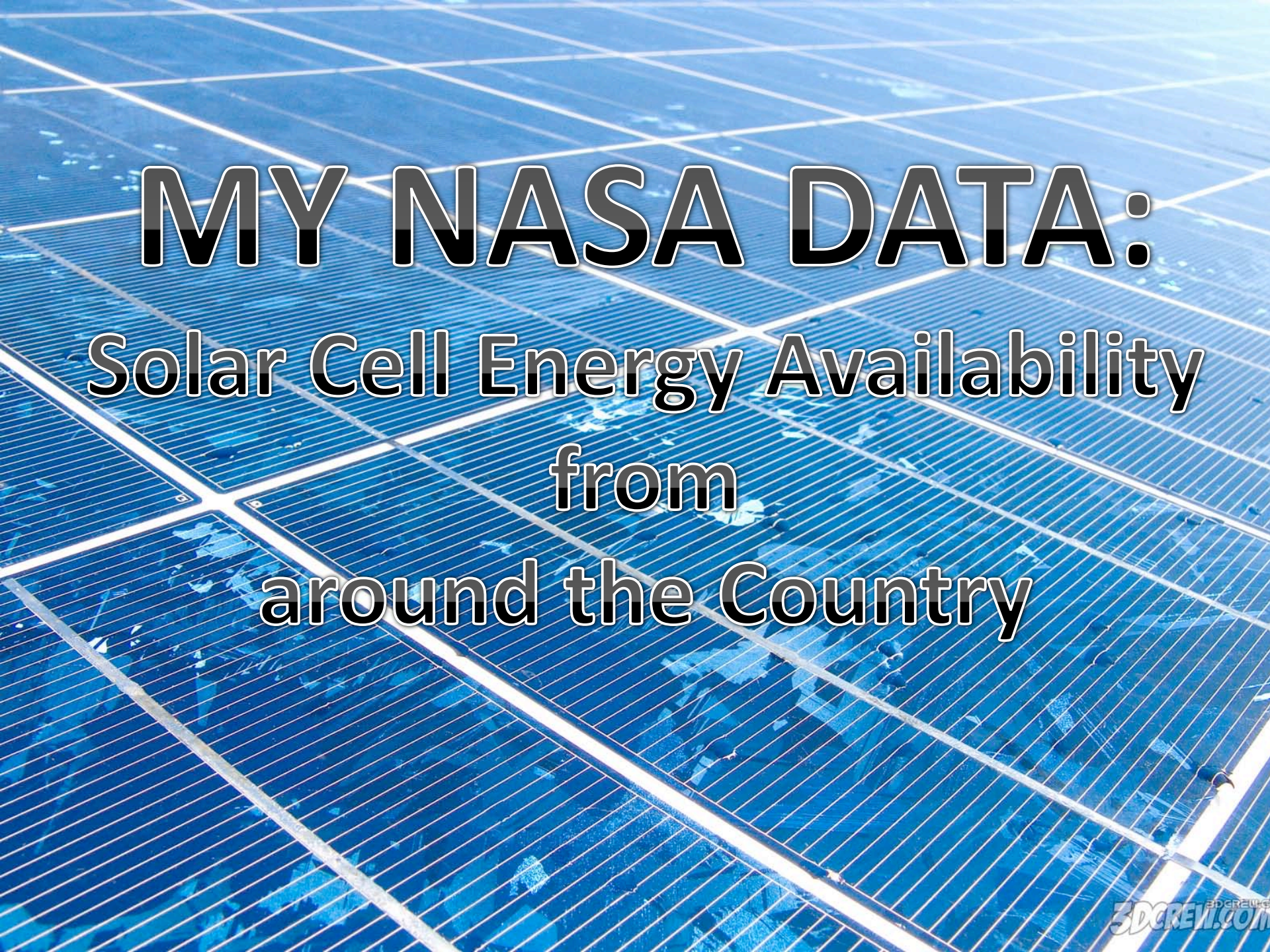

MY NASA DATA:
Solar Cell Energy Availability
from
around the Country

What are solar cells?

Let's get Thinking

If you wanted to live in an area where you could wear a jacket year round, how would you identify these areas?

One of the best ways would be to use satellite data. If you had to use a solar powered RV to travel, you would have to find areas in the country with enough solar radiation to support the vehicle. This can also be done using satellite data.

The Problem

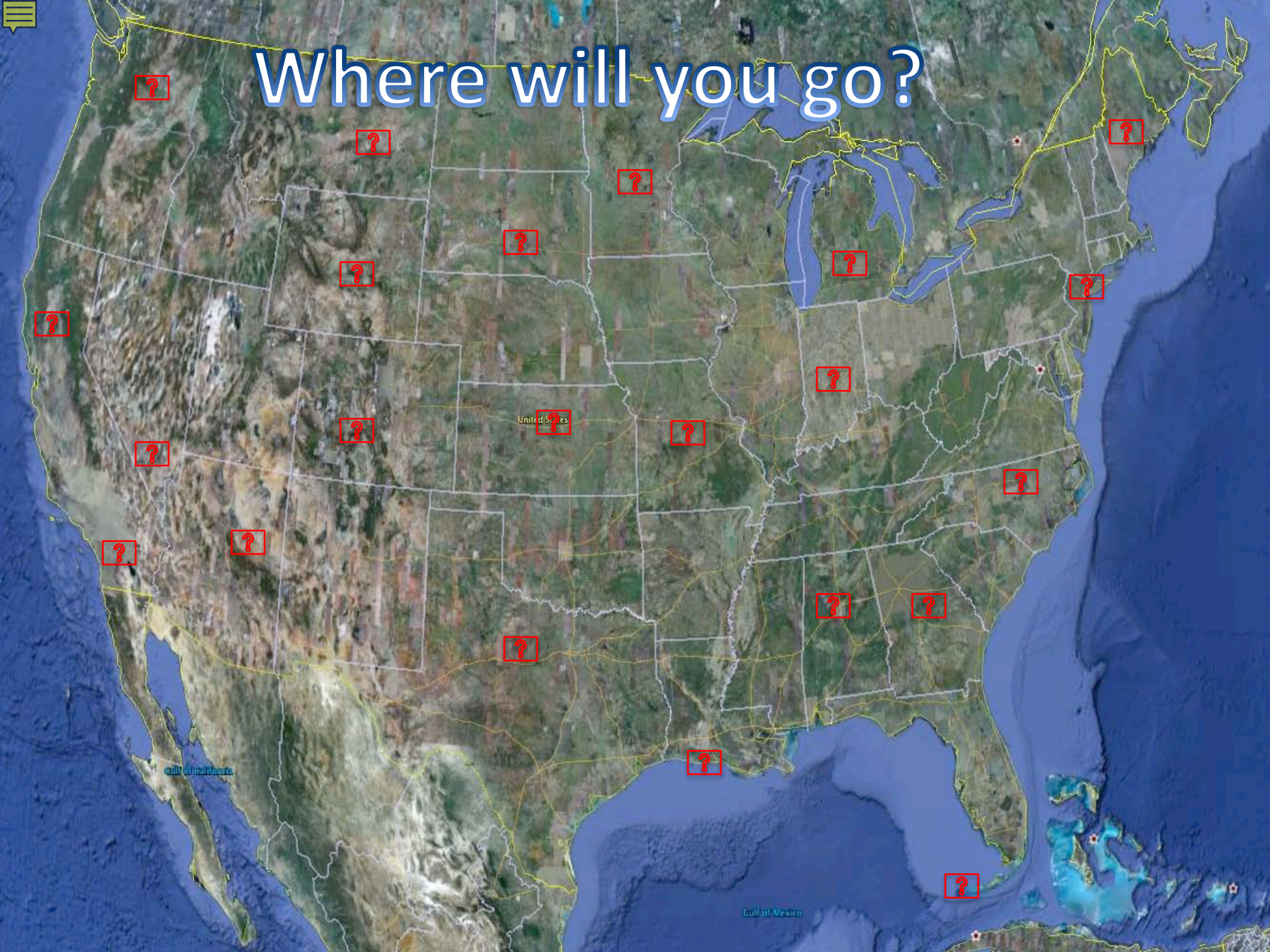
Congratulations! You have finally made it. You are the star you always wanted to be. However, the life of a rock star requires months on the road. Luckily you have plenty of money and a very nice 40' long Motor Home whose electricity is powered by solar panels. Life will change, and being successful means you can't always live at home. Your manager requires you to do the following things:

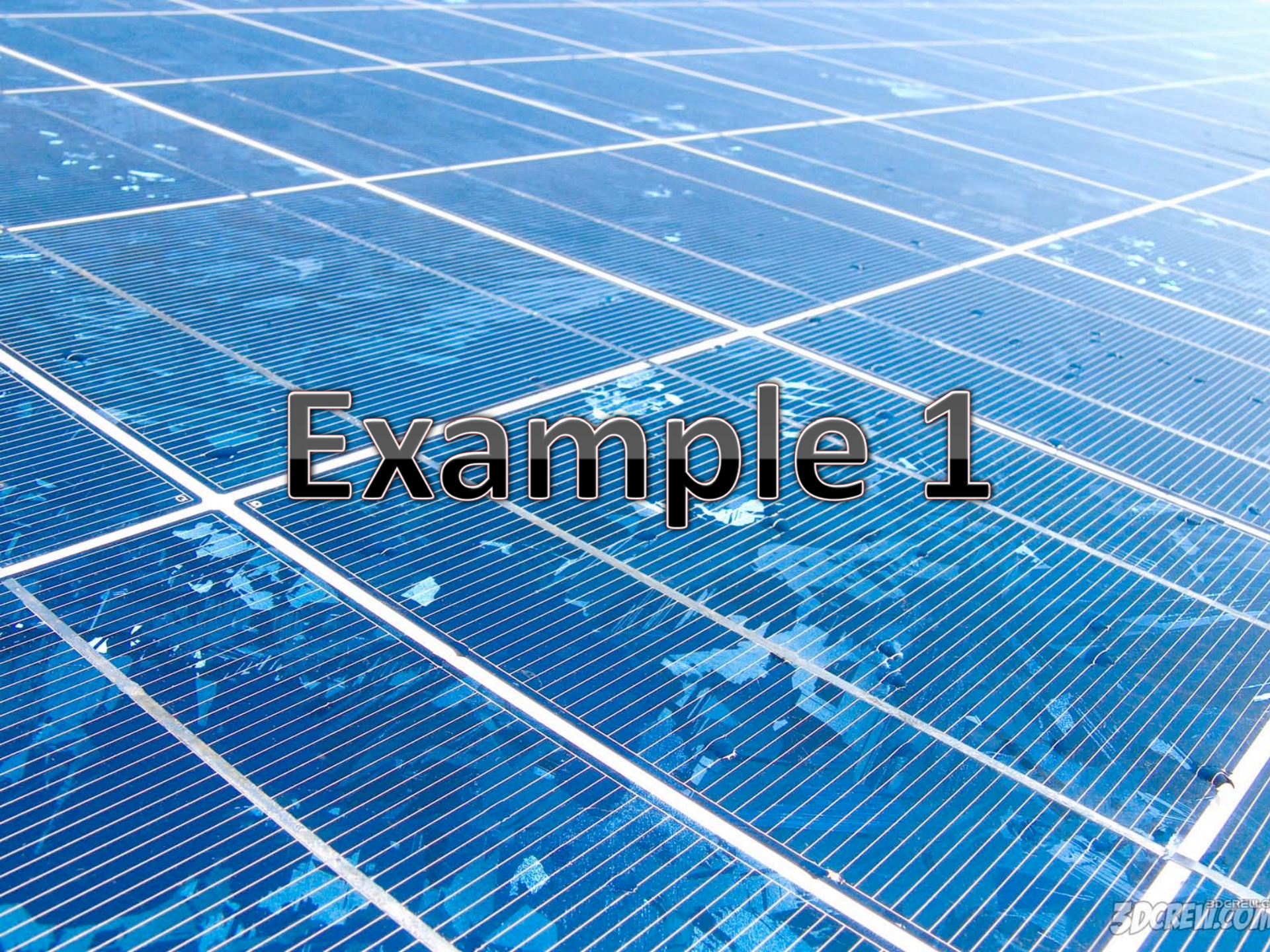
- For stability, you will live part of every year in Sheridan, Wyoming

- Since your performances take you to various parts of the country throughout the year, you must live in at least one other place, but you may only live in a maximum of 4 places throughout the year.

- Every place you live must have an average monthly sunlight of 100 watts/m^2 in order to run your needed electrical power for your home.

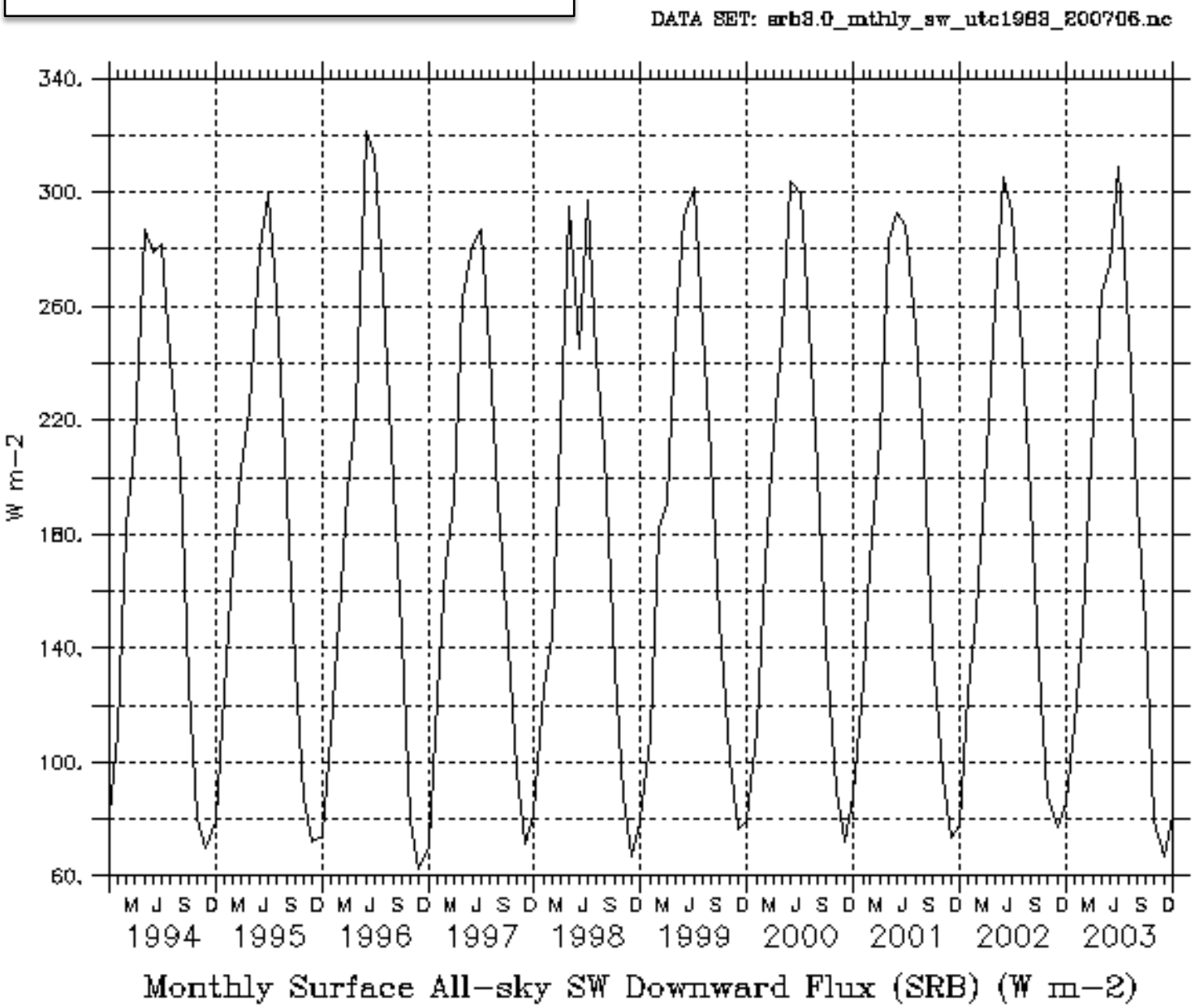

Solar Cells on
the Move

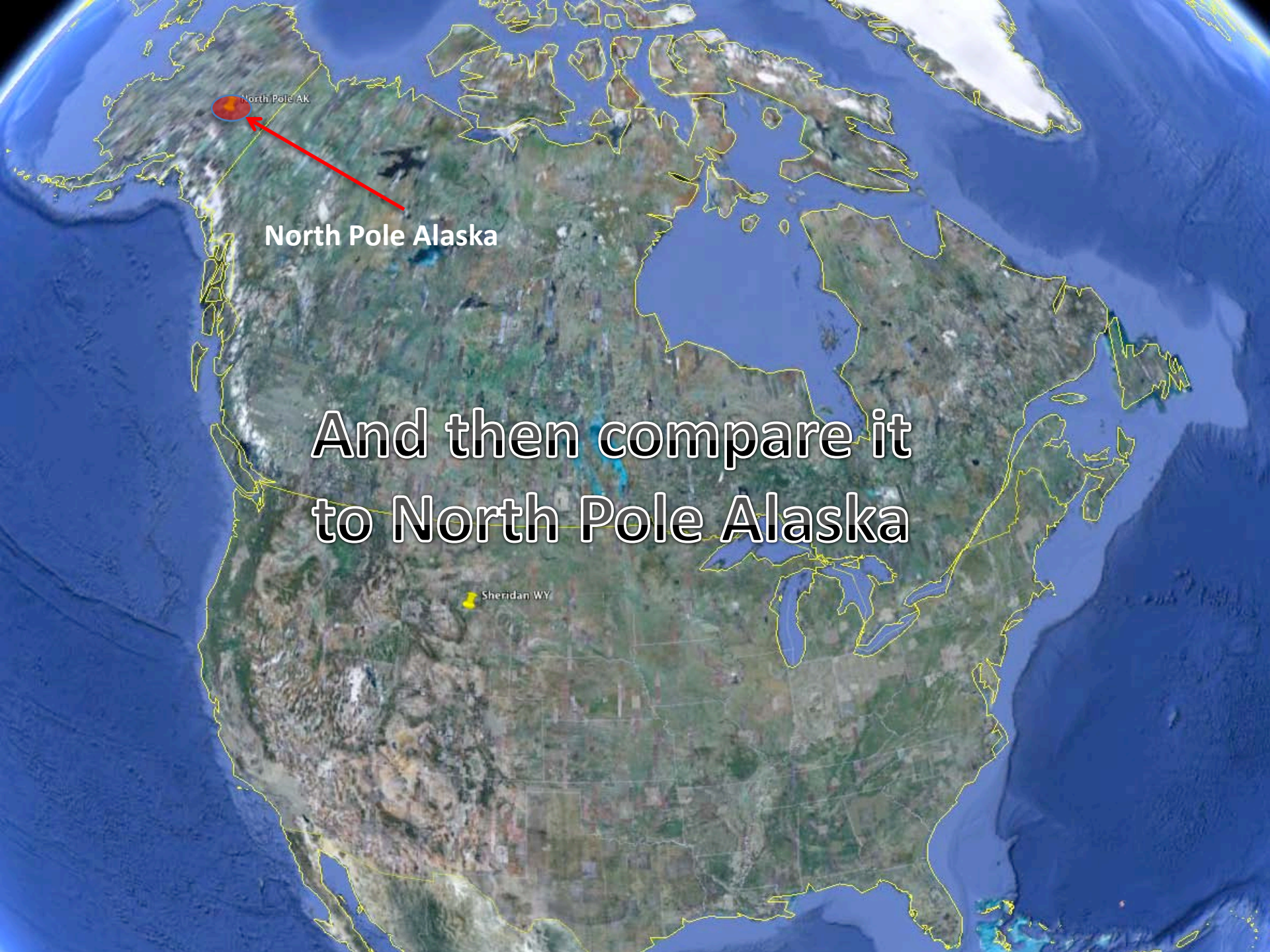

Where will you go?
Gulf of Mexico


Example 1


North Pole AK
Lets start in
Sheridan Wyoming
Sheridan WY
Sheridan Wyoming

Sheridan, Wyoming

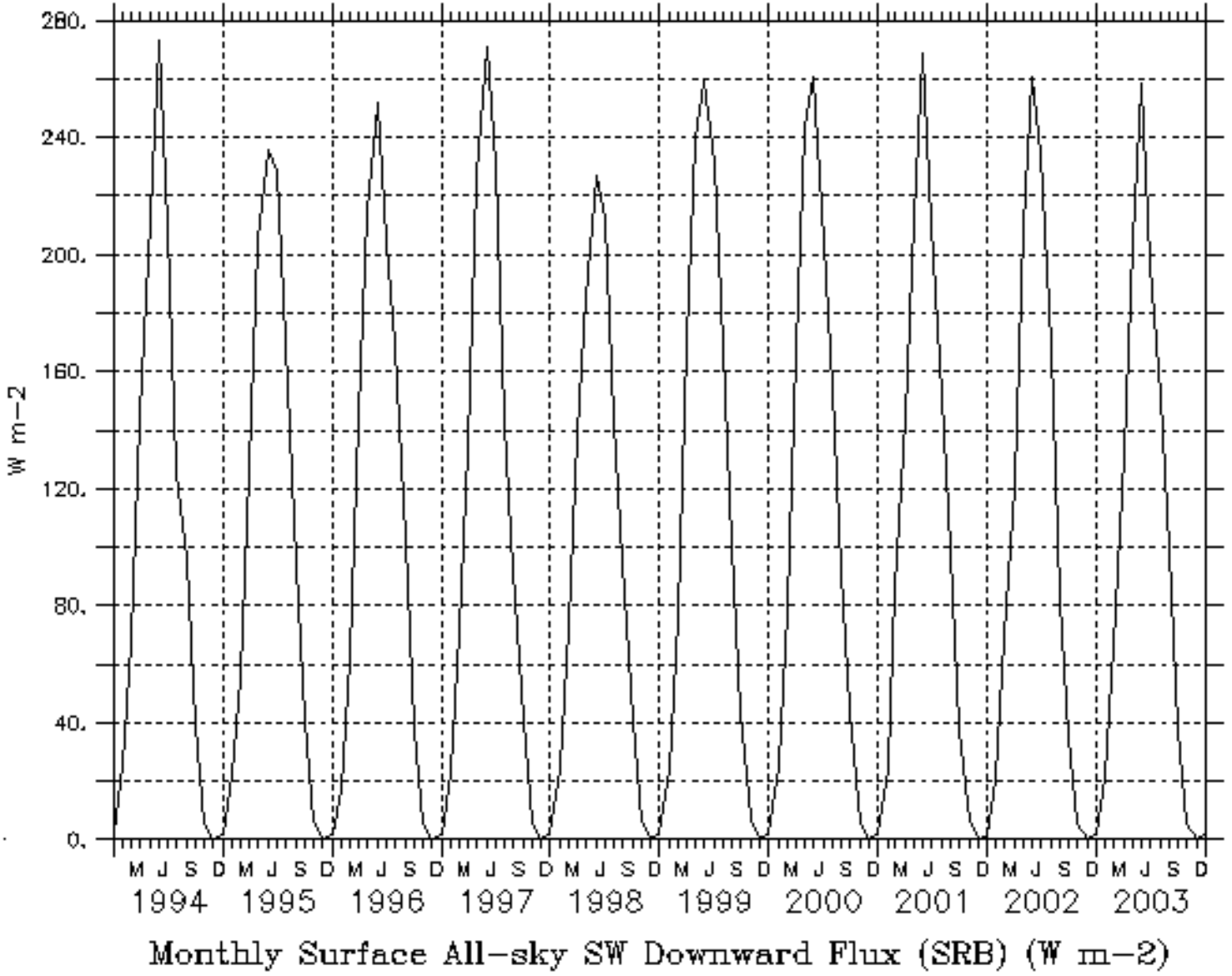



North Pole AK
North Pole Alaska
And then compare it
to North Pole Alaska
Sheridan WY

LAS 7.+/Ferret 6.1 NOAA/PMEL

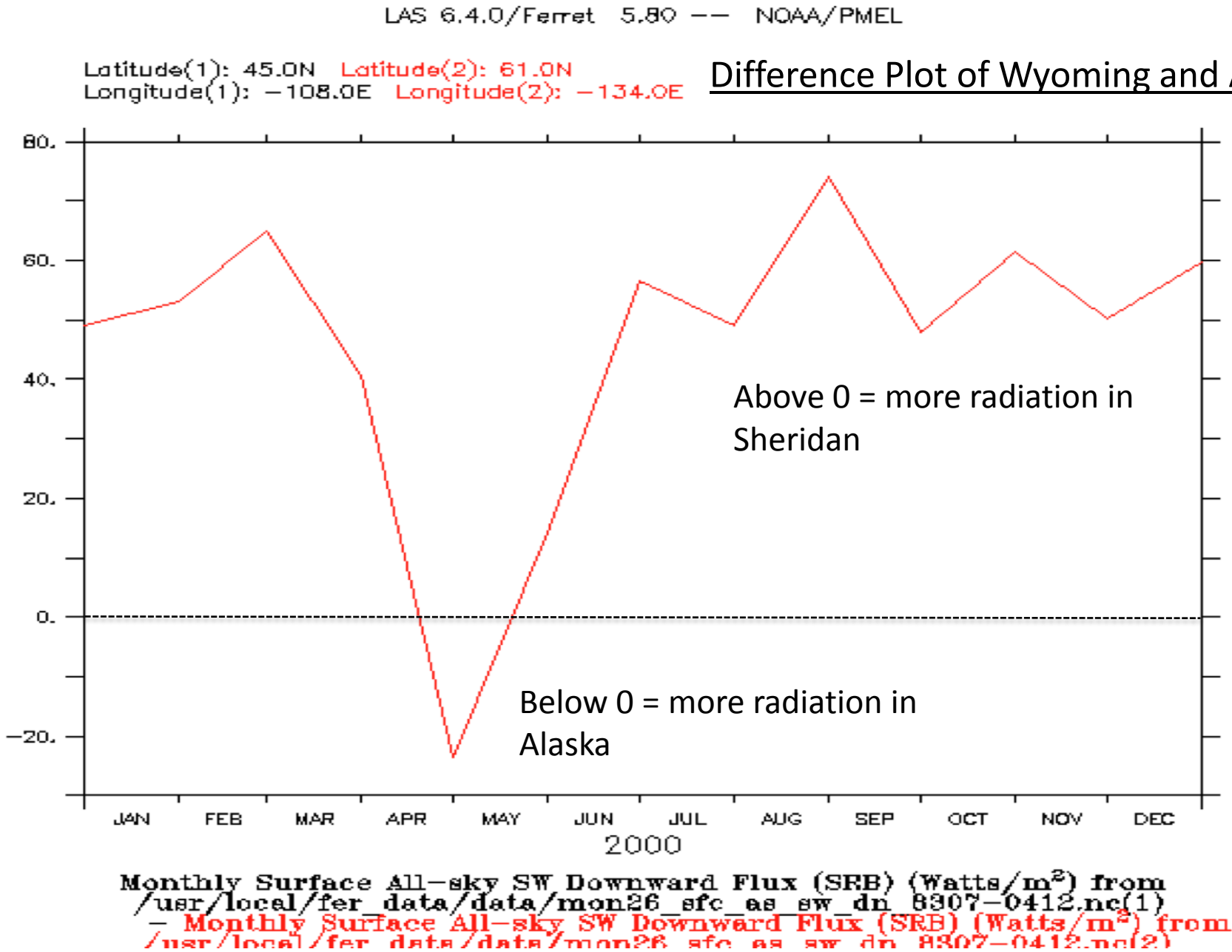
North Pole, Alaska

DATA SET: srb3.0_mthly_sw_utc1983_200706.nc



Monthly Surface All−sky SW Downward Flux (SRB) (W m−2)

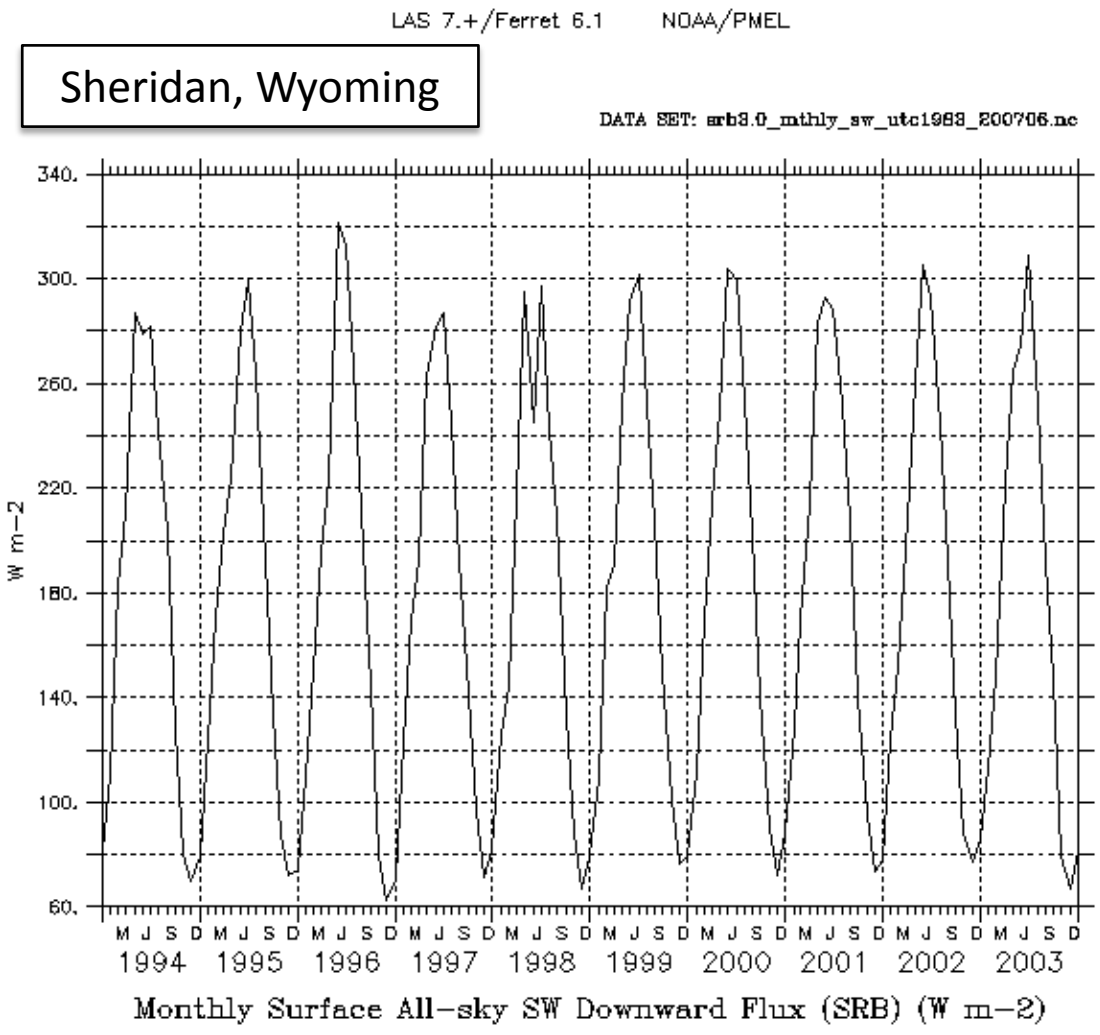
Difference Plot of Wyoming and Alaska



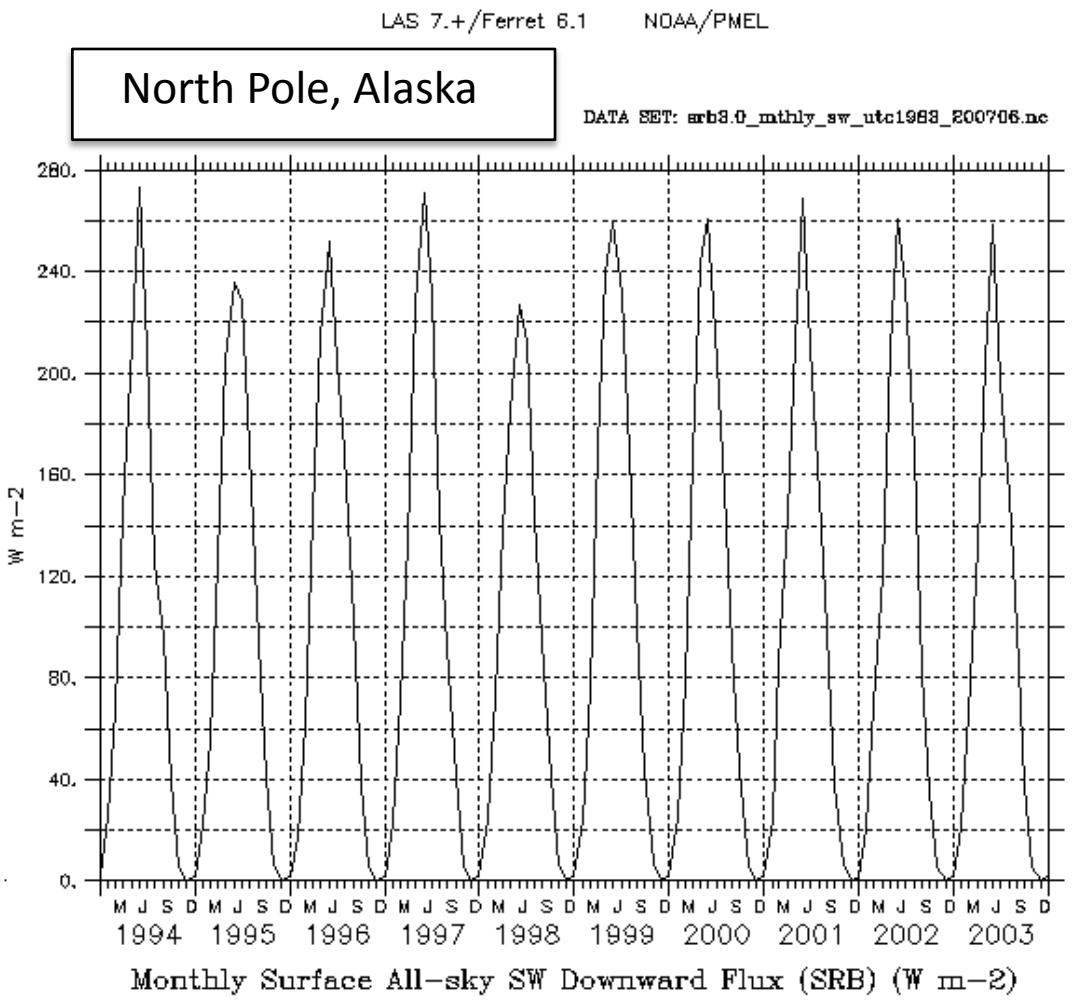
Questions from Part 1

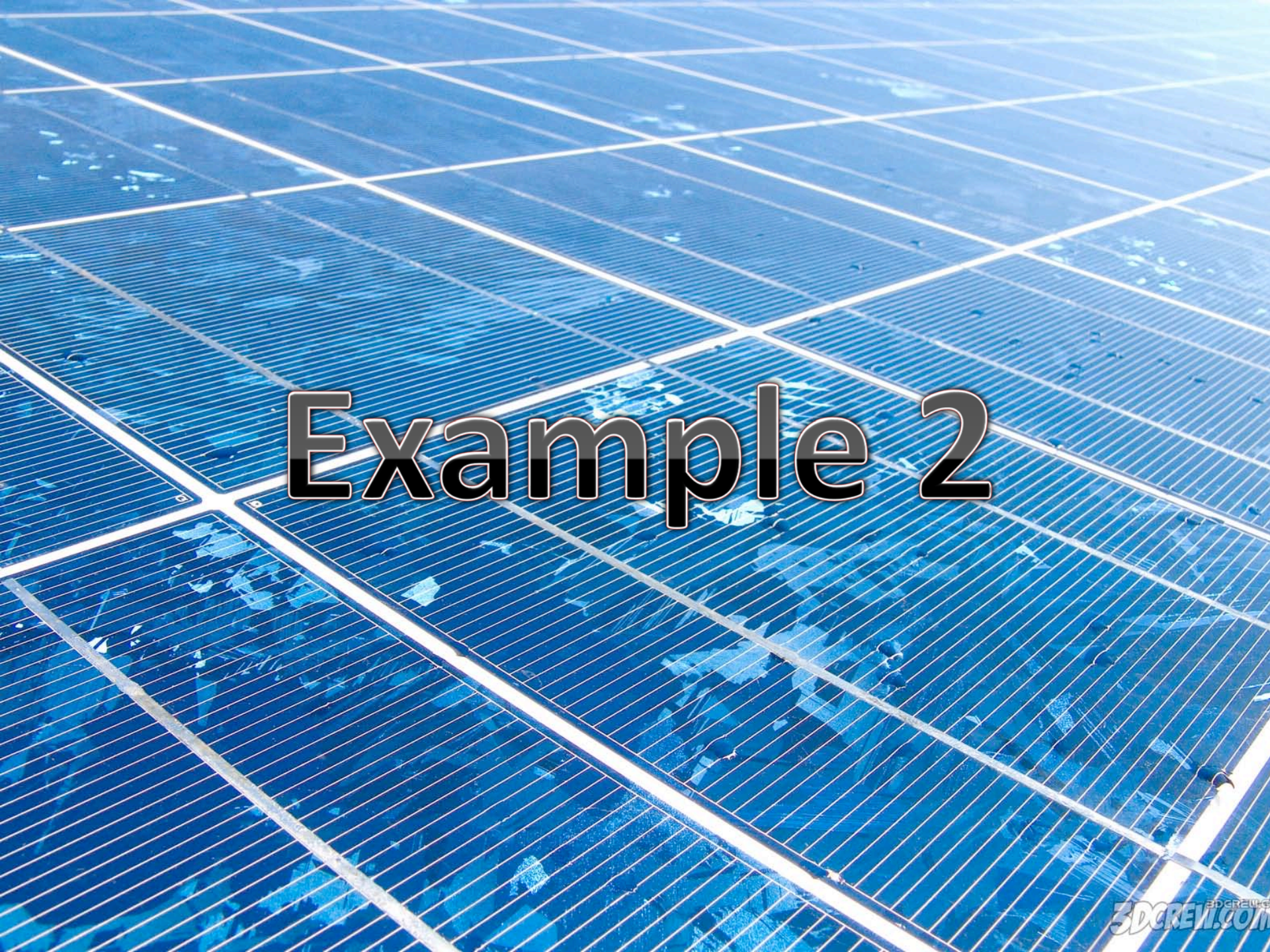
- What did Sheridan look like over 10 years?
- What did Alaska look like over 10 years?
- Were there seasonal changes in both locations ?
- What were the side scales in the overlay plot? What were the units?

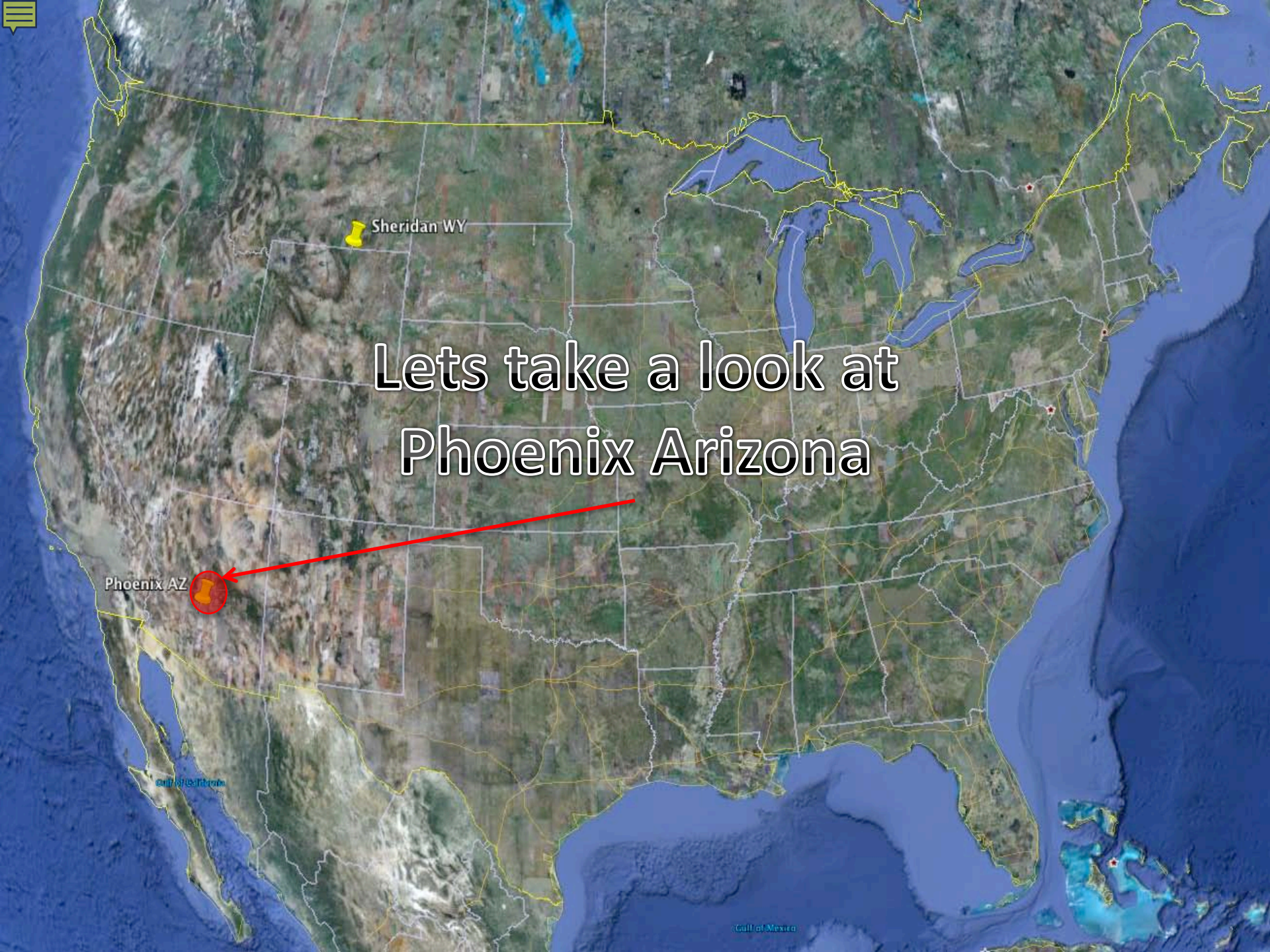
- What did Sheridan look like over 10 years?
- Were there seasonal changes in Sheridan?
- What were the side scales in the overlay plot? What were the units?



- What did Alaska look like over 10 years?
- What were the seasonal changes in North Pole Alaska?
- What were the side scales in the overlay plot? What were the units?



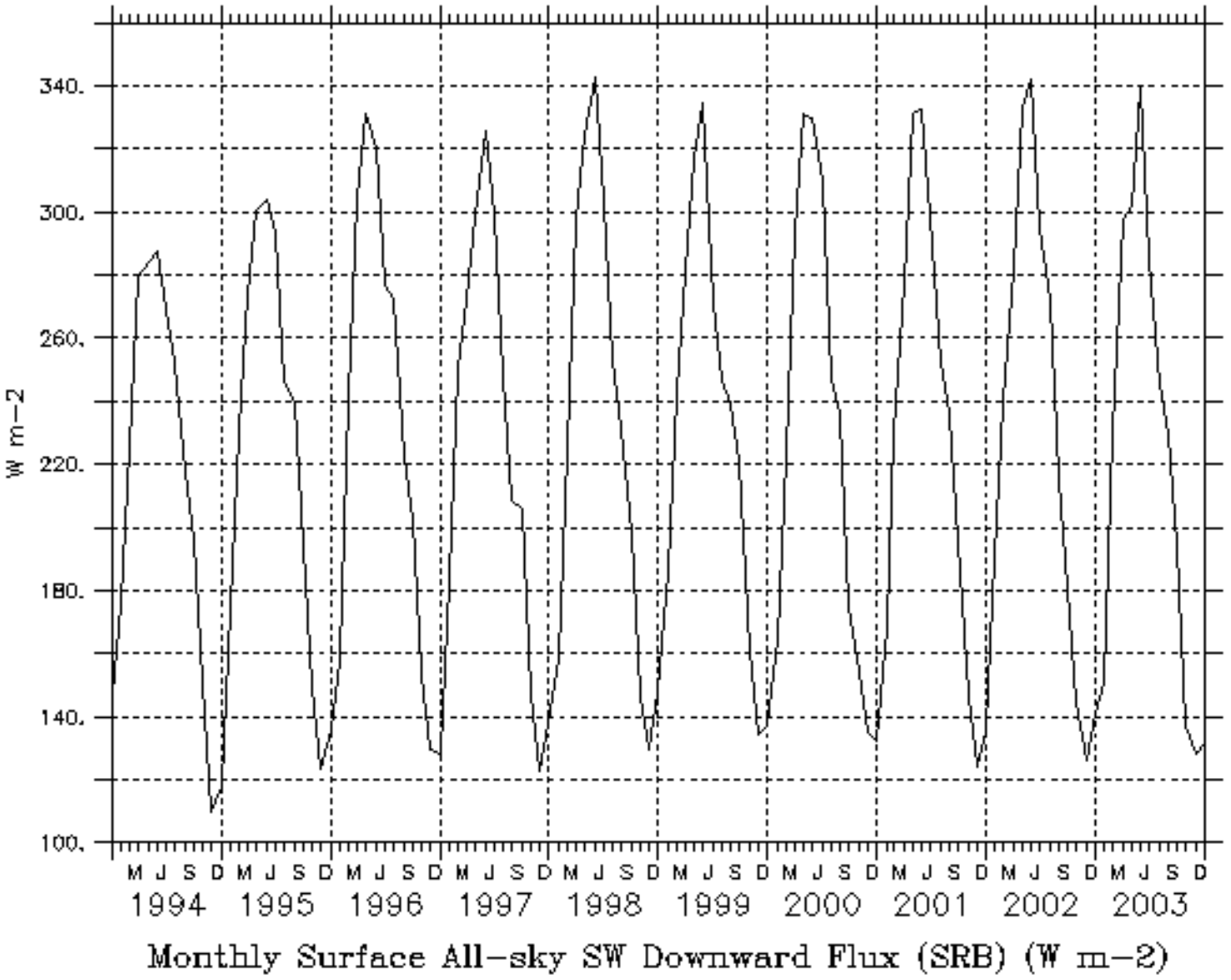

Example 2


Sheridan WY
Lets take a look at
Phoenix Arizona
Phoenix AZ
Gulf of Mexico

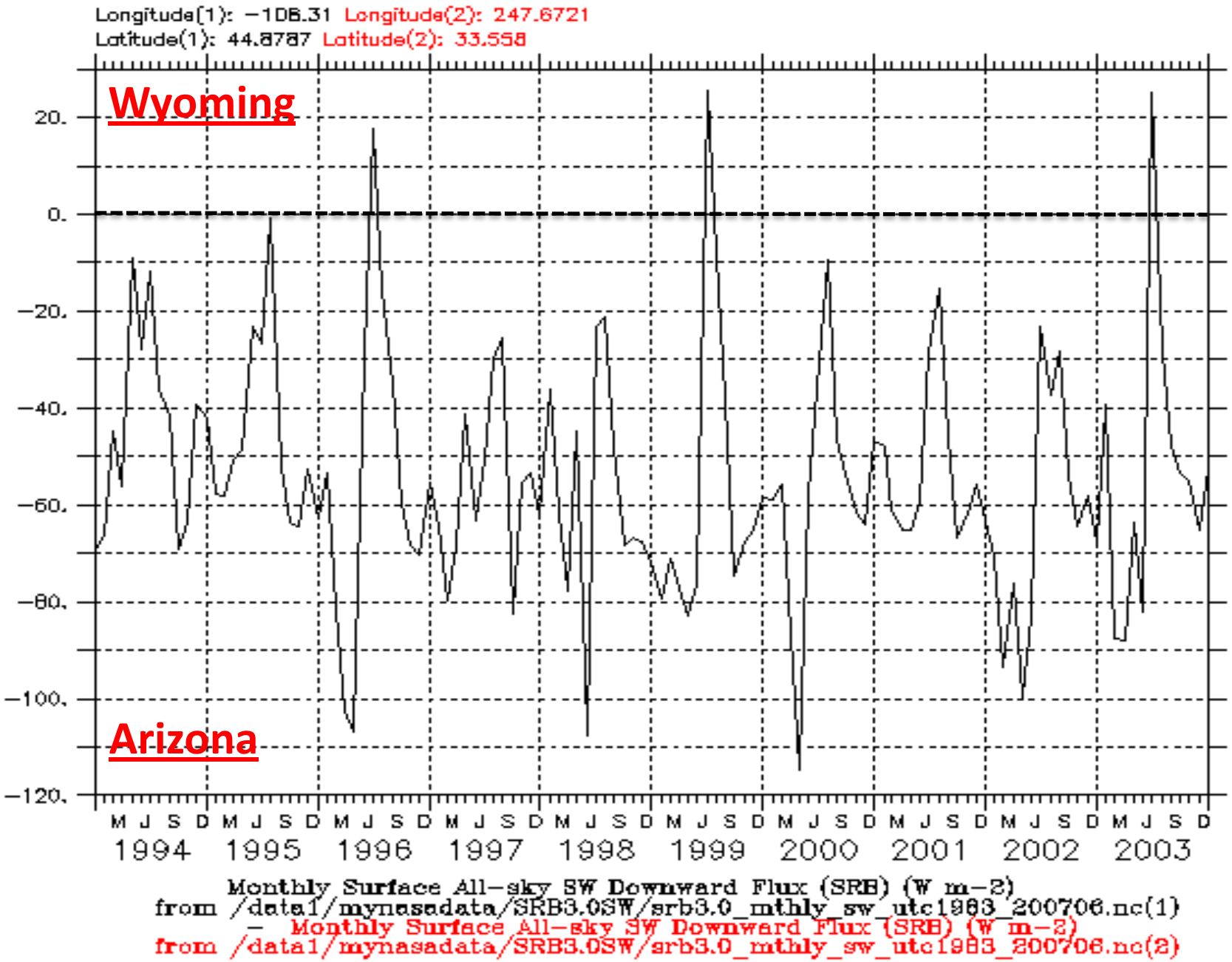
LAS 7.+/Ferret 6.1 NOAA/PMEL

Phoenix, Arizona

DATA SET: srb3.0_mthly_sw_utc1983_200706.nc



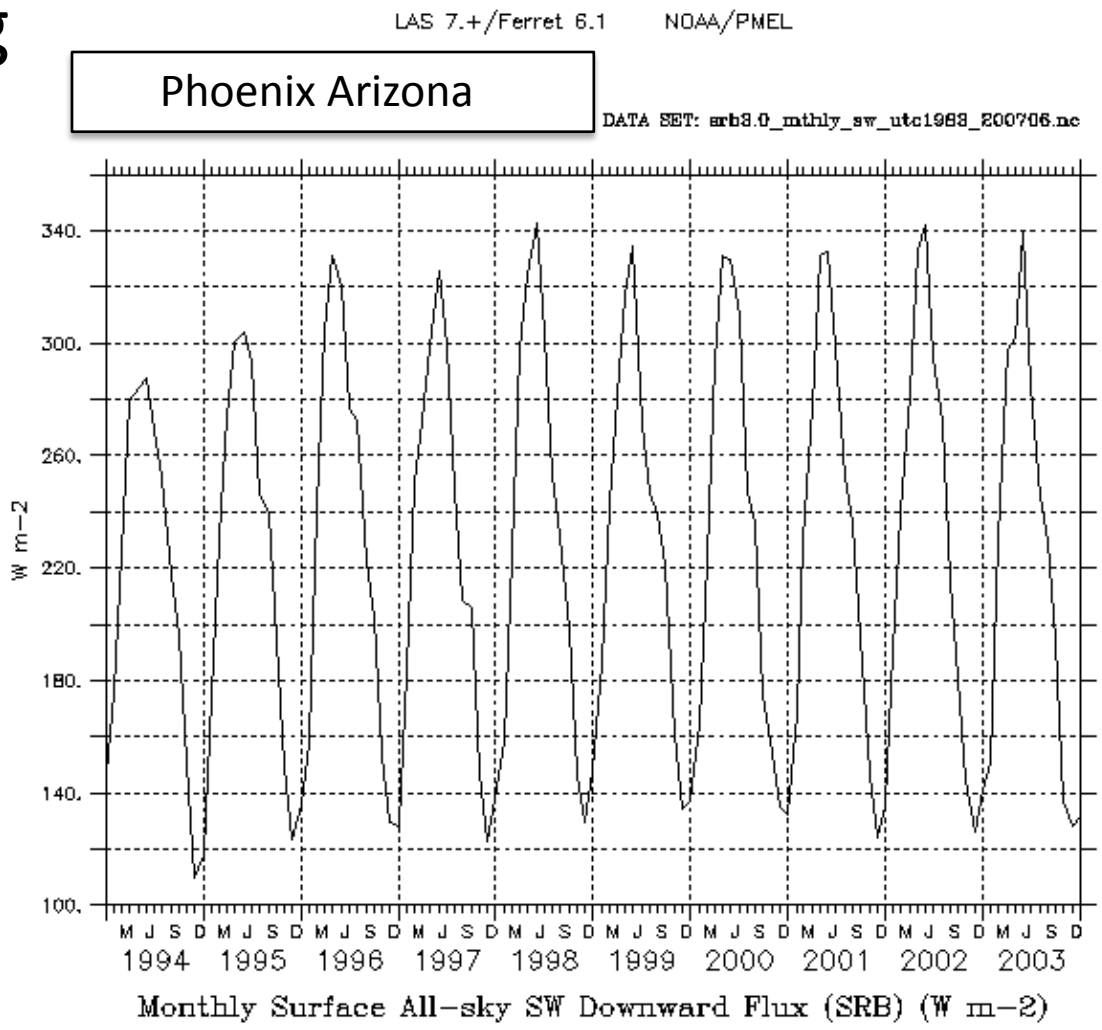
Monthly Surface All-sky SW Downward Flux (SRB) (W m-2)

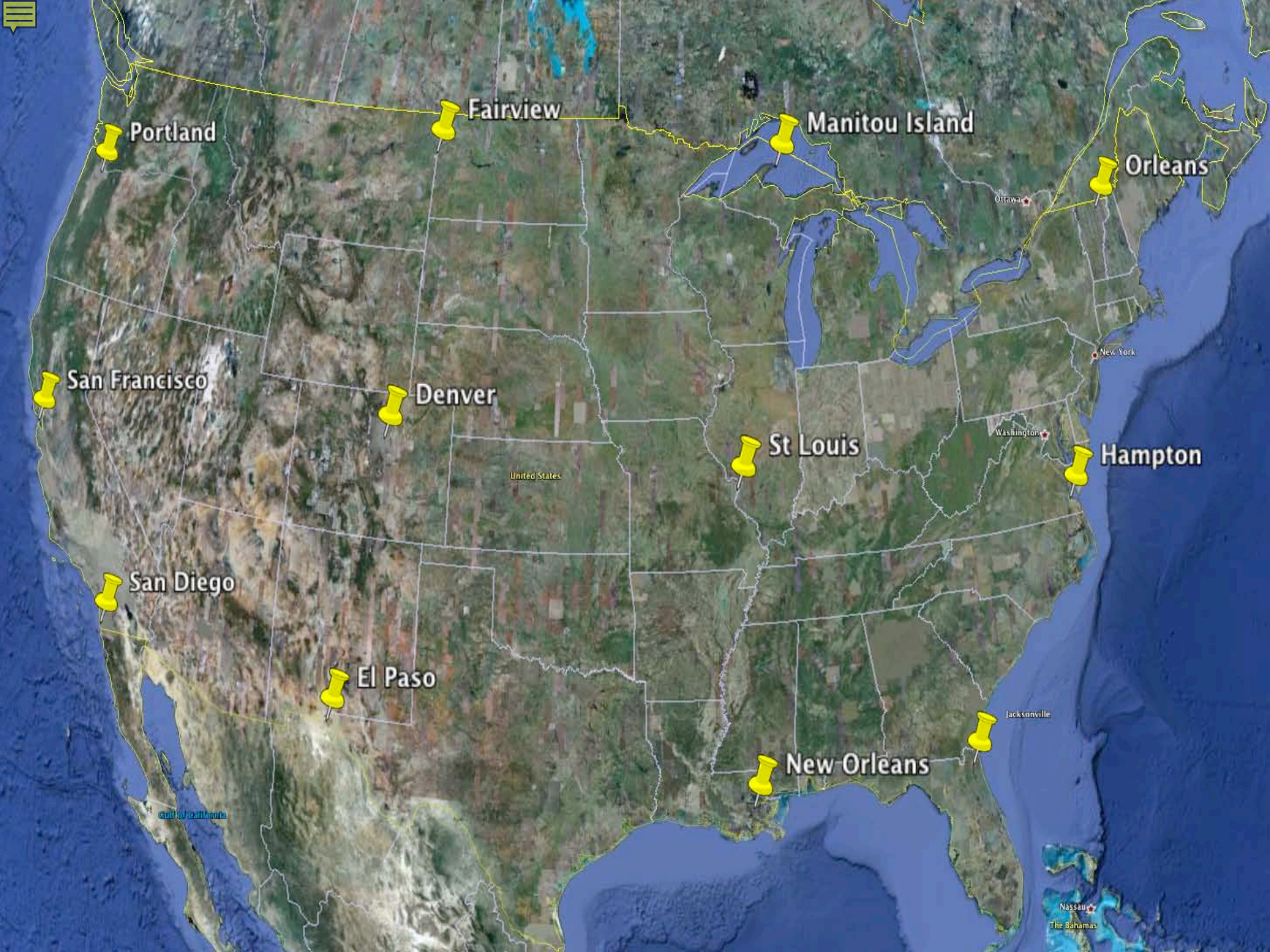

Longitude(1): −108.31 Longitude(2): 247.6721
Latitude(1): 44.8787 Latitude(2): 33.558
Wyoming
Arizona
20.
0.
−20.
−40.
−60.
−80.
−100.
−120.
M J S D M J S D M J S D M J S D M J S D M J S D M J S D M J S D M J S D
1994 1995 1996 1997 1998 1999 2000 2001 2002 2003
Monthly Surface All−sky SW Downward Flux (SRB) (W m−2)
from /data1/mynasadata/SRB3.0SW/srb3.0_mthly_sw_utc1983_200706.nc(1)
Monthly Surface All−sky SW Downward Flux (SRB) (W m−2)
from /data1/mynasadata/SRB3.0SW/srb3.0_mthly_sw_utc1983_200706.nc(2)

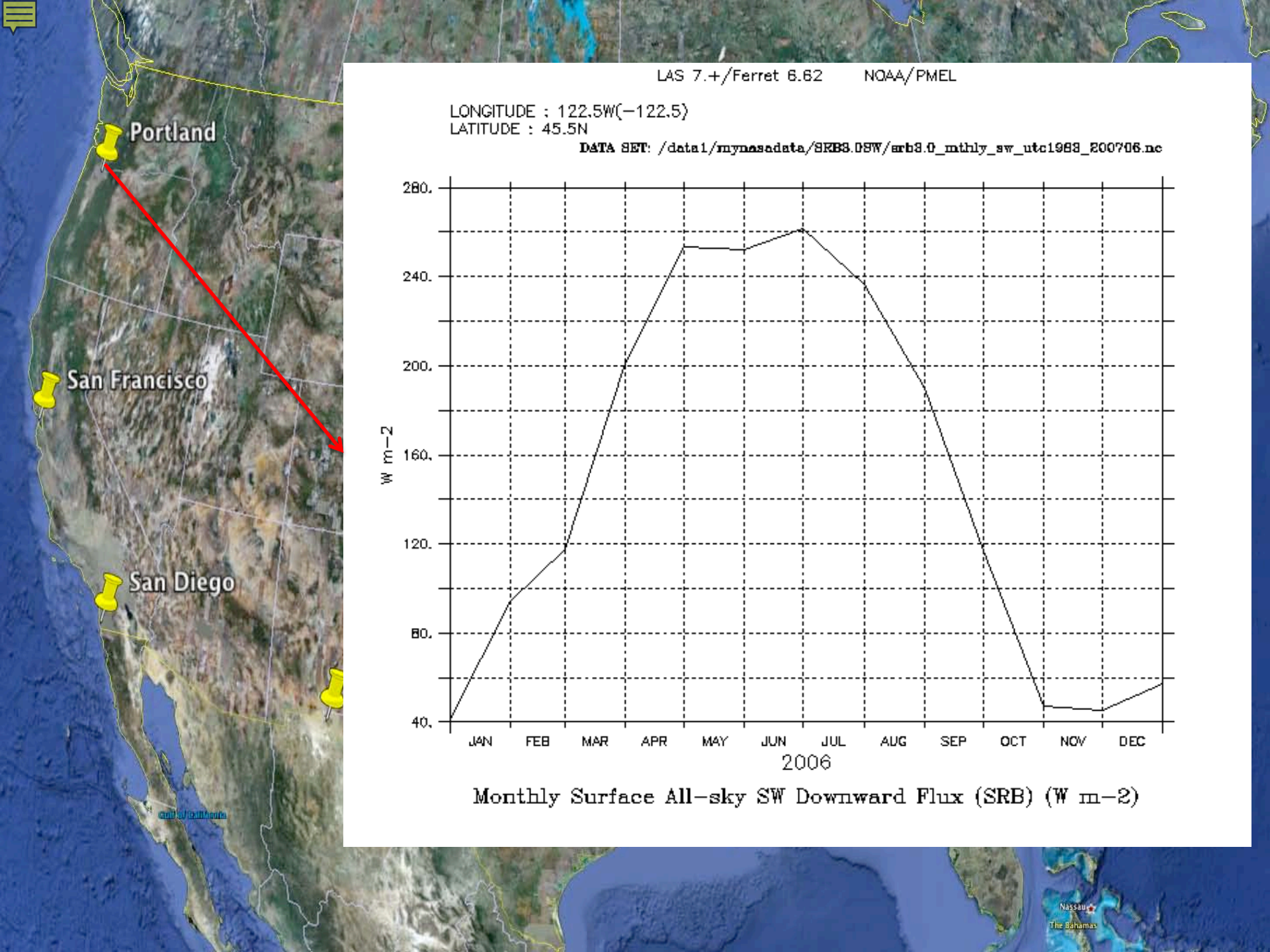
Questions about Arizona

- What trends do you see for the long range?
- Can you find trends in the year?
- After looking at the difference plot, what can you conclude about the two locations?

- What trends do you see for the long range?
- Can you find trends in the year?
- After looking at the difference plot, what can you conclude about the two locations?




Portland
Fairview
Manitou Island
Orleans
San Francisco
Denver
St Louis
Hampton
San Diego
El Paso
New Orleans
Ottawa
New York
Washington
United States
Jacksonville
Nassau
The Bahamas


Portland
San Francisco
San Diego
LAS 7.+/Ferret 6.62 NOAA/PMEL
LONGITUDE : 122.5W(-122.5)
LATITUDE : 45.5N
DATA SET: /data1/mynasadata/SRB3.0SW/srb3.0_mthly_sw_utc1983_200706.nc
280.
240.
200.
160.
120.
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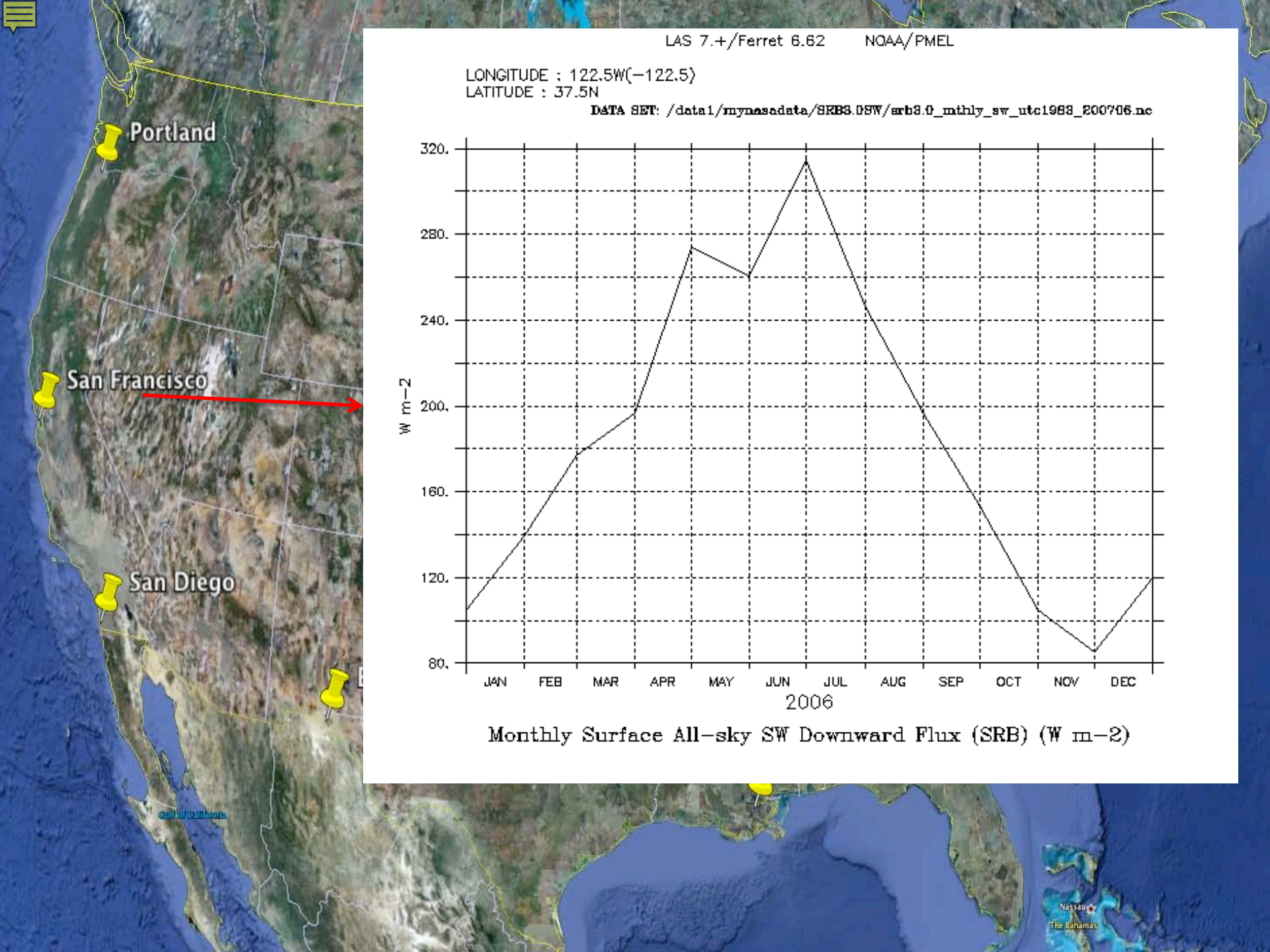
40.
W m-2
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
2006
Monthly Surface All-sky SW Downward Flux (SRB) (W m-2)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San Francisco
San Diego
LAS 7.+/Ferret 6.62 NOAA/PMEL
LONGITUDE : 122.5W(-122.5)
LATITUDE : 37.5N
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W m-2
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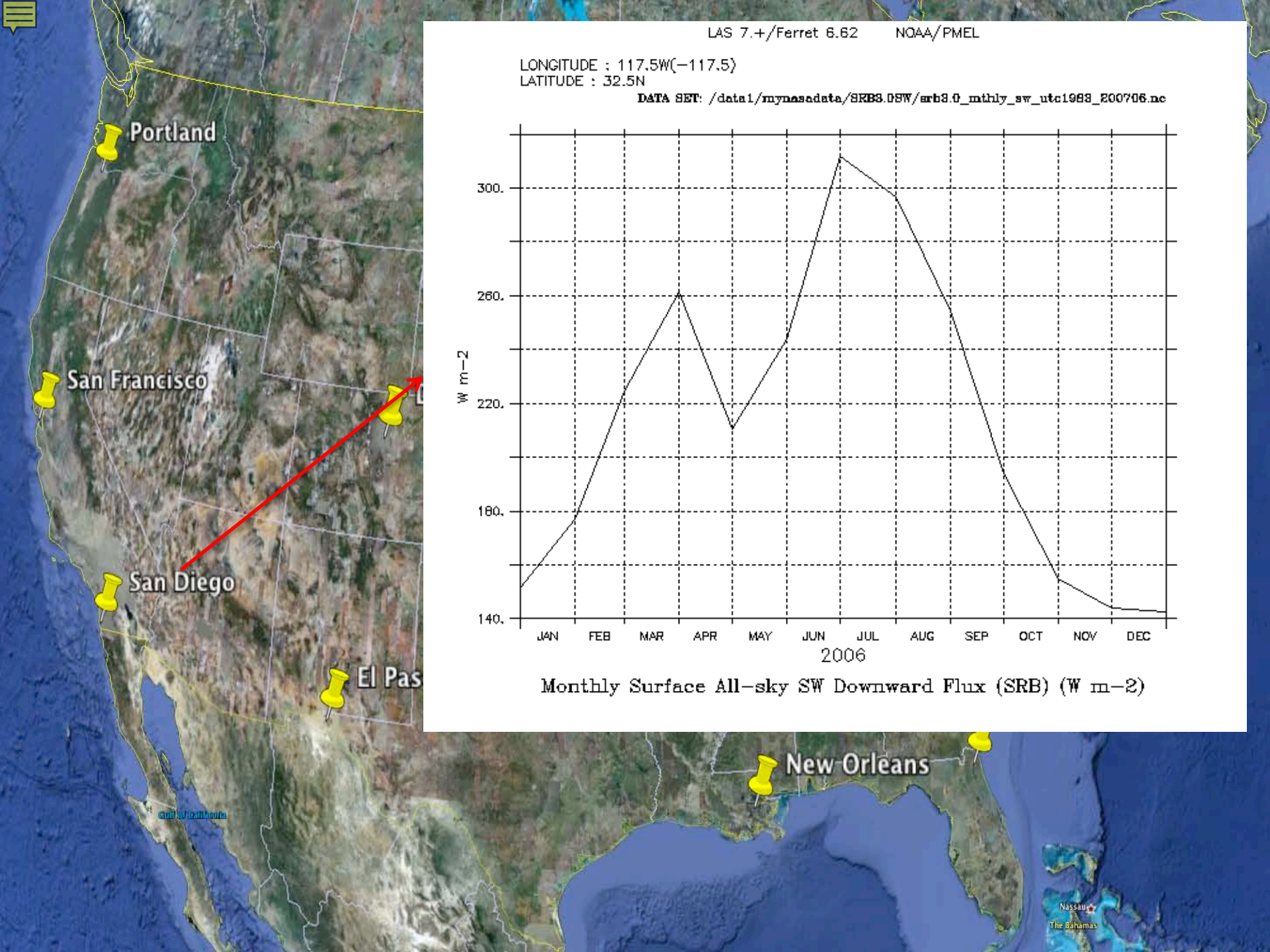
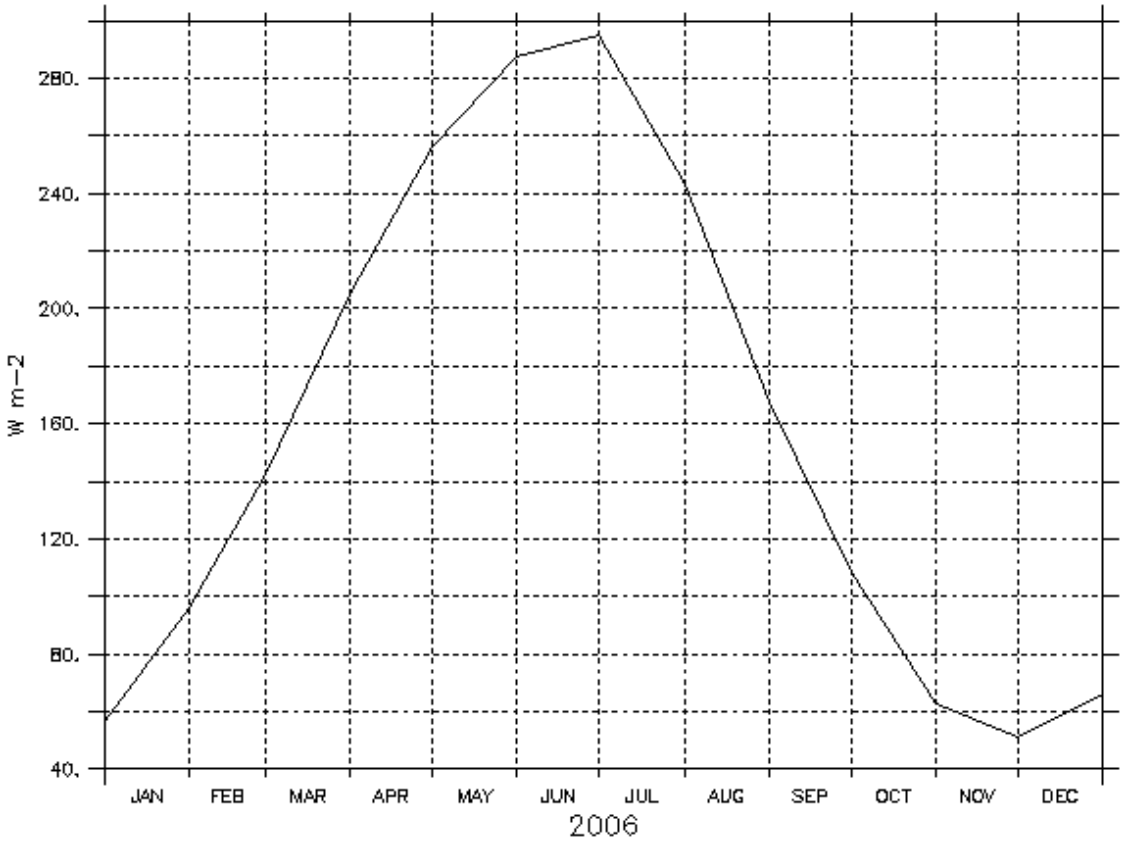
OCT
NOV
DEC
2006
Monthly Surface All-sky SW Downward Flux (SRB) (W m-2)
Nassau
The Bahamas


Portland
San Francisco
San Diego
El Pas
New Orleans
Nassau
The Bahamas
LAS 7.+/Ferret 6.62 NOAA/PMEL
LONGITUDE : 117.5W(-117.5)
LATITUDE : 32.5N
DATA SET: /data1/mynasadata/SRB3.0SW/srb3.0_mthly_sw_utc1983_200706.nc
W m-2
300.
260.
220.
180.
140.
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
2006
Monthly Surface All-sky SW Downward Flux (SRB) (W m-2)

LAS 7.+/Ferret 6.62 NOAA/PMEL

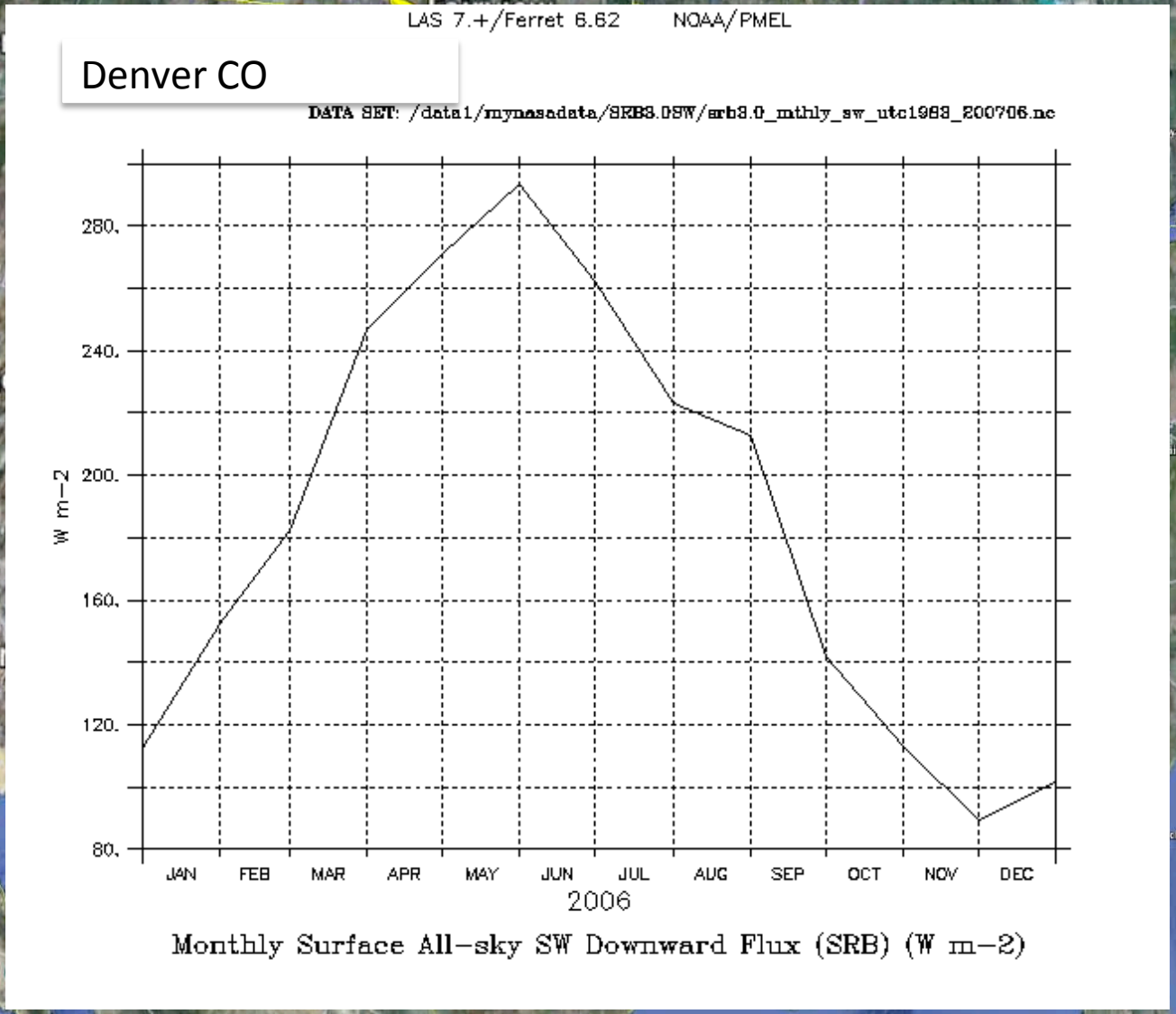
LONGITUDE : 104.5W(-104.5)
LATITUDE : 47.5N

DATA SET: /data1/mynasadata/SRB3.0SW/srb3.0_mthly_sw_utc1983_200706.nc



Monthly Surface All-sky SW Downward Flux (SRB) (W m-2)

Denver CO


LAS 7.+/Ferret 6.62 NOAA/PMEL
DATA SET: /data1/mynasadata/SRB3.0SW/srb3.0_mthly_sw_utc1983_200706.nc
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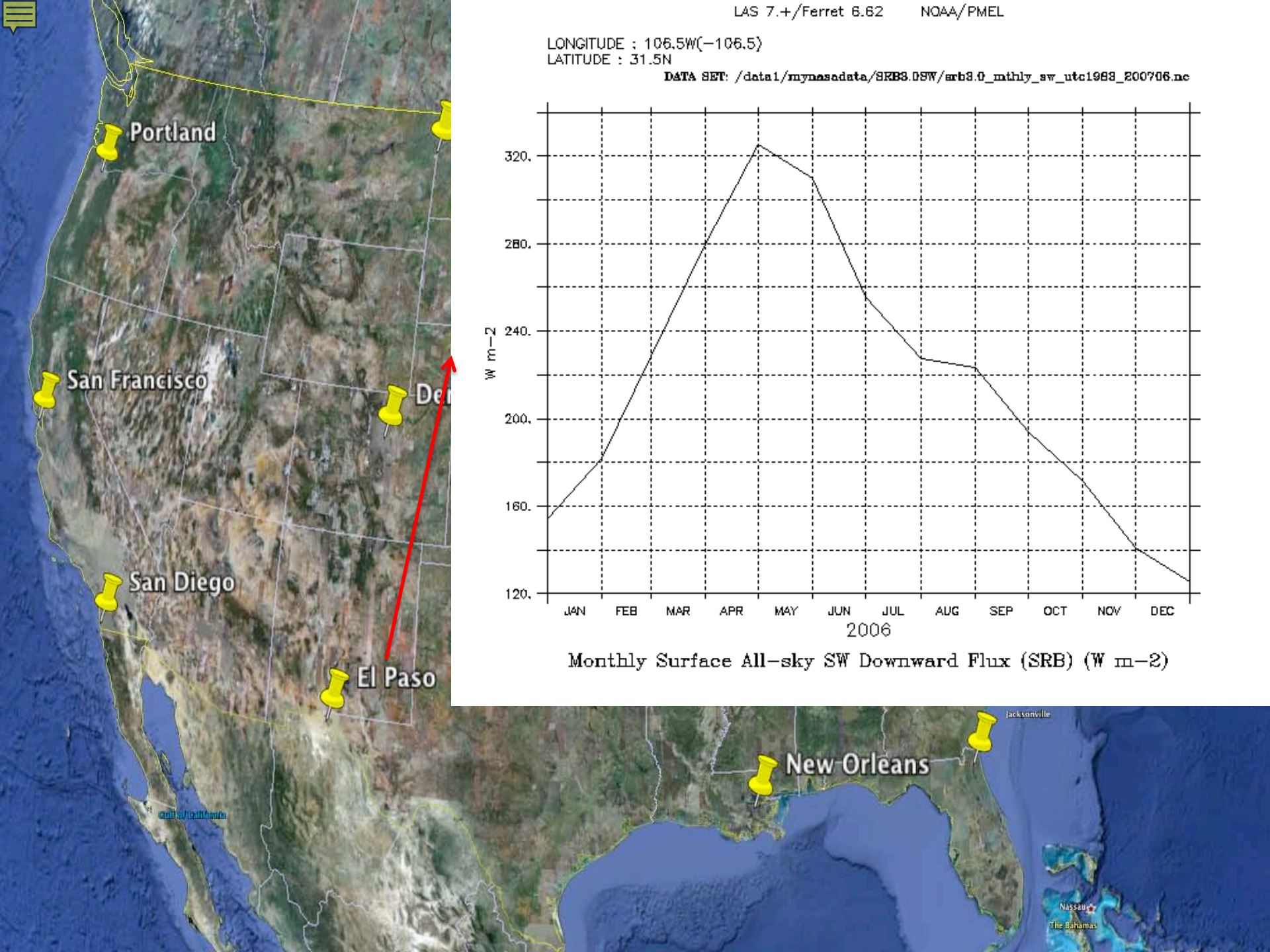
DEC
2006
Monthly Surface All−sky SW Downward Flux (SRB) (W m−2)


Portland
San Francisco
San Diego
El Paso
New Orleans
Jacksonville
Nassau
The Bahamas
LAS 7.+/Ferret 6.62 NOAA/PMEL
LONGITUDE : 106.5W(-106.5)
LATITUDE : 31.5N
DATA SET: /data1/mynasadata/SRB3.0SW/srb3.0_mthly_sw_utc1983_200706.nc
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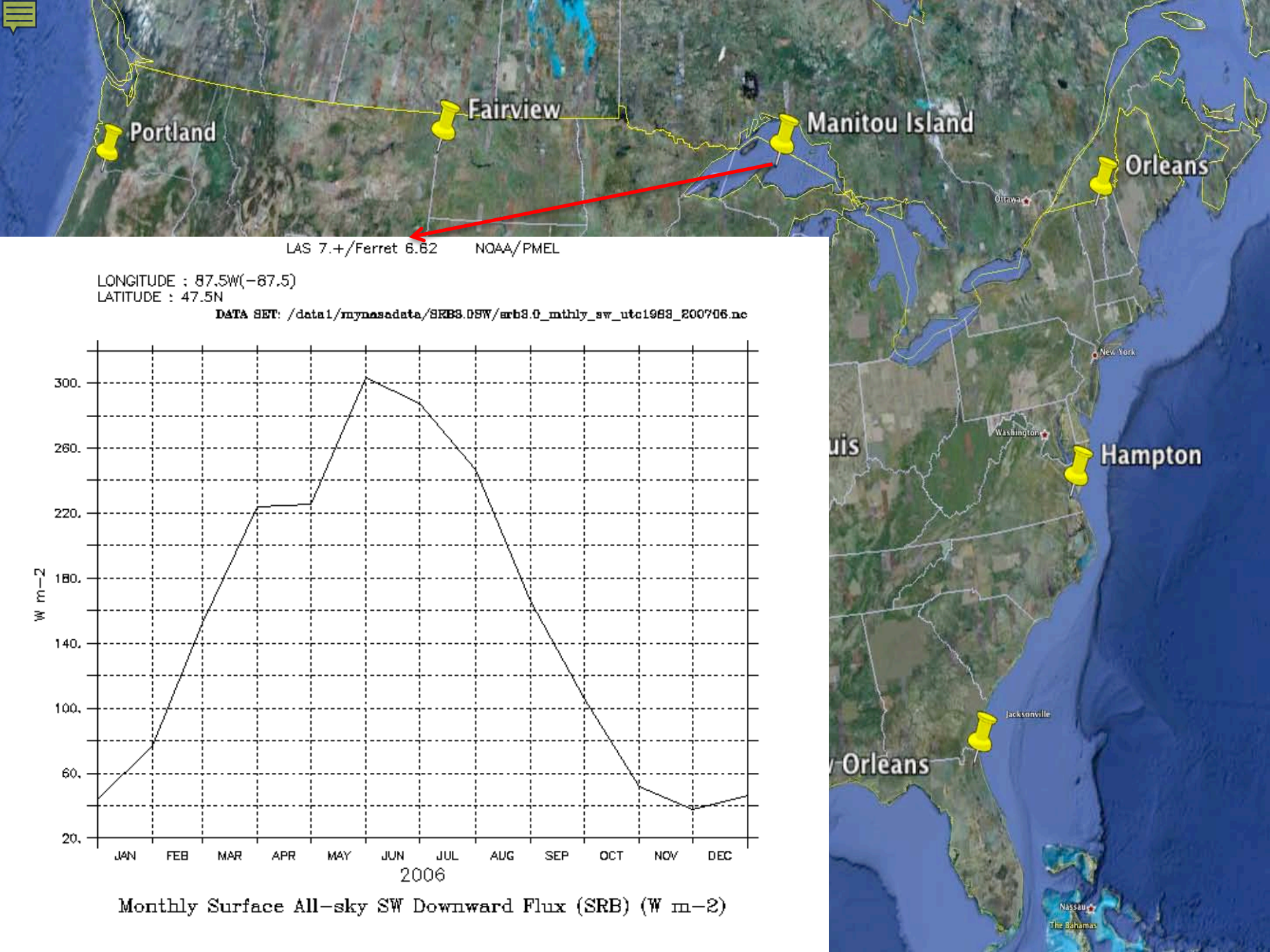
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
2006
Monthly Surface All-sky SW Downward Flux (SRB) (W m-2)


Portland
Fairview
Manitou Island
Orleans
Ottawa
New York
Washington
Hampton
Jacksonville
Orleans
Nassau
The Bahamas
LAS 7.+/Ferret 6.62 NOAA/PMEL
LONGITUDE : 87.5W(-87.5)
LATITUDE : 47.5N
DATA SET: /data1/mynasadata/SRB3.0SW/srb3.0_mthly_sw_utc1983_200706.nc
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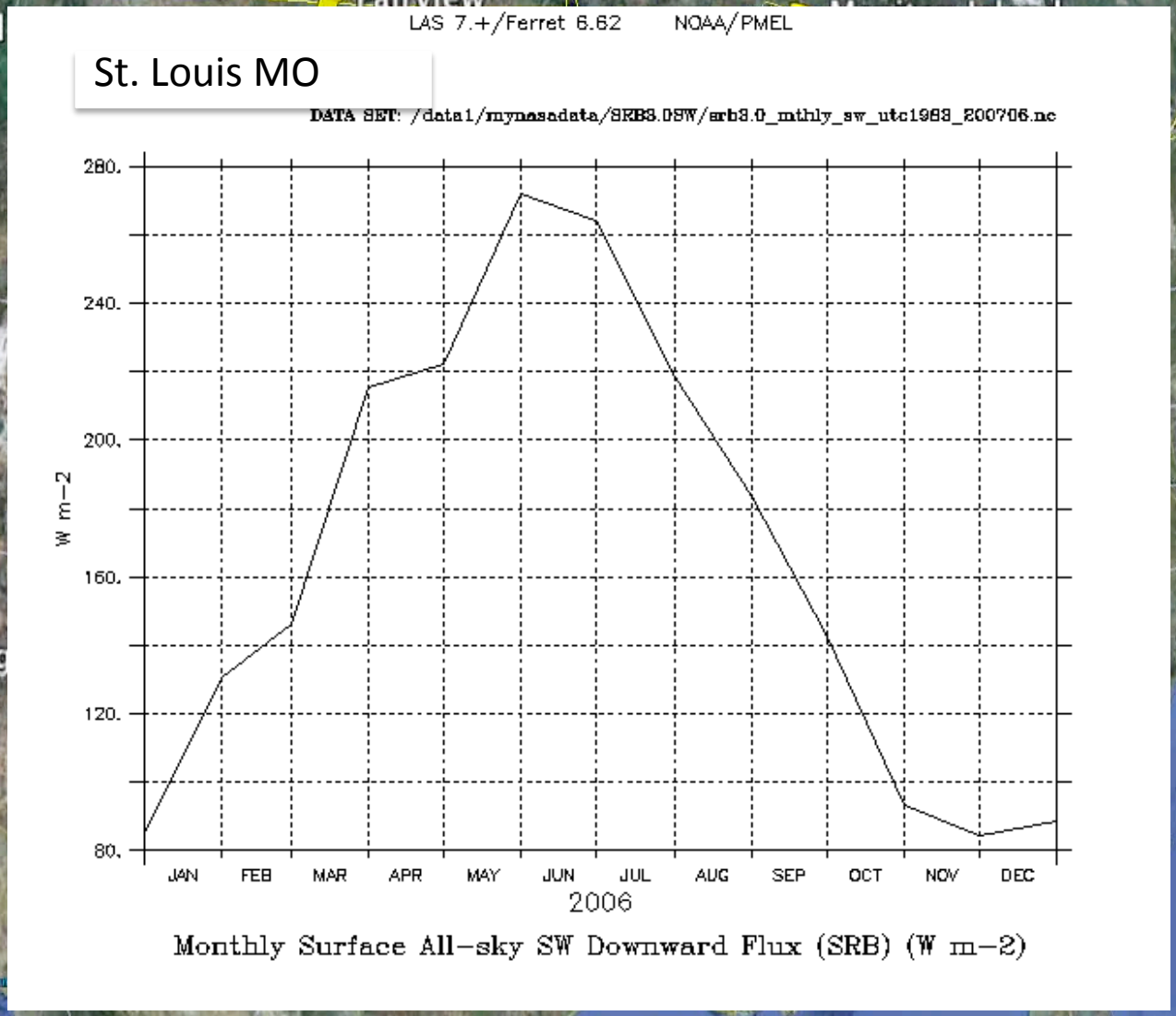
2006
Monthly Surface All-sky SW Downward Flux (SRB) (W m-2)

St. Louis MO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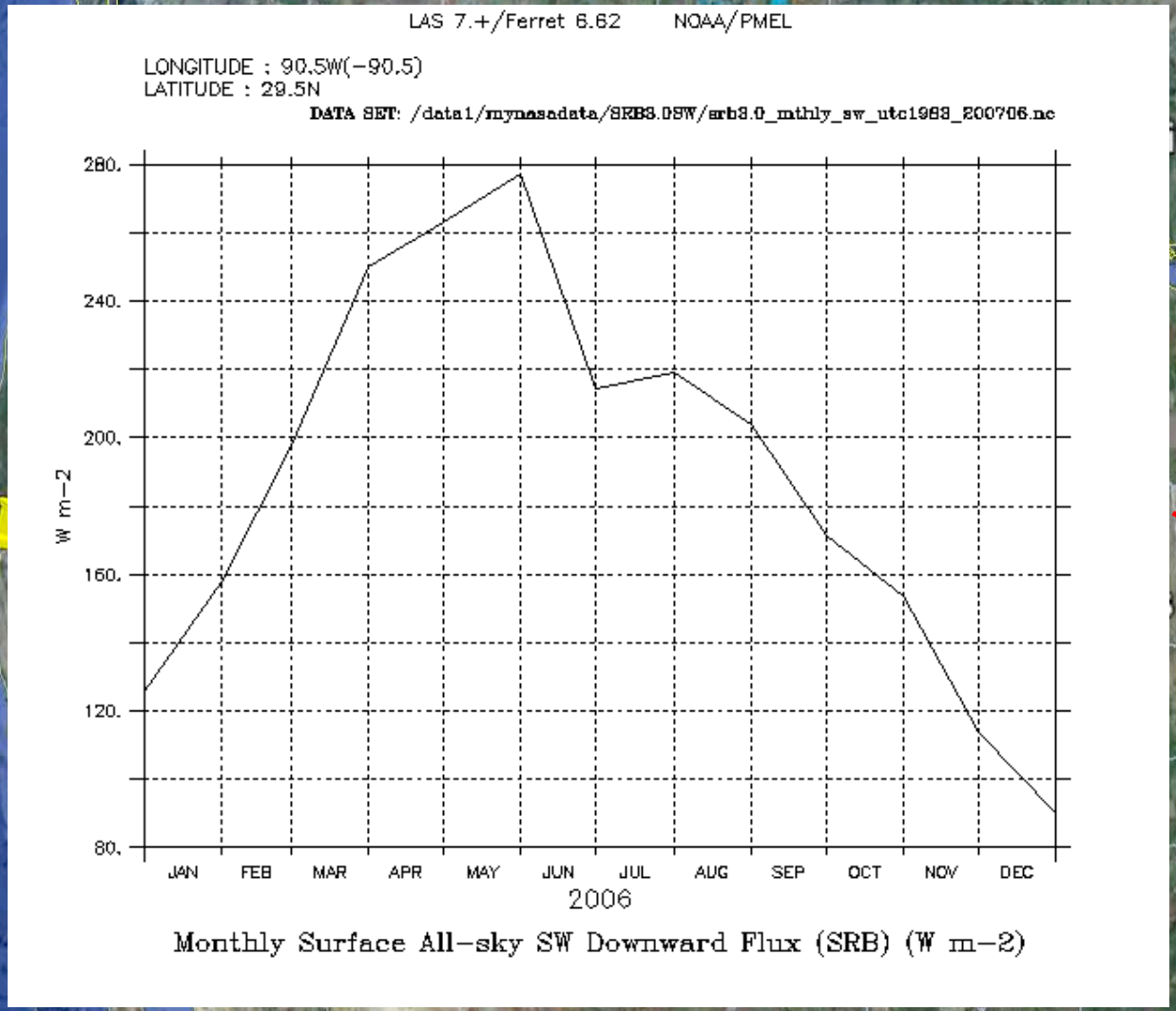
2006
Monthly Surface All−sky SW Downward Flux (SRB) (W m−2)


LAS 7.+/Ferret 6.62 NOAA/PMEL
LONGITUDE : 90.5W(-90.5)
LATITUDE : 29.5N
DATA SET: /data1/mynasadata/SRB3.0SW/srb3.0_mthly_sw_utc1983_200706.nc
280.
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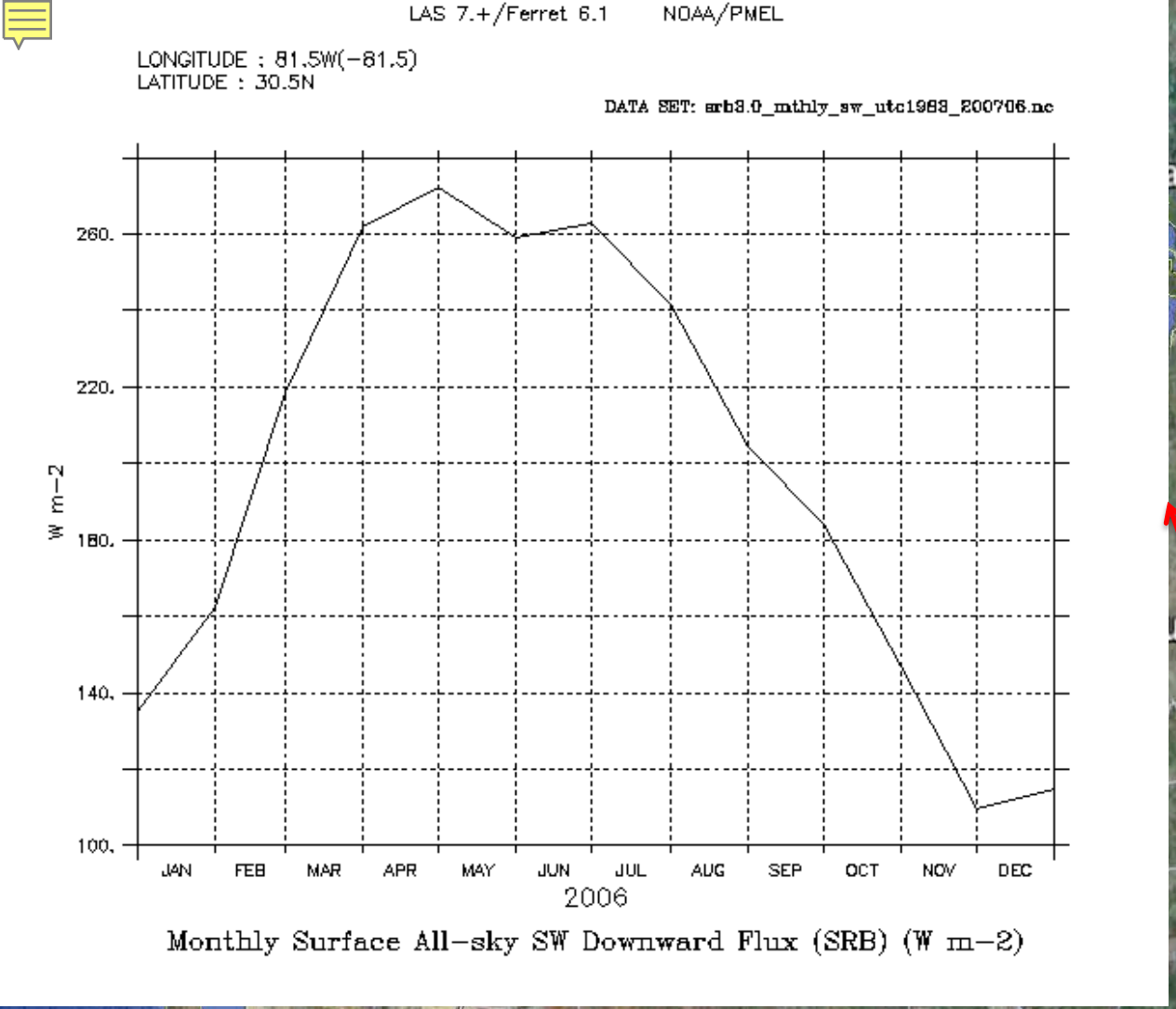
W m-2
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
2006
Monthly Surface All-sky SW Downward Flux (SRB) (W m-2)

Orleans
Hampton
New Orleans
Ottawa
New York
Washington
Jacksonville
Nassau
The Bahamas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2006
Monthly Surface All-sky SW Downward Flux (SRB) (W m-2)

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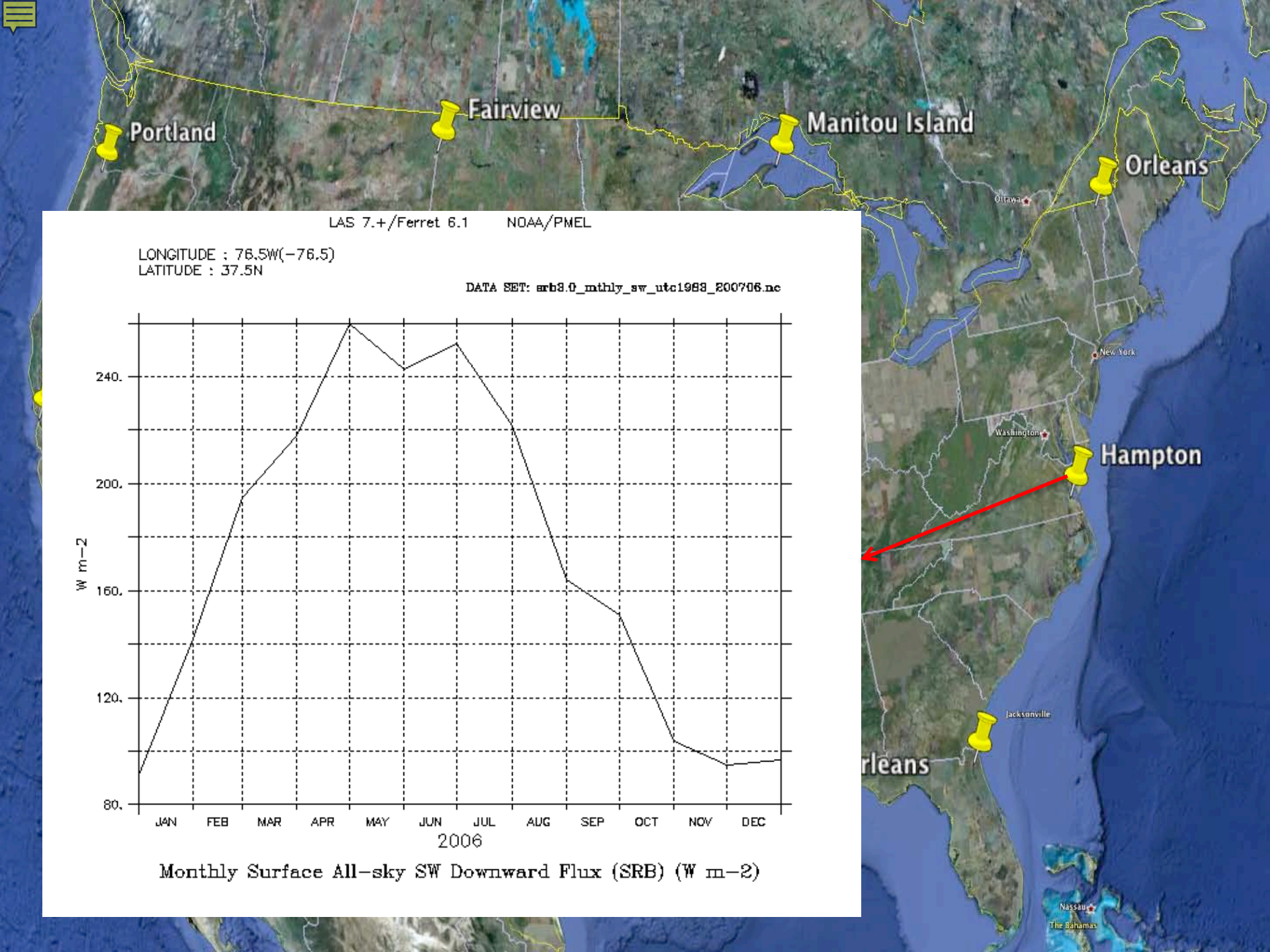
Nassau
The Bahamas


Portland
Fairview
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Orleans
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Ottawa
New York
Washington
Jacksonville
Nassau
The Bahamas
LAS 7.+/Ferret 6.1 NOAA/PMEL
LONGITUDE : 76.5W(-76.5)
LATITUDE : 37.5N
DATA SET: srb3.0_mthly_sw_utc1983_200706.nc
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JAN
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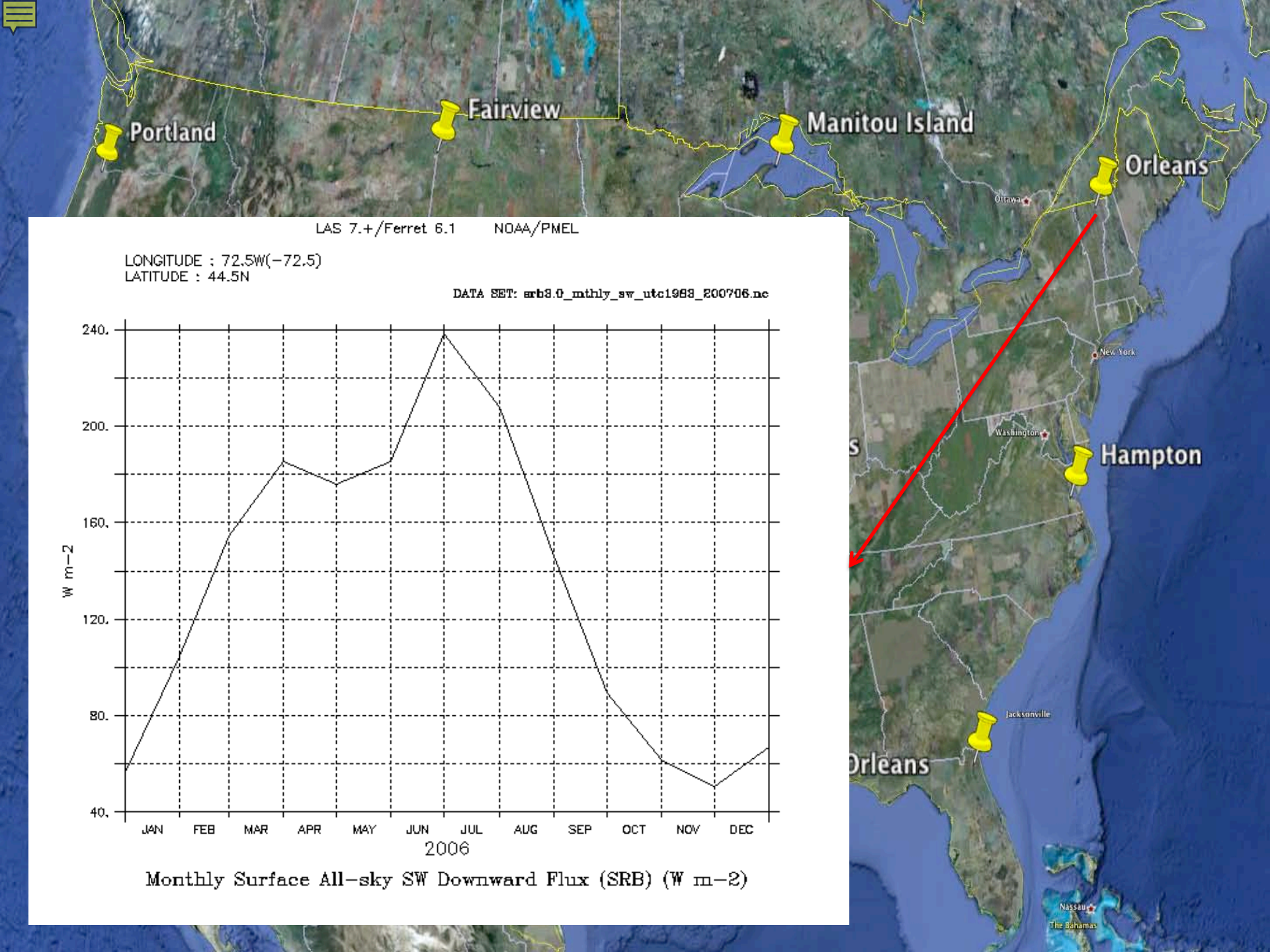
2006
Monthly Surface All-sky SW Downward Flux (SRB) (W m-2)


Portland
Fairview
Manitou Island
Orleans
Hampton
Ottawa
New York
Washington
Jacksonville
Nassau
The Bahamas
LAS 7.+/Ferret 6.1 NOAA/PMEL
LONGITUDE : 72.5W(-72.5)
LATITUDE : 44.5N
DATA SET: srb3.0_mthly_sw_utc1983_200706.nc
240.
200.
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120.
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W m-2
JAN
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OCT
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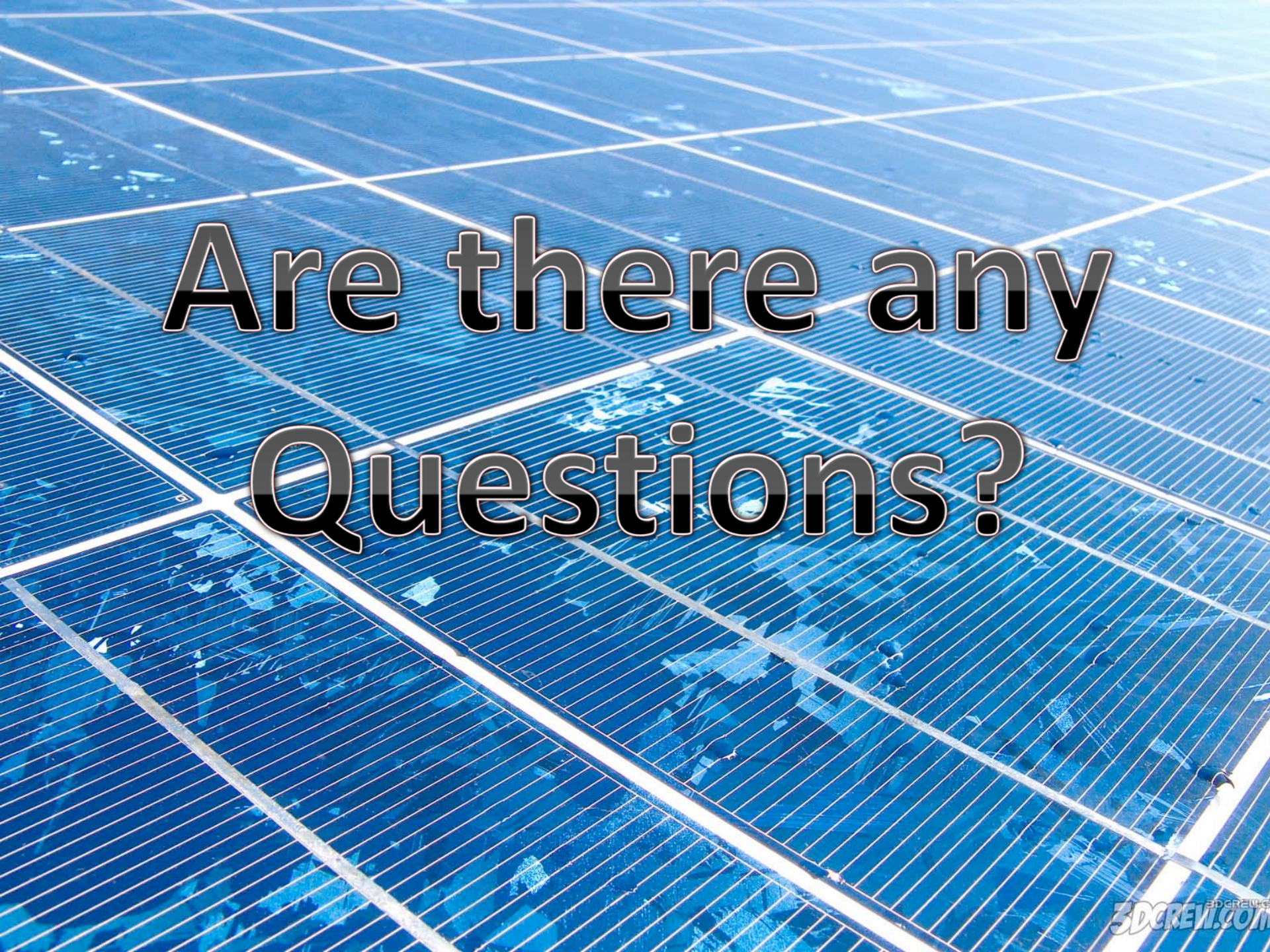
DEC
2006
Monthly Surface All-sky SW Downward Flux (SRB) (W m-2)

A Quick Wrap-up

We learned:

1. What solar cells are, and applications for them.
2. That locations differ in the amounts of radiation received, depending on where they live in the US.
3. How to read and use a time series and difference plot.
4. Locations you could live to receive enough radiation to support an RV through out the year.


Are there any
Questions?

For more information on how you can use real NASA satellite data – for lesson plans, science project ideas and much more – visit the MY NASA DATA website:

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