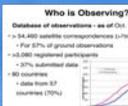




The CERES S'COOL Project



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The S'COOL Project is the EPO arm of the CERES mission and involves students (ages 5-20+) in real science, **making and reporting ground truth observations of clouds** to assist in the validation of NASA's CERES satellite instruments from a **fixed location**.

Participants 1) obtain satellite overpass schedules, 2) observe and report clouds within +/-15 minutes of the satellite's passage, 3) compare and classify the agreement between the ground and satellite views.

States "Top Five"

WA	23%
CA	9%
IA	9%
PR	9%
HI	9%

Countries "Top Five"

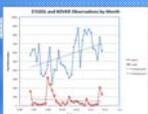
US	50%
Colombia	21%
Argentina	9%
France	9%
Taiwan	4%

A S'COOL ROVER

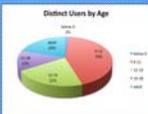
2

ROVER cloud observers are observations made from a **non-permanent** (i.e., roving) observation site, such as a **field trip, vacation**, or just an occasional observation from your **backyard**. The ROVER project is aimed at the Citizen scientist population of observers

We welcome participation from any interested observers, especially from **places where official weather observations are few and far between**.



Plot to the left shows both S'COOL and ROVER observations by month. Spikes in Rover observations possibly result from rovers "lumping" data on a single occasion (i.e., Roz Savage and the Around the Americas)



Plot to the left shows the breakdown of Rovers by age-band. An age-band is selected when a Rover creates a unique nickname to report data.

Rover Facts:

- Distinct Rovers: 337
- Total Rover Observations: 2284
- Rover Satellite Match: 793 (35%)
- S'COOL Satellite Match (Since Rover inception): 3102 (56%)

Rover Observations

Roz Savage

Solo in a 23-foot row boat, Roz Savage aims at bringing attention to a greener future for the world.

Prior to leaving on her journey Roz will get a **satellite overpass predictor** to determine the best time to observe the clouds overhead (+/- 15 min of overpass).

With her ability to make satellite matching **cloud observations over water** we are able to gather cloud data from locations in which ground validation would be nearly impossible.



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5 Lessons Learned

• Citizen scientists are a **great source for data collection** due to their **unique observation locations and ability to accurately observe clouds**.

• Spending **more time promoting the ROVER project** might allow for more data points to be gathered from non-permanent observation locations.

• Even though getting an accurate **satellite overpass schedule is difficult for some Rovers** they are still able to **make the temporal match** with the satellite 35% of the time.

• Certain Rovers submit all of their observations at one time, making it **difficult to analyze the rate of growth for the project due to the outliers in the plotting**.

• Due to remoteness of some Rover locations (oceans) it is **difficult to send them support materials** (cloud charts and satellite overpass hard copy).

Direction

• With the increasing popularity of mobile devices, **cloud identification applications** would make it easier to **bring tools and reporting methods to the field**.

• The availability of mobile applications and/or mobile optimized content has the **ability to bring in a new user base and retain current observers**.

• Continued collaborations and promotion of the Rover project have the ability to add much needed data points from unique locations, helping cloud computing progress.



Rover Observations Around the Americas

• The Around the Americas event was a **25,000 mile sailing circumnavigation of the American continents** with the mission of inspiring, educating, and engaging citizens of the Americas to protect our fragile oceans.

• While on this journey around the Americas several scientists took on the task of a cloud observer. When possible, **cloud observations were taken twice a day and kept in a journal**. When there was an internet connection available, these **reports were sent to the S'COOL team via online report form and entered in the database**.

• One of the things that made this voyage so important to the CERES S'COOL project is that nearly all of the observations were taken from the **water, locations in which permanent observations would be nearly impossible**.



Above is an example of an observation taken just off the coast of Brazil. Once the observation is reported to the ROVER database, a cloud match will be generated, if available, allowing the observer to see what the satellite observed and to view a MODIS image of the observation location. In this observation example, the low cloud cover possibly inhibited any view of mid or upper level clouds.

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