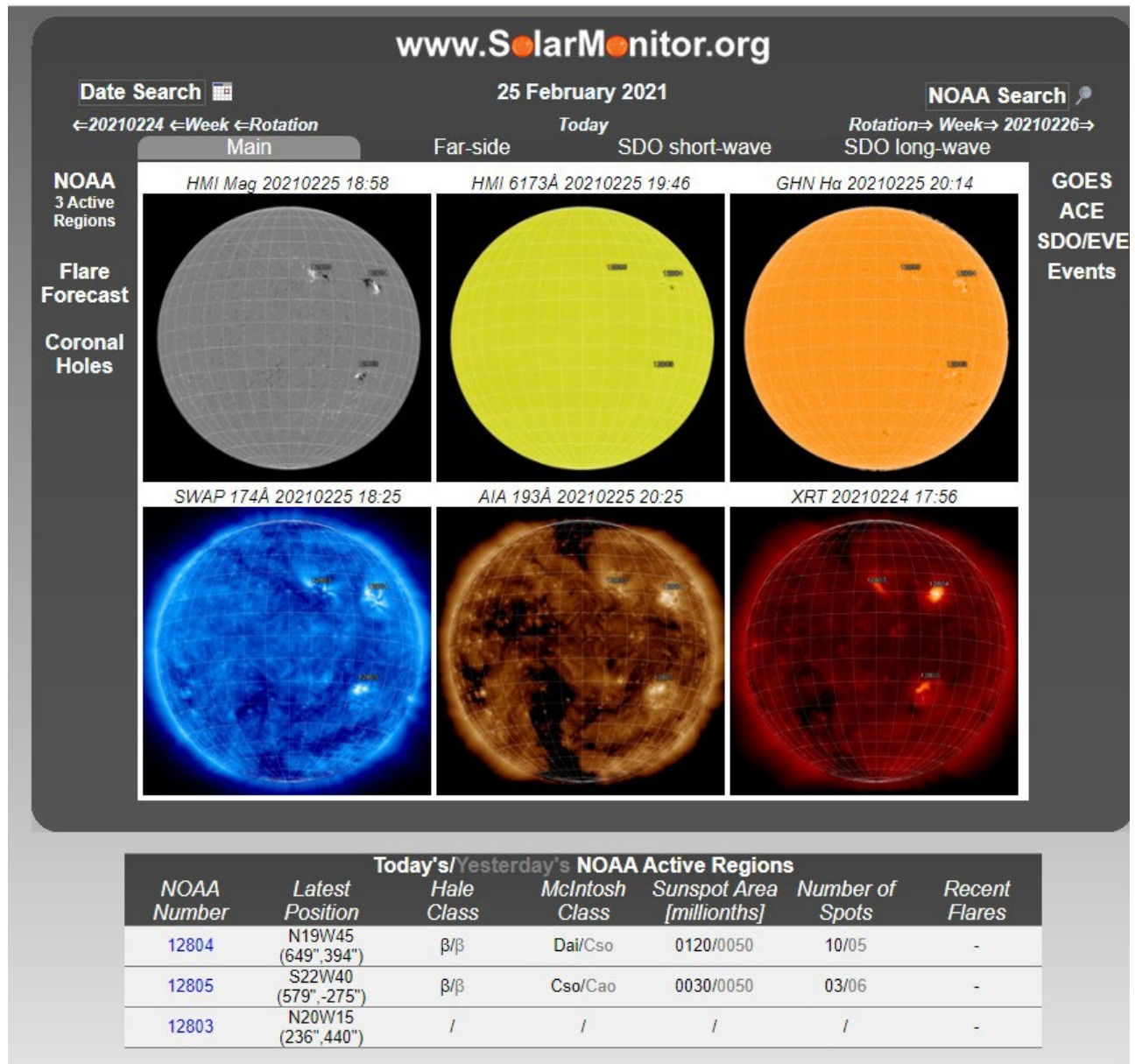


Act 07: Observing the Rotation of the Sun using Data from www.solarmonitor.org

Go to the Solar Monitor website <https://solarmonitor.org>

When you open the page, you will see an image like the one shown here, only for “today’s” date (for whatever date you are doing this lab). I captured this image from Thursday, Feb. 25th, 2021. Notice that there are three active regions.



Act 07: Observing the Rotation of the Sun using Data from www.solarmonitor.org

Part 1: Approximating the rotation rate of the Sun from observing sunspots (Active Regions).

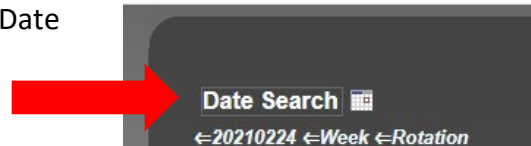
1. Write down today's date (the date when you are doing this lab). _____

a. Do you see any active regions? _____ How many? _____

b. At what wavelength(s) do these active regions appear? _____

c. If you do not see any active regions, go back a week or two. You can go back in time by clicking on the little calendar icon next to the words "Date Search" in the upper left corner of the image.

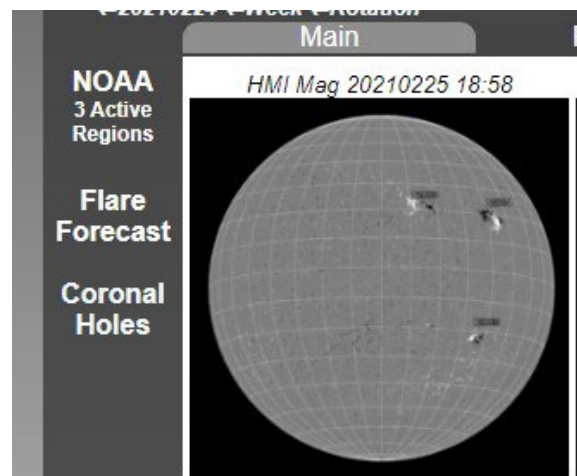
Do you see any active region(s)?



d. Click on the first gray image on the left side of the "Main" set of images. You should see one or more black and white pairs of spots.

This image is called a Magnetogram. As the name suggests, it shows variations in the magnetic field. White is positive, or a north pole, and black is negative, or a south pole.

What are these features?



2. Tracking active regions (ARs).

The Active Regions (ARs) are given numbers, listed on the main page. For Feb. 25th, 2021, there were three ARs, but for whatever date you are observing, the numbers and their locations will be different.

Today's/Yesterday's NOAA Active Regions						
NOAA Number	Latest Position	Hale Class	McIntosh Class	Sunspot Area [millionths]	Number of Spots	Recent Flares
12804	N19W45 (649", 394")	β/β	Dai/Cso	0120/0050	10/05	-
12805	S22W40 (579", -275")	β/β	Cso/Cao	0030/0050	03/06	-
12803	N20W15 (236", 440")	/	/	/	/	-

Act 07: Observing the Rotation of the Sun using Data from www.solarmonitor.org

What is the date when you are STARTING YOUR OBSERVATIONS? _____

List the ARs for this date and their latitude and longitude (Example: N17W30).

NOAA Number

Position (lat/long)

a. Choose one AR for the date you are observing. If there are none, go back in time until you see one. Step the upper left date arrow in the calendar backwards until your chosen AR first appears on the western limb of the Sun (the left side of the image). What is the first date that you can see this active region on the magnetogram?

Date: _____

b. At what latitude and longitude does your AR appear? Try to estimate. 0/0 is approximately in the center of the Sun. In the NOAA images, each line of longitude is 10° East (to the left in the picture) or West (right in the picture). Each line of latitude is 10° North and South of the equator.

Lat/Long: _____

You are now going to track this AR across the Sun using the mapping grid on the next page.

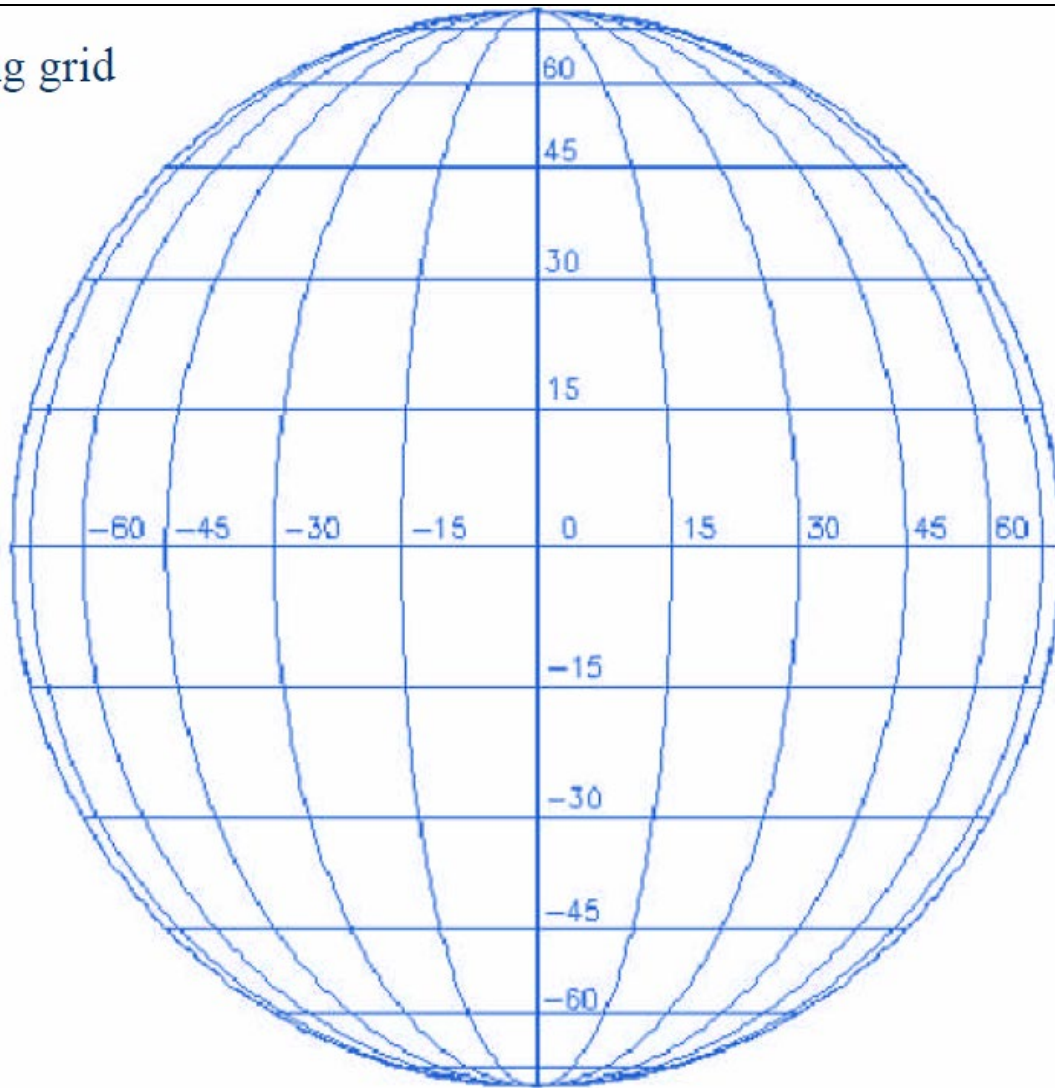
c. Put a mark on the edge of the grid, at the latitude where the AR first appears. Note that the center of the image is labeled 0. That's the Sun's equator. Note that the grid is marked off in 15° intervals.

Now step the calendar forward one day at a time, starting from the date your AR first appears, and put a dot on the grid for every day that you see the active region. Label each dot with a number (1, 2, 3, etc.). Write the position (lat/long) of the feature. Follow your AR across the face of the Sun until it disappears on the eastern horizon. List each numbered dot with the date in the table on the following page (after the grid).

Tracking AR#: _____

Day#	Latitude	Longitude

Mapping grid



3. How many days did it take for this active region to cross the face of the Sun?

a. Date of first observation on the eastern limb: _____

b. Date of last observation on the western limb: _____

c. Total days your AR traveled (= b-a): _____

4. Approximating the rotation rate of the Sun for the latitude of your Active Region by doubling your answer for c above to give the total days for one complete revolution _____

5. For a more accurate estimate, advance the days until your AR goes around the sun and comes to the same place where you started (this is the most accurate method) _____

This number is the number of days it takes for an AR (or sunspot) to go around the sun.