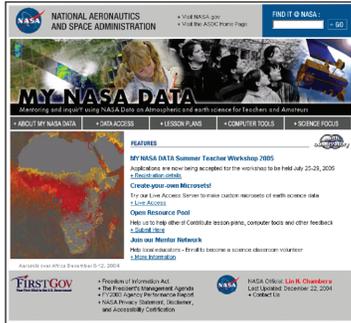




# The MY NASA DATA Project: Extending Earth Science Data Use to the K-12 and Citizen Scientist Communities

The **Mentoring and inquiry using NASA Data on Atmospheric and earth science for Teachers and Amateurs (MY NASA DATA)** project features microsets of NASA earth science satellite data which are both accessible to and of interest to the K-12 educator and citizen scientist communities. The microsets are made from data holdings at the Atmospheric Science Data Center (ASDC) at NASA Langley Research Center and other sources.

<http://mynasadata.larc.nasa.gov>



The MY NASA DATA Web site features sections on:

- Data Access
- ASCII text or visual microsets
- Lesson Plans
- Computer Tools
- Science Focus
- Glossary
- Data Documentation
- Presentations
- Access to Mentor Network
- Contributions welcome



## Live Access Server (LAS)

ASDC data are available for visualization and analysis:

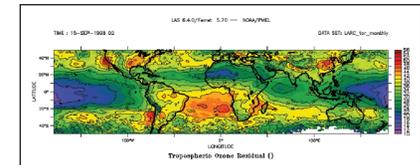
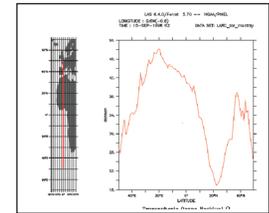
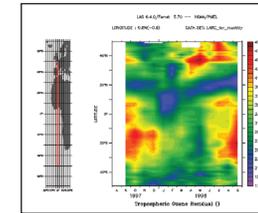
- Aerosols
- Clouds
- Radiation Budget
- Tropospheric Chemistry

Data products include:

- CERES
- MISR
- SRB
- TOR
- ISCCP
- More to come

Graphics output options include:

- Regional maps
- Time series
- Spreadsheets



## MY NASA DATA Teacher Workshops

Participating teachers explore topics in

- atmospheric science
- educational application of data sets
- use of weather measurements
- hands-on classroom activities
- Use of computer technology

Participant feedback and curricular contributions are enlisted as further development of data sets continues.



## MY NASA DATA Mentor Network

- Assist teachers with using real data
- Sign up online
- Contribute educational materials
- Share career path
- Share expertise
- Discuss pedagogical and science questions
- Submit questions
- Answer questions

Year	Month	Day	Time	Location	Event Name
2005	01	01	00:00	00:00	00:00
2005	01	02	00:00	00:00	00:00
2005	01	03	00:00	00:00	00:00
2005	01	04	00:00	00:00	00:00
2005	01	05	00:00	00:00	00:00
2005	01	06	00:00	00:00	00:00
2005	01	07	00:00	00:00	00:00
2005	01	08	00:00	00:00	00:00
2005	01	09	00:00	00:00	00:00
2005	01	10	00:00	00:00	00:00
2005	01	11	00:00	00:00	00:00
2005	01	12	00:00	00:00	00:00
2005	01	13	00:00	00:00	00:00
2005	01	14	00:00	00:00	00:00
2005	01	15	00:00	00:00	00:00
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2005	01	19	00:00	00:00	00:00
2005	01	20	00:00	00:00	00:00
2005	01	21	00:00	00:00	00:00
2005	01	22	00:00	00:00	00:00
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2005	01	28	00:00	00:00	00:00
2005	01	29	00:00	00:00	00:00
2005	01	30	00:00	00:00	00:00
2005	01	31	00:00	00:00	00:00

# Solar Declination and Cloud Cover, Are They Related?

**Purpose:** To use NASA satellite data to correlate cloud cover to the solar declination.

Grade Level: 4-12

## Learning Outcomes:

- Access NASA data using the Live Access Server
- Relate seasonal patterns to cloud formation
- Identify the relationship between solar declination and the four seasons

## Procedure:

1. On the main web page, under Create Your Own Microsets, click links to [Live Access Server](#)
2. Click on [Atmosphere](#)
3. Click on [Clouds](#)
4. Click on [Cloud Coverage](#)
5. Select *Mean Cloud Coverage (ISCCP)*
6. Click on the **NEXT->**. this is located to the right of the page
7. Set constraints:
  - a. In the [Select View](#) drop-down menu highlight Time –Latitude Plot
  - b. In the [Select Output](#) drop-down menu highlight Shaded Plot
  - c. In the [Select Region](#) drop-down menu highlight Full Region
  - d. The coordinates' box is shaped like a compass.
    - In the North position box type 30 N. This sets the northern boundary for the plot.
    - In the South position box type 30 S. This sets the southern boundary for the plot.
    - In the East position box type 23 E and press Enter on your keyboard. This will automatically set the West position box with the same value of 23 E.
    - If there is a Go button, click the button.
  - e. [Select Time](#): only change the time entry on the second row so that the time period ranges from Jan 15, 1995, to Dec 15, 1995.
8. Click on the **NEXT->**. This is located to the right of the page.
9. A plot like Fig. 2 will appear in a new pop-up window.

## Extensions:

- Explain the relationship between the observed cloud cover, solar declination and the seasons.
- Relate cloud formation to expected local weather.
- Explore the impacts of wet and dry seasons in Africa.

Complete lesson plans and other examples using MY NASA DATA are available at <http://mynasadata.larc.nasa.gov>

**Background:** The four seasons on Earth have a scientific basis. The earth is tilted  $23.5^\circ$  from vertical. This tilt and the Earth's orbit around the sun are the reasons for the seasons. Earth's tilt and orbital position cause differing angles at which the sun's rays hit the surface of the Earth. As Earth rotates on its axis, the tilt and orbital position also cause fluctuating lengths of daylight during the year depending on latitude. The latitude on the Earth where the sun is directly overhead at solar noon and days are longest is called the degree of solar declination. This location is somewhere between  $23.5^\circ$  N and  $23.5^\circ$  S depending on the day of the year. This region defines the Tropics. Where solar radiation is most intense, the warm moist air rises and clouds are frequently formed. In this lesson, it will be shown that the location of these clouds tends to follow solar declination. Figure 1 shows the change in solar declination over a calendar year. Figure 2 shows how cloud coverage over tropical Africa ( $30^\circ$ N –  $30^\circ$ S, at longitude  $23^\circ$ E) changes during a calendar year.

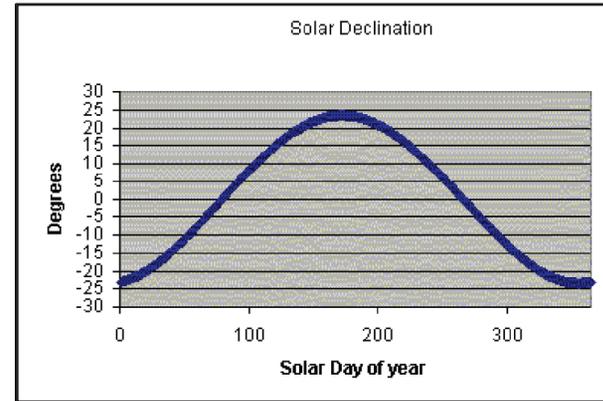


Figure 1  
Solar declination - the latitude where the Sun is directly overhead on the Earth - during the course of the calendar year

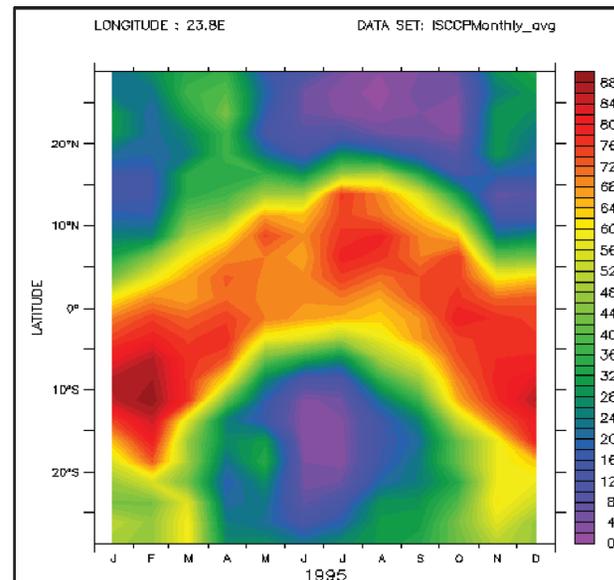


Figure 2  
Mean Cloud Coverage (percent) over Africa along a line of latitude at longitude 23 East over the course of a year from January to December. The maximum cloudiness correlates with the solar declination in Fig. 1.