



Implications of Normalized Difference Vegetation Index Around the Dead Sea

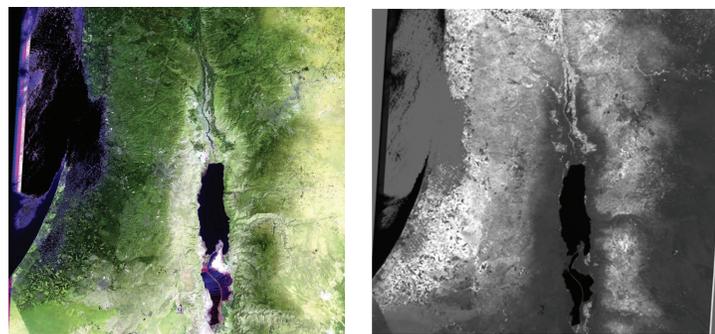
Using Landsat 7 Satellite Imagery to Examine Vegetation Over Six Months



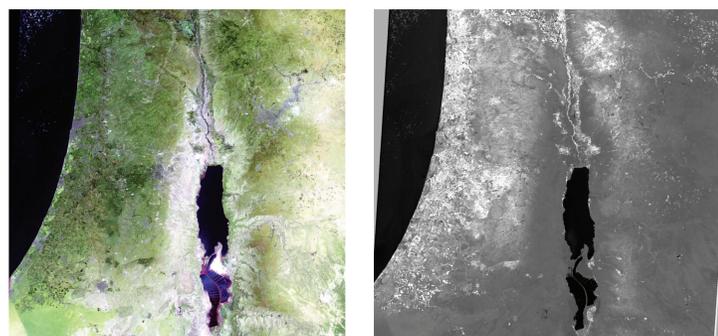
Objective:

To examine whether disparities of water in the region of Israel and the West Bank are effecting the land cover visible in satellite imagery. Normalized Difference Vegetation Index (NDVI) is applied to explore the vegetation vigor in the area.

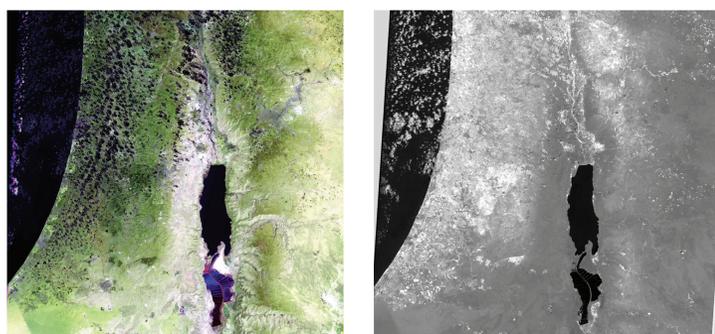
March 2001



June 2001



September 2001

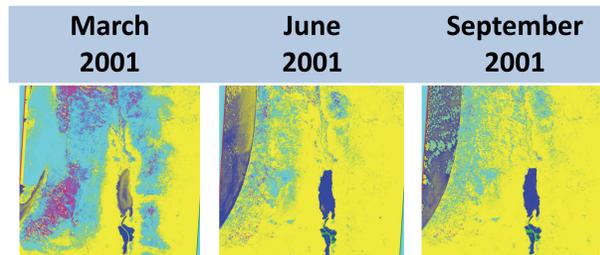


Methodology:

The images were downloaded from Landsat 7. March and September required preprocessing due to cloud cover in the north. The images were stacked and classified using ENVI's Spectral Angle Mapper function to mask for all clouds and cloud shadows.

NDVI is a band math operation applied to the red and near-infrared bands to accentuate the difference (called the "red edge") between these bands for healthy vegetation. The resulting images, shown in black and white to the left, have bright pixels in areas of healthy vegetation and dark pixels in areas of no vegetation—in this region the dark areas are deserts.

Density slicing of the NDVI images shows vegetation vigor changes over the six month time period of the three images. Using the same slicing for each image, with magenta as strong vegetation and yellow as minimal vegetation, the below images were produced.



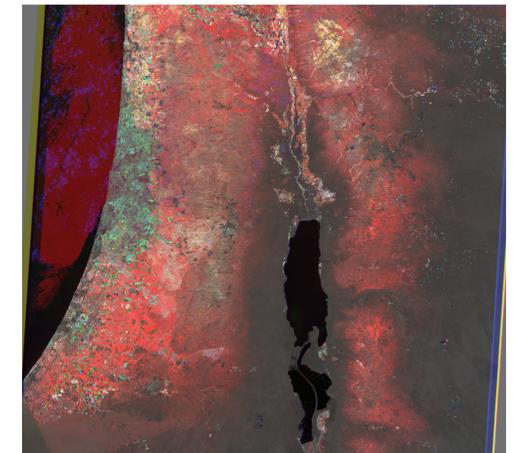
The images show that vegetation in the west tends to be more vigorous throughout the three months examined

Results:

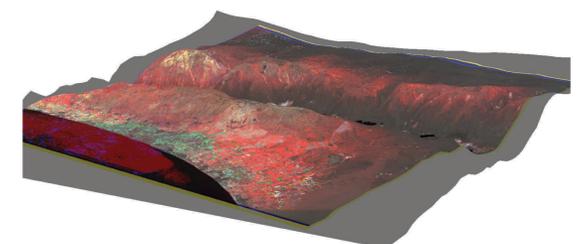
The NDVI images were combined, seen in the upper right, to further examine this process. Darker pixels indicate areas of less strong vegetation growth, and the combined image shows the geopolitical boundaries of the West Bank, shown in the upper right, with the darker pixels acting as vegetation markers.

Using ASTER data a 3-dimensional view of the area, to the right, was examined to see if the demarcated boundaries corresponded to other regional terrain features. However, certain bright regions of Israel proved to be at the same elevation as the West Bank, but were still characteristic of Israeli vegetation vigor, suggesting that elevation is not a deterministic factor for the NDVI results.

Combined NDVI



NDVI With Elevation



Conclusion:

Many factors can account for the difference in vegetation that corresponds to the geopolitical boundary between the West Bank and Israel in 2001.

However, without a perfect match for elevation, it becomes more likely that the difference is based in political policies that impose constraints dictating water allocation between the two countries.

Further work could reveal other conditions contributing to the vegetation Disparity between the two regions.