

## Atmospheric Science

### Atmospheric Water Vapor Activity

#### Introduction

Depending upon its temperature, water comes in three different forms: solid (ice), liquid (rain drops), and gas (invisible to human eyes). As water grows hotter it eventually changes from a liquid into a gas. This gas is called *water vapor*. Water vapor is a very important part of Earth's atmosphere because it traps heat near the surface and keeps our planet warm. Water vapor is also important because as it rises into the atmosphere it cools and turns back into water droplets. As more water droplets appear, they eventually form a cloud. Some clouds produce rain and snow, bringing fresh water back to the surface. So scientists monitor water vapor because it influences Earth's weather patterns, and because it is a very important part of our world's climate system. These maps show satellite measurements of water vapor for a given day, or over a span of days.

You will use the Water Vapor (1 Month - Terra/Modis) data set, which uses the following color table.



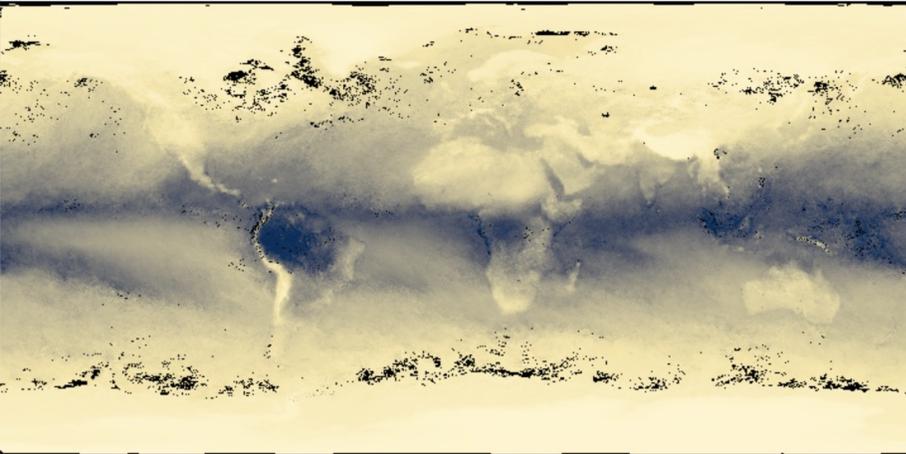
The water vapor product reveals the total amount of water vapor in a 1-km by 1-km column of the atmosphere. Though water vapor (or water in the form of a gas) makes up a very small part of the atmosphere, it plays a major role in Earth's climate. The greater the value (and the darker the color), the more water vapor in that column of air.

#### Procedure and Analysis

##### Part 1: November 2019 to January 2020

1. Go to the [NASA Earth Observations Website](#) (Water Vapor - 1 Month Terra/Modis)
2. You will need "seasonal data" - November 2019 to January 2020 and June 2020 to August 2020.
3. Select the month - start with November 2019 (make sure the month and year are "highlighted" in a dark color). Then click **Add to Analysis**. Then move to December 2019 and January 2020. Add each month to the analysis.

**WATER VAPOR (1 MONTH - AQUA/MODIS)**



**ADD TO ANALYSIS**

Currently viewing:  
**November 2019**  
Permalink

**Downloads** ⓘ

File Type: **JPEG** ▾

Color  Grayscale

<b>1.0 degrees</b>	360 x 180 ▶
<b>0.5 degrees</b>	720 x 360 ▶
<b>0.25 degrees</b>	1440 x 720 ▶
<b>0.1 degrees</b>	3600 x 1800 ▶

View by date: **1 day** 8 day **1 mo**

View by satellite: **Aqua/MODIS** Terra/MODIS

0 1 2 3 4 5 6 cm  
Download color table ⓘ

Dataset you are currently viewing: November 2019 Select Year **2019** ▾

2019 August 2019 September 2019 October 2019 **November 2019** December 2019

**Related Websites**

- [MODIS Atmospheres Science Team](#)
- [LAADS DAAC](#)
- [MODIS](#)
- [Aqua](#)

**Further Reading**

- [Water Vapor](#)
- [Earth's Steamy Blanket](#)
- [Climate Forcings and Global Warming](#)

4. When you have added the three images, click on **Analyze** in the upper right corner. On the next window, do not change anything except change the first drop down menu (**Mode**) to **Animation**.

### ANALYSIS OPTIONS



Select Area (optional)

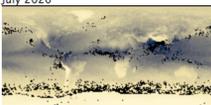
These configuration options are all optional. You may use either the map above to select coordinates for a region you want to analyze or you can enter them in the fields on the left. When you are ready to run the analysis, click on the 'Launch Analysis' button below.

Mode: **1** Animation

File size: **1** 0.1 degrees

**LAUNCH ANALYSIS**

### IMAGE QUEUE

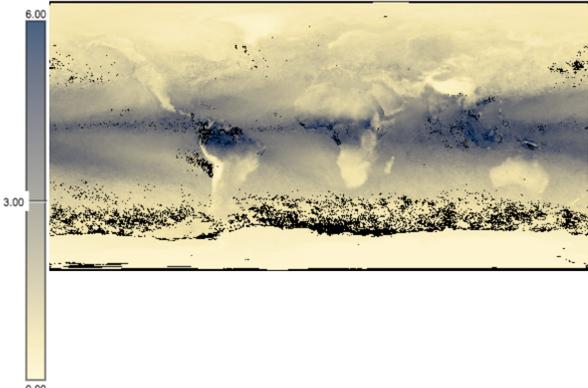
- Water Vapor (1 month - Terra/MODIS) May 2020  
  
Remove
- Water Vapor (1 month - Terra/MODIS) June 2020  
  
Remove
- Water Vapor (1 month - Terra/MODIS) July 2020  
  
Remove

Remove all images

5. Click **Launch Analysis**. On the next page, click **Animate**.

1. Water Vapor (1 month - Terra/MODIS) May 2020
2. Water Vapor (1 month - Terra/MODIS) June 2020
3. Water Vapor (1 month - Terra/MODIS) July 2020

Water Vapor
Water Vapor
Water Vapor

**Animate**

**Step**

Zoom/Room

Data Probe

Plot transect

Distance

Outline region

Select region

Scatter

Histogram

**Reset View**

### **November to January Questions**

1. Why does the zone of greatest water vapor “values” move to the South between November and January?
2. Why is there a zone of higher water vapor “values” over South America?
3. Is there a relationship between the surface type (land, ocean, ice) and the water vapor value? Be specific in your answer.

### **Part 2: June 2020 to August 2020**

1. Repeat your data collection and analysis procedure for the period June 2020 to August 2020.

### **June to August Questions**

1. How does the zone of greatest water vapor “values” shift between November/January and June/August? Why do you think this is?
2. Why do you think the zone of higher water vapor “values” over South America disappears?
3. Why do you think zones of higher water vapor “values” appear over equatorial Africa, India/Bangladesh/Thailand and Antarctica?