

AGU Press Conference

ERUPTIONS FROM THE FAR-SIDE: NEW GLOBAL VIEWS OF THE SUN

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Dynamic Solar Variability

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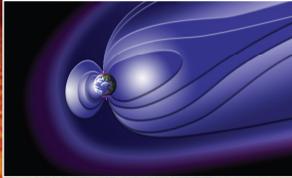
We are here to discuss one of the first results from Solar Dynamics Observatory, the first mission of NASA's Living with a Star Program. The earth orbits inside the atmosphere of the sun, in that sense we truly are living with this star. Even though to the naked eyes the sun appears to be a constant, it is only a limitation of human eyes. Modern telescopes and spacecraft have penetrated the sun's blinding glare and found a maelstrom of unpredictable turmoil on the surface and you will see examples of that from NASA's most recently launched spacecraft SDO & STEREO.

But the sun also produces solar wind, it spews a hot million miles per hour wind of charged particles throughout the solar system, planets, comets, asteroids... they all feel it. In this dramatic footage from one of the STEREO spacecraft we are able to witness this blowing out of solar wind. What you just saw was comet Encke's tail ripped apart by this wind. Yes, the sun is a variable star, a dynamic magnetic variable star that drives every cubic inch of space to the very edge of the solar system, creating dynamic space weather. Its effect on our own planet can be seen in the next movie. The movie is a theoretical model that shows how the dynamic pressure of the solar wind distorts our protective cocoon the magnetosphere. The effect is much stronger during an intense solar eruptions and the cause of geomagnetic storms. Which produces beautiful aurorae as well as other harmful impacts.

This image below provides the rationale for WHY DO WE study the sun?

Understanding Sun-Solar System Connections

Magnetospheres



The Plasma Universe



Comparative Environments



Humans in Space



Power and Communications



Satellite Operations



Climate Change



The upper half shows sun's influence on earth's magnetosphere, ionosphere, mesosphere, interaction with the atmosphere of other planets and understanding basics physical processes of magnetized plasma.

The lower half shows

Human society's vulnerability to solar flares and CMEs as our environment continues to expand above and beyond our planet. We have a permanent presence of humans in Earth orbit, and eventually human voyages beyond Earth. Solar variability can affect, human space flight, satellite operations, smart power grids, GPS navigation, emergency radio communications, air travel, financial services and even terrestrial climate. **Thus understanding solar variability to the point of predictability is crucial to our modern way of life. It is a necessity not a choice for a space faring nation like ours! Missions like SDO and STEREO are taking us closer to achieving this goal.**