

Project Details

ROSES ID: NNH06ZDA001N

Selection Year: 2007

Program Element: Focused Science Topic

Topic: Predict Emergence of Solar Active Regions Before they are Visible

Project Title:

Detection of Emerging Active Regions and Forecast of Their Evolution and Activity by Time-Distance Helioseismology

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Project Member(s):

- Duvall, Thomas L.; Co-I; NASA/GSFC
- Zhao, Junwei ; Postdoctoral Associate; null;
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- Stein, Robert ; Collaborator; Michigan State University
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Summary:

We propose to develop time-distance helioseismology

techniques for the application of detecting emerging active

regions before they become visible. Techniques will

also be developed for predicting active region

growth, decay and maximum activity stage. The work will

include development of deep-focus time-distance data analysis methods for imaging weak and rapidly

evolving sound-speed structures and mass flows associated

with new emerging magnetic flux in the convection zone,

monitoring and predicting the growth and complexity of the

subsurface structures, and also a search for the deep nests

of long-living complexes of activity ("active longitudes")

and their relationship to the global circulation of the Sun.

An important goal of this investigation is to develop and

deliver software for deep-focus time-distance analysis and

inversions of Solar-B and SDO data.

Publication References:

Summary: no summary

Reference: Nigam, R.; Kosovichev, A. G.; Scherrer, P. H.; (2007), Analytical Models for Cross-Correlation Signal in Time-

Summary: no summary

Reference:

Zhao, J.; Couvidat, S.; Bogart, R. S.; Parchevsky, K. V.; Birch, A. C.; Duvall, T. L.; Beck, J. G.; Kosovichev, A. G.; Scherrer, P. H.; (2012), Time-Distance Helioseismology Data-Analysis Pipeline for Helioseismic and Magnetic Imager Onboard Solar Dynamics Observatory (SDO/HMI) and Its Initial Results, Solar Physics, Volume 275, Issue 1-2, pp. 375-390, doi: 10.1007/s11207-011-9757-y