Sky Master ULTIMATE Guide

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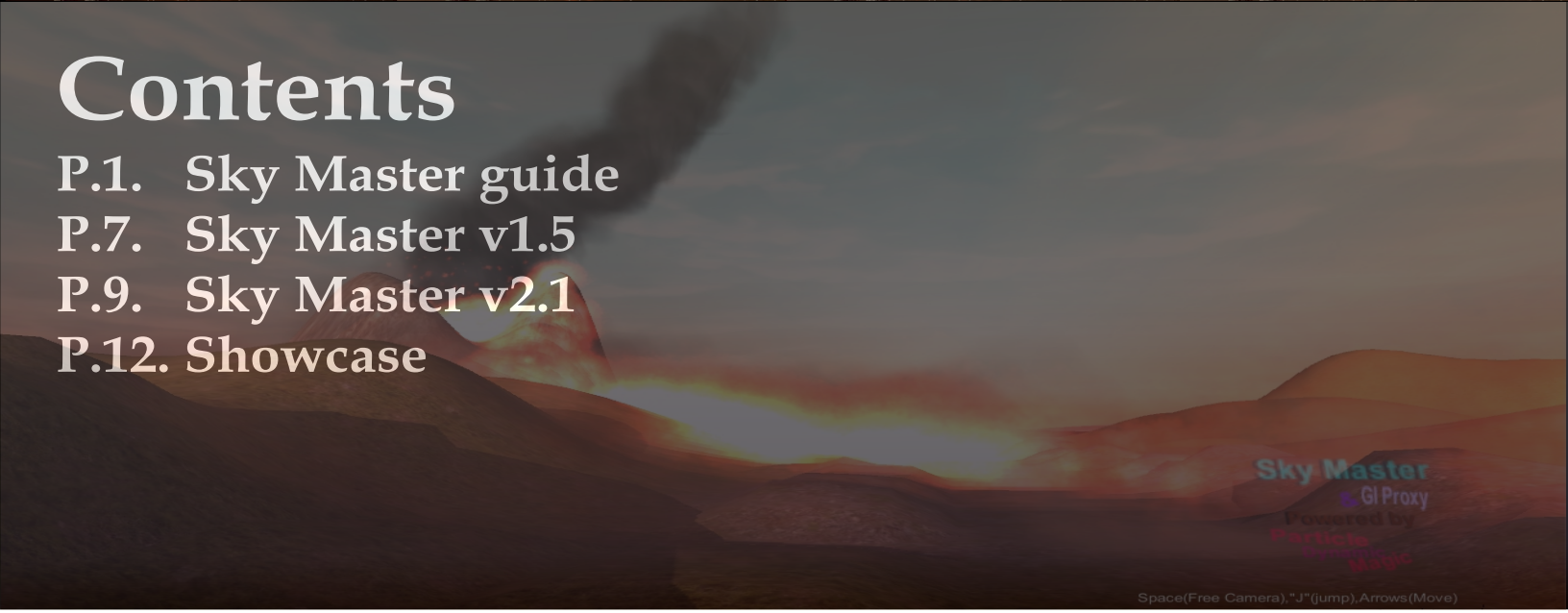
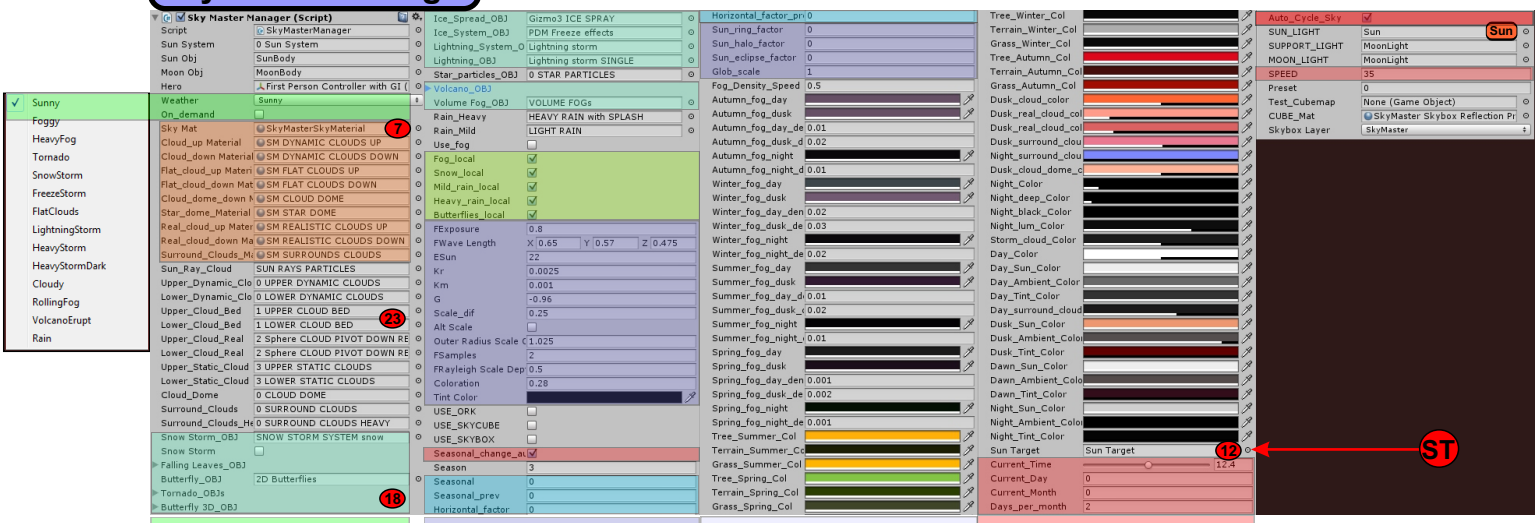
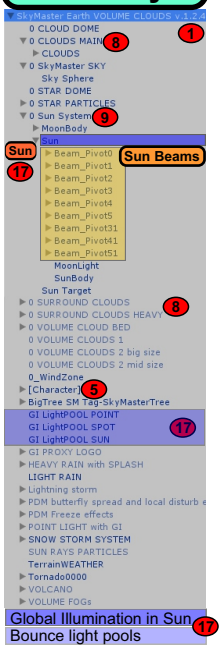


Sky Master Guide

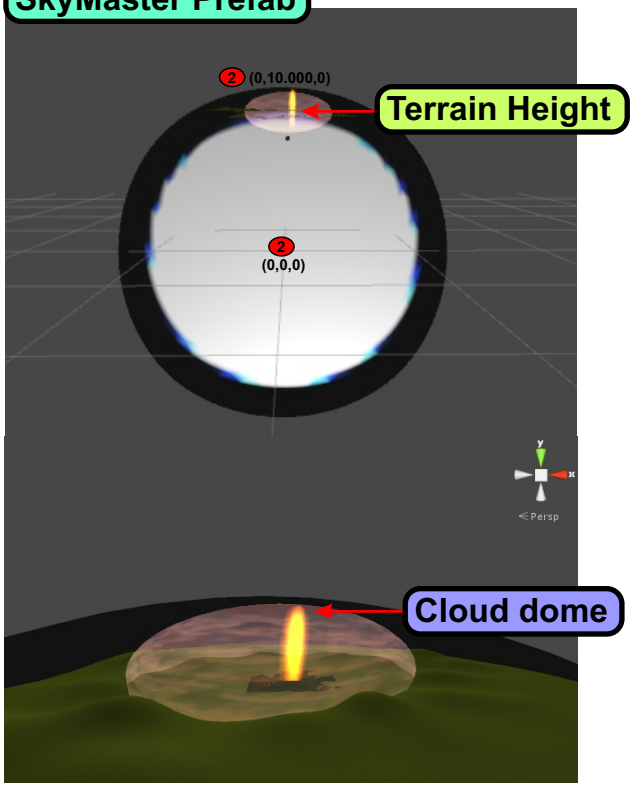
SkyMaster Manager



Hierarchy

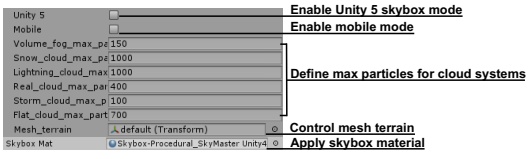


SkyMaster Prefab

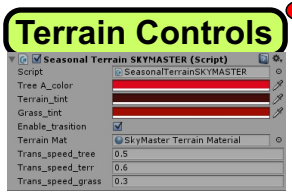


Sun Beam Setup

SkyMaster Manager v1.5



Terrain Controls



Terrain Controls v1.5

(See Page 8)

Quick guide for the implementation in a new project:

1. **Insert one of the latest prefab in the game scene** (in the “SkyMaster/Version 1.5/prefabs” folder)
2. **Adjust the whole prefab system position**, so the sample terrain matches your terrain, then rotate the system based on where you would like the sun to rise from and set to.
3. **Copy the terrain script (SeasonalTerrainSKYMASTER) to your terrain gameobject** and erase the sample terrain (if needed). See Page 8 for the new terrain controls and scatter fog shader.
4. **The volumetric clouds have a "Cut_height" parameter** that must change based on the new height the cloud system center has from zero height. This parameter controls the lighting calculations cut off at night and the height is the one where the sun is considered as occluded and clouds turn black. If clouds appear black during day time, this is the parameter that must be checked and changed.
5. **The prefab contains a hero and a camera in [Character] gameobject** in the prefab root, both should be disabled or erased in order to use the game's camera/hero properly. The new hero must be inserted in the Hero parameter in the main script (SkyMasterManager), in order for the local system option for haze, butterflies etc to work. If the hero is instantiated, an extra script is needed to grab him (from a tag or the game manager) and assign to the hero parameter. This only affects the Haze, butterflies, rain and snow, which need to be parented to and follow the hero, when the local options are checked.
6. **For any extra trees that need to follow the seasonal color changes, add the "SkyMasterTree" tag** and assign the materials of the sample tree or a material that has the color property (renderer.material.color in code).
7. **The current sky shader (SkyMasterShaderE) is applied to the sky dome** (SkyMaster SKY gameobject) and controls the atmopsheric scattering through the main SkyMasterManager script.As if v1.2.4, this shader has been extended with a texture blend feature, so you can use the SkyMasterShaderF_Textured shader in its place (change in the Sky Sphere material called "SkyMasterSkyMaterial") if a texture needs to be blended with the sun and scattering effects.
8. **If there are any clouds that need to be disabled**, can be done so by disabling their particle renderer at any point.
9. **The "Sun System" gameobject in the prefab root**, contains the sun and moon objects and lights. These can be move along their forward vector, if the sun needs to be closer or further away. Normally the sun/moon should be on the sky dome, in order to best match the shader sun light. the moon in the current implementaton is opposite to the sun, this can be changed by script and i plan to have a separate moon cycle in a later update.
10. **The SkyMasterManager is the main script that takes care of all the cloud motion, sky and seasonal changes** etc. To take control over the seasonal changes, disable the "Seasonal Change Auto" parameter. To take control over the time of day disable the "Auto Cycle Sky" parameter or play with the "Current time" one.
11. **The volumetric cloud system in v1.2.4 is a fully featured volumetric cloud solution** and separate from the other particle clouds, using only one draw call and supports sun beams with occlusion from collisions and from the clouds volume. For the occlusion to work with the sun beams, they must be assigned to the "Sun Shafts" list in the"VolumeticCLoudsSM" script (found in the Volume Cloud Bed gameobject in the prefab). The sun beams must also be parented to the sun and look towards its target (usually mid of the terrain).
12. **The sun light will always look at the SunTarget object** (found parented in the sun system), the sun beams should be aligned along the sun and sun target vector when the game starts. The prefab already has a sample set of beams setup.
13. **The volume clouds particle count depends on the particle system Min/Max Emission parameter**.
14. **The volumetric clouds have an integrated renewal system** that can instantiate a new cloud system to renew clouds when the current ones reach over a certain threshold distance (Bound parameter). The speed the distance is reached depend on the wind settings in the cloud script (Speed, Multiplier and Wind parameters).
15. **The current volume cloud speed implementation has a variability per cloud speed adjustment** (which means some clouds will move faster and some slower with the same wind settings). This is only a sample implementation and the next update will offer a lot more options in both cloud formations and motion. The "Volumetric Cloud Bed fly through" scene and "SkyMasterDemo 3" script contain a sample of different motion controls (like make the clouds rotate by controlling the wind parameter externally).
16. **The "Divider" parameter controls how many clouds there will be in the volumetric system**. The Min/Max Emission particle count is divided by this number and the resulting number of particles is assigned to each cloud.
17. **The Global Illumination system is attached to the sun object and is disabled by default**. It can be turned on by enabling the "LightCollisionsPDM" script attached to the sun. The "Cut_height" will disable the sun GI at night, if the sun is below this height (same parameter use as in volumetric clouds).
18. **Advanced particle effects include Turbulence, Ice/fire spread, stick & propagation, Dynamic Tornados**, **Particle to Particle collisions** & more. The manual contains details on how to setup and use these systems and the main prefabs contains ready implementations.

Quick guide for the implementation in a new project:

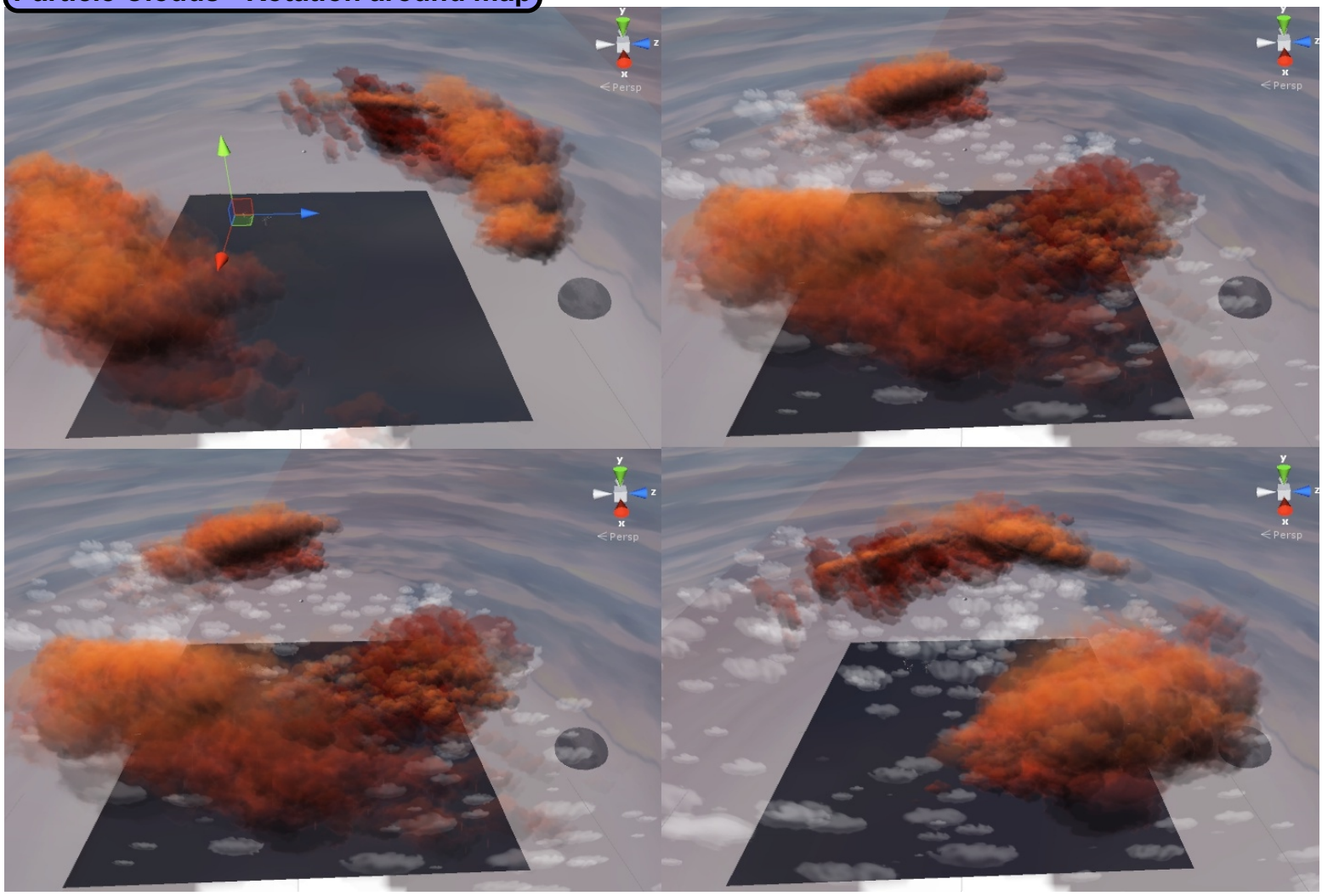
19. **The Volumetric Haze** is based on a Shuriken system and the “ParticleSheetOnGroundSKYMASTER” script, which controls the particles. The system allows the fog to roll on the terrain or over a displacement. The local option makes it roll around the hero as he moves around.
20. **The Dynamic Tornado** uses a Shuriken system for the main effect and the Turbulence & Attractor script (AttractParticlesSKYMASTER”.
21. **The volcano eruption** uses the volumetric smoke (same script as Volumetric Haze) and “PlaceParticleOnGroundSKYMASTER” script for the rolling lava.
22. **The pack contains a particle and gameobject painting and propagation system**, **with advanced collision support**, described in detail in the manual. This system is very broad and can be used to paint objects on surfaces, for ice/fire propagation, particle to particle collisions, particle sticking to objects and much more. A sample use of the system is provided with the sticking ice in winter (during snowstorm).
23. **The particle clouds in Sky Master** (except the volumetric cloud system in v1.2.4) are controlled by material (for time related color change) and season. The on demand controls will override the seasonal changes. The clouds are designed to rotate around the map (but can follow any other route).

Other notes:

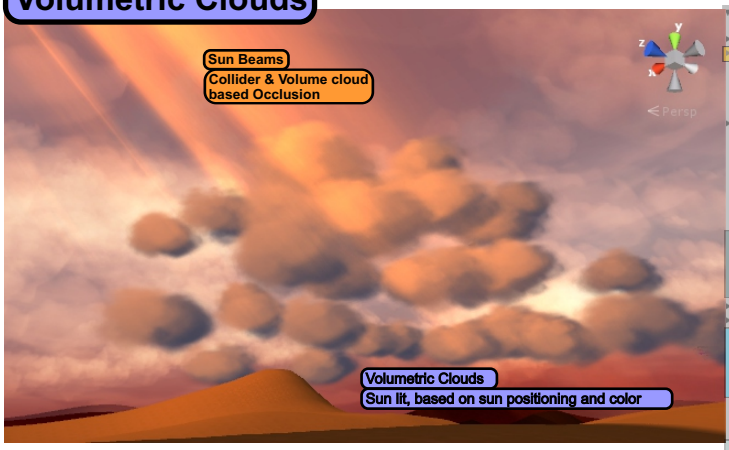
- **The particle clouds require regulation in emission based on the target system specs**. For example i worked on the cloud particle speed in my laptop and as a result clouds are moving much faster in new PCs. This is a Shuriken issue i suppose, since the cloud system speed is done with my script that is frame rate independent. The inner cloud motion is handled by Shuriken. These do not apply to the volumetric cloud system, where i have full control over both the particles and motion.

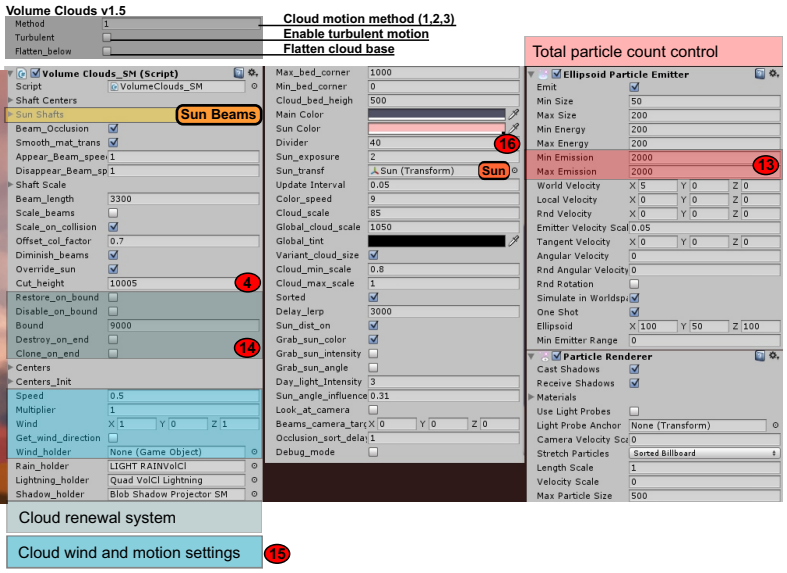
- **The volumetric clouds script keeps a structure with every cloud center**, so if any per cloud effects need to be applied, this structure makes it much easier. The next update will contain local per volumetric cloud rain, lightning, shadow and many more effects.

Particle Clouds - Rotation around map 23



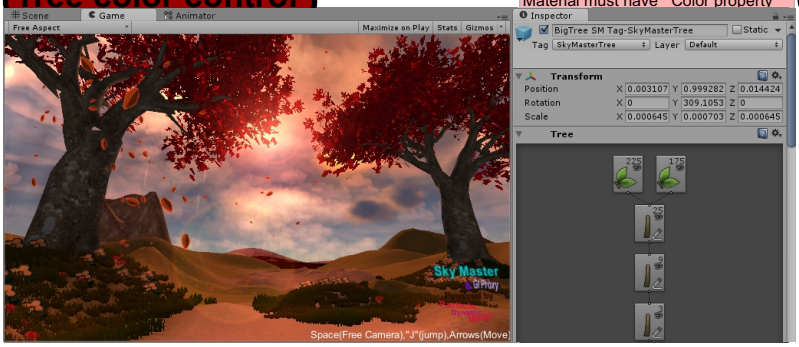
Volumetric Clouds (11)



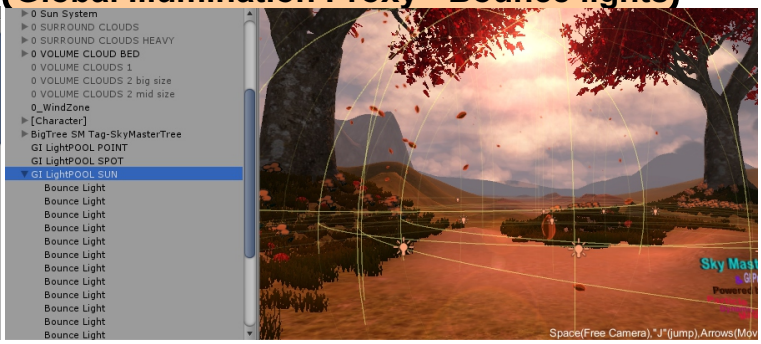


Tree color control

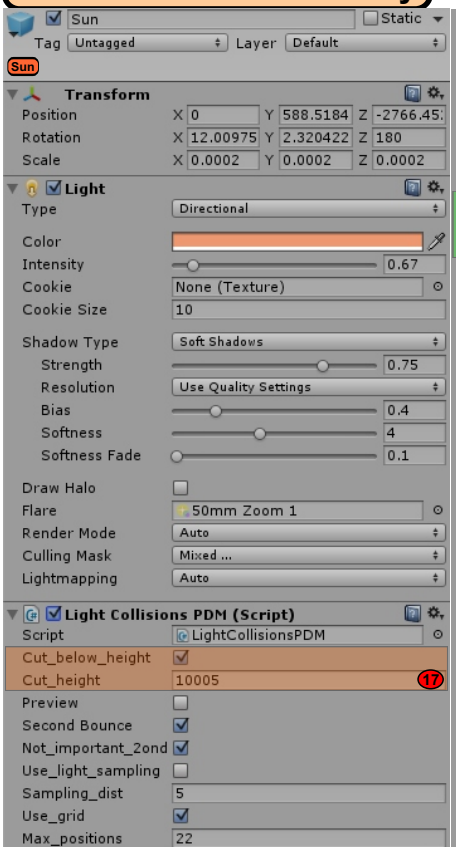
6
Tag tree with SkyMasterTree tag
Material must have Color property



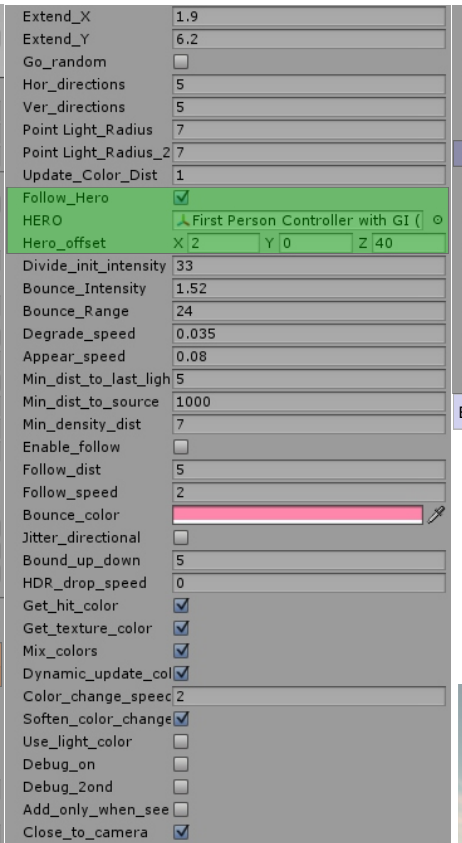
Global Illumination Proxy - Bounce lights



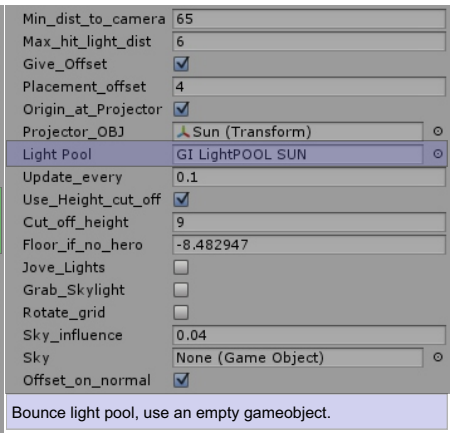
Global Illumination Proxy (17)



Disable GI from sun at night time (when the sun drops below the cutoff height).



Allow sun GI Bounce light grid to move with the hero.
Use for maximizing performance and lower bounce light count.



Bounce light pool, use an empty gameobject.

Volumetric Haze

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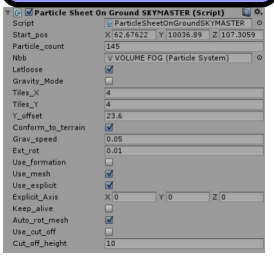

Dynamic tornado - Control with local attractors

20

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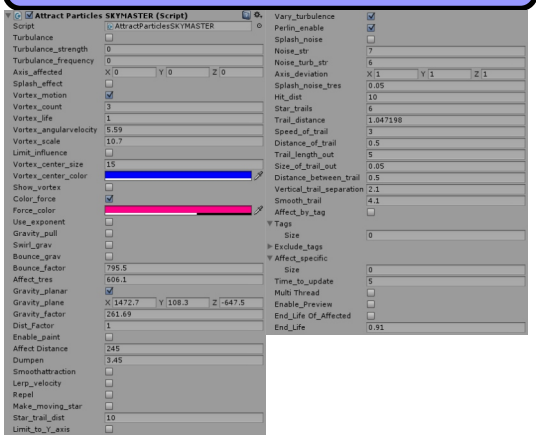
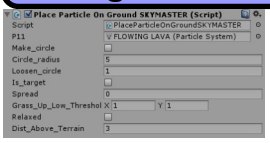
Erupting volcano - Volumetric smoke and rolling lava

Turbulence & Attractors

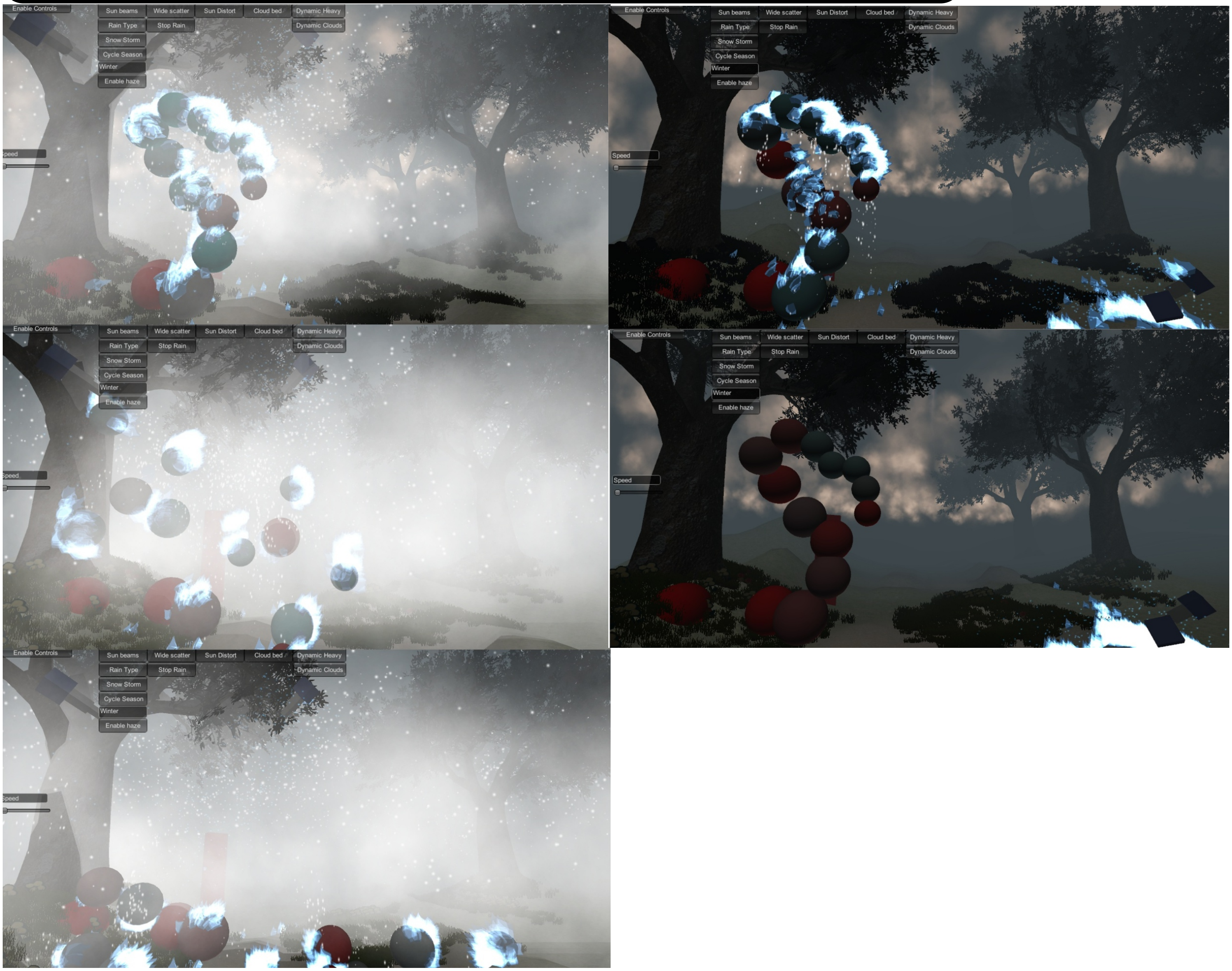


Rolling lava controller

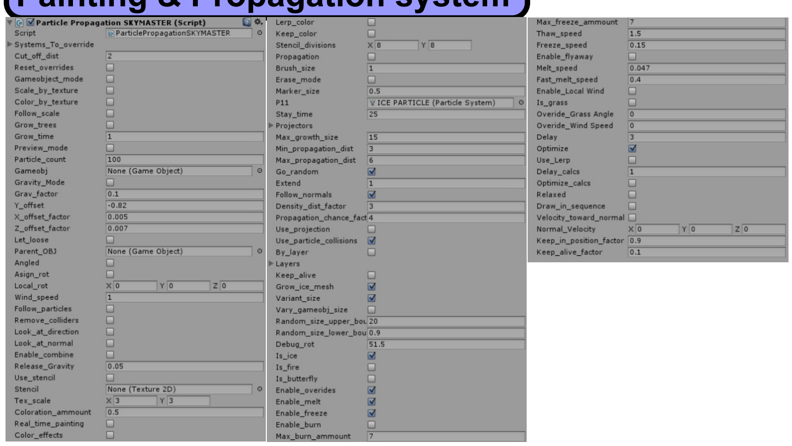


Particle painting - propagation (e.g. for fire)- sticking - growth & melt (for ice) Particle to Particle collisions.

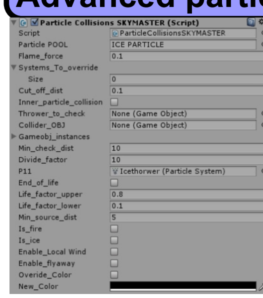
22



Painting & Propagation system



Advanced particle collisions (particle to particle)



Sky Master ULTIMATE Version 1.5

Sky master introduces two new major features in v1.5

- Full Unity 5 integration, with a new skybox shader version of the atmospheric scattering.

- Scatter volume fog shader, for depth in the Unity or mesh terrain

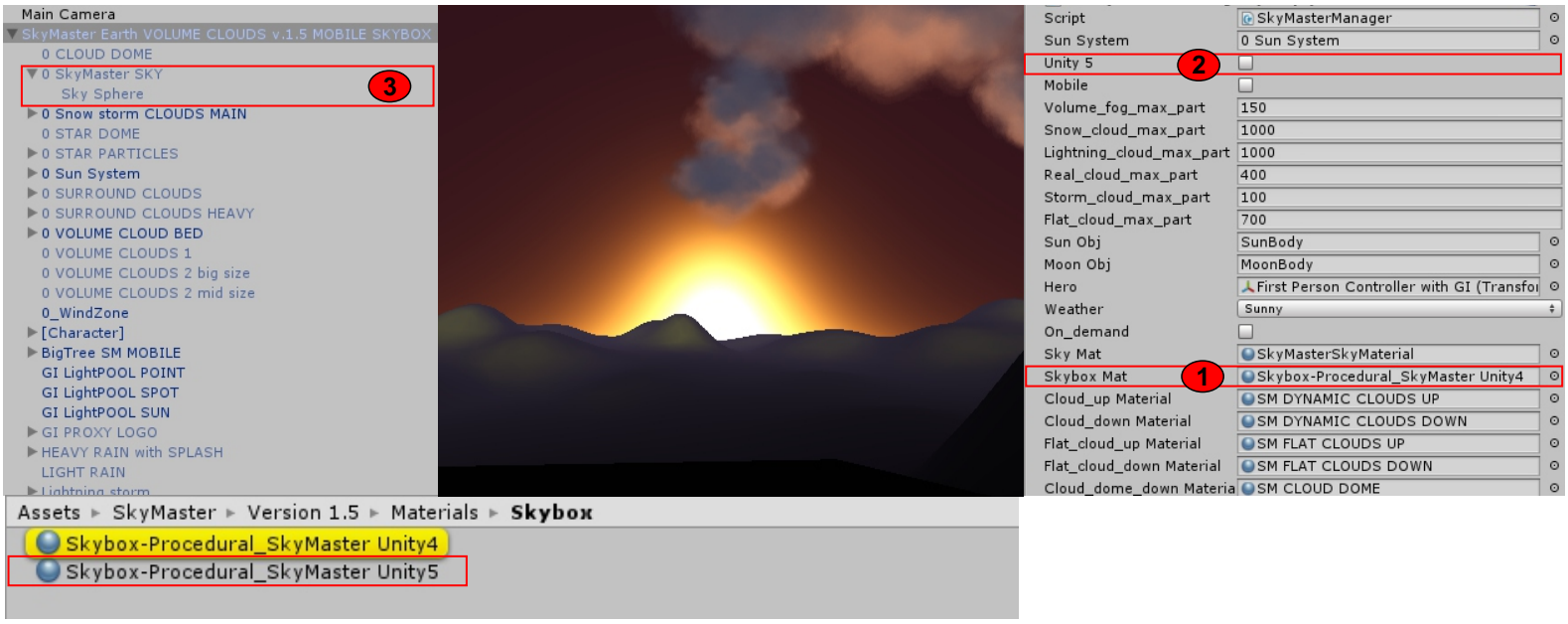
Also there is a completely redone performance based set of prefabs, with a brand new asset bundle.

Guide to using Unity 5 skybox mode

1. Introduce any of the version 1.5 prefabs in the scene. Add the material with Unity 5 skybox shader in the SkyboxMat slot in the main SkyMasterManager script.

2. Check the Unity 5 option in the script. The setup of the material in the skybox is handled automatically. The skybox material can be found in “SkyMaster/Version1.5/Materials/Skybox” folder. This folder also includes the skybox material for Unity 4 use. A ready skybox based prefab is provided for Unity 4.

3. Disable the sky dome so the skybox is visible. The sky dome is found in the prefab root, in ” SkyMaster SKY” gameobject.

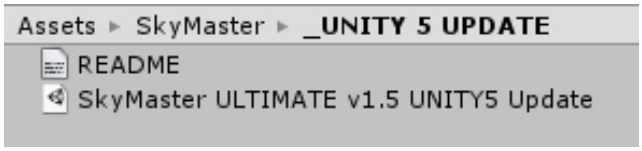


Guide to Sky Master Unity 5 update

In order to use Sky Master with Unity 5, a package has been included that will update the necessary scripts and allow the proper conversion to Unity 5 code. The same update includes a Unity 5 demo scene for reference.

1. Download the asset and import to the project. Confirm the conversion to Unity 5 code. When the error that prevents the conversion to move forward occurs, open the SkyMaster/_UNITY5_UPDATE folder and import the .unitypackage file in the project. After the pack has been imported, allow Unity 5 to continue with the code conversion and will finish successfully.

2. Sky Master ULTIMATE is now ready to be used in Unity 5.

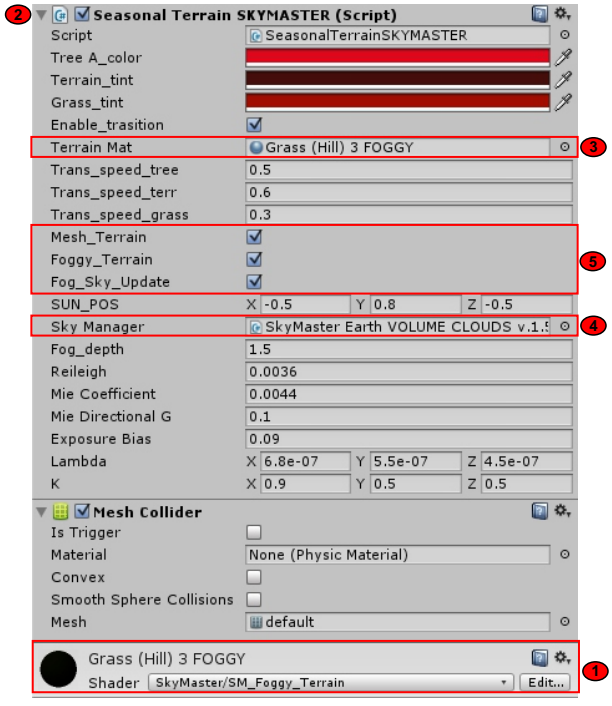


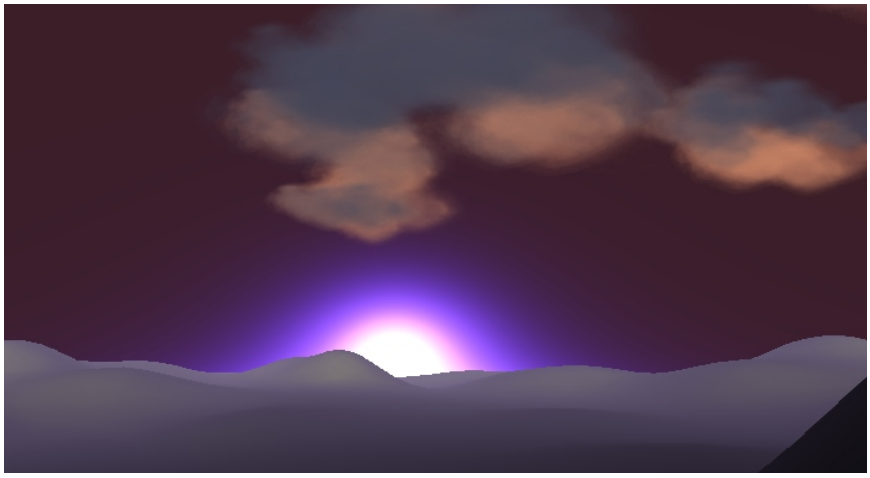
Guide to using the new scatter fog shader on Unity Terrain.

1. Use a material with the foggy terrain shader “SMDistFoggyTerrainFP” in SkyMaster category, in Unity terrain.
2. Attach the “SeasonalTerrainSKYMASTER” script to the Unity terrain
3. Insert the material in the terrain settings and the SeasonalTerrainSKYMASTER script “Terrain Mat” slot.
4. Put the Sky Master Manager in the manager slot, so the system can read the current sky settings
5. Enable “Foggy_terrain” to use the scatter fog and “Fog_Sky_Update” to grab the sky information from the Sky Master Manager and synchronize with the day cycle.

Unity terrain

Mesh terrain





Guide to using the new scatter fog shader on Mesh Terrain or other meshes.

1. Use a material with the foggy terrain shader “SM_Foggy_Terrain” in SkyMaster category, for Mesh terrain (or an item).
2.Attach the SeasonalTerrainSKYMASTER script to the mesh terrain (meshfilter gameobject).
3. Insert the material in the SeasonalTerrainSKYMASTER script “Terrain Mat” slot.
4. Insert the Sky Master Manager in the manager slot, so the system can read the current sky settings.
5. Enable “Foggy_terrain” to use the scatter fog and “Fog_Sky_Update” to grab the sky information from the Sky Master Manager and synchronize with the day cycle.

Sky Master ULTIMATE Version 2.1

Sky master ULTIMATE introduces multiple new features in v2.0

- Full Unity 5 integration, with new skybox shader enchancements.

- Scatter volume fog image effect

- Special effects (refractive rain)

- Shadows and custom attachments to volumetric clouds

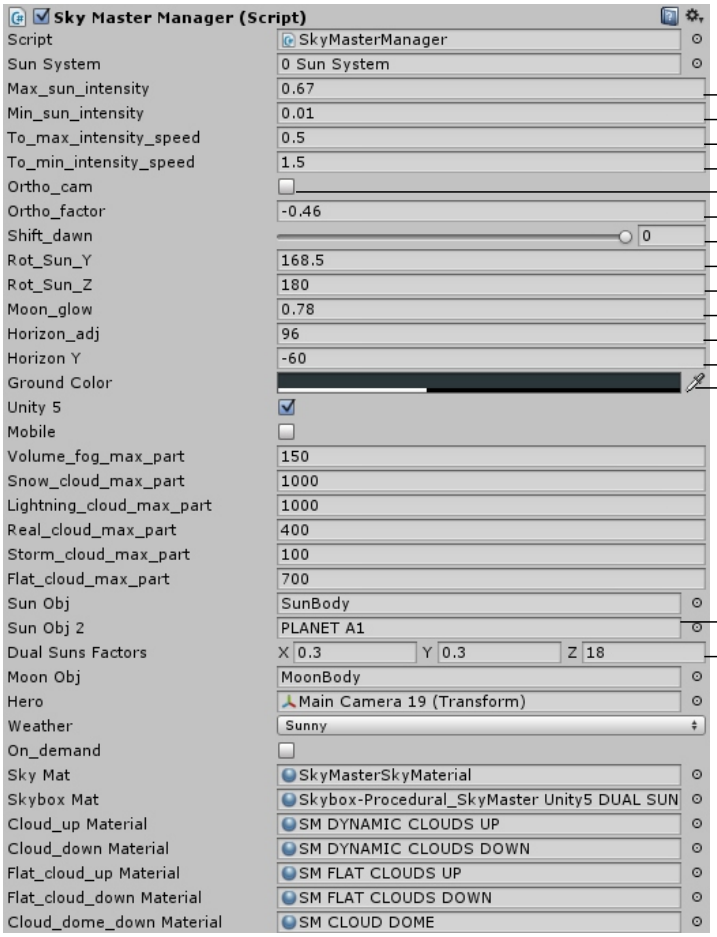
Guide to using Unity 5 skybox and skydome modes

1. The skybox shader is now not dependent on the placement of the script holder. Any deviation from the original prefabs must be compensated for this.
2. The new prefabs place the hero at 0,0,0, instead of 0,10000,0 of the original skydome oriented setup
3. To use the Skybox mode, insert the material in skyboxmat slot, check Unity 5 and select a proper preset (0-3)
4. To use the Skydome system, enable the dome sphere, add material to skymat slot, check Unity 5 (this changed in 2.0) and select a preset that is made for dome (preset 4 sample).

SkyMaster Manager

The new preset system allows the control of both Skybox and Skydome in Unity 5 mode. Unity 5 option must be checked in the Sky Manager script and there are 4 presets ready to use with Skybox mode (0-3) and one for Skydome (4). New presets can be added in code by searching for “if (preset == 0) and copying the code adding a new number and values in the parameters. Then the preset can be called with its ID number at start or during gameplay and customized as needed.

Sky Manager v2.1



Minimum sun intensity

Maximum sun intensity for mid day

Speed the sun reaches max intensity in mid day

Speed the sun reaches min intensity for night

Use orthographic camera mode

Orthographic mode stretch factor

Shift dawn by the specified amount

Adjust the sun rotation in Y axis

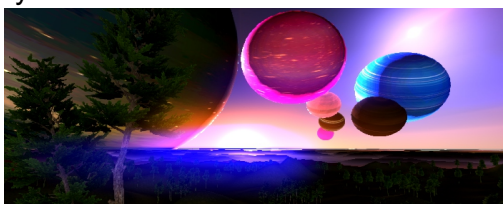
Adjust the sun rotation in Z axis

Moon halo intensity

Adjust the horizon depth

Move the ground/horizon line vertically

Color of the ground



Dual Sun system, define the 2ond sun in this parameter and use the DUAL SUN material for the Skybox
The 2ond sun intensity can be adjusted in the DUAL SUN material using the “2ond sun intensity” variable.

The Dual Suns Factors govern the 1st & 2ond sun balance in the overall intensity of the sky and 3rd parameter adjusts the 2ond sun size. The system may also be used to provide a halo for a 2ond moon or a planet.

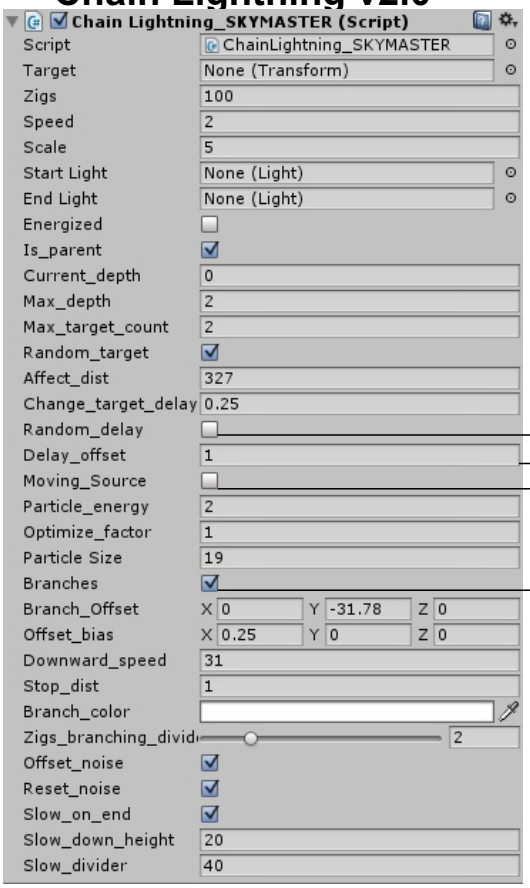
New preset system

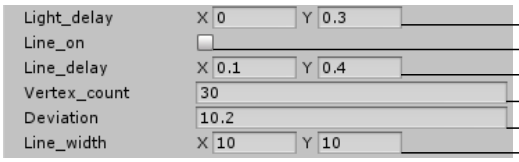
New preset 7 should be used for the Dual Sun case. The 2ond sun is activated when an object is inserted in the “sun obj 2" parameter.

IMPORTANT:
As of v2.1, the Horizontal factor is dedicated to in game use only and thus is zeroed when the game starts. Use zero for this parameter in the editor as well. The sun rotation in the editor is handled by the Rot Y-Z values.

Chain lightning

Chain Lightning v2.0





Randomize light elimination delay

Use line based lightning for richer effect.

Delay line elimination after target has been reached

Maximum vertices to be used in lightning

Maximum deviation for lightning bolt shaping

Line start - end width

As of version 2.0, the system can be used with a line renderer for richer effect. Attach a line renderer to the gameobject that holds the lightning script and check “Line_on” option to use the new sub system.

Randomize target delay

Randomize delay, add this amount around target delay parameter

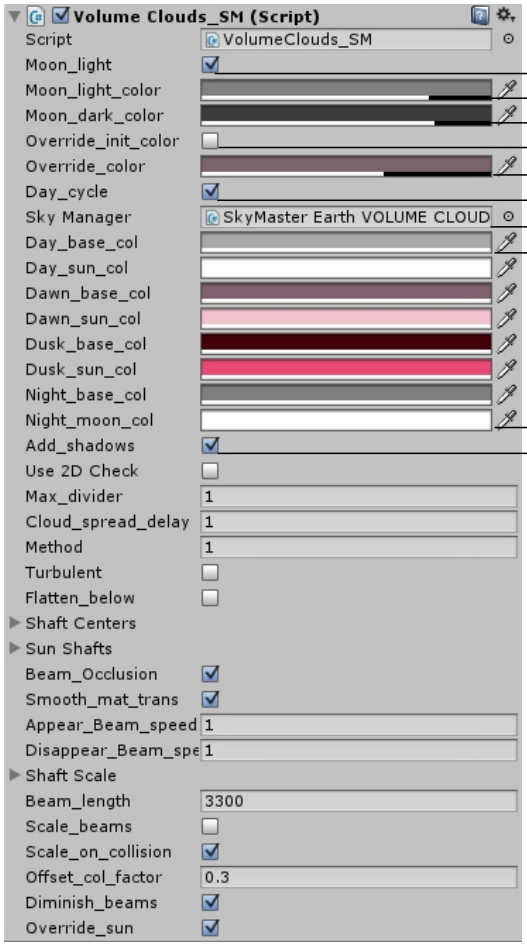
Enable if the lightning source is moving

Enable branching of lightning

Volumetric Clouds

As of version 2.0, the system can be used with a sprite sheet besides the normal single texture. This opens up all kind of possibilities for varying cloud textures. Define the rows and columns numbers in the “Particle Renderer” -> “UV Animation” - > “X-Y Tile” fields. The system will automatically spread the various clouds found in the sheet.

Volumetric Clouds v2.0



Enable grab of moon light at night time

Highlight color of moon light cloud shading

Base color of moon light cloud shading

Use a different color than the originally defined as base

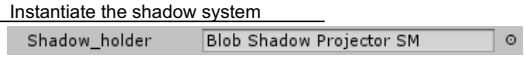
Color to override base color with

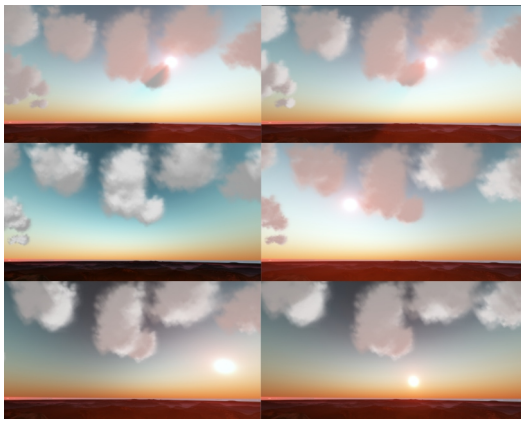
Assign colors based on day/night cycle

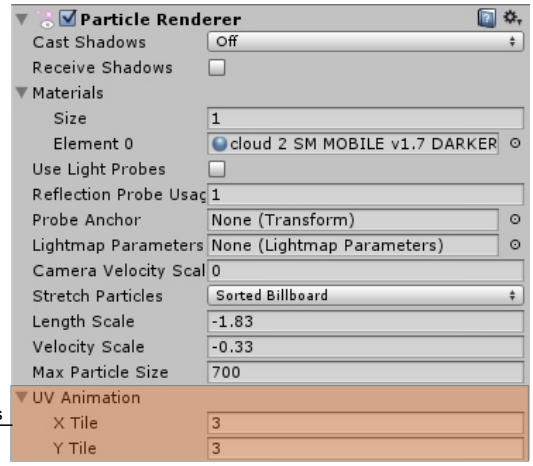
Sky Manager to grab time of day from

Colors to use for each day quarter

Instantiate the shadow system







Cloud Sprite sheet, rows and columns

Volumetric Fog

As of version 2.0, there is a volumetric fog system that can be used with or instead of the shader based volumetric fog. The volumetric fog and sun beams scripts must be attached to the main camera and they are controlled by the Terrain manager script that handles the terrain fog globally. The fog and sun shafts are then controlled by this script, that also has a fog preset system in place for direct assignment of various parameters.

Volumetric Fog v2.0

Global Fog Sky Master (Script)

Script	GlobalFogSkyMaster
Distance Fog	
Use Radial Distance	
Height Fog	☑
Height	246.69
Height Density	0.0065
Start Distance	1
Dist Gradient	
Gradient Bounds	X 0 Y 20900
Luminance	0.47
Lum Fac	0.24
Scatter Fac	34.16
Turb Fac	3.7
Horiz Fac	0.4
Turbidity	14111
Reileigh	411
Mie Coefficient	0.054
Mie Directional G	0.913
Bias	0.42
Contrast	1.51
Sun	Sun (Transform)
Fog Sky	
Tint Color	X 68 Y 155 Z 345
Clear Sky Fac	1.13
Fog Shader	Hidden/GlobalFogSkyMaster
Sky Manager	None (Sky Master Manager)

Enable volumetric fog, attach to main camera
Enable fog in background
Radial calculations for the fog
Use height fog
Fog height
Density of fog
Start distance from camera
Gradient color control of fog
Gradient bounds control
Scatter fog parameters
Sun object
Add fog to skybox
Tint fog color
Factor of fog over skybox
Shader used for the image effect
Sky Manager

Color Correction Curves (Script)
Color Correction Curves Sky Master (Script)
Antialiasing (Script)
Contrast Stretch Sky Master (Script)
Antialiasing Sky Master (Script)

Attach to main camera

Sun Shafts Sky Master (Script)

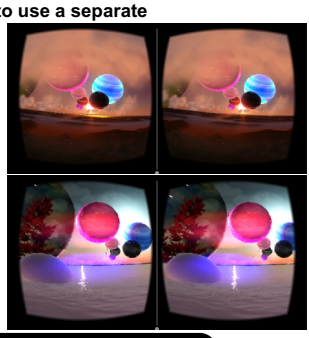
Script	SunShaftsSkyMaster
Resolution	High
Screen Blend Mode	Screen
Sun Transform	SunBody (Transform)
Radial Blur Iterations	2
Sun Color	
Sun Threshold	
Sun Shaft Blur Radius	5.86
Sun Shaft Intensity	1.45
Max Radius	0.4
Use Depth Texture	
Sun Shafts Shader	Hidden/SunShaftsCompositeSM
Simple Clear Shader	Hidden/SimpleClearSM

Terrain, fog and Tree color control

Seasonal Terrain SKYMASTER (Script)

Script	SeasonalTerrainSKYMASTER
Image Effect Fog	☑
Image Effect Shafts	☑
Image Effect Sky Upa	
Fog Preset	0
Update Leaf Mat	☑
Leaf Mats	
Size	4
Element 0	Leaves_3
Element 1	Leaves_3
Element 2	Leaves_3
Element 3	Billboard
Rays_day_color	
Rays_night_color	
Shafts_intensity	1.45
Mesh_moon	☑
Glow_moon	☑
Glow_sun	
Tree A_color	
Terrain_tint	
Grass_tint	
Enable_trasition	☑
Terrain Mat	Grass (Hill) 3 FOGGY TERRAIN v1
Trans_speed_tree	0.5
Trans_speed_terr	0.6
Trans_speed_grass	0.3
Trans_speed_sky	0.1
Mesh_Terrain	
Foggy_Terrain	☑
Fog_Sky_Update	☑
SUN_POS	X -0.5 Y 0.8 Z -0.5
Sky Manager	SkyMaster Earth VOLUME CLOUD
Fog_depth	1.5
Reileigh	0.008510659
Mie Coefficient	0.0004
Mie Directional G	0.1
Exposure Bias	0.07
Lambda	X 6.8e-07 Y 5.5e-07 Z 4.5e-07
K	X 0.9 Y 0.5 Z 0.5

Enable image effect volumetric fog (**GlobalFogSkyMaster script must be attached to the main camera**)
Enable image effect sun shafts (**SunShaftsSkyMaster script must be attached to the main camera**)
Volumetric fog presets (image effect version)
Speed Tree materials for tree leaves seasonal color update. Define to globally change tree coloration based on season
Note that the material will change for all instances that use it, so it is a good practice to use a separate copy of the material and items for the seasonal color change use.
Sun shafts day color
Moon shafts color
Shaft intensity
Enable if mesh is used for the moon, to smooth out moon shaft motion
Add glow to moon
Add extra glow to sun



Control image effects through terrain script

Terrain - Fog v2.1 (Stereo mode)

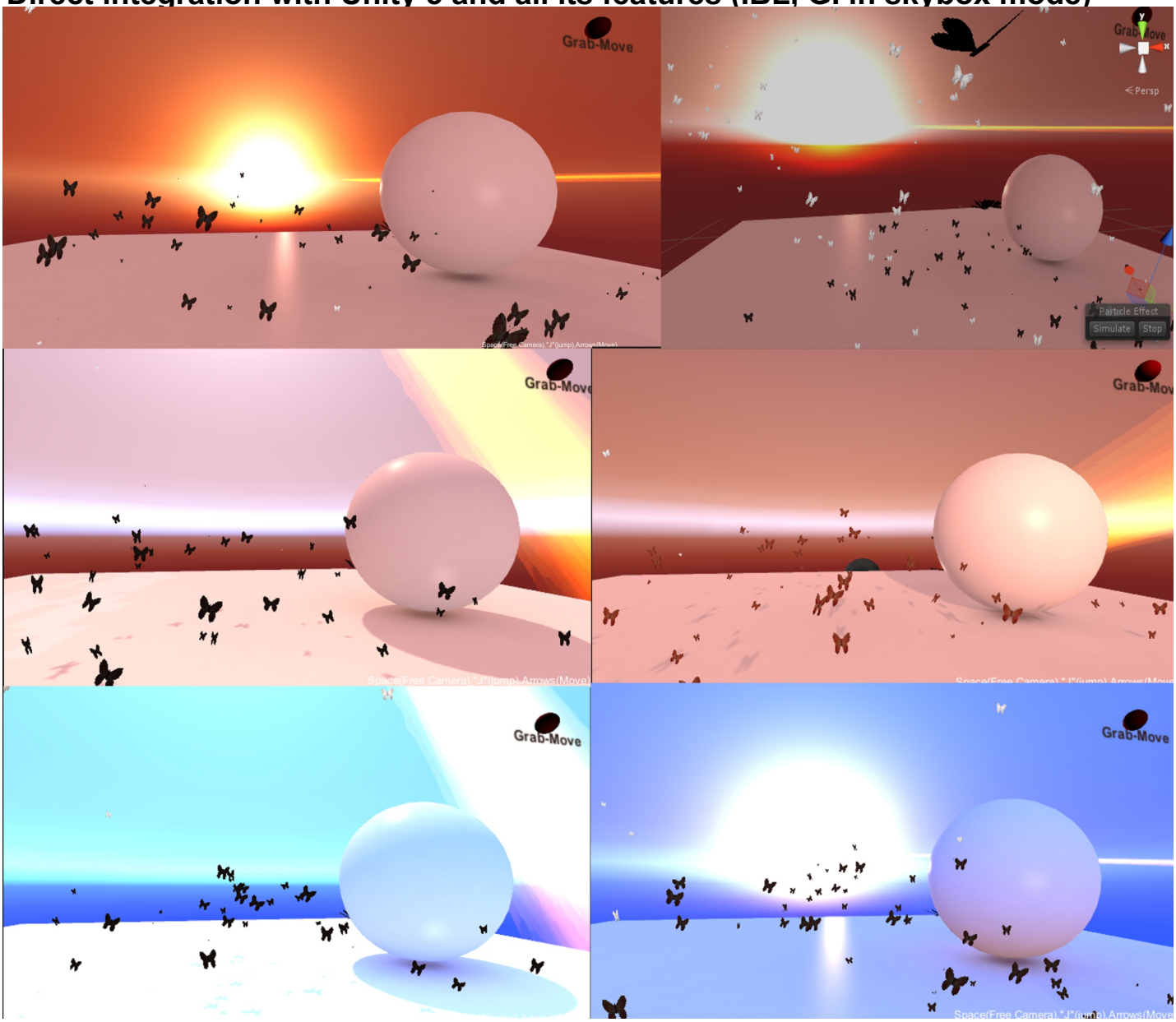
Seasonal Terrain SKYMASTER (Script)

Script	SeasonalTerrainSKYMASTER
Gradient Holders	
Size	1
Element 0	None (Global Fog Sky Master)
Stereo Mode	☑
Left Cam	Main Camera Left
Right Cam	Main Camera Right
Image Effect Fog	☑
Use_both_fogs	
Image Effect Shafts	☑
Fog Preset	0

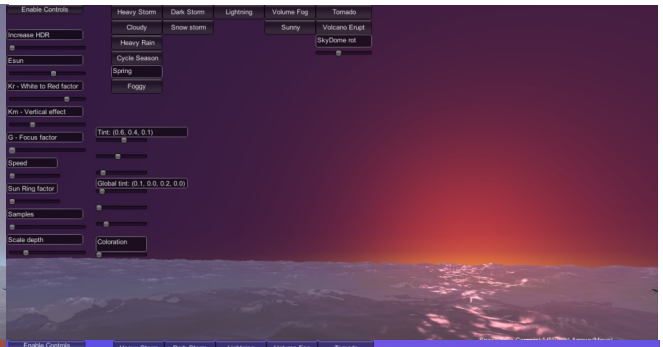
Define a gradient to use per fog preset
The gradient is read from the first Global Fog Sky Master script on the object.
Enable stereoscopic mode - fog update in L/R cams
Left / Right eye cameras to be used in the stereo mode. GlobalFog & SunShafts scipts must be copied from the main camera to the L/R cams manually. Then they are regulated by the Terrain script.
Use the volumetric fog together with the standard Unity fog.

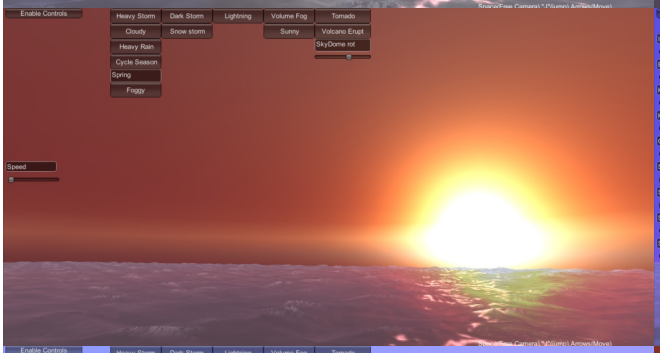
Performance study - 2 draw calls for Sky rendering & Volume clouds

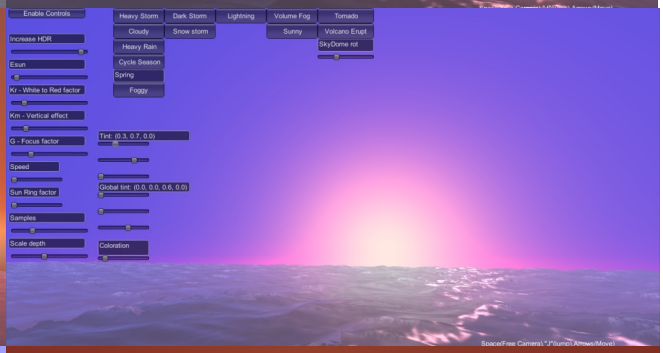
Direct integration with Unity 5 and all its features (IBL, GI in skybox mode)

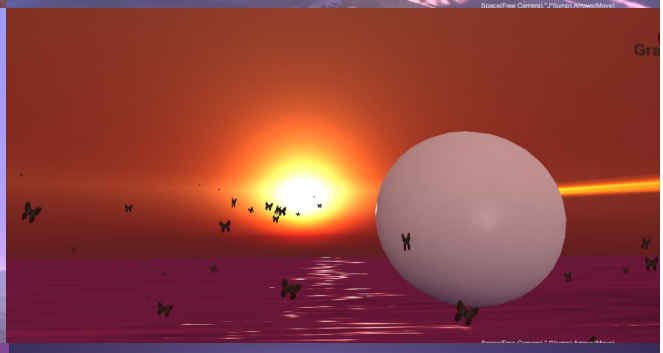


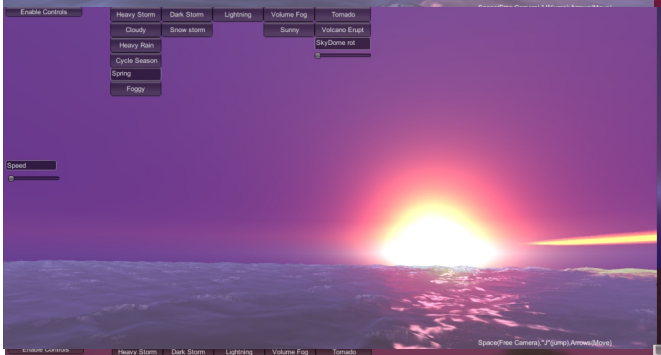
Sky Master UNITY 5 Demo

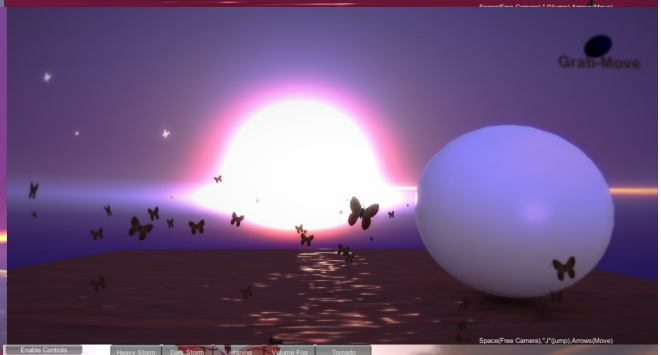


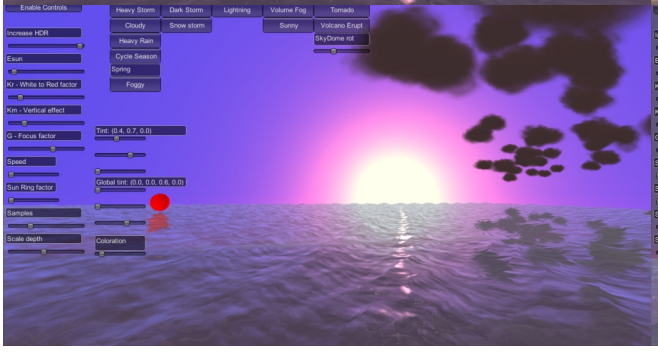












Special effects skybox shader

This shader requires Unity 5 and Shader Model 3.0. If used instead of the standard v1.5 skybox shader, it provides additional options for sky texturing, color adaptation - filtering and texture motion.

The Special effects skybox shader is found in ”Sky Master/Version 1.5 / Unity 5 scene/Shaders/Sky Filter Effects” folder. Set the tiling on the normal map slot to define various motion patterns.