Project Details

ROSES ID: NNH10ZDA001N
Selection Year: 2011
Program Element: Solar Dynamics Observatory

Project Title:
Self-Organized Criticality in Solar Physics

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Summary:
The solar corona is a nonlinear dissipative system that exhibits self-organized criticality (SOC), regarding the generation of magnetic flux elements, nanoflares, microflares, large flares, and CMEs.

With AIA we can study for the first time extensive statistics of these SOC phenomena with high spatial resolution, high cadence, and comprehensive temperature coverage, which will greatly improve new physical insights into the dynamics and statistics of solar phenomena, such as the role of nanoflares for coronal heating, the universal relationship between the fractal geometry of energy dissipation domains and energy frequency distributions, or scaling laws between geometric and physical solar flare parameters. SOC phenomena are also common in geophysics (earthquakes), magnetospheric physics (auroral emission, substorms), stellar physics (stellar flares), pulsars (giant pulses), and accretion disks around black holes. We propose to analyze and model SOC phenomena from SDO/AIA and HMI data, which have optimum cadence, spatial resolution, and complete time and temperature coverage.
Publication References:

Summary: no summary


Summary: no summary


Summary: no summary