Space Science Seminar
Tuesday, 2019 September 17
10:30 a.m.
NSSTC/2096

Overview of Data-Driven MDH Models of Solar Wind Propagation from Chromosphere to Earth's Magnetosphere

Dr. Mehmet Sarp Yalim / Center for Space Plasma and Aeronomic Research, University of Alabama in Huntsville

Host: Dr. Alphonse Sterling

Solar wind is the plasma flow emerging from the Sun that affects us through its continuous interaction with Earth's magnetic environment. Its origin is linked to the existence of the high-temperature solar corona. A realistic solar wind propagation model should be data-driven. This model should ideally start in the photosphere that many space-borne and ground-based solar instruments observe and provide magnetogram data. These data will drive our LTP chromosphere model, where plasma temperatures and ionization ratio are low, which will then drive our corona model through its upper boundary.

In this presentation, I will present an overview of our data-driven magnetohydrodynamic (MHD) modeling efforts for realistic solar wind propagation through different layers of solar atmosphere together with our latest results. I will also present results related to our time-dependent 3D data-driven global MHD simulations of the interaction between solar wind and Earth's magnetosphere in which our global magnetosphere model is driven by time-varying data from the NASA Advanced Composition Explorer (ACE) satellite during a few geomagnetic storm events in previous solar cycles.

https://solarscience.msfc.nasa.gov/colloquia/