



National Aeronautics and
Space Administration



GLOBE

Global Learning & Observations to Benefit the Environment

globe.gov and observer.globe.gov

 @NASAGO

Citizen Science Data Quality: The GLOBE Program

January 8, 2019

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THE GLOBE PROGRAM

GLOBE Program

Global Learning & Observations to Benefit the Environment (GLOBE)



GLOBE by numbers

Since 1995

50+ environmental parameters

122 countries

41,000 schools

200,000 citizen scientists

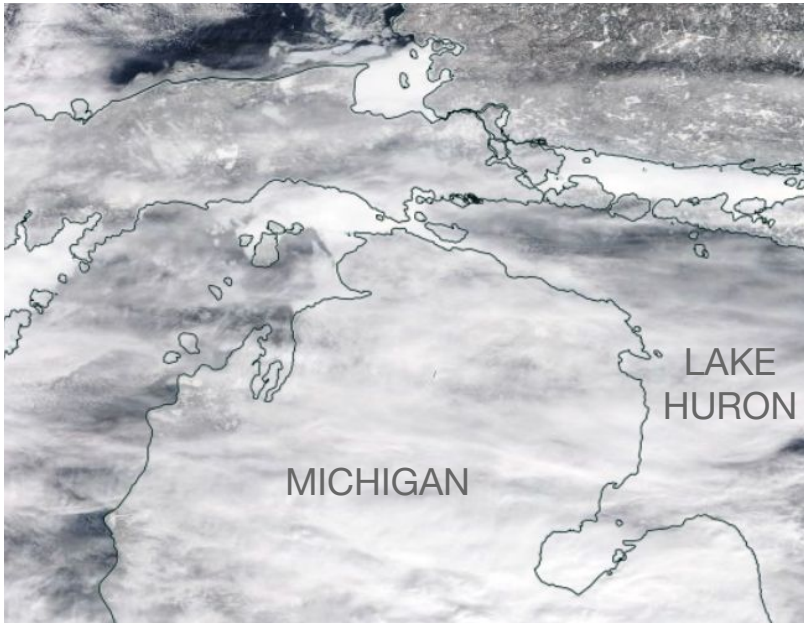
271,000 account holders

195 million measurements

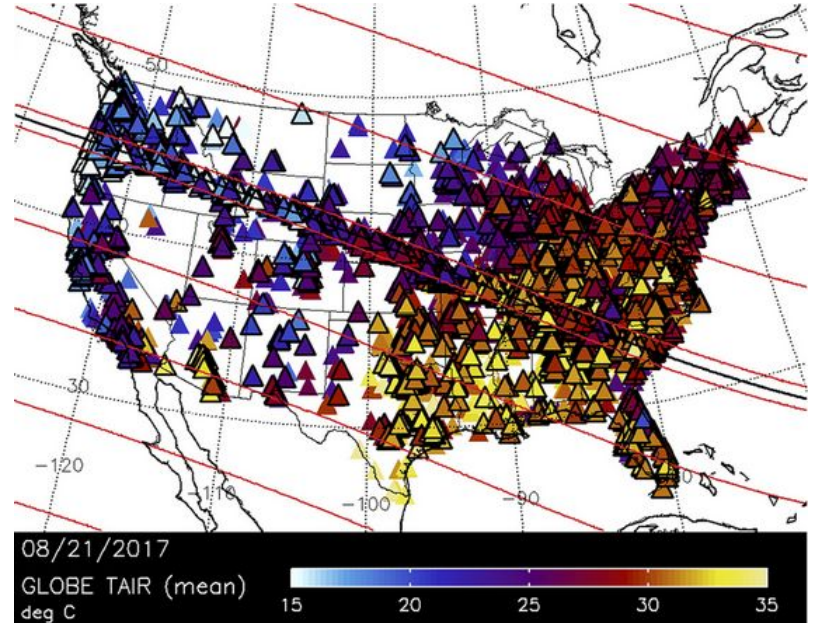


23rd GLOBE Annual Meeting, Detroit, Michigan, USA, July 2019

Research applications of GLOBE data

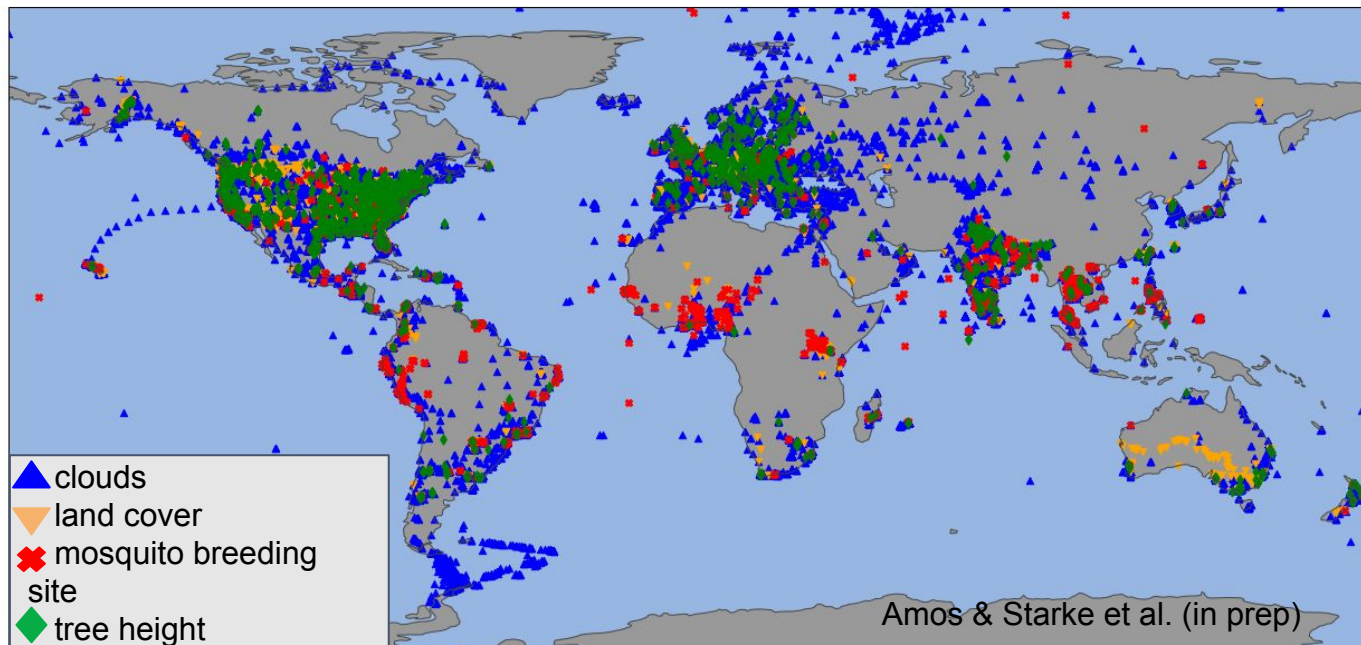


Ault et al., 2006, *Remote Sens. Environ.*



Dodson et al., 2019, *J. Appl. Meteor. Clim.*

39 million observations since 2017 +450,000 of which from Mobile App



GLOBE data are available to everyone: globe.gov/globe-data

Who is collecting data?

Teachers & Students



Citizen Scientists



How are data collected and entered?

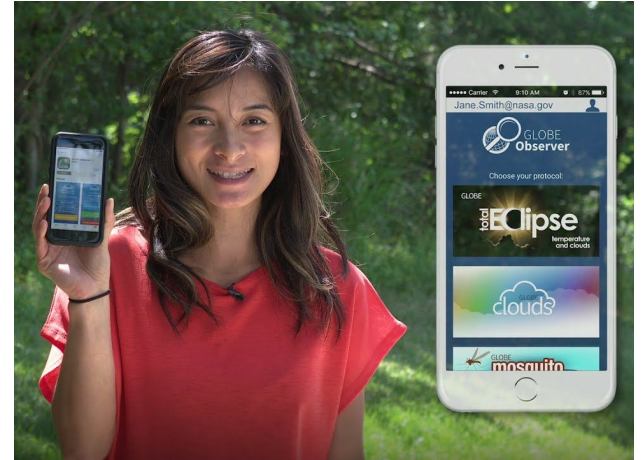
Automated
Stations & Loggers



Manual



Mobile app



Data are collected using standardized protocols

Hydrosphere

Alkalinity
Conductivity
Dissolved Oxygen
Macroinvertebrates
☑ Mosquitoes
Nitrate
pH
Salinity
Water Temperature
Water Transparency



Biosphere

Biometry
☑ Tree Height
Carbon Cycle
Green Up
Green Down
☑ Land Cover
Lilac Phenology
Pheno. Gardens



Pedosphere

Bulk Density
Particle Size Dist.
Particle Density
pH
Soil Characterization
Soil Fertility
Soil Moisture
Soil Infiltration
Soil Temperature
Frost Tube



Atmosphere

Aerosols
☑ Clouds
☑ Air Pressure
Precipitation
☑ Relative Humidity
Surf. Temperature
☑ Air Temperature
Water Vapor



View GLOBE protocols: globe.gov/do-globe/globe-spheres

Participants must complete training before contributing data

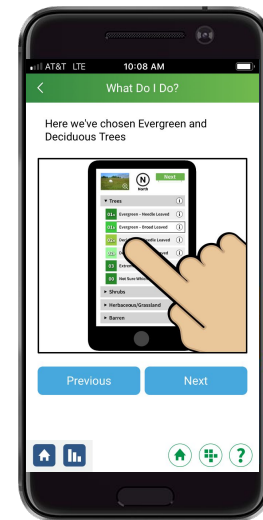
In-Person



Online



In the app



globe.gov/get-trained

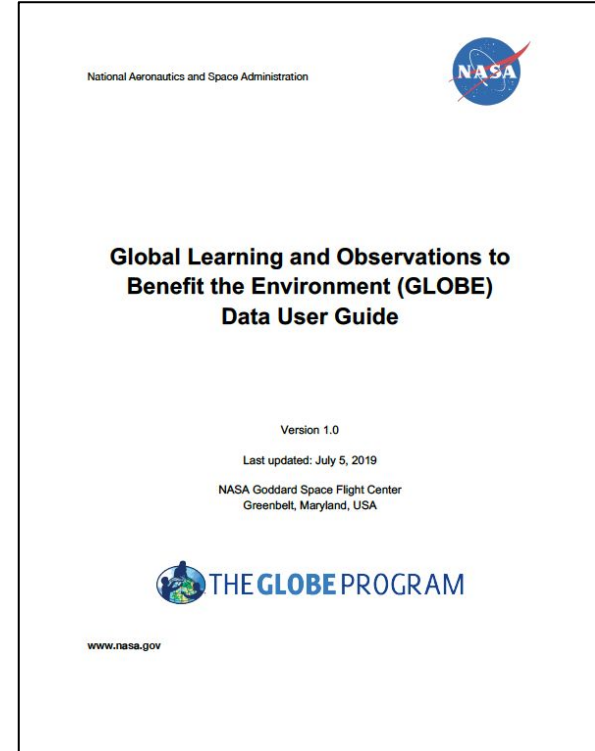
Technical documentation

User guide released July 2019

To help scientists and researchers understand, access, and use available GLOBE data.

PDF available

globe.gov/globe-data/globe-data-user-guide



Data Quality Assurance

Standardized
Protocols

Participant
Training

Range &
Logic
Checks

Photo
Approval

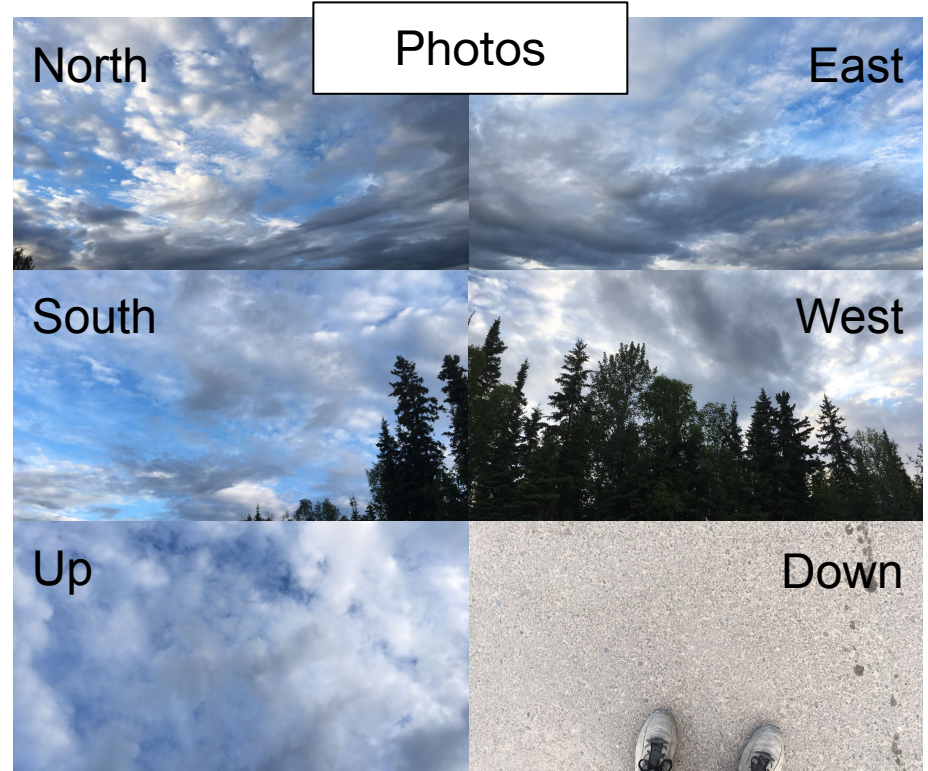
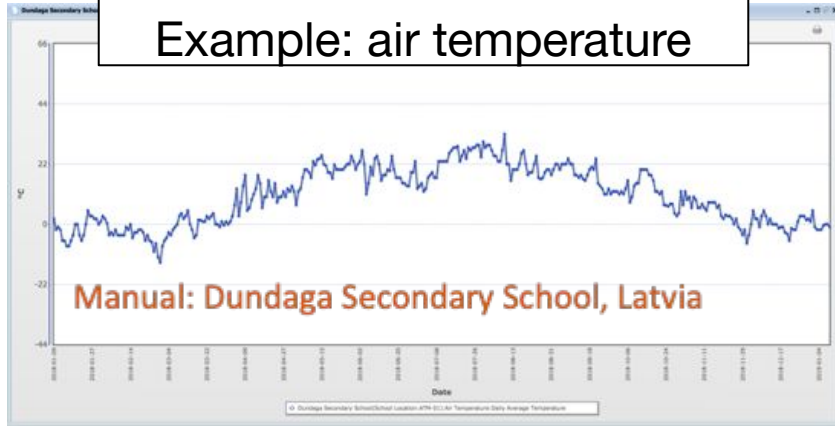
When protocols for collecting data are well written, instruments are of good quality, and range checks are put into place then the data collected is that of “research grade data” (Lawless and Rock 1998)

Lawless, J. G., and B. N. Rock, 1998: Student Scientist Partnerships and Data Quality. *Journal of Science Education and Technology*, 7, 5–13, doi:[10.1023/A:1022575914118](https://doi.org/10.1023/A:1022575914118).



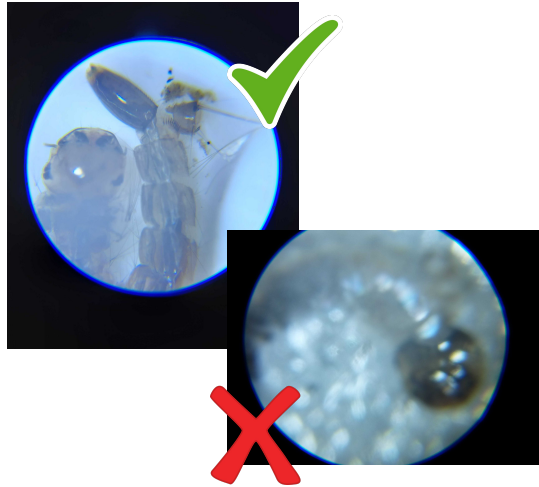
What kinds of data have to be quality controlled?

Discrete data
Example: air temperature

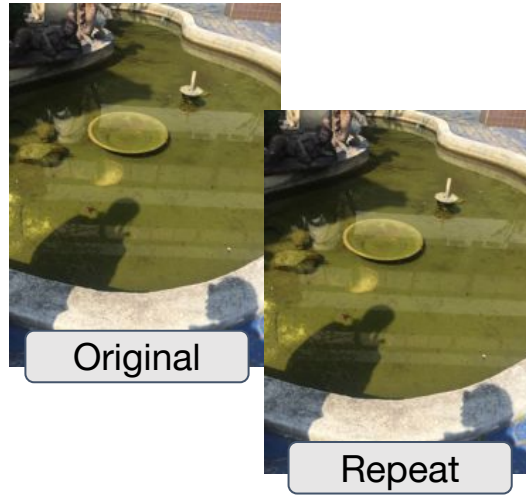


QA/QC: recent exploratory work

Blurry photo detection



Repeat photo detection

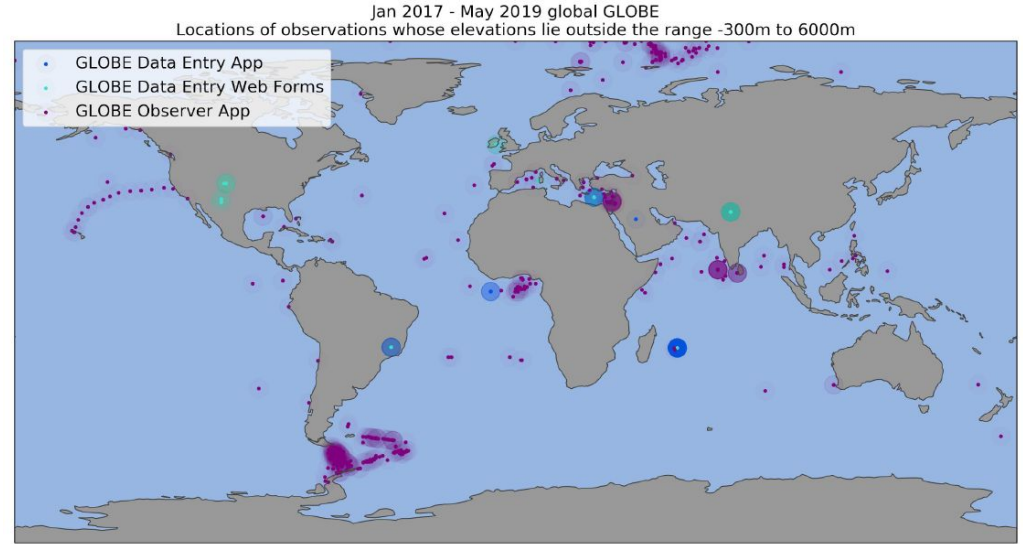
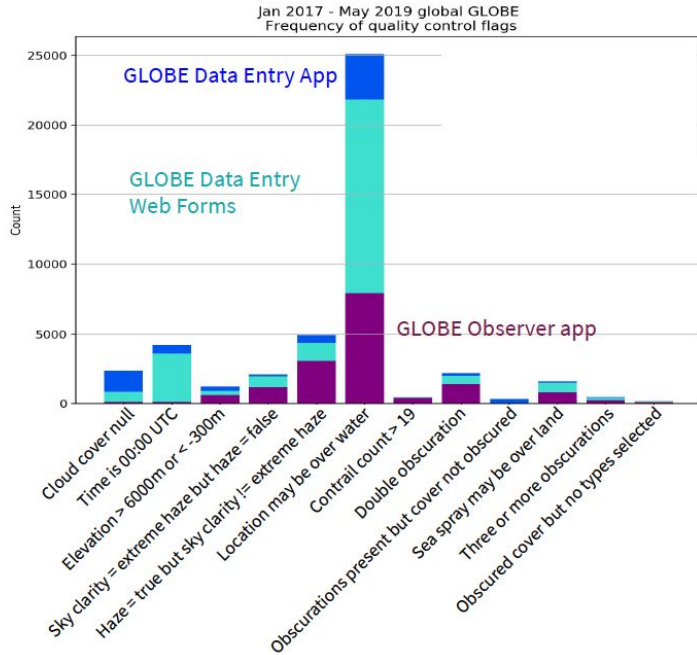


Email intervention



Credit: K. Arica, H. Amos, E. Podest, M. Colón Robles, T. Rogerson

QA/QC: recent exploratory work



Credit: M. Starke, H. Amos, M. Colón Robles, T. Rogerson


Summary

GLOBE is a worldwide community of students, teachers, scientists, and citizen scientists


GLOBE's quality assurance is multi-faceted: standardized protocols, training, range & logic checks on data

GLOBE data are freely available to everyone at globe.gov/globe-data

Upcoming virtual training on Jan 23



A map of the African continent is shown on the left side of the slide. Numerous small, square images are overlaid on the map, representing various GLOBE data points collected from different locations across the continent. The images show diverse landscapes, including fields, forests, and urban areas.


National Aeronautics and Space Administration 

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<https://globe.gov> and <https://observer.globe.gov>
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**GLOBE Data Fundamentals:
Training 1**

January 23, 2020

Questions? help@globe.gov

 **THE GLOBE PROGRAM**

Register here: <http://bit.ly/GLOBE-Data>

Stay connected with GLOBE

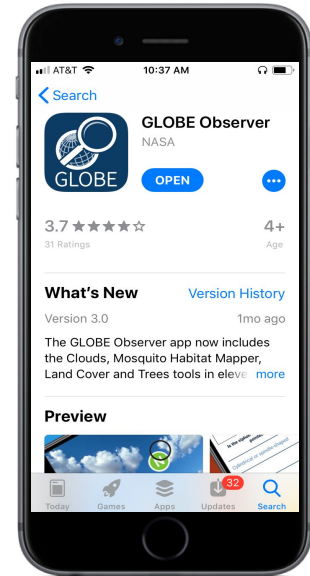
Join our listserv for scientists and researchers using GLOBE data

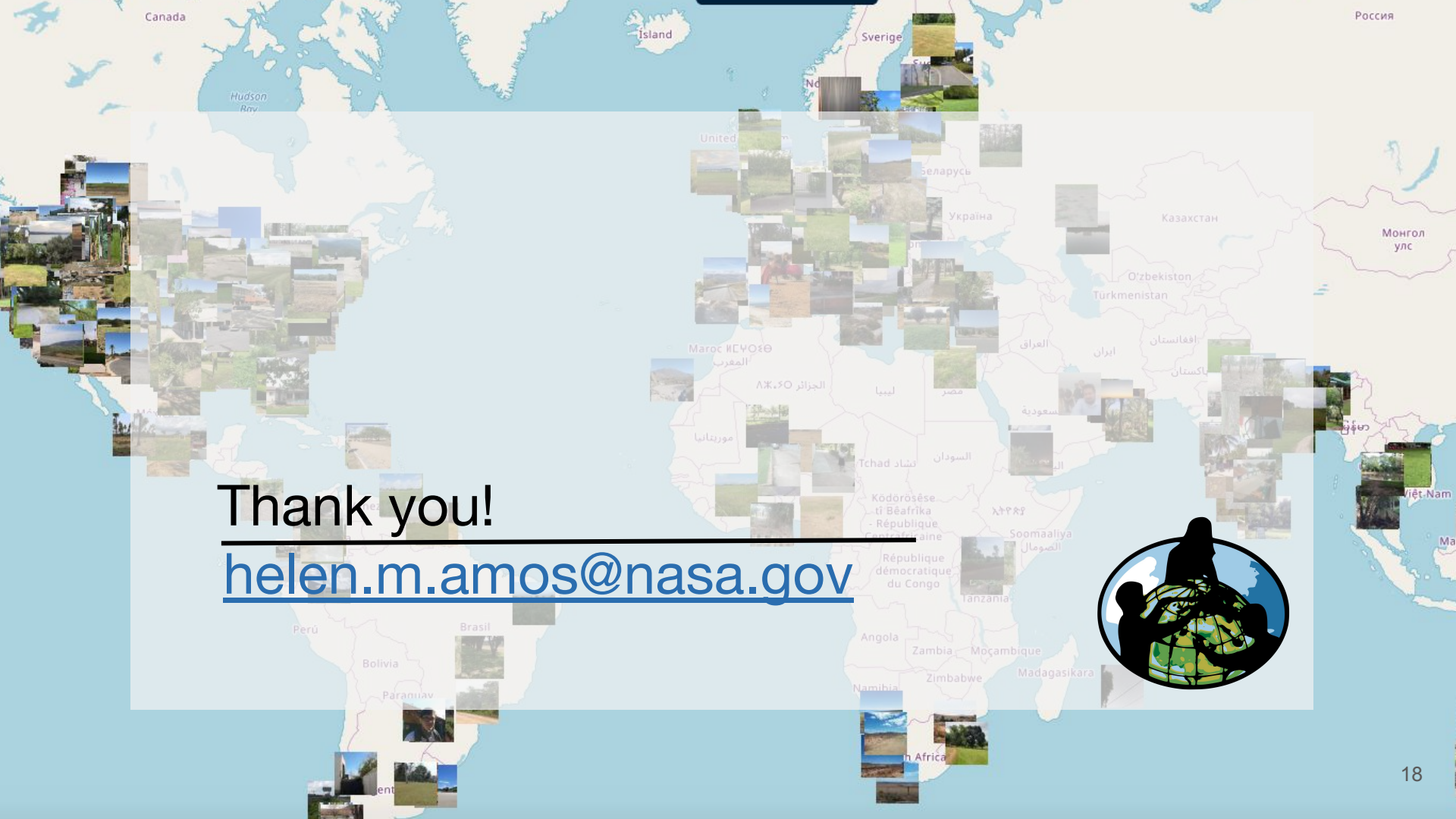
<https://lists.nasa.gov/mailman/listinfo/go-sci>

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Download the app!





Thank you!

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