

The Sun and the Eclipse Across America

August 21, 2017

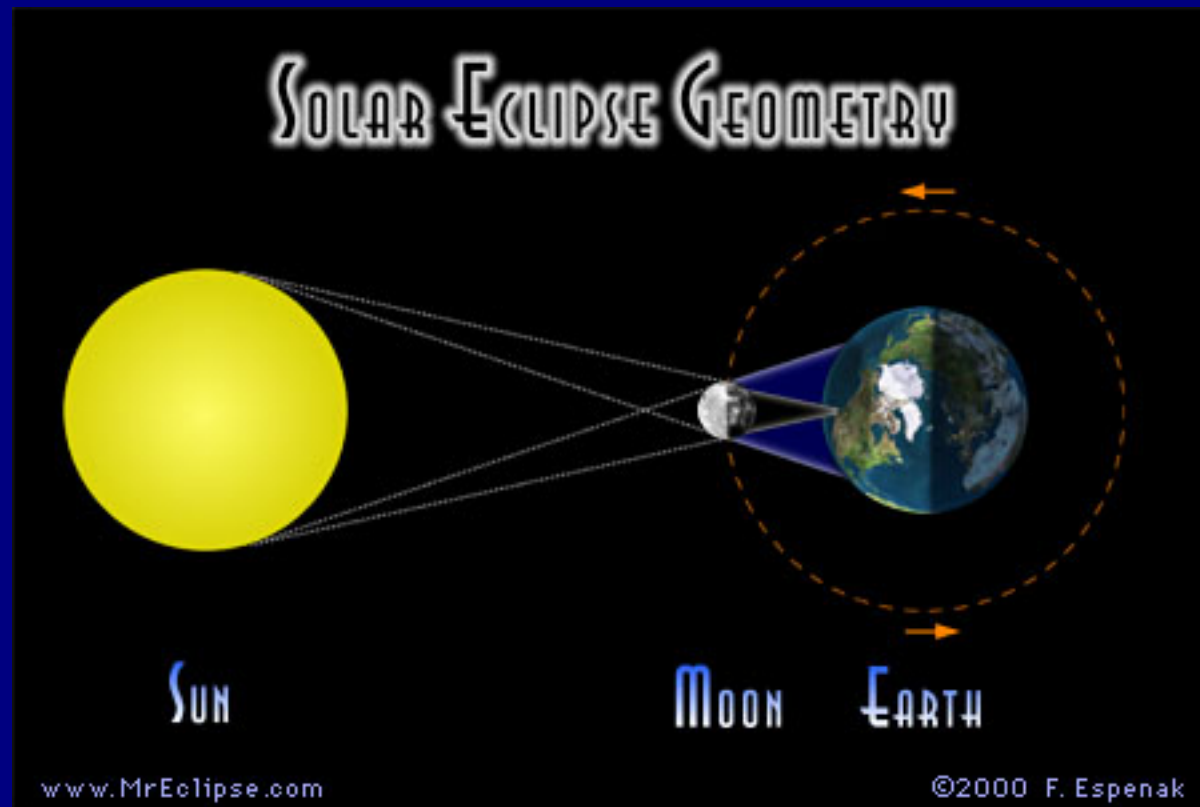
Mitzi Adams, Solar Scientist
ST13, NASA/MSFC



Image Courtesy of Dr. Alphonse Sterling, NASA/MSFC
August 1, 2008 Gansu Province, China

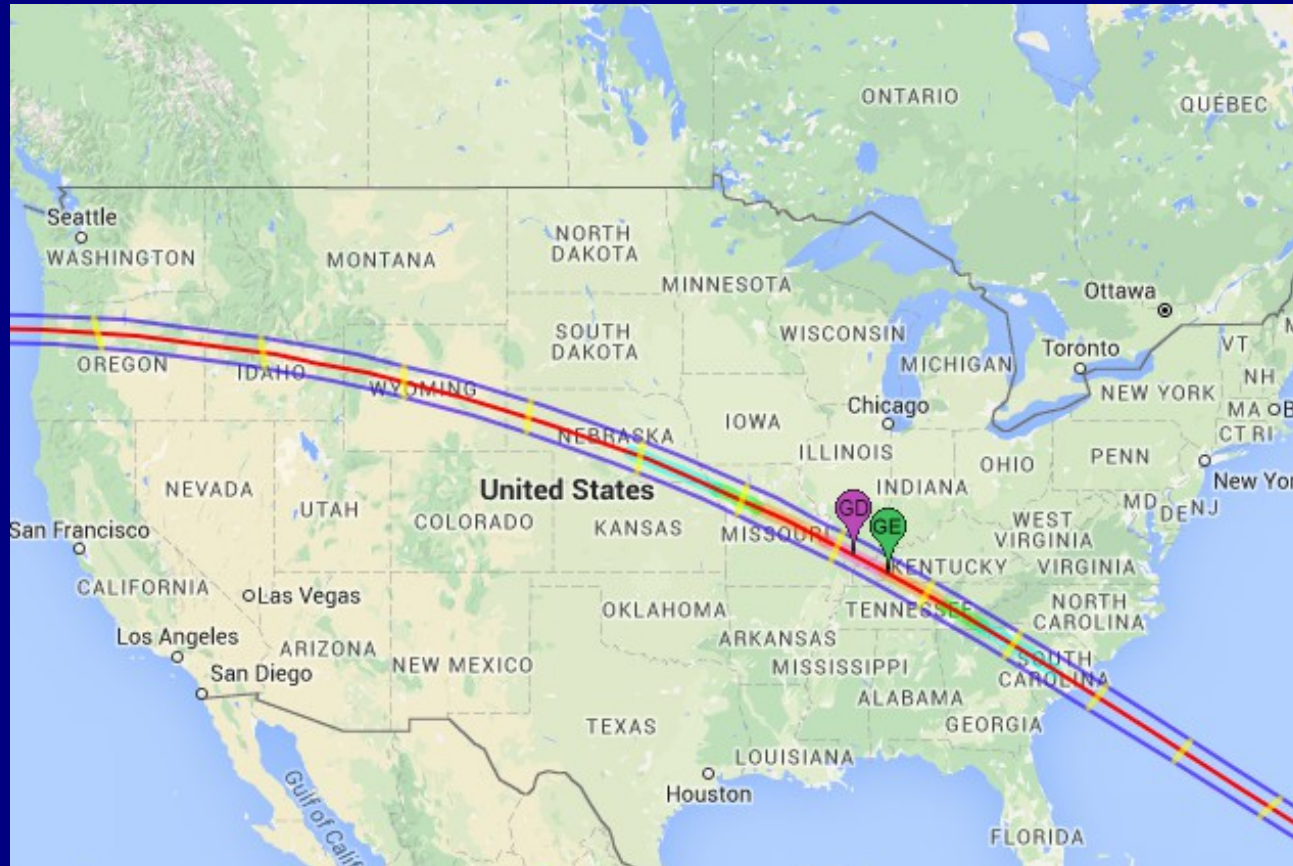
What is an Eclipse?

An eclipse happens when one object blocks the light of another



Images Used With Permission

Eclipse Across America



Close to Hopkinsville, Kentucky (GE):

Start of partial eclipse	16:56 UT	11:56 a.m. CDT
Start of totality	18:24 UT	1:24 p.m. CDT
Maximum eclipse	18:25 UT	1:25 p.m. CDT
End of totality	18:26 UT	1:26 p.m. CDT
End of partial eclipse	19:51 UT	2:51 p.m. CDT

What To Expect

What You Can See: Shadow Bands

Light shines through air, creating a wavy pattern similar to light through water in a pool



What You Can See: Diamond Ring and Bailey's Beads



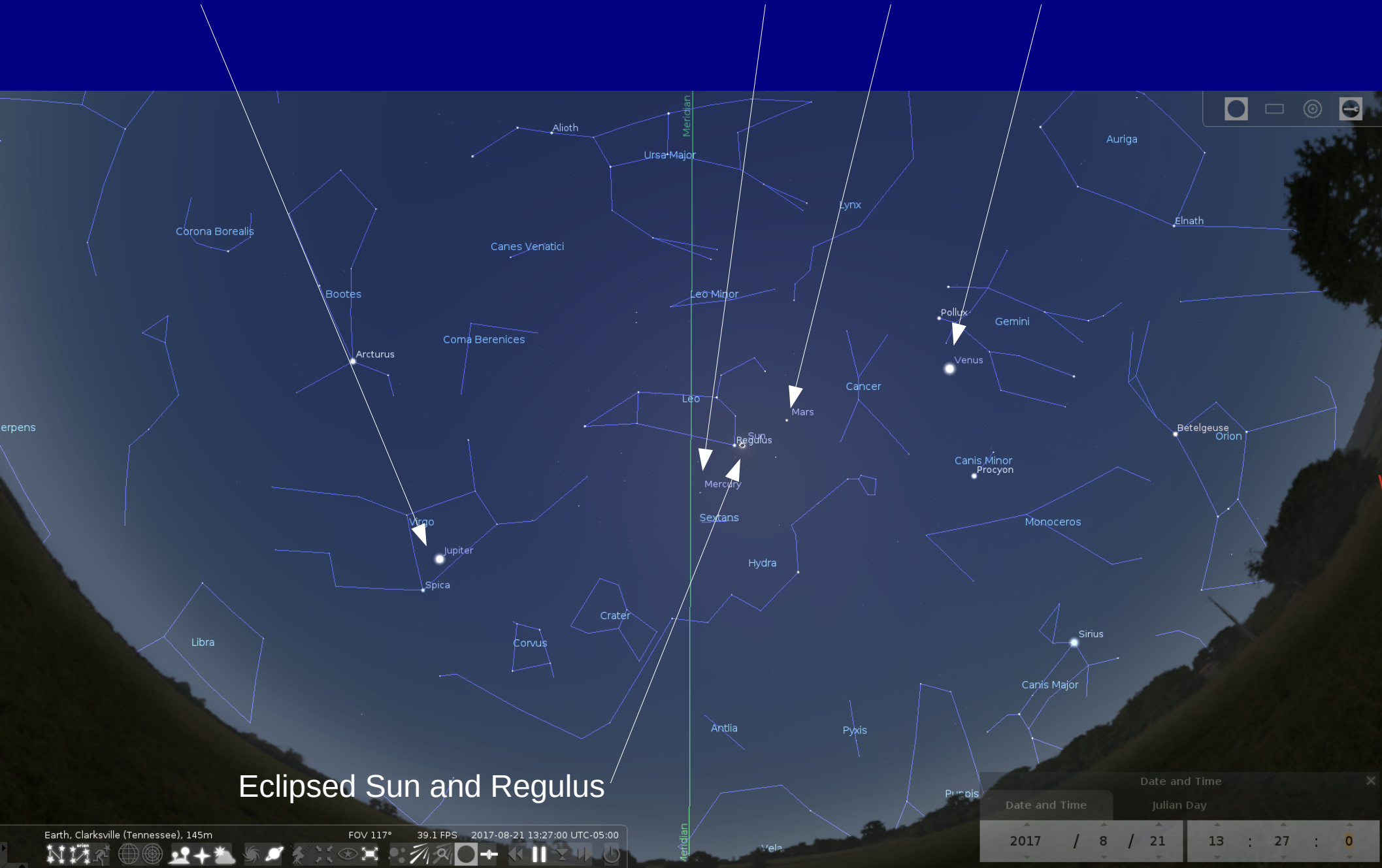
What You Can See: The Corona and Prominences



Rob Lucas, with Jay Pasachoff's 2013 Eclipse Expedition
Image Used With Permission

What You Can See: The Sky During Totality

Jupiter is to the east of the Meridian (left), Mercury, Mars, and Venus to the west.



Eclipse Across America...in Tennessee and Kentucky



Hopkinsville, Kentucky, Greatest Eclipse:
Dr. Renee Weber
Dr. Jesse Dimech (Planetary Scientist, postdoc)

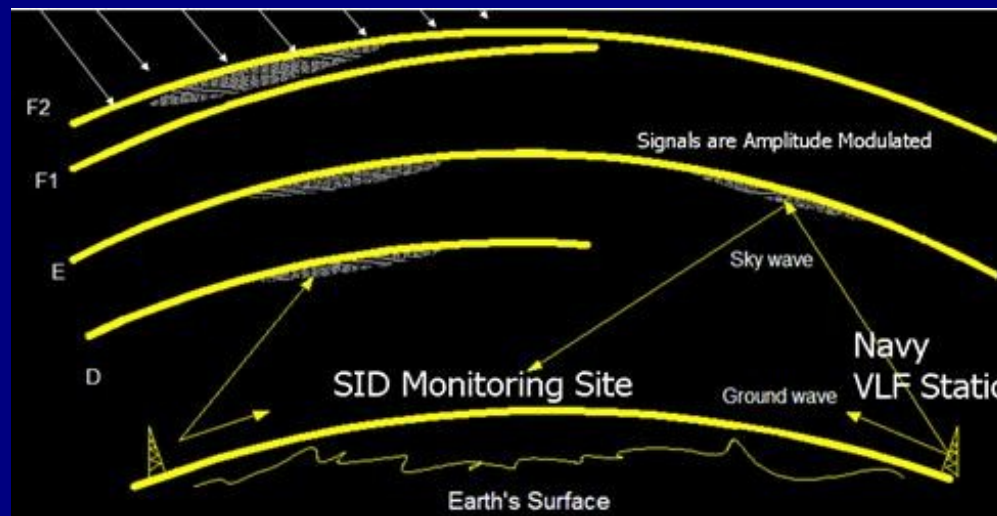
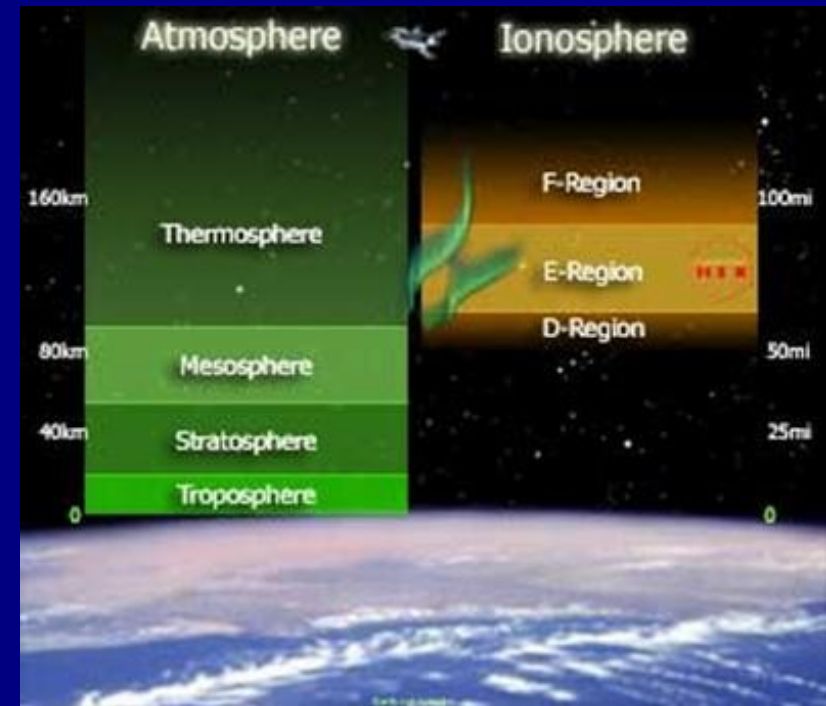
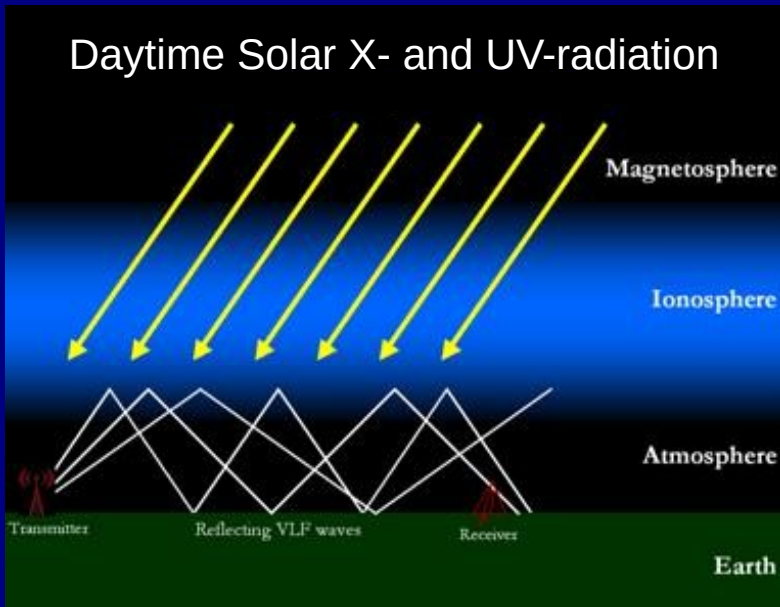
APSU Clarksville:
Mitzi Adams
Linda Rawlins (retired)
Dr. Pete Robertson (Atmospheric Scientist, retired)
Dr. Stephanie Wingo (Atmospheric Scientist, postdoc)

Guthrie, Kentucky:
Dr. Dennis Gallagher

Cookeville, Tennessee:
Dr. Amy Winebarger
Adams, Tennessee:
Dr. Jim Spann

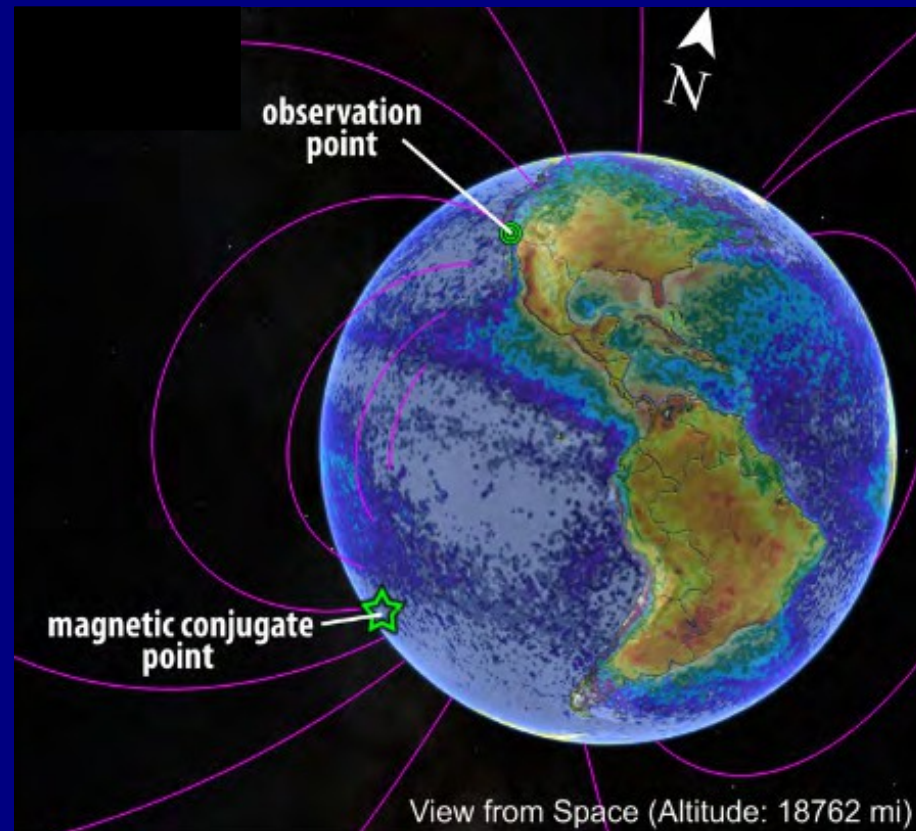
Eclipse Science

Ionospheric Changes



At night (on right), ions recombine, ionosphere has only F and E layers, transmitted radio signals travel higher before bouncing, so can be received at larger distances.

The INSPIRE Project provides creative hands-on opportunities for students of all ages to observe Very Low Frequency waves (i.e. lightning and other atmospheric sounds) by using the INSPIRE VLF-3 Natural Radio Sound Receiver.



WAV File!

Weather Observations

The Mobile Integrated Profiling System (MIPS)



Sounding Equipment

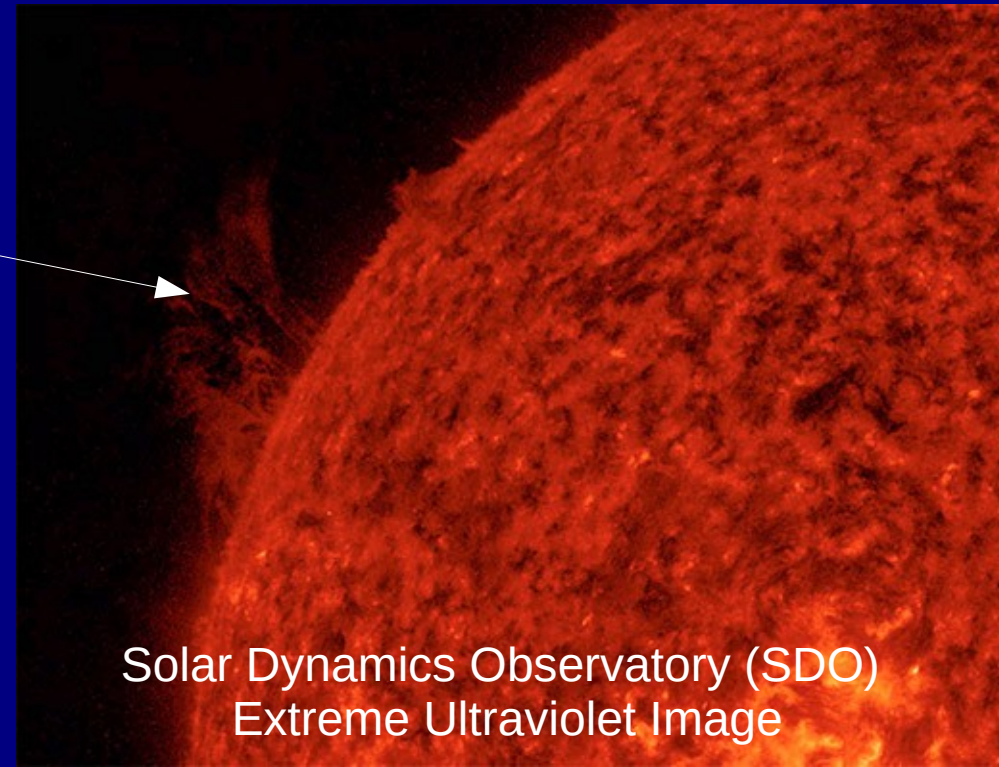


Standardized Eclipse Observations

Citizen Continental-America Telescopic Eclipse Experiment (CATE):
<https://sites.google.com/site/citizencateexperiment/home/>

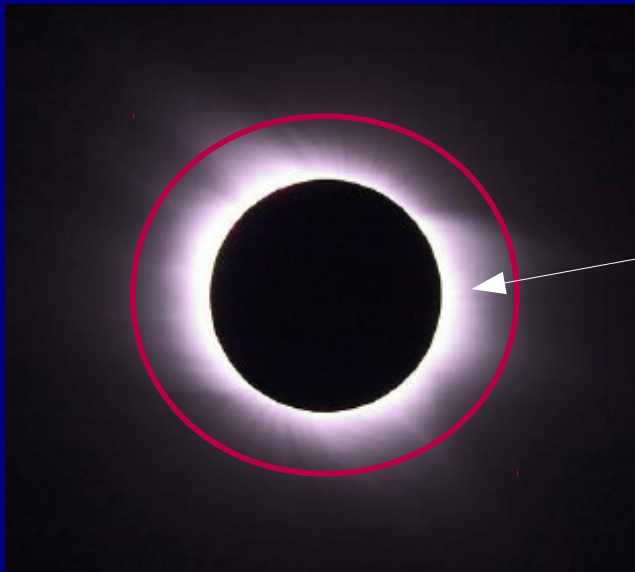


Prominences



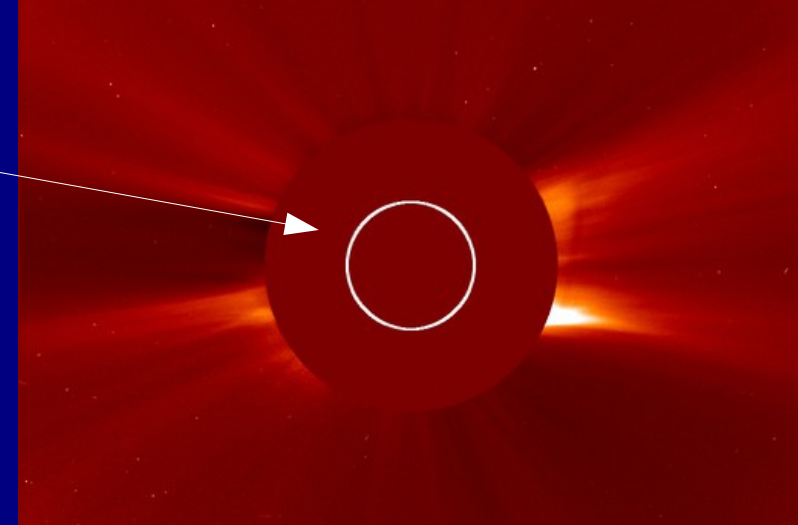
Solar Dynamics Observatory (SDO)
Extreme Ultraviolet Image

Coronal/Chromospheric Observations



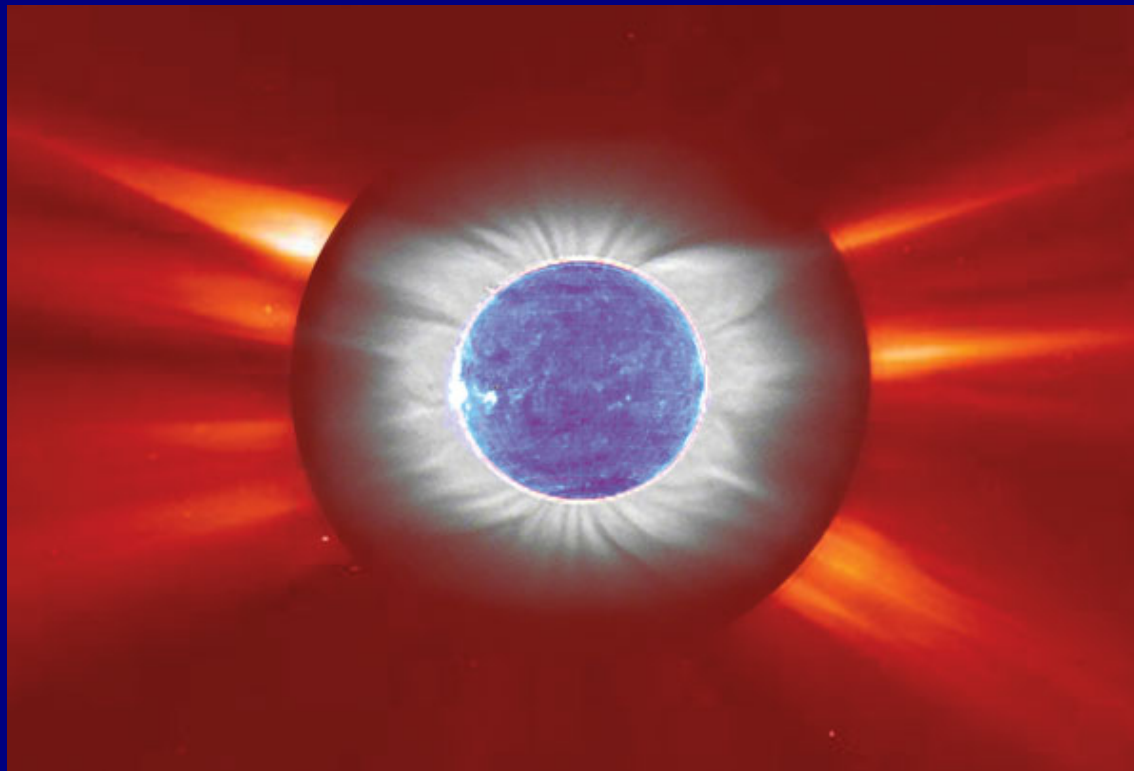
Inner Corona

SOLar and Heliospheric Observatory (SOHO) Coronagraph



Ground-based observatories see up to about 1.3 times the radius of the Sun.

March 2006



Space-based telescopes see from about 2.2. to 30 times the solar radius.