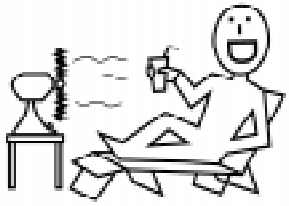

S'COOL BREEZE

Student's Cloud Observations On-Line

Volume 2 , Issue 4 December 2001

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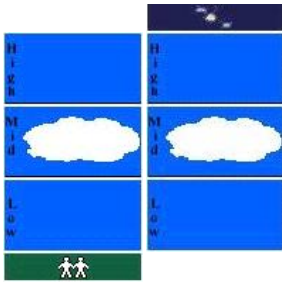


Perfect Match: Sissonville Elementary School, West Virginia on March 7, 2001. *http://scool.larc.nasa.gov/query_data.html*

Watching Clouds Change

by Lin Chambers

In the S'COOL Project, we ask you to make observations within +/- 5 minutes, or at most 15 minutes, of the time the CERES instrument passes over your location. This is because clouds can change quite rapidly, as anyone who has spent any time cloud watching knows. We need your observations at the same time the satellite views the clouds, so that we are comparing apples to apples.

We know that for many of you, observing clouds on the overpass schedule is a challenge. That problem will be somewhat alleviated as soon as the Aqua satellite launches, which will give you two (and sometimes four! - see FAQ) choices of overpass times each day. For those of you who teach multiple classes each day, there is also another option:

observing the diurnal cycle of clouds.

Diurnal cycle means the cycle of cloudiness over the course of the day. In many places and seasons there is a definite cycle of clouds. Sometimes clear mornings are followed by increasing clouds in the afternoon, possibly with thunderstorms in the evening. In other places, thick morning fog or clouds burn off during the course of the day, then reform at night. This is one of the challenges for CERES: how do we take a single daytime observation and use it to compute accurate daily, monthly, and annual average properties. Our own Dave Young leads this effort on CERES. It's called TISA: Time Interpolation and Spatial Averaging.

Your observations at times other than the overpass time can provide useful information to

(Continued on page 2)

March Matches

During the outage of the S'COOL website in October, a major event occurred: the first CERES data from the Terra spacecraft were processed and placed into the on-line S'COOL database. The time period processed was March 2001. By the time you receive this newsletter, April-June 2001 should also be in the S'COOL archive; however this is dependent on correction of one problem that was already discovered in the CERES cloud algorithm.

We invite you and your students to explore the S'COOL database, particularly now that additional satellite matching data are available - with more to come. One of the challenges of satellite data analysis is that it is impossible to look at every piece of data. We invite you, as members of the CERES validation team, to join us in examining these data. *Should you find interesting trends, we want to know!*

To get at the data, click on the "Observation Database" link at the bottom of the S'COOL website. You will then get a page where you can specify a search. For starters, we recommend clicking "Show me only my data" and the time period March 1-31, 2001.

(Continued on page 2)

Watching Clouds Change *(continued from page 1)*

the TISA effort. **If you wish to contribute, please do the following:**

1. Set up a consistent observation schedule for your day. The ideal schedule for our purposes would be an observation at the top of each hour. Even more preferred times are 0, 3, 6, 9, ... 21 Universal Time, because CERES will be producing maps at those times, in addition to hourly products. Even if you can only observe at one or a few of these times, the results will be of use.
2. Send a quick note describing your planned schedule to scool@larc.nasa.gov so we can make a list of schools reporting diurnal cycle information.
3. If at all possible, include at least one observation at an overpass time, which will change from day to day.
4. Submit all observations each day. On the report form, choose the satellite name for the observation at overpass time, choose "No selection" for the other observations.
5. Use your data, or that from other schools submitting multiple observations, to investigate the diurnal cycle of cloudiness in various parts of the world.

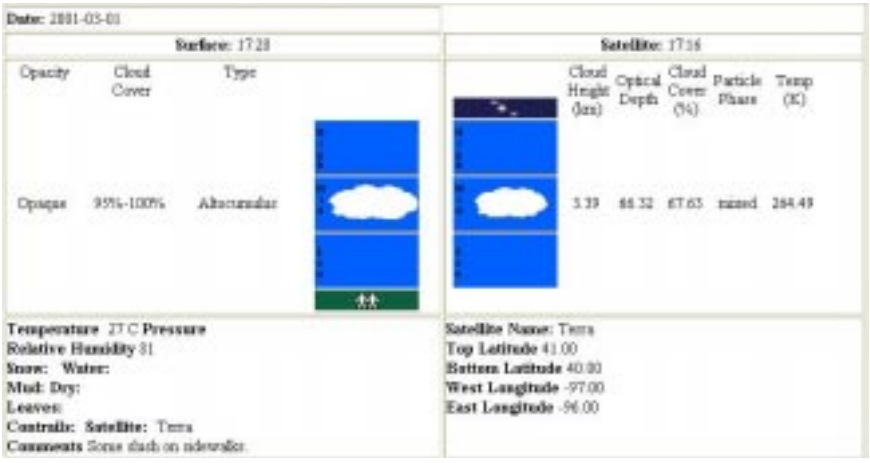
As with all S'COOL observations, observing the diurnal cycle is not required every day. We welcome your observations when they fit into your other classroom activities. And, if you need to set up a new schedule each school year, just send us a note to update our list.

For those who can only observe at the overpass time, you might still want to encourage your students to be aware of cloud changes through the course of the day by taking an occasional brief glance at the sky. And if you have a reason to do additional observations, **please send them in!**

"Diurnal cycle means the cycle of cloudiness over the course of the day. In many places and seasons there is a definite cycle of clouds."

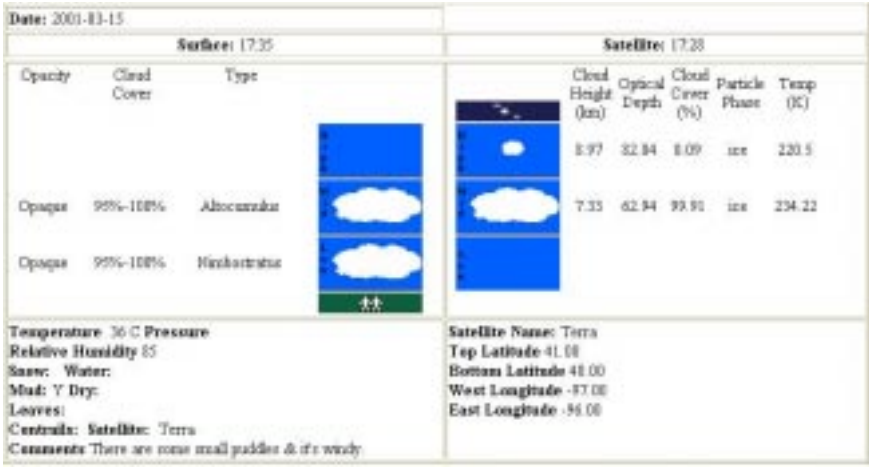
March Matches *(continued from page 1)*

An example for our observers from Cavett Elementary School in Lincoln, Nebraska, is shown. They observed twice during March, and both times satellite matching data are available.



⬅ **The first case on March 1** *is an example of excellent agreement between satellite and surface observers: cloud height and cloud cover agree, the cloud type is consistent with an ice phase cloud, and the visual opacity reported by the surface observers is entirely consistent with the optical depth reported by the satellite (>10 corresponds to opaque - see* ***http://scool.larc.nasa.gov/queryexample.html****).*

➡ **The second case on March 15** *is perhaps more interesting: the S'COOL observers report both low and mid-level opaque clouds, with the additional clue of recent rain (puddles). The satellite, on the other hand, reports a very small amount of high cloud over a thick and overcast mid-level cloud - but no low cloud! This is because the satellite cannot see through the mid-level cloud; yet based on the ground observation we know it is there.*



How often does this occur?

A thorough analysis of S'COOL/CERES matches may help us answer that question.

Sizing Up a Satellite

Just how big is the Terra Satellite?

It was compacted into the nosecone of the rocket but would it fit in our classroom?

Dimensions for the Terra Spacecraft . The Terra was fit snuggly into a tube with these measurements:

Diameter: 3. 5 m

Length: 6. 8 m

• Download a Paper Model of the satellite from the Terra site for students to assemble.
http://terra.nasa.gov/Publicationsterra_model.html

• Using the measurements above and the paper model, determine the approximate scale for this model. Try calculating the size of the attached solar panel.

Now, would the actual Terra satellite fit in your classroom?
Try taping an outline on the floor.

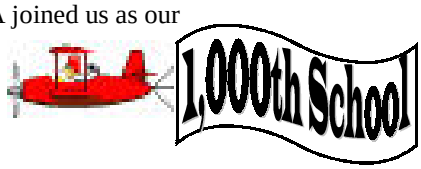
• Terra orbits 705km above the Earth. Using the scaled model, how far would the Terra model be from the Earth? What would be the size of the Earth in this model?

Have fun practicing proportions!

Teacher Corner

NEWS

Deer Creek Elementary School , Nevada City CA joined us as our



Over 772 observations were made in October, a record high. Keep observing! Our next **IOP** will be in December.

Sun-Earth and Seasons - Winter Solstice Measurements: Measure the sun's elevation angle during the week of December 17-21 and enter data on-line.

It's ¡Espanol! We are proud to announce the arrival of the Spanish S'COOL Poster! (43cm x 56 cm) Copies now available.

Teacher Resources:

Observer stickers are now sent out monthly following initial observations. Remember to use the printable certificates available on-line to recognize student observers as well.

Try our new Cloud Dichotomous Key to help students identify cloud types. Find this lesson on our Teacher Resources link. http://asd-www.larc.nasa.gov/SCOOL/lesson_plans/The_sky_and_the_dich_key.html Developed by Kara Houser, Summer Workshop Participant.

Thank you for your continued participation!

"The kids feel like a day without an observation is not complete."

Mollie Vann
Trezevant, TN

Frequently Asked Question!

Next to the # 1 question of *"What 's my password?"*, our most popular question lately has been **Q:"Why are there two overpass times on the same day?"**.

A: The simple answer is that on most days the CERES instrument aboard the Terra satellite will view a location on the Earth just once during daylight hours. On some days, however, CERES may see a location two or more times. And in some locations, CERES will always have more than one overpass. Schools located closer to the poles may receive overpass schedules with more than one overpass in a single day due to the polar orbit of the satellite and the instrument's ability to scan a wide swath of the earth below. Some locations are within the viewing field of the satellite in two consecutive overpasses about 100 minutes apart. In order to understand why, we need to look at how the orbit of a satellite defines where and when it will view a particular location. Further explanation including helpful graphics are found at **http://asd-www.larc.nasa.gov/SCOOL/polaroverpasses.html**

Please check out the S'COOL FAQ Page for more answers to FAQ's.

NASA Langley Research Center
CERES S'COOL Project
Mail Stop 420
Hampton, VA 23681-2199

Summer S'COOL Workshop
July 17-24, 2002

"It's Elementary!"

Teachers of Grades 3-6 across the USA are encouraged to apply. Applications will be available in January.

For more information contact us by:
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Douglas Stoddard, editor
Dr. Lin Chambers, French translator
Roberto Sepulveda, Spanish translator

A Word from the Field

"I am writing to you to thank you for giving us an opportunity of being like scientists. I think that all the class enjoyed examining the sky. I told my parents and they were very interested and touched. I liked this very much because I love doing new things and also working outdoors in the field. Studying the sky is very interesting and I discovered many new things about clouds. I hope next year that we can work together on clouds."

Goodbye,

Francisco

8b at Cardinal Newman College, Buenos Aires, Argentina