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We investigate a relative contribution from short to long-term flaring rate to predicting M and X-class flare probabilities. In this study, we consider magnetic parameters summarizing distribution and non-potentiality by Solar Dynamics Observatory/Helioseimic and Magnetic Imager and flare list by Geostationary Operational Environmental Satellites. A short-term rate is the number of major flares that occurred in an given active region (AR) within one day before the prediction time. A mid-term rate is a mean flaring rate from the AR appearance day to one day before the prediction time. A long-term rate is a rate determined from a relationship between magnetic parameter values of ARs and their flaring rates from 2010 May to 2015 April. In our model, the predicted rate is given by the combination of weighted three rates satisfying that their sum of the weights is 1. We calculate Brier skill scores (BSSs) for investigating weights of three terms giving the best prediction performance using ARs from 2015 April to 2018 April. The BSS (0.22) of the model with only long-term is higher than that with only short-term or mid-term. When short or mid-term are considered additionally, the BSSs are improved. Our model has the best performance (BSS = 0.29) when all three terms are considered, and their relative contribution from short to long-term rate are 19%, 23%, and 58%, respectively. This model seems to be more effective when predicting active solar ARs having several major flares.

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[구 SS-12] Application of a non-equilibrium ionization model to rapidly heated solar plasmas

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We apply a non-equilibrium ionization (NEI) model to a supra-arcade plasma sheet, shocked plasma, and current sheet. The model assumes that the plasma is initially in ionization equilibrium at low temperature, and it is heated rapidly by a shock or magnetic reconnection. The model presents the temperature and characteristic timescale responses of the Atmospheric Imaging Assembly (AIA) on board Solar Dynamic Observatory and X-ray Telescope (XRT) on board Hinode. We compare the model ratios of the responses between different passbands with the observed ratios of a supra-arcade plasma sheet on 2012 January 27. We find that most of observations are able to be described by using a combination of temperatures in equilibrium and the plasma closer to the arcade may be close to equilibrium ionization. We also utilize the set of responses to estimate the temperature and density for shocked plasma associated with a coronal mass ejection on 2010 June 13. The temperature, density, and the line of sight depth ranges we obtain are in reasonable agreement with previous works. However, a detailed model of the spherical shock is needed to fit the observations. We also compare the model ratios with the observations of a current sheet feature on 2017 September 10. The long extended current sheet above the solar limb makes it easy to analyze the sheet without background corona. We find that the sheet feature is far from equilibrium ionization while the background plasma is close to equilibrium. We discuss our results with the previous studies assuming equilibrium ionization.

[구 SS-13] Oscillation of a Small Hα Surge in a Polar Coronal Hole

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Hα surges (i.e. cool/dense collimated plasma ejections) may act as a guide for a propagation of magnetohydrodynamic waves. We report a high-resolution observation of a surge observed with 1.6m Goody Solar Telescope (GST) on 2009 August 26, from 18:20~UT to 18:45UT.