

Soil Enhancement Ratios

The BLM developed the Soil Enhancement Ratios, which are three simple Landsat band ratios for carbonates, iron, and clay. Carbonates can be indicated using band 3 (VIS-red) and band 2 (VIS-green); iron using band 3 (VIS-red) and band 7 (SWIR); and clay (hydroxyls) using band 5 (shorter wavelength SWIR) and band 7 (longer wavelength SWIR). In this model, the three band ratios are calculated and stacked into a three-layer output image. Although, the exact physical relationships of these ratios to surface materials may not apply for all study areas, this set of band ratios can represent and help quantify mineralogical diversity of parent material across the landscape.

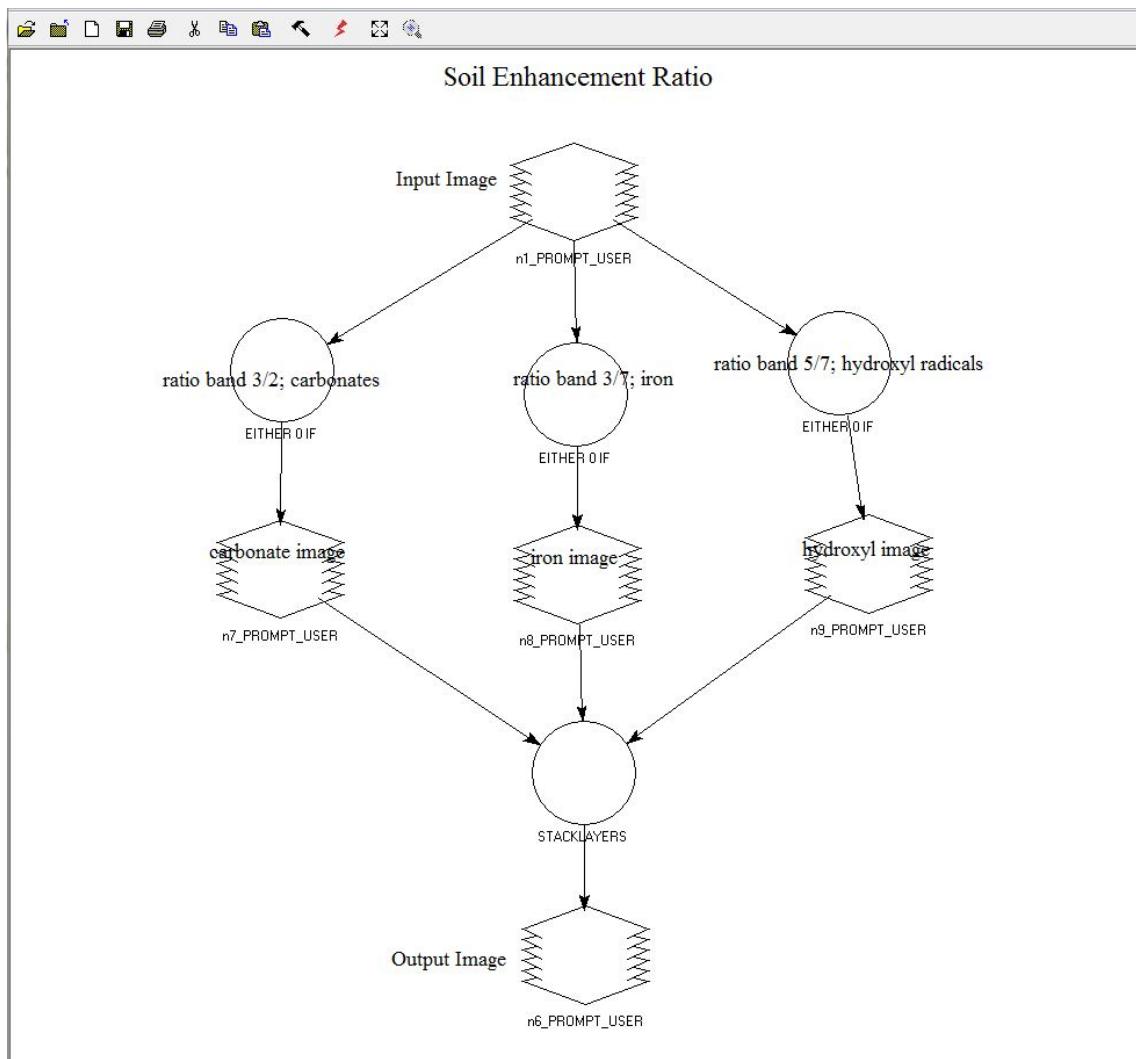
File: soilenhancement.gmd (ERDAS Imagine Model Maker model, v. 2014 and prior)** OR
soilenhancement_modeler.gmd (ERDAS Imagine Spatial Modeler model, v. 2013 and later)**

Input: Landsat 5 or 7 image containing at least bands 2,3,5,7*

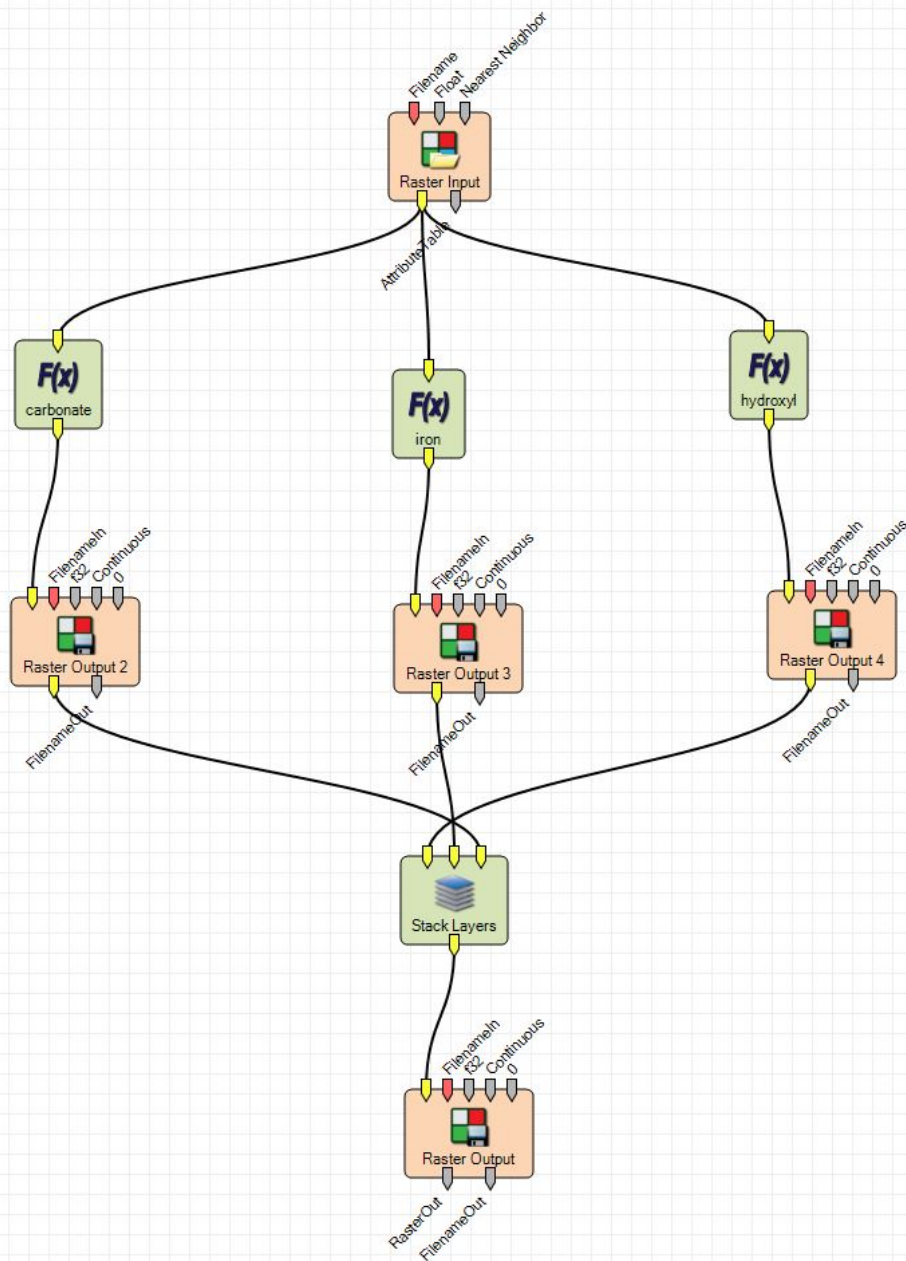
Output: carbonate image, iron image, clay image (single layer images from simple ratios);
three-layer image containing clay ratio (layer 1), iron ratio (layer 2), carbonate ratio (layer 3)

You will be prompted for the input image, and to name the output carbonate, iron, and clay (hydroxyl) images, and the three-layer output image.

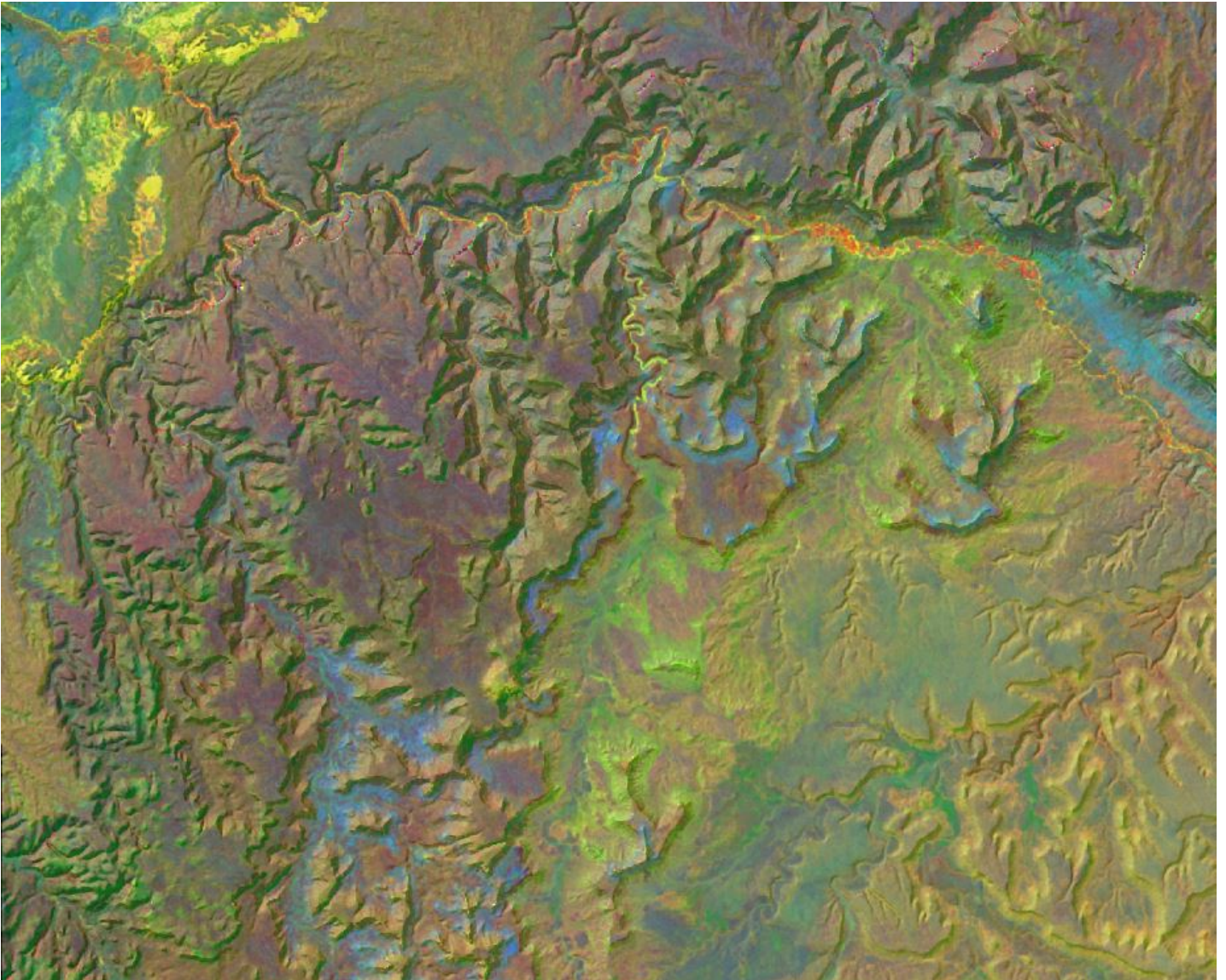
The model open in ERDAS Imagine Model Maker:



The model open in ERDAS Imagine Spatial Modeler:



Example three-layer output image over hillshade:



*Remember ratios must always be calculated on images which have had an atmospheric correction or image standardization applied. Resources for image standardization:

<http://earth.gis.usu.edu/imagestd/>

** ERDAS Imagine Model Maker files (.gmd) can be opened in ERDAS 2014 and all previous versions of Imagine using Model Maker. Starting with ERDAS 2013, the ERDAS Imagine Spatial Modeler is available and requires the .gmdx file type. The results produced by the model should be the same for either model interface. At some version after 2014, the Model Maker and .gmd files will be obsolete.

While these ratios were developed for Landsat bands, they could be modified and used with data from any sensor with bands capturing the same part of the electromagnetic spectrum as the indicated Landsat bands.

Enhanced Thematic Mapper Plus (ETM+)	Landsat 7	Wavelength (micrometers)	Resolution (meters)
	Band 1	0.45-0.52	30
	Band 2	0.52-0.60	30
	Band 3	0.63-0.69	30
	Band 4	0.77-0.90	30
	Band 5	1.55-1.75	30
	Band 6	10.40-12.50	60 * (30)
	Band 7	2.09-2.35	30
	Band 8	.52-.90	15