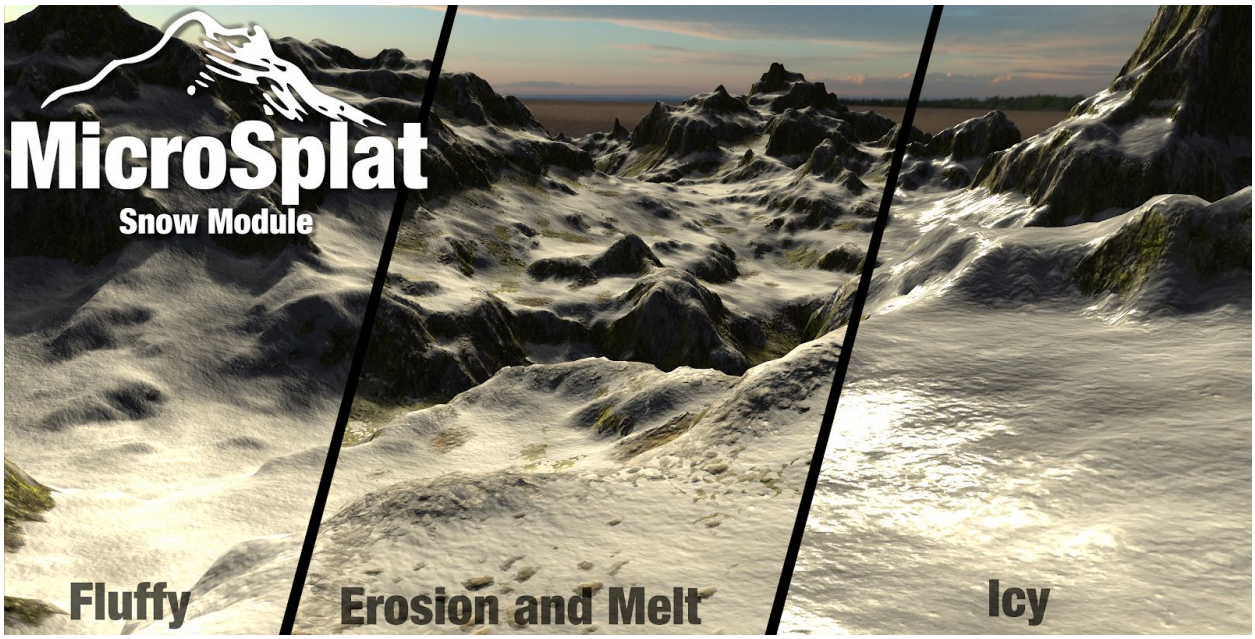
MicroSplat

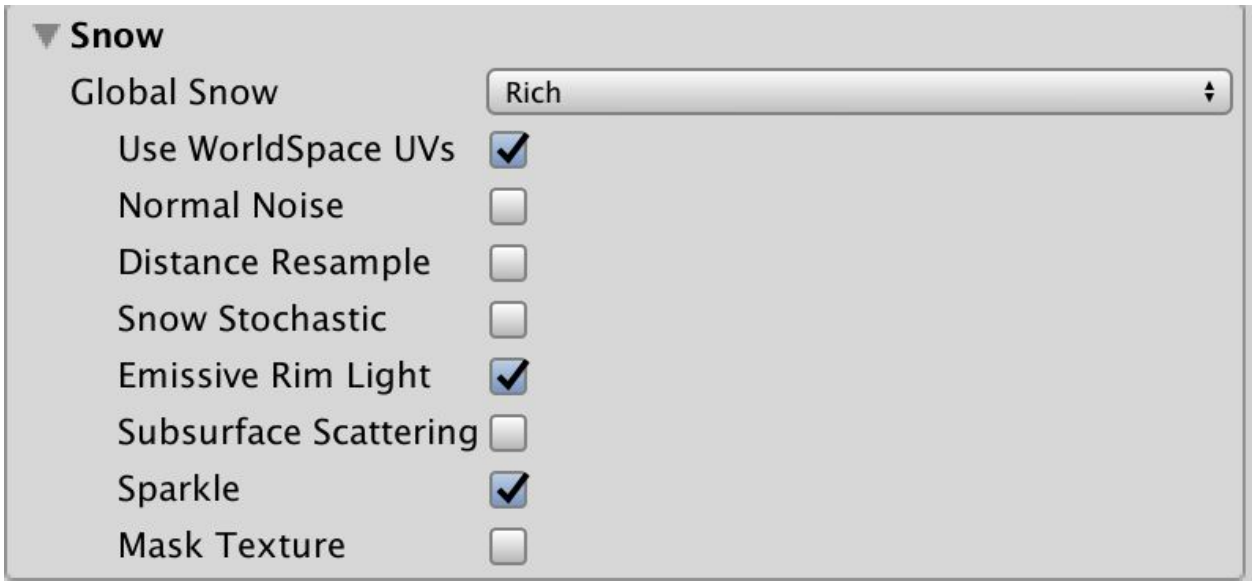
Snow Module, Documentation



Overview

The Snow module adds dynamic snow to the scene, and features the ability to erode or age the snow into an icy surface.

Shader Features



Turning on the 'Global Snow' option will recompile the shader and add additional options for Snow. Note that there are two options for snow, Rich and Simple, which is discussed below.

The **Use World Space UV** option switches the UV's for the snow to a top down projection, this is primarily useful when you are texturing things other than terrain (such as meshes), and need the snow to not follow the UVs of your objects.

The **Normal Noise** option allows you to blend in a normal map at a different UV scale over the snow to break up repetition in the lighting.

The **Distance Resample** option will resample the snow textures with a different UV scale, blending between the two over a distance.

If the Texture Clusters module is also installed, an option for **Stochastic** sampling the snow is also available. Stochastic sampling is another anti-tiling technique which completely eliminates all tiling artifacts, but requires 3 samples per texture instead of 1.

The **Emissive Rim Light** option lets you create a rim lighting effect on the snow.

The **SubSurface Scattering** option adds a cheap subsurface scattering effect. Note that subsurface scattering is mostly only visible on smaller meshes, not terrains.

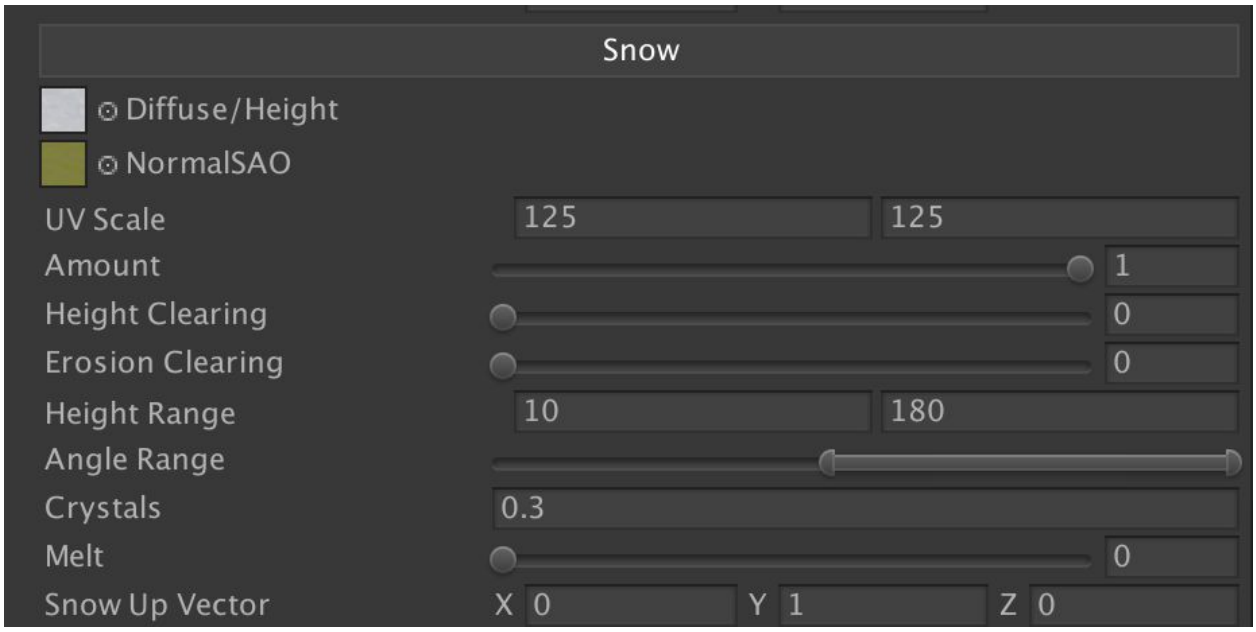
The **Sparkle** Option creates small glints in snow, simulating the small mirror like reflections you see from the microfacets of snow reflecting back.

The **Snow Mask** option allows you to specify a global snow mask. The red channel will specify the maximum value of snow, so if it's value is 1 it will have no effect on the snow, but areas which are painted 0 snow will never appear on. The green channel controls the minimum amount of snow in an area, so a value of 1 will always have snow, and a value of 0 will only have snow when it is supposed to accumulate there. You can paint these masks in the TerrainFX painter when working with terrain.

Simple vs. Rich Snow

Simple snow is visually similar to rich snow, but disables or simplifies a few features which make it hard to compute the snow coverage on the CPU (for footsteps and other effects which need to know if they are on snow). There is a SnowUtilities script included which allows you to query the snow coverage of a given world position, as a 0 (no snow) to 1 (full snow) value. When set to simple snow, the query should be exact. When rich snow is enabled, the Height Clearing, Erosion Clearing, and per-texture snow strength options are enabled, which can significantly change the look of the snow. Note that you can use the Rich snow and get accurate snow coverage on the CPU if you keep the settings reasonable.

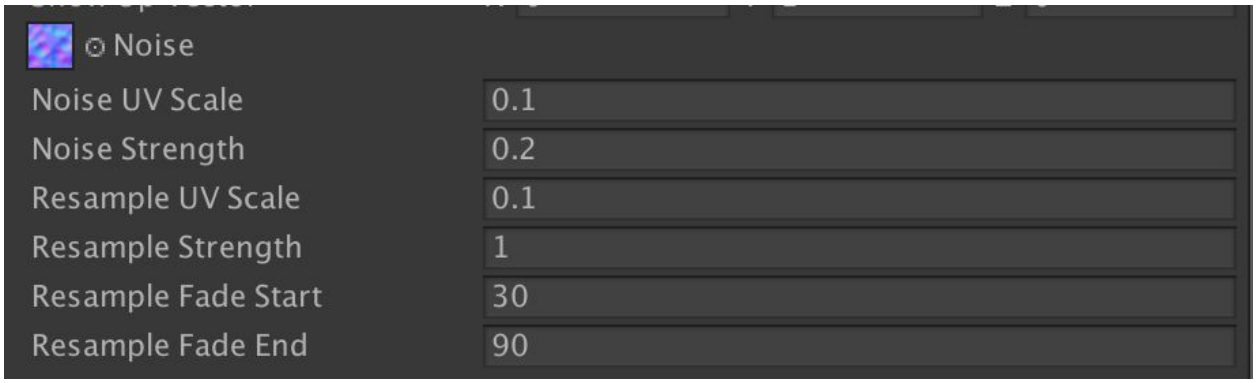
Shader Parameters



The main shader parameters available for snow are described below:

- Diffuse/Height
    - This is the albedo (RGB) and height map (A) texture packed into a single texture
- NormalSAO
    - This is the Normal (RG), Smoothness (B) and Ambient Occlusion (AO) of the snow packed into one texture
- UVScale
    - UV Scale for the snow texture
- Amount
    - Amount of snow
- Height Clearing
    - Causes snow to not appear on the tops of surfaces
- Erosition Clearing
    - Causes snow to erode on surfaces with high ambient occlusion values
- Height Range
    - Height at which snow begins to appear and height at which it is 100% snowy
- Angle Range

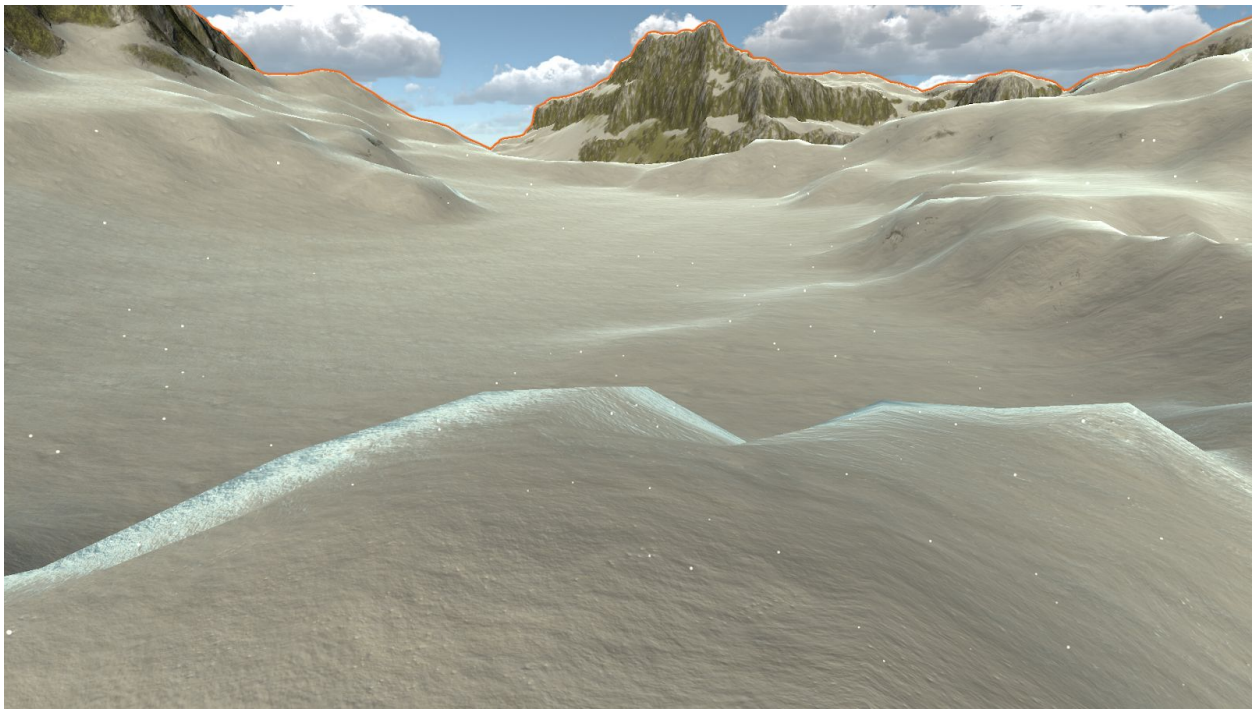
    - Angles in which snow will accumulate
- Crystals
    - How crystalline (Icy) the snow is. Values around 0 are fluffy snow, where as values above 1 are very icy.
- Melt
    - How large the area of wetness should be around the snow edge
- Up Vector
    - The direction the snow accumulated from. Can be used to simulate snow in heavy winds, where accumulation happens on one side of the mountain but not the other.



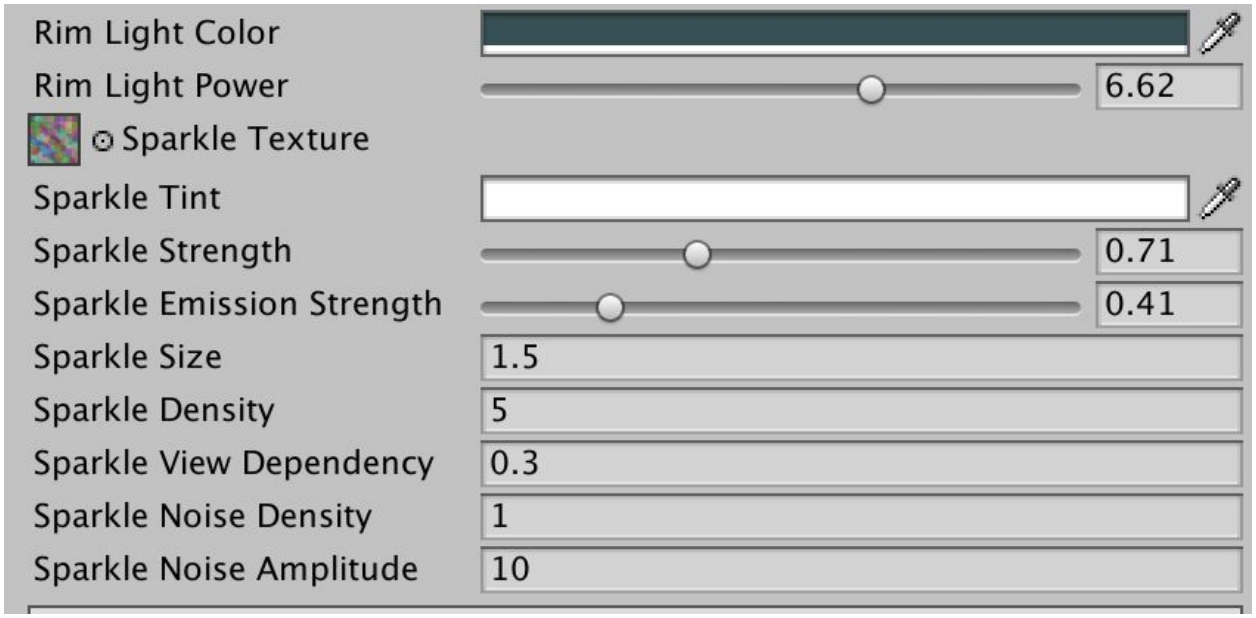
Additional properties are available for Snow Normal Noise and Distance Resampling.

- Noise
    - A bump map to tile over the terrain
- Noise UV Scale
    - Scales Snow UV coordinates by this amount
- Noise Strength
    - How much to blend in this normal into the base normal
- Resample UV Scale
    - Scale of UVs for distance based resampling
- Resample Strength
    - How much should we blend in the distance samples
- Resample Fade Start/End
    - The distance range in which we should cross fade the samples
- Stochastic Contrast
    - Contrast of the blending when stochastic sampling is enabled.

- Stochastic Scale
    - Size of the stochastic triangles when stochastic sampling is used.



An example of using Rim Lighting to create a blue highlight and the sparkle effect to create small glints on the snow.



When Rim Light is enabled, properties to control its color and falloff are available.

When Sparkle is enabled, a noise texture is used to randomize the placement of the sparkles. You can control the tint, overall strength of the effect, and how much the effect is emissive with the next three controls.

In real life, small sparkles on the snow are created when a side of a snow crystal reflects directly into your eye- like a tiny mirror. To simulate this, MicroSplat generates a grid of screen space sized sparkles and distorts the grid with the world position, view vector, and noise.

Sparkle Size and Density are linked- as you change the density it affects the size of the sparkles, so you will need to counter adjust them to a size that you like. View Dependency controls how much the view vector is taken into account with the placement of the sparkles - too high a value and the sparkles will not stick to the terrain, but rather slide around. Finally, you can control the frequency and amplitude of the noise texture used to displace the sparkles placement.

Finally, the amount of snow which appears can be controlled on a per texture basis in the per-texture properties settings.

Adding Snow To Objects

If you own the Terrain Blending module, you can use it to add snow to many meshes in your scene. Simply add the MicroSplatBlendableObject component and make sure the snow feature is turned on, and you can adjust settings to make the snow appear on top of meshes.

If you own the Mesh Workflow Module, it includes an additional feature to export a shader for use with regular meshes. You can use this as a replacement for the standard/lit shader, and it will be generated with global microsplat features like Snow, Trax, Wetness, Decals, and Global texturing options included.