A report on the MAGDAS data and EE index from June 2014 to March 2015

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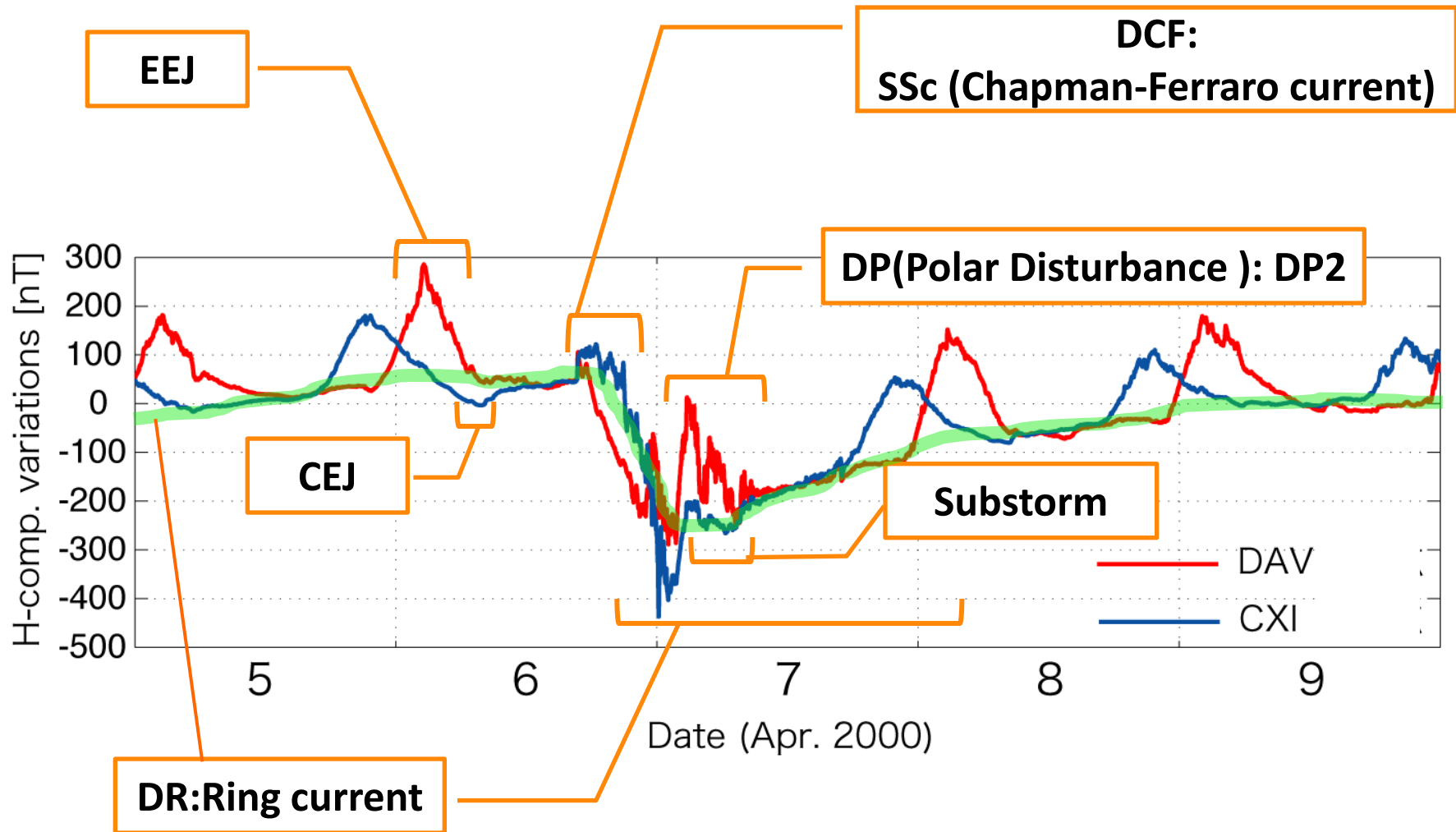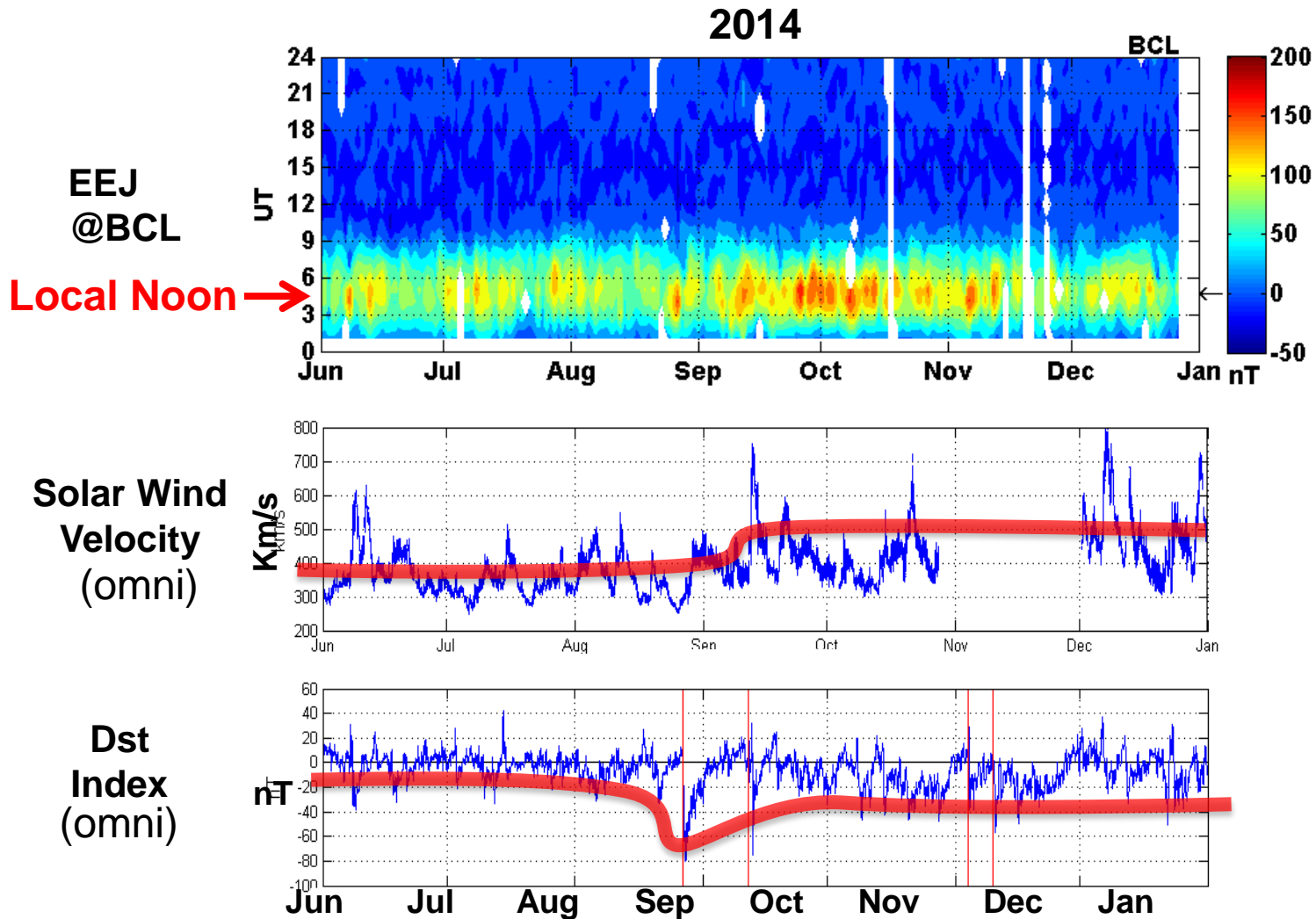
KYUSHU UNIVERSITY

What is EE-index

➢ **Proposed by ICSWSE [ref. Uozumi et al., 2008]**

➢ **Using MAGDAS/CPMN data along the magnetic equator**

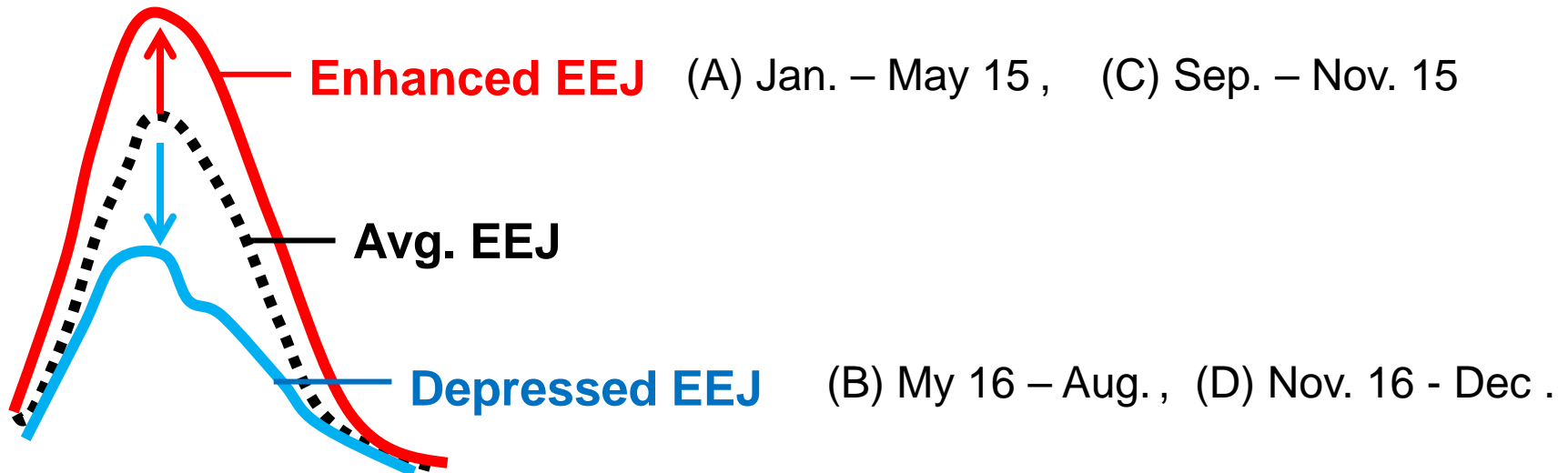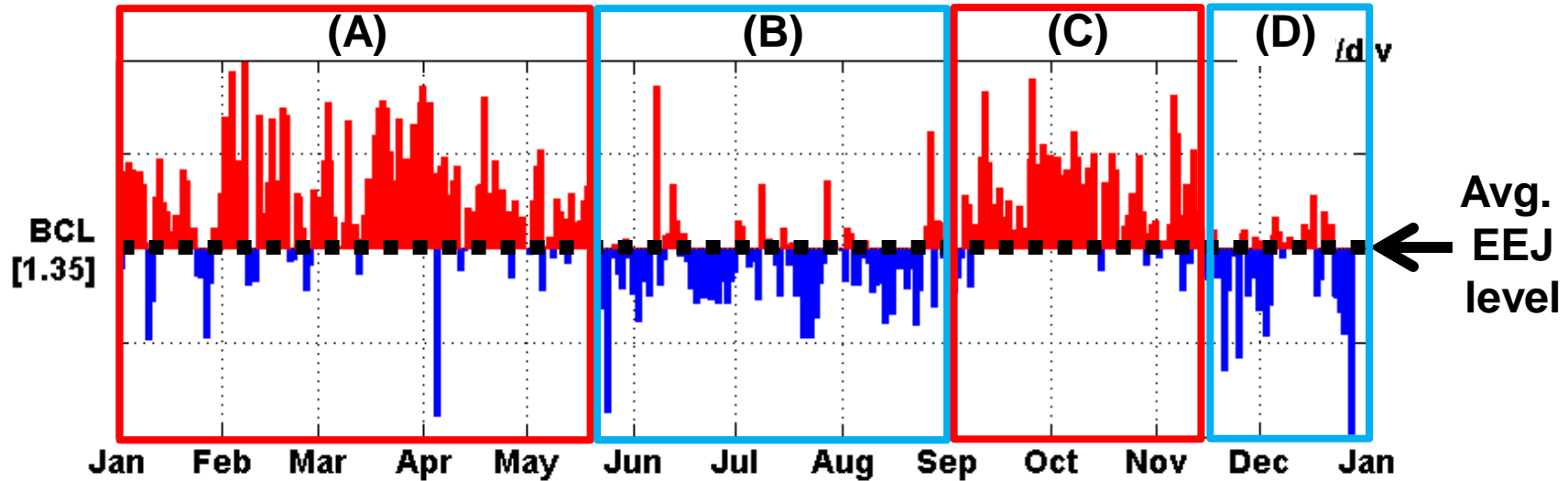➢ **Useful for monitoring temporal or long-term variations of the EEJ**

EEJ and others

Stronger EEJ between September and December during higher activity of Vsw and Dst
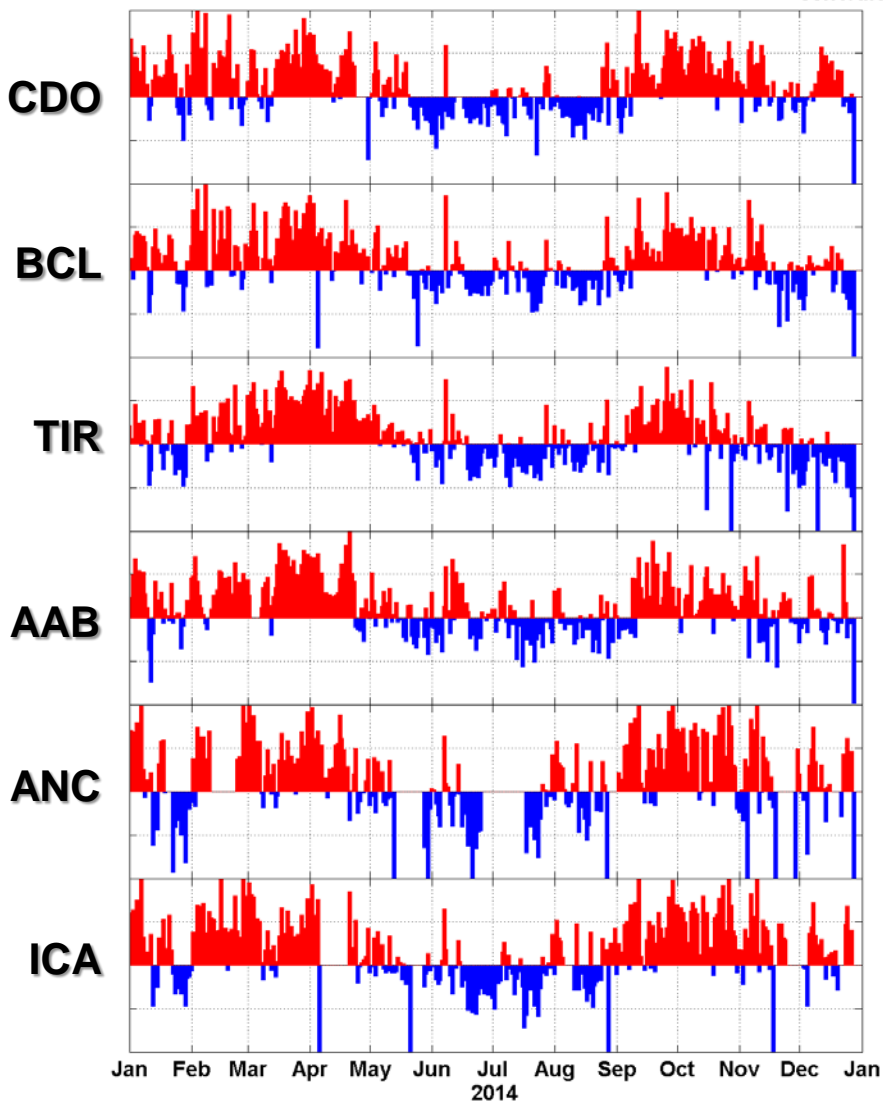
2014

EEJ
@BCL

Local Noon →

Solar Wind
Velocity
(omni)

Dst
Index
(omni)

Long term variation EEJ @ BCL (Viet Nam)

Differences between daily peak-EEJ and yearly average peak-EEJ

Enhanced EEJ (A) Jan. – May 15 , (C) Sep. – Nov. 15

Avg. EEJ

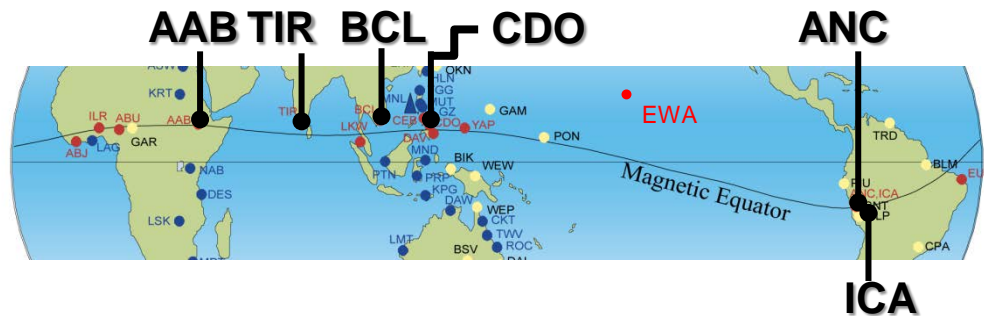**Depressed EEJ** (B) My 16 – Aug. , (D) Nov. 16 - Dec .

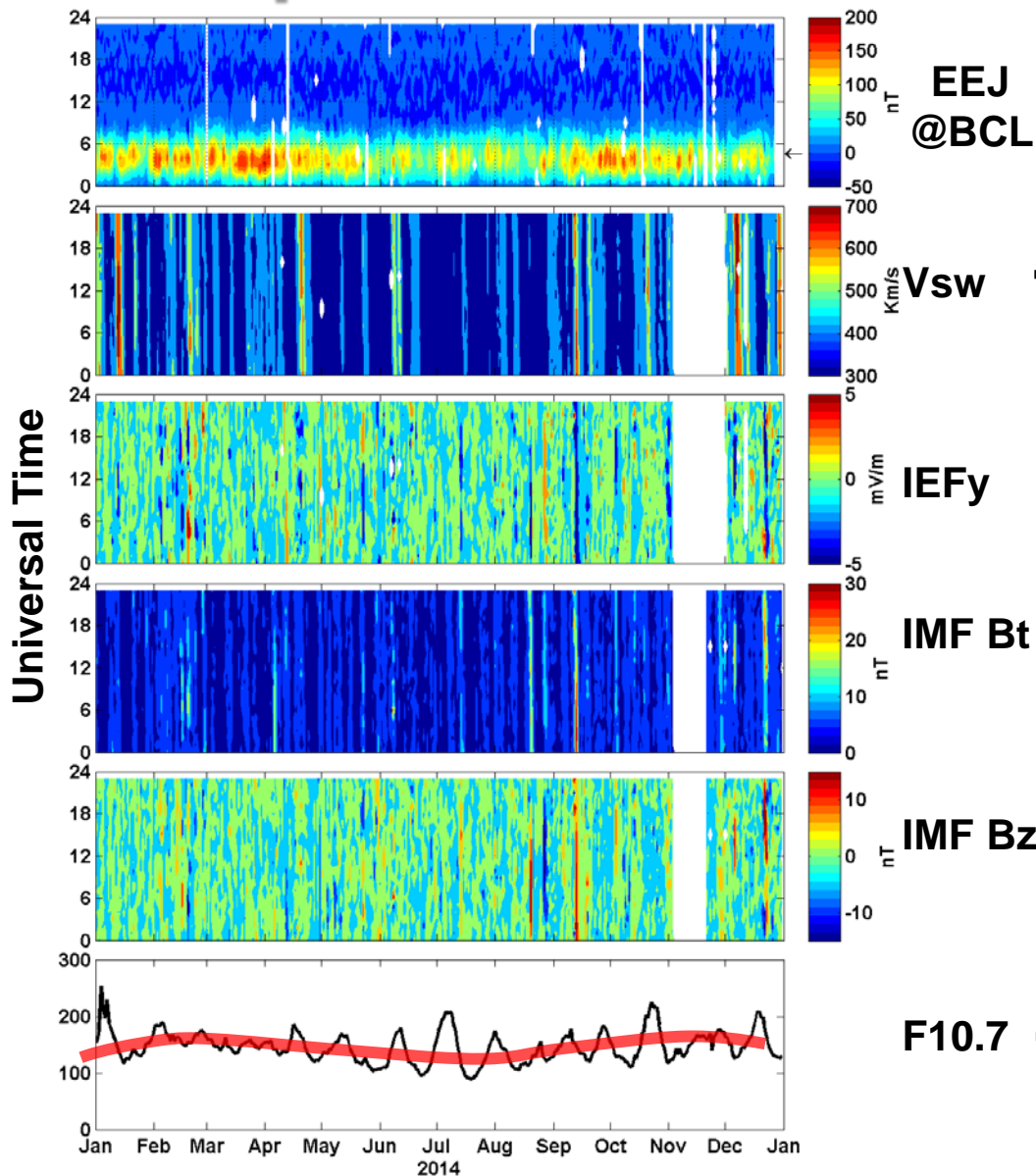# Long term variation of EEJ at other stations

50nT/div

- around the dip equator

- both North and South hemisphere
  - The EEJ trend is **NOT** caused by the geometrical structure of the earth

- What causes the long-term EEJ variations?
  - Solar wind structure
    Vsw, IMF Bt and Bz, IEFy, F10.7
  - Magnetic activity
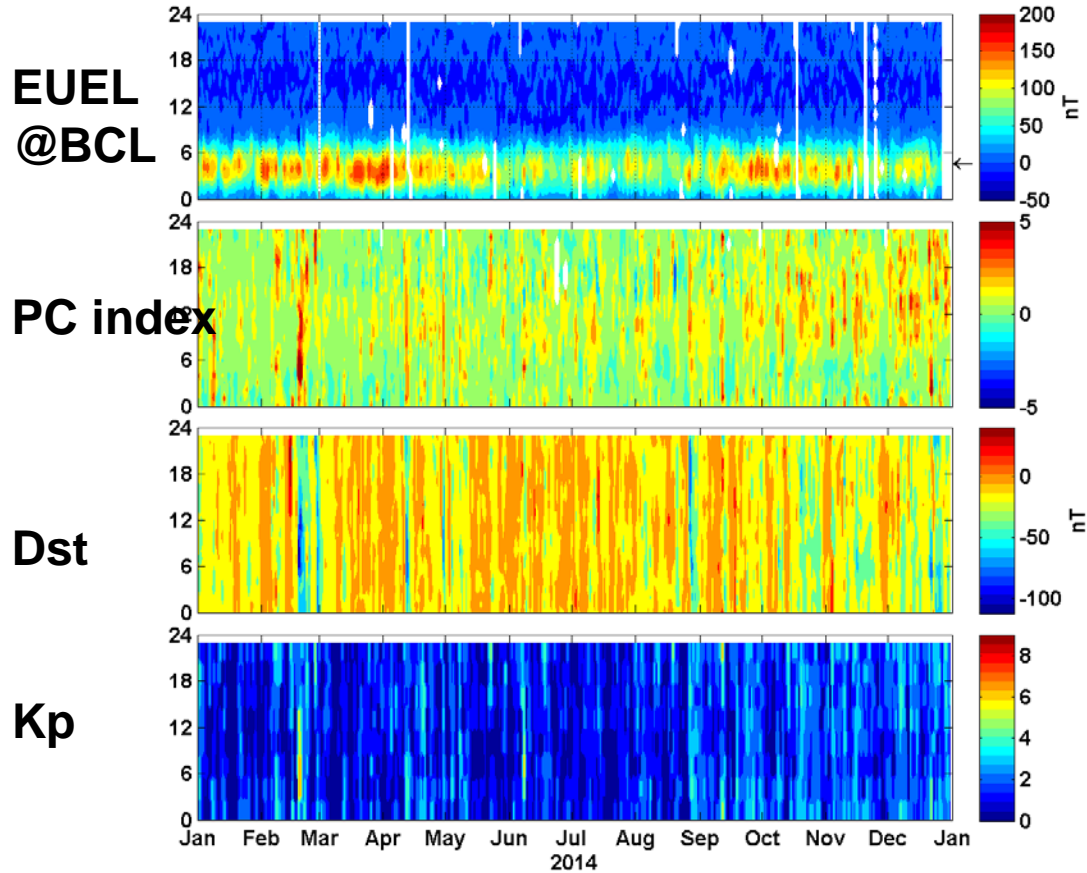   **Kp, Dst, PC index**

Comparison between EEJ and Solar Wind

➜ seem like a most related parameter

Enhanced EEJ	Solar wind velocity
Jan. – May 15	402±81 km/s
Sep. – Nov. 15	412±65km/s
Depressed EEJ	
My 16 – Aug.	356±59 km/s

F10.7 ➜ slight trend
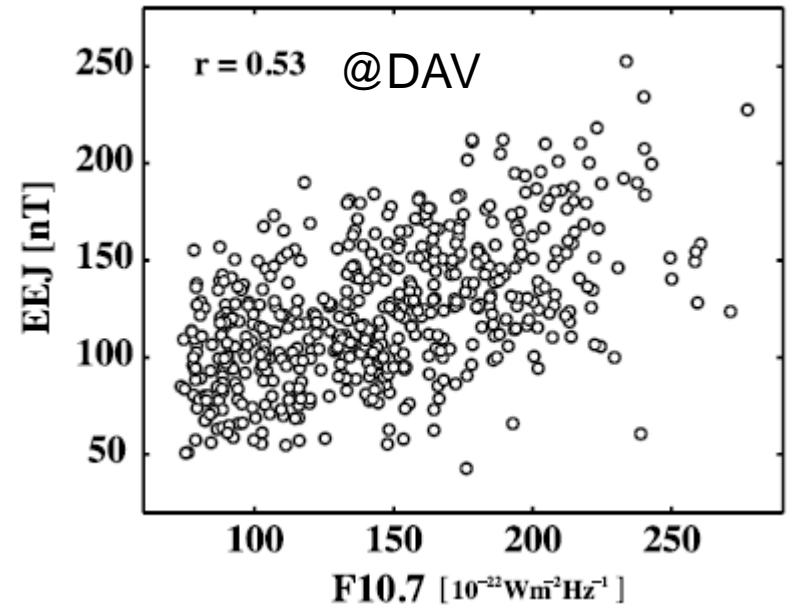
Comparison with Magnetic Activity Indices
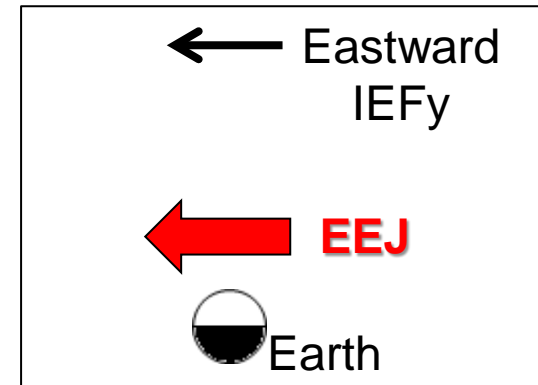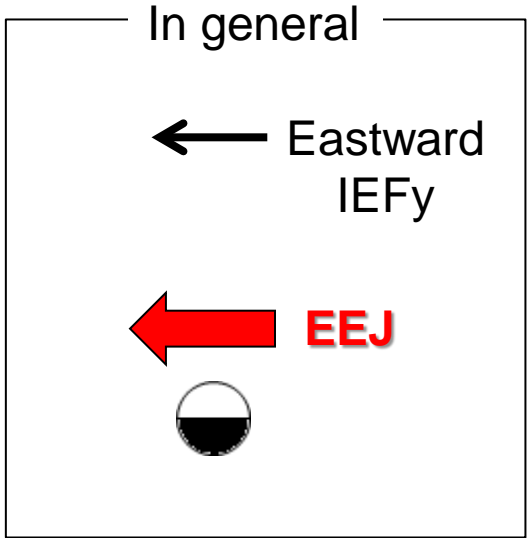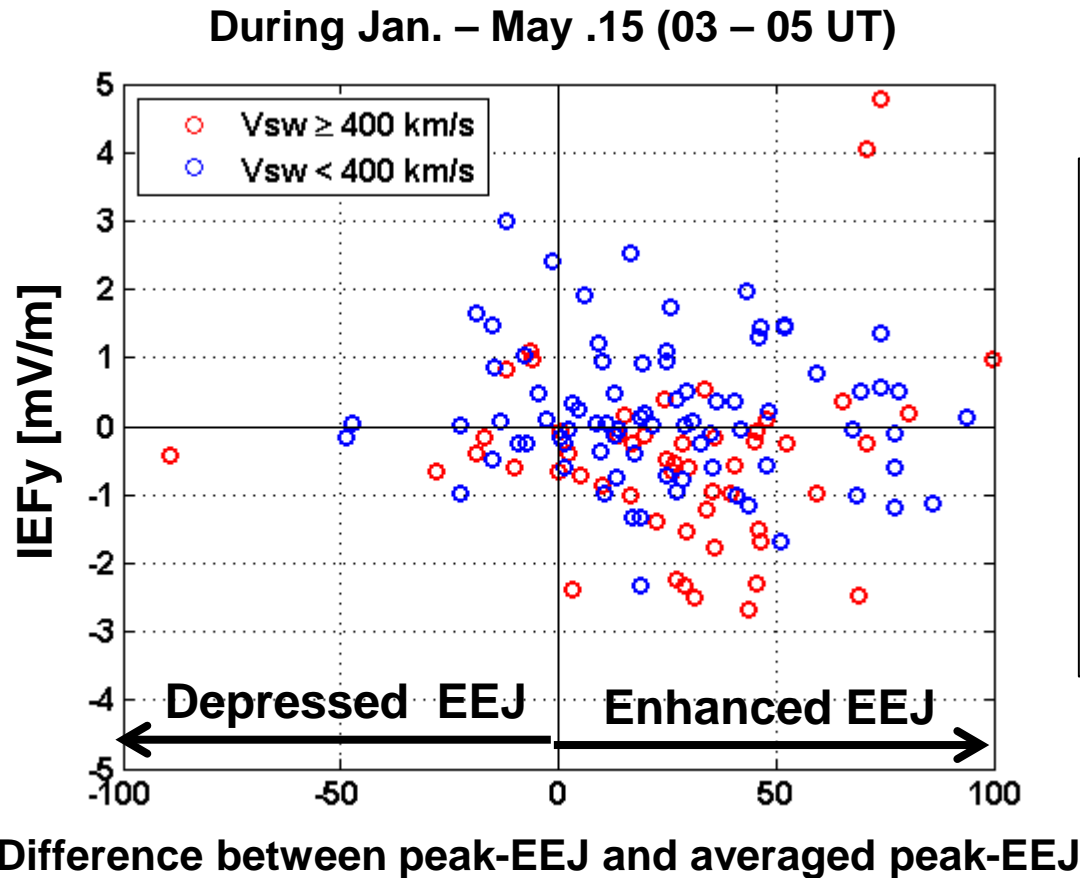

There is no remarkable trend.

The dominant controlling factor in Solar Wind

> F10.7 is positively correlated with EEJ [Yamazaki et al., 2010JGR]

> EEJ is enhanced during eastward IEFy (=Southward IMF Bz)
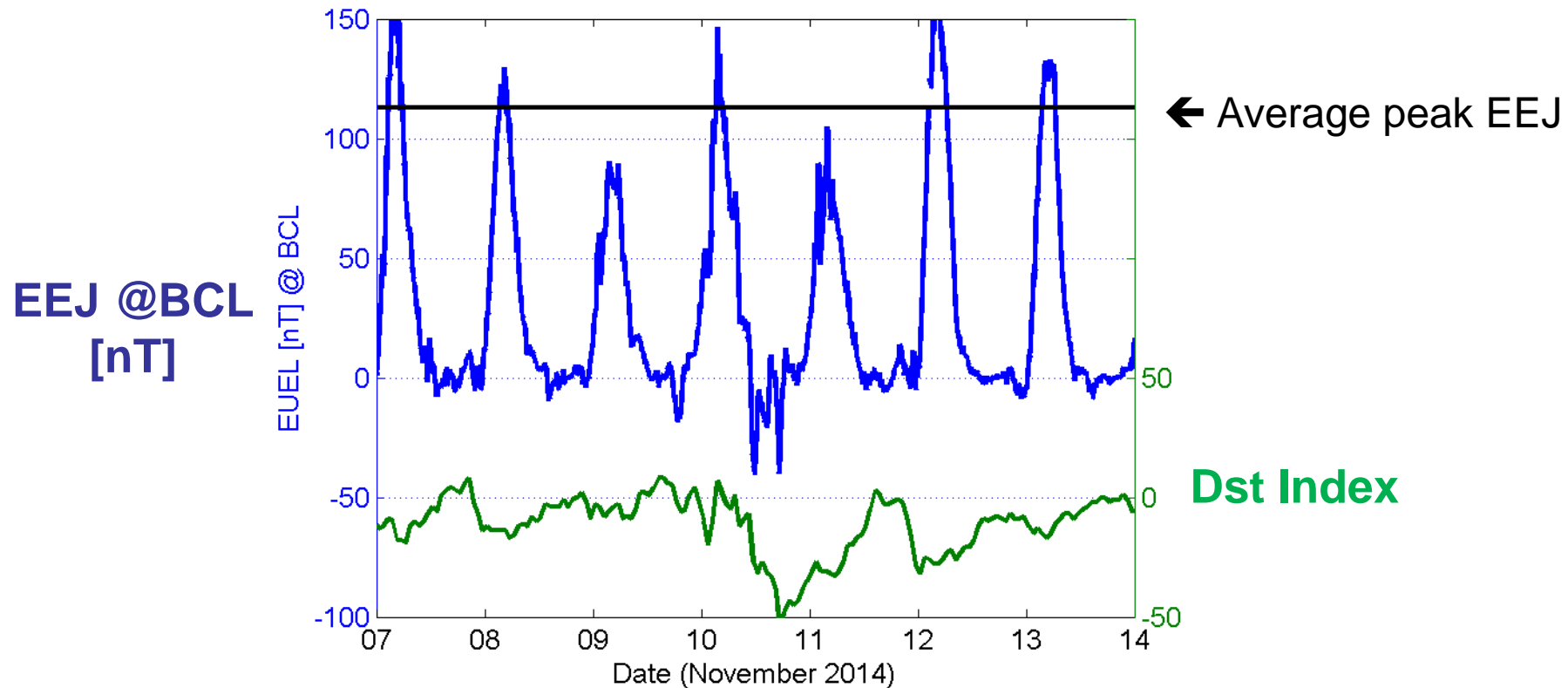
During Jan. – May .15 (03 – 05 UT)

During the period of the enhanced EEJ,
the interplanetary electric field is negative (=westward IEFy)
with high-speed solar wind velocity.

DP2 variation on the EEJ

EEJ @BCL [nT]

← Average peak EEJ

Dst Index

➢ DP2 on the depressed EEJ [Nishida (1968), Kikuchi et *al.*,(1996)]

Summary

➢ The long term variation of EEJ (2014, Jan. – Dec.)

- Both north and south hemisphere

- DP2 variation also observed in the long-term EEJ

➢ EEJ dependence on the solar wind velocity (Vsw)

- Enhanced EEJ during Vsw $\geq$ 400 km/s

- Depressed EEJ during Vsw $<$ 400 km/s

Enhanced EEJ

Avg. EEJ

Depressed EEJ
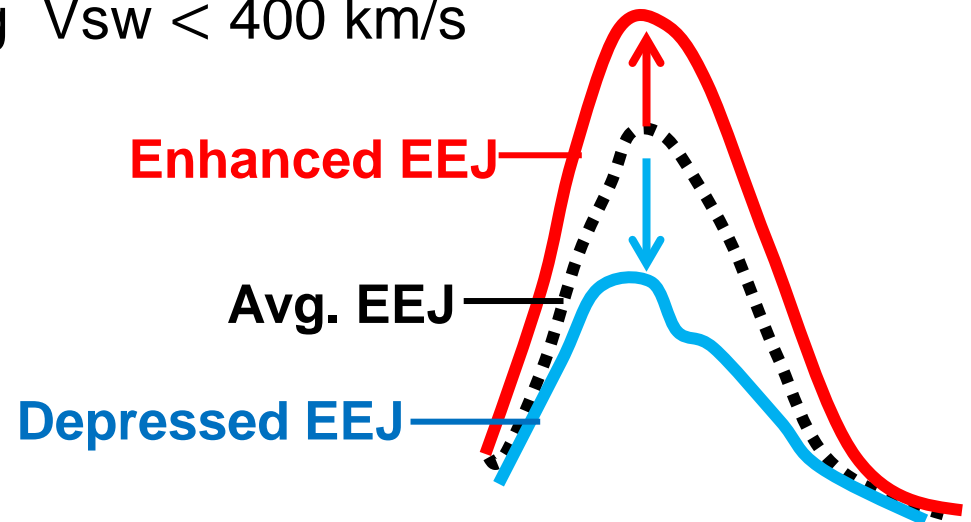
Attention!

Realtime EE-index are calculated with non-calibrated data.

Valid only for monitoring purpose

If you need provisional EE-index, which are not final version but calculated with calibrated data, please contact with PI of MAGDAS/CPMN project.