S002-P05
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Observations of EMIC waves during the May 2024 geomagnetic storm observed by the Arase satellite and PWING network

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During the main phase of the storm, electromagnetic ion cyclotron (EMIC) waves are known to origin in the lower L-shell (L<5) regions in the afternoon sector. This is due to the developing ring current caused by the strong convective electric field in the inner magnetosphere. We present observations of EMIC wave activities during the great geomagnetic storm on May 2024, using data from Arase satellite and PWING ground-based observation network. For the May 2024 storm, the minimum Dst index was around -403 nT, making it the largest geomagnetic storm of the past decade. The Arase satellite detected several magnetopause crossings at L ~5-6 during the main and early recovery phase, suggesting that the magnetosphere was significant compressed. This observation indicates that energetic particles are able to penetrate to regions close to the Earth. PWING ground-based observations exhibit special types of Pc1 pulsations such as the dayside interval of pulsations of the demisting period (IPDP) during the main and early recovery phases at sub-auroral and low-latitudinal stations and several continuous Pc1 pulsations with frequencies of 1-2 Hz during the late recovery phase. In particular, the Arase observations show that high-frequency EMIC waves have a frequency range of 5-36 Hz at L ~2 during the early recovery phase at 18 MLT and 7-8 MLT. We will investigate their characteristics (e.g., polarization sense, wave normal angle, Poynting vector, spatial distributions) and possible free energy sources for these waves by comparing our observations with model calculations (e.g., dispersion relation, the minimum resonant energy for protons and electrons). Our observations provide new insights into the generation processes of EMIC waves and the dynamics of the inner magnetosphere during an intense geomagnetic storm.