Project Details

ROSES ID: NNH22ZDA001N-LWS
Selection Year: 2022
Program Element: Focused Science Topic

Topic: FST #1: Beyond F10.7: Quantifying Solar EUV Flux and its Impact on the Ionosphere - Thermosphere - Mesosphere System

Project Title:
Using Helioseismic Far-side Imaging to improve Solar EUV Irradiance Prediction

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Summary:
We propose to develop a supervised non-linear Machine Learning (ML) regression model of far-side AR helioseismic signal to EUV irradiance measures using SDO/HMI far-side maps and SECCHI EUV images as training data. Front-side EUV image data from SDO/AIA will be correlated to both SECCHI EUV images and to F10.7 cm flux to create a chained regression from far-side helioseismic signal to EUV image characteristic to proxy irradiance values that can be used in current thermospheric satellite drag forecasting models. We will also investigate the impact of large ARs rotating onto the disk on thermospheric temperature and composition, correlating EUV signal increases with measurements from the NASA/Global Observations of the Limb and Disk (GOLD) mission, enabling the development of direct thermospheric impact predictions from far-side AR measurements.
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The investigation directly addresses the LWS program goal to understand how the Earth responds to dynamic external drivers, specifically connecting observed and predicted solar EUV irradiance variations to ITM system responses. As a member of the F10.7 FST team, we will bring far-side AR detection and correlation to EUV irradiance to the effort as a standard tool for use in building other irradiance models or conducting IT impact studies.

Publication References:

no references