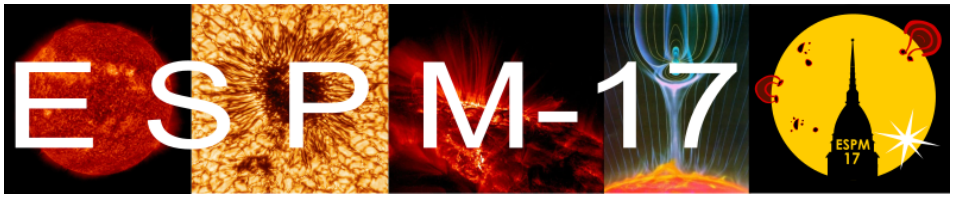

Contribution ID: **40** Type: **Poster**

Deep Learning study into sunspot evolution for use in flare forecasting

Solar flares are large eruptions of electromagnetic radiation from the Sun which can affect the Earth's atmosphere and the radio communications. Since the delay between the flare event and their near-Earth effects is only 8 minutes, it is essential we can forecast these events in advance. This work aims to train a Deep Learning model to predict flares within a forecasting window. We use images obtained from the Solar Dynamics Observatory (SDO) Space weather HMI Active Region Patch (SHARPs) specifically the radial component of the magnetic field. By using the whole active region image observations as input we want to improve our understanding of the physics leading up to flares and thus also improve our ability to forecast them. We looked at magnetogram images between 2016-2023 with cadence of 24 hours and the corresponding GOES X-ray flux in the next 24 hours to create the image and flare-outcome label pairs. Filtering was performed to limit our set to single NOAA number HARP regions within $\pm 75^{\circ}$ longitude. With HARP separated data sets for training and testing our model we implemented a Convolutional Neural Network for the binary classification of flare events with GOES X-ray flare class above C1. We present our initial results of applying the data to the CNN and highlight some of the problems we encountered in the data preparation.

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Session Classification: Coffee break and poster session 2

Track Classification: Multi-scale energy release, flares and coronal mass ejections