Diagnosing flare-productive active regions using EUV images for space weather forecast to deep space probes

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Solar flares and coronal mass ejections (CMEs) are the most significant phenomena for space weather. However, current space weather researches are mainly for circumterrestrial space, and not for deep space probes that are located far from the earth. Radiation hazard from solar flares and CMEs may cause significant damage to the satellites on geocentric orbits and deep space probes. Therefore, to establish of the flare prediction system for deep space probe is one of the most essential tasks in space weather researches. Now, we can obtain the backside EUV images of the sun, by the Solar Terrestrial RElations Observatory (STEREO). In order to develop a flare prediction algorithm for deep space probes by using STEREO EUV images,we analyzed full disk 195 Å images obtained by SOHO/EIT. We examined the differences between the time profiles of EUV intensityof flare productive active regions (ARs) and those of non-flare productive ARs. We found that there are mildly bright pixels in flare productive ARs even when flares were not occurring. On the other hand, in the non-flare productive ARs, the possibility of the appearance of mildly bright pixels is much less than that in the flare productive ARs. This difference possibly may be used for an indicator of flare productivity of each AR.