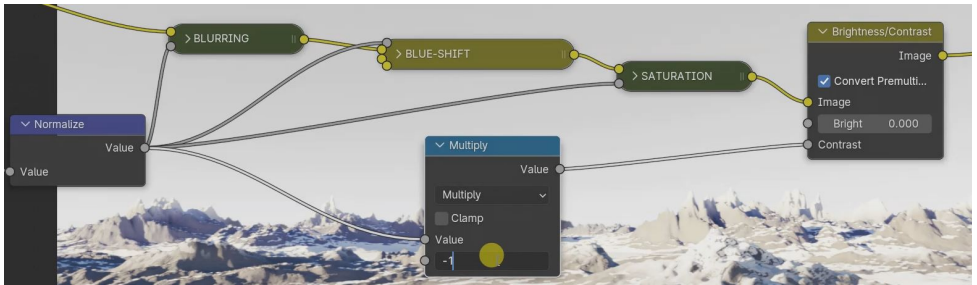
In this case, it's important to note that **reducing contrast** is done by **setting negative values** in the Contrast field.

Since **the normalized (but not inverted) Depth information** returns values from 0 to 1, with 1 for the most distant elements, the first thing to do is to **multiply the output of Normalize by -1**. This will result in 0 for the closest objects and -1 for the farthest ones, thus achieving an initial contrast reduction.

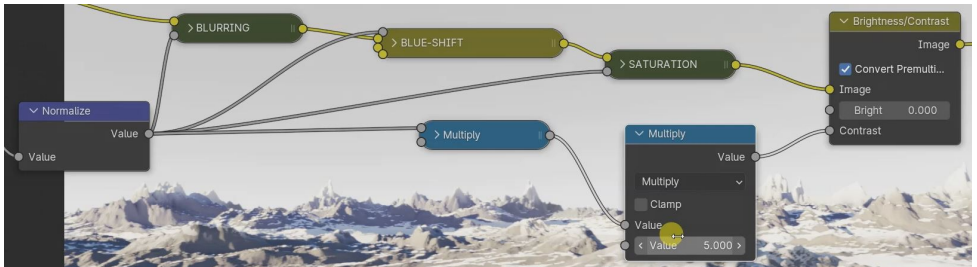
We can perform this operation by inserting a **Math node of the Utilities group** between the Normalize node and the Contrast input of the Brightness Contrast node, changing the mode of the **Math node to Multiply** and **setting -1 as the second value** of the operation.

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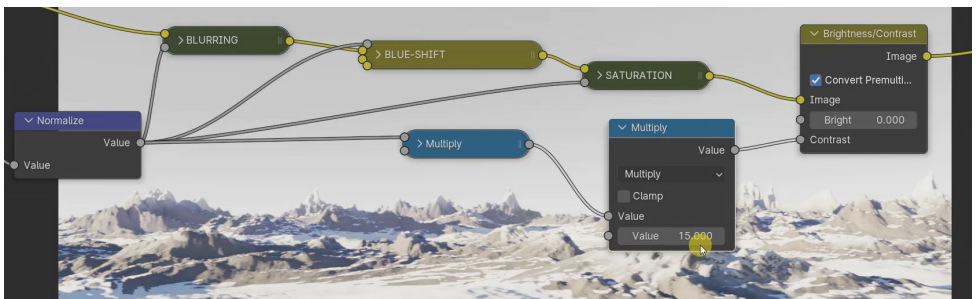
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The contrast reduction is already in effect, but **it's not very noticeable** because the lowest value is -1. To gain more control over this operation, **let's insert a second Math Multiply node**, placing it between the first Multiply node and the Contrast input.

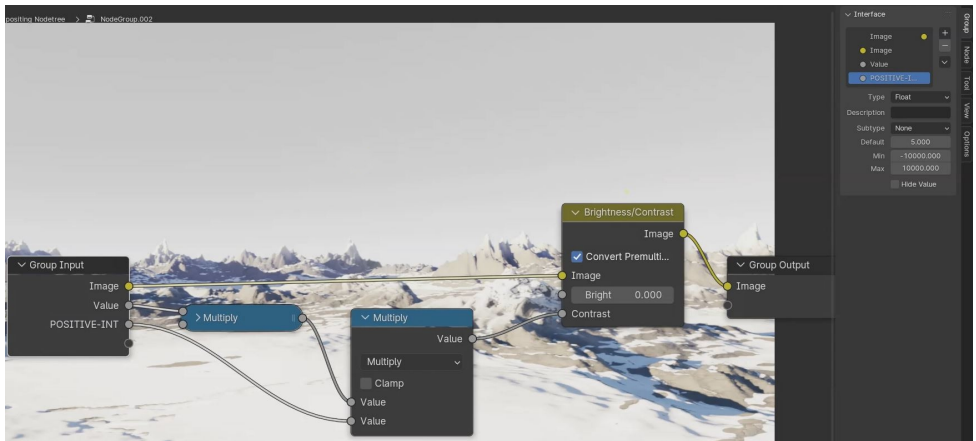


In this case, we should **remember to use a positive value** for the second Value field. This node will multiply its second value, which we can specify as desired, by the distance mask. As a result, we will obtain a **Contrast value ranging from 0 to a negative value, as desired**.

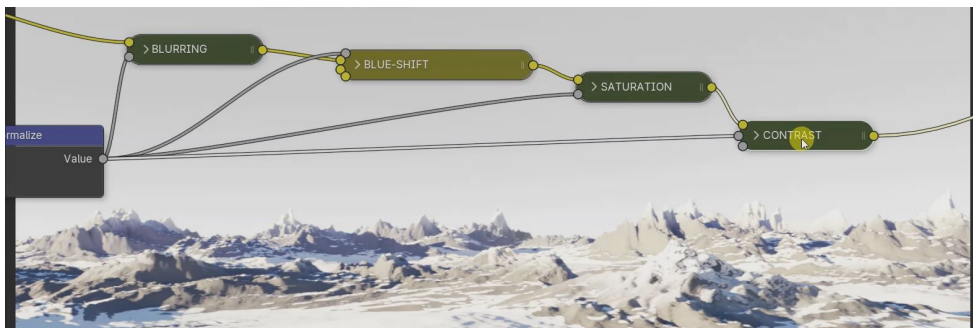


Let's group the two Math Multiply nodes and the Brightness Contrast node into a new group, which we'll call **CONTRAST**.

Let's enter the group and **connect the second Value input** of the second Multiply node to an input of the group. This way, we can **easily modify** the multiplication value (and thus the contrast intensity) **even when the group is closed**.



I would like to remind you that you can easily activate or deactivate an entire group by selecting it and pressing the **M** key once or multiple times (shortcut for the **Mute** operation).

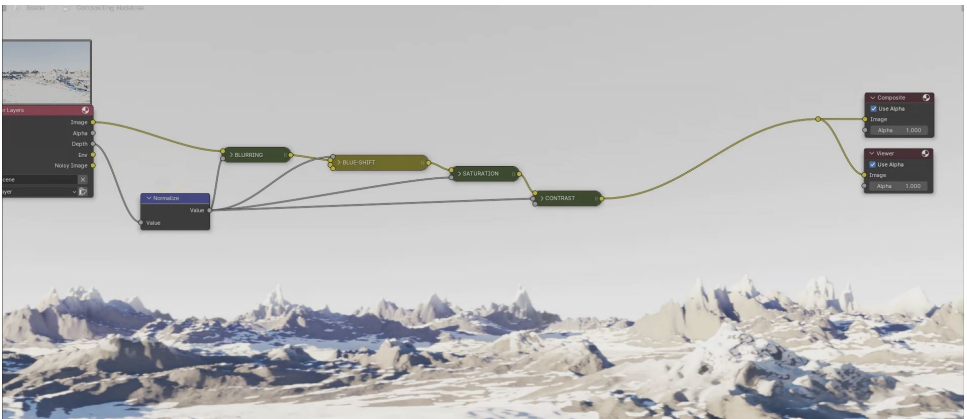


9. Background & Z-Combine; Conclusion

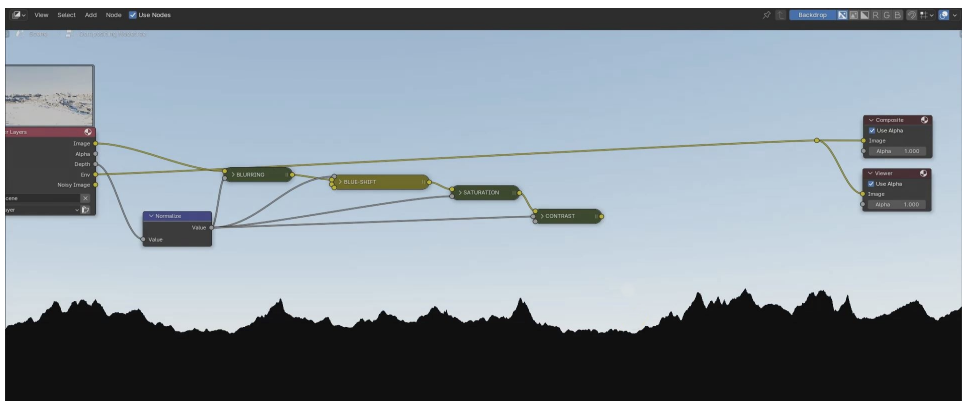
video version: <https://youtu.be/PluhPdqd6d8>

In this ninth and final episode of a series on Atmospheric Perspective in Compositing in Blender 4.1, we will **add the virtual universe background** to the setup and conclude the series.

The operations we have performed so far have also significantly **affected the virtual universe background**, especially in terms of **desaturation**, due to the extreme values present in the Depth mask corresponding to the background, which is at an infinite distance.



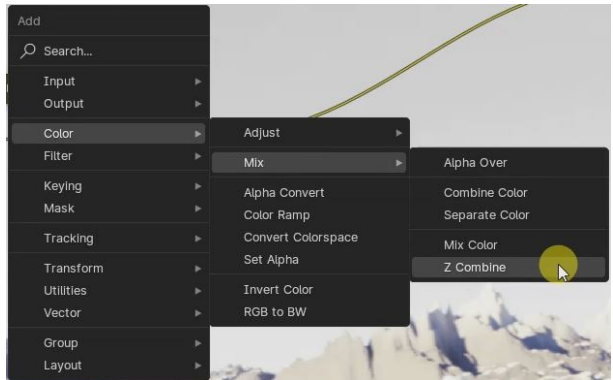
In the second episode of this series, I had you **enable the Environment Render Pass before starting the rendering**. The output of this Render Pass shows only the virtual universe in color, while all the objects present in the scene are black.



Therefore, we need to **overlay the Environment Render Pass onto the rendering** modified with various effects.

There are **several ways** to perform this operation. In my case, I chose to use a **Z-Combine** node, from the **Color Mix** group, immediately connecting its output to the Reroute node.

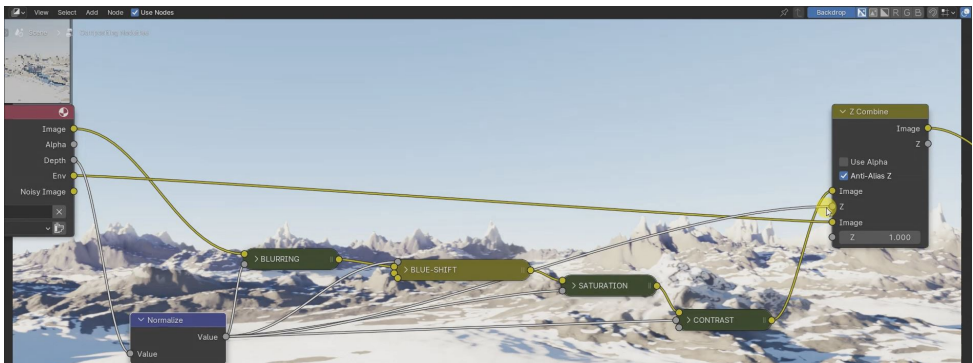
This node **blends two images** using their **Z channels** to determine which pixel is **closer to the virtual camera**.



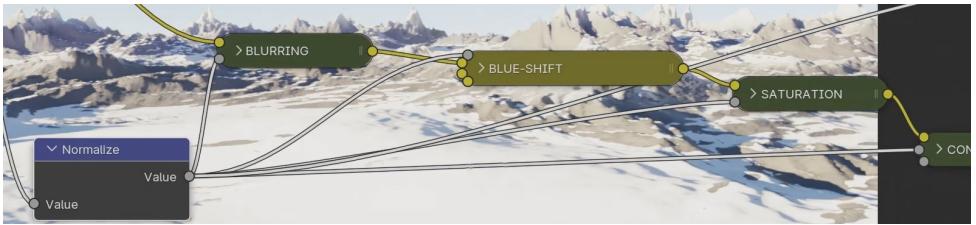
Let's connect the output of the CONTRAST group to the first Image input of the Z-Combine node.

Then, let's connect the Environment Render Pass straight to the second Image input of the Z-Combine node.

Finally, let's connect the Normalize node to the first Z input of the Z-Combine node, leaving the second one empty.



Observing the setup, we notice that **the Normalize node has 5 outgoing links**, and the effects are implemented in succession.

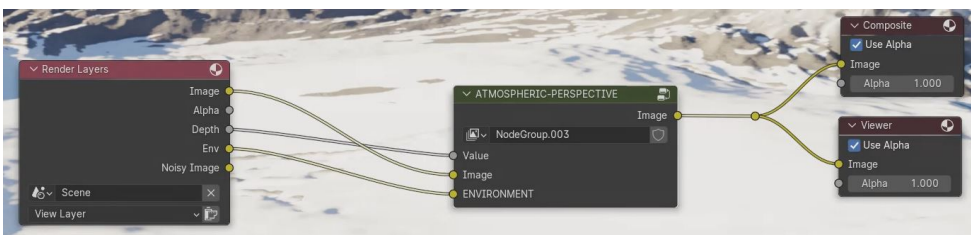


Node groups can be nested.

All these elements (from Normalize to Z-Combine) can, in turn, be included in a single **group** called **ATMOSPHERIC-PERSPECTIVE**.



This group can then be inserted into other projects simply by **appending the NodeTree present in this project**.



I talked about appending Compositing Nodes Groups from other Blender projects in a videotutorial previously published on my channel.

In conclusion, we can use the Depth information to modify Saturation, Contrast, Blur, and Color Grading of the elements based on their distance.

Don't forget to **activate the Environment Render Pass before rendering**, so that you can isolate the background of the virtual universe and work only on the

objects present in the scene before adding the background back at the end of the effects chain!

We have thus concluded this series of nine episodes on Atmospheric Perspective in Compositing in Blender 4.1. I hope the tutorials can be helpful to you!

See you soon!