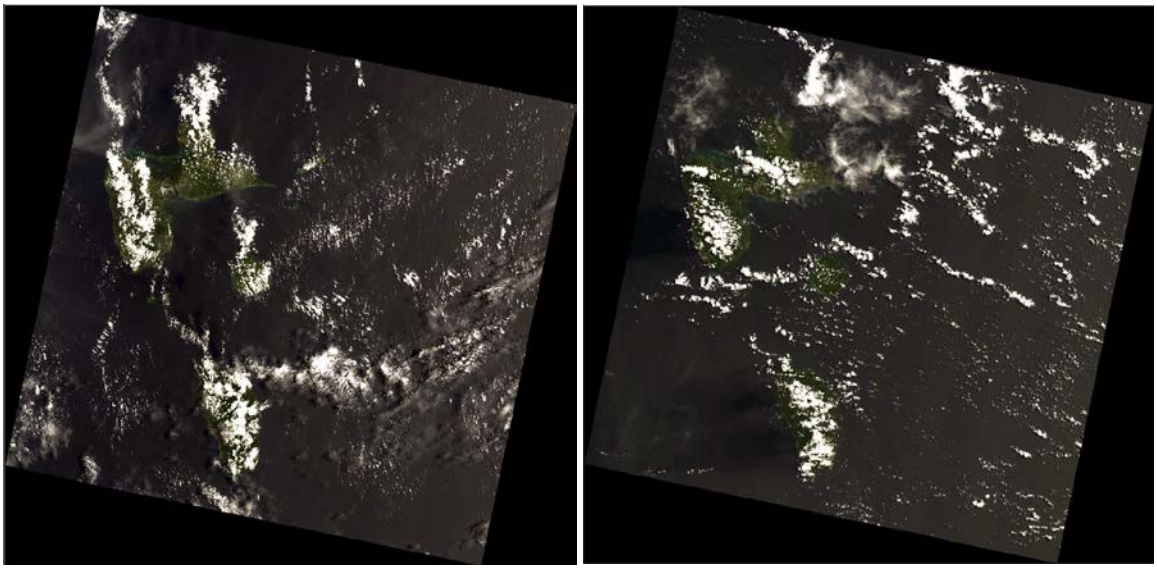
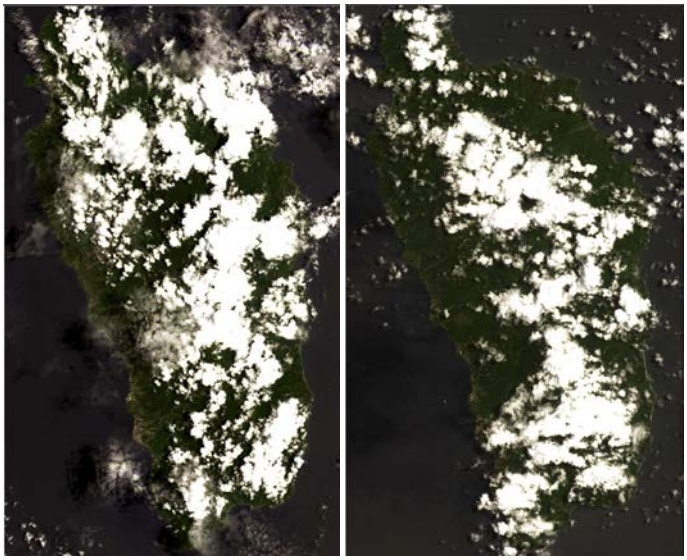
Dominica Temporal Analysis

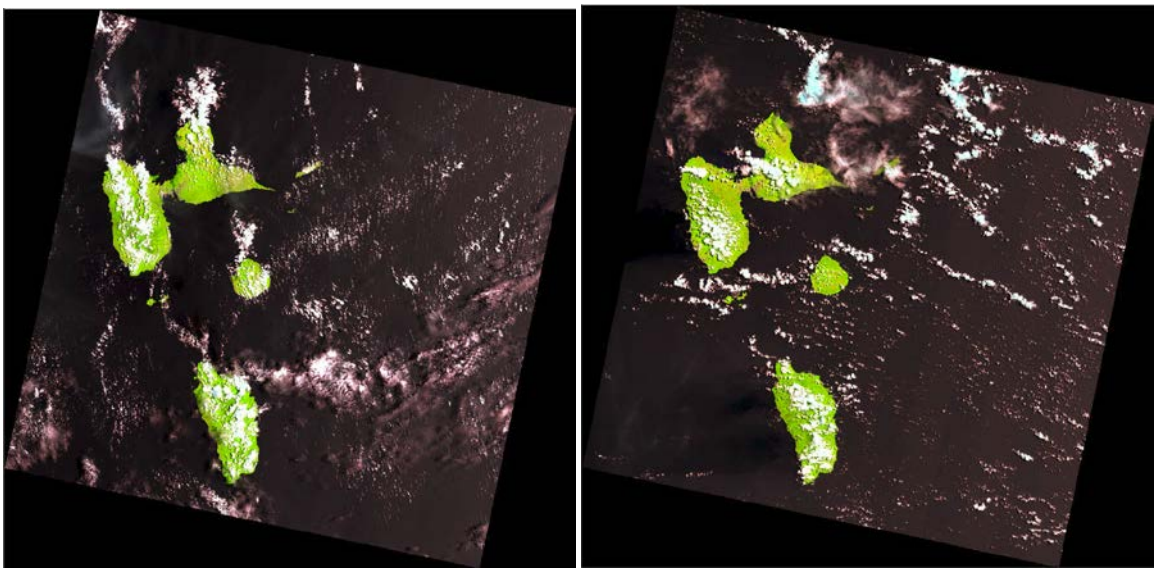
True Color Images: May 5th, 2013 (left); June 22nd, 2013 (right)



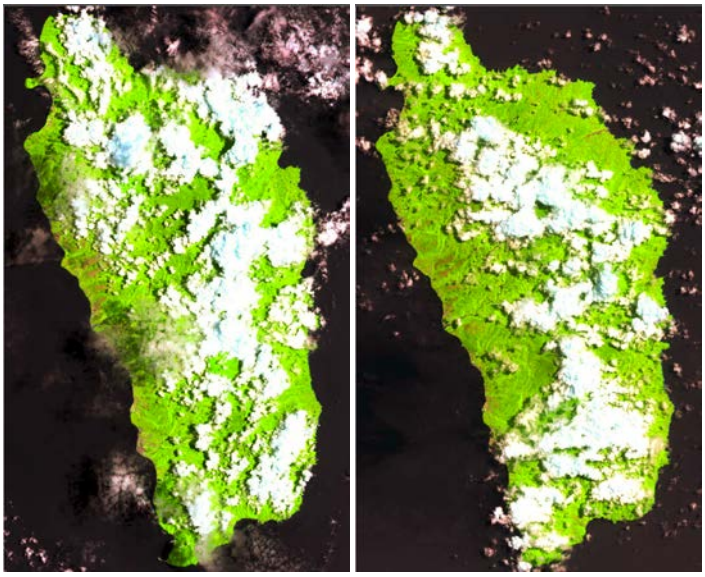


True Color Images, Dominica Subset: May 5th, 2013 (left); June 22nd, 2013 (right)
Note significant cloud cover over most of inland Dominica.

654-RGB Images: May 5th, 2013 (left); June 22nd, 2013 (right)

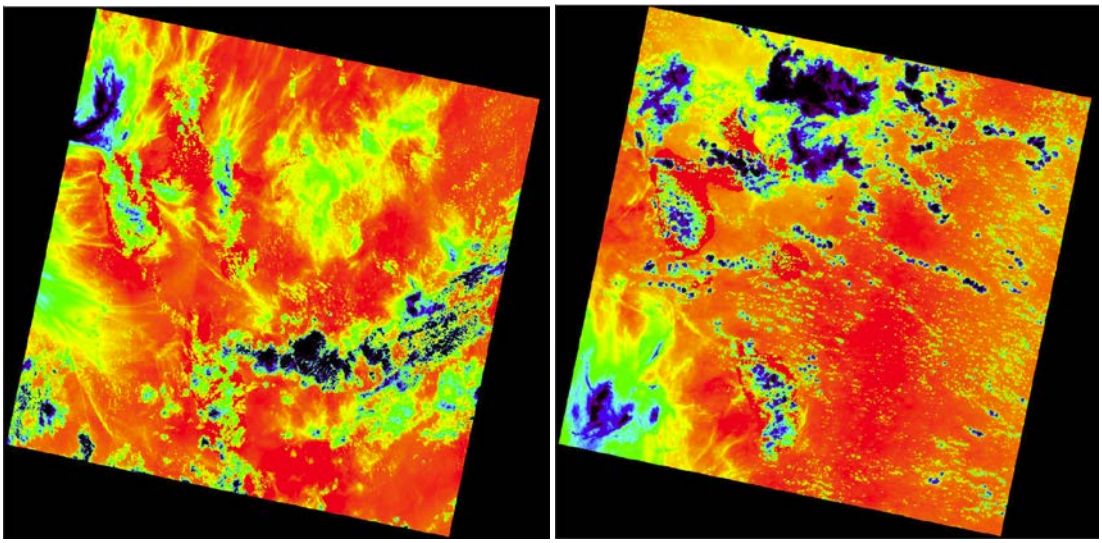


Small regions/cracks of cyan cloud pixels in the May 5th image clouds. In the June 22nd image there were larger patches of cyan cloud pixels in the northern clouds. The cyan patches do not appear to correspond to lower temperature; i.e. white pixels near cyan pixels tend to have similar temperature values to the cyan pixels. In the May 5th image, the coldest cloud pixels aren't cyan. In the June 22nd image, the coldest pixels generally are cyan (though the temperature is higher than freezing throughout the image). Also, the cyan pixels are not exclusively the coldest pixels in the June 22nd image and many white pixels have values approaching the minimum cyan values.

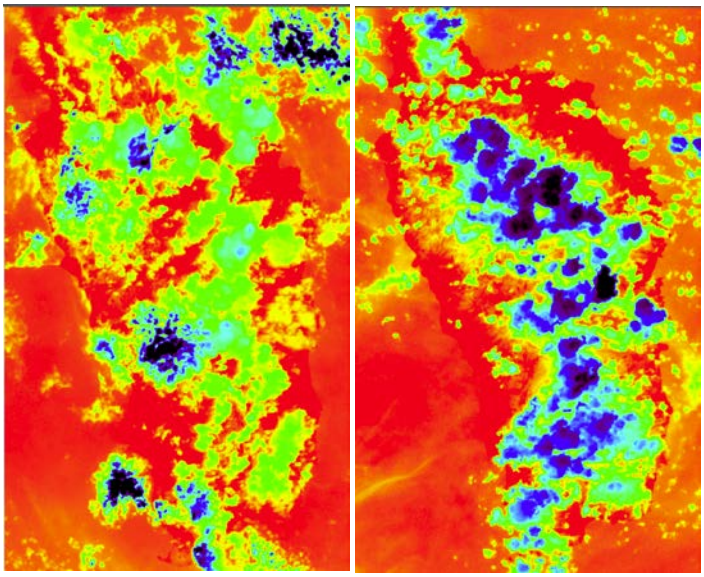


654-RGB Images, Dominica Subset: May 5th, 2013 (left); June 22nd, 2013 (right)
A few patches of cyan cloud pixels in each image, slightly larger cyan regions in May 5th image.

False Color Image of Band 10 Temperature: May 5th, 2013 (left); June 22nd, 2013 (right)
Highest temperatures = red, lowest temperatures = black



In both images islands have highest temperatures (only slightly higher than sea temperatures but usually difference is distinct) and clouds have lowest temperatures.



False Color Band10 Temp Images, Dominica Subset: May 5th, 2013 (left); June 22nd, 2013 (right)
Dominica's coasts are especially distinct in the June 22nd image (only indistinct along the southeastern coast). Land and sea temperatures have a less sharp difference in the May 5th image; only distinct coasts along the northern edge of the island.

Temperature Statistics:

May 5th

	Mean	St Dev	Range
Band 10	292.169111	4.690753	42.197876
Band 11	290.587576	4.714249	35.569123

May 5th, Band Comparison

	Mean	St Dev	Range
B10-B11	1.581535	1.188618	32.318573

June 22nd

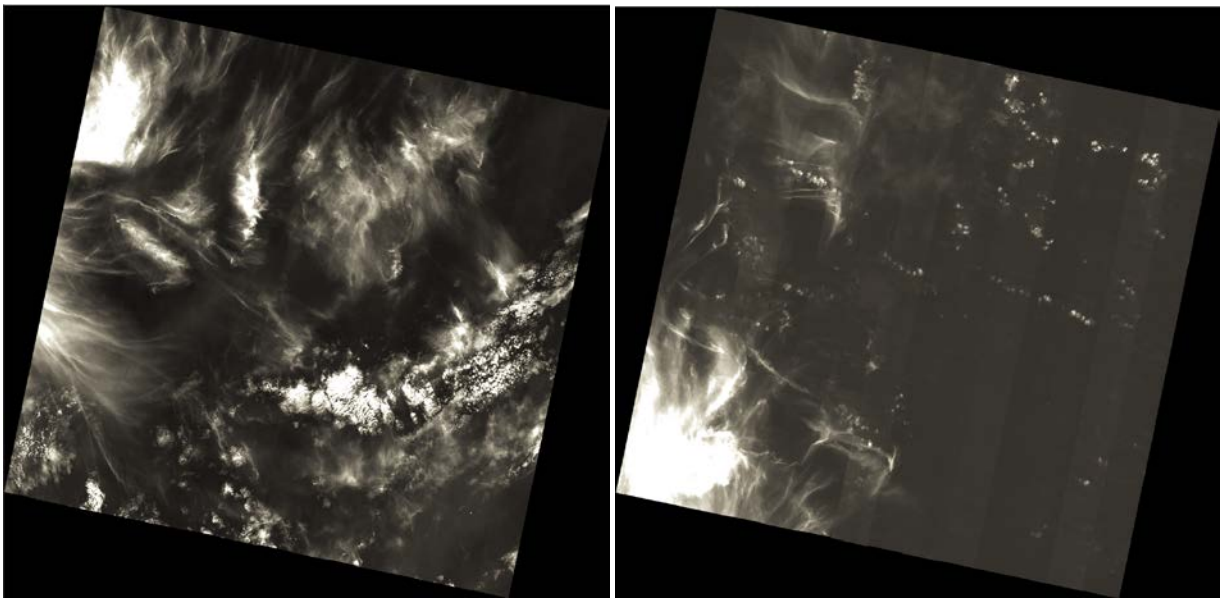
	Mean	St Dev	Range
Band 10	295.355796	3.402937	34.145203
Band 11	295.336908	2.951357	30.48407

June 22, Band Comparison

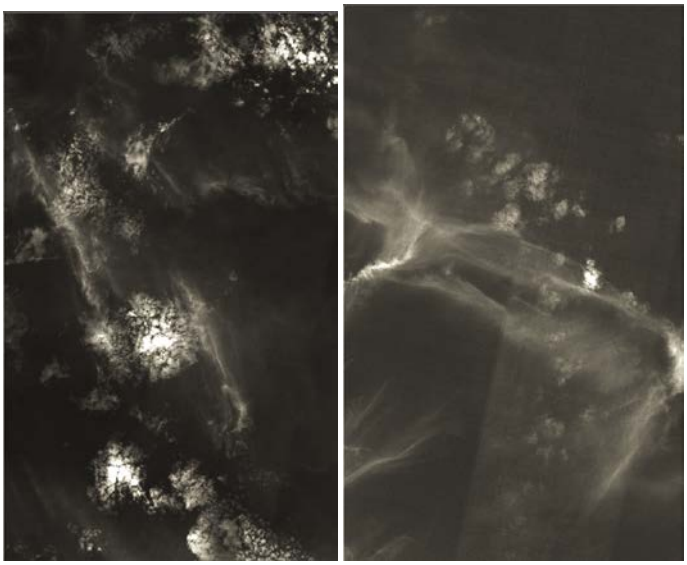
	Mean	St Dev	Range
B10-B11	0.018889	0.608857	11.883911

NOTE: In general there appears to be better agreement between the two temperature bands in the June 22nd image than in the May 5th image.

Cirrus Band Images: May 5th, 2013 (left); June 22nd, 2013 (right)

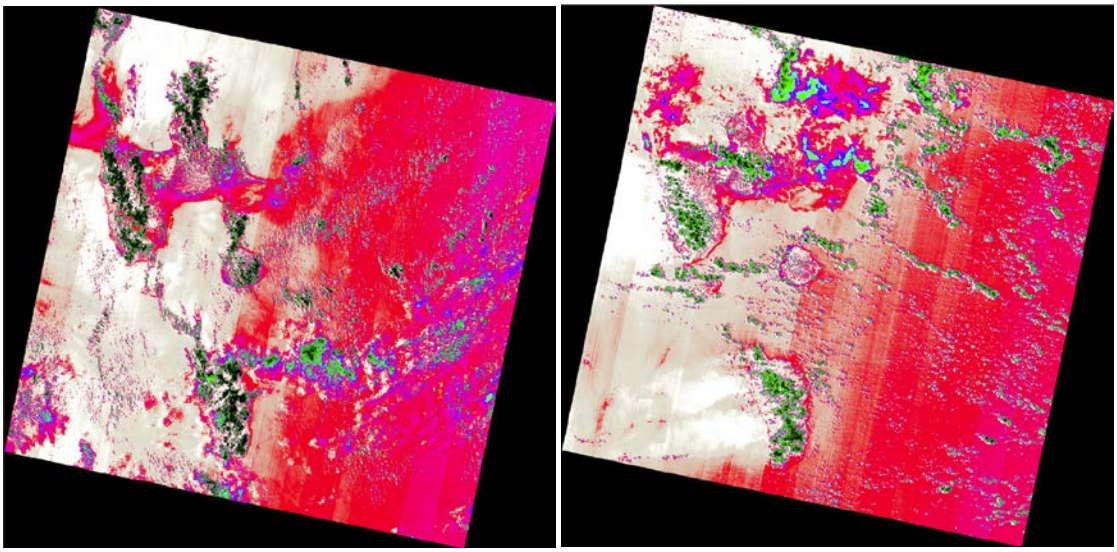


Fewer cirrus clouds and much fewer cold/high non-cirrus clouds in the June 22nd image. Though the largest regions of cirrus clouds aren't visible in the VIR range, they are visible in the TIR as regions of lower temperature (however, the cirrus patches are not the coldest clouds in the image).

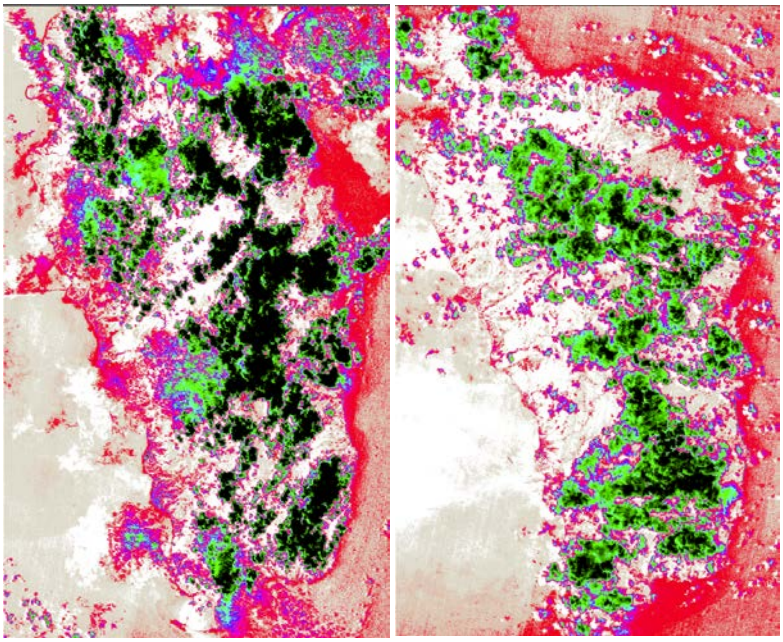


Cirrus Band Images, Dominica Subset: May 5th, 2013 (left); June 22nd, 2013 (right)
More cirrus clouds in the June 22nd image but more high/cold non-cirrus clouds in the May 5th image.

Aerosol Index False Color Image: May 5th, 2013 (left); June 22nd, 2013 (right)
Aerosol Index = (B1-B2)/(B1+B2)
16-Level image; black = low index values (Band 2 > Band 1), white = high index values (Band 1 > Band 2), cool colors = lower index values, warm colors = higher index values

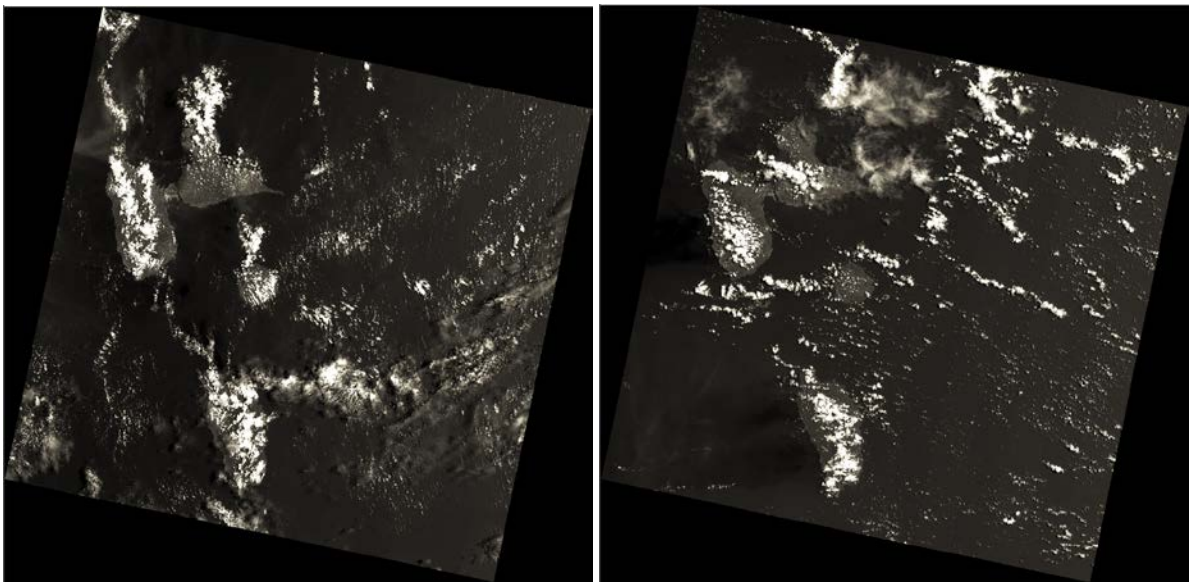


95% of pixels have an index value between 0 and 0.06 in both images. There are no regions in either images where Band 1 reflectance is significantly higher than Band 2. In both images, the lowest Band 1 reflectance appears over the largest clouds and the highest Band 1 reflectance appears predominantly in the waters around the three islands, suggesting in this image high Band 1 values are most strongly correlated with shallow water.

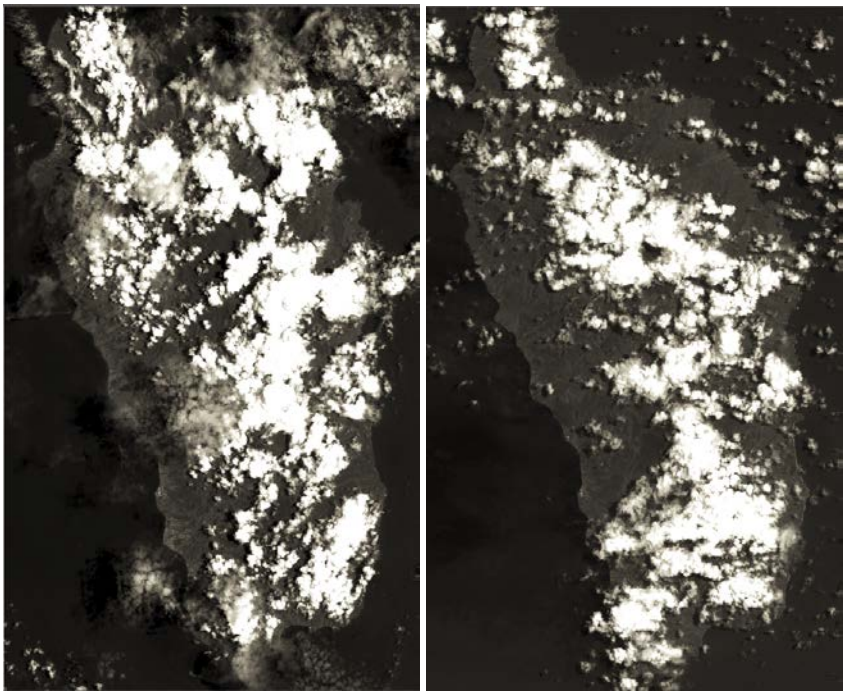


Aerosol Index Images, Dominica Subset: May 5th, 2013 (left); June 22nd, 2013 (right)
Island's coasts roughly distinct in both images. Band 1 is highest on the eastern side of the island, consistent with the image as a whole. Again, this is tentatively attributed to shallower water.

Albedo False Color Image: May 5th, 2013 (left); June 22nd, 2013 (right)
Highest values = white, lowest values = black



Albedo is significantly higher over cloud cover than any other part of the image but also has a distinct (higher) spectral signature than ocean.

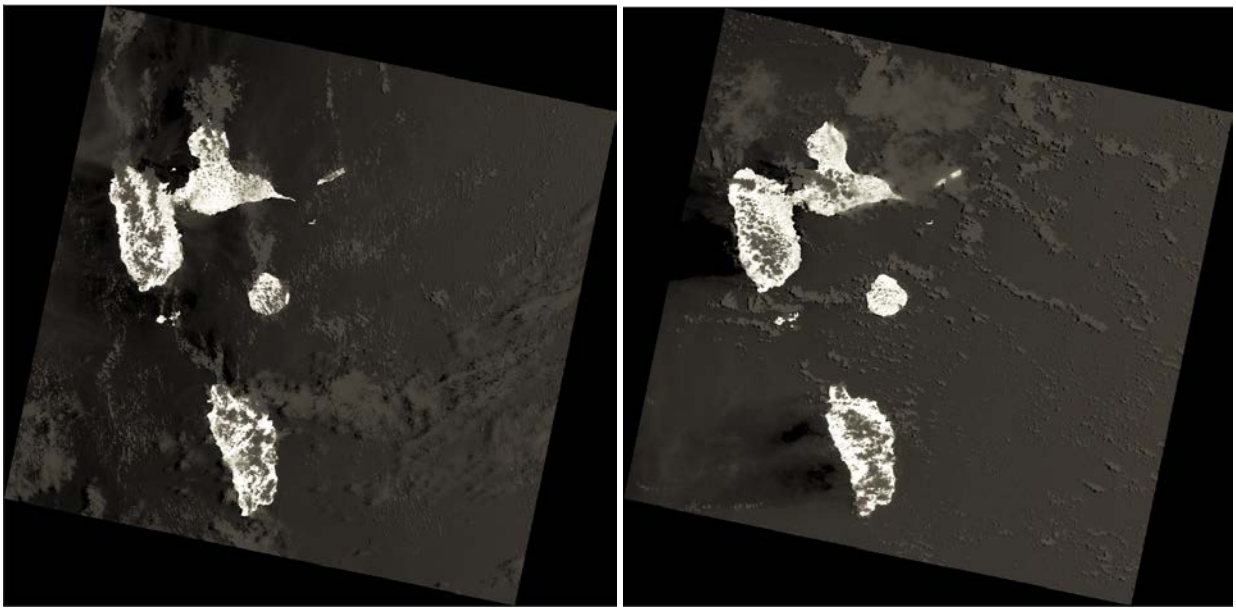


Albedo Images, Dominica Subset: May 5th, 2013 (left); June 22nd, 2013 (right)
Though it's difficult to distinguish in images this size, barren land on the island has markedly higher albedo values than forest.

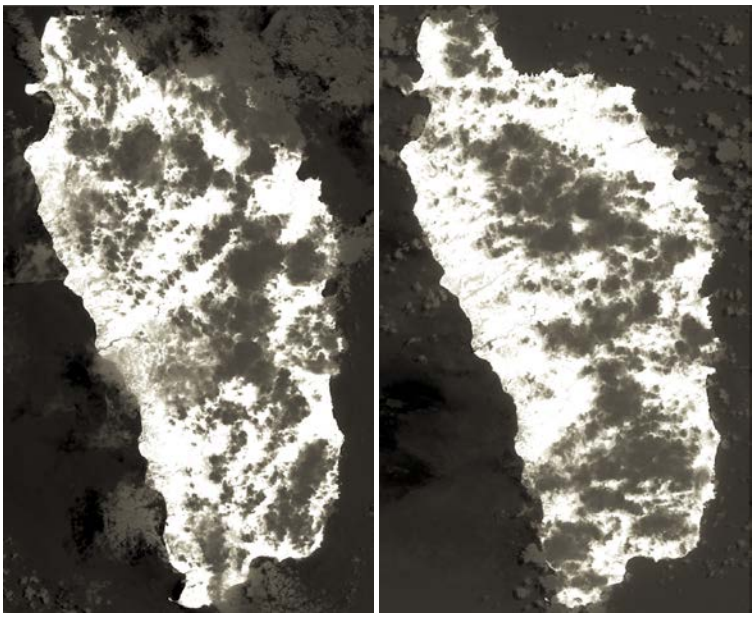
Albedo Statistics:

	Mean	St Dev	Range
May 5th Albedo (Smith)	0.122222	0.089566	1.104444
	Mean	St Dev	Range
June 22nd Albedo (Smith)	0.119826	0.095405	1.068538

NDVI False Color Image: May 5th, 2013 (left); June 22nd, 2013 (right)
Highest values = white, lowest values = black



Highest NDVI values over the islands. Values negligibly low over ocean and clouds.

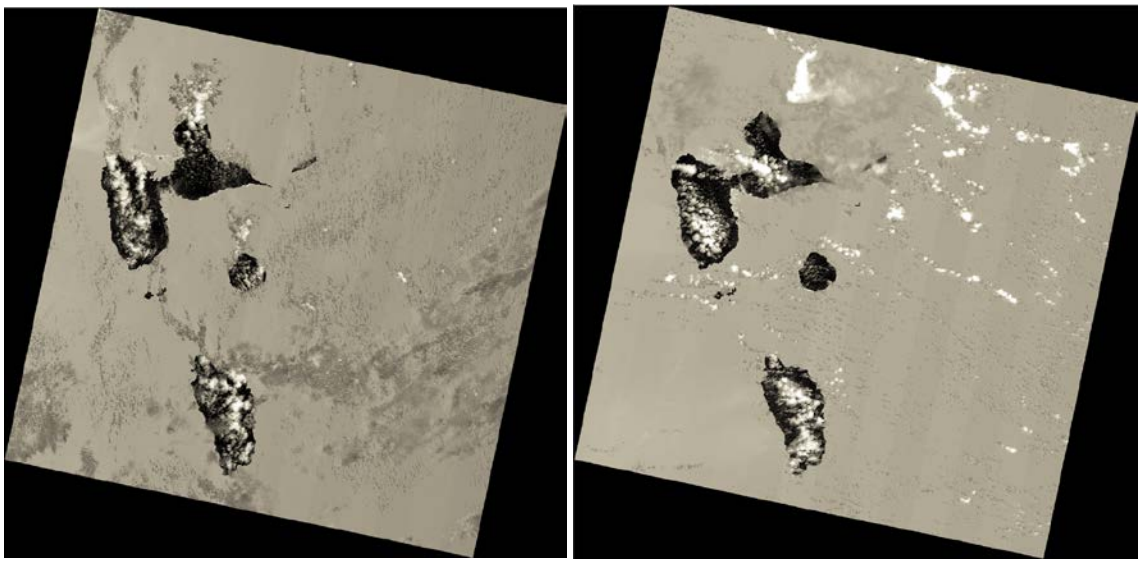


NDVI Images, Dominica Subset: May 5th, 2013 (left); June 22nd, 2013 (right)
Though it's difficult to distinguish in images this size, barren land on the island has markedly lower NDVI values, though they're still higher than either clouds or water.

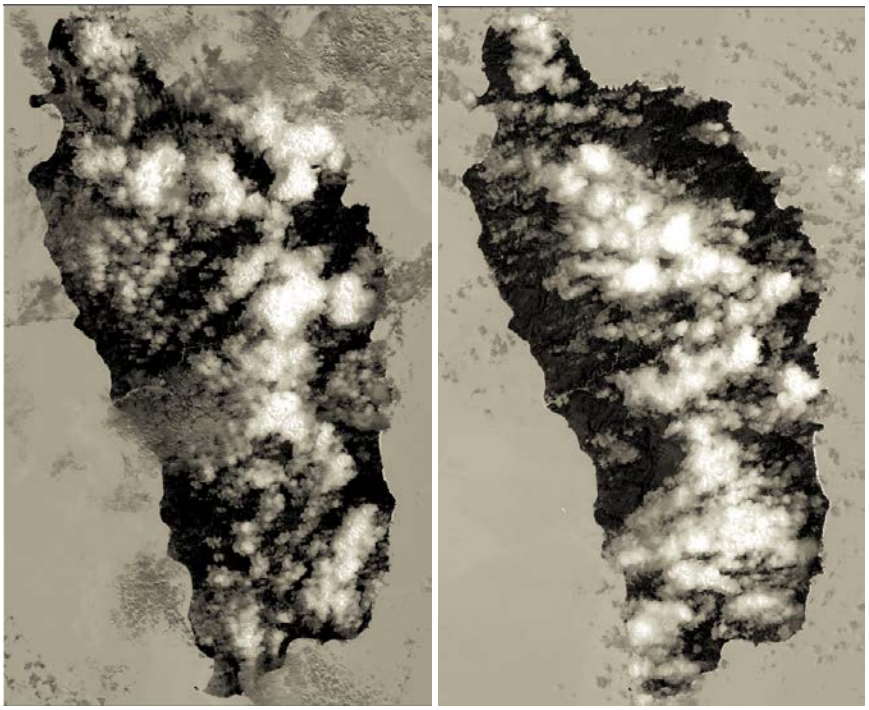
NDVI Statistics:

	Mean	St Dev	Range
May 5th NDVI	-0.02614	0.14146	1.493132
June 22nd NDVI	-0.0294	0.162813	1.805937

Ice Index False Color Image: May 5th, 2013 (left); June 22nd, 2013 (right)
Ice Index = (B4-B6)/(B4+B6)
Highest values = white, lowest values = black



Regions with highest ice index values correspond to cyan cloud pixels. (Cyan patches are smaller than the white areas in the image. 0.26 appears to be the minimum ice index value at which cyan cloud pixels appear.)



Ice Index Images, Dominica Subset: May 5th, 2013 (left); June 22nd, 2013 (right)
In both images, lowest Band 6 reflectance (i.e. highest Ice Index values) occurs over subsections of cloud.

Ice Index Statistics:

	Mean	St Dev	Range
May 5th: (B4-B6)/(B4+B6)	0.050953	0.060657	2
June 22nd: (B4-B6)/(B4+B6)	0.056619	0.066616	2