Contribution ID: **109** Type: **Poster**

A Strong-flare Prediction Model Developed Using a Machine-learning Algorithm Based on the Video Data Sets of the Solar Magnetic Field of Active Regions

It is well accepted that the physical properties obtained from the solar magnetic field observations of active regions (ARs) are related to solar eruptions. These properties consist of temporal features that might reflect the evolution process of ARs, and spatial features that might reflect the graphic properties of ARs. In this study, we generated video data sets with timescales of 1 day and image data sets of the SHARP radial magnetic field of the ARs from 2010 May to 2020 December. For the ARs that evolved from “quiet” to “active” and erupted the first strong flares in 4 days, we extract and investigate both the temporal and spatial features of ARs from videos, aiming to capture the evolution properties of their magnetic field structures during their transition process from “quiet” (non–strong flaring) to “active” (strong flaring). We then conduct a comparative analysis of the model performance by video input and single-image input, as well as of the effect of the model performance variation with the prediction window up to 3 days. We find that for those ARs that erupted the first strong flares in 4 days, the temporal features that reflect their evolution from “quiet” to “active” before the first strong flares can be recognized and extracted from the video data sets by our network. These features turn out to be important predictors that can effectively improve strong-flare prediction, especially by reducing the false alarms in a nearly 2 day prediction window.

Primary author: WANG, Jingjing

Session Classification: Coffee break and poster session 2

Track Classification: Space weather and the solar-heliospheric connections