Analysis of the D layer in the auroral and circumpolar regions

using RSDN-20 transmitters signal propagation

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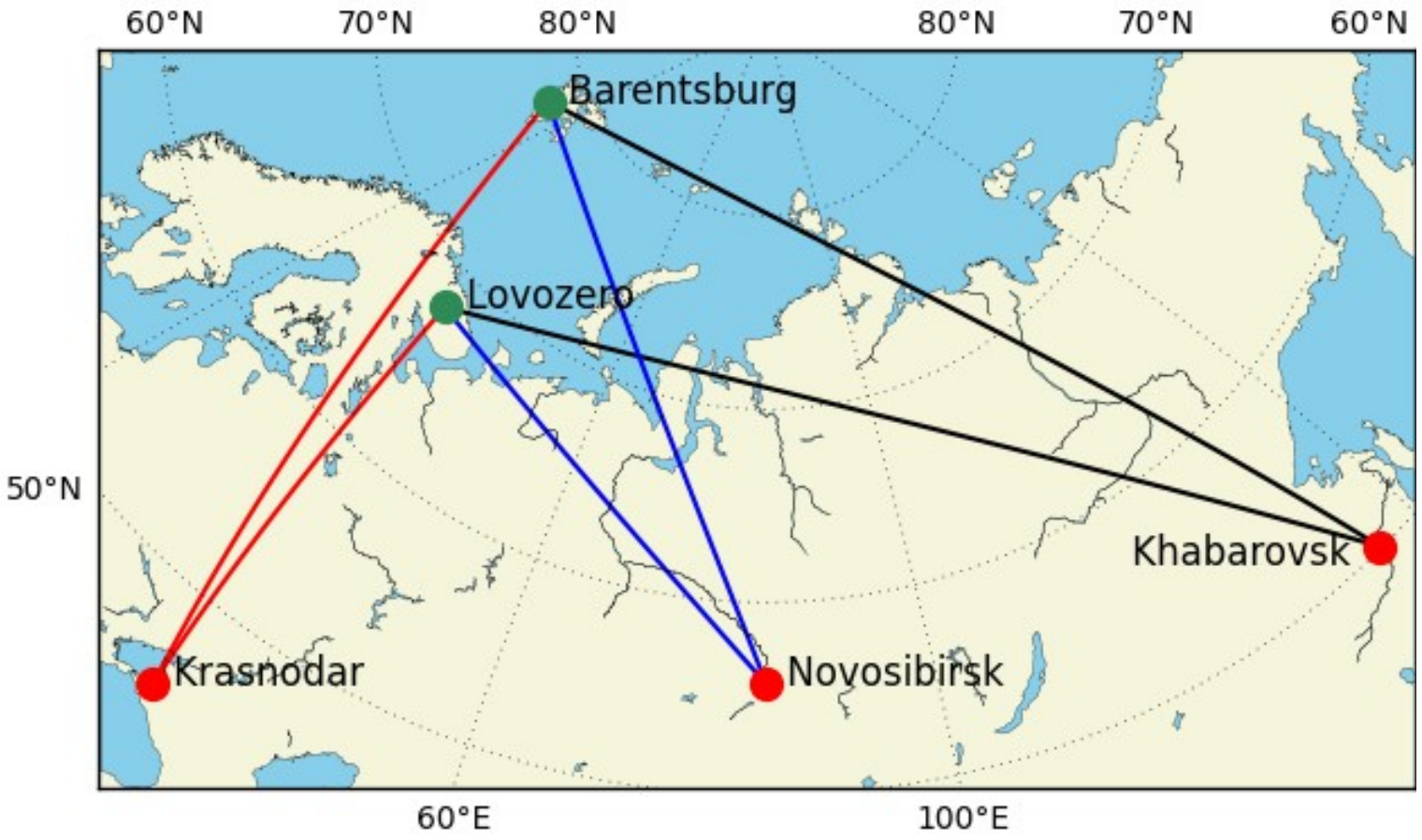
Receivers

- Features:
  - E_z- component
  - B_{II} - component
  - Wave polarisation
  - Direction of propagation
  - Synchronized with UTC (error less than 1 usec)
- Processing:
  - Filtering 11904.8 Hz
  - Transmitter selection

RSDN-20 VLF transmitters

- Features:
  - no amplitude modulation or phase manipulation
  - unique trace KRA → LOZ/BRB



Resceivers:

Lovozero	(LOZ)
Barentsburg	(BRB)

Transmitters:

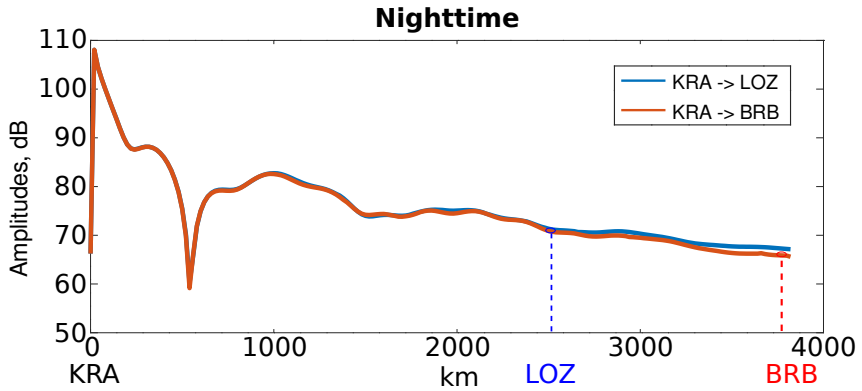
Krasnodar	(KRA)
Khabarovsk	(KHA)
Novosibirsk	(NOV)
Revda	(REV)
Seyda	(SEY)

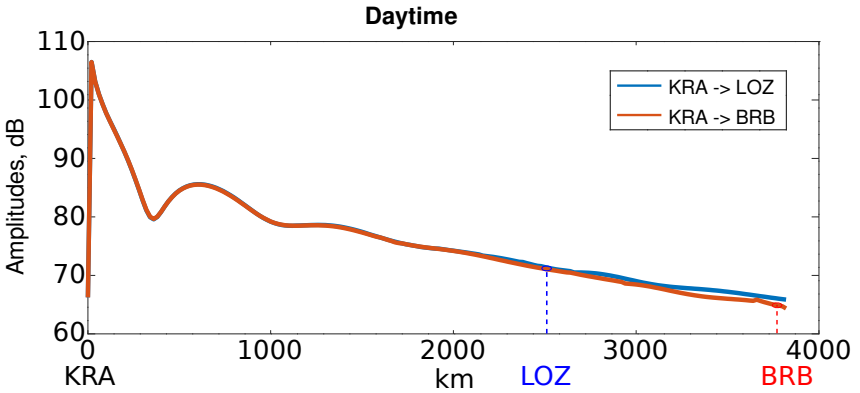
Frequencies (kHz):

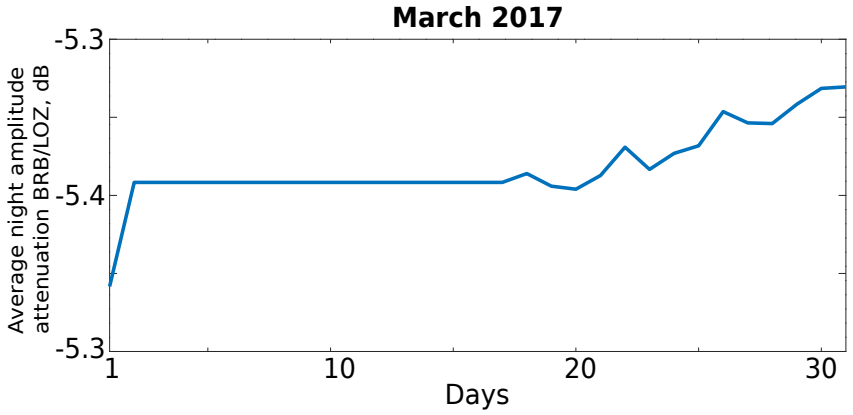
F1	11,904
F2	12,648
F3	14,880
F3p	14,881
F4	12,090
F5	12,044

LWPC model results BRB/LOZ

- Amplitude discrepancy is less than 1dB during daytime or nighttime in the LOZ distance (Quiet geomagnetic conditions)



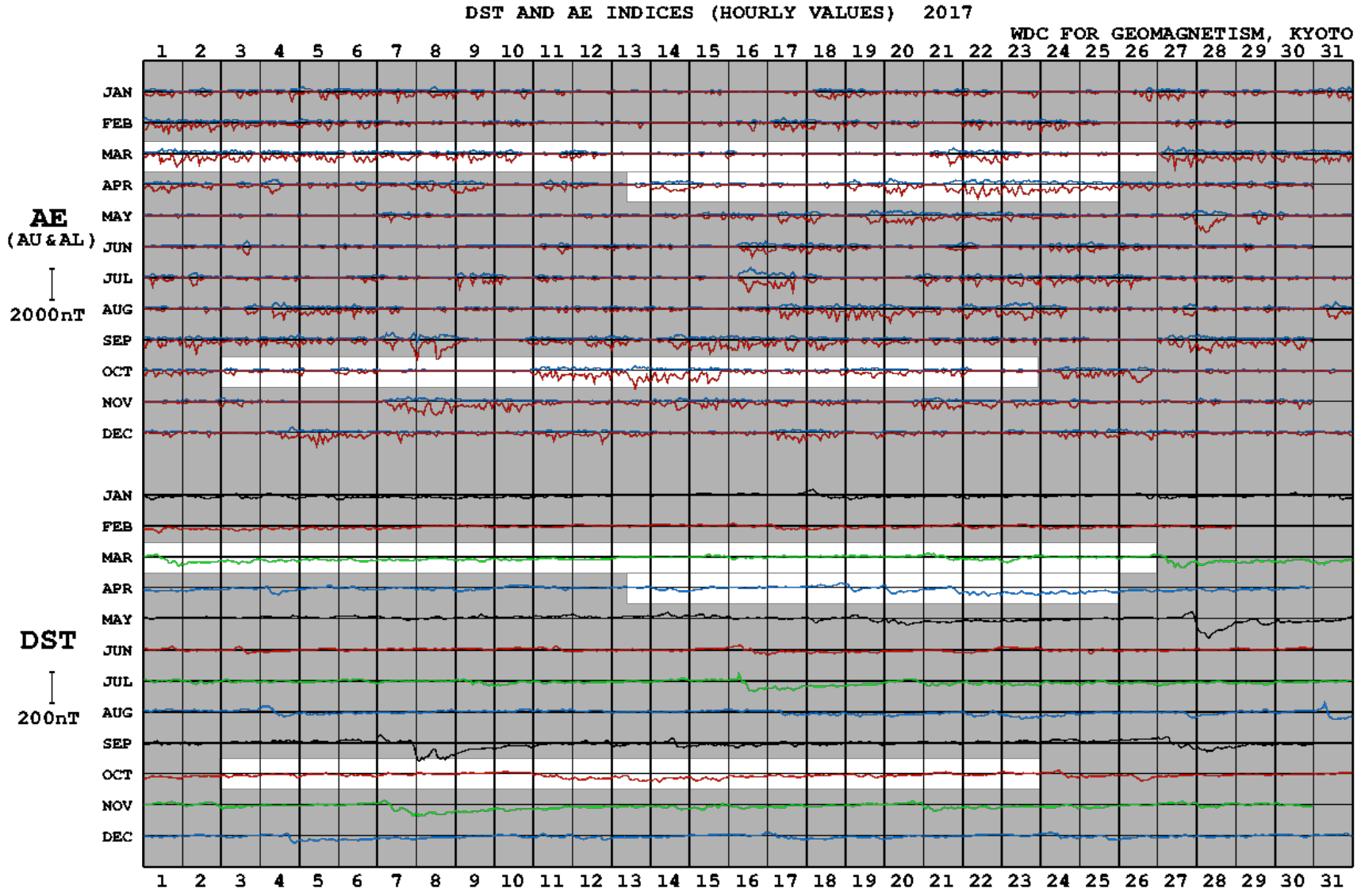




Average March night attenuation in the BRB → LOZ distance less than 5.5 dB

Events, indices, (sub)storms

World Data Center for Geomagnetism, Kyoto



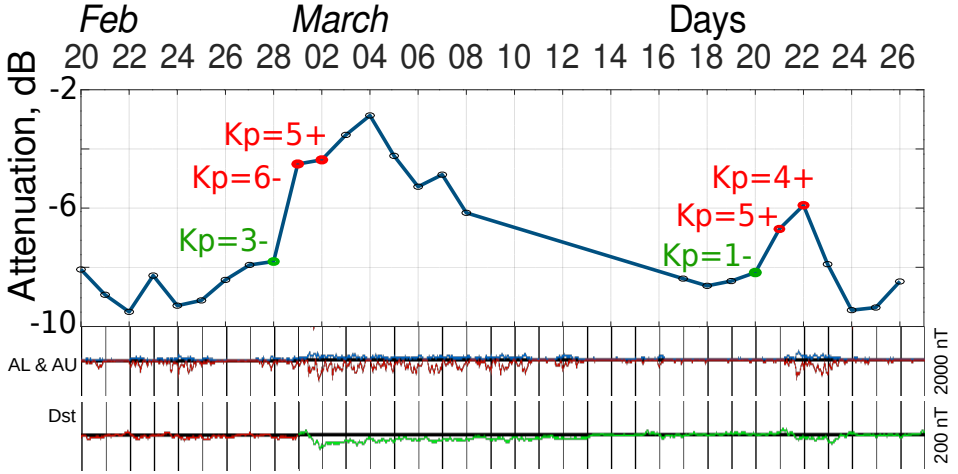
Kp_{March1}=6+

Kp_{March2}=5+

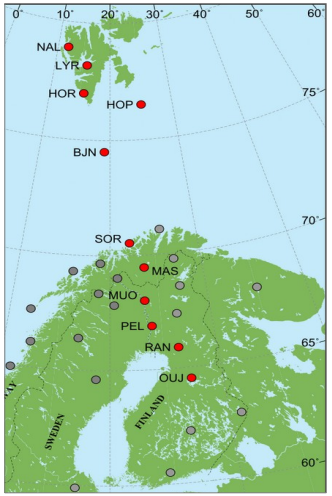
Kp_{April} =6-

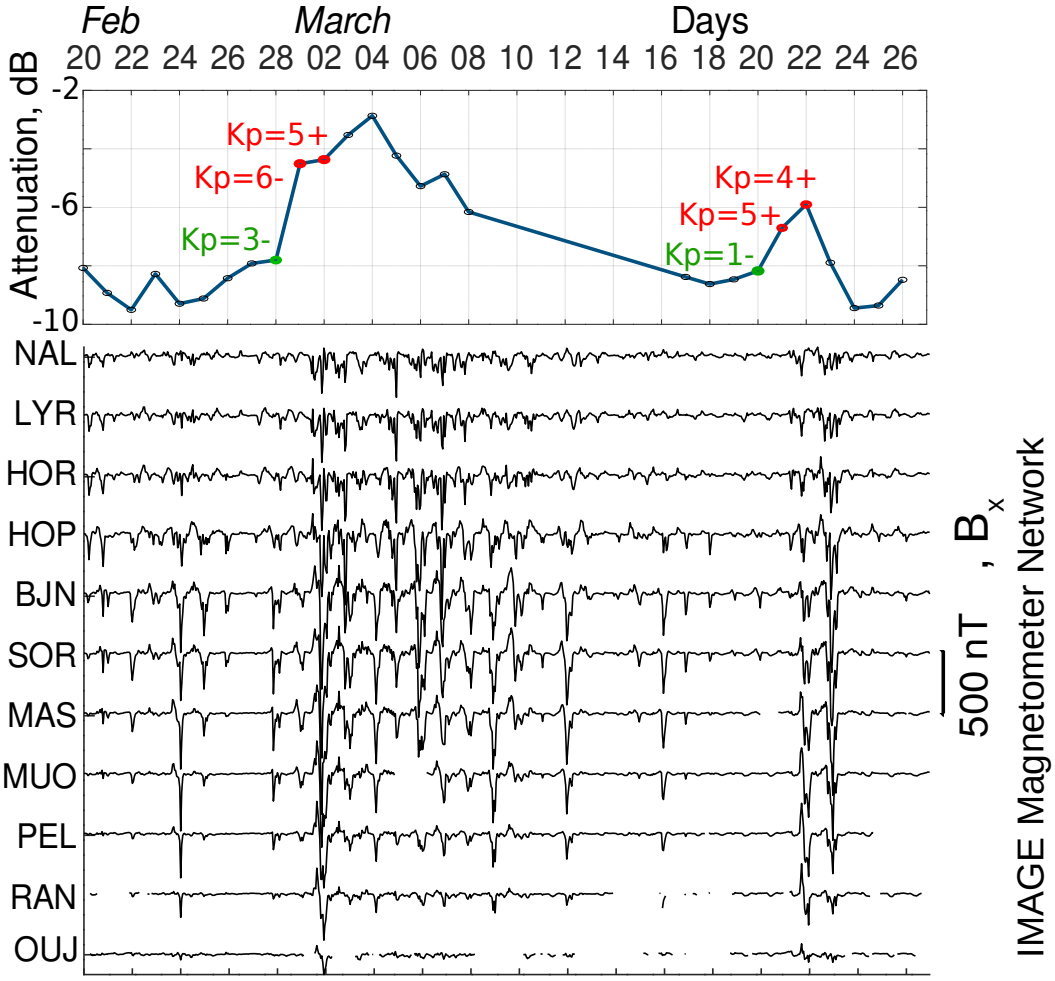
$Kp_{October}$=6-

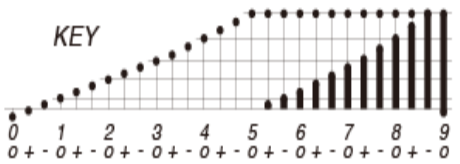
Observations, substorm influence propagation capabiliti

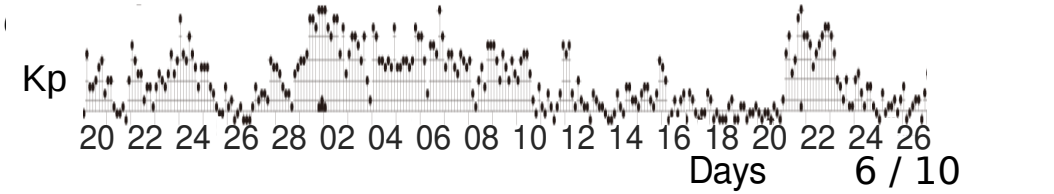


March
2017









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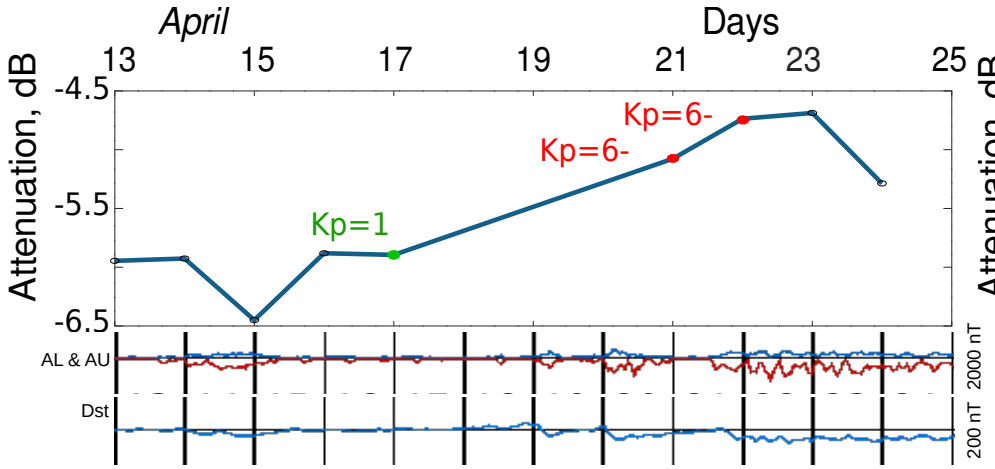
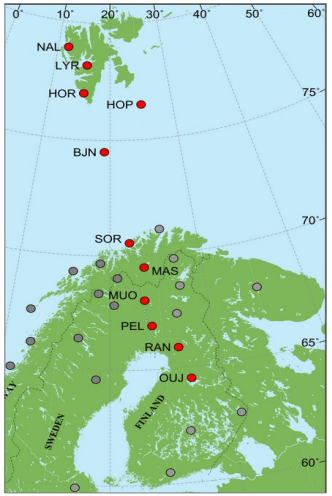
Observations, substorm influence propagation capabiliti



April
2017



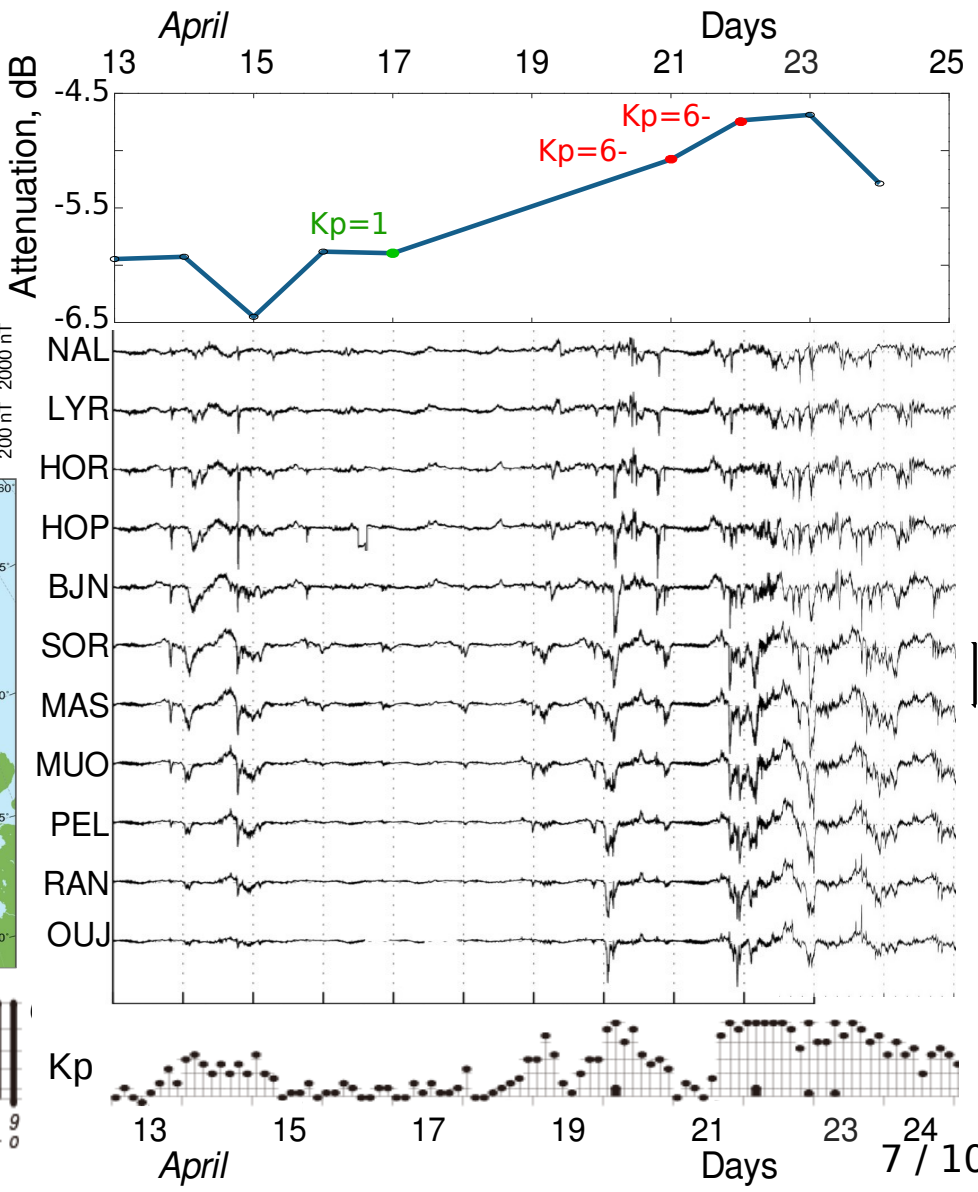
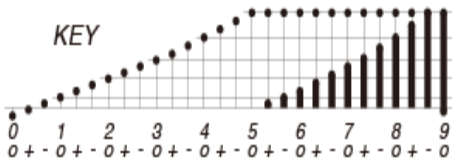


IMAGE Magnetometer Network



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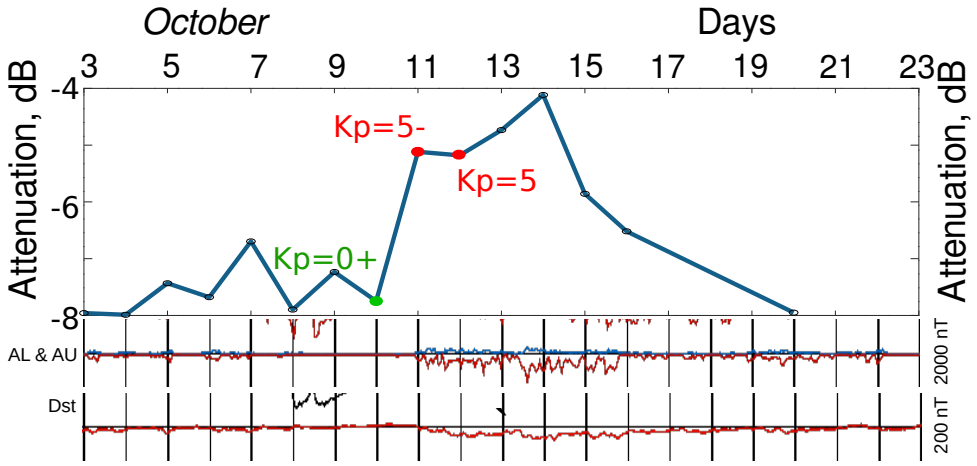

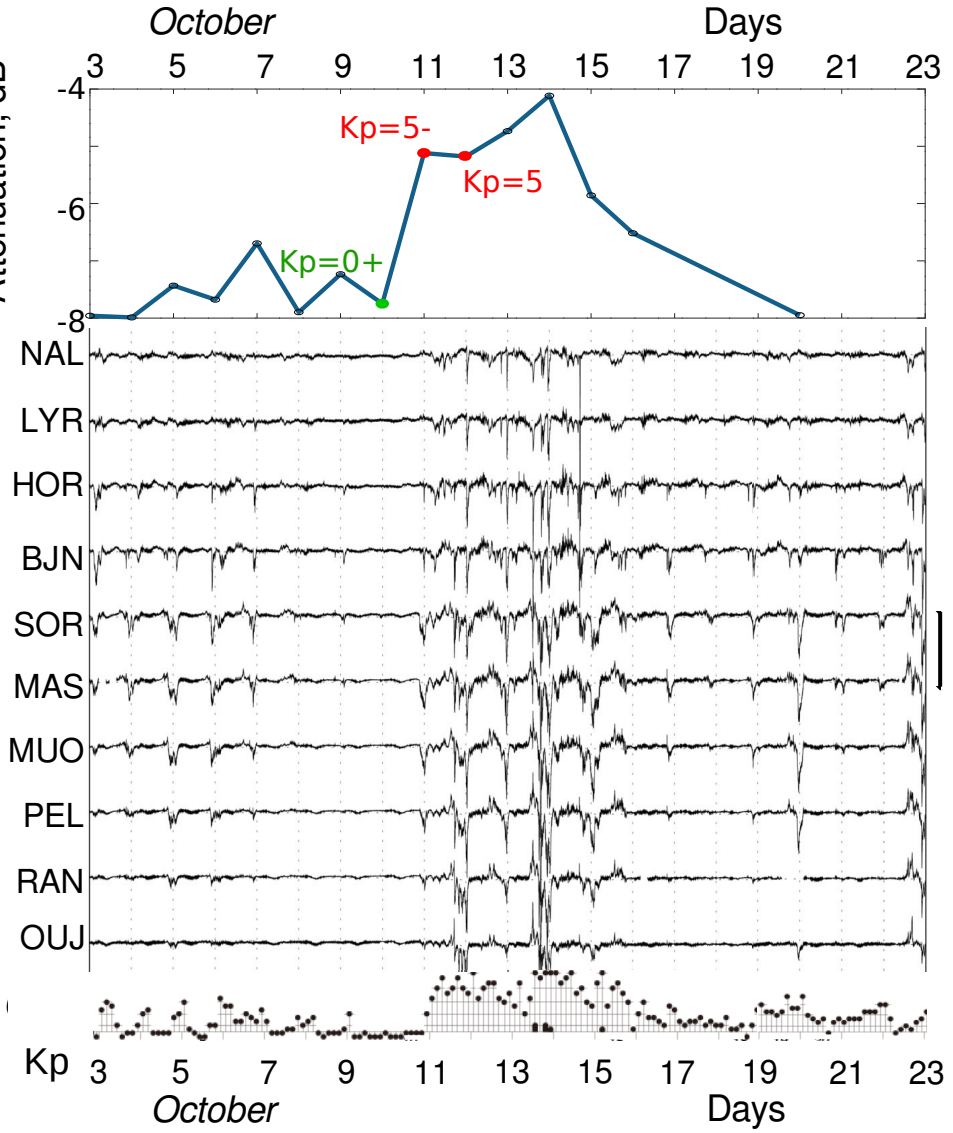

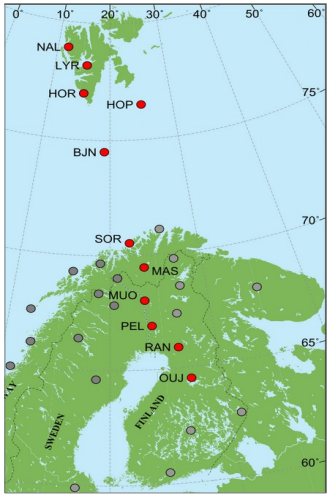

October
2017

IMAGE Magnetometer Network

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THREE-HOUR-RANGE INDICES

Conclusions

- A correlation between (sub)storms and D-region electron dancity profiles was shown

Thank you for your attention!