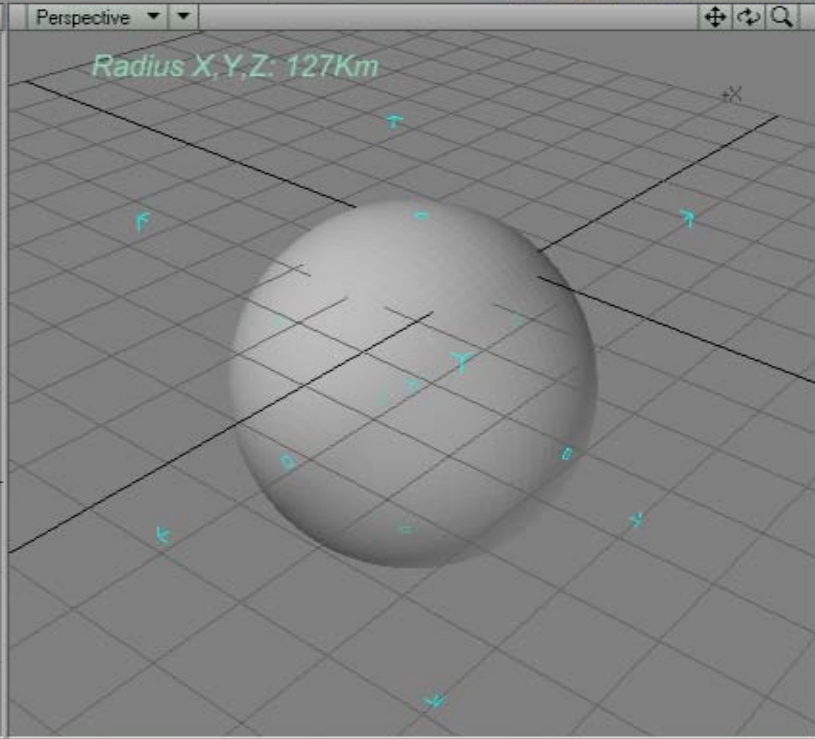
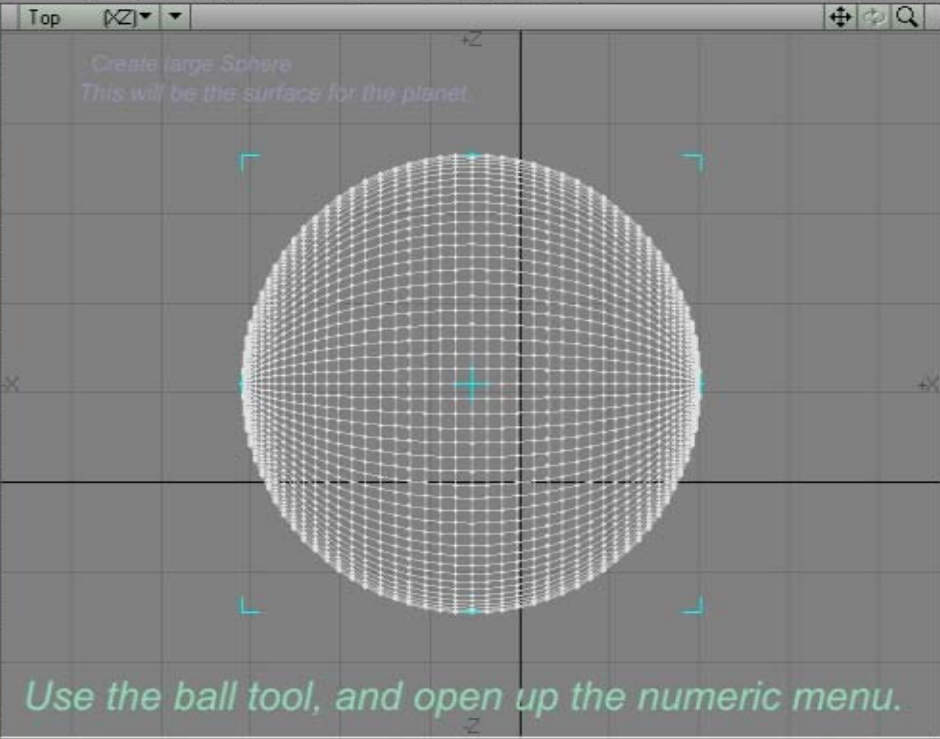




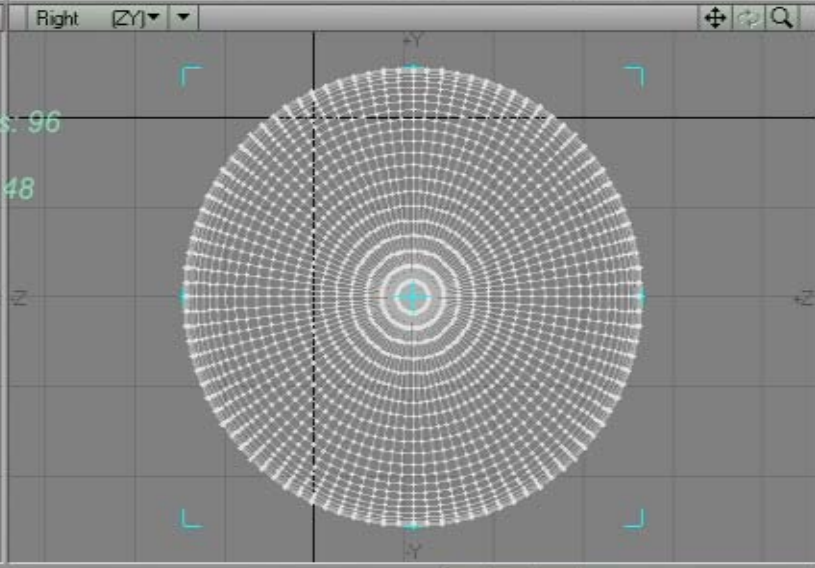
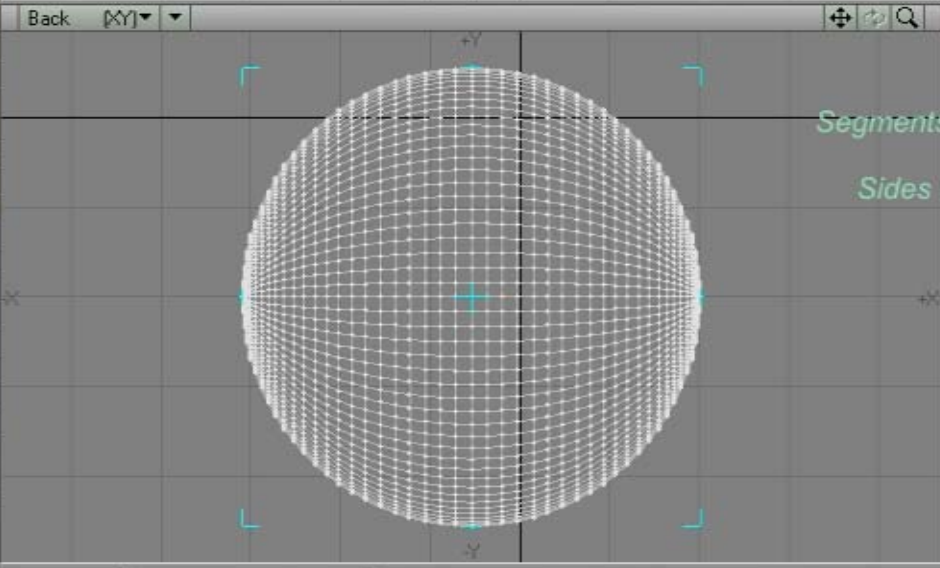
# Introduction to Creating Realistic Planets

*By Joel Tamblyn*

- Modeler
- Surface Editor F3
- Image Editor F4
- Presets
- Objects
  - Box
  - Ball** 0
  - Disc
  - Cone
  - Capsule
  - Platonic Solid
  - SuperQuadric
  - Gemstone Tool
  - Equilateral Tri
  - Gear
  - Wedge
  - Toroid
  - Quadric
  - ParametricObj
  - Bubbles
  - Helix
  - Plot1D
  - Plot2D
- Elements
  - Pen
  - Text
  - Sketch
  - Bezier
  - Spline Draw
  - Make Curve
  - Skelegons
  - Metaballs
  - Points
  - Spray Points
  - Metaedges
  - Make Pol
  - Points to Polys
  - RandPoints
  - RandPicks
  - Stipple
  - Make Fan
  - Make Strip
  - Cage



- Back [X] Y]
- Spline Draw
- Make Curve
- Skelegons
- Metaballs
- Points
- Spray Points
- Metaedges
- Make Pol
- Points to Polys
- RandPoints
- RandPicks
- Stipple
- Make Fan
- Make Strip
- Cage



# Layers of Planet

- Surface
  - Radius:127.6KM
  - Segments:48
  - Sides:96
  - Create a specific surface called “Planet Surface”.
  - Save the surface.

# Cloud Cover

- Resize surface for clouds.
  - Using the size tool. Enlarge Sphere by 100.2%.
  - Create a specific surface “Cloud Cover”.
  - Save the new object which will be used for clouds.

# Atmosphere

- Undo or load up the Surface object again.
  - Using the size tool and numeric keypad. Bring the size of the planet up to 101.7%.
  - Create a specific surface “atmosphere”.
  - Save the third object atmosphere.
- This is the end of the Modeler portion.

# Scene Editor

- We will first start with loading up the original Sphere “Planet Surface”.
- Turn Smoothing on for the Object.

# Surfacing

- Three main mapping done for the planet surface.
  - Color
  - Diffuse
  - Specular

- Layout
- Rendering
- Scene Editor **F1**
- Graph Editor **F2**
- Surface Editor** **F3**
- Image Editor **F4**
- Motion Mixer
- Spreadsheet
- VIPER
- Presets
- Properties
- Camera Zoom **Z**
- Motion Blur
- Blur Length
- Depth of Field
- Focal Distance
- Lens F-Stop
- Stereoscopic
- Eye Separation
- Image Area
- Frame Size
- Pixel Aspect
- Limited Region **L**
- Adjust Region
- Camera Mask
- Mask Position
- Mask Color
- Antialiasing
- Antialiasing
- Enhanced AA
- Adaptive Samp**

### Surface Editor

Edit by: Object  
 Filter by: Name  
 Pattern:

Surface Name  
 Earth-Surface  
 Earth - Surface  
 Earth-Clouds  
 Earth-Atmosphere

Number of Objects: 3, Number of Surfaces: 3  
 Load Save Rename  
 Surfaces Selected: 1  
 Earth - Surface  
 Polygons: 4608  
 Textures: 3  
 Shaders: 0  
 Display Options

Basic Advanced Environment Shaders

Color **090 118 150** E T  
 Luminosity  E T  
 Diffuse  E T

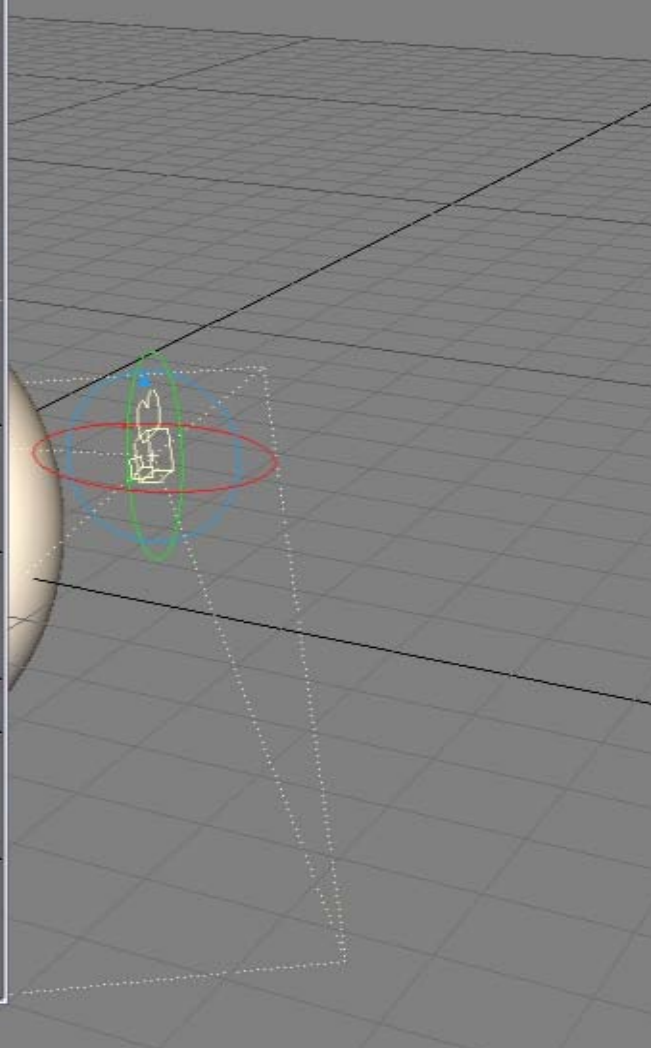
Specularity  E T  
 Glossiness  E T  
 Reflection  E T

Transparency  E T  
 Refraction Index **1.0** E T  
 Translucency  E T

Bump  E T

Smoothing  
 Smooth Threshold  E T  
 Double Sided

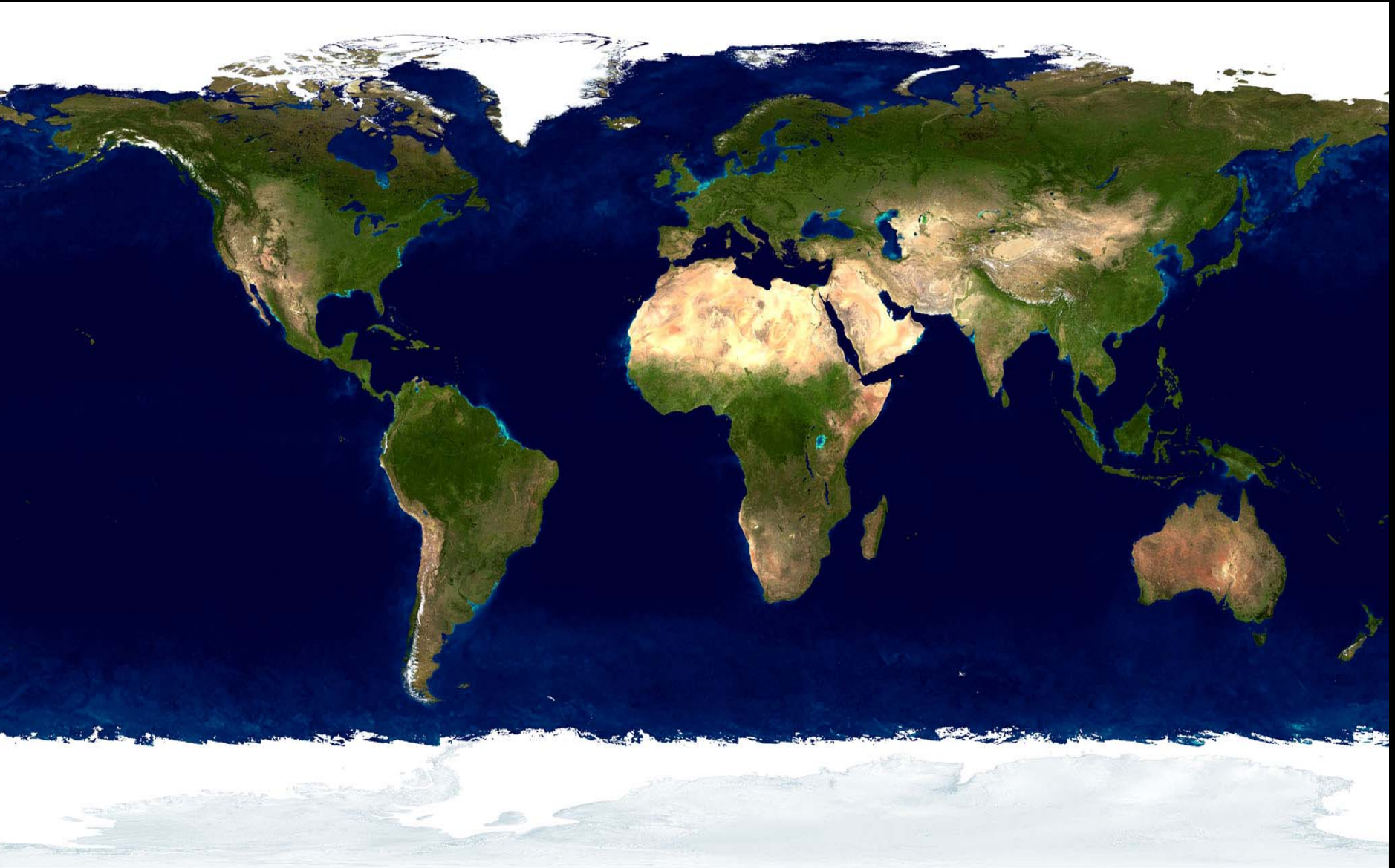
Comment

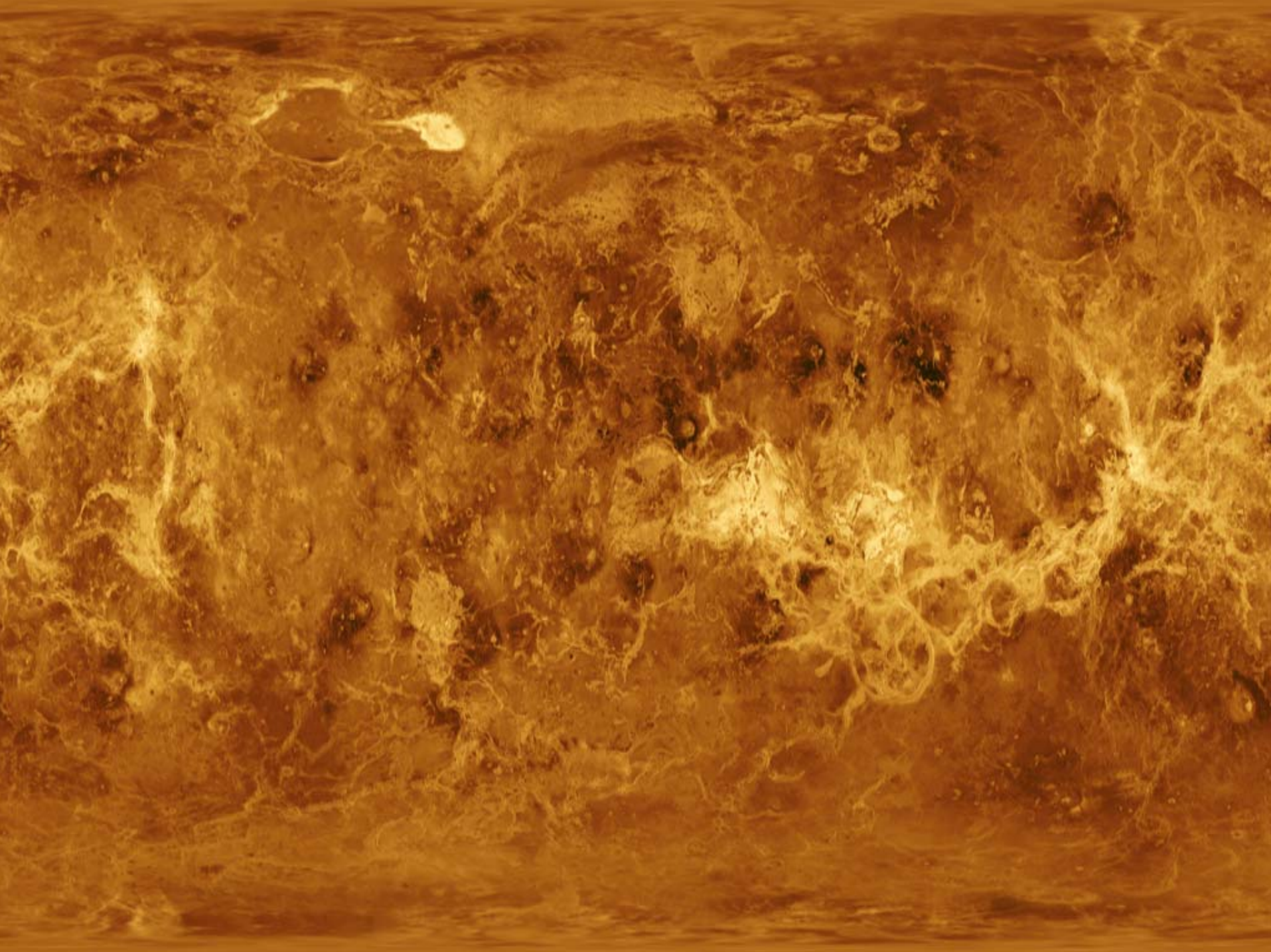


# Color

- Base Color
  - Red: 90, Green: 115, Blue 150
- Texture
  - Layer Type
    - Image Map
  - Opacity: 50%
  - Projection Spherical
  - Axis Y

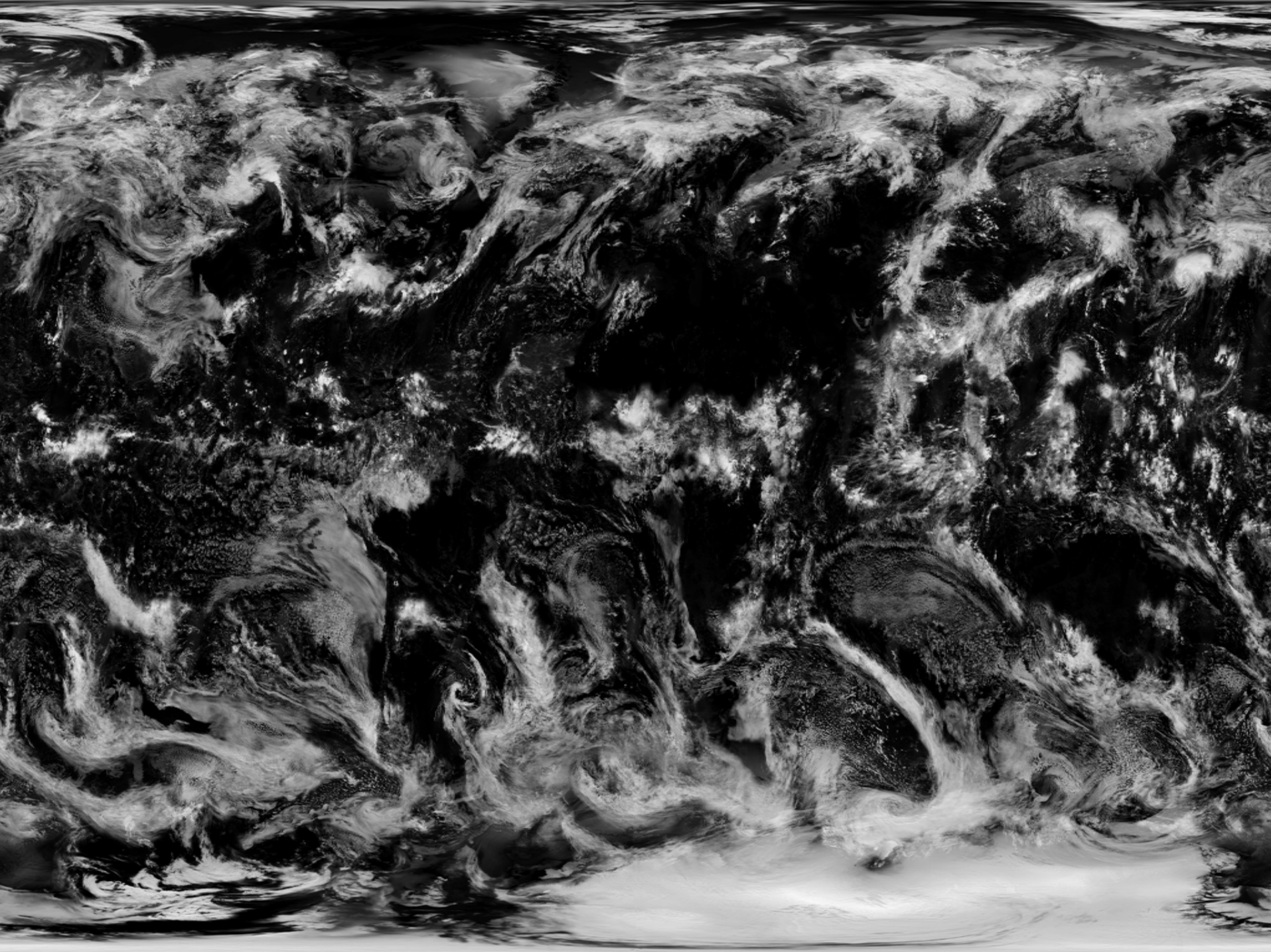
# Image for Surface





# Diffuse

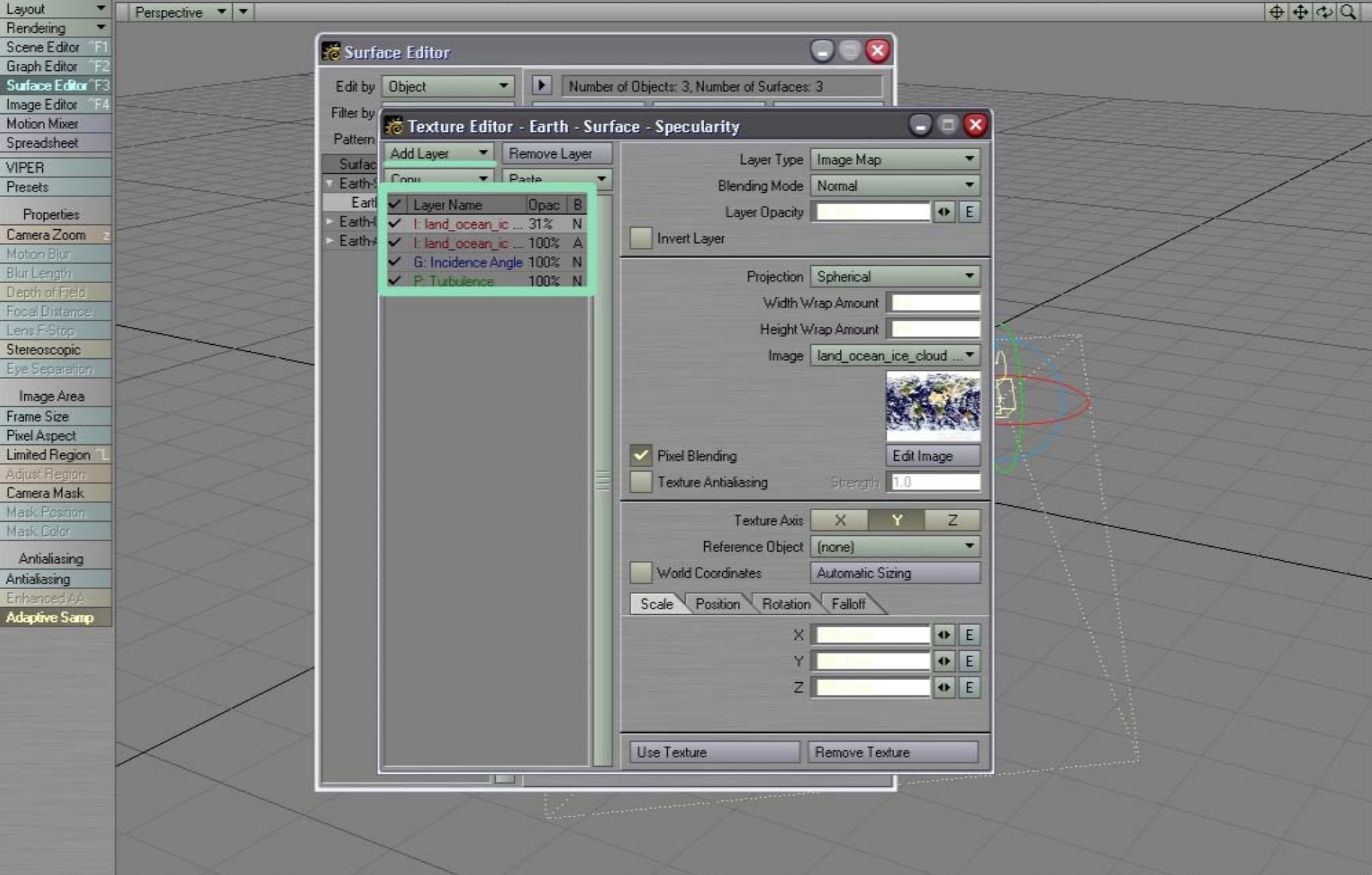
- Set base diffuse to 70% to compensate for the light given off by the atmosphere.
- Using Texture mapping to create the shadows of clouds.



- Diffuse Mapping
  - Layer Type: Image Map
  - Opacity: 50%
  - If the cloud image used has white clouds on black ocean, Turn on Invert layer.
  - Spherical Projection
  - Cloud image like shown before.
  - Around the Y-Axis again.
  - Rotation
    - H: 0.1

# Specular

- 4 layers, that must go in the exact order given.
- Layers used to give the correct rough lighting from the planet's ocean.



# Layer 1

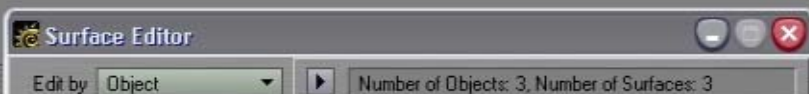
- Layer Type: Image Map
- Opacity: 30%
- Spherical Projection
- Choose your Specular Land Image
- Y-Axis

# Layer 2

- Layer Type: Image Map
- Blending Mode: Alpha
- Spherical Projection
- Same Image used before.
- Y-Axis again.

# Layer 3

- Layer Type: Gradient
- Input: Incident Angle
  - Key 1:
    - Value at 200% when at 0 degrees.
  - Key 2:
    - Value at 200% when at 20 degrees.
  - Key 3:
    - Value at 0% when at 50 degrees.



## Texture Editor - Earth - Surface - Specularity

Layer Name	Opac	B
✓ I: land_ocean_ic ...	31%	N
✓ I: land_ocean_ic ...	100%	A
✓ G: Incidence Angle	100%	N
✓ P: Turbulence	100%	N

Invert Layer

Layer Type: Gradient  
 Blending Mode: Normal  
 Layer Opacity:  E

Input Parameter: Incidence Angle

Start:

*Intensity of layering.*    
*Adjusts the degree that the value is applied.*    
   
 Smoothing: Spline

End:

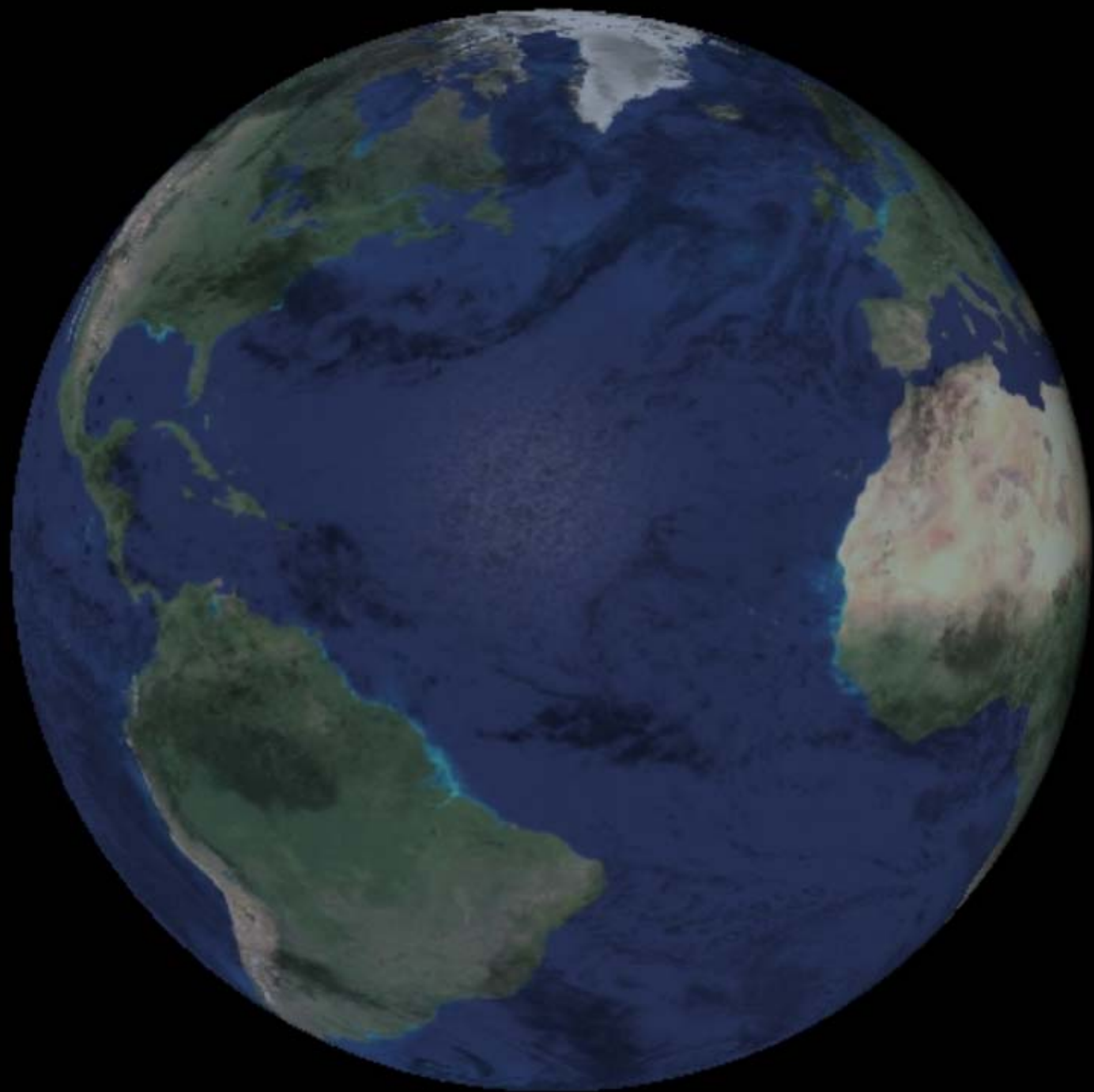
*Click on Gradient shaded area to create a new Key.*

# Layer 4

- Layer Type Procedural
- Procedural Type: Turbulence
- Value 20%
- 1KM on all Axis

# End of Surface

- Glossiness to 40%
- Diffuse Sharpness to 70% (Advanced Tab in the Surface Editor).
- Save the newly textured object.



# Clouds

- Load up the clouds object into the scene editor.
- Turn on Smoothing and Double sided.

# Three Mappings

- Color Channel
  - Base Color
    - Red: 255, Green: 255, Blue: 255
  - Texture
    - Layer Type: Procedural
      - Procedural Type: Turbulence
      - Frequency: 7
      - All Axis': 500 meters
    - Texture color: RGB: 200/200/200

- Set diffuse to 80%, like the surface dampens effects the lighting of the atmosphere has on it.
- To make Cloud object transparent between clouds. Do a transparency map. Use spherical projection on the y-axis. And invert the layer, to make the black transparent instead of the white clouds.

# Bump Mapping

- Layer Type: Procedural
- Procedural Type: Turbulence again.
- Value: 10%
- Frequency: 7
- Scale: 300 meters down each axis.

# Finish with Clouds

- Set “Diffuse Sharpness” to 70%.
- Save Object.



# Atmosphere

- Open the final object for the atmosphere.
- Turn on smoothing.
- Open the texture for the color channel.
  - Layer Type: Gradient
  - Input: Incident Angle

- Key1
  - RGB: 0/0/0
  - Parameter: 0 degrees
- Key2
  - RGB: 65/125/225
  - Parameter: 10 degrees
- Key3
  - RGB: 140/170/215
  - Parameter: 15 degrees
- Key4
  - RGB: 90/110/150
  - Parameter: 18 degrees
- Key5
  - RGB: 0/0/0
  - Parameter: 60 degrees

- The gradient color effect provides for a soft blue color that is normally observed from space. It is also used to fade transitionally as it approaches space. And at a much more rapid rate as it approaches the planet.
- The next step is to create a transparency gradient. Like what we did with the surface, we need to make sure the actual reflection of the atmosphere occurs at certain “incident angles”.

- Layer Type: Gradient
- Input: Incident Angle
  - Keys
    - Key1
      - Value: 120%
      - Parameter: 0 degrees
    - Key2
      - Value: 100%
      - Parameter: 5 degrees
    - Key3
      - Value: 0%
      - Parameter: 15 degrees
    - Key4
      - Value 100%
      - Parameter: 70 degrees

# Finishing Up

- Under the advanced tab set “Addictive Transparency” to 40%. When certain objects are brighter the covering layer becomes more transparent.
- And like the other two layers, put Diffuse Sharpness to 70%. This helping the atmosphere to have a nice transition from night to day.
- Under object properties you can set the “Object Dissolve” for the atmosphere. 10% is a good default to use. You can adjust this setting easily to control the size of the blue rim.
- And save your third and final object.

# Scene Layout

- Using the default distant light is fine for lighting. But a few modifications must be made.
  - Turn Affect Specular off in light properties.
  - Make a second distant light just like it.
- One light will be used for the warm sun lighting of the planet, while the other will be used for the white lighting in the scene, which becomes more intense as it approaches the horizon.
  - Set RGB of the light to: 250/220/180
  - Turn “Affect Diffuse” off and turn “Affect Specular” on for the second light.
  - Set the ambient light to 0%.

- 
- Thank you for viewing my Realistic Planet tutorial.
  - Please visit:
    - <http://www.jht.cjb.net/>
    - <http://earthobservatory.nasa.gov/Newsroom/BlueMarble/>
  - For images to map to your realistic planets.
  - For a more comprehensive look into the Realistic Planet creation:
    - [http://www.majesticimaging.com/html/lw\\_atmotut/index.html](http://www.majesticimaging.com/html/lw_atmotut/index.html)
    - <http://personal.southern.edu/~dascott/tutorial01/nasa-earth.htm>