Coronal Mass Ejections from Non-sunspot Regions and their Space Weather Consequences

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We examined the source regions of coronal mass ejections (CMEs) to understand why CME occurrence rate did not drop in cycle 24 unlike sunspot number (SSN). We identified surface signatures of wide CMEs (>60 deg) using SDO/AIA and STEREO/SECCHI and found that 55% of CME originated from sunspot regions while 41% of the CMEs were from non-sunspot regions. Significant number of the originated from non-sunspot region so it is not necessary for the CME rate to follow SSN perfectly. In fact, the average sunspot number has declined by ~40% while the number of prominence eruptions (PEs), which is closely related to the CMEs, observed by Nobeyama radio heliograph dropped 16%. We also found that 4% of wide CMEs are stealth CMEs. The implication on space weather effects of the non-sunspot CMEs are discussed.