



NASA GLOBE Clouds: Your Observations Impacting the Research Community

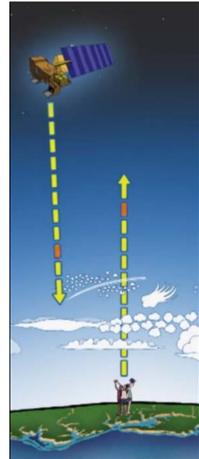


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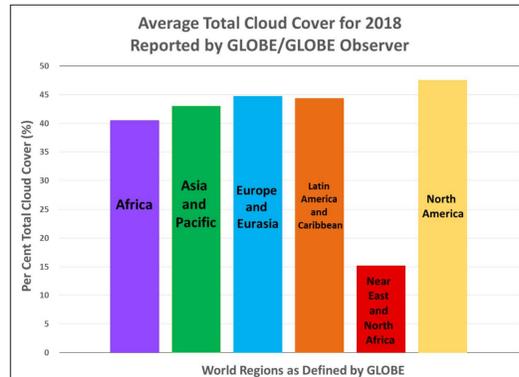
NASA GLOBE Clouds

NASA GLOBE Clouds is led by the Science Education team at NASA Langley Research Center, in Hampton, VA. The team provides a “match email” to GLOBE participants that compares satellite data to their cloud observations.



Average Cloud Cover Worldwide for 2018

First Look at 2018 Cloud Observations Worldwide



Total number of cloud observations for 2018: **215,440**

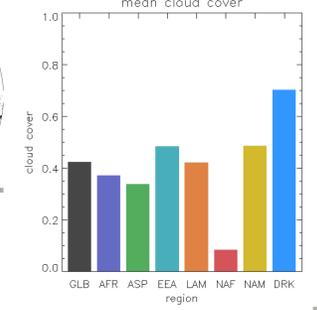
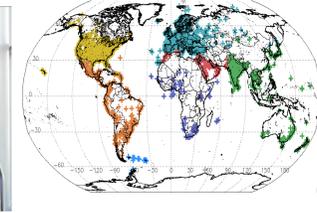
Total number of cloud observations per region:

- Africa: **1,692**
- Asia and Pacific: **27,131**
- Europe and Eurasia: **89,186**
- Latin America and Caribbean: **7,022**
- Near East and North Africa: **33,573**
- North America: **47,573**

The average total cloud cover worldwide for 2018 was 39.46%.

GLOBE Clouds Data Challenges

RESULTS: Worldwide Spring Average Total Cloud Cover was ~40%



The 2018 NASA GLOBE Clouds Spring Data Challenge received over **55,000 observations** from more than **15,000 locations** in **99 countries** in every continent, including Antarctica!

GLB = GLOBAL
ASP = Asia and Pacific
EEA = Europe/Eurasia
LAM = Latin America/Caribbean
NAF = Near East/North Africa
DRK = Drake Passage, Antarctica

Help scientists study cloud types and cover around the world through the GLOBE Clouds Data Challenges:

- Fall Challenge: October, 2019
- Summer Challenge: July 2020
- Winter Challenge: January 2021

How to Make a Cloud Observations

1. Check satellite overpass times to time your observation
2. Find a location in an open area
3. Get your time and location information
 - Total Cloud Cover
 - Cloud types per height (includes cloud cover for that height and opacity)
 - Report Surface Conditions
5. Send data to GLOBE to receive a satellite match
 - Desktop Data Entry
 - Email Data Entry
 - GLOBE Observer app
 - GLOBE Data Entry App



Call for Observations: Dust Storms



Obscuration = when dust, heavy rain, snow, fog, smoke, haze, volcanic ash, ocean spray, or blowing sand blocks the sky and clouds.

Overcast = when clouds completely cover the sky.

How to Report Dust Storms

Select clouds and choose obscurations.



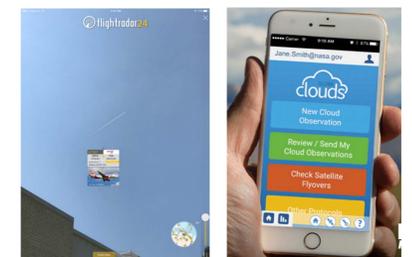
Contrails Investigations Project

Track which airplanes are creating and NOT creating a contrails

Date	Local Time	Airplane Type	Airplane Calibrated Altitude or Height (ft)	Airplane Track (degrees)	Contrail Type
Example 08/29/2018	Example 10:45am	Example E75L	Example 34,000	Example 28	Example 28
10032018	13:54	DL1859	16,000	163	No contrail
10032018	14:03	AAL18	17,404	167	No contrail
11082018	13:18	CHJ7	27,000	63	No contrail
12032018	10:25	AZ30	36,000	231	S or short-lived
12032018	10:29	WQ706	35,000	143	S or short-lived
12062018	13:05	UAA655	33,000	50	S or short-lived



Flight observations courtesy of **Lexington School for the Deaf** (presented at 2019 GLOBE Northeast SRS)



Step 1: Flightradar24 for plane info
Step 2: Report contrails via GLOBE

Pilot Program; Please ask if you are interested in participating in it!

Satellite Match Table

NASA Cloud Observation and Satellite Match			
Satellite	GEO	Terra	Your Observation
Universal Date/Time 2018-04-11	21:05	21:06	21:08
Latitude Range	18.89 to 19.53	18.79 to 19.59	Latitude 19.21
Longitude Range	-156.2 to -155.56	-156.27 to -155.47	Longitude -155.8
Total Cloud Cover	Broken 79.43%	Broken 69.27%	Overcast (>90%)
Cloud Cover	No Clouds	Few (0.91%)	
Cloud Altitude		6.51 (km)	
Cloud Phase		Ice 266.92 (K)	
Cloud Opacity		Translucent	
Cloud Cover	Broken 68.22%	Broken 60.99%	Overcast (>90%)
Cloud Altitude	3.12 (km)	3.94 (km)	
Cloud Phase	Mixed 281.4 (K)	Mixed 278.34 (K)	
Cloud Opacity	Opaque	Opaque	
Cloud Cover	Isolated 11.21%	Few (7.36%)	
Cloud Altitude	1.26 (km)	1.5 (km)	
Cloud Phase	Water 292.44 (K)	Water 287.24 (K)	
Cloud Opacity	Translucent	Translucent	
Corresponding NASA Satellite Images	GOES-15 Infrared	MODIS Rapid Response	
Click to view image -->	GEO Tutorial	MODIS Guide	

GLOBE Clouds News

Your daily observations of total cloud cover, cloud types, and photographs of the sky and the horizon are making a difference and impacting the research community.

GLOBE Cloud Protocol featuring NASA Satellite Comparison

Clouds are powerful agents of global change. They affect the overall temperature or energy balance of the Earth and play a large role in controlling the planet's long-term climate.

To understand the impact of clouds over time, we need accurate data on clouds. NASA has a number of satellites orbiting the Earth and collecting data about clouds and the Earth's energy. While these satellites give us a big picture of what's going on, they sometimes have trouble with the details.

Now we need your help in collecting data so we can better understand the different types of clouds and the effects they have on our Earth's climate. Plus we need data from your vantage point, right here on Earth. Satellites only see the top of the clouds while you see the bottom. By putting these two vantage points together we get a much more complete picture of clouds in the atmosphere.

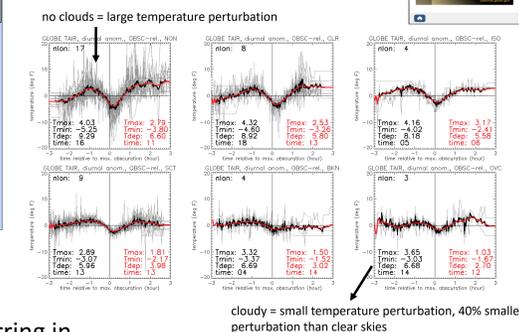
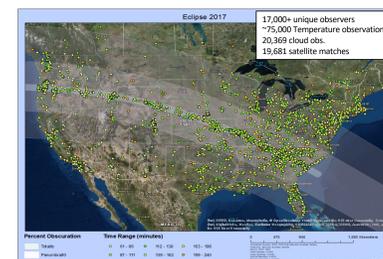
GLOBE Observer Cloud Science

The role of clouds in climate is complex, they cool the Earth's surface by reflecting sunlight and warm it by radiating and trapping heat" - NASA's CERES Principal Investigator Norman Loeb

<https://www.globe.gov/web/s-cool>

2017 North American Solar Eclipse

RESULTS: Greater cloud cover reduces temperature perturbation



Credit: J. Brant Dodson (NASA LaRC), Dodson et al., 2019, in review

Upcoming total solar eclipses occurring in South America on December 14, 2020 and in North America on April 8, 2024!

Contact GLOBE Clouds Team: <https://scool.larc.nasa.gov/GLOBE/contact/>