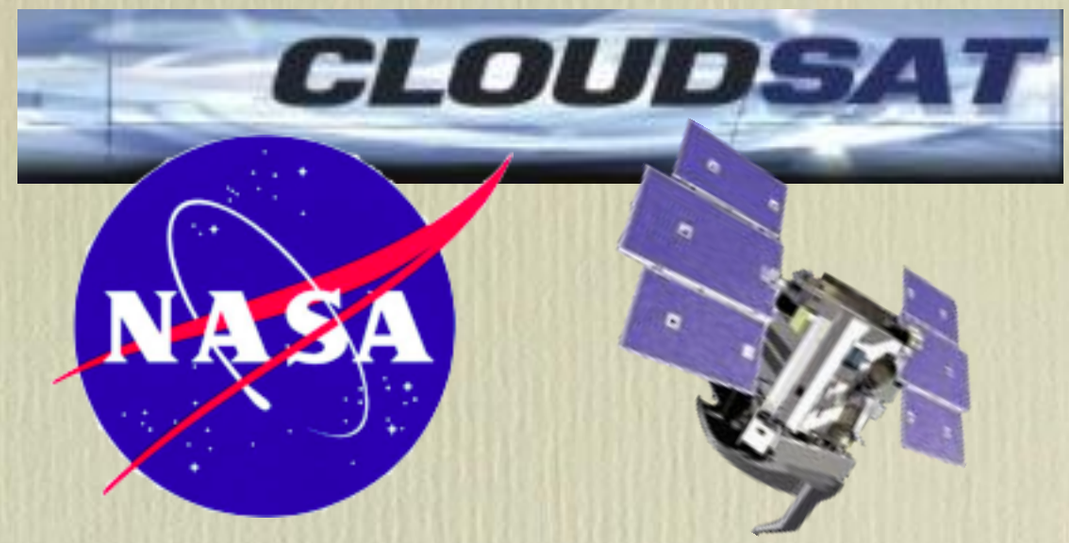


GLOBE and the CloudSat Education Network:

Partners for Atmospheric Inquiry

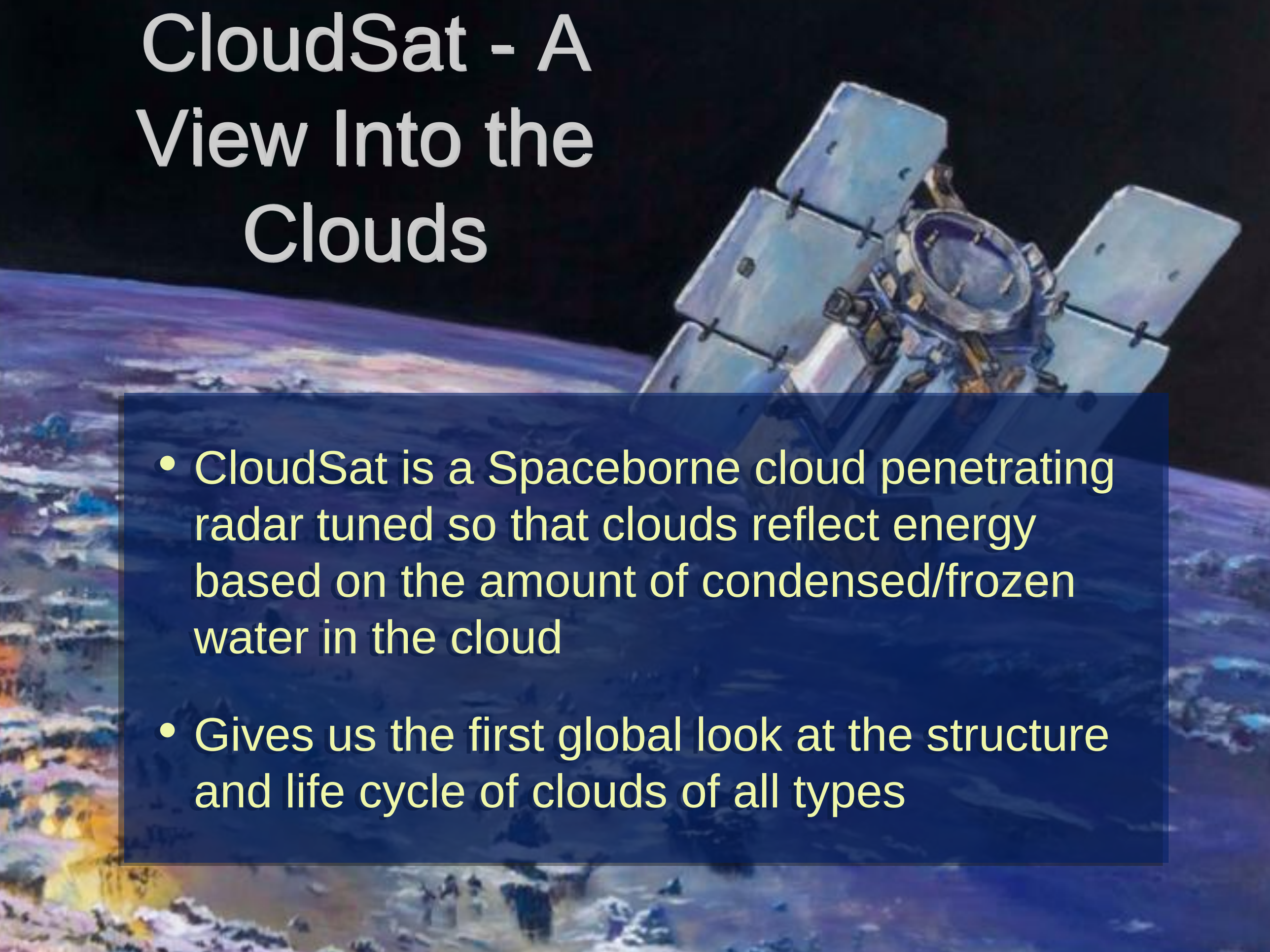
Todd D. Ellis[1] and Deanna TeBockhorst[2]
CloudSat Education Network
[1]SUNY College at Oneonta, Oneonta, NY
[2]Colorado State University, Fort Collins, CO

Who we are

Deanna TeBockhorst
•Classroom teacher
•Science Facilitator
Museum educator
•GLOBE teacher, trainer, partner since 1996

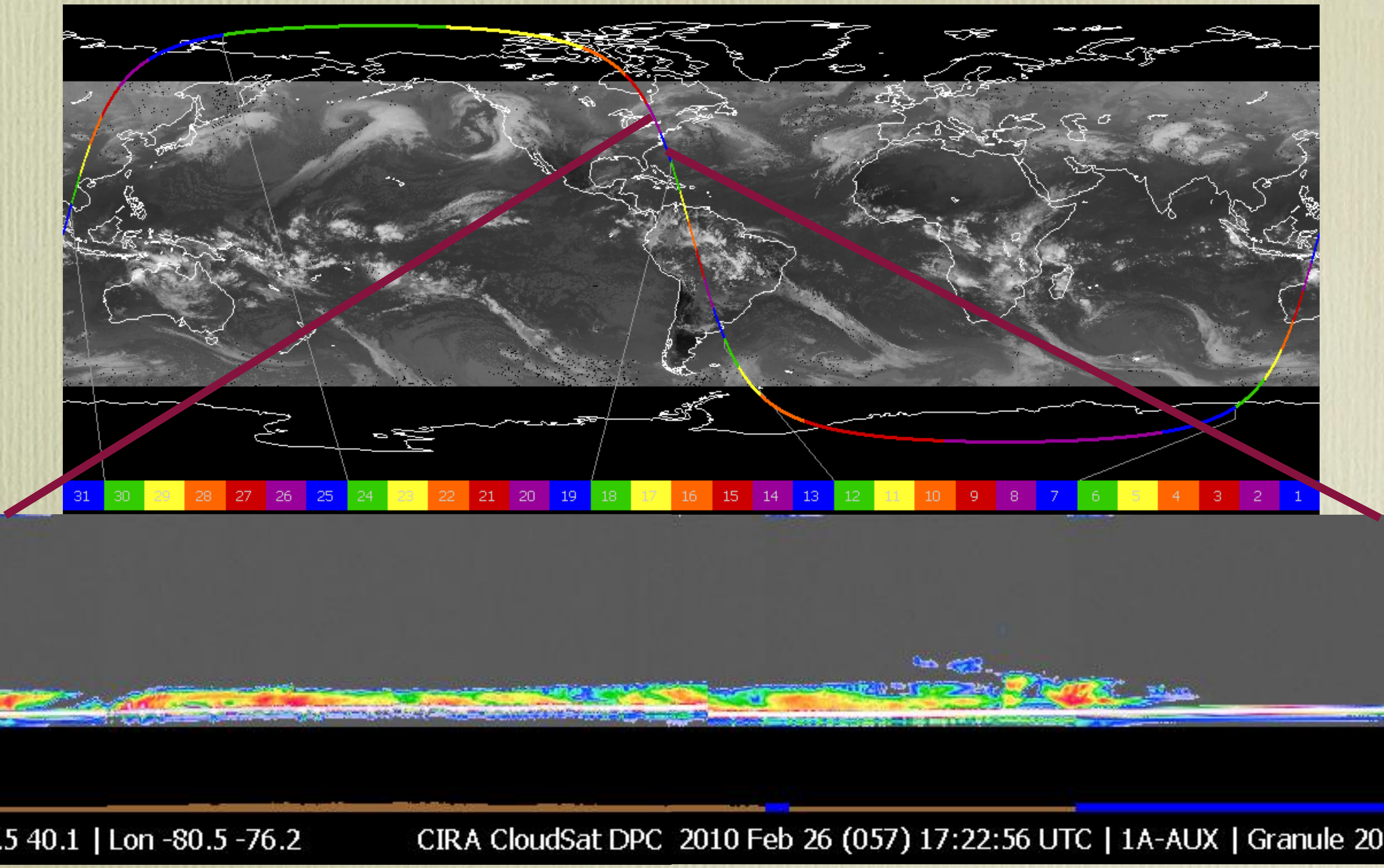
Todd Ellis
•Assistant Professor of Meteorology
•PI, NSF CCLI grant on using data in classrooms
•GLOBE trainer since 2008 partner since 2009

CloudSat - A View Into the Clouds



- CloudSat is a Spaceborne cloud penetrating radar tuned so that clouds reflect energy based on the amount of condensed/frozen water in the cloud
- Gives us the first global look at the structure and life cycle of clouds of all types

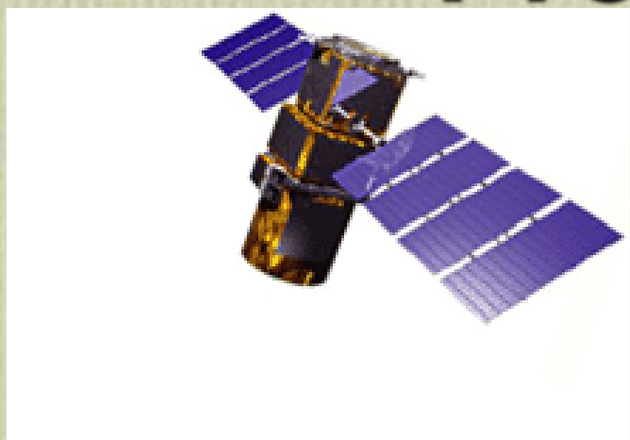
CloudSat in Action

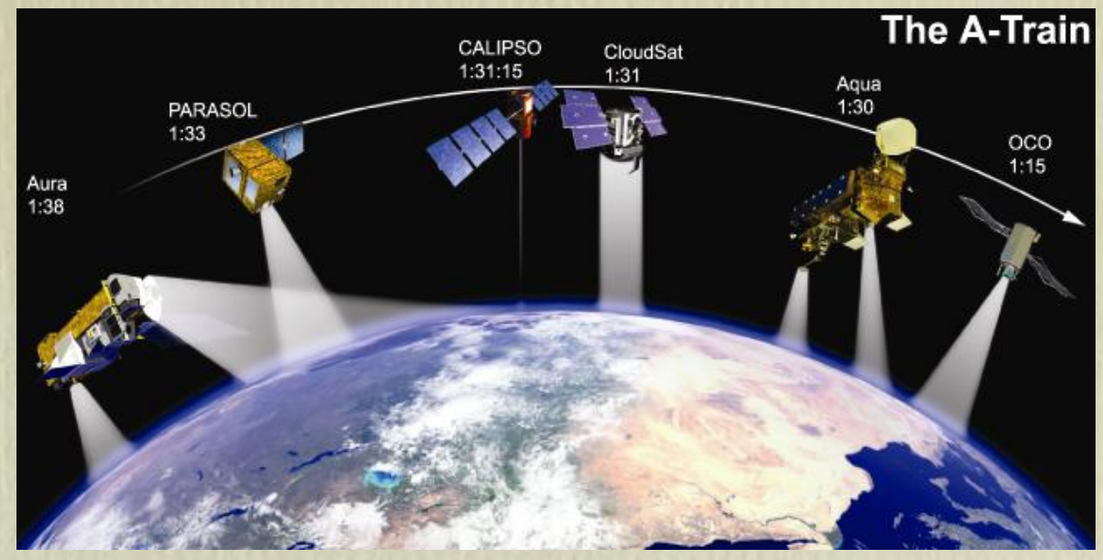


The Mission of the CEN

- The CloudSat Education Network has two main missions
  - To recruit, support, and maintain a cadre of schools around the world who observe atmospheric protocols to help validate CloudSat's cloud identification product
  - To provide high quality Education and Public Outreach on behalf of NASA, JPL, and the CloudSat mission through school visits and conference attendance
- To that we've recently moved toward one more
  - To increase to amount of science inquiry and use of NASA and GLOBE data among our schools

GLOBE NASA Earth System Science Projects





GLOBE teams with many NASA ESSP Satellite Missions

The GLOBE Program

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CALIPSO and CloudSat Education and Public Outreach programs partner with GLOBE and NASA CONNECT

The Education and Public Outreach programs for two of NASA's A-Train satellites, CALIPSO and CloudSat, partnered with NASA CONNECT (250,000 registered educators with 8.7 million students from 87 countries) to produce a show titled *The A-Train Express* . In the show students learned how weather affects their daily lives and just what the difference is between weather and climate. The students were also introduced to two of NASA's earth science satellite missions CALIPSO and CloudSat.

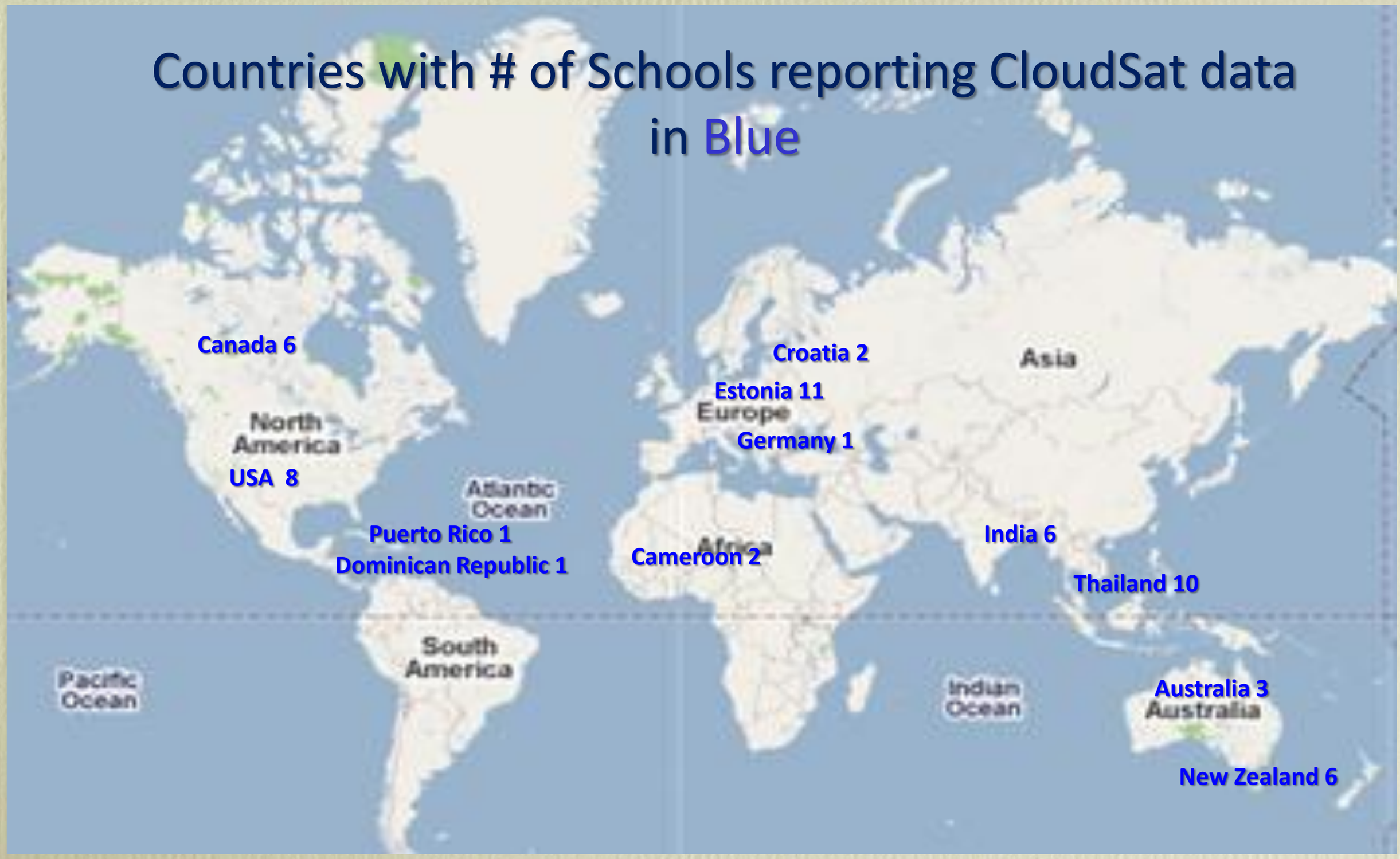
NASA CONNECT films students at the School of International Studies at Meadowbrooke, in Norfolk Virginia, for a video titled "The A-Train Express". The video includes students in the U.S. and France participating in taking sun photometer measurements for CALIPSO and cloud observations for CloudSat, which are then reported at the GLOBE website.

What makes a CEN school?

- They are GLOBE trained in Atmospheric Protocols and have reported for at least 3 months
- They are provided with additional training on observing cloud types and amount, and we assist them in identifying overpasses
- They are asked to report sky cover in quadrants, take digital images of quadrants and with an all-sky mirror, report one-hour precipitation prior to overpass in addition to normal GLOBE observations

CloudSat and GLOBE

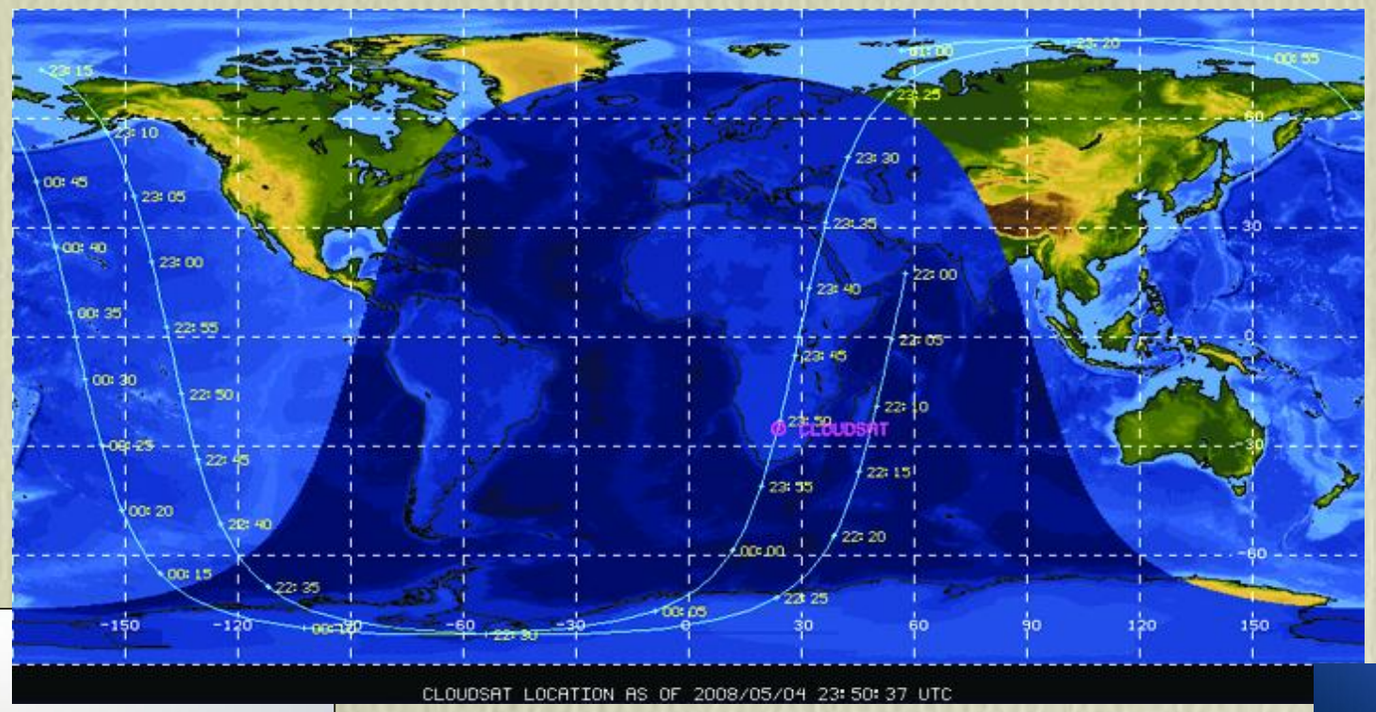
CloudSat Education Network: 57 GLOBE Schools in 11 countries
More that 1100 data Reports since April, 2006 CloudSat launch.



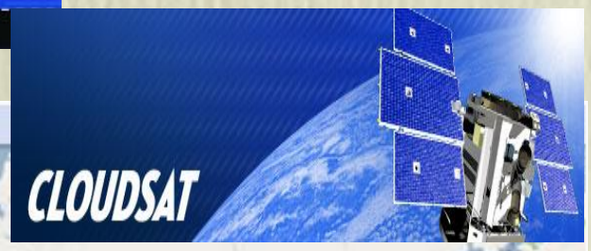
CloudSat and GLOBE

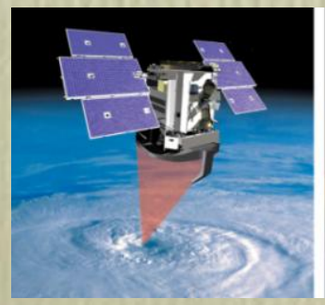
CloudSat Education Network: 56 GLOBE Schools in 11 countries

GLOBE students make cloud observations and collect data for their research as well as provide ground-based observations to CloudSat scientists.



Every 16 days, after 233 revolutions of the Earth, CloudSat crosses the equator at exactly the same geographic longitude as it did before.





CEN and Inquiry

- We encourage, train, and support our schools to use their data as part of participation in CEN
- CEN Schools in Thailand, India, Germany/Estonia, and Australia hold conferences where students discuss and present research findings using their observations, CloudSat obs, and GLOBE data
- Assisting with a sister cities collaboration between Estes Park, CO and Monteverde, CR

New Directions for CEN and GLOBE

- Training for using CEN, NASA, GLOBE data in classroom, especially related to clouds
- Coupling CEN/GLOBE observations to remote sensing data for schools in CEN
- Encouraging more inquiry - training on how to ask answerable scientific questions
- Increasing our footprint in the Eastern U.S. - SUNY Oneonta GLOBE partnership

For More Information

- We will be at the NASA booth most days this week
- Go to http://cloudsat.atmos.colostate.edu
- Email ellistd@oneonta.edu or deanna@atmos.colostate.edu