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## **Large scale changes in the polar ionosphere during CME and CIR storms, its relation to Sub-Auroral Polarization Streams (SAPS) and particle precipitation**

From June 11th to August 19th, 2023, I delved into studying large scale changes in the polar ionosphere during CME and CIR storms, and its relation to Sub-Auroral Polarization Streams (SAPS) and particle precipitation. This research took place at Nagoya University's Institute for Space-earth Environmental Research (ISEE) in Japan. It was part of the SCOSTEP Visiting Scholar (SVS) program, which aims to engage the public through initiatives like PRESTO and SCOSTEP. Dr. Nozomu Nishitani, an Associate Professor at ISEE and the lead researcher for the SuperDARN Hokkaido pair of radars, supervised this study and my time there.

The research aimed to understand how Sub-Auroral Polarization Streams (SAPS) start and behave under various storm triggers like CMEs and CIRs. It began by examining data from Defense Meteorological Satellite Program (DMSP) satellites. While at ISEE, I successfully analyzed SuperDARN observations available at the ISEE server and incorporated GPS-TEC data from the ISEE website. This study effectively demonstrated notable variations in SAPS during different geomagnetic storm triggers, showcasing distinct differences between hemispheres and changing patterns throughout the seasons.

Engaging in numerous productive conversations with Dr. Nishitani and the SuperDARN research



Photo with Dr. Nishitani

team proved highly valuable, as their suggestions and corrections significantly impacted my work. Participating in various seminars, group discussions, and Q&A sessions greatly enhanced my understanding and confidence in the realm of Space Physics. Beyond academic pursuits, there were also enjoyable gatherings for leisure and entertainment. The research took place at the Division for Ionospheric and Magnetospheric Research group, ISEE, where the stay was at Researcher's village Daiko, Nagoya University Daiko campus.

Moving forward, the upcoming research will encompass an extensive examination of nearly all the storms occurring between 2015 and 2023. This will involve the incorporation of AMPERE (Active Magnetosphere and Planetary Electrodynamics Response Experiment) data alongside the existing DMSP, SuperDARN, and GPS-TEC observations. The primary goal of this endeavor is to compile and publish a paper on this subject in a prestigious academic journal.