



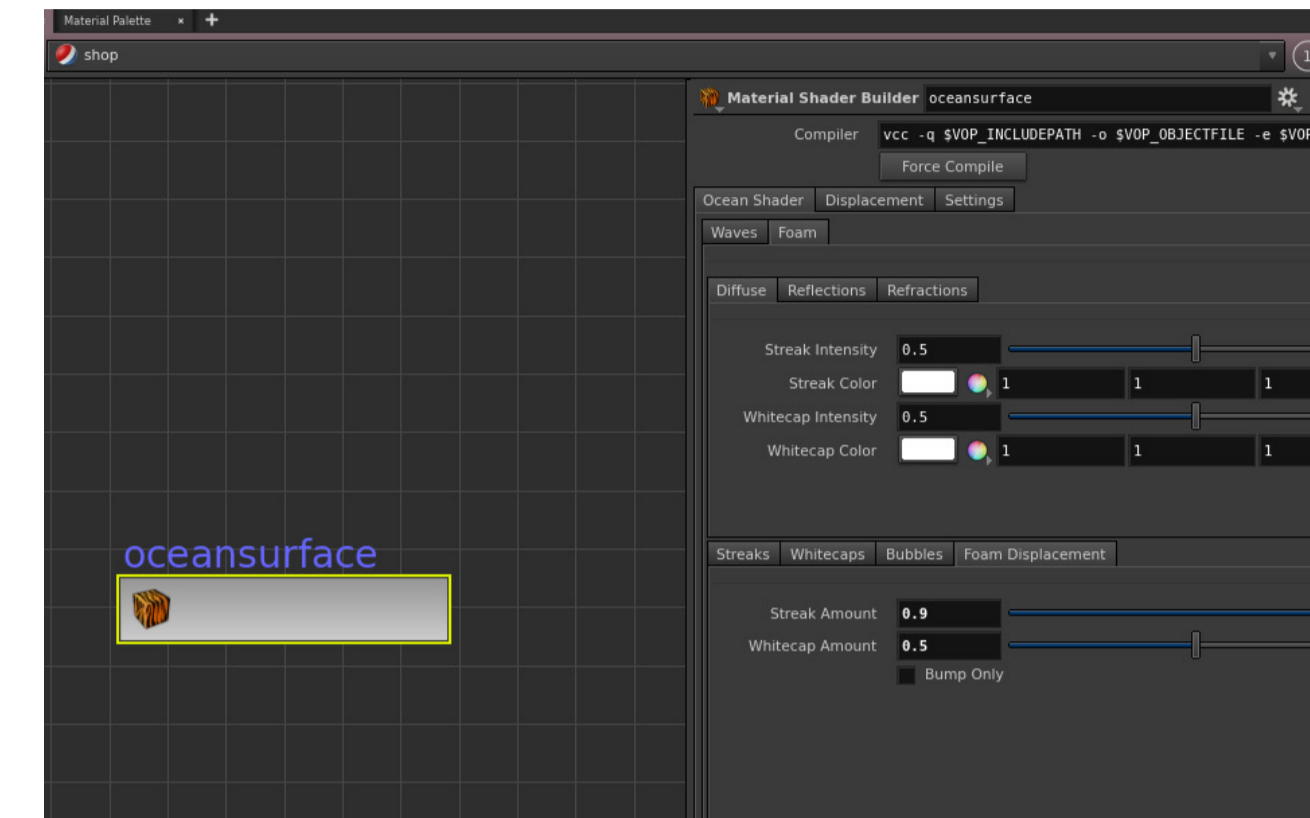
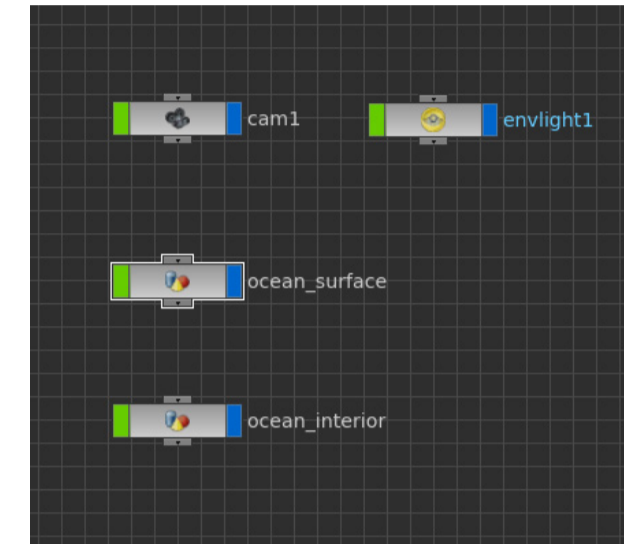
CG OCEANS IN HOUDINI

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The Ocean FX Shelf

Different tools in the Ocean FX Shelf tab create a ocean-surfaces: Small Ocean, Large Ocean, Guided Ocean Layer, Wave Tank, Beach Tank, Flat Tank, Ocean Flat Tank, Whitewater.



Collision Objects

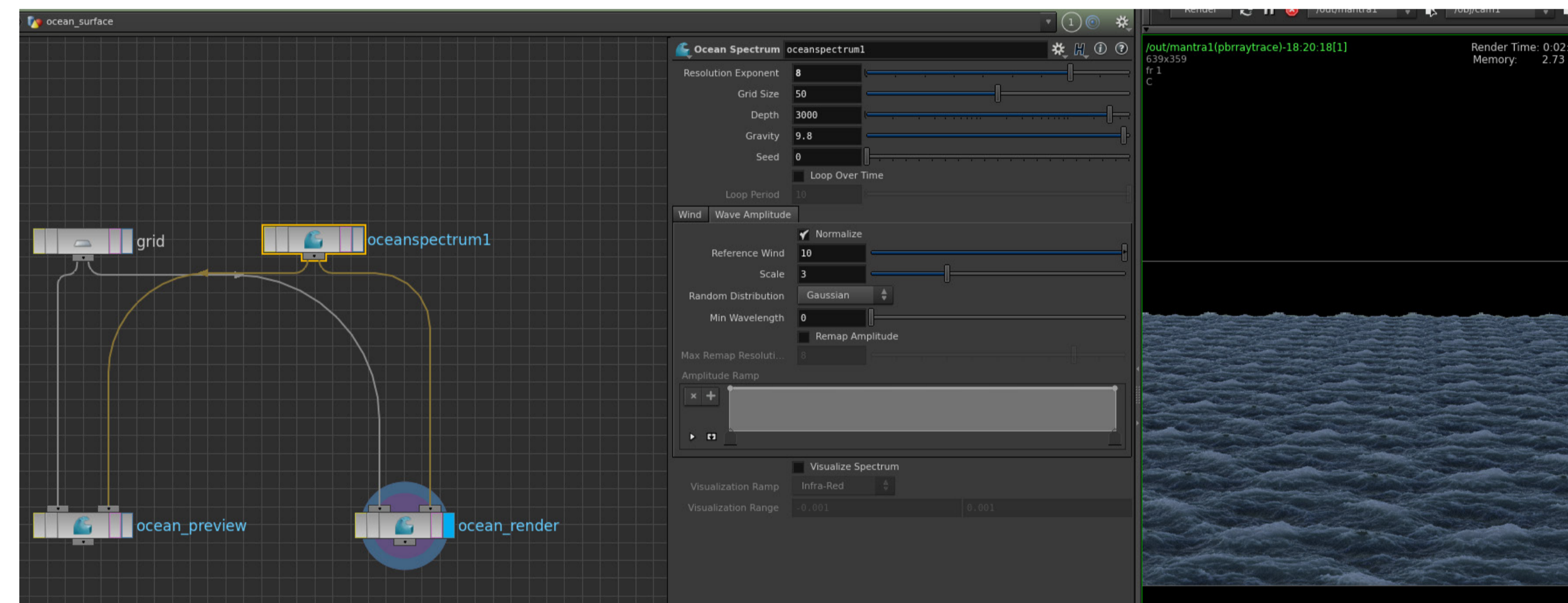
Houdini's Ocean tools have been improved for Houdini 16, giving more control over the look and timing of oceans, render-time evaluation of ocean spectra, and improved tools for integration with FLIP simulations. These FLIP simulations could be driven by ocean movement in H15 but no tools for the integration of the displacement and whitewater back into the surrounding ocean existed. The best objects for an integration into an ocean are objects with a high speed and impact on the water. In the Oceanvolume Shader the Cloud Density can be decreased to show objects under the water surface. Furthermore the Volume Shadow Quality and Volume Quality settings on the Sampling tab of the Mantra node have to be adapted.

Creating Oceans

- Combining ocean-surfaces with a grid enables to change the size of the ocean as well as to generate a higher resolution. When changing the size of the ocean, the shape of the waves will remain without changes. In the Ocean Spectrum node the Grid Size option enables to modify the world space size of the generated ocean spectrum.
- The Ocean Spectrum node sets the values and the Ocean Evaluate node applies the values to the grid geometry.
- Tessendorf-style (statistical model, physical model, 2D volumes Wind)
- The simulation will be determined by the expression in the Time parameter on the Ocean Evaluate node.

-Important physical values for the shape and animation of the ocean:

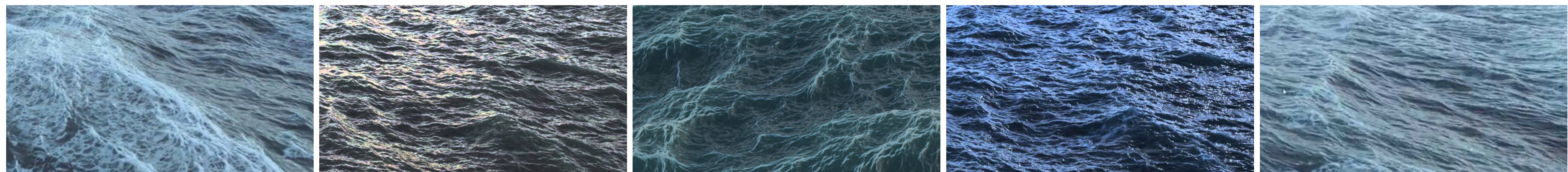
- *Depth and Wave Amplitude
- *Wind Speed and Wind Direction in degrees along the x axis
- *Directional Bias is the amount that the waves will align with the wind direction, Directional Movement is the amount that the waves will move in the same direction as the wind
- *Chop is the amount of sharp cups on the waves



The pictures above show my ocean scene file in Houdini 15. At object-level I created a camera, an environment light and the ocean by clicking on the Ocean FX Shelf tab (image on the upper left side). On the upper right side the settings of the Oceansurface Shader can be seen. On the picture below the ocean_surface node contains the grid, the oceanspectrum, the ocean preview and the ocean render node.

Whitewater

- In the Foam Solver streaks, whitecaps, bubbles and foam displacement can be controlled.
- The foam can be activated in the Geometry tab, checking the Foam Attribute and selecting Foam option in the Visualize Attribute option.
- The Foam Solver parameters generate the Foam Layer through Volumes.
- In oceans foam is emitted from peaks of waves
- In H15 the foam was based on textures, in H16 it is based on particles.
- The foam render is restricted to a grid or camera. The adaptive density (Z Density Follow) enables fewer particles which are far away, but larger in scale.
- The foam is stretched and compressed and does not just move with the waves.
- Foam adds to the displacement of the ocean shader.



Different Houdini ocean renders of SideFX artists.

Shading and rendering

- Instead of reading a texture, Houdini 16 reads the rest values of the ocean for the Shading. A HDR Map of the Sky is used for the Environment Light.
- The Ocean Render node renders using displacement maps that have to be created before in the 'Export to texture' tab
- The Fetch_Export_Ocean has to be connected to the input of a Mantra node. Before rendering the Ocean_Render, this node has to be synchronised with the Ocean_Preview.

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