[구SS-07] Simultaneous EUV and Radio Observations of Bidirectional Plasmoids Ejection During Magnetic Reconnection

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We present a multiwavelength study of the X-class flare, which occurred in active region (AR) NOAA 11339 on 3 November 2011. The EUV images recorded by SDO/AIA show the activation of a remote filament (located north of the AR) with footpoint brightenings about 50 min prior to the flare occurrence. The kinked filament rises-up slowly and after reaching a projected height of ~49 Mm, it bends and falls freely near the AR, where the X-class flare was triggered. Dynamic radio spectrum from the Green Bank Solar Radio Burst Spectrometer (GBSRBS) shows simultaneous detection of both positive and negative drifting pulsating structures (DPSs) in the decimetric radio frequencies (500-1200 MHz) during the impulsive phase of the flare. The global negative DPSs in solar flares are generally interpreted as a signature of electron acceleration related to the upward moving plasmoids in the solar corona. The EUV images from AIA 94 Å reveal the ejection of multiple plasmoids, which move simultaneously upward and downward in the corona during the magnetic reconnection. The estimated speeds of the upward and downward moving plasmoids are ~152-362 and ~83-254 km/s, respectively. These observations strongly support the recent numerical simulations of the formation and interaction of multiple plasmoids due to tearing of the currentsheet structure. On the basis of our analysis, we suggest that the simultaneous detection of both the negative and positive DPSs is most likely generated by the interaction/coalescence of the multiple plasmoids moving upward and downward along the current-sheet structure during the magnetic reconnection process. Moreover, the differential emission measure (DEM) analysis of the active region reveals presence of a hot flux-rope structure (visible in AIA 131 and 94 Å) prior to the flare initiation and ejection of the multi-temperature plasmoids during the flare impulsive phase.

[구SS-08] Changes in High Degree p-mode Parameters with Magnetic and Flare Activities

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Solar energetic transients, e.g., flares, CMEs, etc., release large amount of energy which is expected to excite acoustic waves (p-modes) by exerting mechanical impulse of the thermal expansion of the flare on the photosphere. We study the p-mode properties of flaring and dormant active regions (ARs) to find association between flare and p-mode parameters. We compute the magnetic and flare activity indices of ARs using the line-of-sight magnetograms and GOES X-ray fluxes, respectively. The p-mode parameters are computed from the ring-diagram analysis. We correct p-mode parameters for magnetic field, filling factors and foreshortening by multiple linear-regression analysis. Our analysis of several flaring and dormant ARs observed during the Carrington rotations 1980-2109, showed strong association of mode parameters with magnetic and flare activities. We find that the mode parameters are contaminated by the geometrical effect. Mode amplitude decreases with angular distance from the solar disc centre. The mode width increases with magnetic activity while amplitude showed opposite relation due to mode absorption by the sunspot. After correcting modes due to all geometrical effects, magnetic activity and filling factor, we find that the modes amplitude, and mode energy increases with flare energy while width shows opposite relation.