Study of The Generation/Disappearance Processes of Coronal Hole Using Large-Scale Image Data

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A continuous stream of charged particles flowing outward from sun, so called solar wind, is one of the important topics in the category of solar physics, because it highly affects the solar terrestrial environment. It is important to predict the solar wind condition for space weather study. A solar wind is believed to come from the areas where the Sun’s corona is darker, called coronal hole. In this study, we focus on the behavior of coronal holes to understand the mechanisms of the generation/disappearance process of coronal holes. We have developed the automatic tracking module, which tracks the temporal variation of coronal holes. We used the data from Atmospheric Imaging Assembly (AIA) on board Solar Dynamics Observatory (SDO) satellite and Sun Earth Connection Coronal and Heliospheric Investigation (SECCHI) on board two Solar TErrestrial RElations Observatory (STEREO) satellites. We can observe the whole Sun by using these three satellites. Using this module, we detected and tracked the coronal holes. As a consequence, we found typical two different generation processes. The one is gradual emergence around the active regions, and the other is sudden emergence according to flaring activity (i.e. dimmings). We discuss which process is dominant for producing the coronal hole. Also, we have analyzed magnetic field observation using Helioseismic and Magnetic Imager (HMI)/SDO. We also discuss the relationship of magnetic fields and coronal holes.