

CloudSat Education Network

Integrated One-Day Data Sheet

(modified from 2005 GLOBE Program® Teacher's Guide – <http://www.globe.gov>)

School Name: _____

Observer names: _____

Date: Year _____ Month _____ Day _____

Study Site (use GLOBE Atmosphere Instrument Shelter site if available or fill out a new Atmosphere Investigation site description form and submit to GLOBE):

ATM - _____

Local Time* (hour:min): _____ **Universal Time** (hour:min): _____

*Note additional time requirements for CEN Special Precipitation protocols

CLOUDS

(*Suggestion:* Have one group of students determine cloud type and % cover for the total sky, while others determine type and cover for each 1/4 or quadrant of the sky – see CEN Cloud Quadrant Protocol section.)

Cloud Type (Check **all** types seen)

High: Cirrostratus Cirrus Cirrocumulus

Middle: Altostratus Altocumulus

Low: Stratus Stratocumulus Cumulus

Rain or Snow-Producing: Nimbostratus Cumulonimbus

Contrail Type (Record the **number** of each type observed)

_____ Short-lived _____ Persistent Non-Spreading _____ Persistent Spreading

(Remember that **zero** is important data, so do not leave blank unless sky obscured)

Cloud Cover (Check **one**) – refer to table below for percentages

No clouds Clear Isolated Scattered Broken Overcast Sky obscured

| Percentage | If less than: | If greater than or equal to: |
|------------|---------------------|------------------------------|
| 10% | Clear (0%-9%) | Isolated (10%-24%) |
| 25% | Isolated (10%-24%) | Scattered (25%-49%) |
| 50% | Scattered (25%-49%) | Broken (50%-89%) |
| 90% | Broken (50%-89%) | Overcast (90%-100%) |

[Modified from GLOBE Table AT-CL-1 in **Cloud Protocols** section of 2003 Teacher's Guide]

Contrail Cover (Check **one**- if sky not obscured)

None 0-9% 10-24% 25-50% >50%

If Sky Obscured (Check **all** that apply if more than 25 percent of sky obscured)

Fog Smoke Haze Volcanic ash Dust

Sand Spray Heavy rain Heavy snow Blowing snow

Special CEN Cloud Quadrant Protocols

Normally, the CloudSat satellite will not pass directly over your location, but will be either to the east or the west in the sky above you on flyover days. Because of this, the mission scientists would like you to record additional data (in addition to normal GLOBE measurements). You can help by following these instructions:

Procedure: Four students stand back-to-back with their arms extended up and touching. Each student faces one of the four cardinal directions – north, south, east, west. The student determines cloud types and percentage of cloud cover for her/his fourth (one quadrant) of the sky. Record any additional weather observations for the quadrant that CloudSat is passing through in the **Comments** (Metadata) section of the data sheet (for example, “lightening several kilometers away to the northeast”).

For EACH quadrant of the sky, make observations and record data on:

North

Cloud Type (Check *all* types seen)

Cirrostratus Cirrus Cirrocumulus Altostratus Altopcumulus
 Stratus Stratocumulus Cumulus Nimbostratus Cumulonimbus

Cloud Cover (Check *one*)

No clouds Clear Isolated Scattered Broken Overcast Sky obscured

East

Cloud Type (Check *all* types seen)

Cirrostratus Cirrus Cirrocumulus Altostratus Altopcumulus
 Stratus Stratocumulus Cumulus Nimbostratus Cumulonimbus

Cloud Cover (Check *one*)

No clouds Clear Isolated Scattered Broken Overcast Sky obscured

South

Cloud Type (Check *all* types seen)

Cirrostratus Cirrus Cirrocumulus Altostratus Altopcumulus
 Stratus Stratocumulus Cumulus Nimbostratus Cumulonimbus

Cloud Cover (Check *one*)

No clouds Clear Isolated Scattered Broken Overcast Sky obscured

West

Cloud Type (Check *all* types seen)

Cirrostratus Cirrus Cirrocumulus Altostratus Altopcumulus
 Stratus Stratocumulus Cumulus Nimbostratus Cumulonimbus

Cloud Cover (Check *one*)

No clouds Clear Isolated Scattered Broken Overcast Sky obscured

PRECIPITATION

Special CEN Precipitation Protocols

Special CloudSat precipitation protocols have been created by mission scientists to obtain valuable rain and snow data. These are almost identical to the GLOBE protocols, but the times are different. The scientists want to know what is happening at the time that the satellite flies over (rather than over a 24-hour period). Therefore students are asked to make rain or snow observations just before and during flyover (instead of one observation at local solar noon as in GLOBE).

Procedure: Follow normal GLOBE precipitation protocol instructions **except** record amount of precipitation in gauge or on snowboard **one hour before CloudSat flyover**. Also record the number of days that the rain or snow accumulated and other comments/metadata such as “it was raining when we checked the rain gauge” or “we had a rain shower this morning”. Then record the amount of rain or snow **again at time of flyover**. Record data.

Rainfall (one hour before CloudSat flyover)

Local Time (hour:min):_____ Universal Time (hour:min):_____

Number of days rain has accumulated:_____

Rainwater in rain gauge (mm)*:_____

Rainfall (at time of CloudSat flyover)

Rainwater in rain gauge (mm)*:_____

Snowfall (one hour before CloudSat flyover)

Local Time (hour:min):_____ Universal Time (hour:min):_____

Number of days snow has accumulated on the snowboard:_____

Depth of snow on the snowboard* (mm):

Sample 1:_____ Sample 2:_____ Sample 3:_____

Snow Pack: Total snow accumulation on the ground (mm):

Sample 1:_____ Sample 2:_____ Sample 3:_____

Rain equivalent of: 1. Snow on the snow board (mm): _____

2. Total snowpack on the ground (mm): _____

Snowfall (at time of CloudSat flyover)

Depth of **new** snow on the snowboard* (mm):

Sample 1:_____ Sample 2:_____ Sample 3:_____

Rain equivalent of **new** snow on the snow board (mm): _____

* Remember: Record 0 when there has been no rainfall or snowfall.

Record M for missing if there was rain or snow and you were not able to take an accurate reading.

Record T for trace amount of rainfall or snowfall (when too small to measure).

CURRENT TEMPERATURE

Type of thermometer used (for example, GLOBE Digital Max/Min):_____

Current air temperature: (degrees C) _____

COMMENTS/UNUSUAL CONDITIONS (METADATA)

(Please record observations on any weather-related activity such as strong rain, wind etc.)