

Clay (hydroxyls) Normalized Difference Ratio

This ratio is the same conceptually as the clay (hydroxyls) ratio from the Soil Enhancement Ratios, but normalized instead of a simple ratio. Normalized difference Landsat band ratio using band 5 (shorter wavelength SWIR) and band 7 (longer wavelength SWIR). (See Soil Enhancement Ratio description)

This ratio has also been successfully used in arid environments to indicate areas potentially influenced by gypsum (Nield et al., 2007).

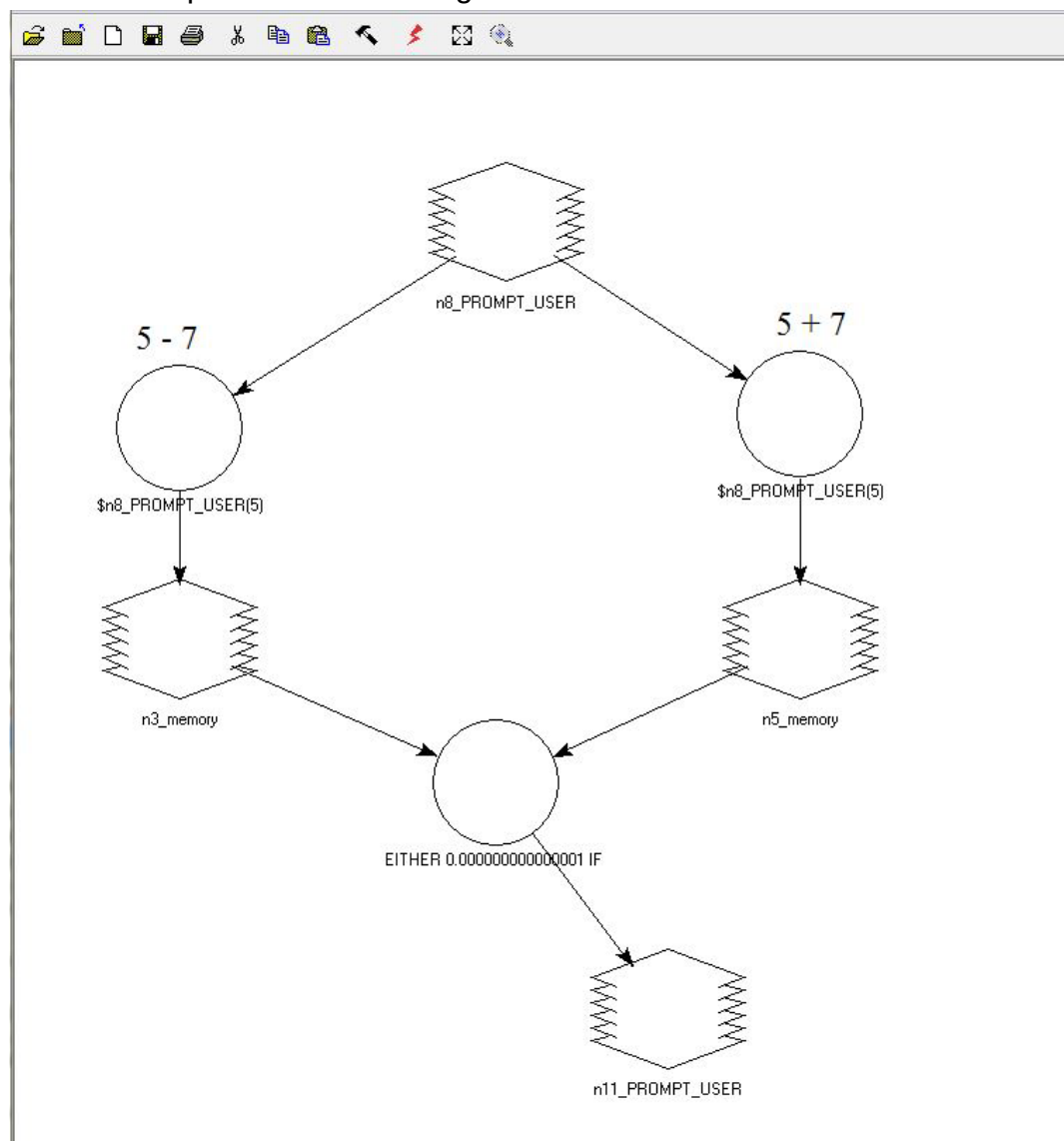
File: clay_index_5_7.gmd (ERDAS Imagine Model Maker model, v. 2014 and prior)** OR clay_index_5_7_modeler.gmdx (ERDAS Imagine Spatial Modeler model, v. 2013 and later)**

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

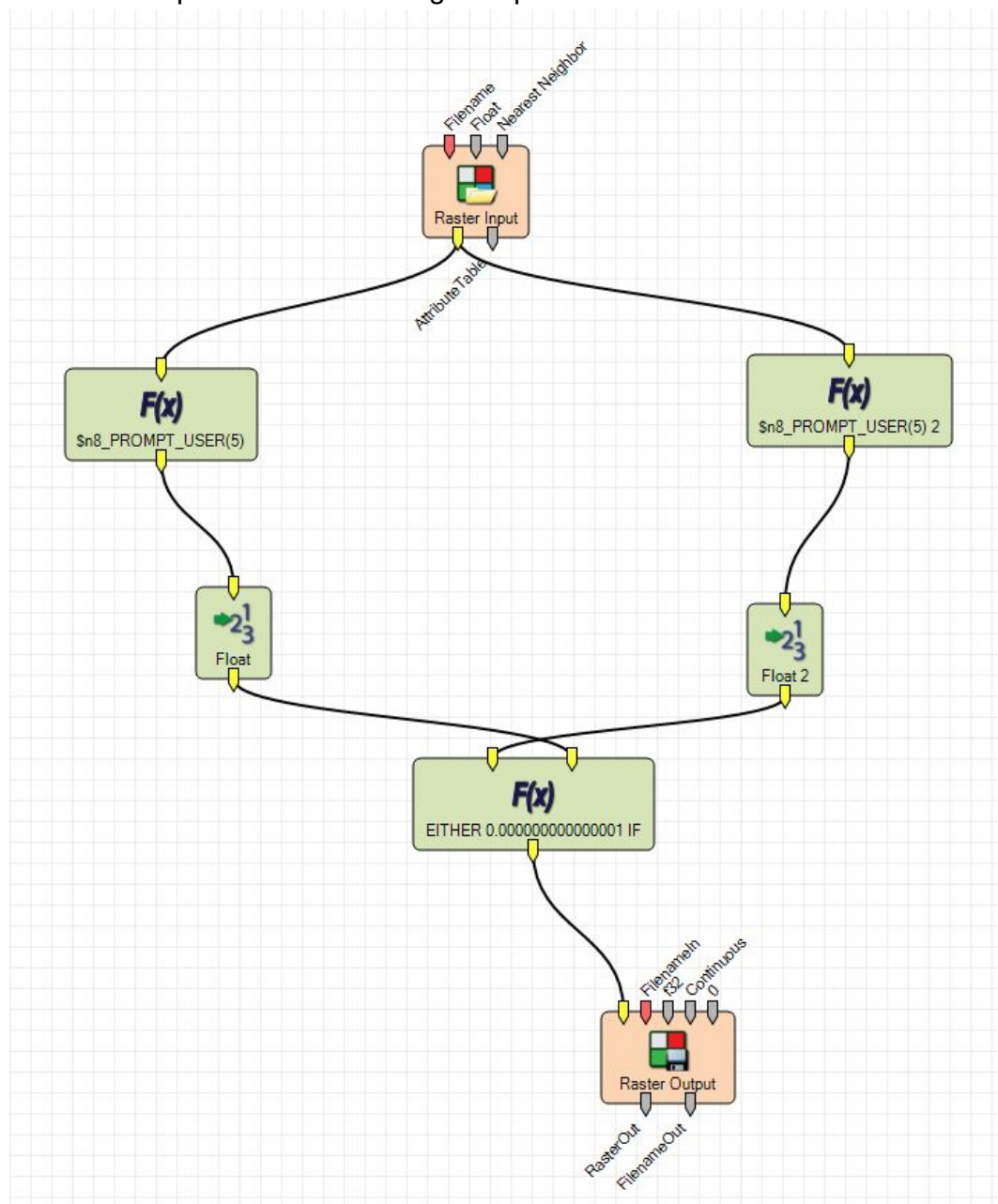
Output: single layer image with data values ranging from -1 to 1; Pixels with higher values can be interpreted as pixels with higher possibility of clay (hydroxyls) influence.

You will be prompted for the input image, and to name the output image.

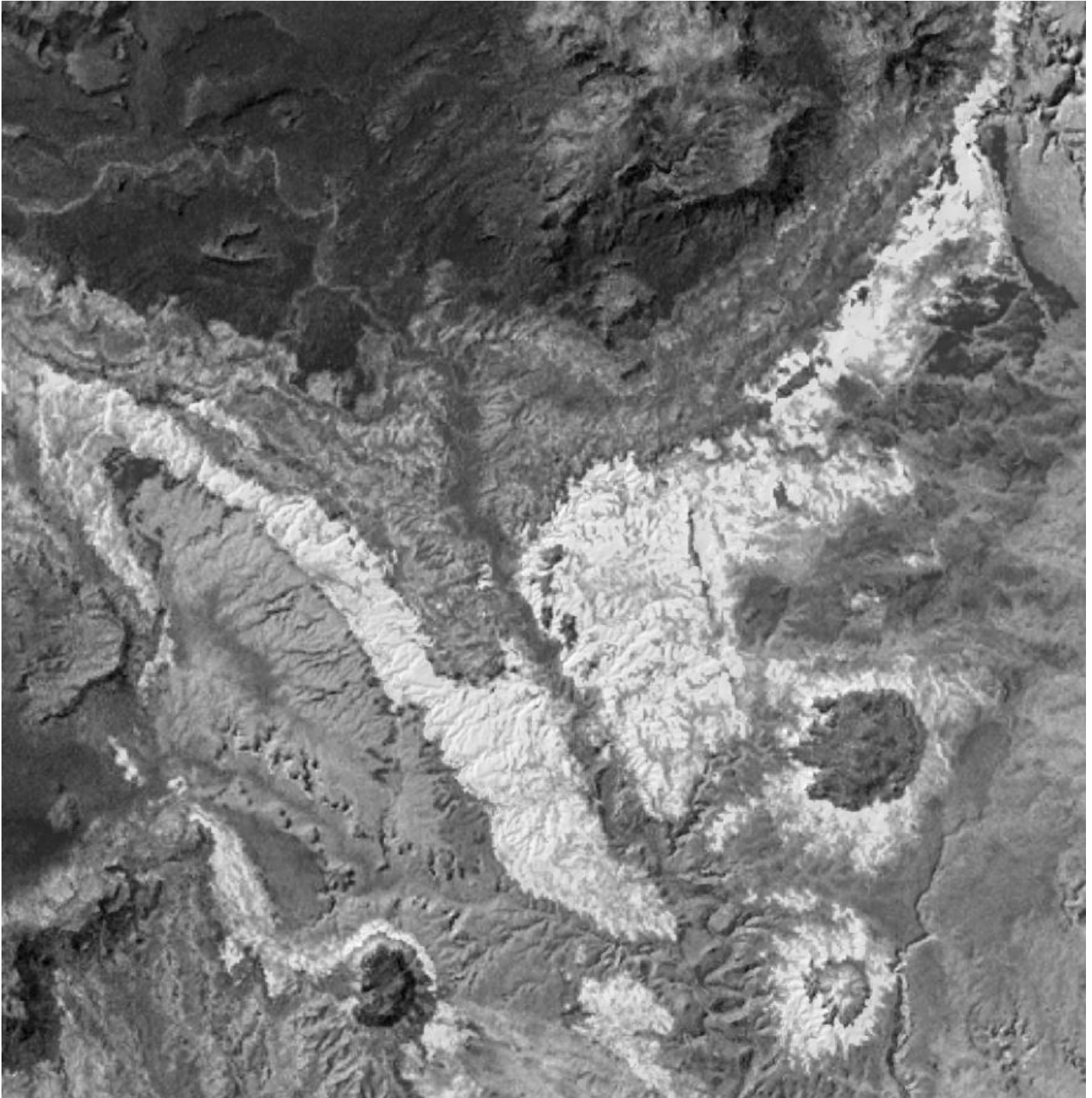
The model open in ERDAS Imagine Model Maker:



The model open in ERDAS Imagine Spatial Modeler:



Example normalized clay (hydroxyls) ratio output image over hillshade. Bright pixels have higher data values and can be interpreted as areas of potentially higher clay (hydroxyls) influence:



Reference for gypsum ratio: Nield, S.J., Boettinger, J.L., and Ramsey, R.D., 2007. Digitally mapping gypsic and natric soil areas using Landsat ETM data. Soil Science Society of America Journal 71: 245-252.

*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