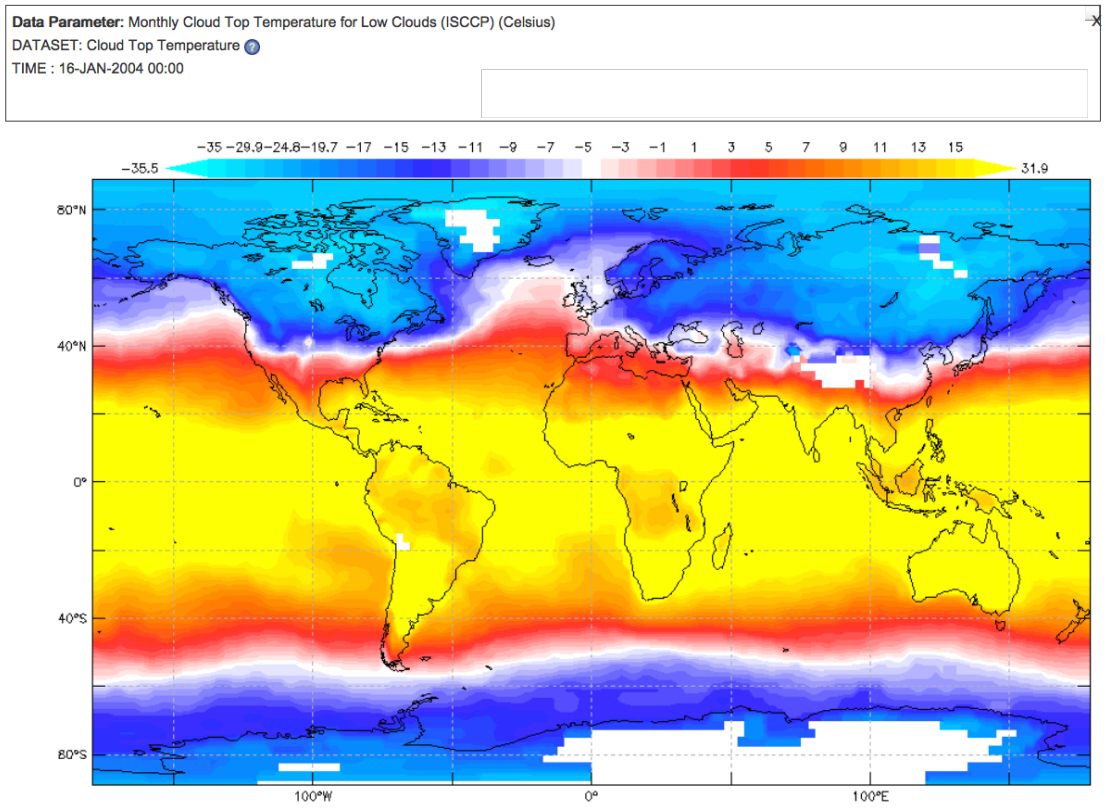
NAME:_____ DATE:_____ CLASS:_____

MY NASA DATA: Cold, Clouds, and Snowflakes

http://mynasadata.larc.nasa.gov/?page_id=474?&passid=96

Part 1: Use the following 2 maps and additional information to answer the questions and to pick a city to investigate in Part 2.

Plot 1 –Monthly Cloud Top Temperature for Low Clouds from ISCPP (degrees Celsius) in January 2004.

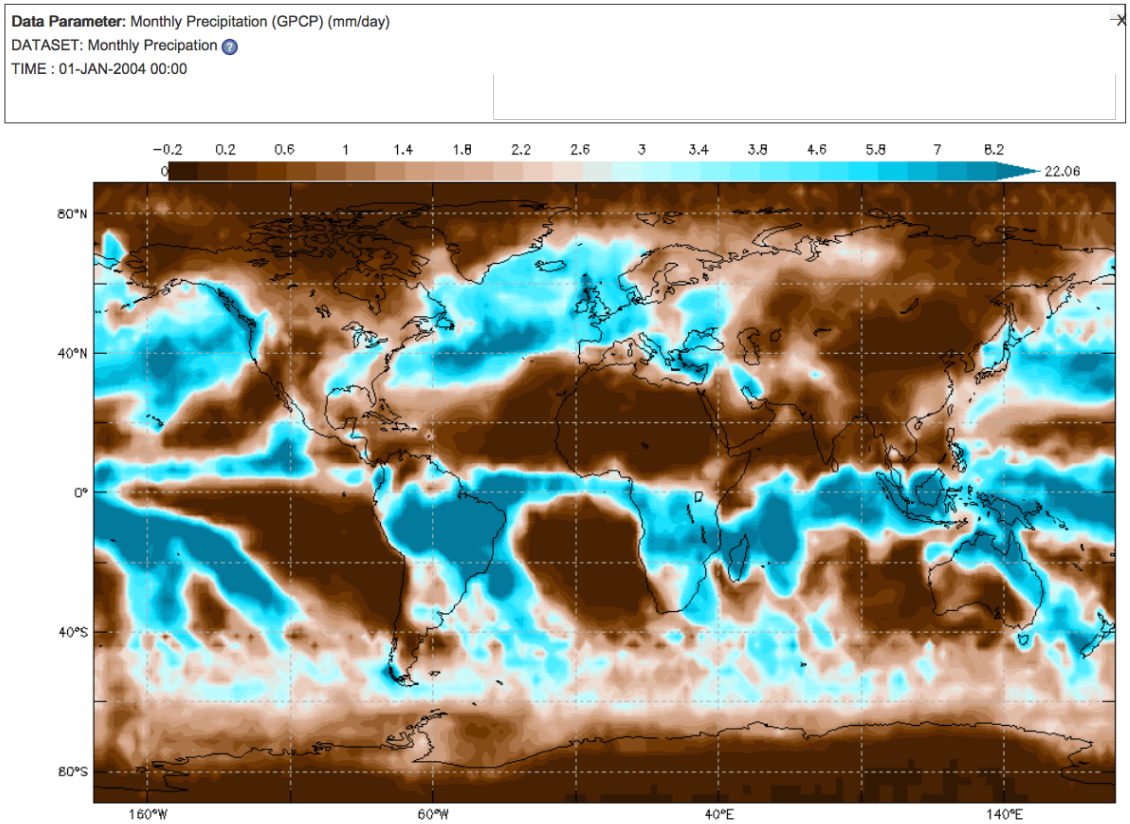


NAME:_____ DATE:_____ CLASS:_____

MY NASA DATA: Cold, Clouds, and Snowflakes

http://mynasadata.larc.nasa.gov/?page_id=474?&passid=96

Plot 2 –Monthly Precipitation from GPCP (mm/day) in January 2004.



Part 1 Questions and Instructions:

1. Using the two plots above, discuss with your class what areas you think would have snow in January.

2. Using your answers to Question 1, select one of the following cities and find its location on a map. There are 6 cities to choose from, so students may want to work in small groups and investigate each city:

   City Name: Buffalo, New York
   Country: United States
   Latitude: 42.886447
   Longitude: -78.878369

   City Name: Indianapolis, Indiana
   Country: United States
   Latitude: 39.785853
   Longitude: -86.156783

   City Name: Vancouver, British Columbia
   Country: Canada
   Latitude: 49.282729
   Longitude: -123.120738

   City Name: London
   Country: England/United Kingdom
   Latitude: 51.529069
   Longitude: -0.135931

   City Name: Moscow
   Country: Russia
   Latitude: 55.755826
   Longitude: 37.617300

   City Name: Oslo
   Country: Norway
   Latitude: 59.913869
   Longitude: 10.752245

3. For your chosen city, use Plot 1 above to estimate the cloud top temperature in January.

4. For your chosen city, use Plot 2 above to estimate the annual precipitation for your city. Use the formula **mm per day X 14.4 = inches per year.**

5. Do a search on the internet to find a picture of the city as well as the following information: language spoken, population, and elevation.

NAME:_____ DATE:_____ CLASS:_____

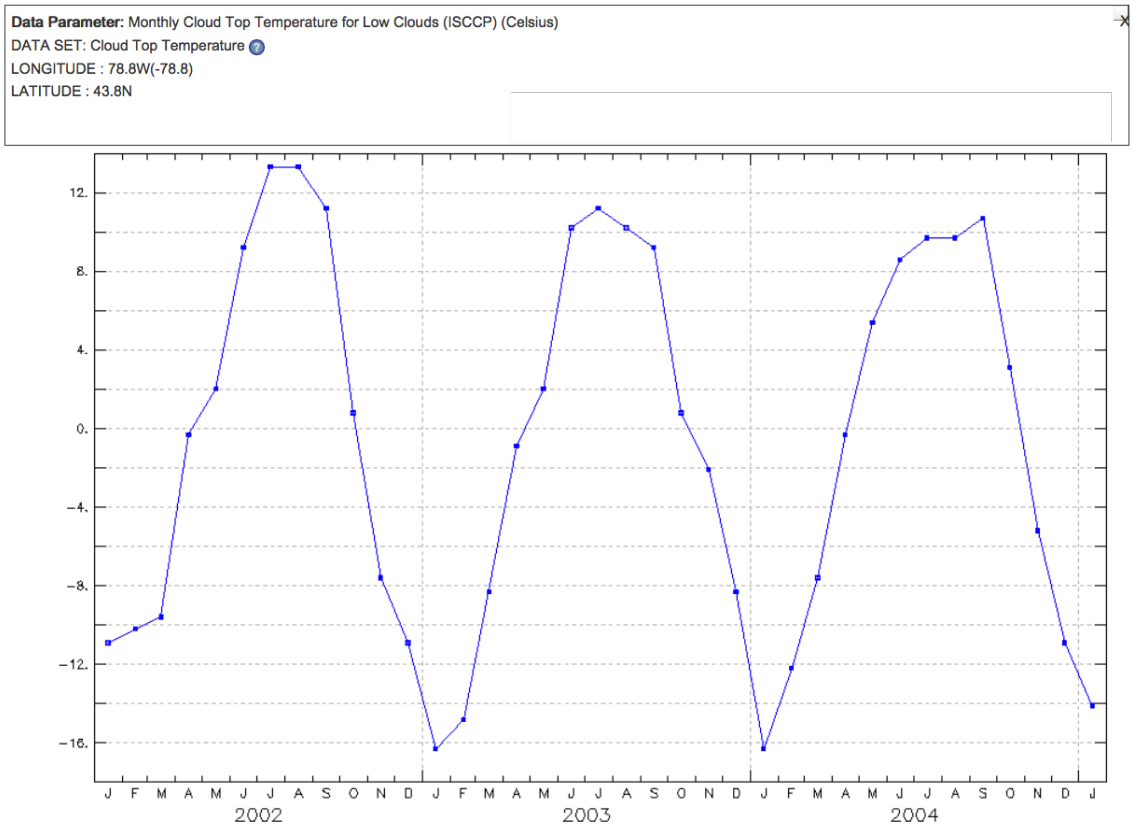
MY NASA DATA: Cold, Clouds, and Snowflakes

http://mynasadata.larc.nasa.gov/?page_id=474?&passid=96

Part 2: Find your selected city in the next set of plots, then use the time series graphs of monthly cloud top temperature and precipitable water to answer the questions starting on page 17.

City Name: Buffalo, New York

Plot 1 –Monthly Cloud Top Temperature for Low Clouds from ISCPP (degrees Celsius), January 2002 – January 2005.

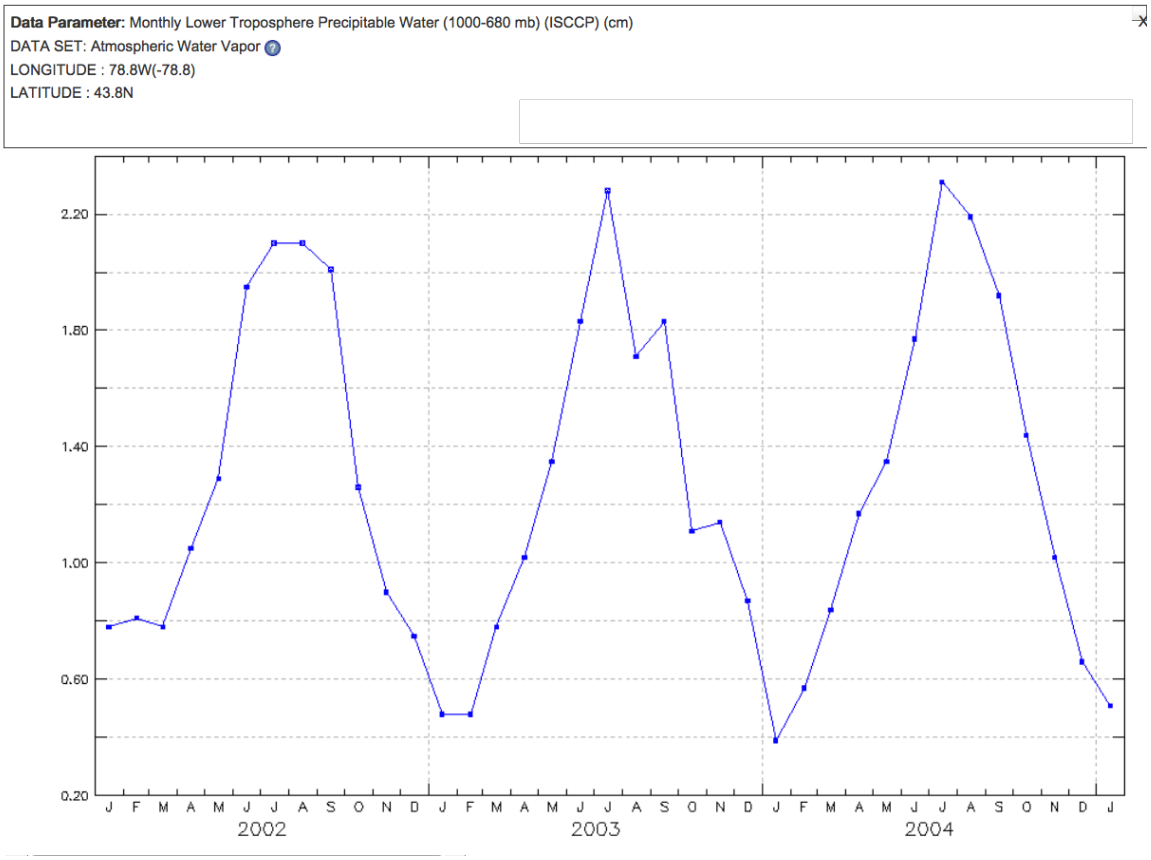


NAME:_____ DATE:_____ CLASS:_____

MY NASA DATA: Cold, Clouds, and Snowflakes

http://mynasadata.larc.nasa.gov/?page_id=474?&passid=96

Plot 2 –Monthly Lower Troposphere Precipitable Water (1000-680 mb) from ISCPP (cm), January 2002 – January 2005.



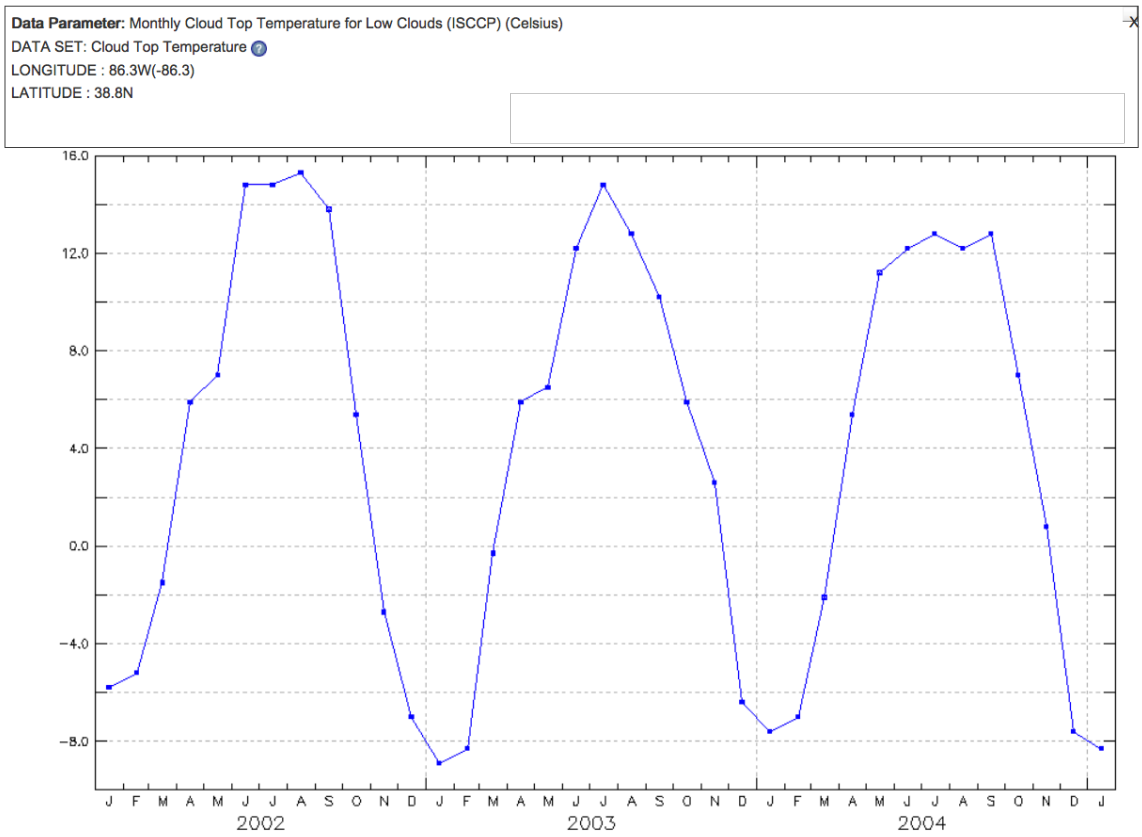
NAME:_____ DATE:_____ CLASS:_____

MY NASA DATA: Cold, Clouds, and Snowflakes

http://mynasadata.larc.nasa.gov/?page_id=474?&passid=96

City Name: Indianapolis, Indiana

Plot 1 –Monthly Cloud Top Temperature for Low Clouds from ISCPP (degrees Celsius), January 2002 – January 2005.

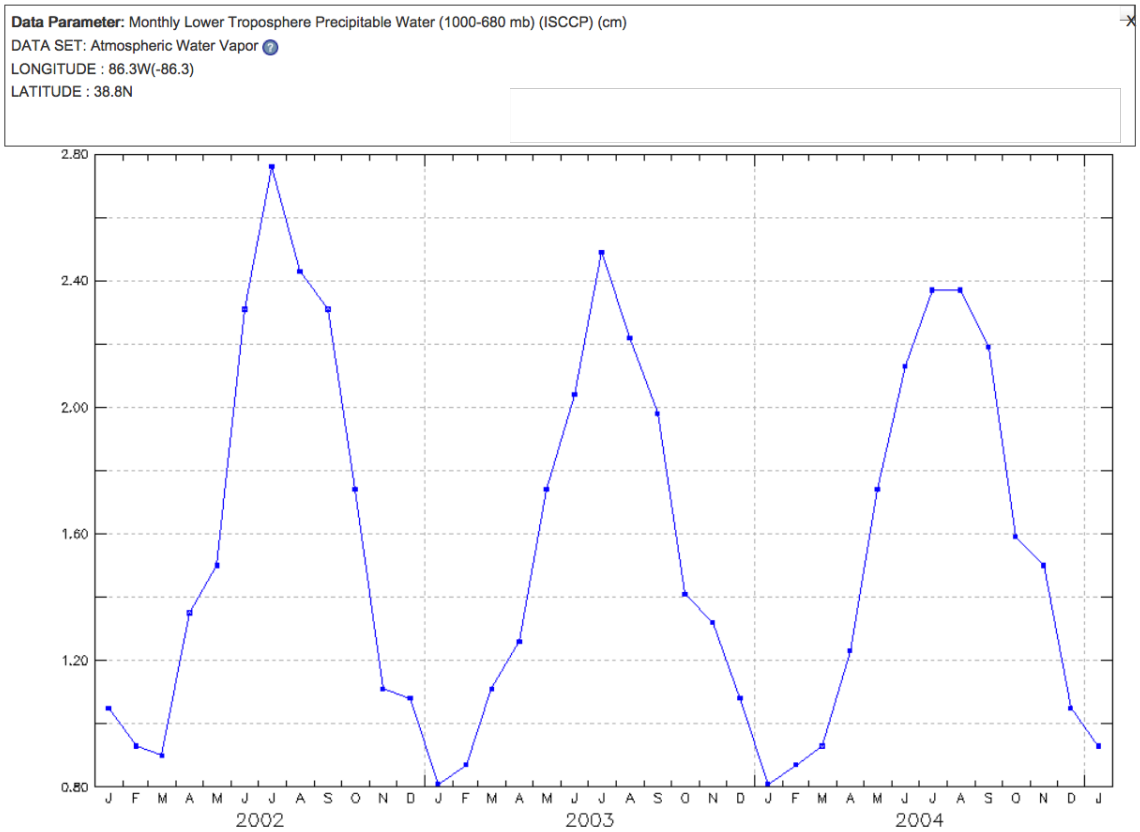


NAME:_____ DATE:_____ CLASS:_____

MY NASA DATA: Cold, Clouds, and Snowflakes

http://mynasadata.larc.nasa.gov/?page_id=474?&passid=96

Plot 2 –Monthly Lower Troposphere Precipitable Water (1000-680 mb) from ISCPP (cm), January 2002 – January 2005.



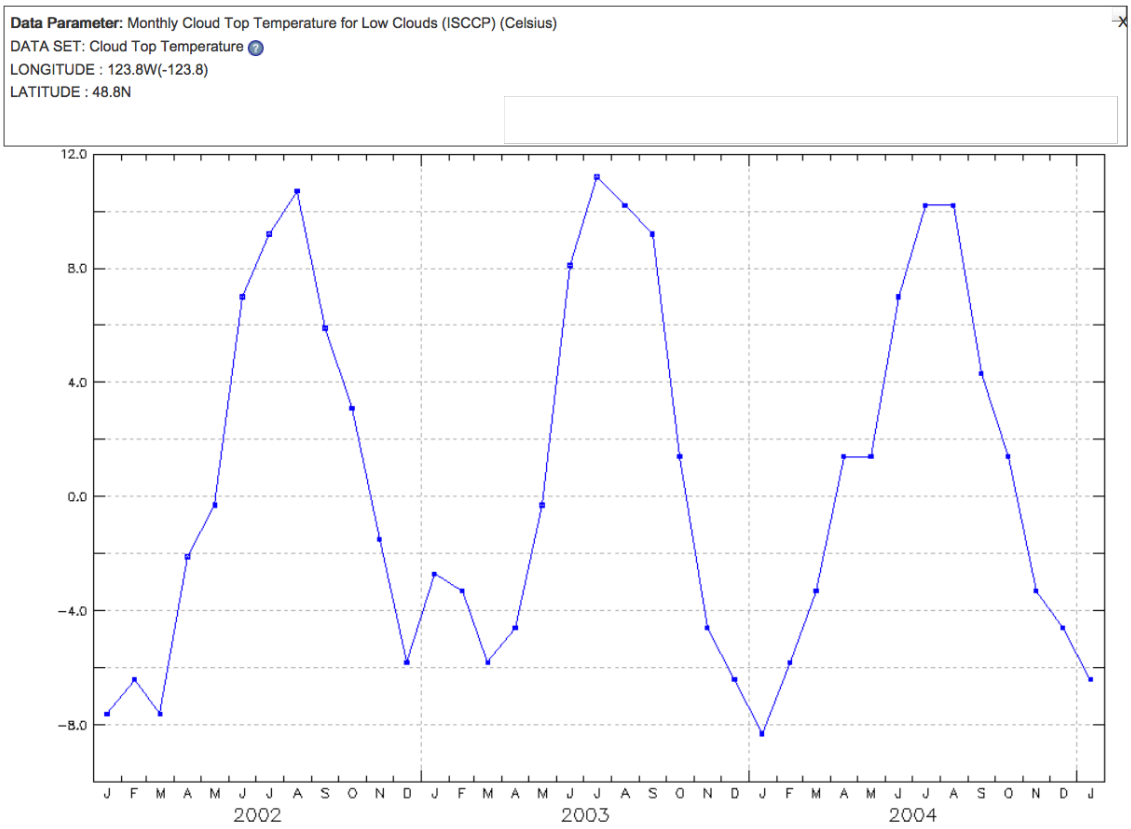
NAME:_____ DATE:_____ CLASS:_____

MY NASA DATA: Cold, Clouds, and Snowflakes

http://mynasadata.larc.nasa.gov/?page_id=474?&passid=96

City Name: Vancouver, British Columbia, Canada

Plot 1 –Monthly Cloud Top Temperature for Low Clouds from ISCPP (degrees Celsius), January 2002 – January 2005.

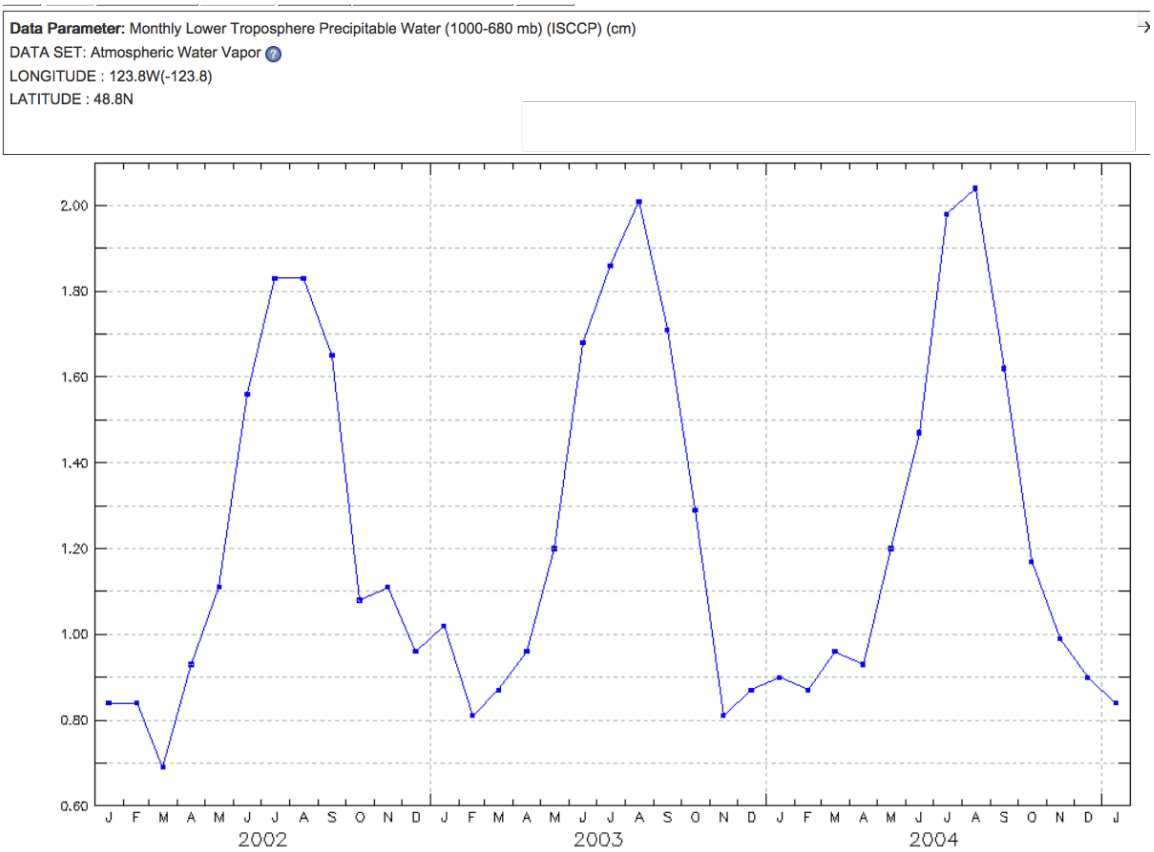


NAME:_____ DATE:_____ CLASS:_____

MY NASA DATA: Cold, Clouds, and Snowflakes

http://mynasadata.larc.nasa.gov/?page_id=474?&passid=96

Plot 2 –Monthly Lower Troposphere Precipitable Water (1000-680 mb) from ISCPP (cm), January 2002 – January 2005.



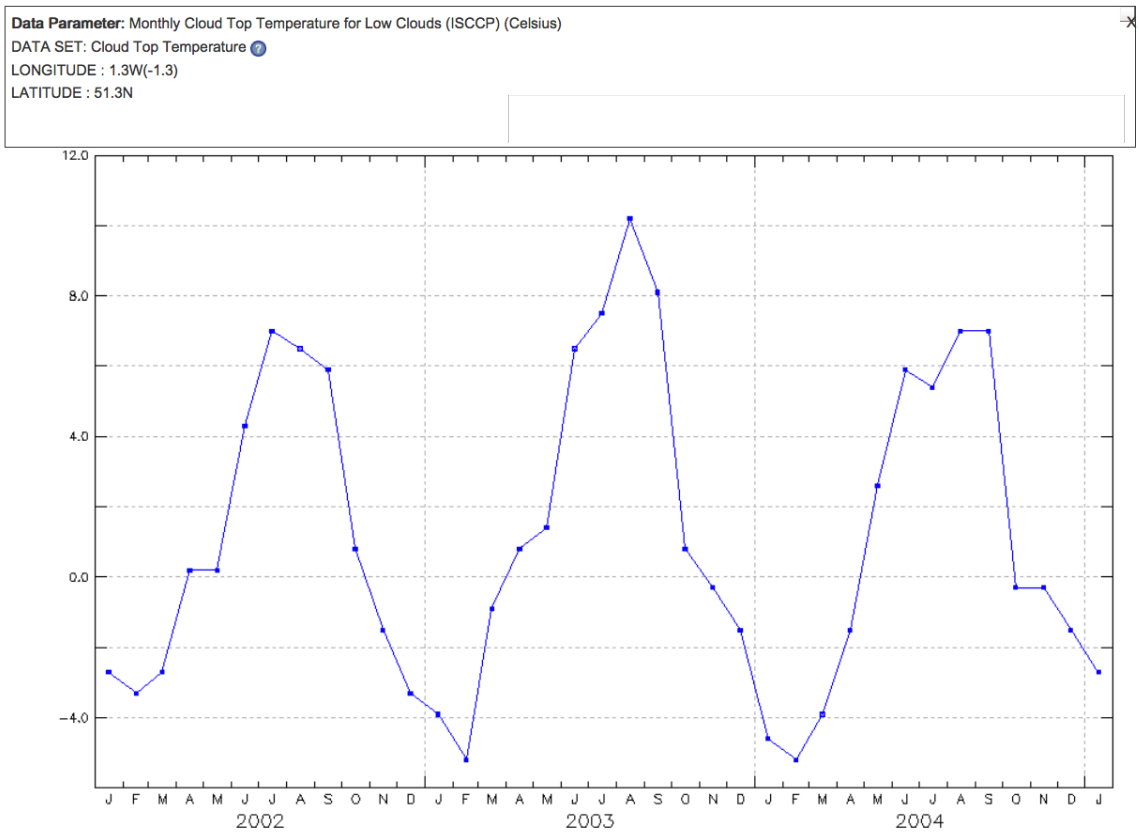
NAME:_____ DATE:_____ CLASS:_____

MY NASA DATA: Cold, Clouds, and Snowflakes

http://mynasadata.larc.nasa.gov/?page_id=474?&passid=96

City Name: London, England, United Kingdom

Plot 1 –Monthly Cloud Top Temperature for Low Clouds from ISCPP (degrees Celsius), January 2002 – January 2005.

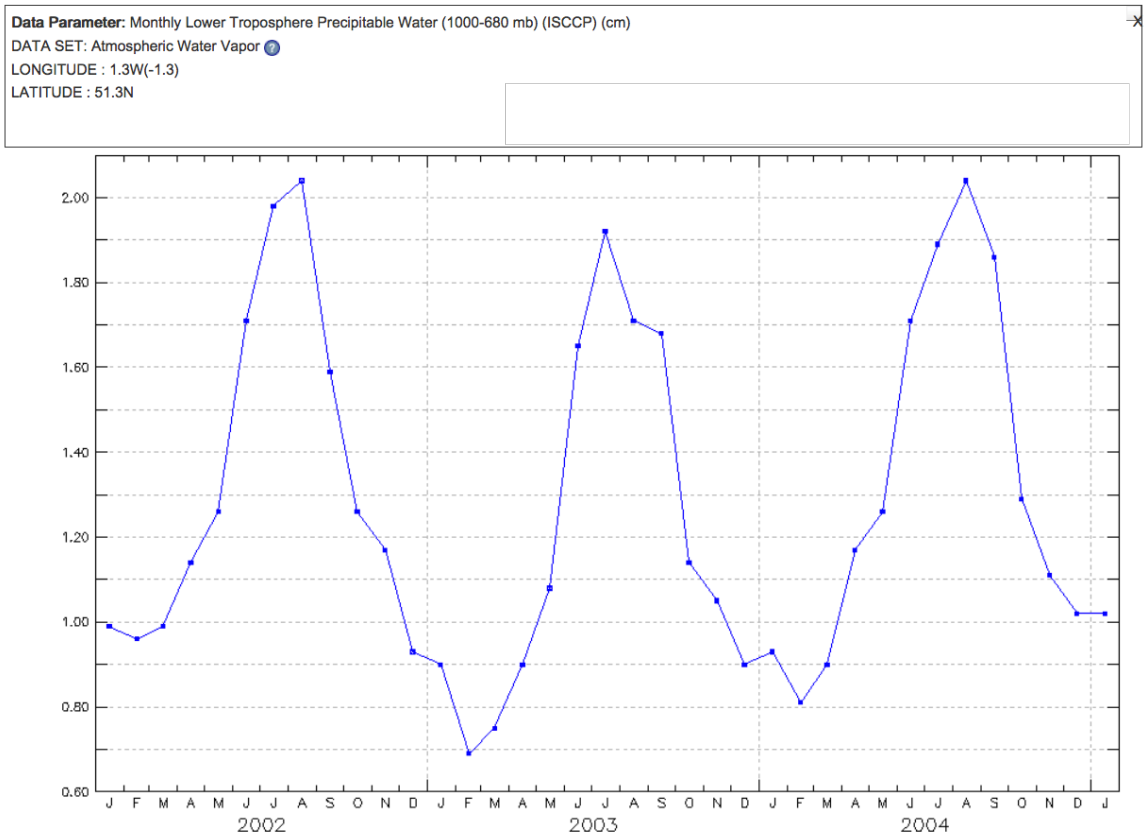


NAME:_____ DATE:_____ CLASS:_____

MY NASA DATA: Cold, Clouds, and Snowflakes

http://mynasadata.larc.nasa.gov/?page_id=474?&passid=96

Plot 2 –Monthly Lower Troposphere Precipitable Water (1000-680 mb) from ISCPP (cm), January 2002 – January 2005.



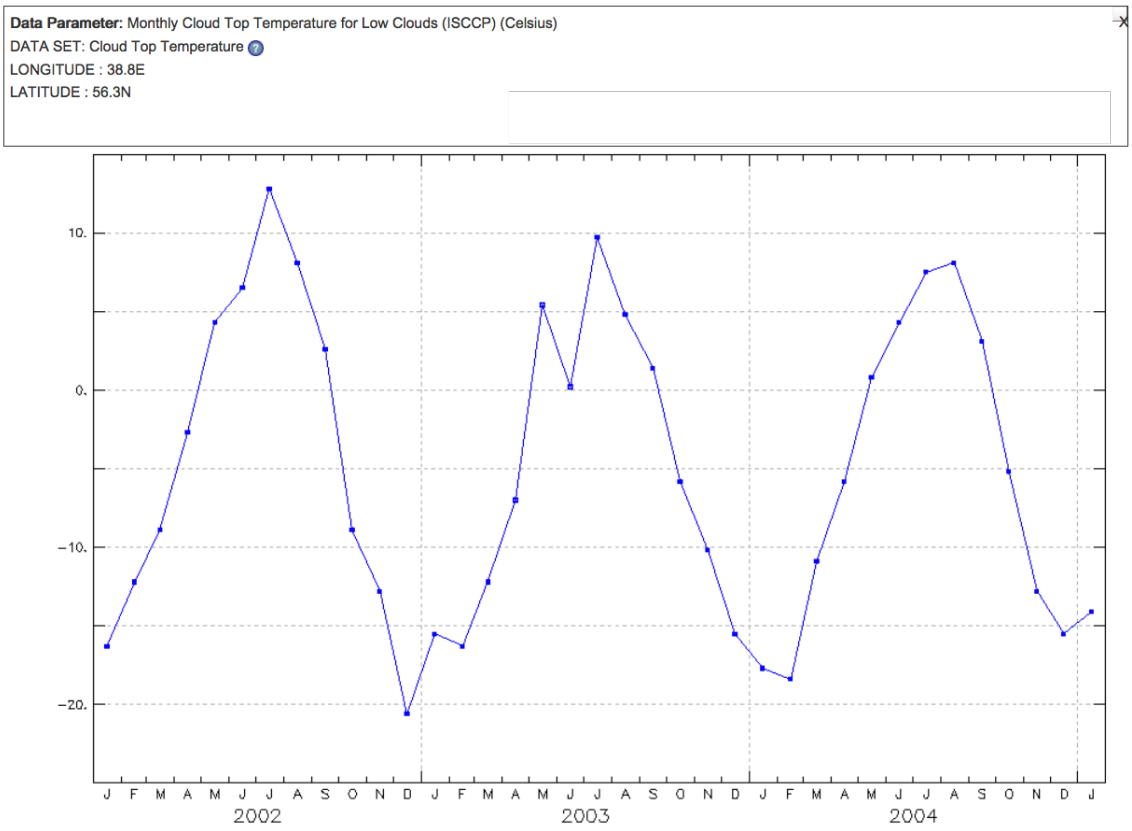
NAME:_____ DATE:_____ CLASS:_____

MY NASA DATA: Cold, Clouds, and Snowflakes

http://mynasadata.larc.nasa.gov/?page_id=474?&passid=96

City Name: Moscow, Russia

Plot 1 –Monthly Cloud Top Temperature for Low Clouds from ISCPP (degrees Celsius), January 2002 – January 2005.

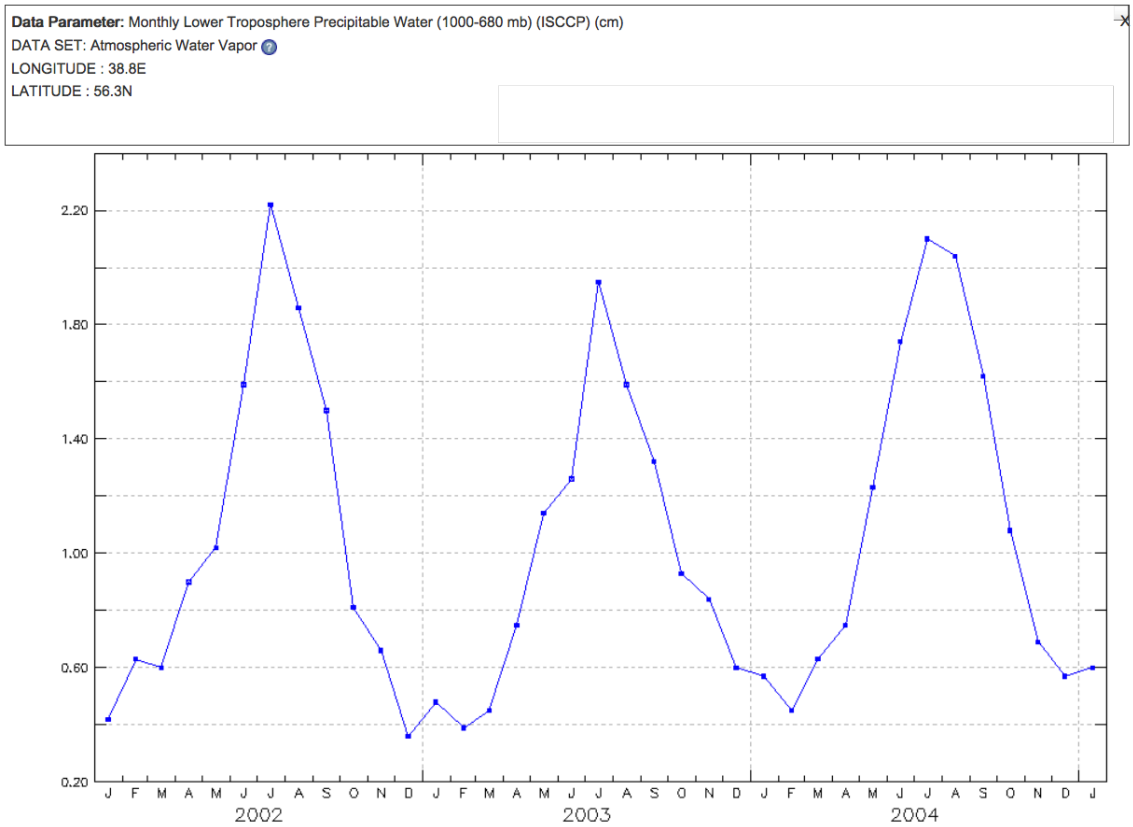


NAME:_____ DATE:_____ CLASS:_____

MY NASA DATA: Cold, Clouds, and Snowflakes

http://mynasadata.larc.nasa.gov/?page_id=474?&passid=96

Plot 2 –Monthly Lower Troposphere Precipitable Water (1000-680 mb) from ISCPP (cm), January 2002 – January 2005.



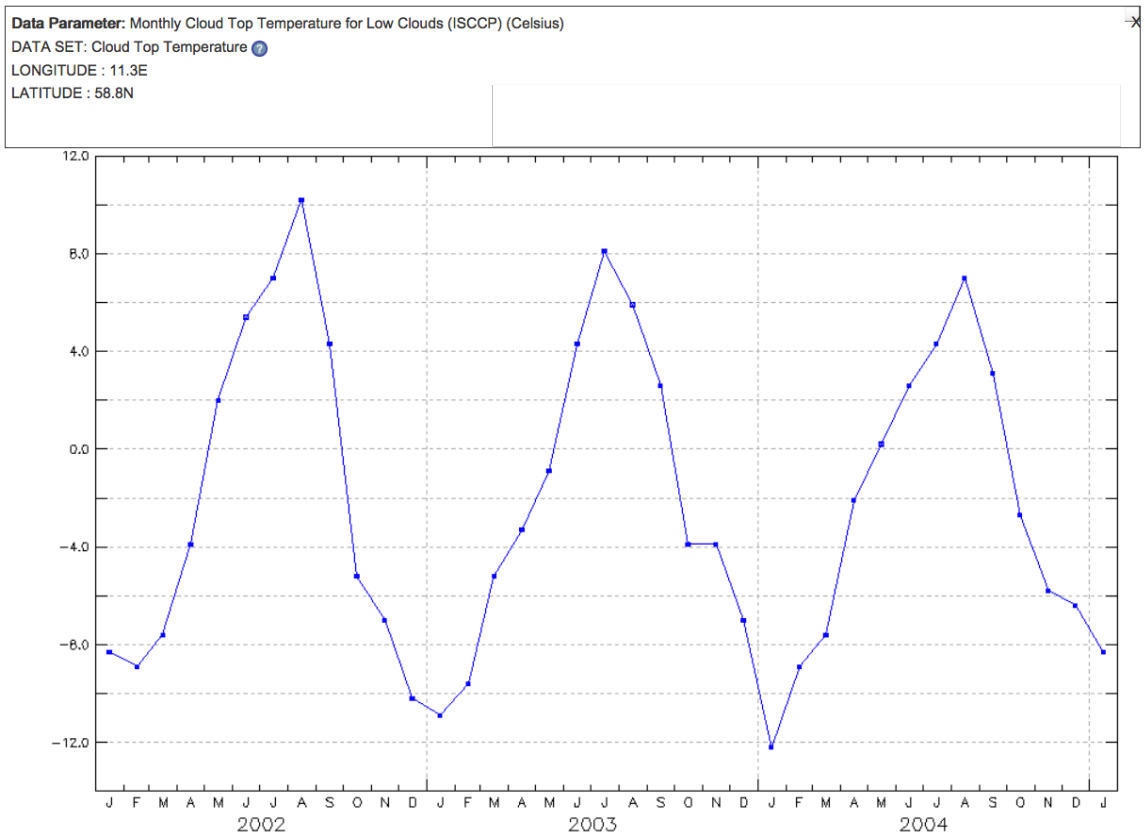
NAME:_____ DATE:_____ CLASS:_____

MY NASA DATA: Cold, Clouds, and Snowflakes

http://mynasadata.larc.nasa.gov/?page_id=474?&passid=96

City Name: Oslo, Norway

Plot 1 –Monthly Cloud Top Temperature for Low Clouds from ISCPP (degrees Celsius), January 2002 – January 2005.

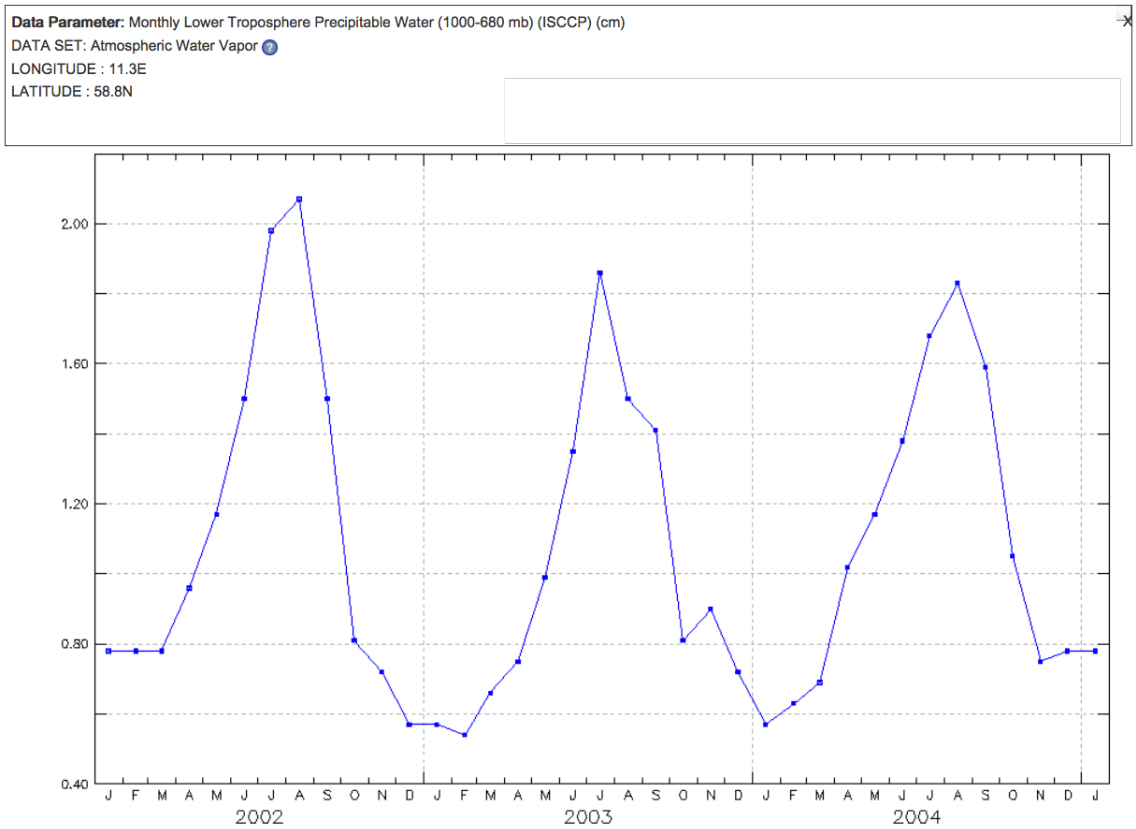


NAME:_____ DATE:_____ CLASS:_____

MY NASA DATA: Cold, Clouds, and Snowflakes

http://mynasadata.larc.nasa.gov/?page_id=474?&passid=96

Plot 2 –Monthly Lower Troposphere Precipitable Water (1000-680 mb) from ISCPP (cm), January 2002 – January 2005.



NAME:_____ DATE:_____ CLASS:_____

MY NASA DATA: Cold, Clouds, and Snowflakes

http://mynasadata.larc.nasa.gov/?page_id=474?&passid=96

Part 2 Questions:

1. How are the graphs of all of the cities the same? How are they different?

2. During what months are the temperatures of the cloud tops the warmest? During what months are they coldest?

3. During what months does the lower atmosphere have the highest amount of moisture? During what months does it have the lowest amount of moisture?

4. When the atmosphere has low moisture, what seems to be true of the temperature of the cloud tops? When the atmosphere has high moisture, what seems to be true of the temperatures of the cloud tops?

5. How does the temperature of the tops of the clouds relate to the amount of moisture in the atmosphere?

Part 3: Determine the Celsius temperature of your city from the LAS map. Use the Applet to Grow Snowflakes - http://whyfiles.org/interactives/a4.html - to create an image of what a snowflake would look like in that area of the world with that cloud top temperature. Next, use the print screen, copy, and paste functions to paste that image into a word document.

Part 3 Questions:

Answer the following questions based on your snowflake:

1. Are the shapes of the snowflakes all the same? What makes the shapes different?

2. What types of symmetry do the snowflakes with dendrites and plates have?

NAME:_____ DATE:_____ CLASS:_____

MY NASA DATA: Cold, Clouds, and Snowflakes

http://mynasadata.larc.nasa.gov/?page_id=474?&passid=96

3. How many lines of symmetry are there?

4. What is the angle of rotational symmetry?

5. Determine the number of faces, edges, and vertices of the prisms and columns.