



Tracking Sunspots

Overview:

Students will examine sunspots and track them at different latitudes on the Sun.

This activity is adapted from the Tracking Sunspots activity on NASA's Solar and Heliocentric Observatory (SOHO) website (2009): https://soho.nascom.nasa.gov/classroom/for_students.html (https://soho.nascom.nasa.gov/classroom/for_students.html).

Objectives:

Students begin to familiarize themselves with solar activity by tracking sunspots at different latitudes on the Sun. This activity is designed to get students thinking about solar activity and whether it might have any influence on cosmic rays. This can be used as an introduction to the solar cycle to explore the relationship between sunspots and other solar activity.

Lesson Preparation:

If you are going to do a paper/pencil version of the activity then prepare a set of copies of the figures provided. This will include Figure One: 1 Solar Mapping Grid and Figures 2-14: Sunspot Images from June 22 to July 3.

Figures Courtesy of NASA SOHO https://soho.nascom.nasa.gov/classroom/for_students.html (https://soho.nascom.nasa.gov/classroom/for_students.html)

You may wish to make color copies and laminate them for future use. You could also consider copying the Solar Mapping Grid on a transparency to ease marking of sunspot locations. Alternatively, students can obtain their own sunspot images directly from NASA at (<https://soho.nascom.nasa.gov/sunspots/> (<https://soho.nascom.nasa.gov/sunspots/>)).

Procedure:

Distribute the sunspot Solar Mapping Grid and images of sunspots from June 22 to July 3. Have students pair up to form small groups. Assign each group a set of sunspots (A, B, or C) to track. For each day students note the position of the sunspots from one group (A, B, or C) on the Solar Mapping Grid. Have them label each position with the Sunspot Group (A, B, or C.) You may want them note changes in shape or size. Have students make a chart that notes the longitude of the sunspots for each day. Students should calculate how far the sunspots move each day (in degrees of longitude). Students should then determine the average daily rate of motion by calculating the average of the degrees moved each day. Students should use this data to determine the rotation period of the Sun (the time to rotate 360 degrees). Students should then compare their rates to those found in different sunspot groups. (Note: that since the Sun is not a solid body that the rotation rates differ somewhat and these differences are tied to solar activity.)

Details

- Lesson
- Antarctic
- About 1 period
- Download, Share, and Remix
- Middle School and Up
- NASA SOHO (https://soho.nascom.nasa.gov/classroom/for_students.html)

Materials

Sunspot Images

Standards

- b. Position and motion of objects
- c. Light, heat, electricity, and magnetism
- b. Objects in the sky
- c. Changes in earth and sky
- b. Understandings about science and technology

Extension:

Advanced students can be asked to factor in the revolution of the Earth (The Earth is moving around the Sun in the same direction that the Sun rotates at about 1 degree per day. So they need to add one degree per day to the apparent movement to allow for this.) ☒ Students can obtain their own sunspot images directly from NASA at (<https://soho.nascom.nasa.gov/sunspots/> (<https://soho.nascom.nasa.gov/sunspots/>)). Those images can be used to replace the figures provided. Or they can be used in addition to the figures provided to compare rotation rates from different years, get greater variety of latitudes, or create their own extension activities. ☒ Students can search the NASA SOHO <https://soho.nascom.nasa.gov> (<https://soho.nascom.nasa.gov>) to research other forms of solar activity. They could create their own investigations or do one of the activities in the extension links. ☒ Students can research the Solar Cycle and its effect on cosmic radiation.

Resources:

Information about Cosmic Rays and the Solar Cycle <http://neutronm.bartol.udel.edu/catch/cr3.html> (<http://neutronm.bartol.udel.edu/catch/cr3.html>)

Information about Cosmic Rays <http://news.spaceweather.com/cosmic-rays-are-intensifying/> (<http://news.spaceweather.com/cosmic-rays-are-intensifying/>)

Matching Magnetic Activity to Sun Spots. https://soho.nascom.nasa.gov/classroom/matching_activity.html (https://soho.nascom.nasa.gov/classroom/matching_activity.html)

Measuring the Motion of a Coronal Mass Ejection https://soho.nascom.nasa.gov/classroom/cme_activity.html (https://soho.nascom.nasa.gov/classroom/cme_activity.html)

Baile sunspot data: http://analyzer.depaul.edu/see_project/Sunspots/default.htm (http://analyzer.depaul.edu/see_project/Sunspots/default.htm)

Assessment:

Students are assessed on their ability to determine the rate of solar rotation at different latitudes and explain why the rates might differ.

Author / Credits:

This activity is adapted by Eric Thuma from the Tracking Sunspots activity on NASA's Solar and Heliospheric Observatory (SOHO) website: https://soho.nascom.nasa.gov/classroom/for_students.html (https://soho.nascom.nasa.gov/classroom/for_students.html). (2009)

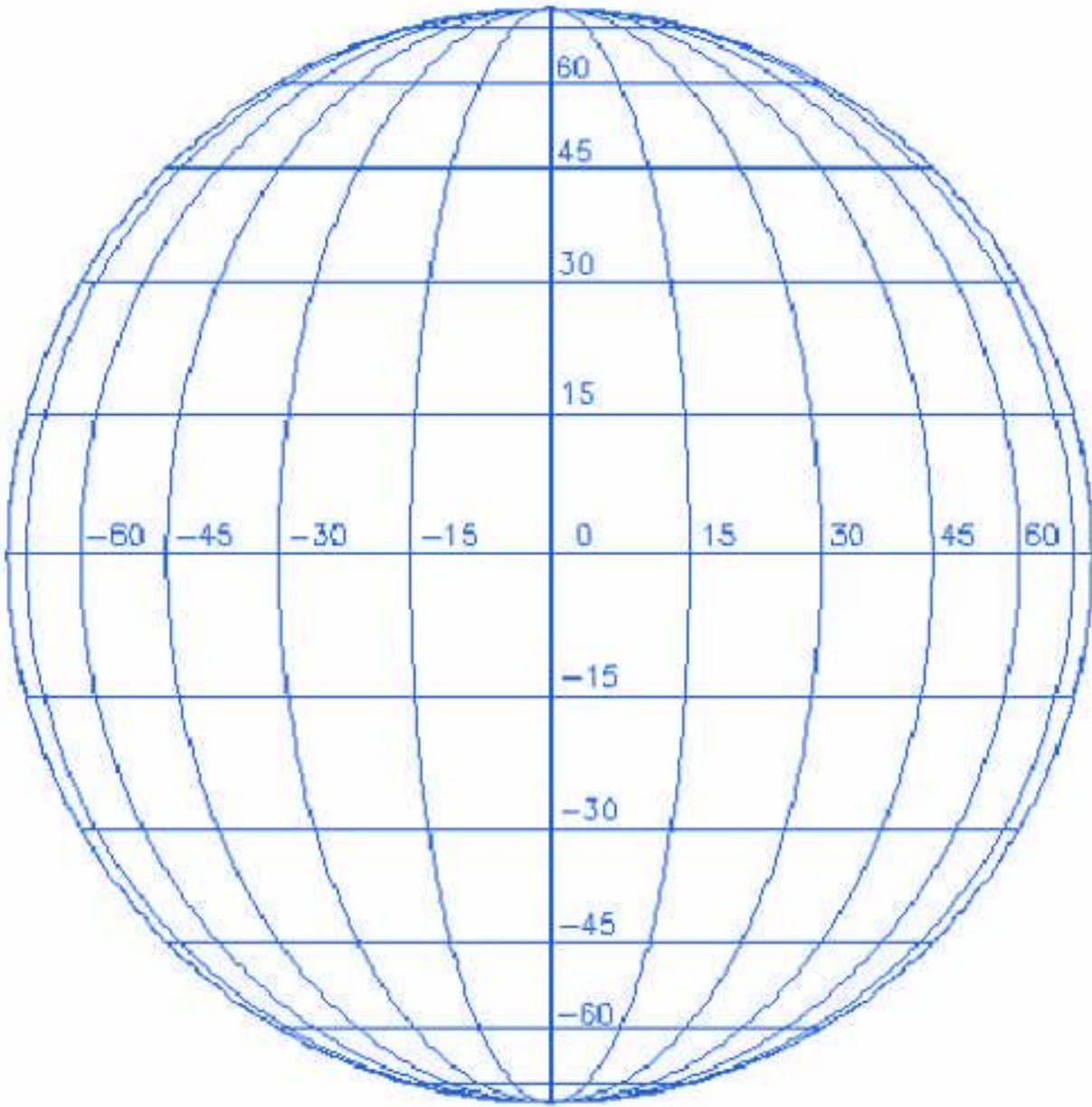


Figure 1 https://soho.nascom.nasa.gov/classroom/for_students.html

June 30

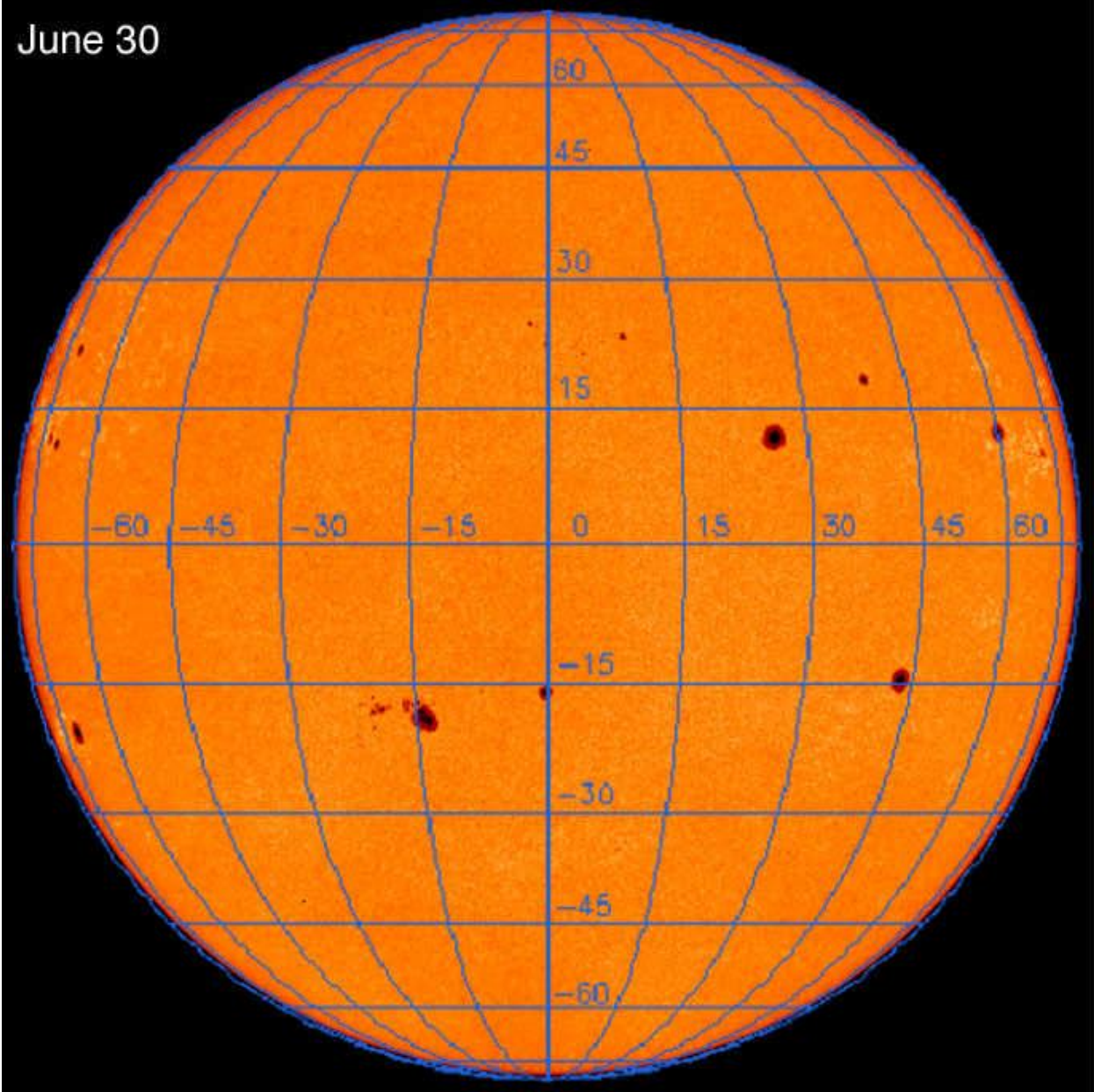


Figure 2 https://soho.nascom.nasa.gov/classroom/for_students.html

June 23

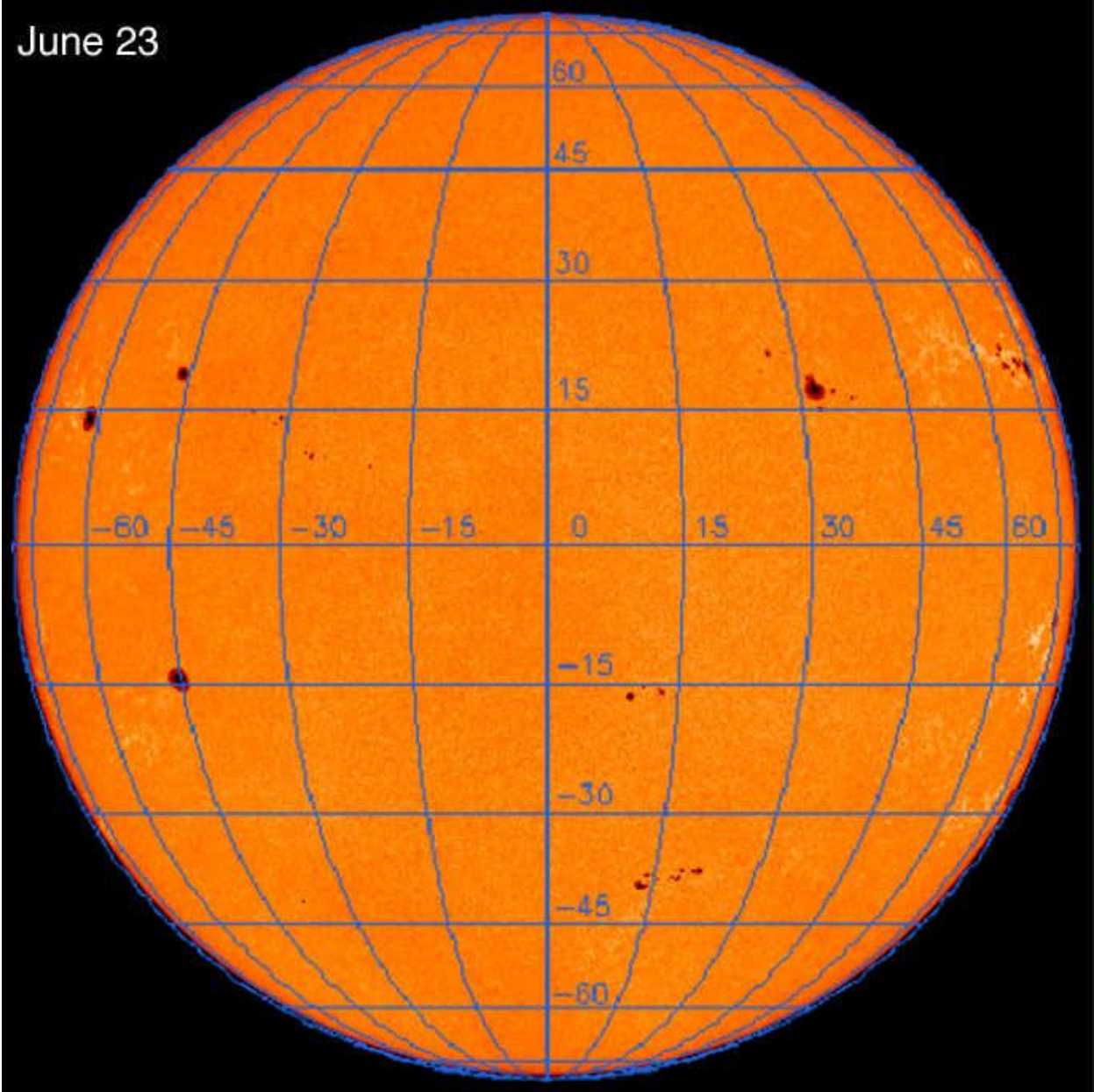


Figure 3 https://soho.nascom.nasa.gov/classroom/for_students.html

June 24

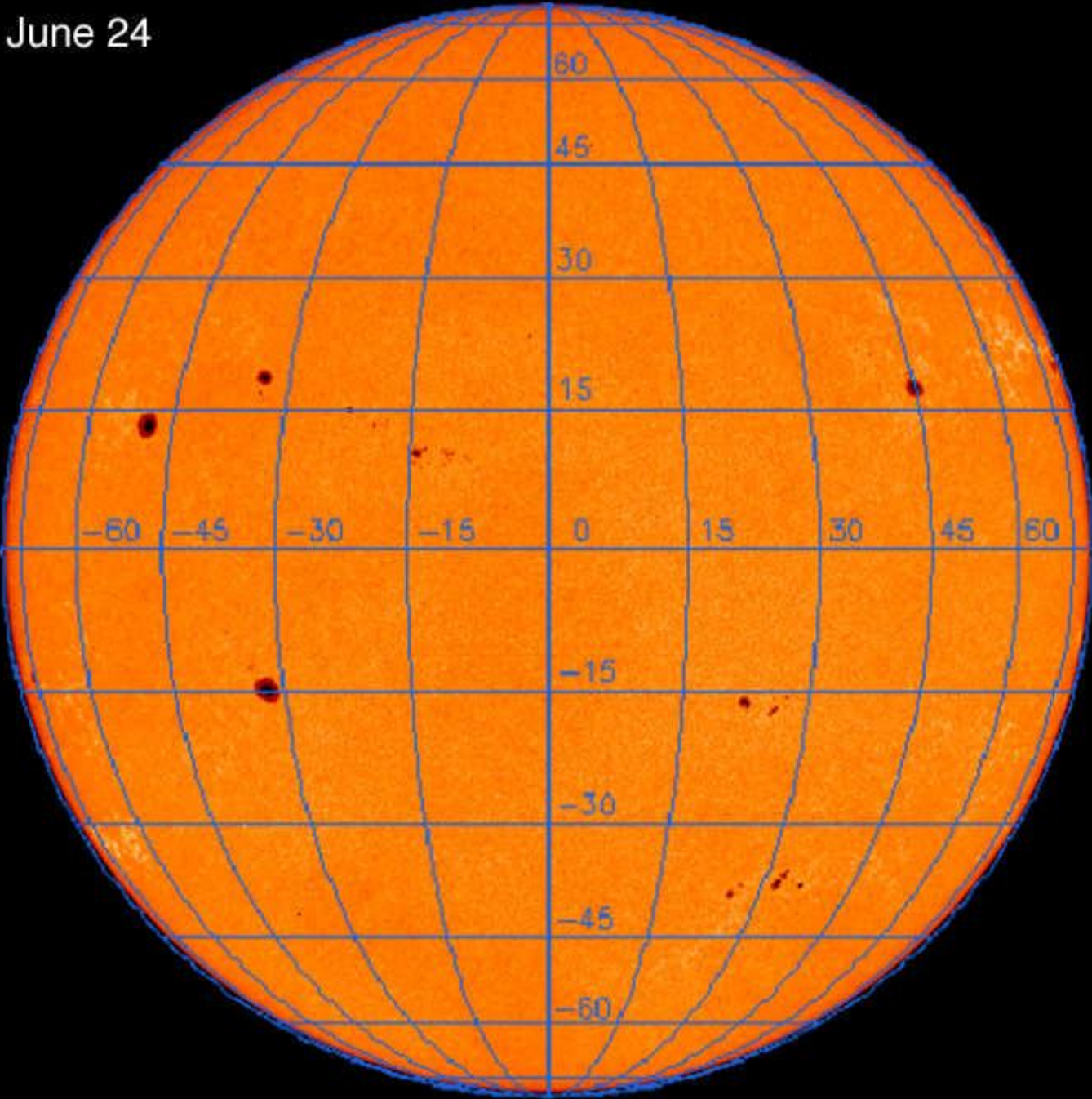


Figure 4 https://soho.nascom.nasa.gov/classroom/for_students.html

June 25

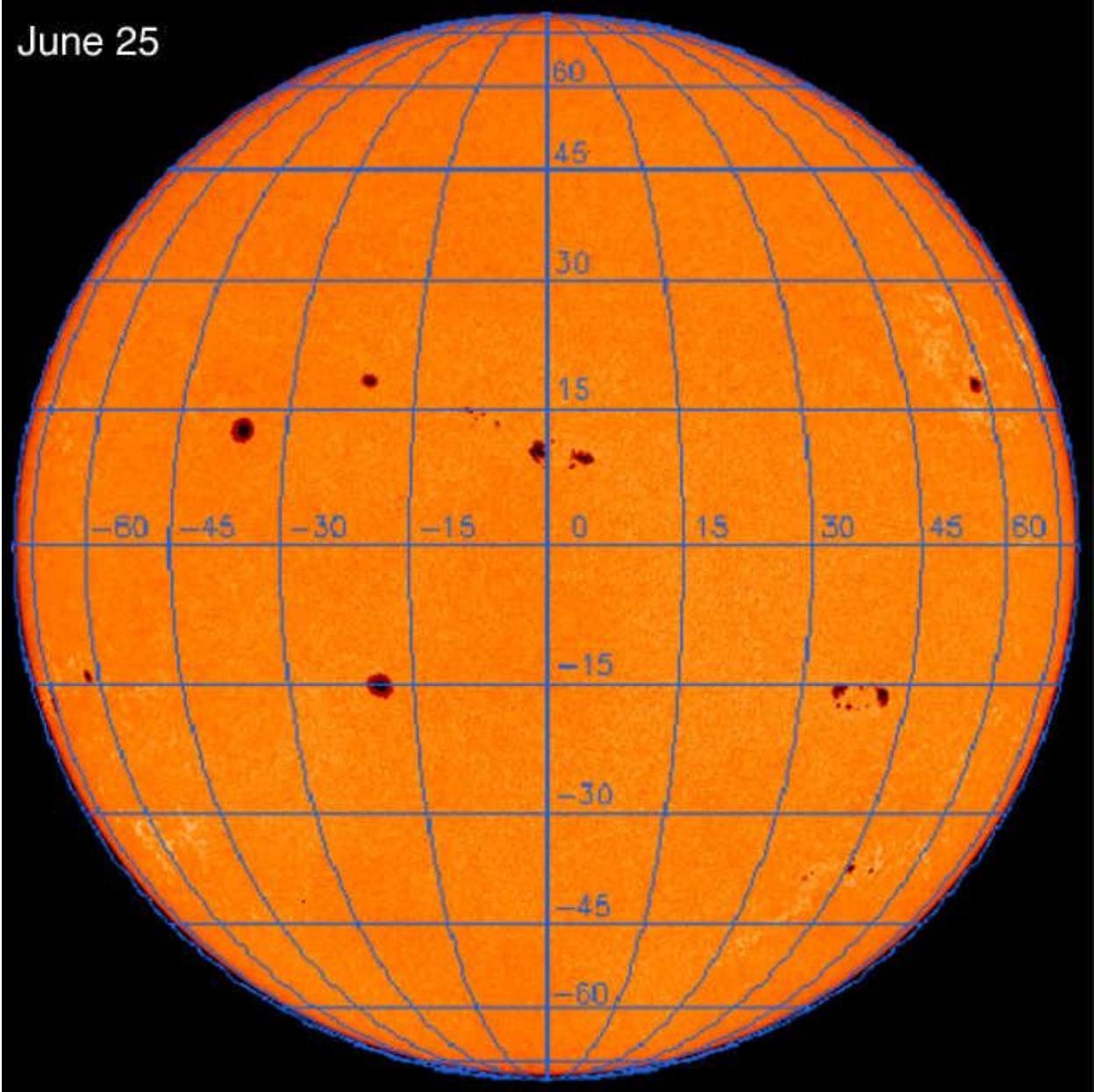


Figure 5 https://soho.nascom.nasa.gov/classroom/for_students.html

June 26

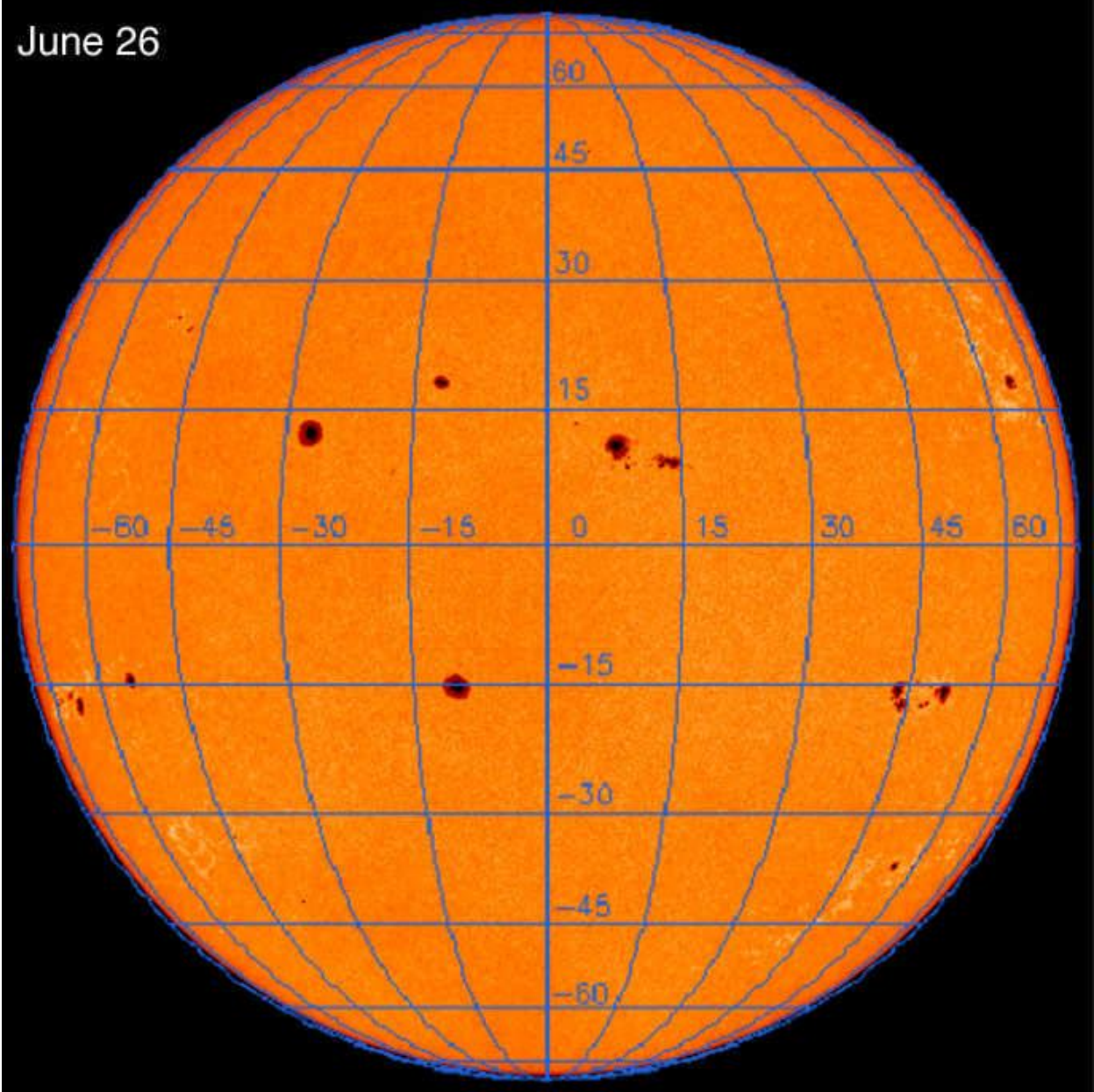


Figure 6 https://soho.nascom.nasa.gov/classroom/for_students.html

June 27

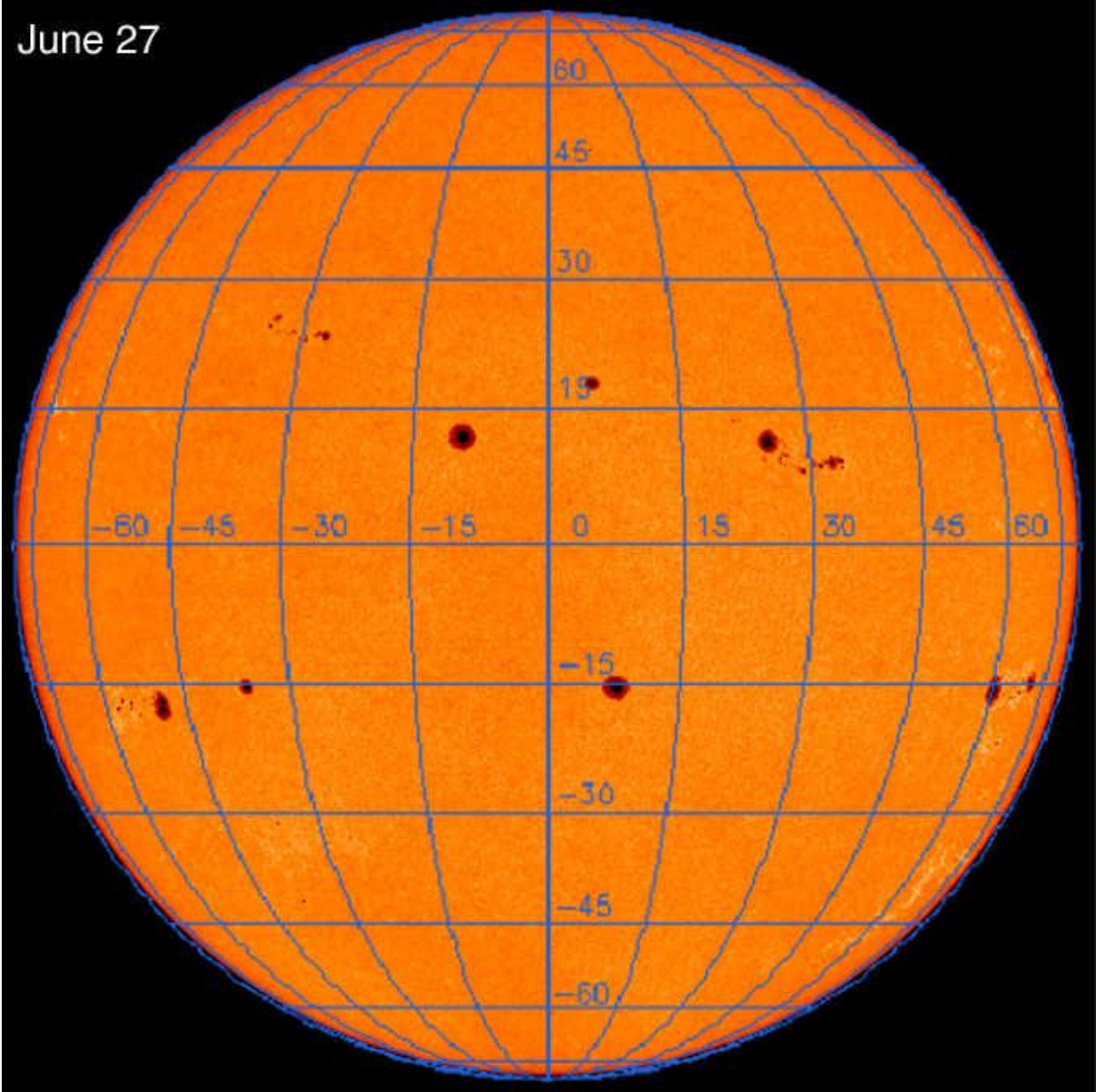


Figure 7 https://soho.nascom.nasa.gov/classroom/for_students.html

June 28

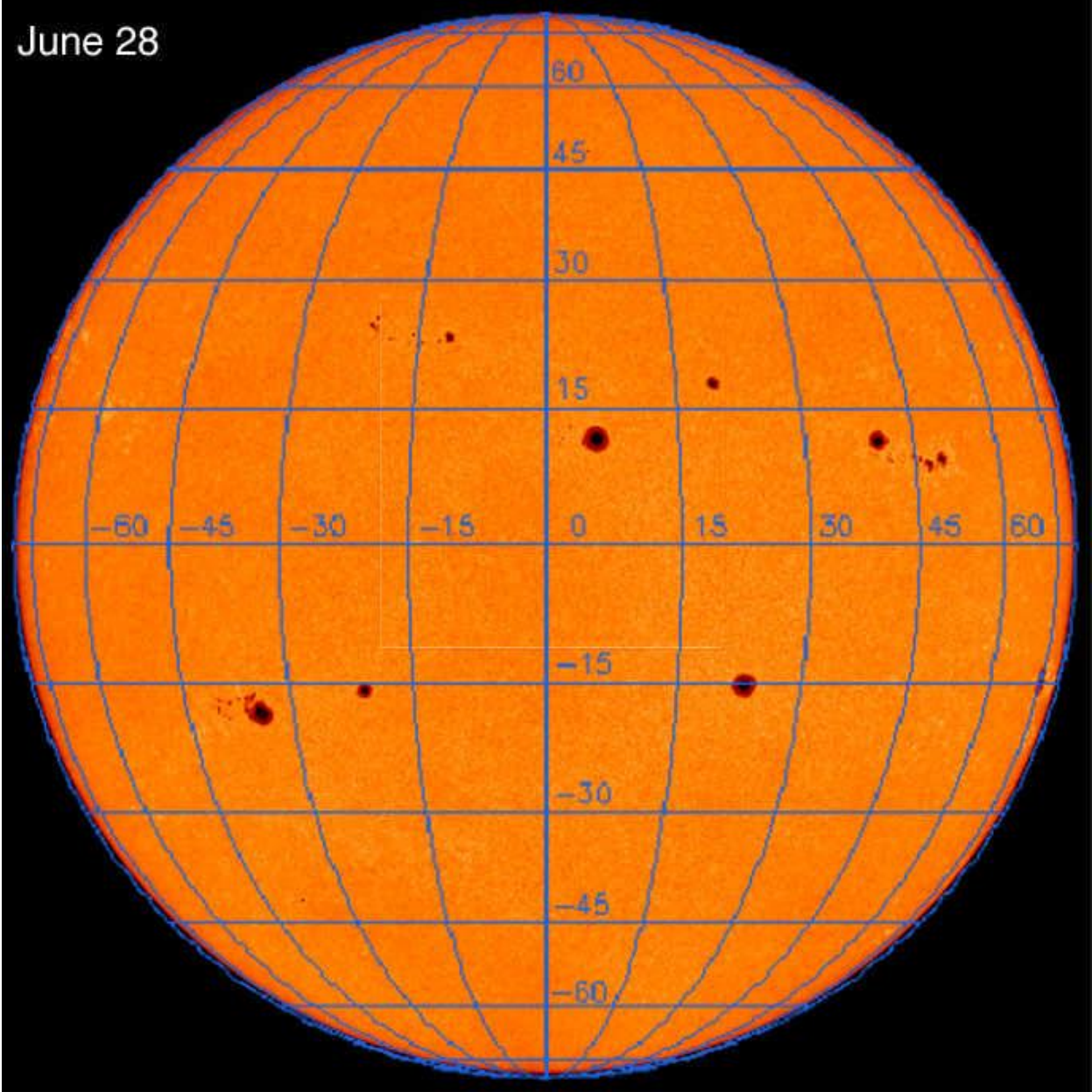


Figure 8 https://soho.nascom.nasa.gov/classroom/for_students.html

June 29

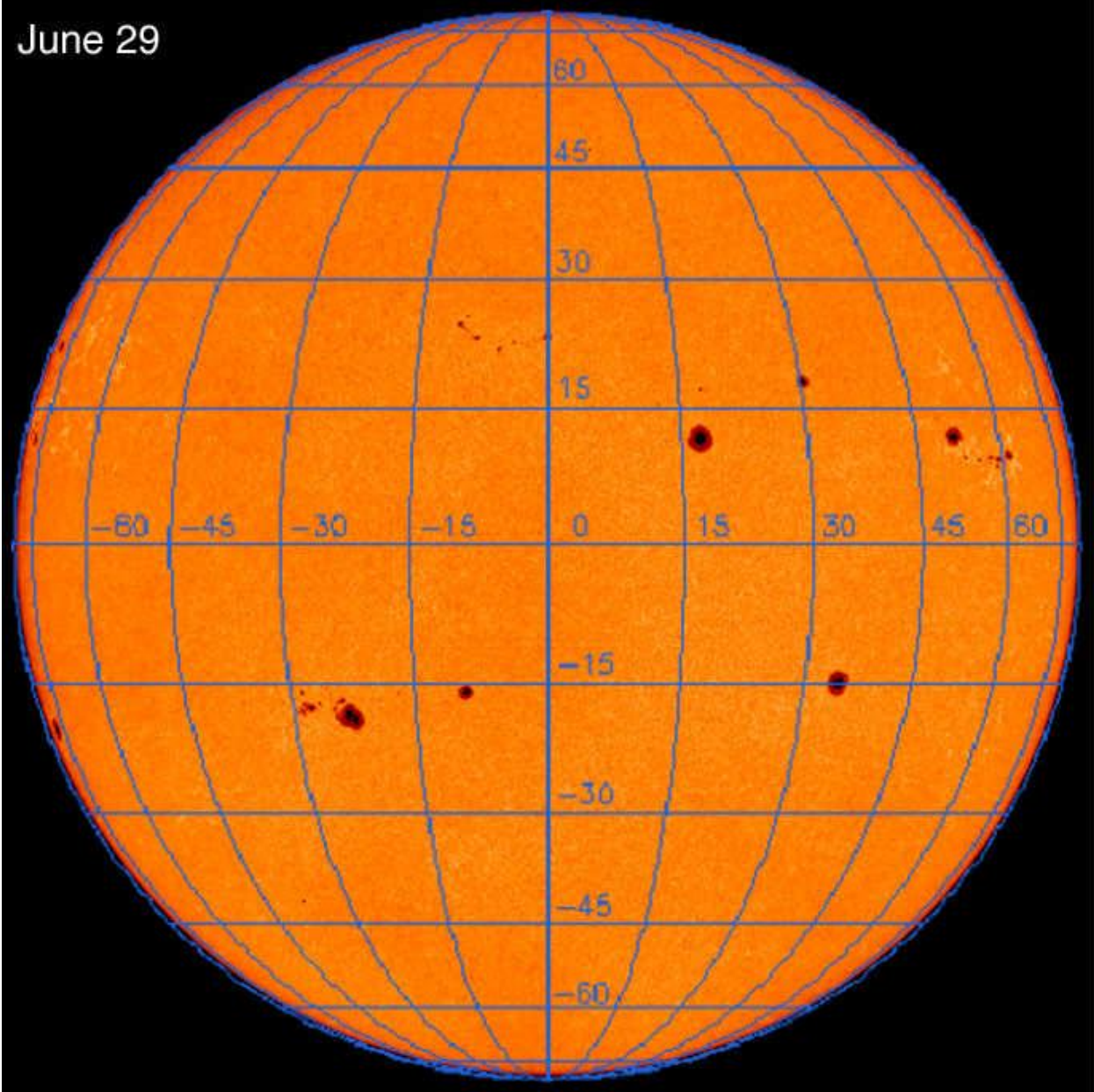


Figure 9 https://soho.nascom.nasa.gov/classroom/for_students.html

June 30

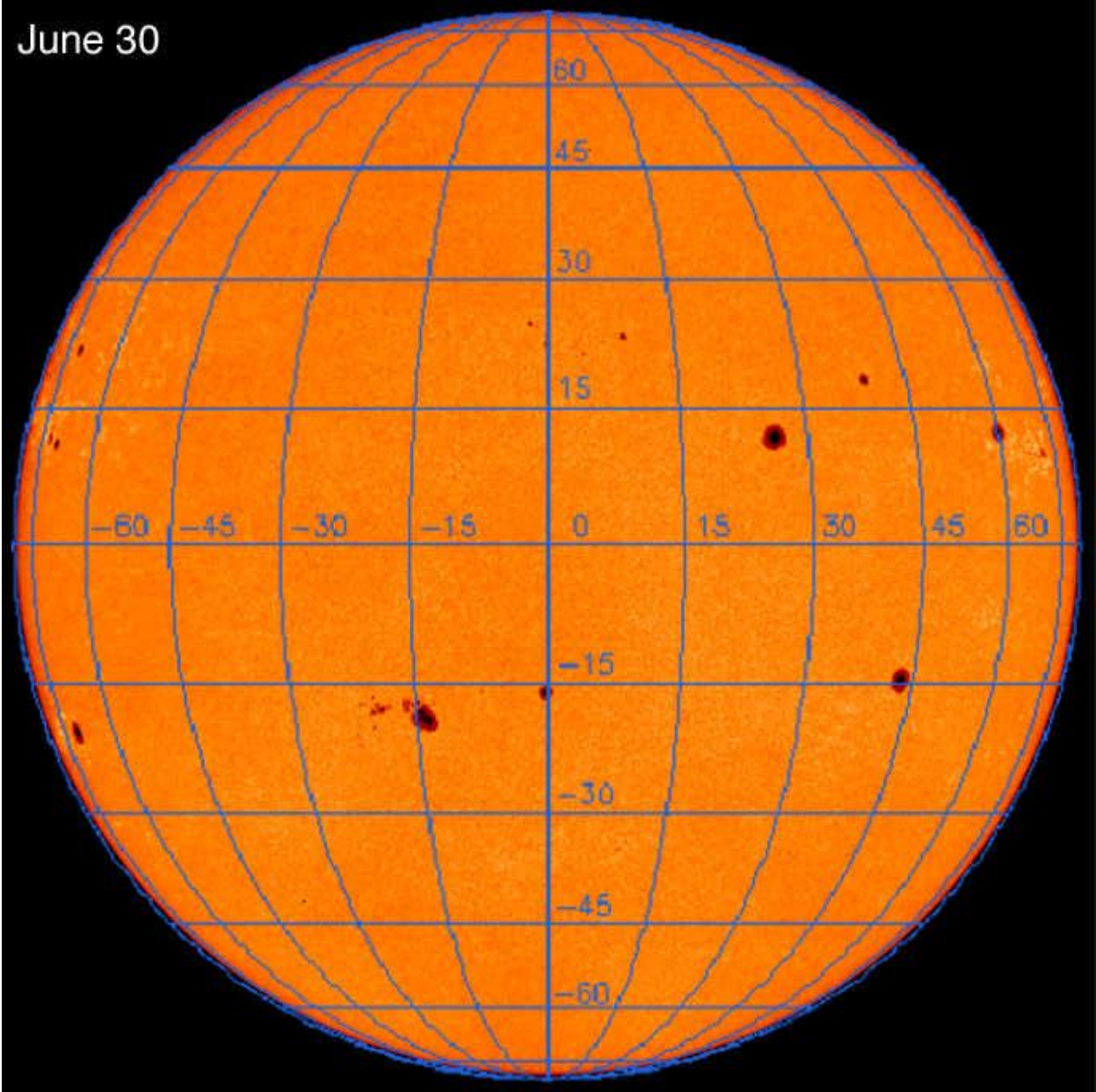


Figure 10 https://soho.nascom.nasa.gov/classroom/for_students.html

June 30

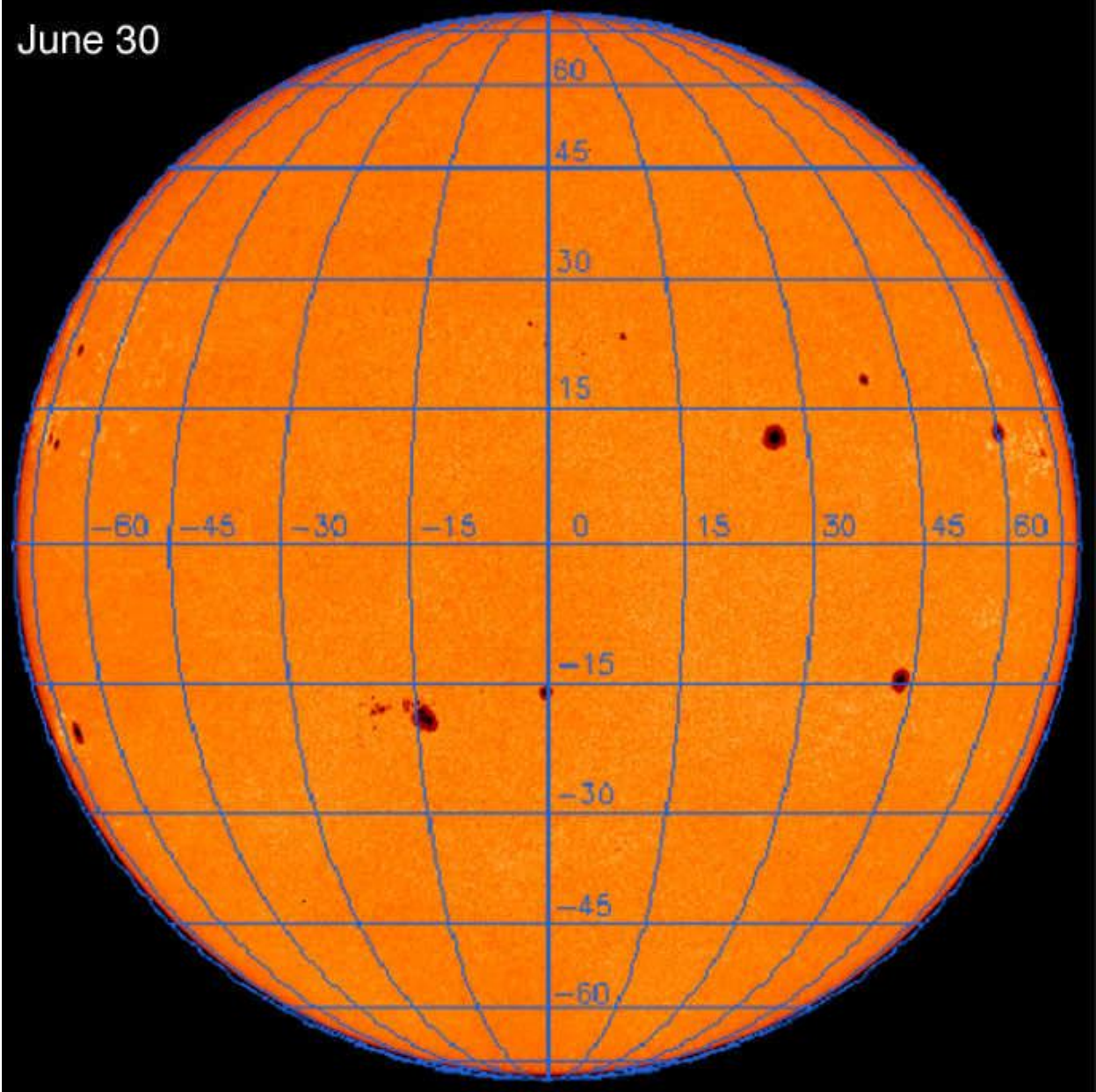


Figure 11 https://soho.nascom.nasa.gov/classroom/for_students.html

July 1

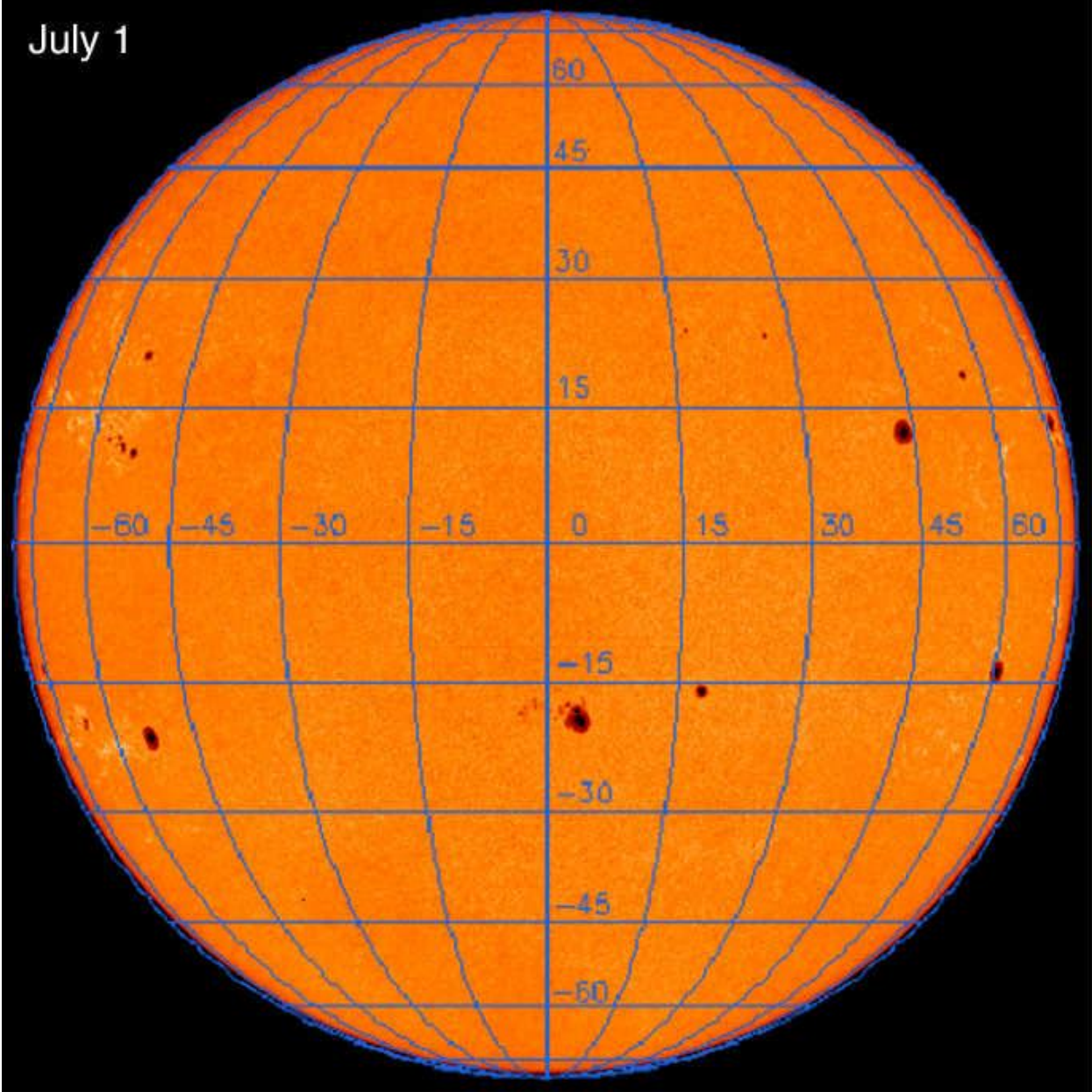


Figure 12 https://soho.nascom.nasa.gov/classroom/for_students.html

July 2

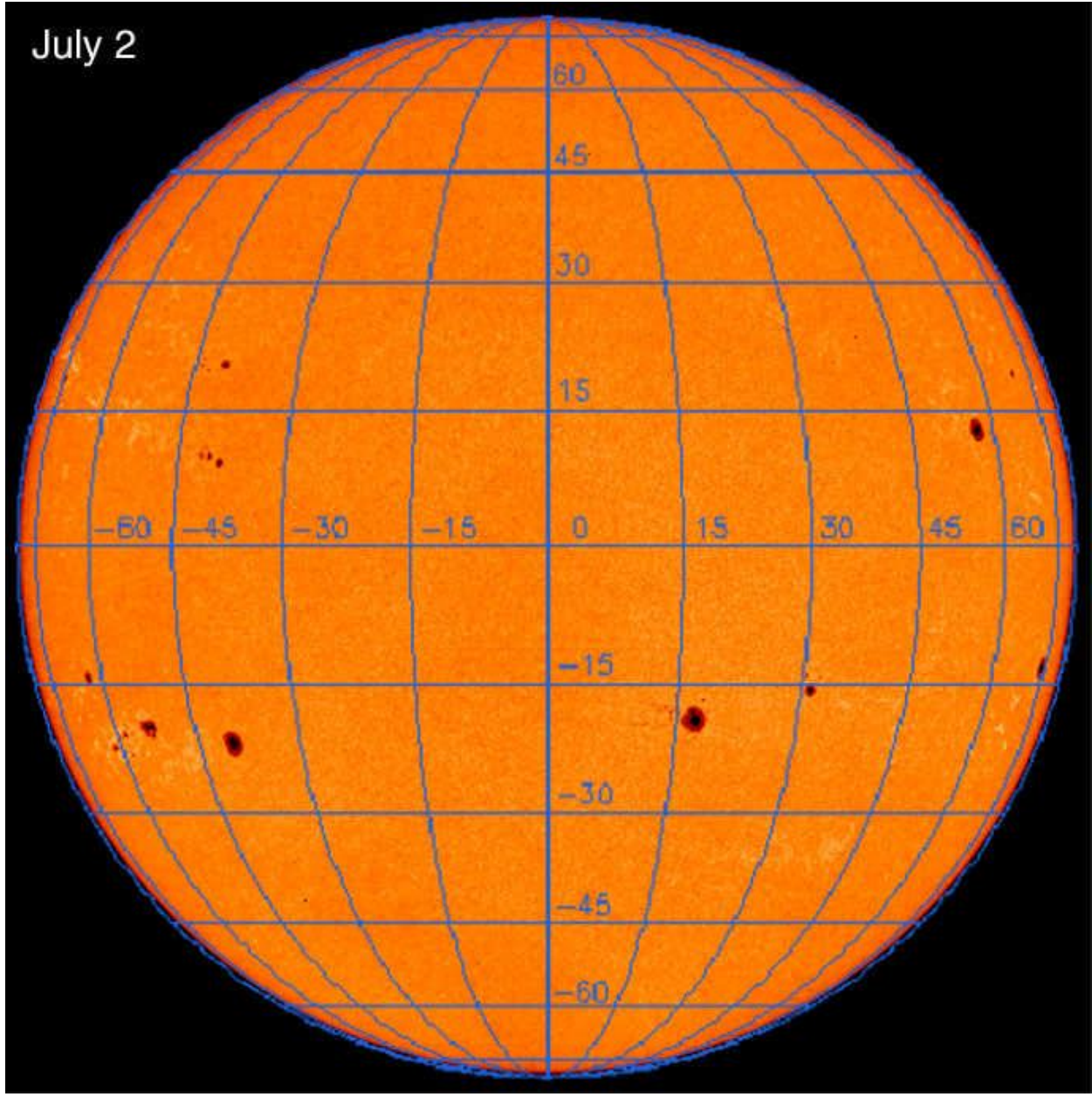


Figure 13 https://soho.nascom.nasa.gov/classroom/for_students.html

July 3

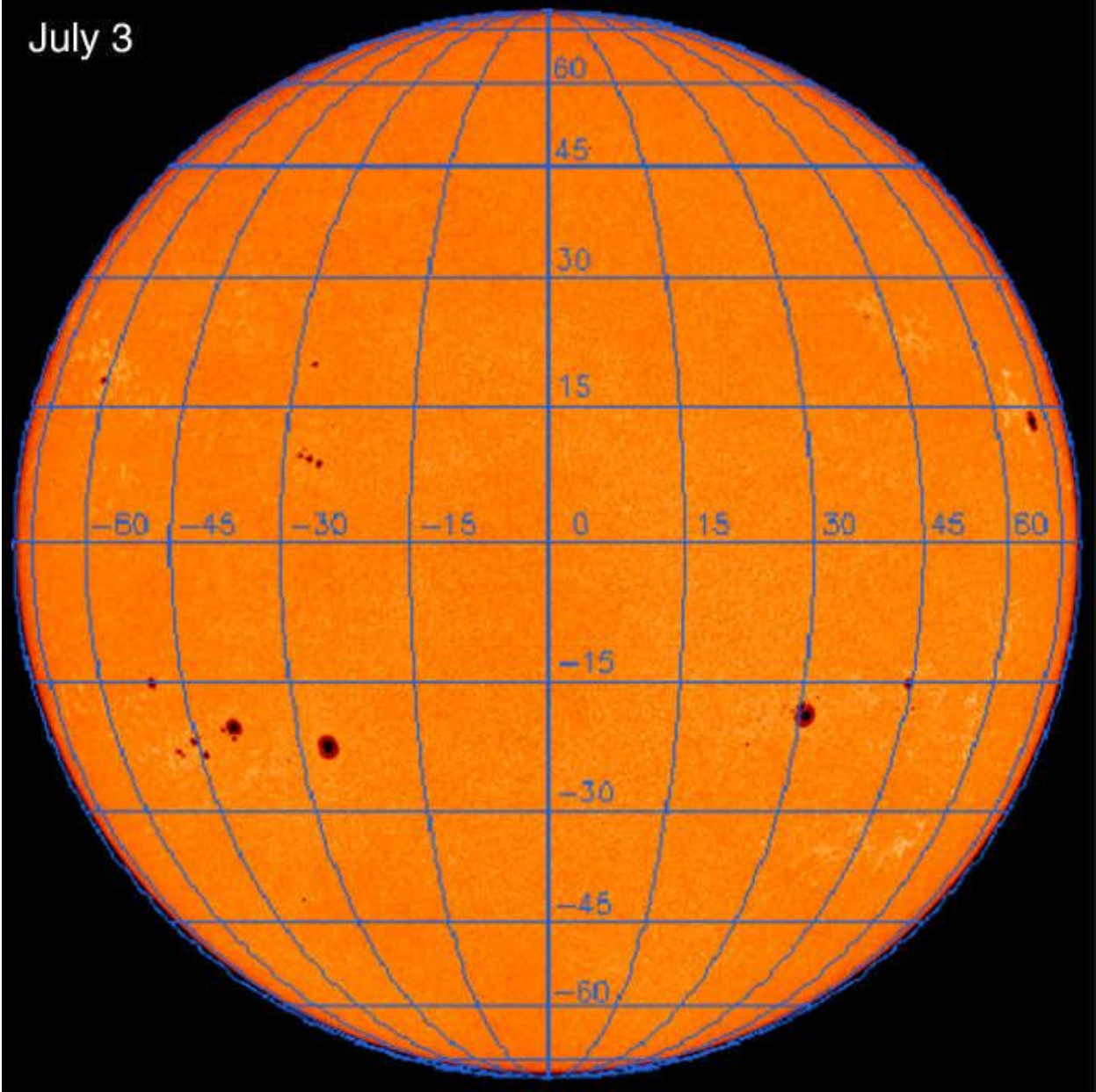


Figure 14 https://soho.nascom.nasa.gov/classroom/for_students.html