Geophysical Research Abstracts
Vol. 16, EGU2014-9597, 2014
EGU General Assembly 2014

EUV & UV Irradiance Variability: Algorithmic Approach and Challenges

Joe Zender (1), Rangaiah Kariyappa (2), Gabriel Giono (3), Lakshmi Pradeep Chitta (2), Sankalagare Kumara (2), and Luc Damé (4)

(1) ESA/ESTEC, SCI-SO, Noordwijk, Netherlands (joe.zender@esa.int, 0031-71-5654697), (2) Indian Institute of Astrophysics, Bangalore 560034, India , (3) National Astronomical Observatory of Japan, 2-21-1 Osawa, Mitaka, Tokyo 181-8588, Japan , (4) LATMOS (Laboratoire Atmosphères, Milieux, Observations Spatiales), 11 boulevard d'Alembert, 78280 Guyancourt, France

Understanding the role of magnetic field in the EUV and UV solar irradiance variability is an important task in solar physics, particularly a one-to-one spatial correspondence between the different photospheric magnetic features and coronal emission structures.
We aim to study the variability of magnetic field in correspondence with EUV & UV solar irradiance for a period of three years (January 2011 - December 2013) using the Large Yield Radiometer (LYRA), the Atmospheric Imaging Assembly (AIA), and Helioseismic and Magnetic Imager (HMI) on board the Solar Dynamics Observatory (SDO).
We used the Spatial Possibilistic Clustering Algorithm (SpoCA) on AIA spatially resolved images to create segmentation maps for Active Region (AR), Coronal Holes (CH) and Quiet Sun (QS). The AIA segmentation maps are then applied on full- disk HMI line-of-sight of magnetograms, and the different parameters such as the intensity, the magnetic field and contribution of AR/CH/QS features are computed and compared with the full-disk integrated intensity, absolute magnetic field and LYRA irradiance measurements.
We present the data flow and algorithms used and give for the invidiual steps of the algorithms the challenges encountered and the potential source of inaccuracies. Special emphasis will be given to:
- the different spatial and temporal performance of the data products originating from different space instrumentation,
- projection effects,
- effect of the observable (i.e. the wavelength).
We successfully show that the algorithms used are reliable and feasible for the analysis and comparison of brightness of coronal features with the corresponding photospheric magnetic features.