

NASA GLOBE CLOUD GAZE

Creating Data Quality Flags for Citizen Science Cloud
Observations Matched to NASA Satellite Data

GLOBE
clouds

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The GLOBE Program

Since 1995

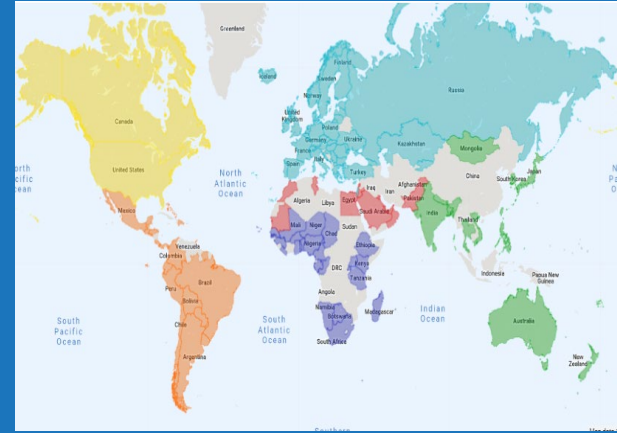
123 countries

34,000 schools

142,000 citizen scientists

400+ publications

globe.gov



Global Learning and Observations to Benefit the Environment (GLOBE)





[Visit the Observer Website](#)

[Visit the GLOBE Website](#)

Steps to observe:

- Overall cloud cover
- Sky conditions
- Cloud types, cloud cover, and opacity by height
- Take photos

High Level Clouds

Which high level clouds/contrails are present?

No high level clouds/co

Cirrus

Cirrocumulus

Cirrostratus

What percentage of the high level sky is covered by clouds?

Few
>0 – 10

Isolated
10 – 25

Scattered
25 – 50

Broken
50 – 90

Overcast
90 – 100

What is the sky color?

Deep Blue

Blue

Light Blue

Pale Blue

Milky

What is the sky visibility?

Unusually Clear

Clear

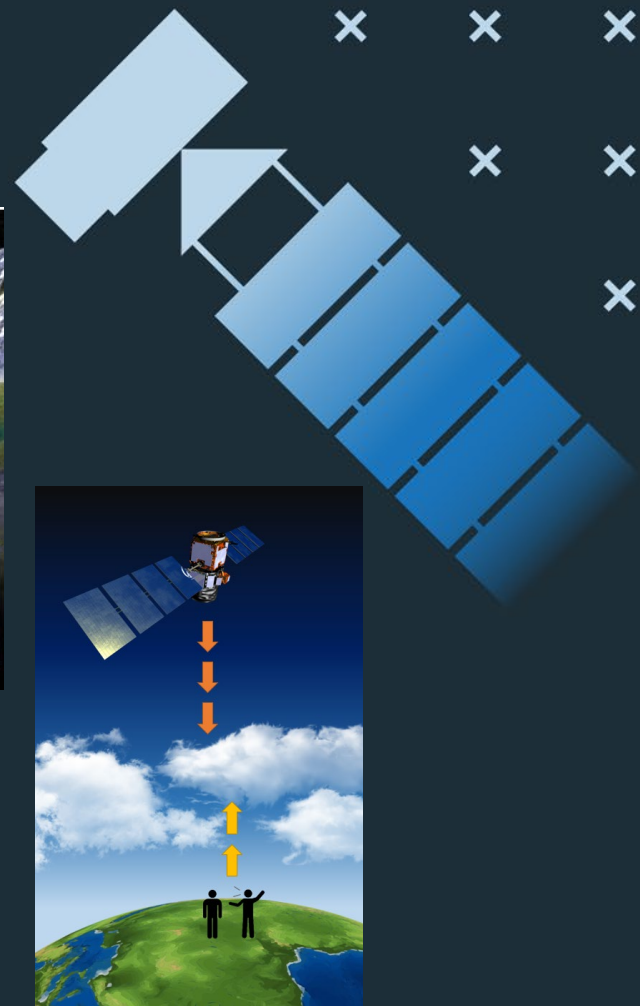
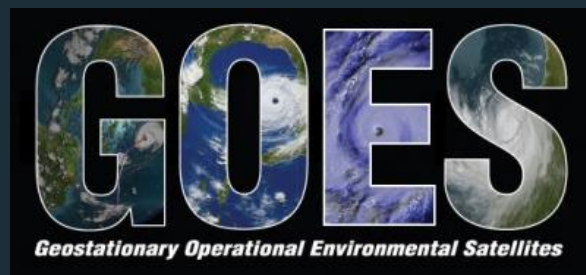
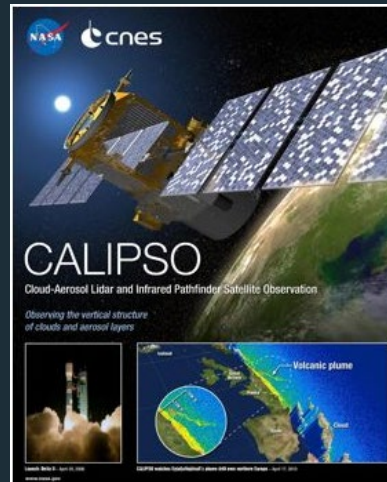
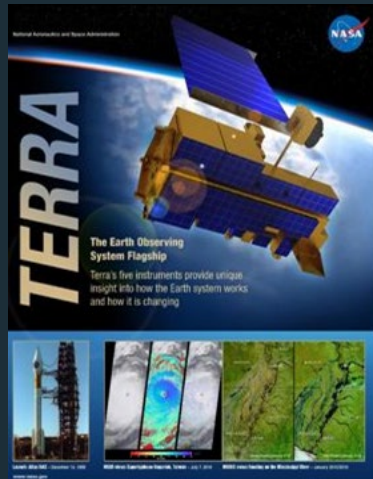
Somewhat Hazy

Very Hazy

Extremely Hazy



Satellites and Instruments

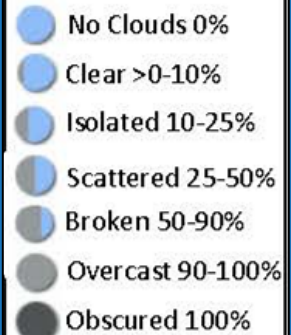




NASA Cloud Observation and Satellite Match

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%) 
H I G H	Cloud Cover Cloud Altitude Cloud Phase Cloud Opacity	No Clouds 	Few (0.91%)  6.51 (km) Ice 266.92 (K) Translucent	
M I D	Cloud Cover Cloud Altitude Cloud Phase Cloud Opacity	Broken 68.22%  3.12 (km) Mixed 281.4 (K) Opaque	Broken 60.99%  3.94 (km) Mixed 278.34 (K) Opaque	 Altostratus Overcast (>90%)  Opaque
L O W	Cloud Cover Cloud Altitude Cloud Phase Cloud Opacity	Isolated 11.21%  1.26 (km) Water 292.44 (K) Translucent	Few (7.36%)  1.5 (km) Water 287.24 (K) Translucent	

The circles represent cloud cover.



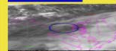
Detailed information per height:

- Low
- Mid-level
- High

Corresponding NASA
Satellite Images.
Click to view image --->

GOES-16

[Visible](#)



[Infrared](#)



[GEO Tutorial](#)

MODIS

[Rapid Response](#)



[Worldview](#)



Sky Visibility : no report

Sky Color : no report

North

East

South



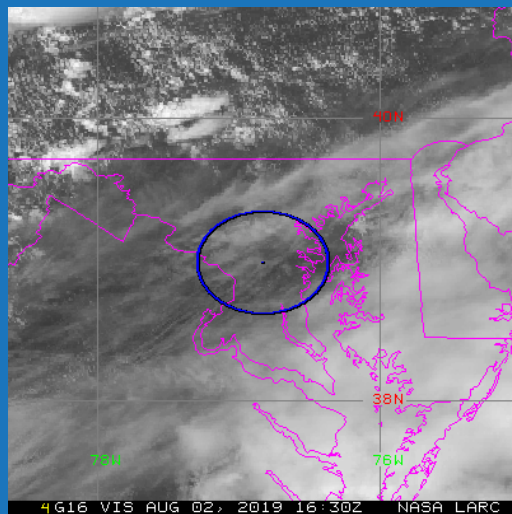
West

Up

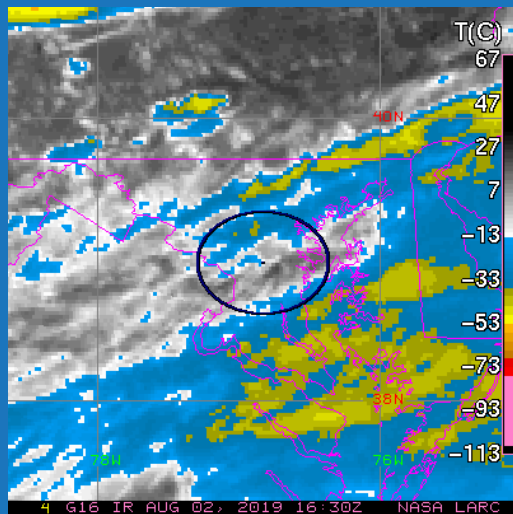
Down



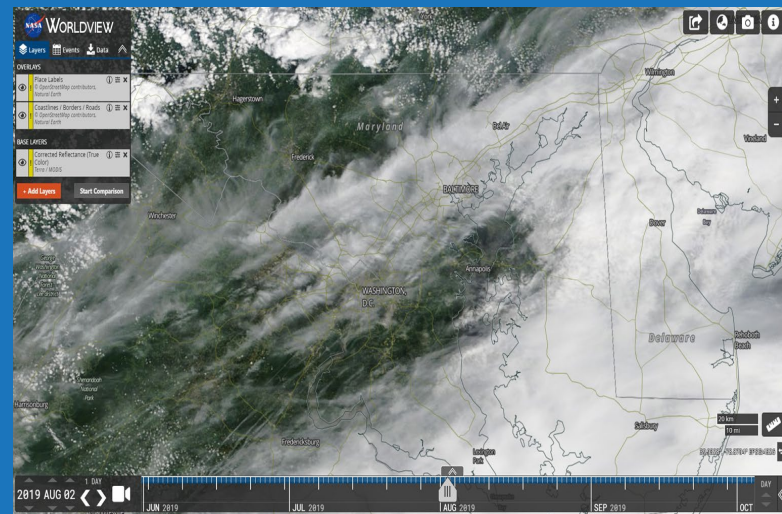
GOES 16 - Visible



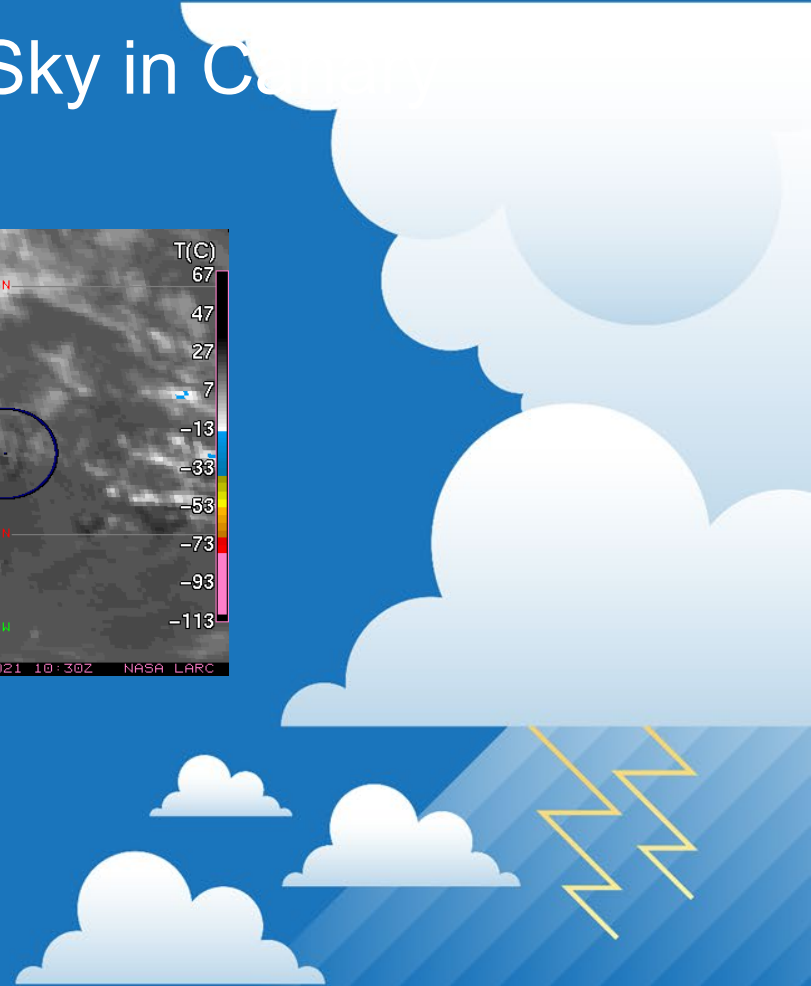
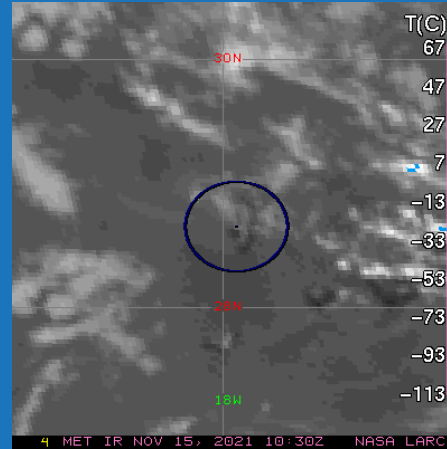
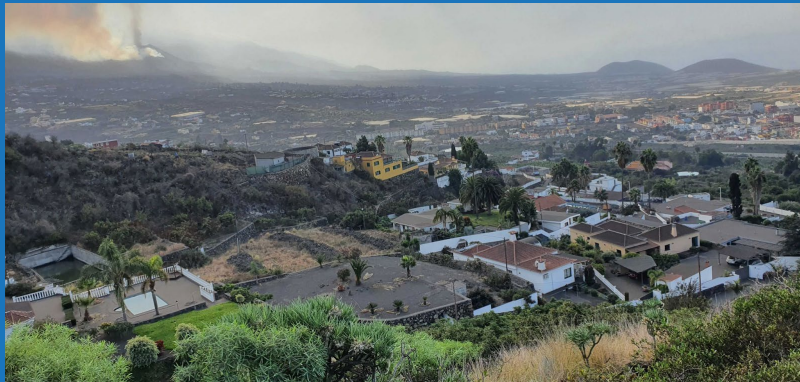
GOES 16 - Infrared



MODIS True Color

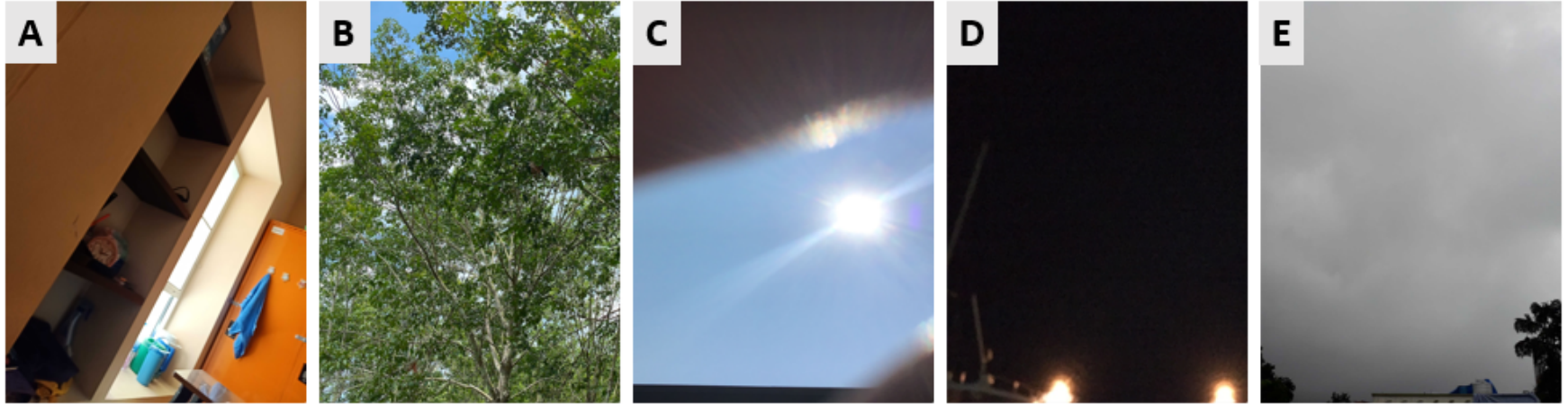


Observer Reported Obscured Sky in Cienfuegos Islands, 15 November 2021



Examples of data quality issues found in the data

Sample Images of Reference Data Beyond Cloud Type



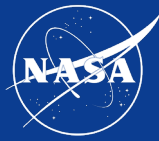
- A. Observations are taken inside, especially during a training session or just testing out the GLOBE Observer app.
- B. Buildings or trees could be in the view.
- C. Some photographs could be out of focus or have a finger in the view.
- D. A few observers send in observations at night.
- E. Some people misclassify a milky sky or obscured sky instead of choosing overcast conditions (100% cloud cover).

NASA GLOBE CLOUD GAZE



*Merging two giants of citizen science
GLOBE and the Zooniverse*

<https://www.zooniverse.org/projects/nasaglobe/nasa-globe-cloud-gaze>



CLOUD GAZE Team : NASA GLOBE Clouds team at NASA LaRC with collaborators from GLOBE Observer and Zooniverse. PI: Marilé Colón Robles (SSAI/NASA LaRC).

Science Steering Committee : 13 researchers from NASA (LaRC, GSFC, JPL, Ames, MSFC), NOAA (NSSL), and multiple institutions (U. of Maryland, U. of Toledo, U. of Wisconsin-Madison).

Our goal is to collect metadata from the sky photographs and develop data quality flags for citizen science cloud observations.

Citizen scientists select best selection per sky photographs



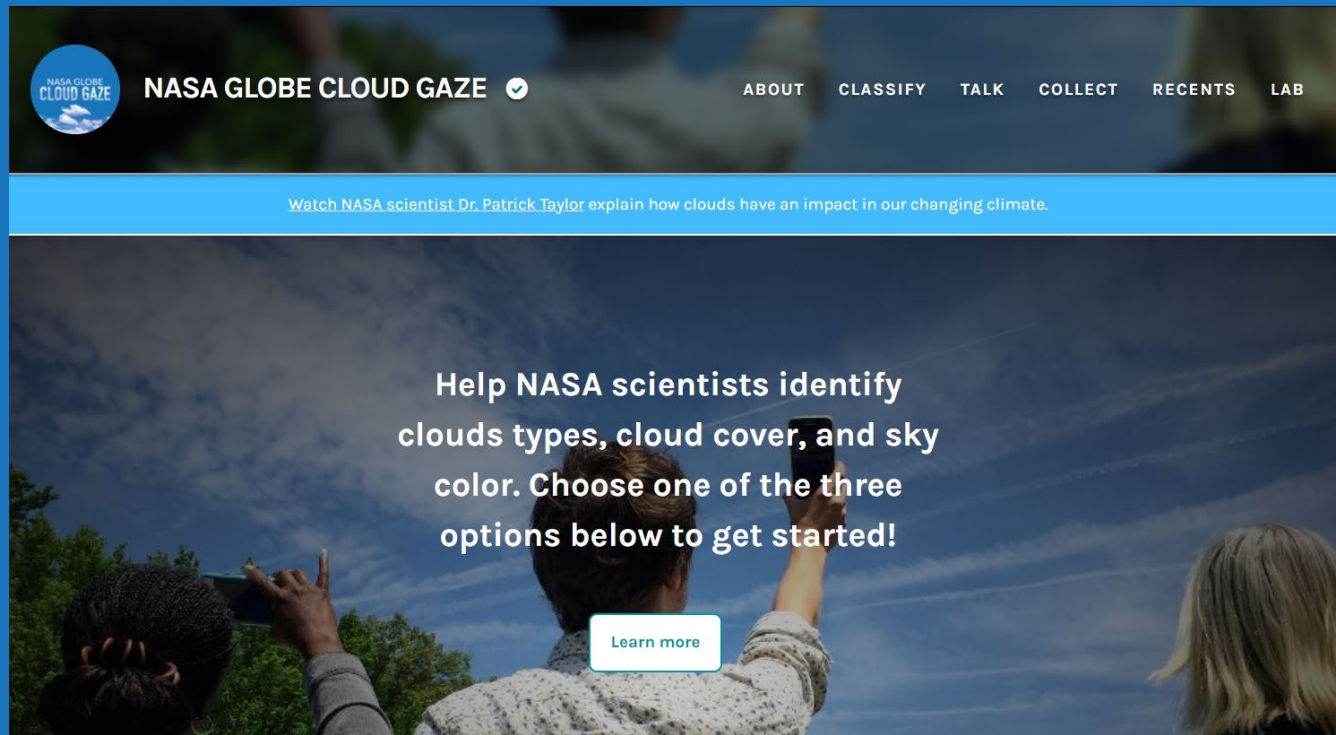
TASK	TUTORIAL
 Clear Sky	 Cumulus
 Cirrus or Cirrostratus	 Cumulonimbus
 Cirrocumulus or Altopcumulus	 Contrails
 Altostratus or Stratus	 Smoke and Haze
 Stratocumulus	 Dust

Showing 10 of 10 [Clear filters](#)

Done & Talk

Done

Data available by July 2022



<https://www.zooniverse.org/projects/nasaglobe/nasa-globe-cloud-gaze/>



Cloud Challenge 2022

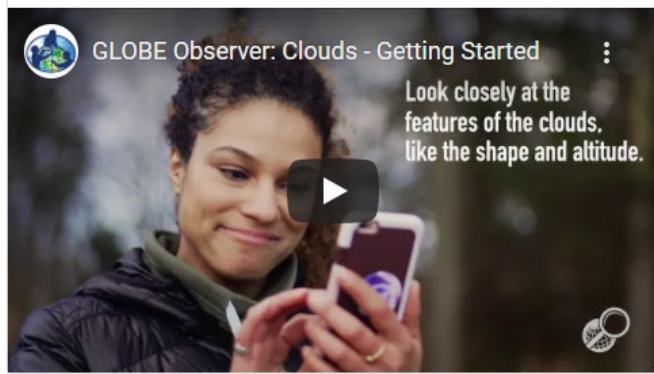
January 15 February 15, 2022

[https://observer.globe.gov/
cloud-challenge-2022](https://observer.globe.gov/cloud-challenge-2022)

Two Ways to Participate

GLOBE Clouds Observations

(1) Submit your own cloud observations using The GLOBE Program's [GLOBE Observer app](#). (Remember to always be safe and follow local guidelines while observing.) If you can, try to make observations during satellite overpasses, and help us reach our goal of 20,000 [satellite matches](#) during the challenge!



NASA GLOBE CLOUD GAZE

(2) You can also participate from the comfort of your home through [NASA GLOBE CLOUD GAZE](#). Using this project on the Zooniverse online platform, you can identify cloud types and other phenomena in photos taken by GLOBE participants.



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