

Project Details

ROSES ID: NNH07ZDA001N

Selection Year: 2008

Program Element: Focused Science Topic

Topic: Focused science topic for Strategic Goal 1 (Solar storms): Exploring the magnetic connection between the photosphere and low corona

Project Title:

Solar Spicules, Spicule-like Features, and their Magnetic Environment

PI Name: Alphonse Sterling

PI Email: atn@g.ucla.edu

Affiliation: NASA/MSFC/NSSTC

Project Member(s):

- Lites, Bruce W; Collaborator; National Center for Atmospheric Research
- Moore, Ronald Lee; Co-I; MSFC/NSSTC

Summary:

Solar spicules, and similar features, are a major component of the magnetically-dominated solar atmosphere between the photosphere and the low corona. As such, they are a crucial factor in the lower boundary condition of the heliospheric space weather system. We propose a three-year program to study chromospheric and UV/EUV spicules, and their relationships with their magnetic environments. Our data will be from the Solar Optical Telescope (SOT) and the EUV Imaging Spectrometer (EIS) on the Hinode satellite, supplemented with UV/EUV images from TRACE, and images of X-ray jets from the Hinode X-Ray Telescope (XRT). Magnetic field data will be vector magnetograms from SOT, supplemented with line-of-sight magnetograms from SOT and from SOHO/MDI. We will study the morphology and the statistics of: (1) the magnetic characteristics at the bases of various spicules and jets, and (2) the relative appearance of the various spicules and jets at different wavelengths. This investigation will address questions such as: whether some types of spicules are produced by a magnetic, rather than a purely wave-based, mechanism; what magnetic configurations are necessary for the existence of spicules and jets; what percentage of chromospheric spicules evolve into UV/EUV spicules; and what chromospheric features correspond to X-ray jets. We will train and partially support a postdoctoral-level scientist during this program.

Publication References:

Summary: no summary

Reference: Pasachoff, Jay M.; Jacobson, William A.; Sterling, Alphonse C.; (2009), Limb Spicules from the Ground and from Space, Solar Physics, Volume 260, Issue 1, pp.59-82, doi: 10.1007/s11207-009-9430-x

Summary: no summary

Reference: Sterling, Alphonse C.; Moore, Ronald L.; DeForest, Craig E.; (2010), Hinode Solar Optical Telescope Observations of the Source Regions and Evolution of "Type II" Spicules at the Solar Polar Limb, The Astrophysical Journal Letters, Volume 714, Issue 1, pp. L1-L6, doi: 10.1088/2041-8205/714/1/L1

Summary: no summary

Reference: Moore, Ronald L.; Cirtain, Jonathan W.; Sterling, Alphonse C.; Falconer, David A.; (2010), Dichotomy of Solar Coronal Jets: Standard Jets and Blowout Jets, The Astrophysical Journal, Volume 720, Issue 1, pp. 757-770, doi: 10.1088/0004-637X/720/1/757

Summary: no summary

Reference: Santolík, O.; Pickett, J. S.; Gurnett, D. A.; Menietti, J. D.; Tsurutani, B. T.; Verkhoglyadova, O.; (2010), Survey of Poynting flux of whistler mode chorus in the outer zone, Journal of Geophysical Research, Volume 115, Issue 15, CitelD A00F13