Color Blending

Overview

The blending of attributes in an RGB display can greatly enhance the visibility of geologic features within the seismic data. The Color Blending application is a 3D visualization tool that combines three separate attribute volumes into a single volume for interpretation. When applied to seismic data RGB blending or co-rendering can highlight geologic and geophysical features thus improving interpretability.

The Design

The multi-attribute RGB is created by a mathematical mapping that assigns a color to each point in an output volume based on the values in each of the three input volumes. The RGB volume is a blended volume of the colors RED, GREEN and BLUE. The intensity of each color increases as the distance from the origin. As such, each point within the blended volume has a specific RED, GREEN and BLUE value. Figure 1 is an example of an RGB volume.

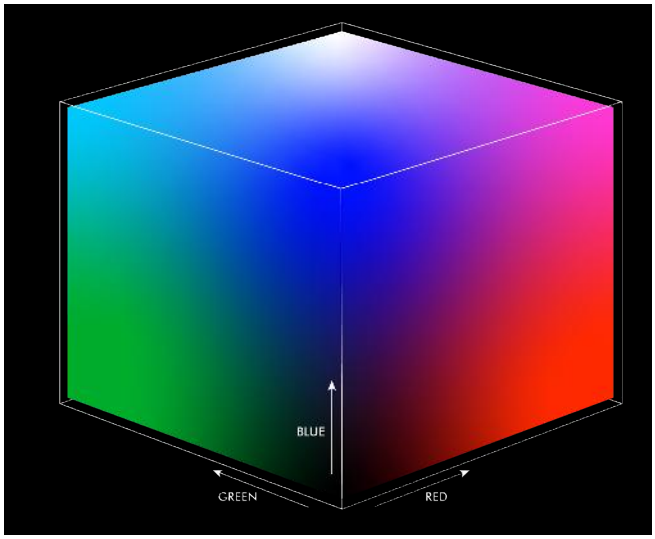

Figure 1

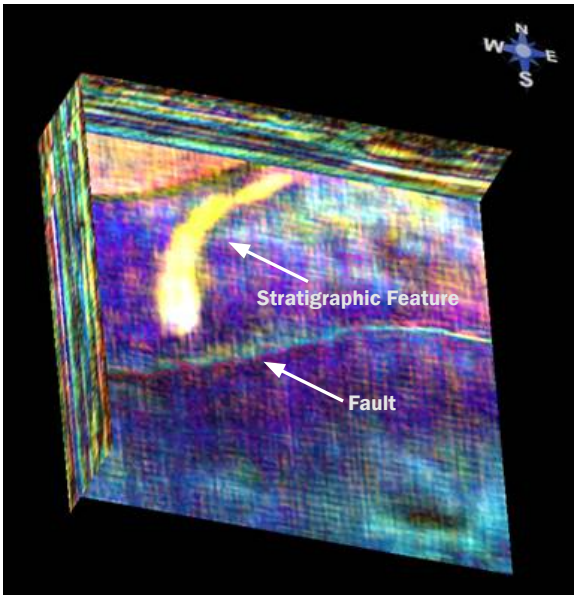

Figure 2

An Illustration

Color based co-rendering techniques work well when the individual data sources have some degree of cor-relation. Spectral decomposition applied to seismic data is an excellent example of a data type that is well suited for RGB blending. For example, the RGB volume shown in Figure 2 was generated from 3 spectral de-compositions centered at 16 Hz (R), 24 Hz (G) and 32 Hz (B).

In Figure 2, a fault represented by a curved line that traverses the data from west to east is clearly visible. Also, a stratigraphic feature in the top half of the horizontal section (yellow body) is visibly enhanced.

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What are the different color modes and what do they mean?

There are three different choices for blending attributes in the RGB Blending tool - RGB, CMY, and HSV. Below is a short description of each.

RGB

The standard Red, Green and Blue blended volume. RGB blended volumes created from spectral decomposition seismic volumes have been successfully used to highlight stratigraphic features within the data.

CMY

Is a blended volume using the colors Cyan, Magenta and Yellow. CMY volumes have been useful when applied to structural features, such as, faults.

HSV

HSV is a cylindrical coordinate representation of points on an RGB color model. The hue (H) of a color refers to the pure color it resembles. For example, all tones of red have the same hue. The saturation (S) describes how white the color is. Pure red has a saturation of 1, whereas, tints of red will be less than 1. Finally, the value (V) is also called the lightness and describes how dark a color is. A value of zero is black. See figure 3.

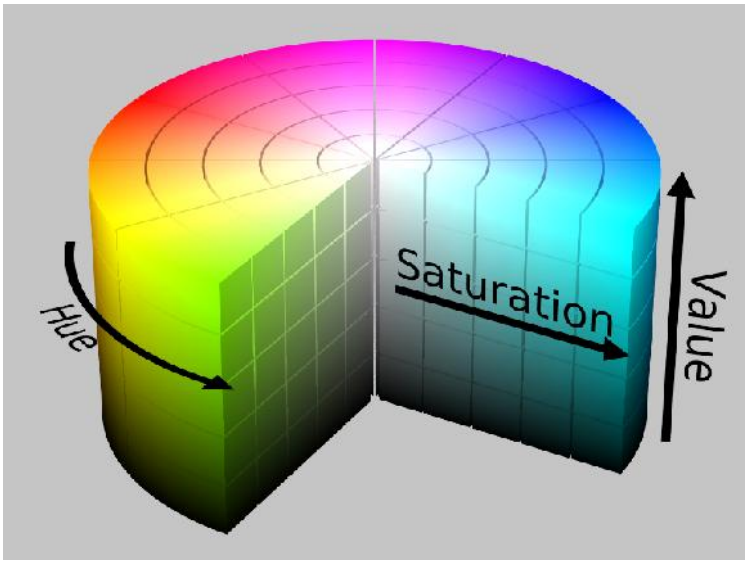

Figure 3

The value of the HSV color differs from RGB in that it separates the image intensity from the color information. HSV color information has been used to enhance structural information within seismic data (Laake, A., 2012 Structural Mapping with Spectral Attributes, 2012, 86th Annual International Meeting, SEG Las Vegas Nevada.)

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