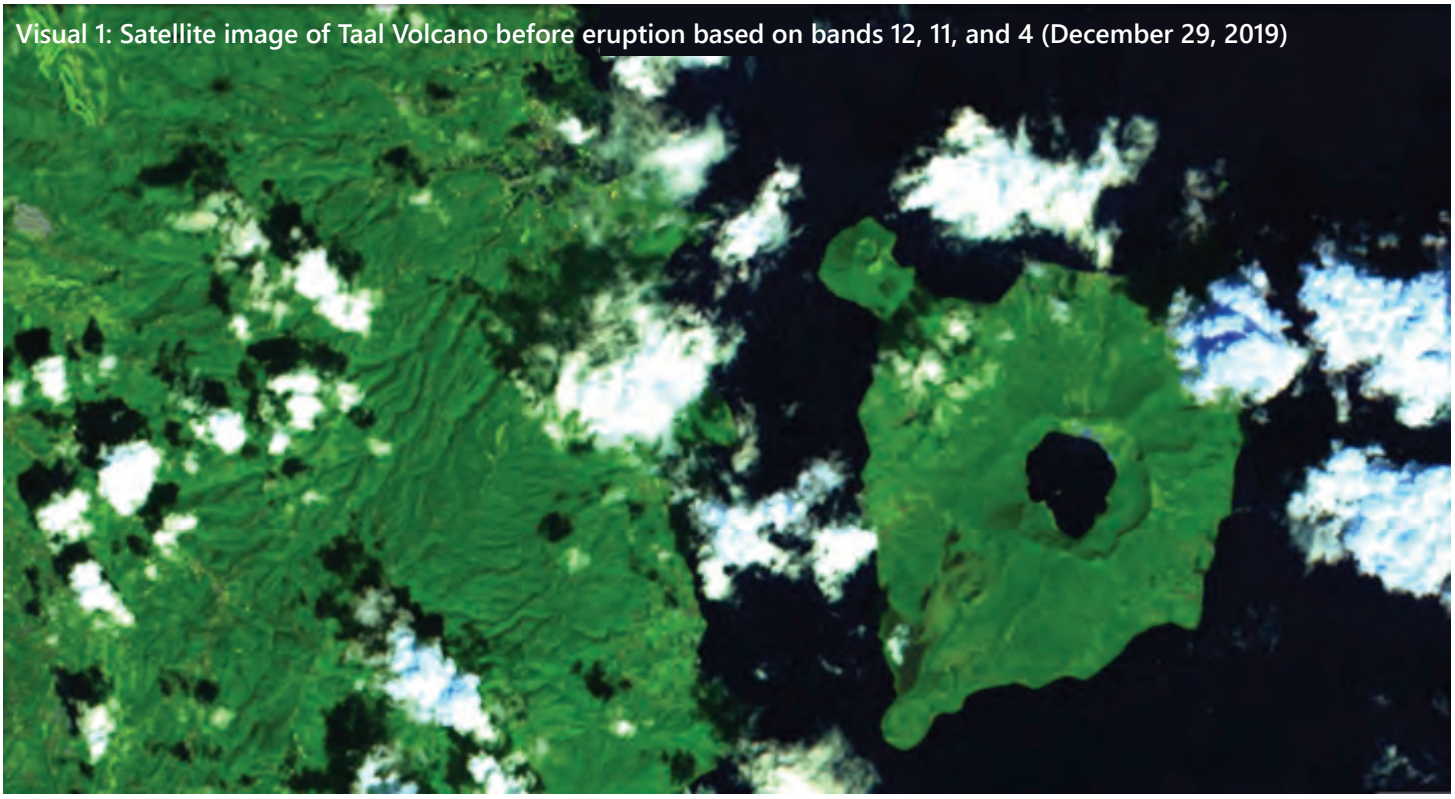
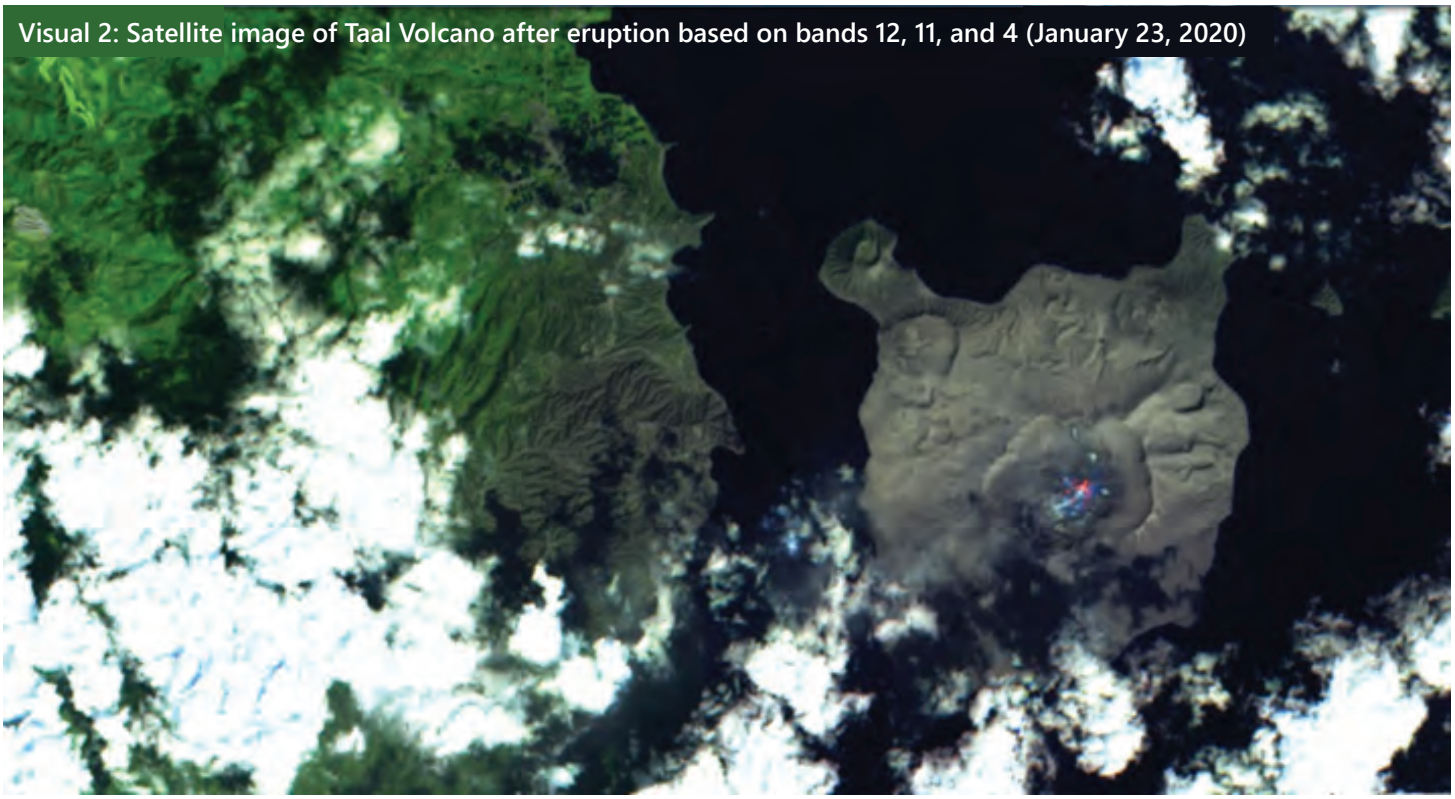
Taal Volcano Erupts

Blankets Region of Phillippines in Ash

Satellite images from before and after the January 12, 2020 eruption show the area covered in volcanic ash. More than 50,000 residents have been evacuated.



Visual 1: Satellite image of Taal Volcano before eruption based on bands 12, 11, and 4 (December 29, 2019)



Visual 2: Satellite image of Taal Volcano after eruption based on bands 12, 11, and 4 (January 23, 2020)

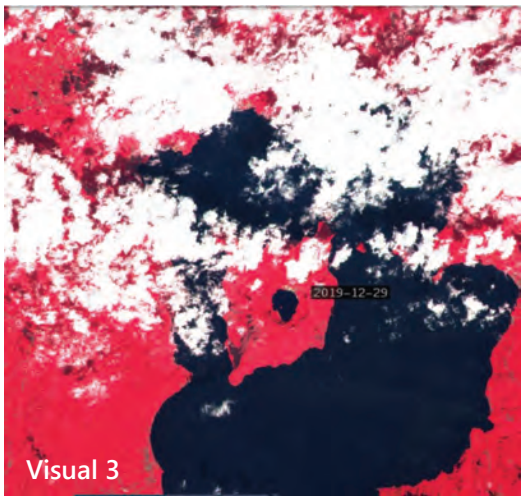
Ed Jones / AFP/ Getty

Taal volcano, the second most active volcano in the Philippines, is located in the province of Batangas, and surrounded by Taal Lake, a freshwater, highly sulfuric, lake. The eruption, which began on Sunday, January 12, spewed ash a mile high and triggered dozens of earthquakes as far as the capital city Manila. Experts spent the subsequent days assessing the likelihood of another eruption, or even a tsunami. Taal's last eruption occurred in 1977.

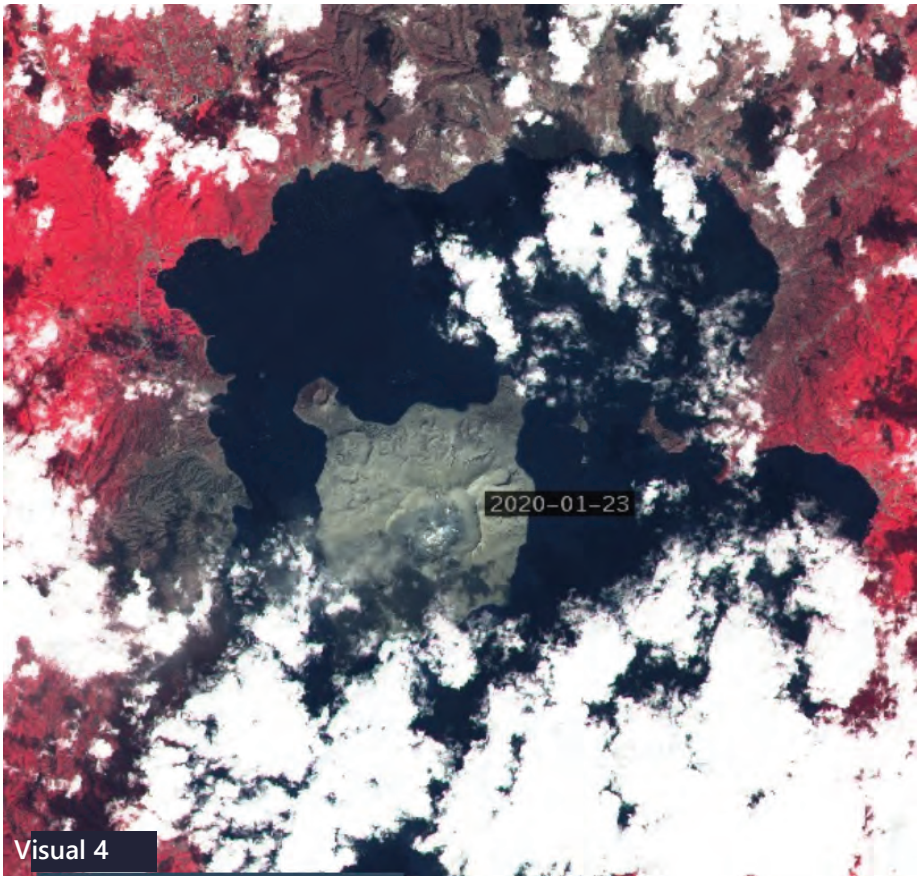
Roughly 50,000 residents of the area have been urged to evacuate- though many have returned sporadically to assess damage and retrieve salvageable possessions. Returning residents are met by two feet of ash, not only on land but in the water, where dead fish rise to the surface. Satellite images (visuals 1 and 2) from before and after the eruption show how completely the ash has covered the island. Thanks to a rainstorm following the eruption, some areas of the ash have hardened enough to walk on.

Before the eruption, the island boasted vivid plant life and hundreds of animals, wild and agricultural. Following the eruption, vegetation is almost universally covered in ash. Satellite images (visuals 3 and 4) based on color infrared bands of light show this: the island is full of vegetation before the eruption (represented by red) and almost devoid of detectable vegetation after (represented by shades of gray). Satellite images based on a more detailed vegetation index (visuals 5 and 6) still show how complete the ash covered vegetation.

Visual 3 and 4: Satellite images of Taal Volcano showing vegetation index based on bands 8, 4, and 3. Vegetation is represented in red. Visual 4 shows that most of the surrounding vegetation is covered in ash.

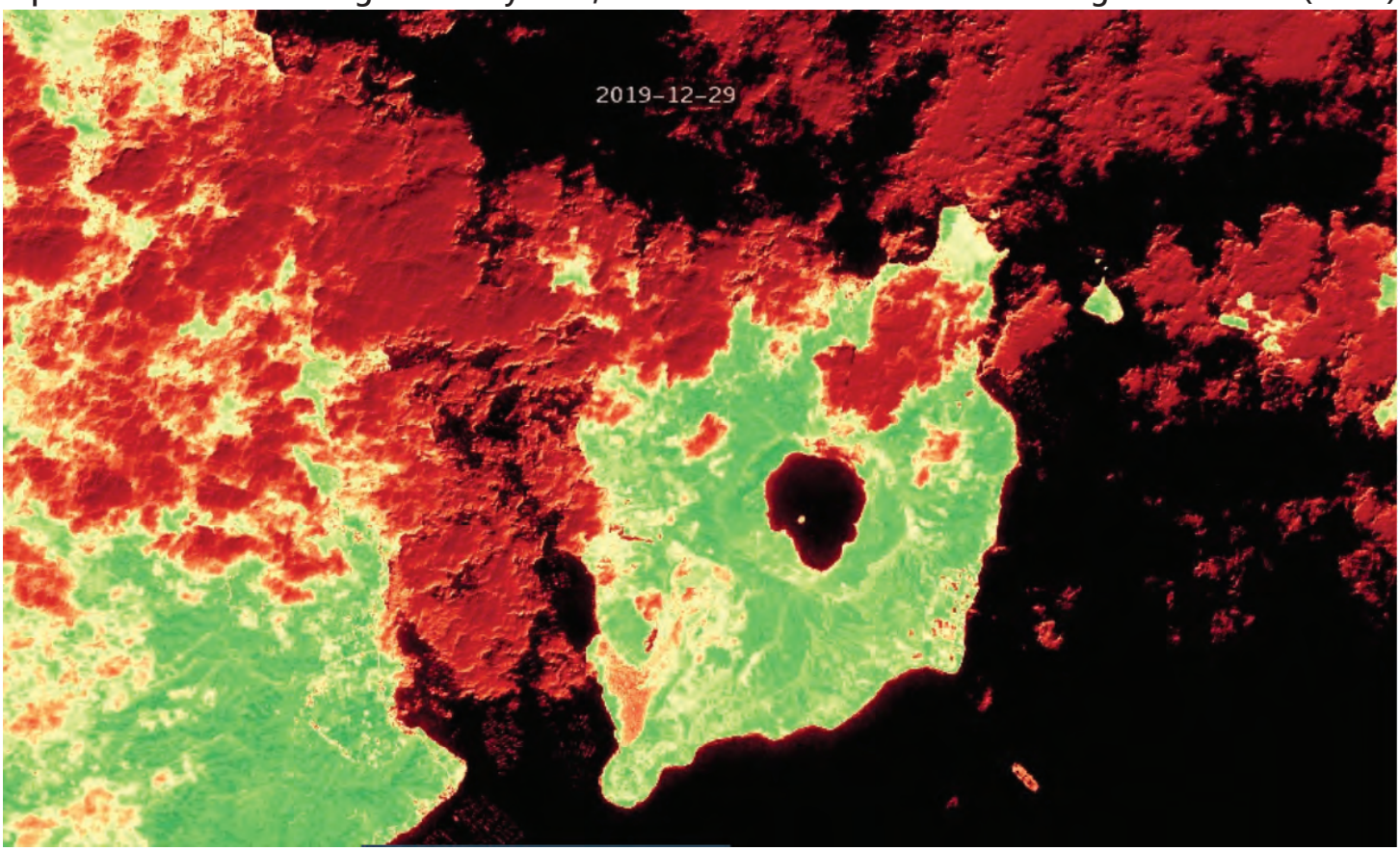


Visual 3

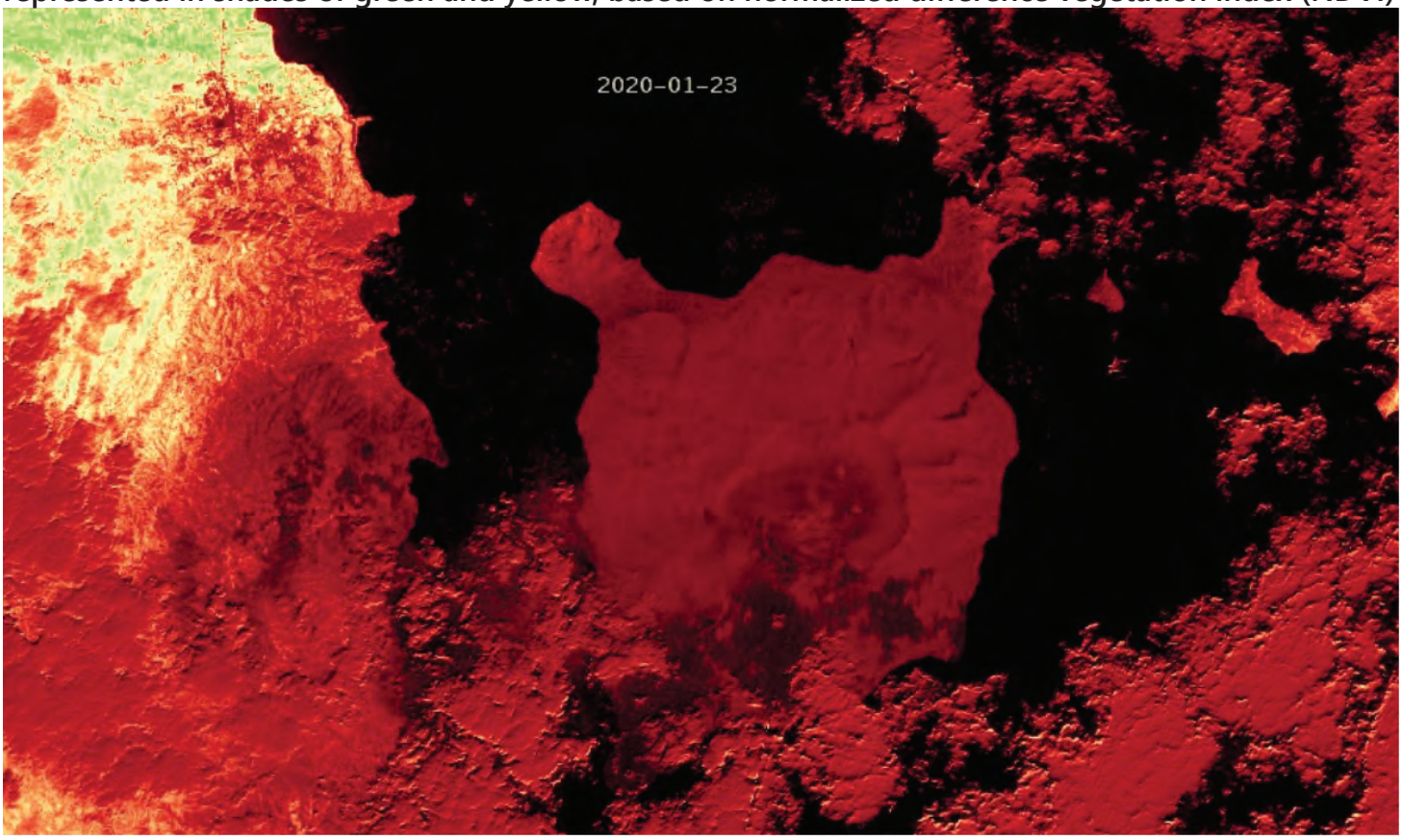


Visual 4

Visual 5: Satellite image of Taal Volcano showing vegetation on December 29, 2019. Vegetation is represented in shades of green and yellow, based on normalized difference vegetation index (NDVI)



Visual 6: Satellite image of Taal Volcano showing vegetation on January 23, 2020. Vegetation is represented in shades of green and yellow, based on normalized difference vegetation index (NDVI)



Code used

Visuals 1 and 2 (highlight lava):

```
return [B12*2.5,B11*2.5,B04*2.5]
```

Visuals 3 and 4 (vegetation index):

```
return [B08*2.5,B04*2.5,B03*2.5]
```

Visuals 5 and 6 (detailed vegetation index):

```
let ndvi = (B08 - B04) / (B08 + B04);
return colorBlend(ndvi,
  [-0.2, 0, 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1.0 ],
  [[0, 0, 0],  //  < -.2 = #000000 (black)
   [165/255,0,38/255],        //  -> 0 = #a50026
   [215/255,48/255,39/255],   //  -> .1 = #d73027
   [244/255,109/255,67/255],  //  -> .2 = #f46d43
   [253/255,174/255,97/255],  //  -> .3 = #fdae61
   [254/255,224/255,139/255], //  -> .4 = #fee08b
   [255/255,255/255,191/255], //  -> .5 = #ffffbf
   [217/255,239/255,139/255], //  -> .6 = #d9ef8b
   [166/255,217/255,106/255], //  -> .7 = #a6d96a
   [102/255,189/255,99/255],  //  -> .8 = #66bd63
   [26/255,152/255,80/255],   //  -> .9 = #1a9850
   [0,104/255,55/255]         //  -> 1.0 = #006837
  ]);
```