

Solar Heliospheric & INterplanetary Environment (SHINE) Conference

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<http://shinecon.org/CurrentMeeting.php>

Session 5: “Solar magnetic activity and solar-stellar connections”

Organizers: Irina Kitiashvili (NASA Ames & BAERI), Mausumi Dikpati (HAO, NCAR), Todd Hoeksema (Stanford University), Michael J. Thompson (HAO & NCAR), Ricky Egeland (HAO & Montana State University)

Prediction of solar magnetic activity on various temporal scales is a fundamental element of space weather, which requires a wide range of theoretical and observational expertise in solar phenomena from the deep interior to the corona. Historical observations have revealed many features of cyclic variations of the solar activity; but these data are dramatically insufficient to draw a physical picture of global magnetic field evolution. New observational data, currently available from space missions and ground-based observatories, provide us with detailed information about solar dynamics and magnetism. However, because of the relatively short duration of data series and the great variety of data types and quality, it is challenging to assimilate these data in theoretical models and make reliable forecasts. The recent unexpectedly weak solar activity cycles, as well as observations of rotational and magnetic topology transitions in solar-type stars, suggest that the Sun and its magnetic dynamo are currently in a very interesting evolutionary stage. This could relate to the difficulty in getting a model of the Sun to produce solar-like – rather than anti-solar-like – differential rotation, to reproduce the rotation profile obtained from helioseismology, and to predict solar activity cycles.

The proposed session will combine the expertise of observers, theoreticians and modelers and provide a unique platform to discuss the current status and challenges for understanding solar and stellar dynamics and activity on different temporal and spatial scales.

During the session the following questions will be discussed:

- 1) What are the important links between the solar dynamics and activity from the interior to the surface and corona?
- 2) What additional observations would test the hypothesis that Sun-like stars undergo a transition from large-scale to small-scale magnetic field topology?
- 3) What additional observations and models are needed to reconstruct solar evolution to explain current dynamical properties?

Speakers:

Travis Metcalfe (Space Science Institute) – The solar-stellar connection and transition state of the solar dynamo.

Lisa Upton (HAO) – Links between the solar dynamics and activity