

Reconstructing polar asymmetry of GLE69 via WASAVIES simulation

*PARK INCHUN¹, Yoshizumi Miyoshi¹, Tatsuhiko Sato², Ryuho Kataoka³, Yuki Kubo⁴, Shoko Miyake⁵

1. Nagoya University Institute for Space-Earth Environmental Research, 2. Japan Atomic Energy Agency, 3. National Institute of Polar Research, 4. National Institute of Information and Communications Technology, 5. National Institute of Technology, Ibaraki College

Solar Energetic Particle(SEP) is one of the most important components for predicting space weather. When a powerful SEP event occurs, neutron observations on the ground can detect the increase of flux. This event is called Ground Level Enhancement(GLE).

On January 20, 2005, a powerful GLE (GLE69) occurred, causing significant flux enhancement on south pole region. The McMurdo neutron monitor in Antarctica recorded 18 times more fluxes compared to Thule station in Greenland. Previous studies suggested that this asymmetry phenomenon is related to IMF direction, which has never been confirmed by the simulation.

In this research, we investigate this asymmetry of neutron flux using WASAVIES (Warning System for Aviation Exposure to SEP [Kataoka et al., 2014]) which consists of SEP simulation in the heliosphere, particle trajectory tracing in the magnetosphere, and the air shower simulation. Using WASAVIES, we investigate propagation direction of SEPs and compare the results with neutron monitor observations. Initial results of this study indicate that SEPs come mainly from southern-hemisphere, which is consistent with previous studies. The results also suggest importance of transportation of SEP in the azimuthal direction, which has not included in this study.

Keywords: WASAVIES, Solar Energetic Particle, Space Weather