

Solar-Terrestrial Environment Data Analysis Workshop

Venue: The Luigans Spa & Resort Hotel (<http://www.luigans.com/en/>)

Date & Time: March 4 (Wed.), 2015 9:00-18:00

The solar-terrestrial environment (STE) data analysis workshop is promoting collaborative analyses of observation and simulation data to study the cause-effect activities from the Sun to the Earth using latest space weather events. The workshop is held twice a year in Japan. We select three or four scientifically interesting events during the periods for detailed analysis. Presentations of analysis on the past remarkable geoeffective events are also welcome.

1. Overview of STE between June 2014 and March 2015

Sunspot number has increased since the beginning of 2013 again and seems to become the maximum in the middle of 2014. In October 2014, a gigantic sunspot group, named NOAA/AR12192, appeared and produced many M-class and X-class flares. However, this active region did not produce any solar energetic particle events and geomagnetic storms. Geomagnetic activities are still low compared with recent several cycles. During this period, there is no geomagnetic storm with Dst-index value less than -100 nT. The enhancement of high-energy electron flux at geosynchronous orbit was observed associated with the geomagnetic storm on September 27-30. Several Dillinger phenomena caused by M-class and X-class flares were observed by domestic ionosondes. Ionospheric negative storms occurred associated with geomagnetic storms.

2. Selected events for detailed analysis

A. **Slow CMEs and high speed solar wind following the CMEs: August 27-30, 2014 geomagnetic storm and related activities with this storm**

Geomagnetic storm gradually started at around 03UT on 27 August 2014. This geomagnetic storm was caused by slow CMEs on 22 August. High speed solar wind from an isolated coronal hole near the solar equator followed the CMEs. Negative ionospheric storm occurred associated with this geomagnetic storm.

B. **IMF direction of CME and its effect: September 12-13, 2014 geomagnetic storm and related activities with this storm**

NOAA/AR12158 produced a M4.5/1N long duration event (LDE) flare with a full halo CME. The enhancement of solar energetic particles flux by this flare was observed by NOAA/GOES satellite. The arrival of an interplanetary shock was observed as Sudden Storm Commencement (SSC) at Kakioka at 1554UT on 12 September 2014. Interplanetary magnetic field (IMF) was mainly directed northwards. As the result, the intensity of geomagnetic storm was relatively small. The enhancement of high-energy electron flux at geosynchronous orbit and the

negative Ionospheric storm occurred associated with this geomagnetic storm.

C. Large active region without CMEs: *Activities of NOAA/AR12192*

NOAA/AR12192 had larger area than that of AR10486 at the moment of the Halloween event in October 2003 and produced many M-class and X-class flares. However, solar energetic particle events and geomagnetic storms were not produced by the activity of AR12192. AR12192 appeared as AR12173 in the previous rotation and returned as AR12209 and produced several M-class flares in the next rotation.

D. Hyder flare associated with a large filament eruption: *The Enhancement of solar energetic particle flux between 1 and 4 November 2014 and a weak geomagnetic storm on 4 and 5 November*

A large filament eruption occurred between 04UT and 06UT on 1 November 2014. A Hyder flare was observed associated with this filament eruption. The enhancement of solar energetic particle flux started several hours after this flare. A weak geomagnetic storm associated with this event occurred between 4 and 5 November.