

S002-03

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Observations of Solar Radio Bursts Associated with Solar Flares in May 2024

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Solar activity has reached its maximum, and a total of 20 large-scale (X-class) solar flares occurred in May 2024. In particular, 12 large-scale solar flares occurred in the active region NOAA 13664, including the most intense flare of X8.7 in this solar cycle. The coronal mass ejections (CMEs) released by these solar flares caused the first major geomagnetic storm in 19 years, and Dellinger phenomena, ionospheric disturbances, and low-latitude auroras were observed in various parts of Japan. It is known that Type II and Type III solar radio bursts are observed in association with CMEs and accelerated electron beams. By analyzing the spectrum of radio bursts observed in the frequency range of 70 MHz to 9 GHz, it is possible to derive near real-time CME velocities by assuming solar atmospheric density (Naoi et al. 2018 Fall Meeting of the Astronomical Society of Japan, M05a). The National Institute of Information and Communications Technology (NICT) conducts steady-state observations of solar radio bursts with the Solar Radio Observation System at the Yamagawa Radio Observatory.

The system successfully observed more than 17 cases of solar radio bursts associated with numerous X- and M-class solar flares in May 2024. Specifically, the system successfully observed the following solar radio bursts: M1.8-class solar flare on May 1, X1.7, M4.4, and M1.1 flares on May 3, M9.1 and M1.5 flares on May 4, M8.8, and X1.3 flares on May 5, two X1.0 flares on May 8, X2.3 flare on May 9, X4.0 flare on May 10, X5.8 flare on May 11, X1.7 flare on May 14, C9.9, and X3.5 flares on May 15, and X2.9 flare on May 27. These events were detected in real time by an automatic detection program and an automatic warning system. Furthermore, the directions and velocities of CMEs have been estimated from radio burst observations and coronagraph images taken by LASCO/SOHO, which were input into the SUSANOO simulation to estimate the arrival time of CMEs at Earth. In this talk, we will show observation data of solar radio bursts taken by the Yamagawa Radio Observatory in May 2024, and the analysis of CME velocity estimations.