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Studying the Sun with satellites and eclipses
The Sun is a variable star.

That variability is driven by its magnetic field.
The Sun emits infrared, visible, UV, X-ray, and gamma ray photons (light), solar wind, solar energetic particles, and magnetic field.

The output is variable for ALL of these components.
The solar wind has blown a bubble in space that extends way beyond the orbit of Pluto. We call this bubble the “Heliosphere”
SOHO (Solar and Heliospheric Observer)

Launched in 1995

Orbiting L1 Lagrange Point

Composite image from three SOHO telescopes:
EIT (Extreme ultraviolet Imaging Telescope, green)
C2 Coronagraph (red)
C3 Coronagraph (blue)

10/26/2003
STEREO (Solar Terrestrial Relations Observatory)

Launched in 2006

Two spacecraft that moved away from the Earth. Both are now on the far side of the Sun

Composite image from four STEREO telescopes:
EUVI (Extreme UltraViolet Imager, orange)
COR1 (green)
COR2 (red)
HI 1 (blue)

08/31/2012
SDO (Solar Dynamics Observatory)

Launched in 2010

In a tilted (non-equatorial) geosynchronous orbit

Image from AIA (Atmospheric Imaging Assembly)
Solar Probe Plus
Solar Probe Plus is a large (685 kg, 4 meters tall) spacecraft that will launch in 2018 and travel to within 4 million miles of the Sun’s surface. The Earth is 25 times further away and even Mercury is 10 times further.
How close will Solar Probe Plus get?
Really close!

Solar Probe Plus
Closest Approach
NASA 2016 Eclipse Science

Greatest Duration of Eclipse

Maba, Indonesia

Woleai, Micronesia

1999 Turkey