S'COOL BREEZE

Student's Cloud Observations On-Line

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One Small Step for NASA

Beech Springs Intermediate school

The above title grabbed the headlines in the Herald-Journal of Spartanburg, S.C., USA, in an article written by Diane Norman. That small step was taken by students at Beech Springs Intermediate School with teacher Dr. Ed Donovan as they participated in a S'COOL observation. Peering out from beneath umbrellas and hooded raincoats students declared conditions to be 100 percent cloud cover! "Dr. Donovan has been saying for a month that he wanted to do this in the rain," said sixth-grade teacher Benita Westmoreland.

Students learned to convert local time to Universal Time, in order to correctly report their findings to the S'COOL project. Dr. Donovan explained that UT was time according to Greenwich, England. Students also found it necessary to convert their pressure readings from inches to hectoPascals before filing their report on-line.

Their class has been involved in learning about satellites, weather, orbits and math. Ms. Westmoreland acknowledged that the students noticed things while participating in S'COOL, that previously they had not,

"Once you do something like this you look at clouds in a different way," student Robert Few said.

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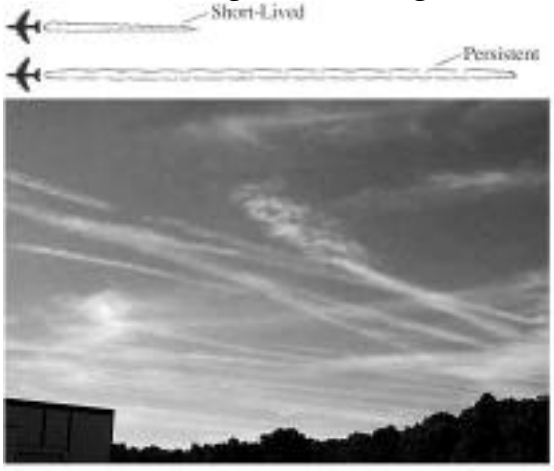
INSIDE THIS ISSUE

Contrails - Aviation's Clouds

Message from Dr. Pat Minnis, senior research scientist in the Radiation Science Branch of the ASD, NASA, Langley Research Center, Hampton, Virginia.

The long line-shaped clouds that we often see forming behind airplanes are condensation trails or, in short, contrails. They are becoming more and more frequent as the number of airplanes increases. During the past decade, air traffic has increased at a rate of almost 8% each year. This means that there are almost twice as many planes flying now than flew during 1989. Scientists predict that air traffic may increase by up to 500% by the year 2050. Because contrails are a type of cirrus cloud, they may have an effect on climate. This effect will become larger as more airplanes take to the sky.

Currently, we have only a few estimates of where, how many, and how often contrails occur. In order to understand the effect of contrails on the climate, we need to know much more about contrails. Although we are using some satellites to



Sky filled with spreading, persistent contrails.

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Contrails (continued from page 1)

measure contrails, we are not certain that we can see all of the contrails from these satellites. Sometimes, we mistake a natural cloud for a contrail and at other times, we can miss contrails because they grew into a natural-looking cirrus cloud. Often, we cannot see very thin contrails. Therefore, we need as many observations from the surface that tell us when contrails occur, how many are seen, and in what conditions they occur.

Contrails are man-made clouds that only form at very high altitudes (usually above 8 km) where the air is extremely cold (less than –40°C). If the air is very dry, they do not form behind the plane. If the air is somewhat moist, a contrail will form immediately behind the aircraft and make a bright white line that lasts for a short while. Persistent contrails will form immediately behind the airplane in very moist air. These long-lived contrails will usually grow wider and fuzzier as time passes. Sometimes they will actually take on the characteristics of a natural cirrus cloud and no longer look like contrails after only a half hour or so. Persistent contrails can exist long after the airplane that made them has left the area. They can last for a few minutes or longer than a day. However, because they form at high altitudes where the winds are usually very strong, they will move away from the area where they were born. Often, when we look up into the sky, we will see old persistent contrails that formed far away but moved overhead because of the wind. An example of very persistent contrails is shown in the S'Cool cloud chart. Persistent contrails are those most likely to affect climate.

NASA could use more data on contrails. Thus, when cloud amount is estimated, it would be good to know:

1. Is it possible to see contrails? That is, can the high altitudes be seen from the surface, or are there too many low clouds in the way?
2. Is it possible to view upper levels of the atmosphere, and are contrails seen?
3. If contrails were seen, were they persistent or short-lived?
4. If persistent, how many were seen?
5. If persistent, were natural-looking cirrus clouds also in the sky?
6. If persistent and possible, how much of the sky contained contrails?

This information, if taken regularly, will help us learn where and how often contrails occur. By matching the surface observations with the satellite data, we will then know if we are using the satellite data correctly to identify contrails and determine how they affect climate.

S'COOL participants are encouraged to write responses to this request in the comments section on the observation form. ■

One Small Step (continued from page 1)

It made me more interested in science - in the weather and stuff," said Brett Hayes. "It made it more interesting because we've been working with NASA ," Chuck Watson said. ■

Students at Theodore Monod School in Billiers, France, ask questions as their teacher Michel Duchemin and his assistant look on when they received a visit from NASA.

Check Out Home Pages

Ecole des Hospitalieres Saint-Gervais, Paris France

<http://www.fdn.fr/~jrubeli>

Menchville High School, Newport News, VA,USA

<http://www.mville.nn.k12.va.us>

Theodore Monod in Billiers, France:

<http://www. Mygale.org/08/maddu>

NOTES OF INTEREST

TEACHER INPUT REQUESTED

S'COOL is looking into the possibility of a week-long workshop for the summer of 1999. Although it is only on the drawing board at this time, we would like your input. Since you have now spent some time using S'COOL with your classes you probably have some good ideas as to what could further benefit participating teachers.

We would like to hear your suggestions as we continue looking into this potential happening. E-mail us, call us or write us. It is important to make it worth your time.

We hope to have more news on this in the next newsletter.

TRY THIS

CONVECTION

MATERIALS:	RUBBERBAND
LARGE BEAKER OR JAR	WATER
SMALL VIAL OR JAR	FOOD COLORING
PLASTIC WRAP	PENCIL

DIRECTIONS

1. Pour warm water and a few drops of food coloring in a small jar. Cover it with plastic wrap and secure with a rubber band.
2. Pour cold water into large beaker until it is about 2/3 full.
3. Place small container in bottom of large one. Puncture plastic wrap with pencil.
4. Observe what happens to water in small jar.

CONCLUSIONS

1. What happened to water in small jar?
2. How does this compare to the movement of air in our atmosphere?
3. What is the relationship between this movement and the formation of clouds?

***Pictures in last issue taken by Pam Leon, NASA photographer**

Students at Marcel Pagnol School, in Maze, France, listen attentively during Carolyn Green's May visit.

Ecole des Hospitalieres Saint-Gervais, Paris, France, records observations as visiting NASA scientist Dr. Lin Chambers watches, and teacher Christophe Salome assists.

Teacher Corner

- THE MESSAGE BOARD IS A GREAT PLACE FOR TEACHERS AND/OR STUDENTS TO SHARE IDEAS. PERHAPS YOU WOULD LIKE TO COORDINATE WITH ANOTHER TEACHER TO OBSERVE AT THE SAME TIME FOR DATA COMPARISON.
- If you have an e-mail address and have not received messages from us, please notify us.
- New lesson plans on the website