

The Great American Eclipse

Perspectives From The National Science
Foundation

Carrie Black

Associate Program Director, Geospace Science



Solar Physics at the National Science Foundation

- NSF Atmospheric and Geospace Sciences Division
 - NCAR, Atmospheric Science, Geospace Science
- Since the sun is a star, the Astronomical Sciences Division also supports studies of the sun.
- We also partner with NASA Heliophysics Science Division



The Great American Eclipse

- 21st century technology, social media – crowdsourcing
- Citizen science :
 - Participation via CitizenCate and Eclipse Megamovie
 - NSF Partnered with the American Astronomical Society to provide mini-grants for eclipse science and they are great resource for information.
 - AAS has resources for getting involved
- Images and data from millions of people will be collected and analyzed by scientists for years to come.



Manmade vs Natural Eclipses

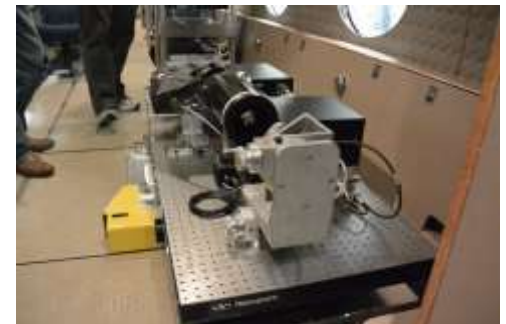
- The moon as the perfect occulter
 - Manmade occulters particularly on space based platforms block out the lower corona where space weather originates – this is where the action is
 - This is because, particularly in space, it is difficult to align the disk perfectly.
 - The surface of the sun is so bright and the atmosphere is so diffuse that instruments designed to study the corona would easily burn out if exposed to the photosphere





Eclipse Science: Instrument Testing and Crowdsourcing Experiments

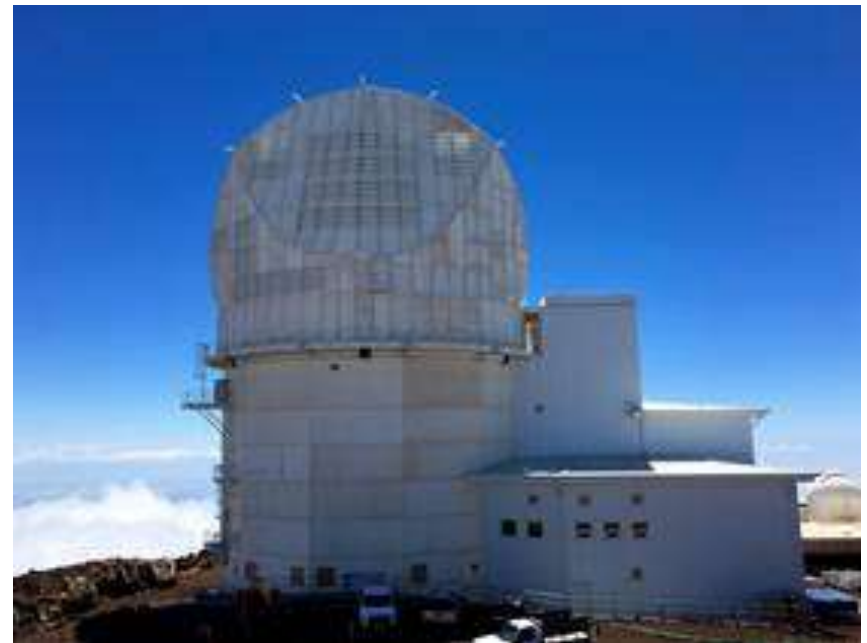
- Scientists are using this eclipse as a natural laboratory
 - Earth's disappearing ionosphere creates unique opportunities
 - A cold spot forms in the eclipse shadow and should create ripples in the atmosphere that expand outward from there.
 - Proof of concept for massive crowd-sourced space weather observations by leveraging GPS signals received by smart phones.
 - EclipseMob – high school and college students are working with scientists to make measurements of the ionosphere
 - NCAR's Gulfstream V and AirSpec
 - Looking for candidates for heating and acceleration of the solar wind.





NSF Daniel K. Inouye Solar Telescope

- The worlds largest solar telescope (4m)
- The microscope on the sun:
NSF DKIST will study this region with a smaller FOV
- Getting at the fundamental science of the sun
- First light in early 2020





Looking to the Future

- Crowdsourcing techniques tested in this eclipse will be improved and ready for the next solar eclipse in the US on April 8, 2024
- Continue to support investigations of the sun and space weather





THANK YOU