

Project Details

ROSES ID: NNH06ZDA001N

Selection Year: 2007

Program Element: Focused Science Topic

Topic: Solar Origins of Irradiance Variations

Project Title:

The Fine Structure of Active Regions and Weak Magnetic Fields from MDI Images

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Project Member(s):

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- Ulrich, Roger K.; Collaborator; University of California at Los Angeles

Summary:

In response to NASA Roses 2006 B.7 - Living With a Star Targeted Research and Technology Program (NNH06ZDA001N-LWS), we submit this proposal entitled "The Fine Structure of Active Regions and Weak Magnetic Fields from MDI Images" under the Focused Science Topic: "Solar Origins of Irradiance Variations". The goal of the proposed research is to carry out a detailed study of solar spectral irradiance variations from UV to the infrared wavelengths and to compare the measured spectral irradiance changes to the observed variations in total solar and spectral irradiances. The proposed investigation will focus on the following three major science questions: (1) How does the formation and evolution of sunspots and active regions influence spectral irradiance variations; (2) what is the energy budget of solar active regions; and (3) how to detect and characterize the weak magnetic fields outside of active regions? The proposed research will directly address one of the Focused Science Topics: namely, our research will study in detail the magnetic topology of active regions and their role in irradiance changes to better understand the physical processes by which solar magnetic activity causes these variations. To achieve our goals, we will use the full disk and high resolution MDI images. Solar spectral irradiance to be used in this study will come from the SORCE/SIM experiment and also from the UARS/SUSIM and SOLSTICE experiments at UV wavelengths. Total solar irradiance is provided by the SOHO/VIRGO, ACRIMIII and SORCE/TIM experiments. As part of the proposed work, we will also develop a new method to identify the quiet-Sun values and to separate them from the weak magnetic field structures. The proposed work will enhance current MDI image analysis techniques and it will also provide technical and science tools to the SDO/HMI experiment. The proposed work is a three years long effort. The proposed team (Dr. Judit M. Pap, Principal Investigator; Dr.W. Dean Pesnell, Co-Investigator, and Professor Roger Ulrich, Collaborator) is highly experienced in image analysis as well as studying and interpreting irradiance variations.

Publication References:

no references