Updates on GLOBE Clouds

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Citizen Science Cloud Observations
• In January, GLOBE and S’COOL programs formally started to merge.

• GLOBE Cloud Observers started receiving cloud satellite matches, when their observations correspond to an overpass.
CERES S'COOL PROJECT UPDATE
The Evolution and Value of a Long-Running Education Project with a Foundation in NASA Earth Science Missions

Since 1997, S'COOL has engaged interested participants worldwide in observing clouds and comparing data from ground and satellite sources to inform validation efforts for several NASA Earth science missions.

Scientists are increasingly interested in cloud-bounding data but there are no consistent accuracy assessments. Recent observations suggest that clouds contain more information than previously thought. Understanding cloud properties is essential for modeling climate and weather. Ground-based cloud observations are valuable, but they are limited in scope and require significant expertise. Satellite observations provide a complementary perspective, but they are subject to limitations in spatial and temporal coverage. Combining ground and satellite observations can provide a more complete picture of cloud properties.

The S'COOL project, introduced at the 1997 Conference on Clouds and the Earth's Radiant Energy System (CERES), provides a platform for teachers and students to participate in this important scientific endeavor. The project encourages teachers and students to observe and record cloud properties, such as type, coverage, and height, and to use these observations to evaluate the accuracy of satellite cloud data.

The S'COOL project has evolved over the years, incorporating new technologies and expand its reach. The project now includes a variety of activities, including field observations, satellite data analysis, and educational resources. The project has engaged thousands of students and teachers worldwide, providing a valuable educational and research tool.

Fig. 6. The CERES MODIS optical depth retrieval distribution as a function of the three S'COOL observer cloud opacity categories: (a) opaque, (b) translucent, and (c) transparent. The opaque, translucent, and transparent categories are based on the mean optical depth (τ) and the peak in percent occurrence shifts towards a lower optical depth value from (a) to (c). The peak at 0.76 optical depth for the transparent and translucent categories is in agreement with the matching process and does not reflect a deficiency in observer skill.

Fig. 7. CCGD cloud map where blue, white, and red indicate cloud cover as observed by the S'COOL observers. The hatched overlay indicates the cloud height category reported by the S'COOL observers. (a) A case where the S'COOL observers accurately reported a single high cloud layer. (b) A case where the S'COOL observers were unable to resolve the multiple cloud layers. The overlay shows the observed cloud height and the corresponding satellite cloud layer.
• GLOBE Observer app identifies overpass times based on your lat/lon
• Allows you to set alarms for overpass times
Cloud Observation Metrics

<table>
<thead>
<tr>
<th>Total Observations for 2017</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>GEO Satellite Matches</td>
<td>51,046</td>
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<tr>
<td>CERES Satellite Matches</td>
<td>10,036</td>
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<tr>
<td>CALIPSO Satellite Matches</td>
<td>36</td>
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<tr>
<td>Total Combined Satellite Matches for 2017</td>
<td>61,118</td>
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</tbody>
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* Metrics from Jan 1, 2017 – Sept 10, 2017
Eclipse Connections

- GLOBE Community submitted air temperature and cloud observations before, during, and after the eclipse

- Over 18,000 cloud observations made August 21st using GLOBE Observer
Clouds During the Eclipse

Over 18,000 clouds observations with more than 61,000 clouds photos submitted on 8/21
Want to Reach these Citizen Scientists?

We can help you:

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• Host a webinar
• Support outreach visits
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Air Temperature

Over 76,000 air temperature measurements reported