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SID Monitor Data Analysis Sheet

Analyze the data from 9/17/2006-9/24/2006
File can be found N:\Courses\Rod Physics\SOLARSID\Data
Email pages 1,2 & 5 only!! Add the last name of one of your group members to the beginning of the file "rodriguezDataSIDSunriseActivity.doc"

1. With your teacher, look through the instructions on the Example Sheet and make sure you understand them.

2. My monitor is located in *Cincinnati, OH*, timezone *Eastern*.
   The transmitter is located in *Cutler, Maine*, timezone *Eastern*.

3. By reading the graphs or data files, figure out the sunrise and sunset times of your data and write that information into your data table.

4. Figure out your local sunrise and sunset times for the days for which you have data: http://aa.usno.navy.mil/data/docs/RS_OneDay.html. Then, convert your local time to UT time (you can find out how at http://www.timezoneconverter.com/cgi-bin/tzc.tzc), and write that information into your data table.

5. Figure out the sunrise and sunset times for the location of the transmitter, convert to UT, and write that information into your data table as well.

6. Plot your data for both sunrises and sunsets on the graphs provided.

7. By reading your data table and your graphs, answer the following questions:
   a) Are your data **sunrise** times
      ___ Same as your local sunrise times?
      ___ Same as the transmitter sunrise times?
      _X_ Neither?
      **Our data is between the values for local sunrise and transmitter sunrise*

   b) Are your data **sunset** times
      ___ Same as your local sunset times?
      ___ Same as the transmitter sunset times?
      _**X**_ Neither?
      **Our data is above both of the values for local sunrise and transmitter sunset*

   c) Compute the average difference in time between local sunrises/sets and your data sunrises/sets.

- The average difference between local **sunrise** and data sunrise is __0 hours, 59 minutes and 1.5 seconds (hours and minutes)
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- **<u>*NOTE*</u>** this is with the provision that by "difference between" you mean "local times minus our data times". On average, our local time was about 0 hours, 59 minutes and 1.5 seconds ***greater*** than our data time.
- The average difference between local **sunset** and data sunset is __- 0 hours, 11 minutes and 52.5 seconds_ (hours and minutes)
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- **<u>*NOTE*</u>** this is with the provision that by "difference between" you mean "local times minus our data times". On average, our local time was about 0 hours, 11 minutes and 52.5 seconds ***less*** than our data time.
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d) Does the relationship between sunrise and set times remain roughly the same each day, or does it change? If it changes, what do you think might be the causes(s)?

<u>In terms of the local sunrise times for Cincinnati, the sunrise times for Cutler, Maine, and the sunrise times as shown by our gathered data, the relationship between the sunrise times seems to stay mostly the same, with a general upward trend. As for the sunset times, all three sets of data also seem to have the same relationship, except with a general downward trend. From this we can discern that the sun rises at a slightly later time each day while the sun sets at a slightly earlier time. Though the day to day change is minute, a close view of the graph shows a slight but definite trend as mentioned for both cases. This is most likely due to the fact that we are approaching winter, in which daylight hours are shortened through the exact effect that we are witnessing within our data.</u> _

e) Is the signal strength

_X_ Higher at night?
___ Higher during the day?
___ Same at night as in the daytime?

<u>*NOTE*</u> this answer is with the provision that our end signal, the signal that we receive in the end to use as data, is stronger at night than it is in the day.

f) Are your data noisier (with more squiggles) during the nighttime or the daytime?

___ Noisier at night
_X_ Noisier during the day
___ Same at night as in the daytime

Why do you think? During the nighttime, solar activity does not reach the Atmosphere/ Ionosphere of our side of the planet. Thus, there is less activity in the Ionosphere to interfere with the signals. Also, layers D and E of the ionosphere disappear at night. These changes allow the signal to travel farther through the ionosphere, so that once refraction and total internal reflection sends it down to the earth, the signal travels a greater distance horizontally in terms of two points on the earth. Additionally, the signal encounters less interference as it travels, so the signal is both clearer and stronger at night. During the day, the D and E layers are both present and there is more ionospheric activity, so by the same reasoning the signal ends up noisier and weaker. The activity from both the sun, which is now present in the sky, and the ionosphere, create more noise as well.

g) Is there a time in your data where it looks like you have no signal at all?

___ No

_X__ Yes, between the following UT times: _12:04_ and _19:49_

Can you explain this? (If not, note that the transmitters often are taken down for maintenance and you may have found one of those times.) Either there was a glitch in the system, or the transmitter was shut down for maintenance (9/18/2006).

h) If your monitor picked up a solar flare, it would appear as a sudden spike (or occasionally a sudden drop) in signal strength. And only during the daytime (why?). Because at night we do not face the sun, so we do not pick it up.

NO Do you think you found a flare?

If so, at what (UT) time? ____No Flare____

If you'd like to check, the SID manual tells you how to track down a flare.

i) Read the sheet on how the ionosphere changes during the daytime, nighttime, during a solar flare, and during a lightning storm. Can you identify any lightning storms in your data?

_X_ No, there were no lightning storms. However we found disturbances at 15:45, 16:00(9/20/06), 17:00 (9/23/06), 13:00-16:00, 17:00-18:00, 19:30 (9/24/06); these are not lightning storms because the occurred during the daytime and lighting storms are not picked up unless they occur during the night.

Name _____

SID Monitor Sunrise/Sunset Worksheet

Analyze the data from 9/17/2006-9/24/2006
File can be found N:\Courses\Rod Physics\SOLARSID\Data

My monitor is located in: Cincinnati, Ohio Timezone: _EST_
The transmitter is located in: Cutler, Maine Timezone: _EST_

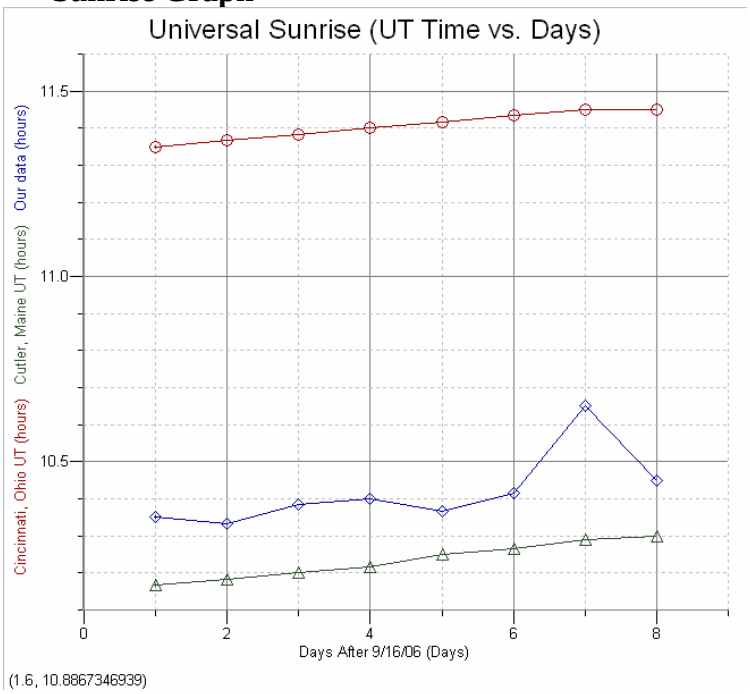
	Data Sunrise (UT)	*Local Sunrise (UT)*	*Transmitter Sunrise (UT)*
Day 1	**10:21**	**11:21**	**10:10**
Day 2	**10:20**	**11:22**	**10:11**
Day 3	**10:23**	**11:23**	**10:12**
Day 4	**10:24**	**11:24**	**10:13**
Day 5	**10:22**	**11:25**	**10:15**
Day 6	**10:25**	**11:26**	**10:16**
Day 7	**10:26**	**11:27**	**10:17**

To find sunrise and sunset times, see http://aa.usno.navy.mil/data/docs/RS_OneDay.html
To convert from local to UT time, see http://www.timezoneconverter.com/cgi-bin/tzc.tzc

	Data Sunset (UT)	*Local Sunset (UT)*	*Transmitter Sunset (UT)*
Day 1	23:59	23:43	22:36
Day 2	23:52	23:42	22:34
Day 3	23:57	23:40	22:32
Day 4	23:56	23:38	23:30
Day 5	23:46	23:37	23:28
Day 6	23:52	23:35	23:26
Day 7	23:41	23:34	23:25

Replace the graphs below with your graphs from Graphical Analysis

Sunrise Graph



Sunset