

## Landsat 8 – TIR Bands 10 and 11 Temperature Comparisons

By inverting the Plank Function in Band Math, temperature was calculated for all four images for both Band 10 and Band 11. The two bands produced relatively significantly different temperature values. To compare the temperature values between the two bands, Band 11 from Band 10. (In Band Math: B1-B2, B1 = Band 10, B2 = Band 11). Mean temperature, standard deviation, and temperature range were calculated for each image and for each band. The mean difference between bands, standard deviation and difference range were also calculated for each image.

### Dominica

	Mean	St Dev	Range
Band 10	292.1691	4.69075	42.1979
Band 11	290.5876	4.71425	35.5691

### Dominica, BandComparison

	Mean	St Dev	Range
B10-B11	1.58154	1.18862	32.3186

### Florida

	Mean	St Dev	Range
Band 10	297.4723	6.59535	93.6425
Band 11	297.1922	5.82516	80.9074

### Florida, Band Comparison

	Mean	St Dev	Range
B10-B11	0.28009	1.26781	86.4368

### Mississippi

	Mean	St Dev	Range
Band 10	295.7065	3.4277	39.7586
Band 11	294.5566	3.19729	35.6477

### Mississippi, Band Comparison

	Mean	St Dev	Range
B10-B11	1.14989	0.61606	14.885

### Alaska

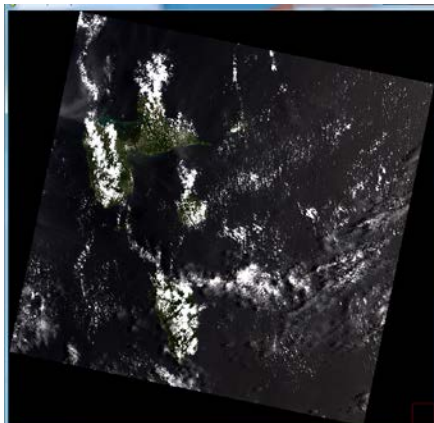
	Mean	St Dev	Range
Band 10	271.7542	3.95967	58.6228
Band 11	272.6785	3.76723	55.9453

### Alaska, Band Comparison

	Mean	St Dev	Range
B10-B11	-0.9243	0.57124	8.09055

Masks were applied to each band difference image (i.e. Band 10 – Band 11) to detect the spatial distribution of pixels closest to zero (between -0.5 and 0.5).

### Dominica



432-RGB (True Color) display of the Dominica Landsat 8 tile.

Pixels Closest to Zero (Masked Pixels between -0.5 and 0.5):

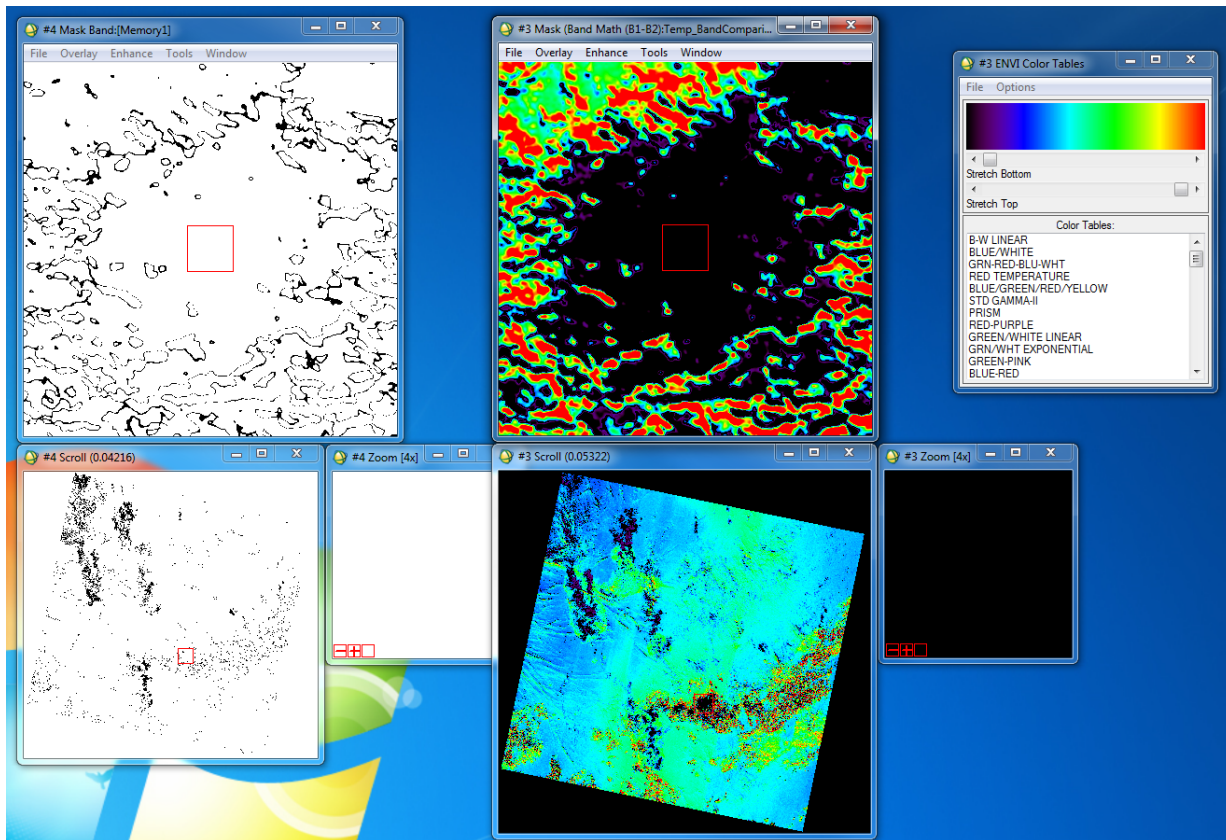
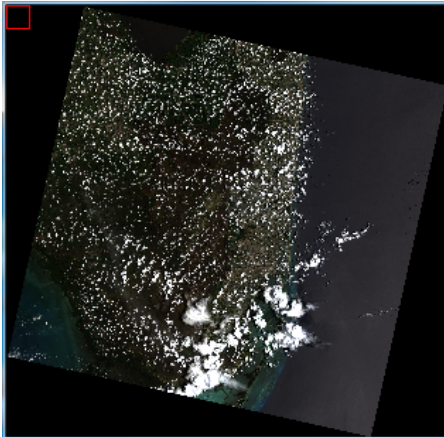


Image on left is the mask (black pixels are masked, i.e. the pixels closest to zero). Image on the right is a display of the subtracted image with the mask applied. As is visible from comparison of the two images, not all black pixels in the image on the right are masked; there is a relatively large range of pixel values so the lowest pixel values also appear black. This really only affects the central cloud system (pictured in the zoom Image window) where the black regions are surrounded almost directly by red regions. (Comparison between the two images can confirm the extent of the mask.) The areas of greatest agreement between the two bands appear to be over cloud cover, although the red and black (non-masked) pixels are the regions of greatest variation between the bands and those also appear exclusively over clouds.

## Florida



432-RGB (True Color) display of the Florida Landsat 8 tile.

Pixels Closest to Zero (Masked Pixels between -0.5 and 0.5):

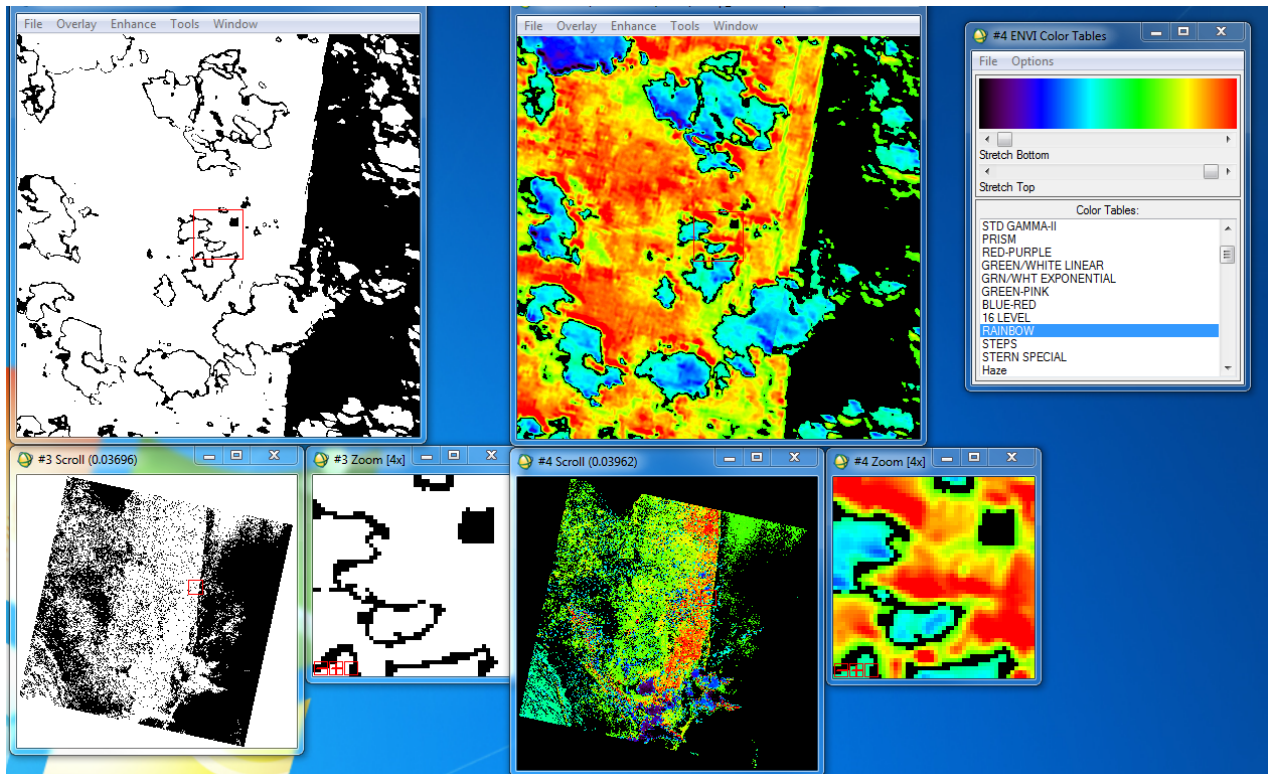
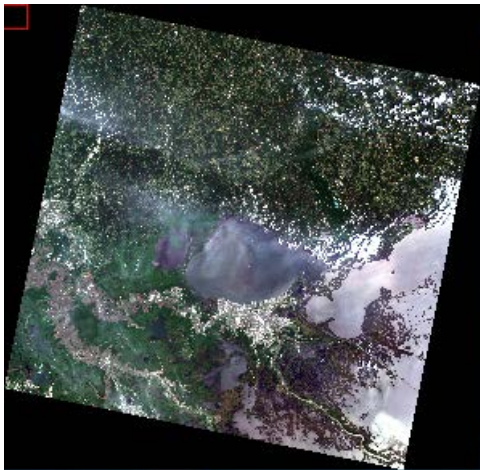


Image on left is the mask (black pixels are masked, i.e. the pixels closest to zero). Image on the right is a display of the subtracted image with the mask applied. The pixel values in the Florida image have a smaller range than in the Dominica image so no non-masked pixels appear black. Unlike in the Dominica image, the majority of the masked pixels appear to over the ocean. The cloud pixels appear mainly negative (Band 11 > Band 10), though generally ringed by a band of pixels with values close to zero. The land pixels appear mainly positive (Band 10 > Band 11).

## Mississippi



432-RGB (True Color) display of the Mississippi Landsat 8 tile.

Pixels Closest to Zero (Masked Pixels between -0.5 and 0.5):

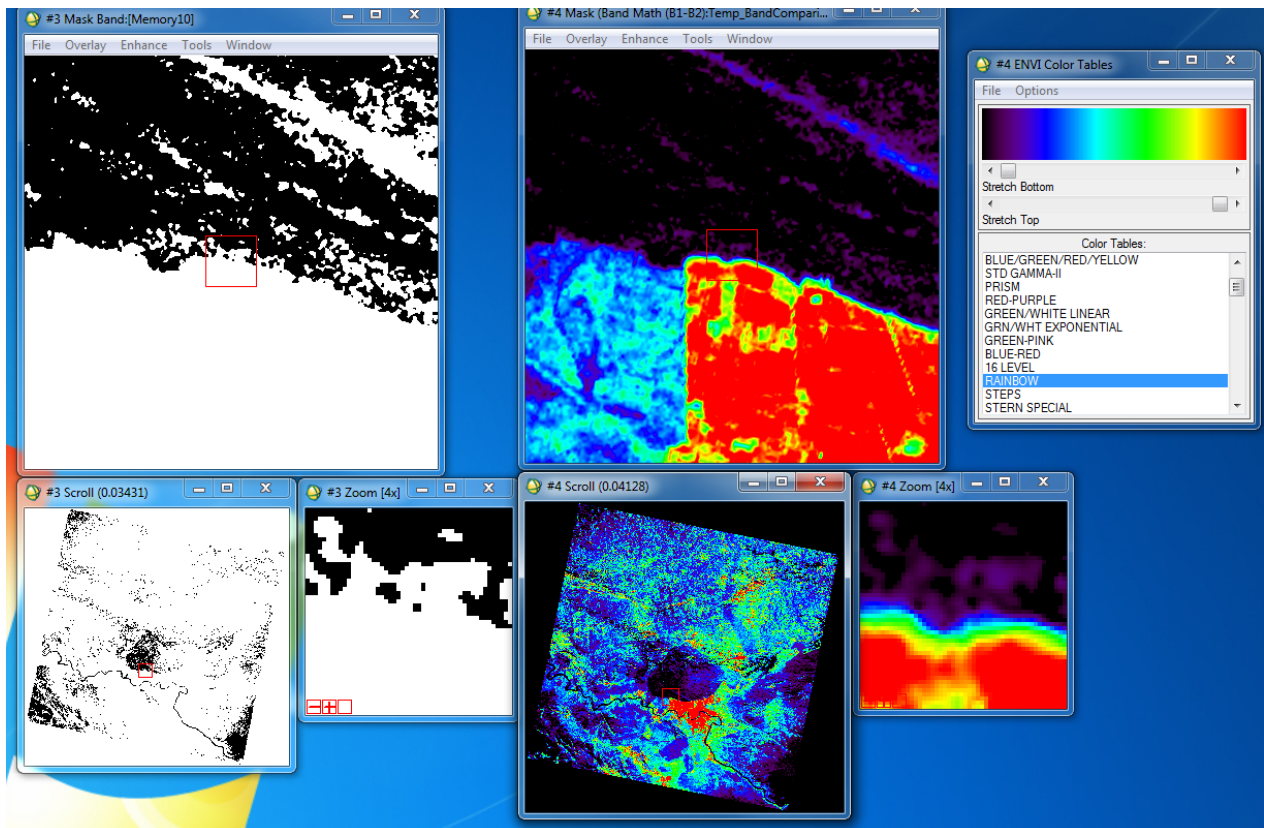
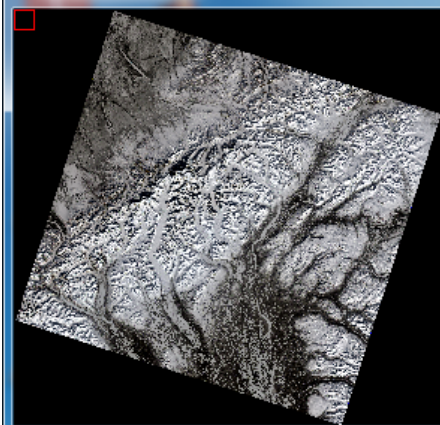


Image on left is the mask (black pixels are masked, i.e. the pixels closest to zero). Image on the right is a display of the subtracted image with the mask applied. Like Florida, the pixel values in the Mississippi image have a smaller range than in the Dominica image so no non-masked pixels appear black. Also like the image of Florida, the majority of the masked pixels appear to over water. The cloud pixels appear mainly negative (Band 11 > Band 10), though some masked pixels are interspersed. The land pixels appear mainly positive (Band 10 > Band 11), with the highest positive values over urban land (the bright red patch is New Orleans).



## Alaska



432-True Color display of the Alaska Landsat 8 tile.

Pixels Closest to Zero (Masked Pixels between -0.5 and 0.5):

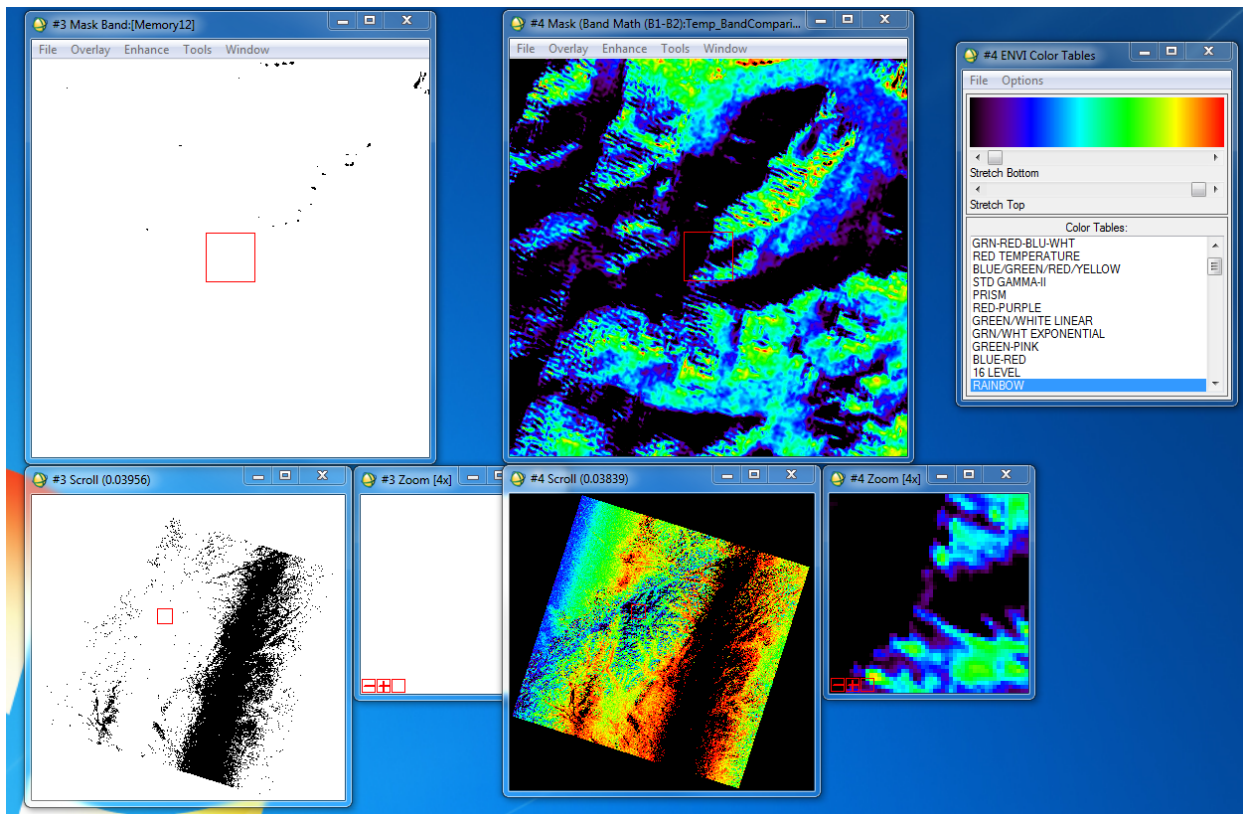


Image on left is the mask (black pixels are masked, i.e. the pixels closest to zero). Image on the right is a display of the subtracted image with the mask applied. The Alaska image has a larger range of pixel values, so like in the Dominica image, some of the non-masked pixels appear black. The non-masked black pixels occur in the highest mountain peaks (visible in the Image and Zoom windows above). The dark pixels in the mountain range represent negative pixel values (Band 11 > Band 10). At lower altitude, the pixels appear more positive (Band 10 > Band 11). The majority of masked pixels occur along a distinct strip which partially includes the lowest altitudes and the most exposed (i.e. little snow, more exposed soil and rock) terrain in the image, however, the strip extends out of the valley, making it

somewhat less clear under which land cover or altitude conditions Band 10 and Band 11 produce the most similar values.