



GLOBE  
**Observer**

**GLOBE Clouds:  
1 Million Matches and Counting**  
Marilé Colón Robles, NASA LaRC/ADNET

# GLOBE Clouds Team



**Jessica Taylor**  
Principal  
Investigator



**Tina Rogerson**  
Data Manager



**Rosalba  
Giarratano**  
Education  
Specialist



**Marilé  
Colón Robles**  
Project  
Scientist



**Ashlee Autore**  
Research  
Support

# Overview

- Satellite Comparisons by the Numbers
- Update to Satellite Comparison Table
- Past Events
  - NASA Langley Open House
  - Solar eclipses 2023 and 2024
  - GLOBE Eclipse Challenge:  
Clouds and Our Solar-Powered Earth

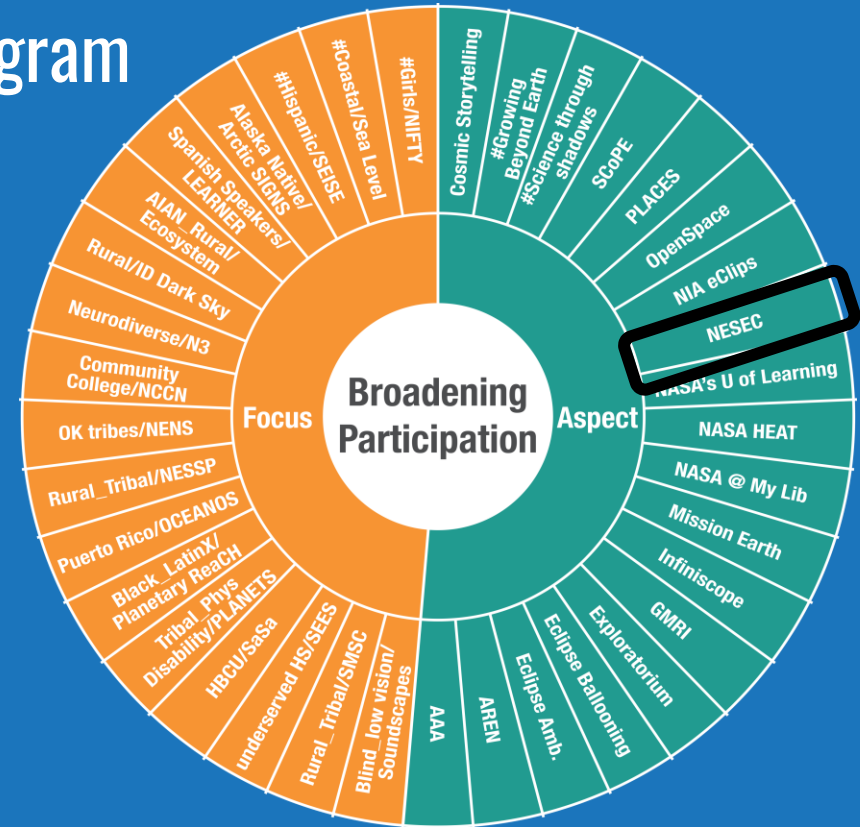


**Thank you to CERES, SatCORPS, and ASDC teams for their ongoing support.**

# NASA SME Science Activation Program

*The Science Activation program is a competitively-selected network of collaborative projects that seek to connect NASA Science with diverse learners of all ages in ways that activate minds and promote a deeper understanding of our world and beyond, with the ultimate vision:*

*to increase learners' active participation in the advancement of human knowledge.*



# Satellite Matches by the Numbers and Addition of NOAA-20 1 January 2017 to 1 May 2024























Satellite	Total Satellite Matches	NASA LaRC Team Support
<b>GEO Satellite Matches</b> GOES, Himawari, METEOSAT	992,422	SatCORPS
<b>SSF Satellite Matches</b> <ul style="list-style-type: none"><li>• Terra – 162,176</li><li>• Aqua – 147,888</li><li>• NOAA-20 – 38,878</li></ul>	348,942	CERES Flash Flux
<b>Total (2017 – Current)</b>		1,341,364

**GLOBE Cloud Observations:** 1,476,692

**Observations with images:** 529,512

**Total Clouds and Sky Photos:** 2,599,745 (each cardinal direction, upward, and downward)

# Satellite Comparison Table New Look

 <b>GLOBE Cloud Observations Paired with NASA Satellite Data</b>				
Total Satellite Match Count: 1,224				
Useful Resources: <a href="#">How to Compare My Cloud Observations with Satellite Data</a> , <a href="#">Understanding Satellite Match</a> , <a href="#">Cloud Cover</a> , <a href="#">Cloud Type</a> , <a href="#">Cloud Opacity</a> , <a href="#">Satellites</a>				
Observation	GLOBE	<a href="#">METEOSAT-10 Satellite</a>	<a href="#">Terra Satellite</a>	<a href="#">NOAA-20 Satellite</a>
Universal Date/Time	2023-08-16 11:22:00	2023-08-16 11:10	2023-08-16 11:28	2023-08-16 11:14
Latitude	51.45	51.13 to 51.77	51.01 to 51.81	51.04 to 51.84
Longitude	-0.98	-1.3 to -0.66	-1.38 to -0.58	-1.3 to -0.5
Total Cloud Cover	Scattered (25-50%) 	Scattered 27.87% 	Scattered 44.35% 	Broken 60.24% 
High Clouds	Short Lived Contrails: 1 Non Spreading Contrails: 3	No Clouds 	Cover: Few (1.70%)  Altitude: 10.25 (km) Phase: Ice 226.95 (K) Opacity: Transparent	Cover: Few (4.20%)  Altitude: 8.27 (km) Phase: Ice 241.06 (K) Opacity: Transparent
Mid Clouds		Cover: Few (1.64%)  Altitude: 2.08 (km) Phase: 557.83 (K) Opacity: Transparent	No Clouds 	Isolated Cover: 19.38%  Altitude: 2.48 (km) Water 277.9 Phase: (K) Opacity: Translucent
Low Clouds	 Cumulus Cover: Scattered (25-50%)  Opacity: Opaque	Cover: Scattered 26.23%  Altitude: 0.91 (km) Phase: 564.39 (K) Opacity: Transparent	Cover: Scattered 42.65%  Altitude: 0.98 (km) Phase: Ice/Water Mix 286.09 (K) Opacity: Transparent	Scattered Cover: 36.65%  Altitude: 1.43 (km) Water 283.08 Phase: (K) Opacity: Translucent
GLOBE Cloud Photos and Corresponding NASA Satellite Images.	<b>GLOBE Photos</b> North East South  West Up Down  Note: Photos submitted though GLOBE need approval before being displayed, this may take a few days.	<b>METEOSAT-10</b> <a href="#">Visible</a>  <a href="#">Infrared</a>  <a href="#">GEO Tutorial</a>	<b>MODIS Terra</b> <a href="#">Worldview</a>  <a href="#">Worldview Tutorial</a>	<b>VIIRS NOAA-20</b> <a href="#">Worldview</a>  <a href="#">Worldview Tutorial</a>
Sky Conditions, Surface Conditions and Observer Comments	<b>Sky Conditions</b> Sky Visibility : Clear Sky Color : Blue  <b>Surface Conditions</b> Snowice : No Standing Water : No Muddy : No Dry Ground : No Leaves on Trees : Yes Raining or Snowing : No	Are there any comments you would like to add? Be sure to add the name of the satellite for our record. <div style="border: 1px solid black; height: 100px; width: 100%;"></div> <div style="text-align: right;"><a href="#">Submit Comment</a></div>		

User feedback from:

- Interns who use screen readers
- Community members from the 2023 GLOBE Annual Meeting



Group photo of attendees at the 2023 GLOBE Annual Meeting

# NASA Langley Open House 2023



GLOBE and My NASA Data area  
with Clouds Corn Hole Activity



# NASA Langley Open House 2023 / Hispanic Families Engagement

Parent Quote:

*One of the most interesting things is to see that the children can dream that it's not a limiting factor, that they are Hispanic; they can also be there (NASA) one day. To see so many Hispanics at NASA, it not only makes us feel proud but it is a source of inspiration that they too can one day achieve their own dreams.*



Collaboration with NASA funded program Engaging Hispanic Communities to do a special tour showcasing Acting Deputy Center Director Lisa Ziehmman and members of the HEAC ERG.



# GLOBE Eclipse Challenge: Clouds and Our Solar-Powered Earth

15 March – 15 April 2024


Collected:


- 23,000 cloud observations
- 25,444 satellite comparisons

With observations from over 90 countries



The Sun drives many processes in Earth's atmosphere.


National Aeronautics and Space Administration 



**Air Temperature**  
Energy from the Sun warms the surface of the Earth. Warmth from the Earth's surface heats the surrounding air, causing it to rise.


**Clouds**  
Warm air cools as it rises, and water vapor condenses into puffy cumulus clouds.


**Wind**  
Changes in temperature drive differences in air pressure, causing wind to form.



How will the eclipse affect these solar-powered processes?

Share your eclipse observations using the GLOBE Observer app.  
Learn more at [observer.globe.gov/eclipse](https://observer.globe.gov/eclipse)

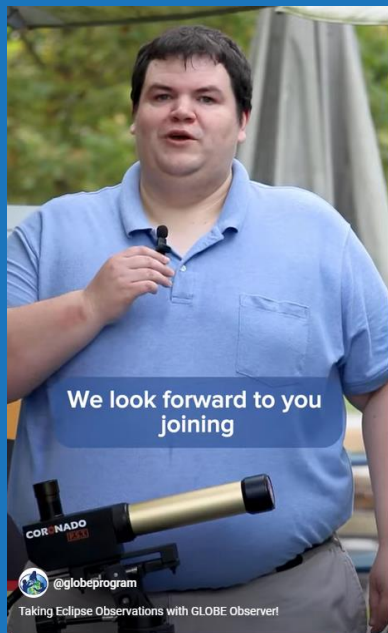
 **GLOBE Observer**  
the app of THE GLOBE PROGRAM



nasa.gov

# GLOBE Eclipse Challenge Special Thanks

Dr. Brant Dodson &  
NASA Skywatchers



Dr. Patrick Taylor



Dr. Sergio Sejas

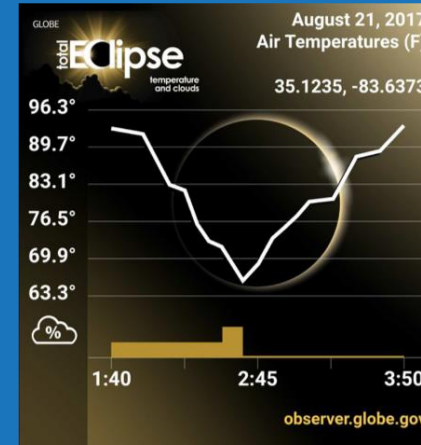


Dr. Brad Hegyi



# Solar Eclipses 2023 and 2024 Data Collection

## 14 October 2023 (annular) and 8 April 2024 (total)



In the Eclipse Tool: Participants collect air temperature and clouds before and after maximum.

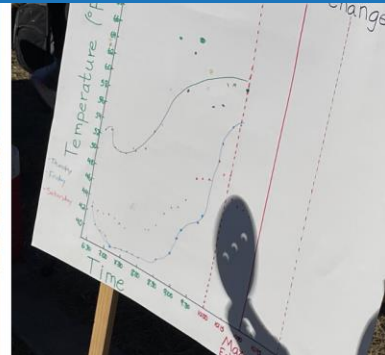
\*Dodson et al., 2019, Eclipse Across America: Citizen Science Observations of the 21 August 2017 Total Solar Eclipse  
<https://doi.org/10.1175/JAMC-D-18-0297.1>

# Annular Solar Eclipse – 14 October 2023



The team was part of the NASA footprint at the 2023 Albuquerque Balloon Fiesta event (900,000 people) during the Annular Solar.

**Air temperature measurements: 17,000**  
**Cloud measurements: 2,100**



# Total Solar Eclipse – 8 April 2024

## Events and Engagements

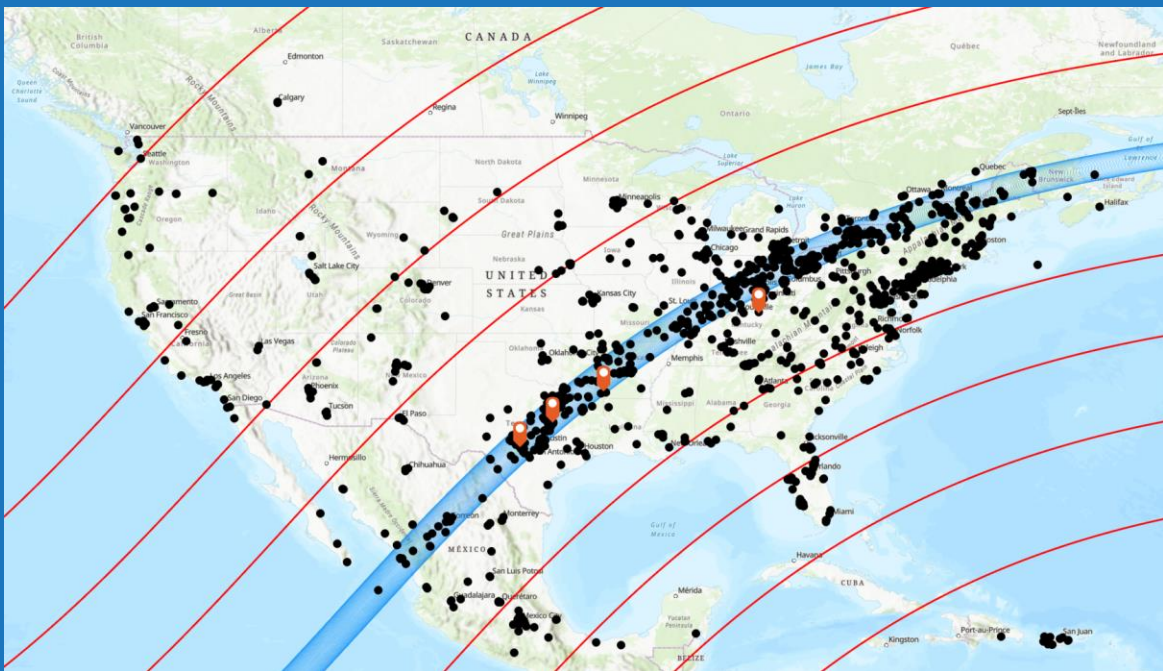
- Products and Videos in English and Spanish
- Scientific Presentations (poster and NASA Hyperwall talks) at the American Meteorological Society's Annual Meeting
- 5-week GLOBE Eclipse Workshop for U.S. Educators

## Participants

- Air Temp Measurements:
  - **34K+** (2.3 times the previous 3-day average)
- Clouds Measurements:
  - **10K+** (13 times the previous 3-day average)
- **Accounts for over half of all the data contributed to NASA citizen science projects!**



# Preliminary Results



 = % totality lines, 20% increments

 = path of totality

 = GLOBE Observation site

 = city study sites/ASOS stations

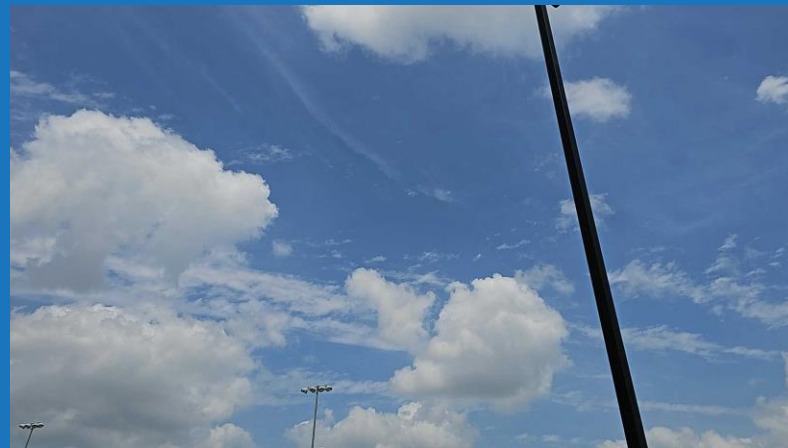
- First focus: 4 major cities (pop. >10k) with notable cloud changes (type or percentage)
- Kerrville, TX (primarily hot-humid)
- Waco, TX (primarily hot-humid)
- Texarkana, TX/AR (primarily hot-humid)
- Georgetown, KY (primarily mixed-humid)

# Preliminary Results

- Generally, citizen scientists reported lower cloud coverage than the nearby ASOS site, but agreed with the satellite match report
- Kerrville, Waco, and Texarkana (all in path of totality) citizen scientists reported cloud coverage decreases as totality approached, and increases post-eclipse
- Contrail reports increased as the partial eclipse started & continued
- Noticeable temperature decreases at local eclipse max



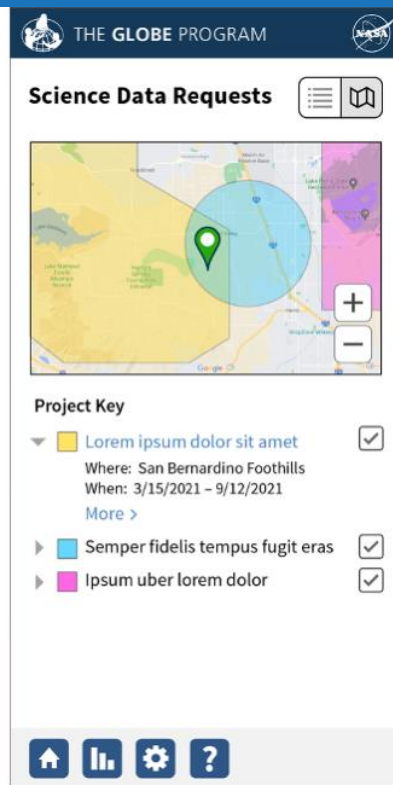
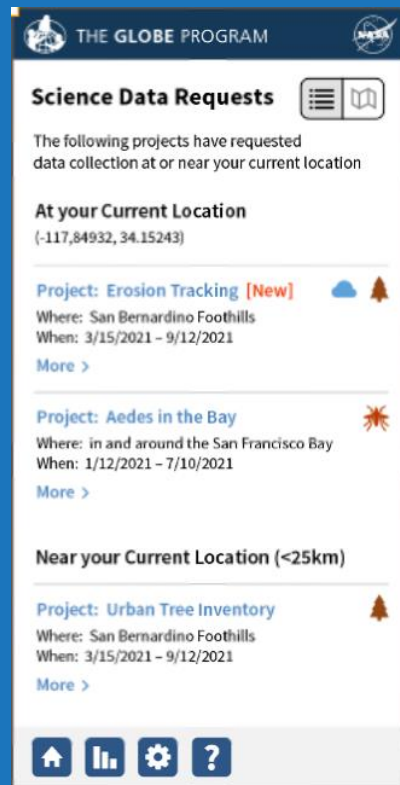
Waco, TX; during partial, before local max



Waco, TX; same location, 30 min later, 25 min before max

# Opportunities for You

- Requesting Data Collection (Geofencing) - only available in the US
- Suggest ideas for Data Challenges
- Use the Data





# GLOBE Clouds Team



**Jessica Taylor**  
Principal  
Investigator



**Tina Rogerson**  
Data Manager



**Rosalba  
Giarratano**  
Education  
Specialist



**Marilé  
Colón Robles**  
Project  
Scientist



**Ashlee Autore**  
Research  
Support