



Contribution ID: 295

Type: **Poster**

Long-Period of Plasma and Magnetic-Helicity Oscillation Prior to Three C-class Flares

The objective of this work is to identify various periods of magnetic helicity and detect the long-periods plasma oscillations in an Active Region NOAA12353 prior to a series of C-class flares in the lower solar atmosphere. To analyse the magnetic helicity flux in the lower solar atmosphere, linear force-free field extrapolation was used to construct a model of the magnetic field structure of the active region. Subsequently, the location of long-period oscillations in the active region was probed by examining the spectral energy density of the measured intensity signal in the 1700 Å, 1600 Å, and 304 Å channels of the Atmospheric Imaging Assembly (AIA) of the Solar Dynamics Observatory (SDO). Significant periods of oscillations were determined by means of 3D-wavelet analysis. We report the presence of different long periods oscillation in the lower solar atmosphere before and after the flare events.

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Session Classification: Coffee break and poster session 2

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