A Rapidly Prepared Analysis of Ionosphere Dynamics

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Outline

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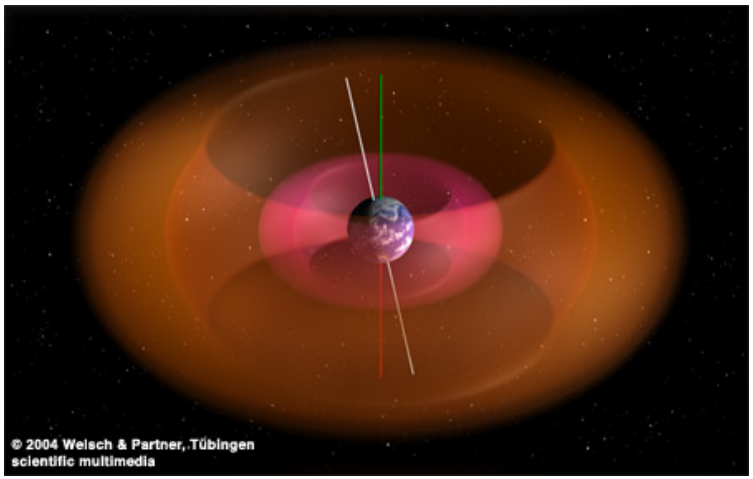
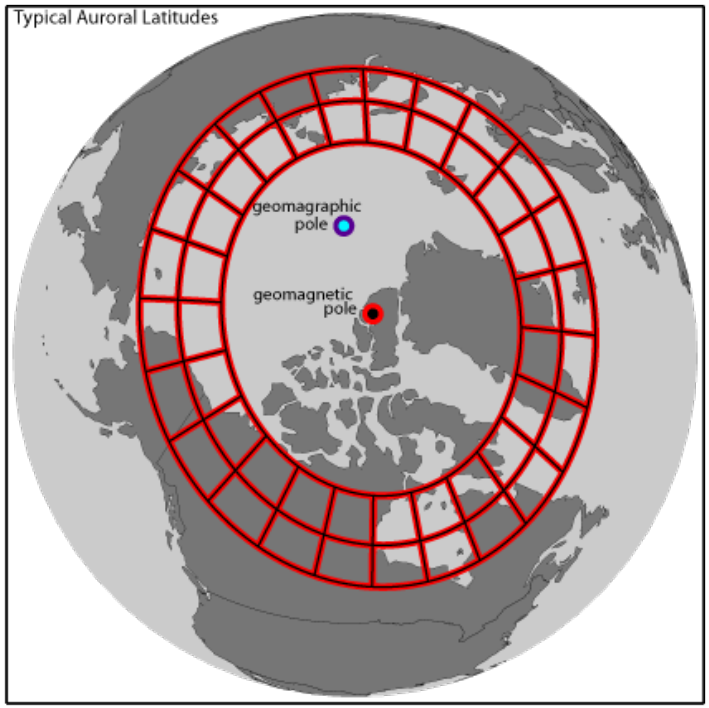
Scientific Goals

Can we observe signatures of energetic electrons from the Duskside Relativistic Electron Losses (DREP) as ionization in the D region. Study the auroral oval at altitudes 90-700 km

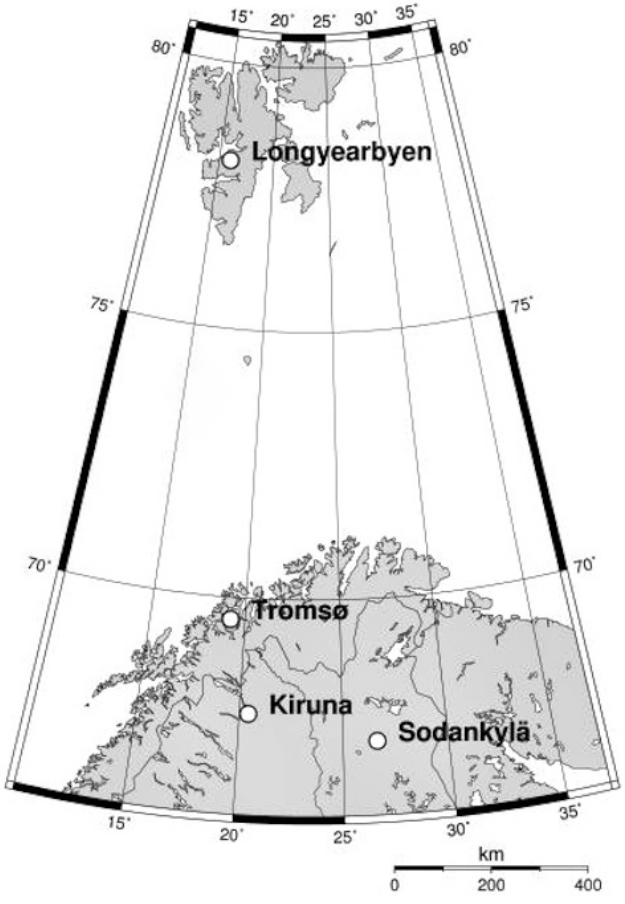




Methods

Sondrestrom and EISCAT incoherent radars, for the time period t=22:00 UT-23:30 UT:

- Perform three, 24 minute long, elevation sweeps along magnetic meridian. Use pulse option 1 for Sondrestrom and CP3 for EISCAT.
- Collect data for: electron and ion temperature, ion radial velocity, and electron density.



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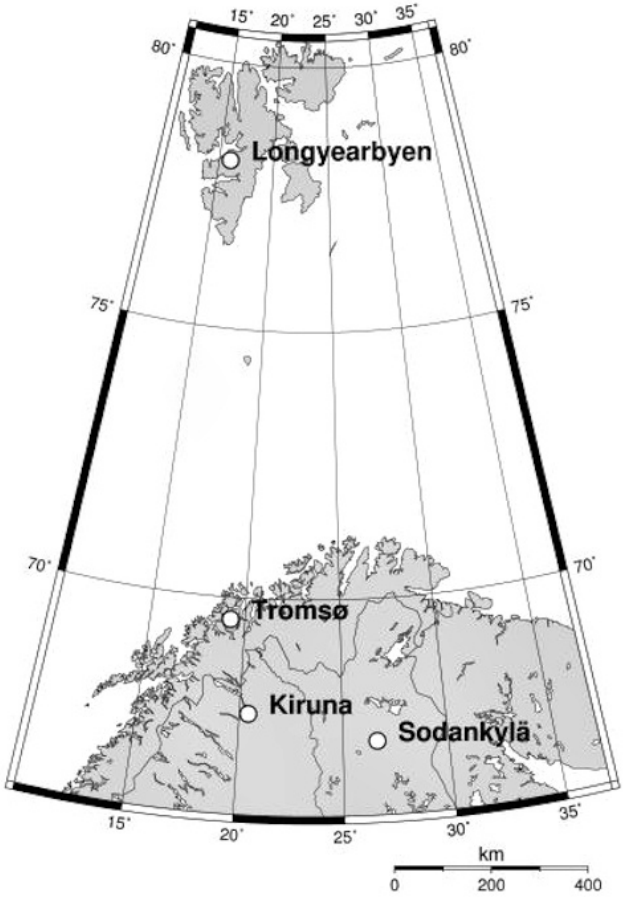

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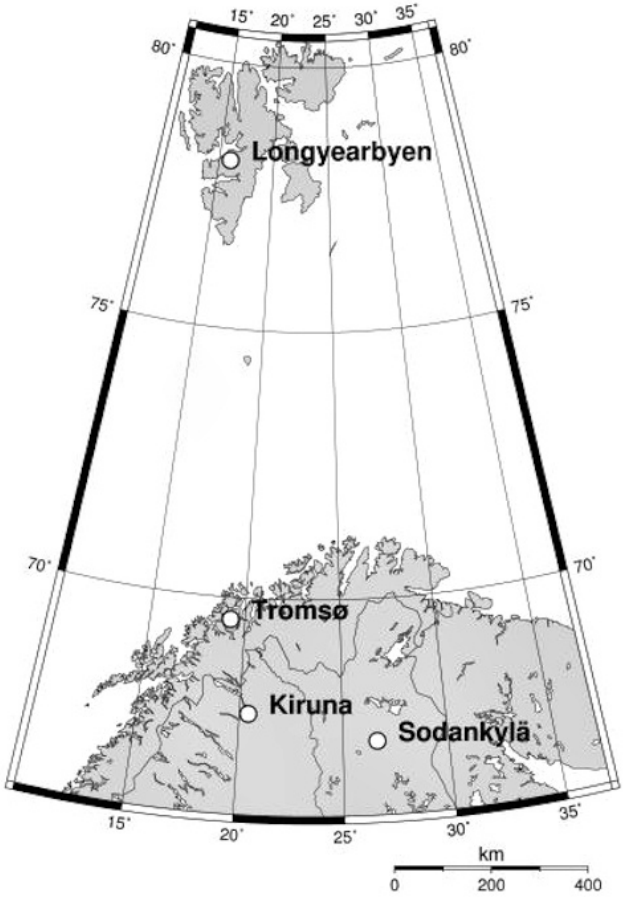

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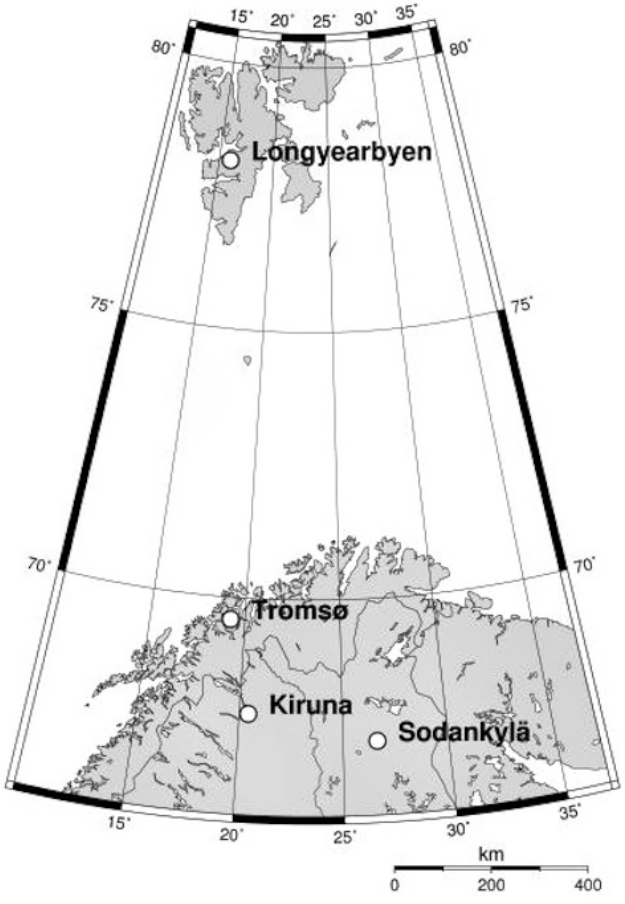
Supporting measurements:

- Satellite based: ACE, NOAA POES, DMSP
- Radar: SuperDarn
- Ground based magnetometer network: west Greenland and Norway.



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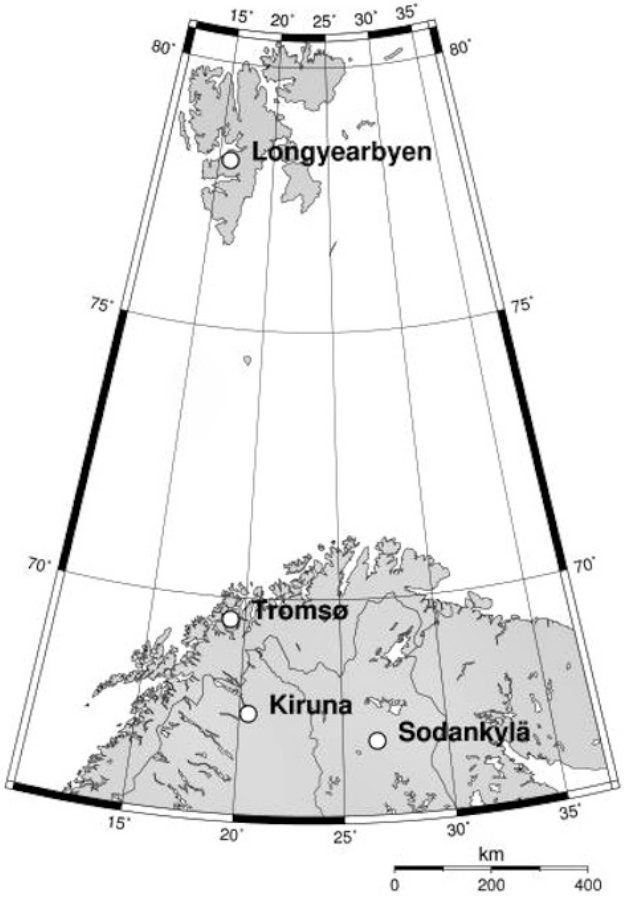

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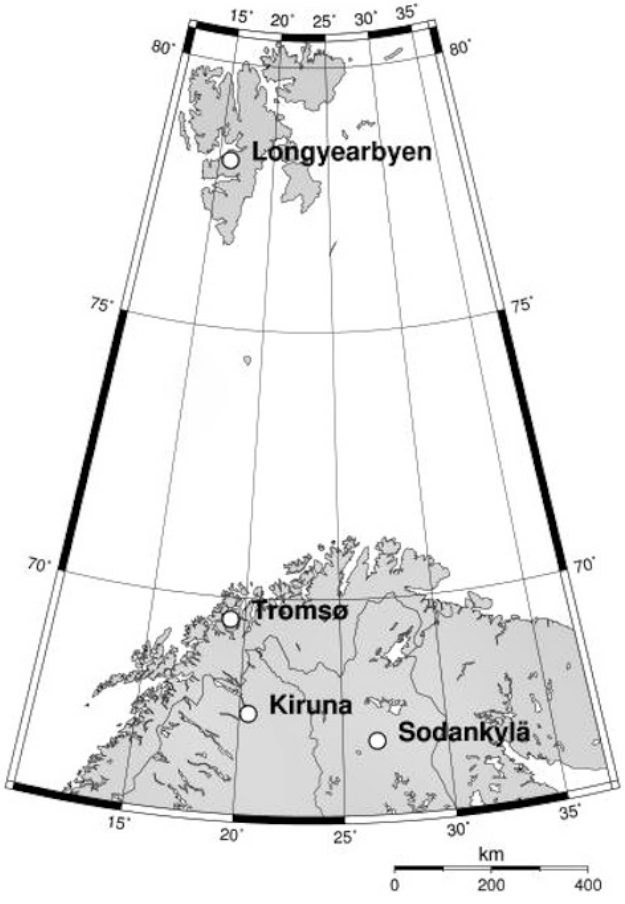

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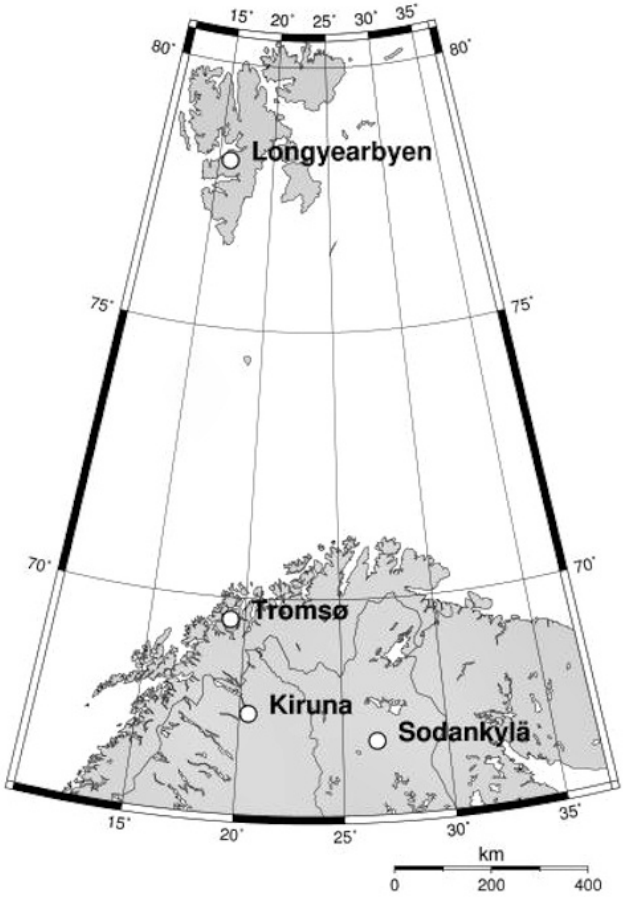
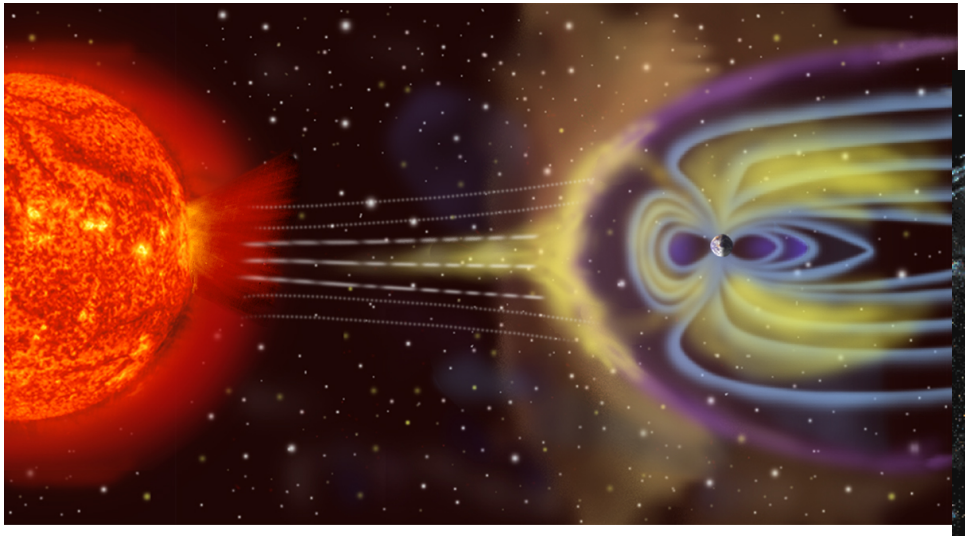
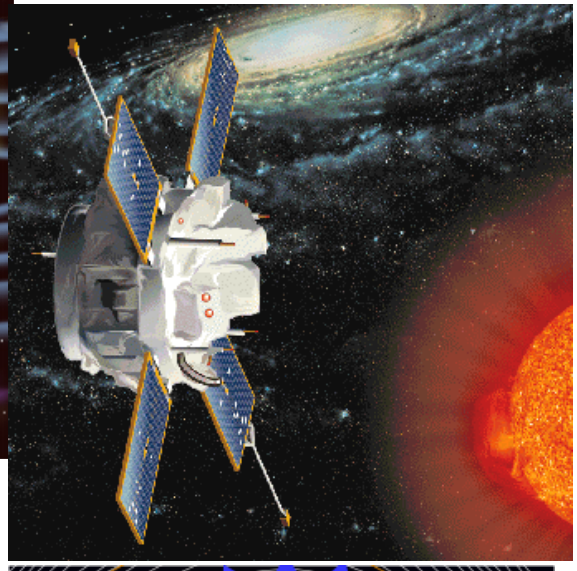
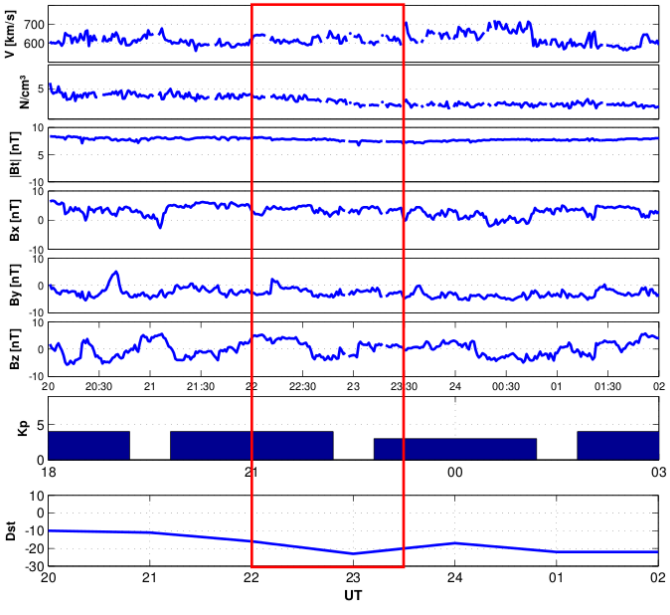
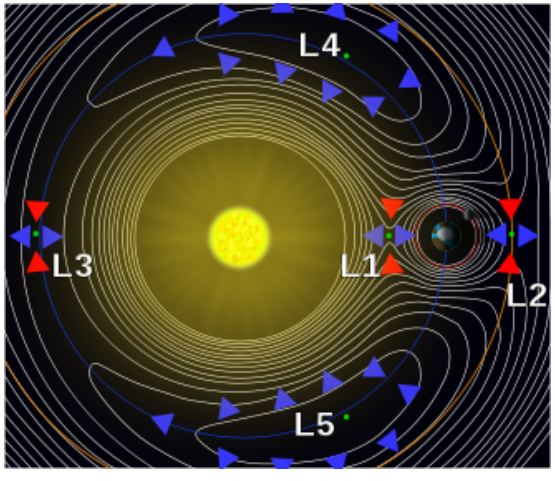


Solar Wind and IMF









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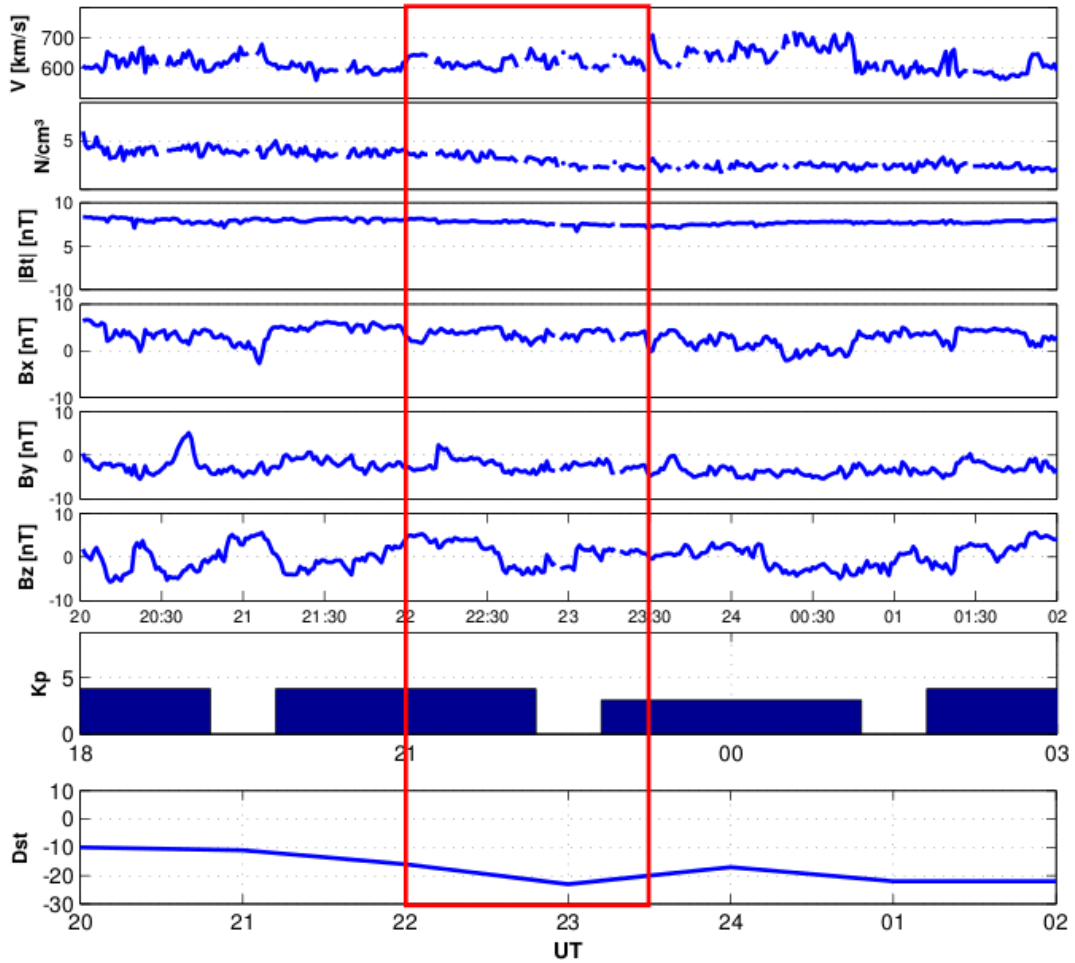
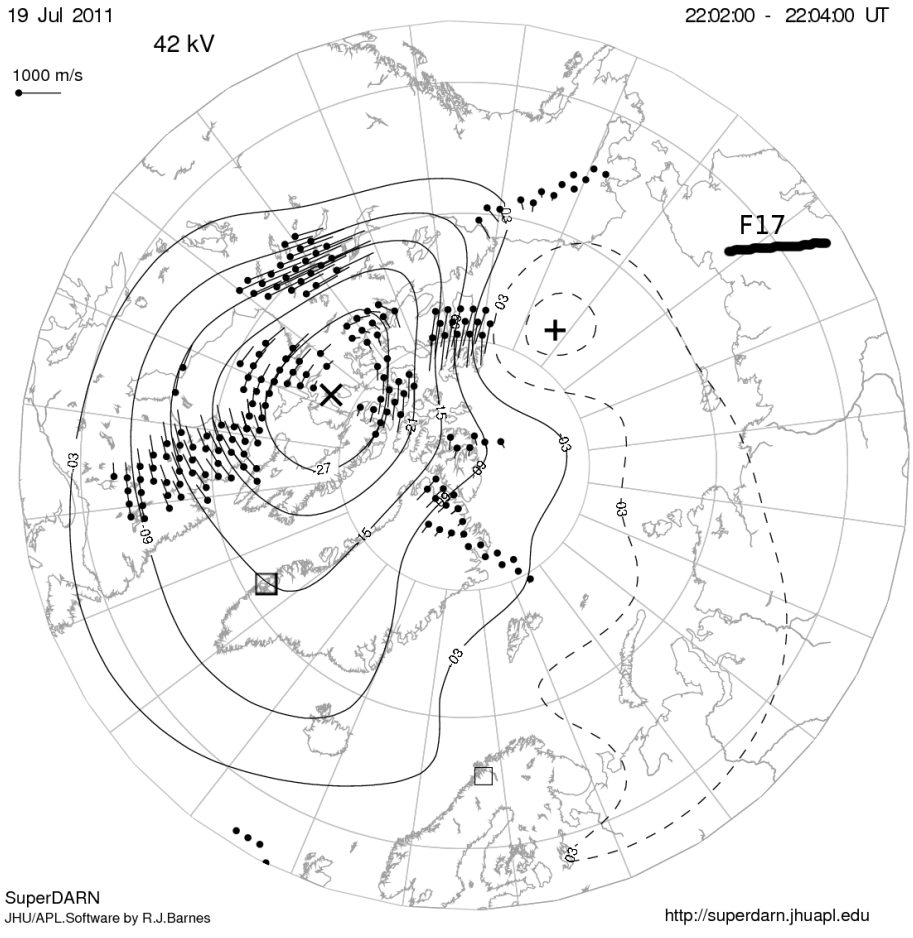


Figure: Traveling time between the L1 point and the Earth: approx. 40 min.

DMSP and SuperDARN

Ion velocities and ion energy



Convection map movie

DMSP and SuperDARN

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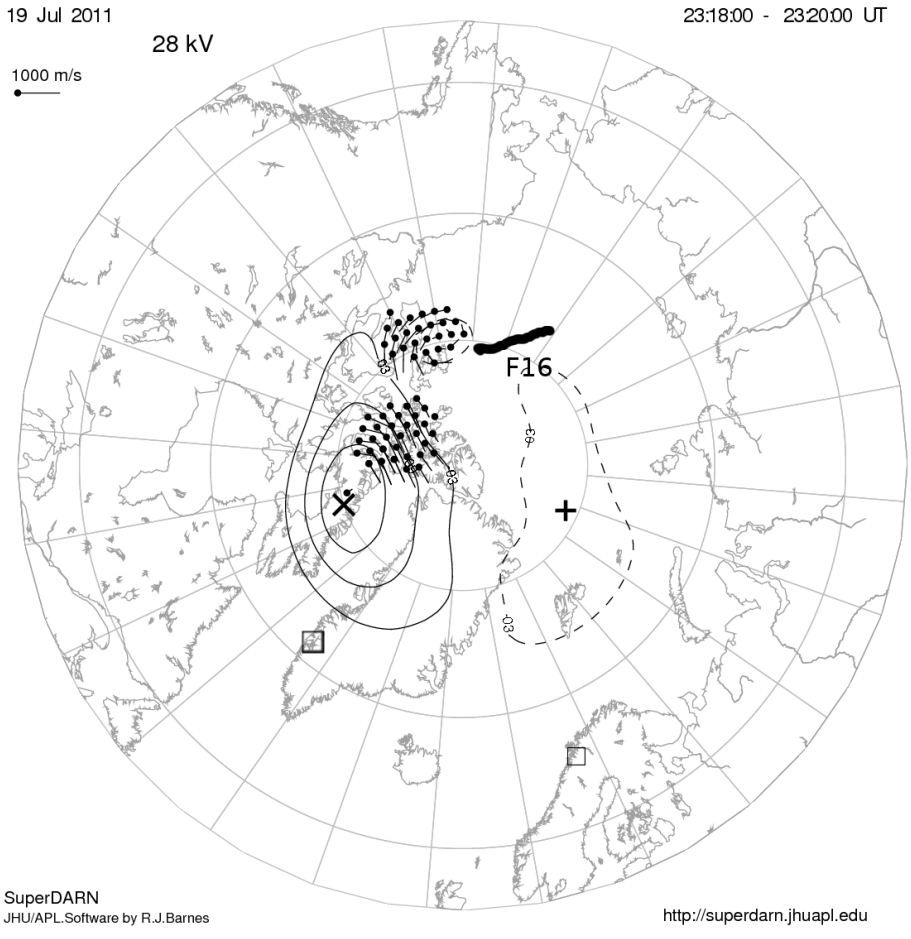

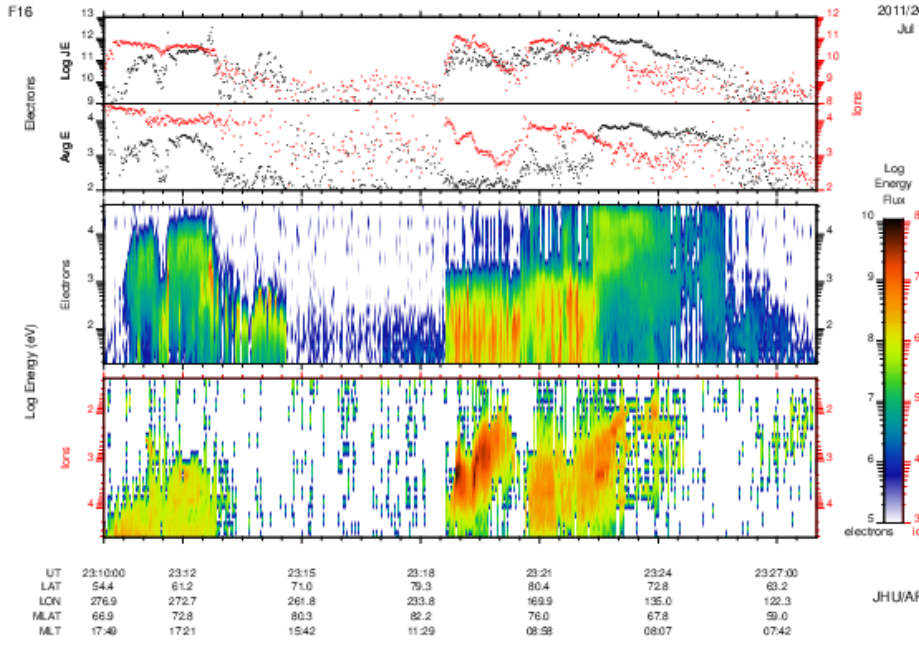

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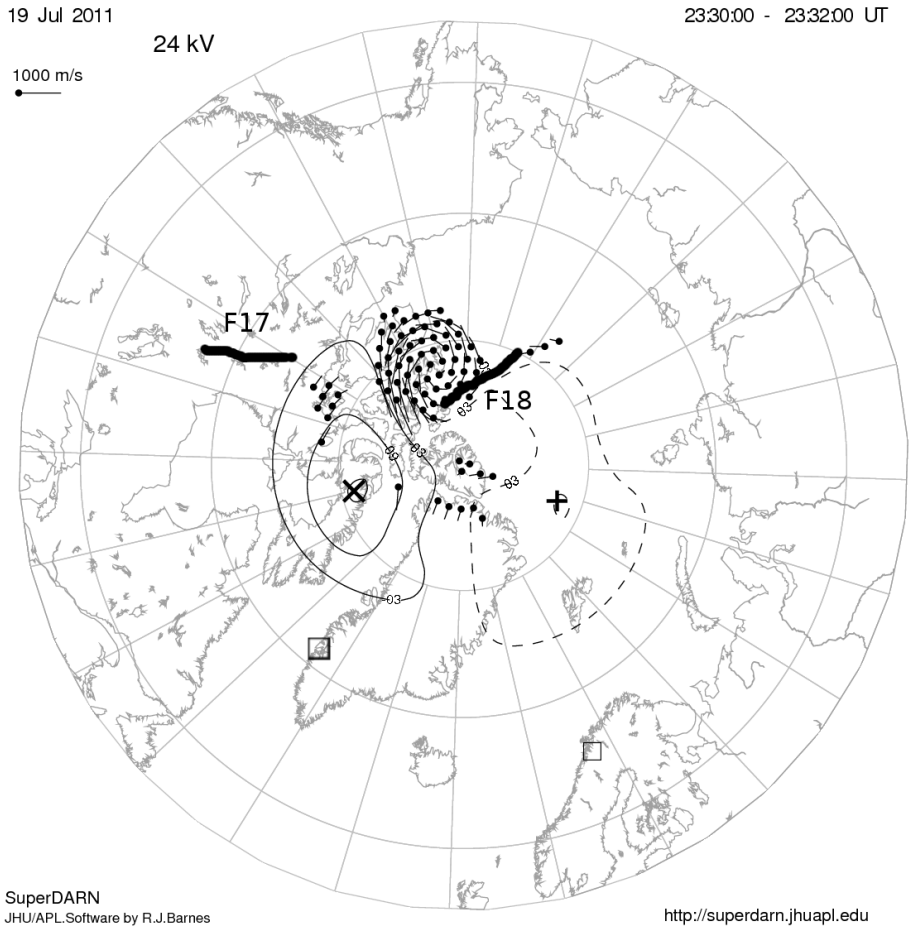

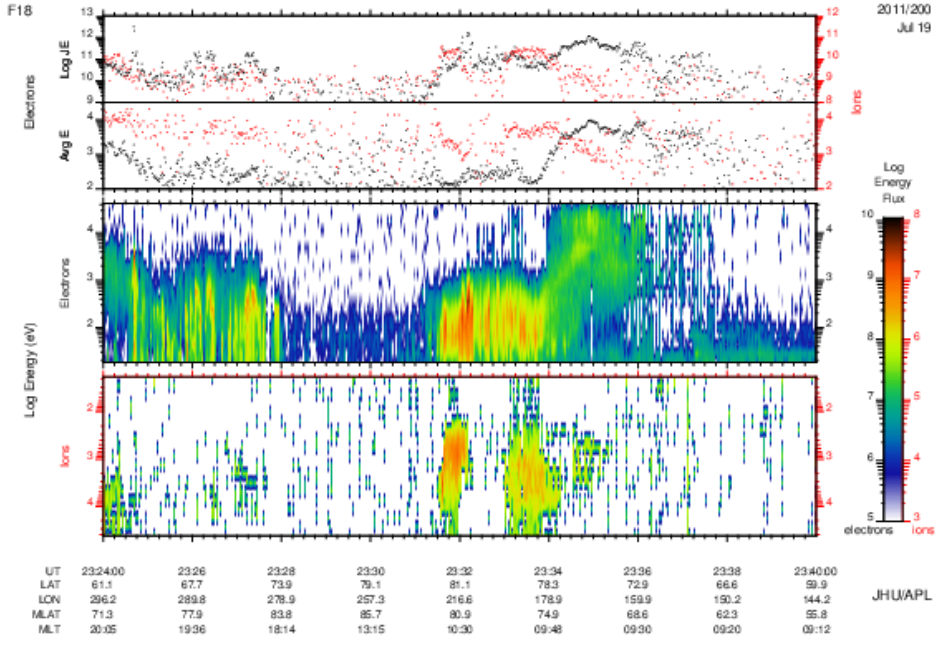

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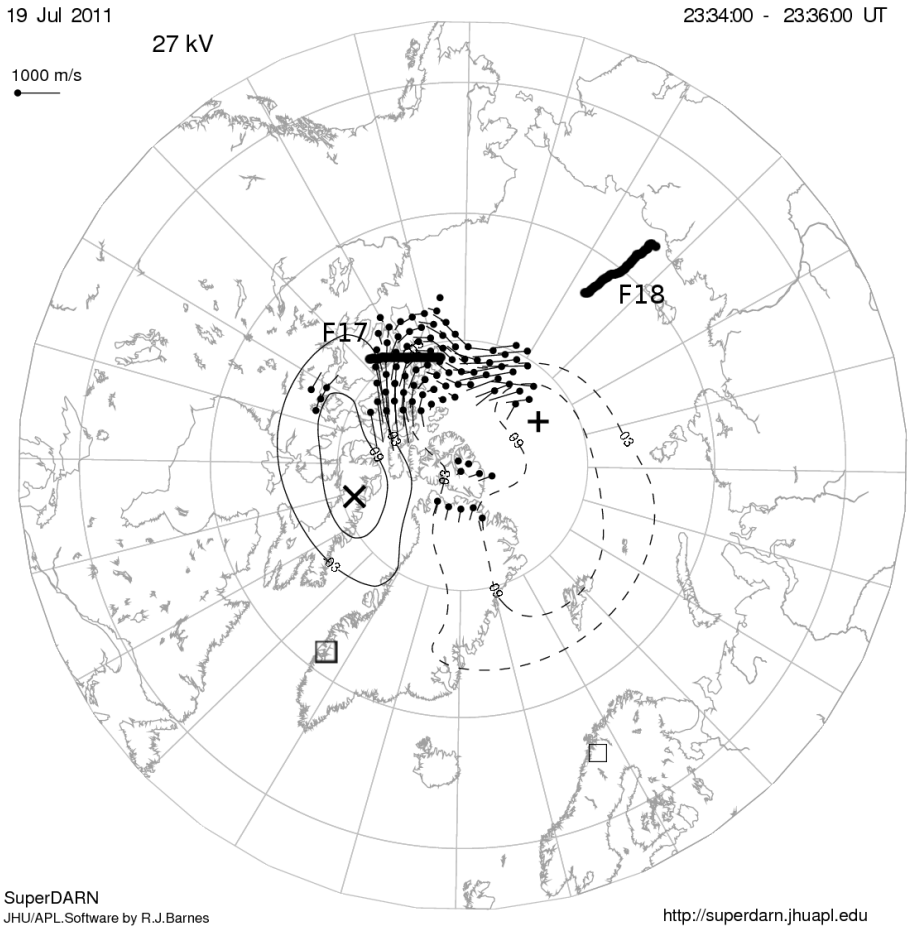
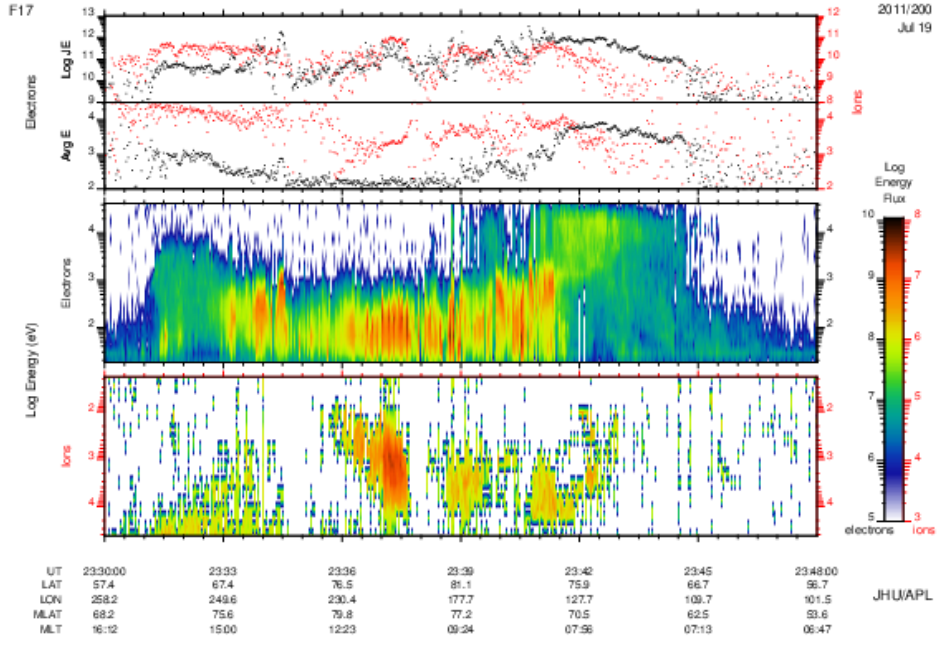
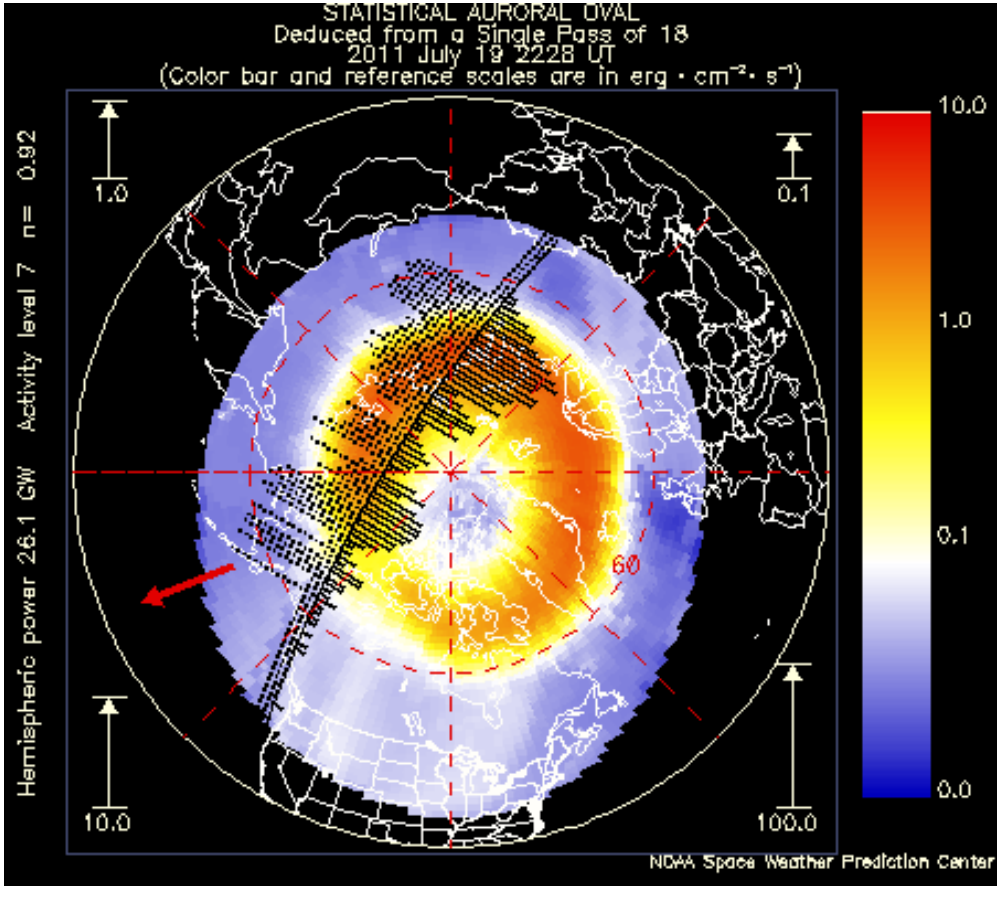
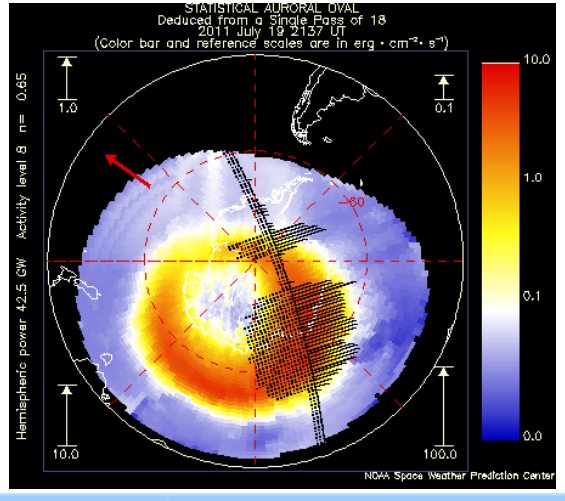




NOAA POES

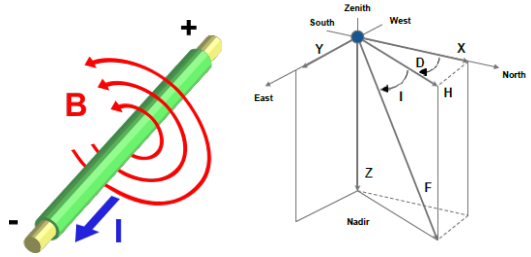
Total Energy Detector

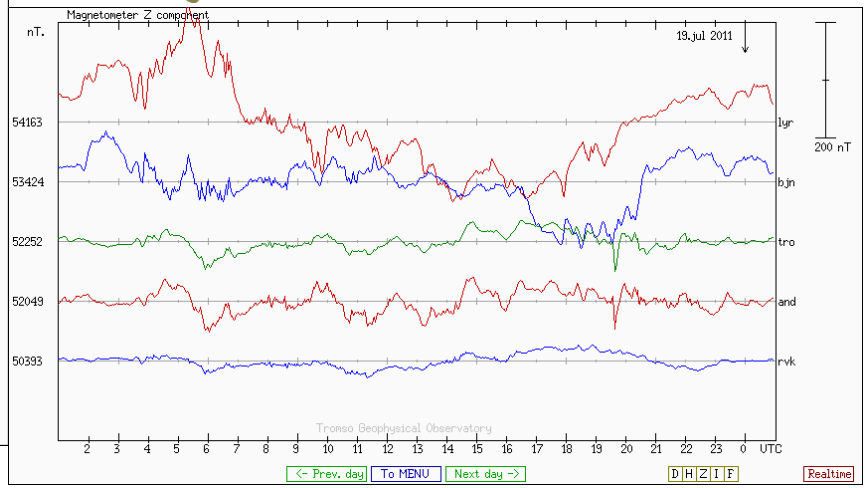




Total Power Dissipation (GW)	Activity Index	Kp Index
4-6	3	1+
10-16	5	2+
24-39	7	3+
61-96	9	5-

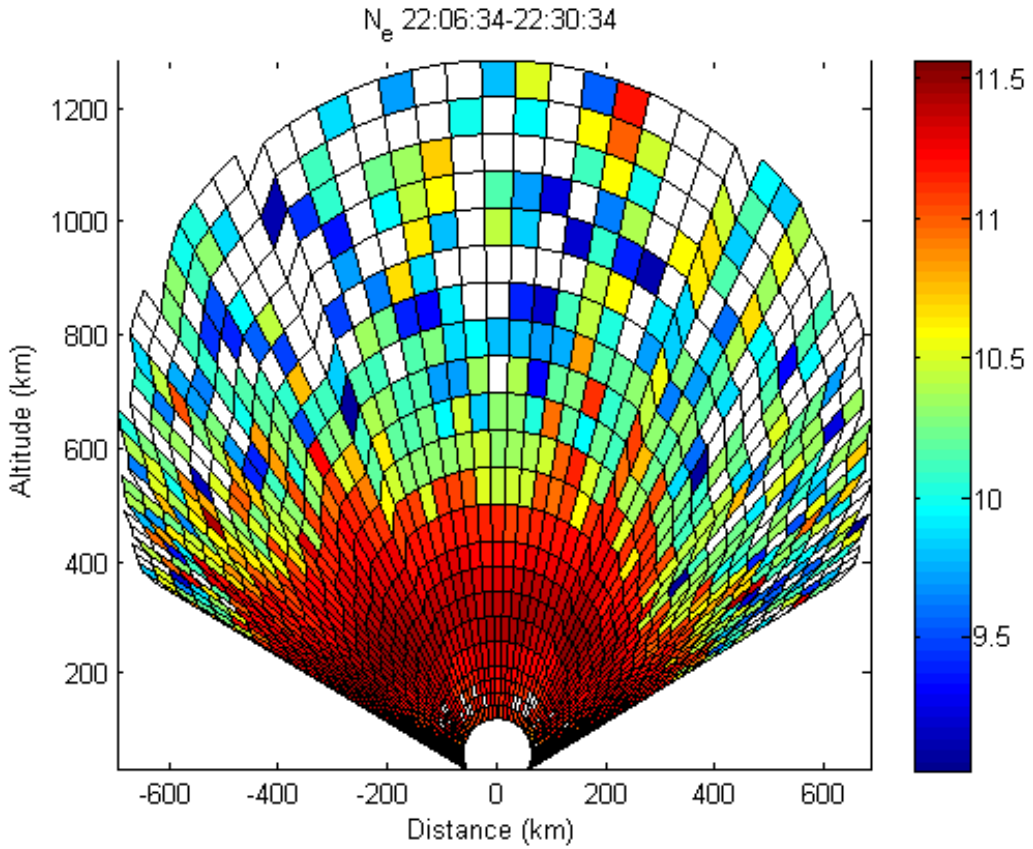
Magnetometers

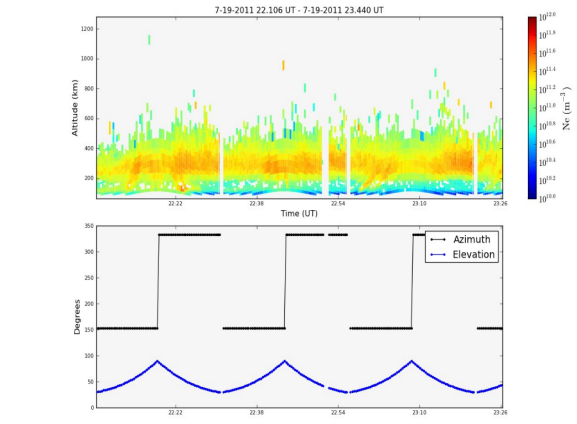


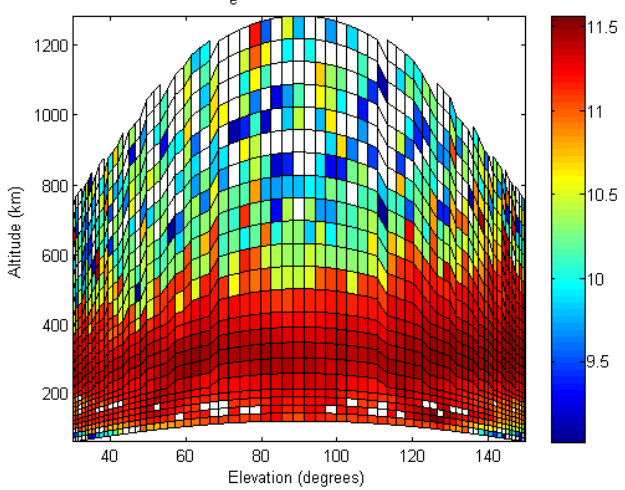


Sondestrum

N_e 22:06:34 - 22:30:34







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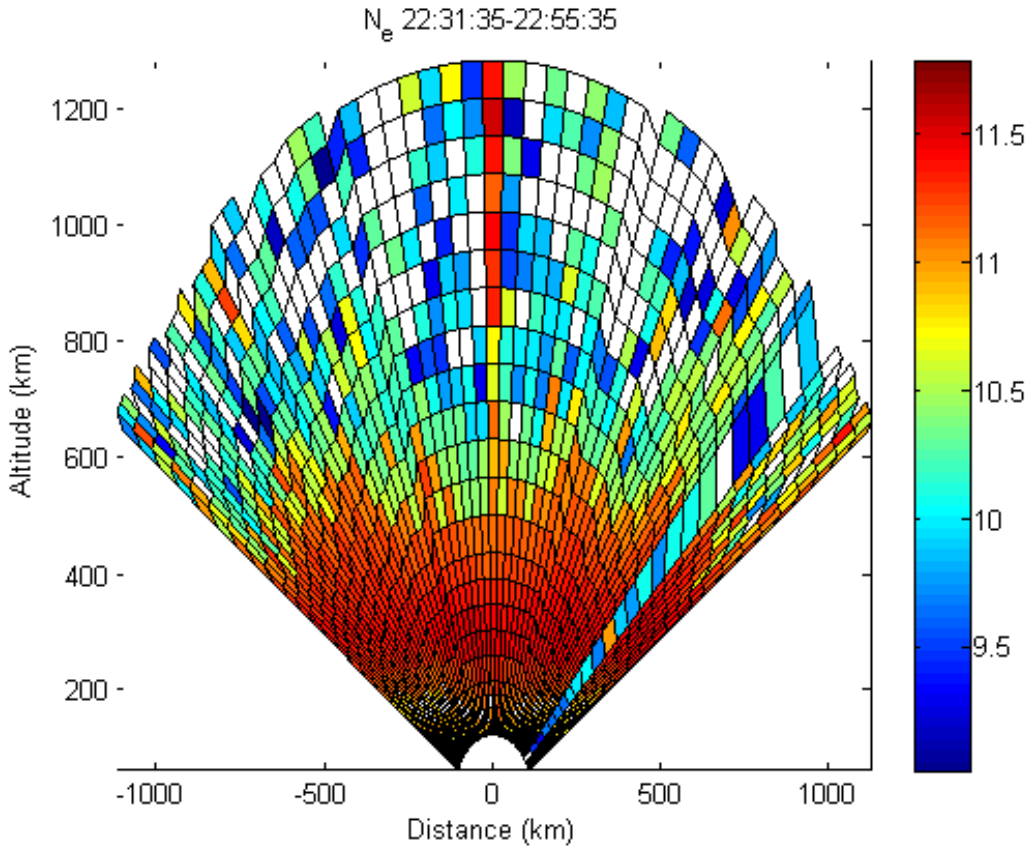
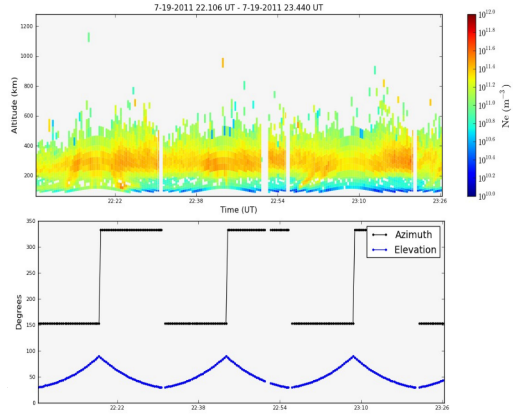
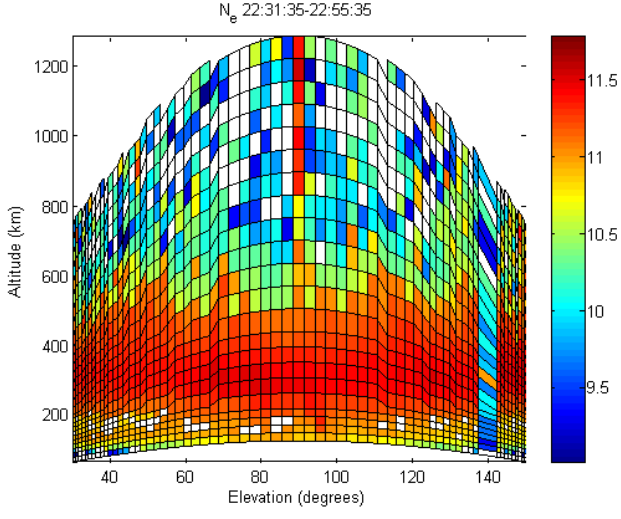
N_e 22:31:35 - 22:55:35

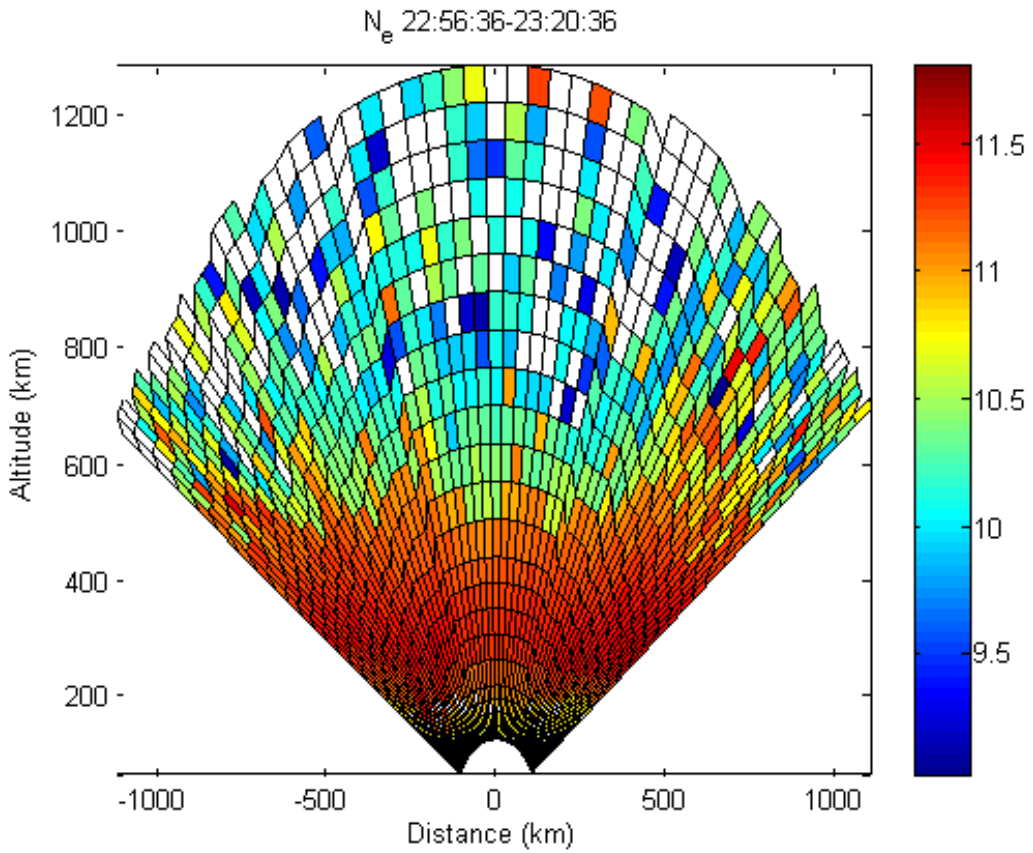


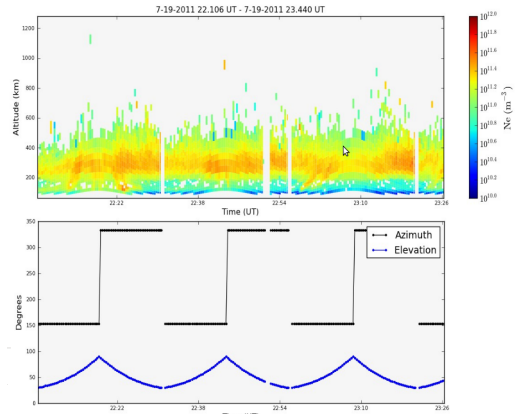


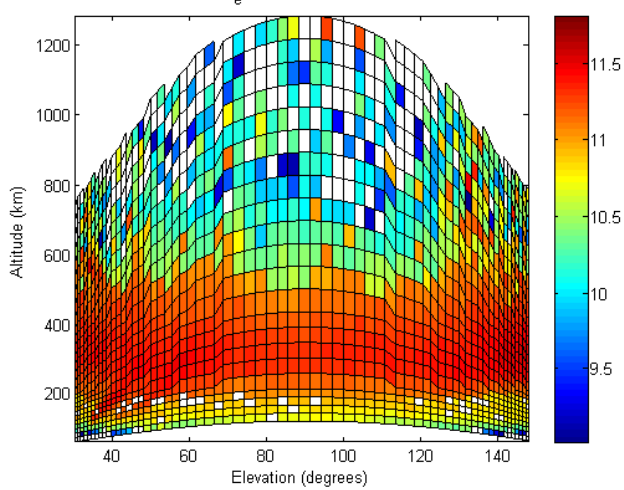


Sondestrum

N_e 22:56:36 - 23:20:36







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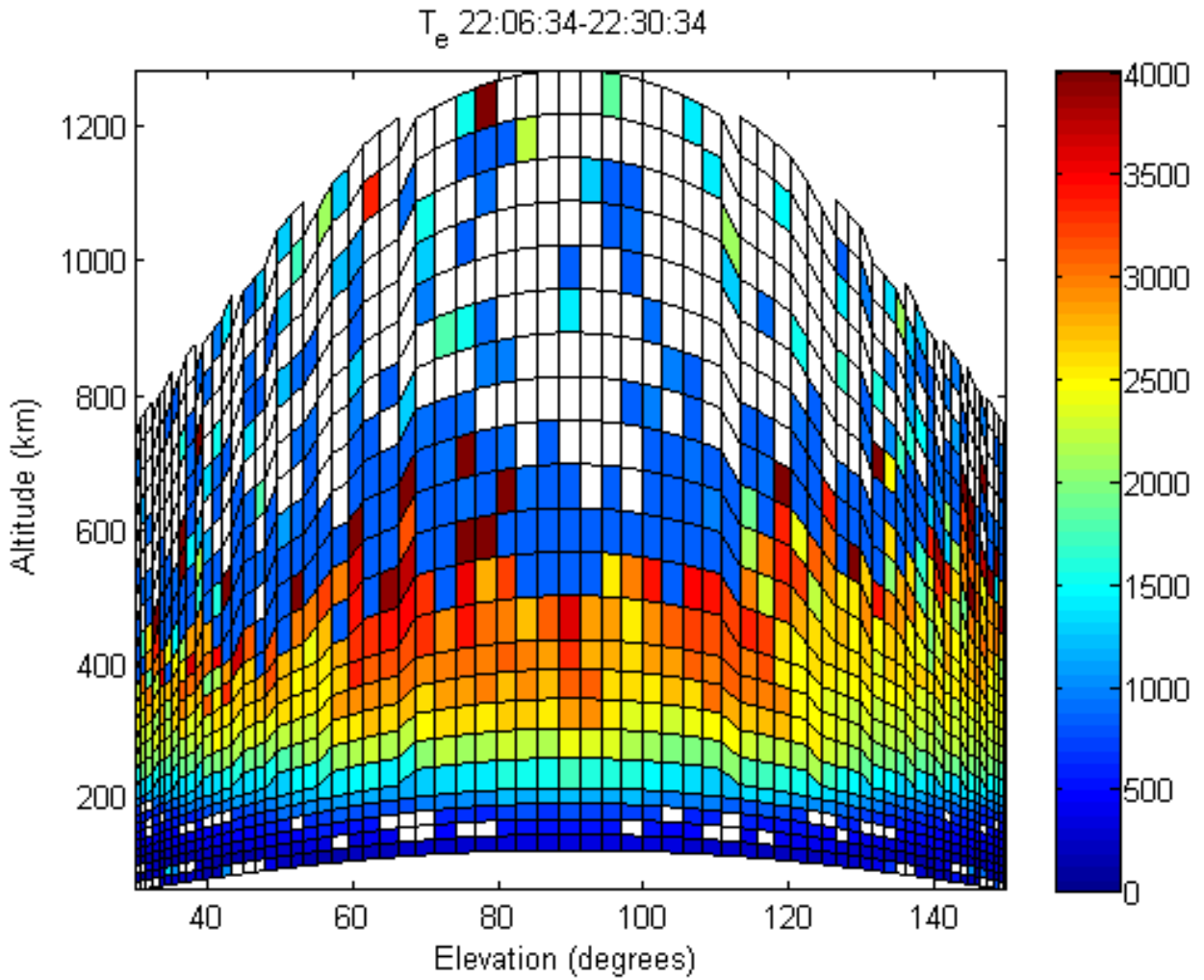

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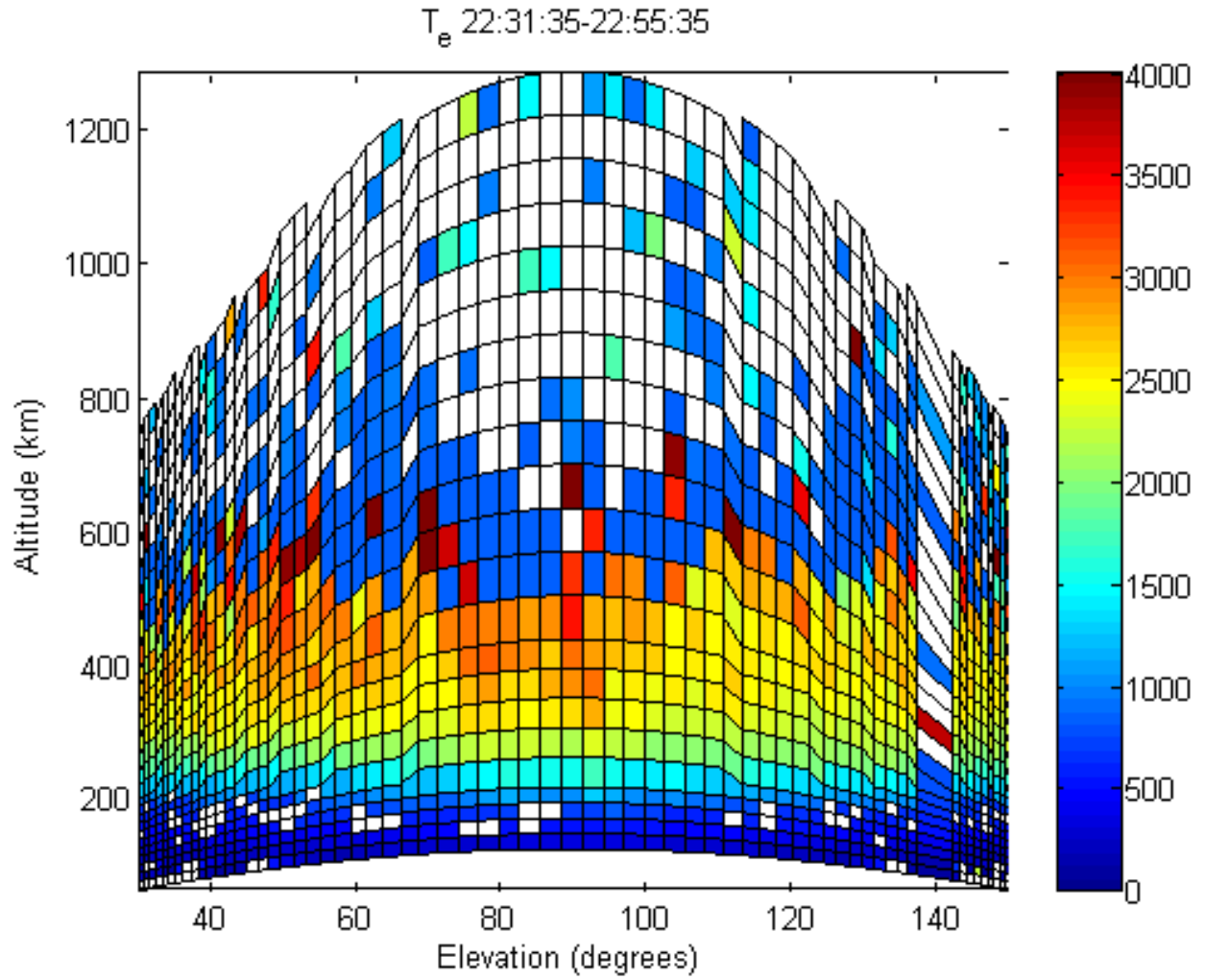

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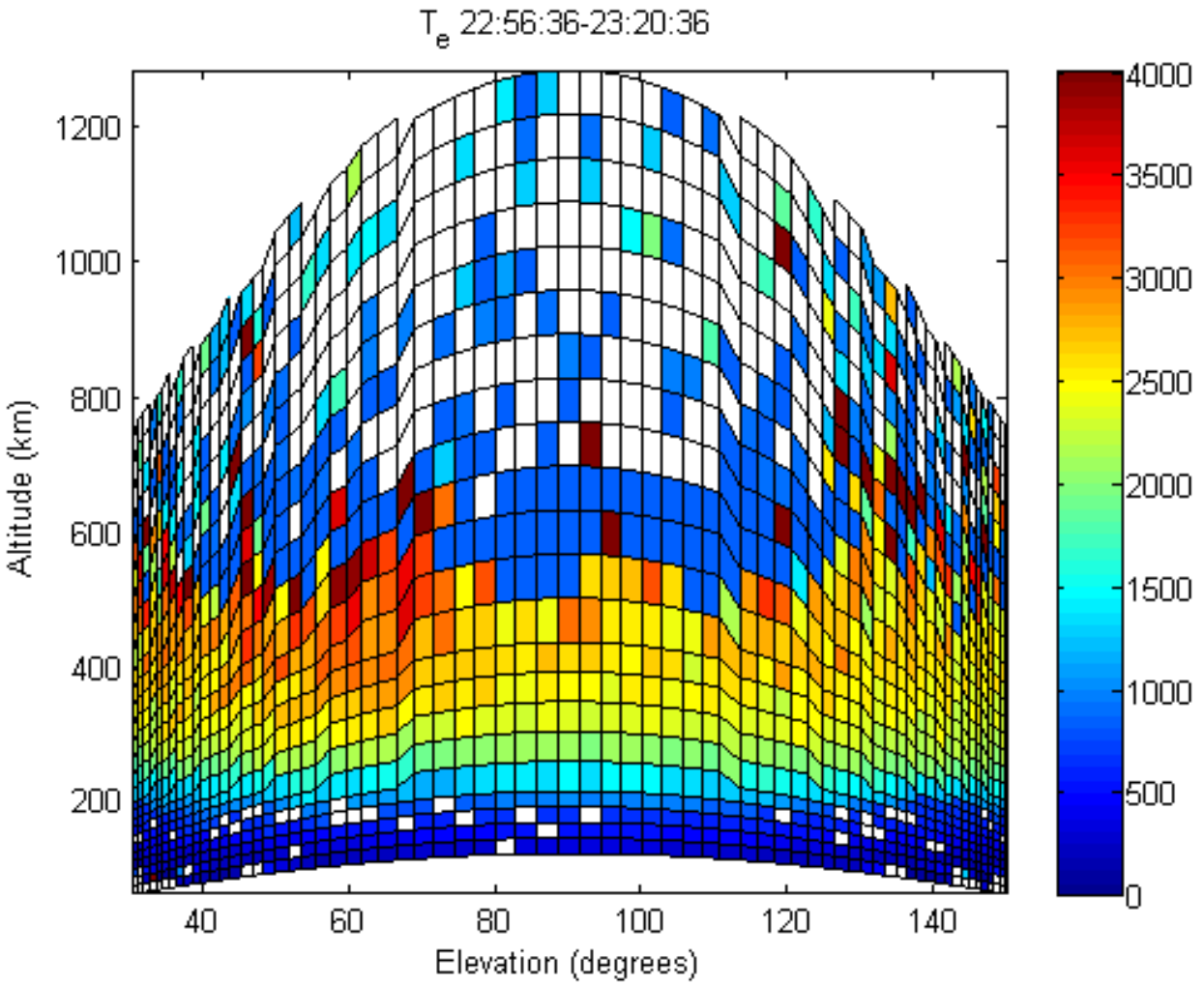

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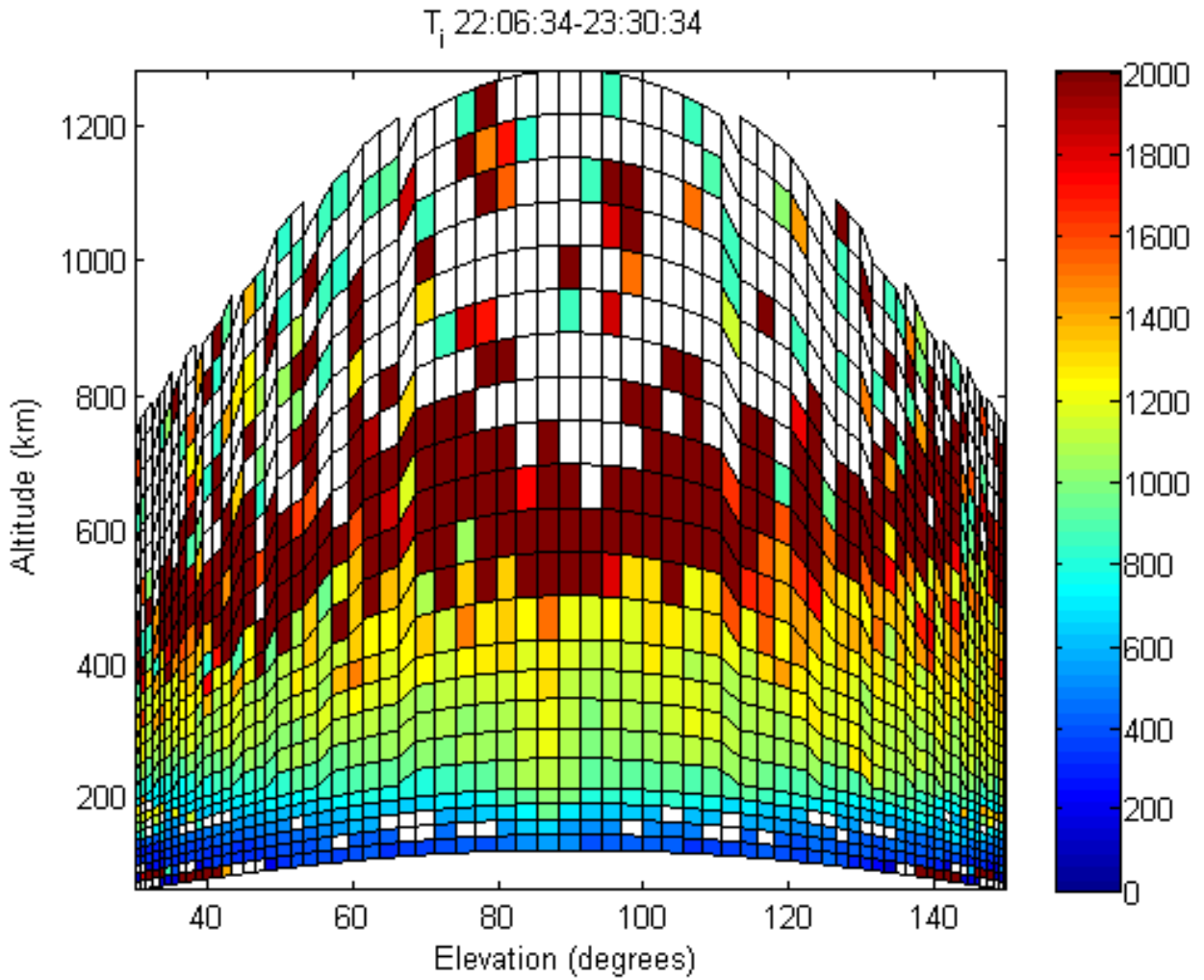

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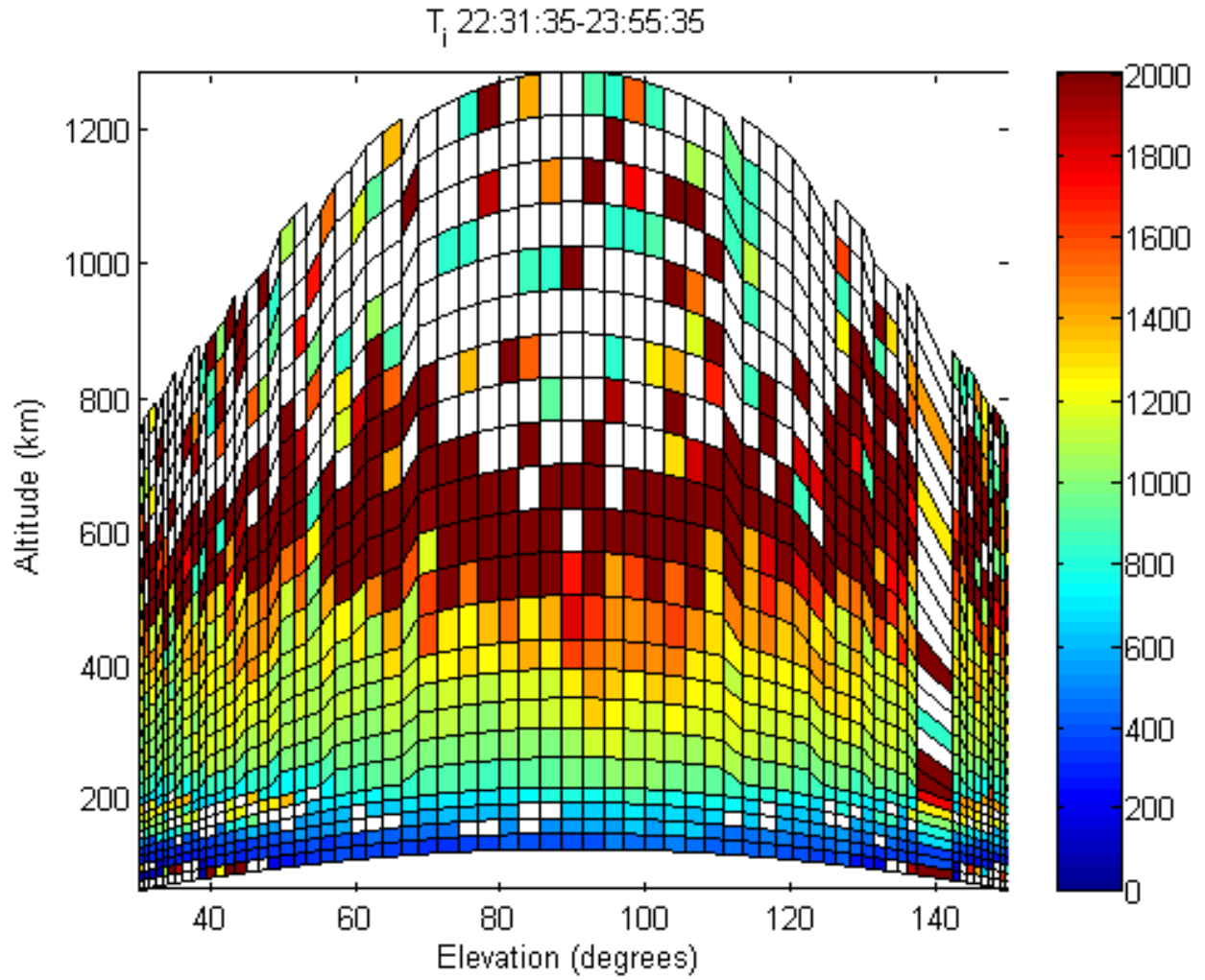

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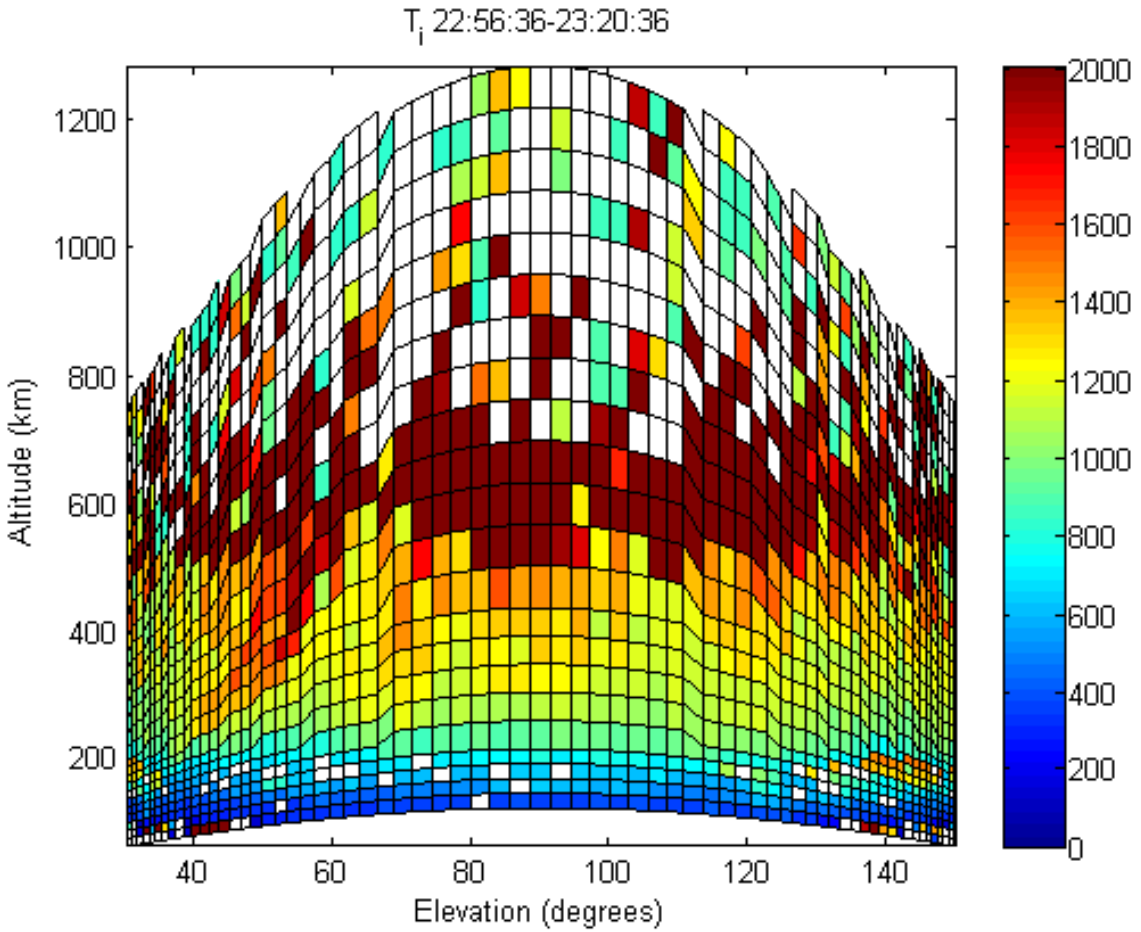
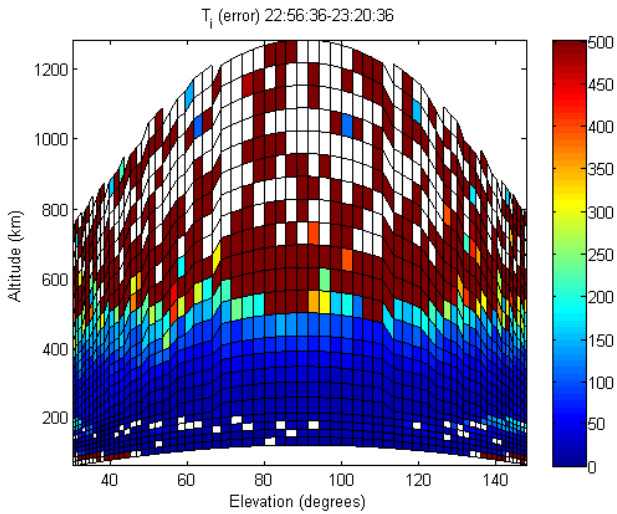
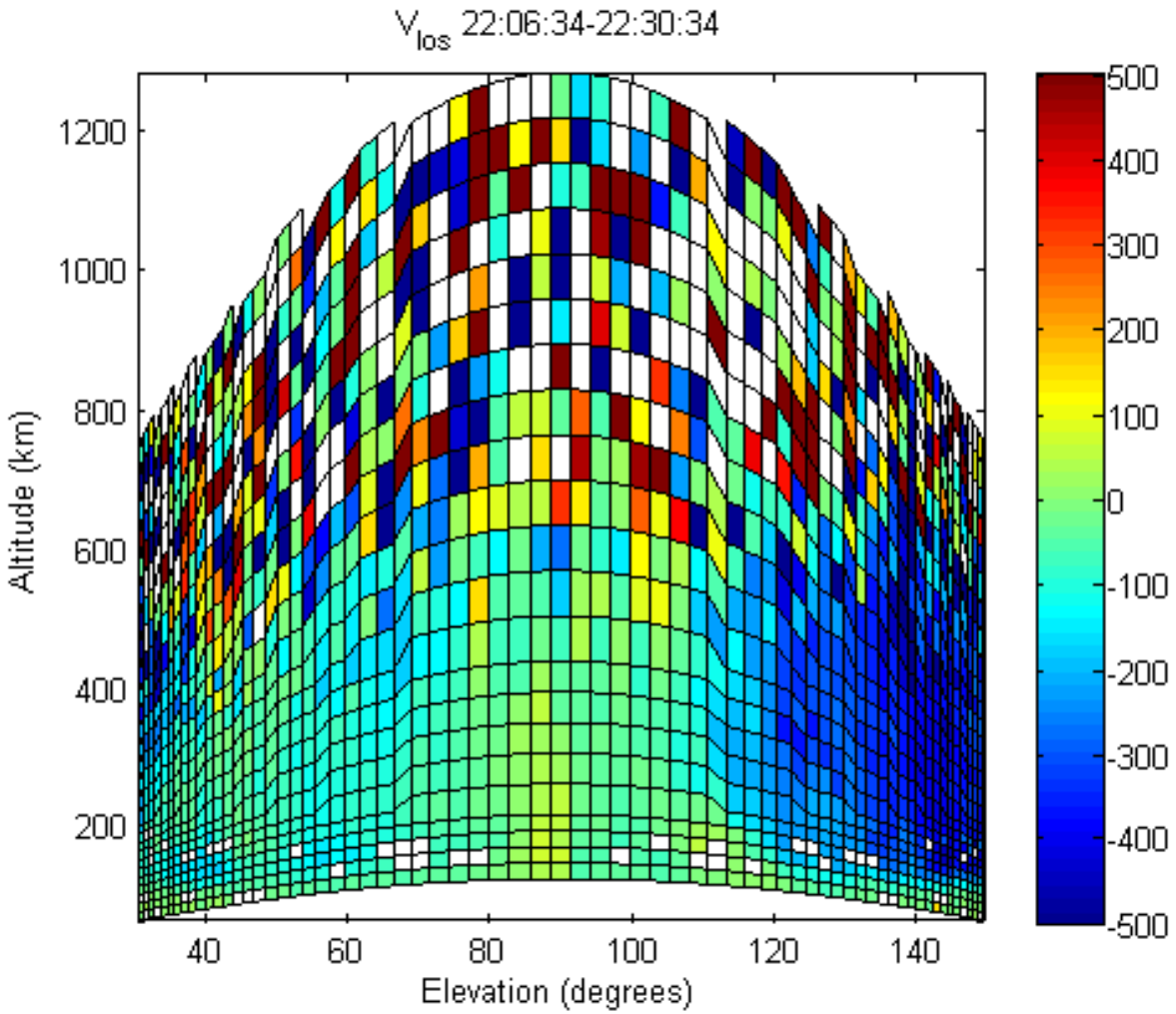




Sondestrum

V_{los} 22:06:34 - 22:30:34



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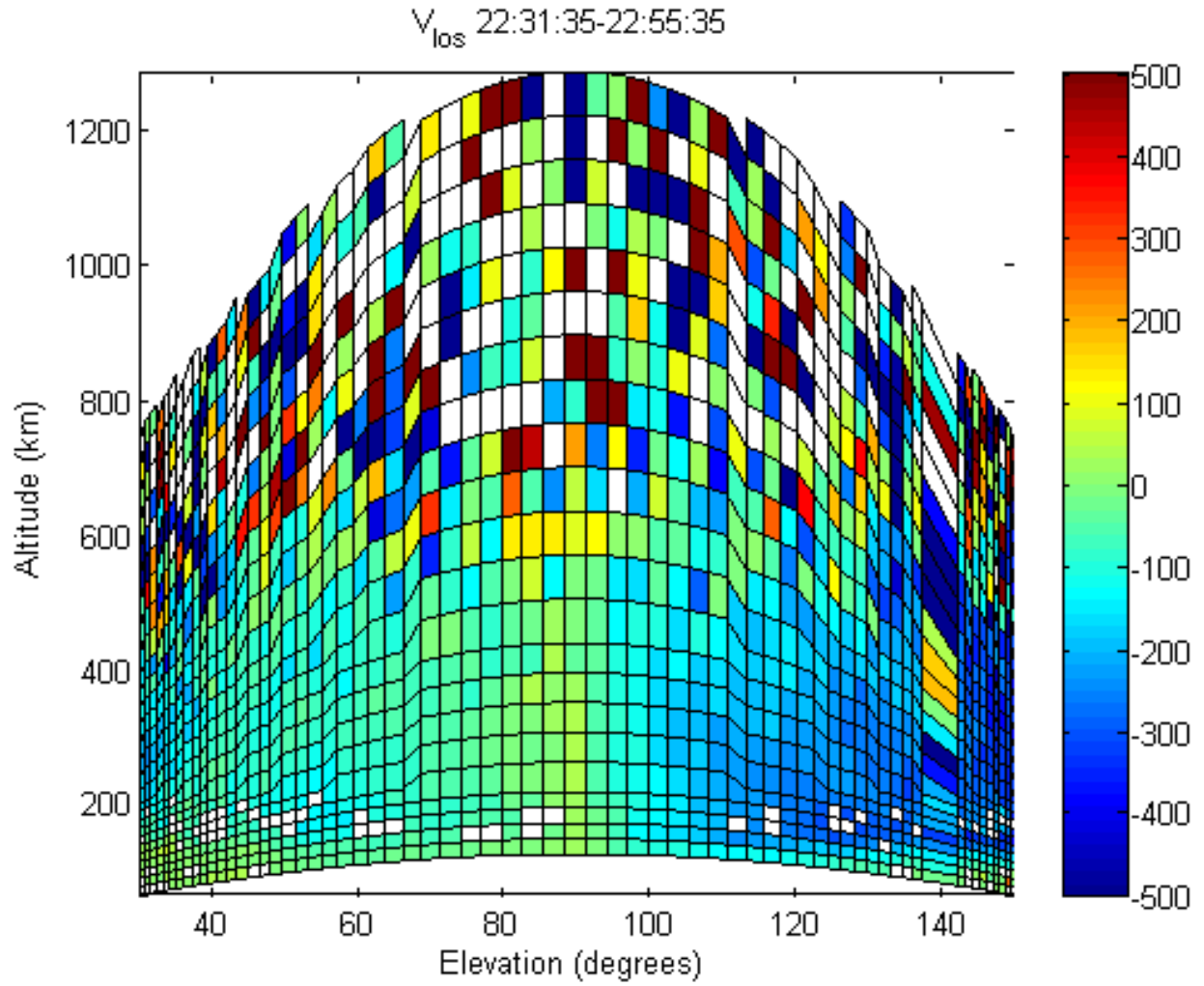
V_{los} 22:31:35 - 22:55:35



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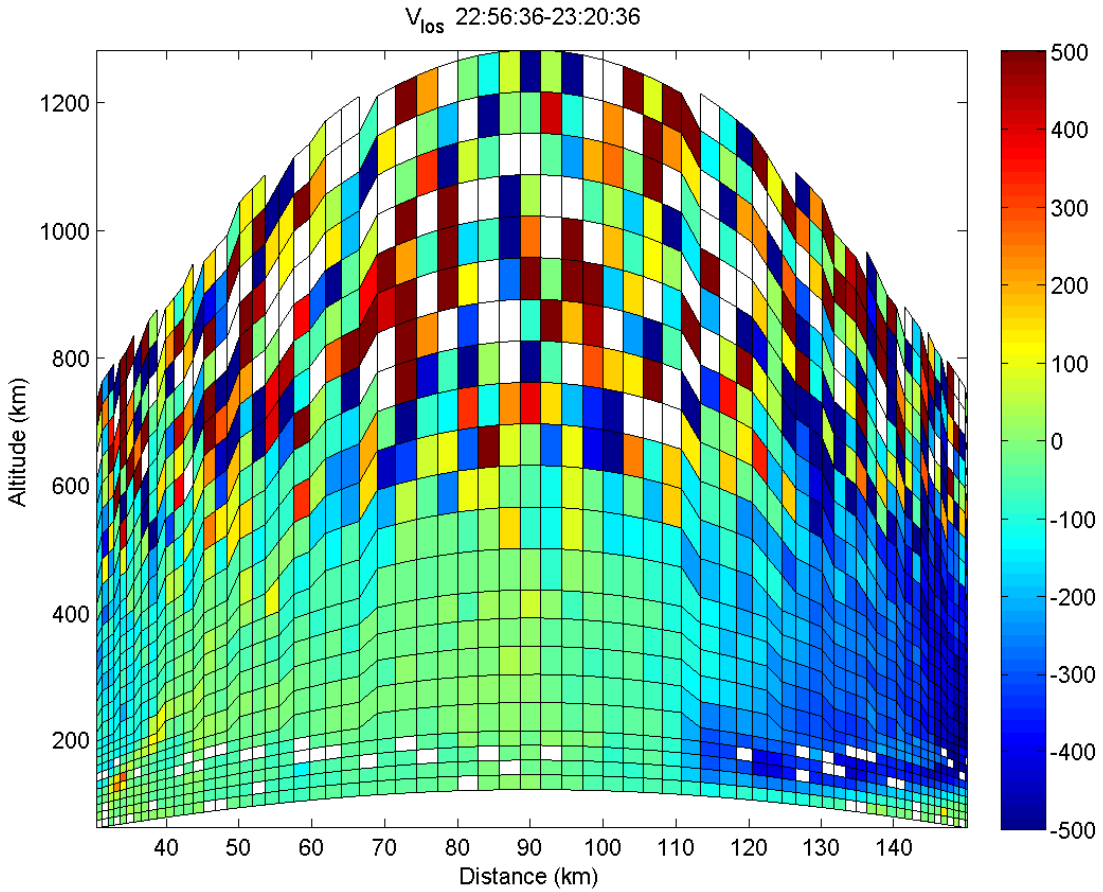
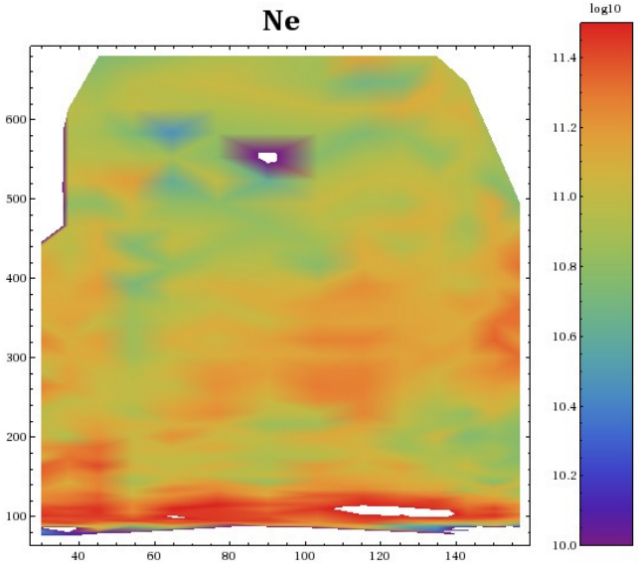
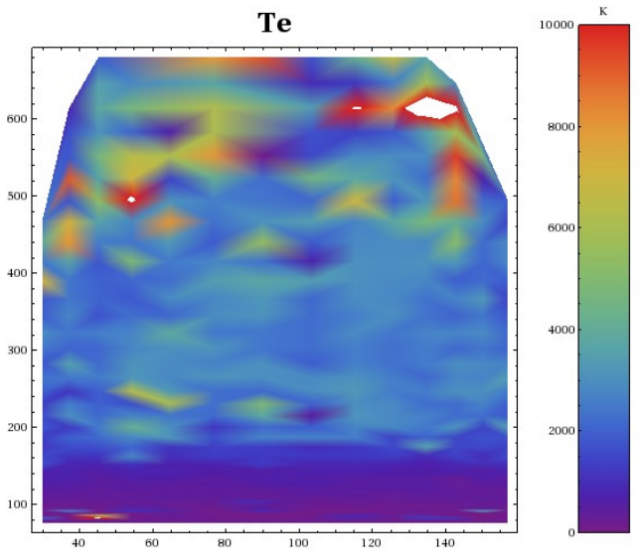
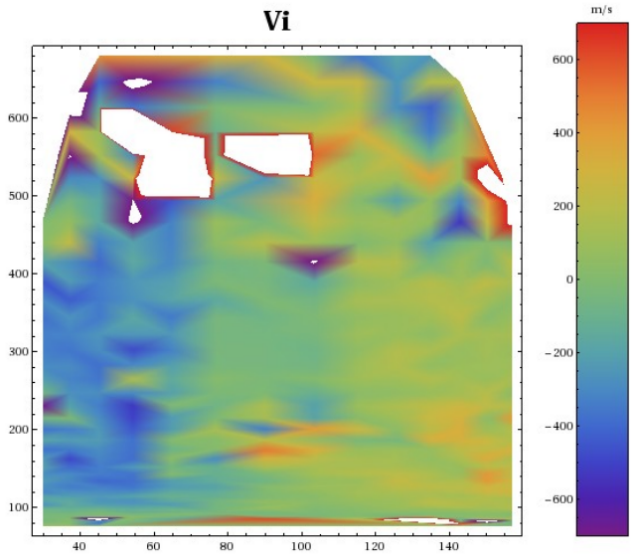
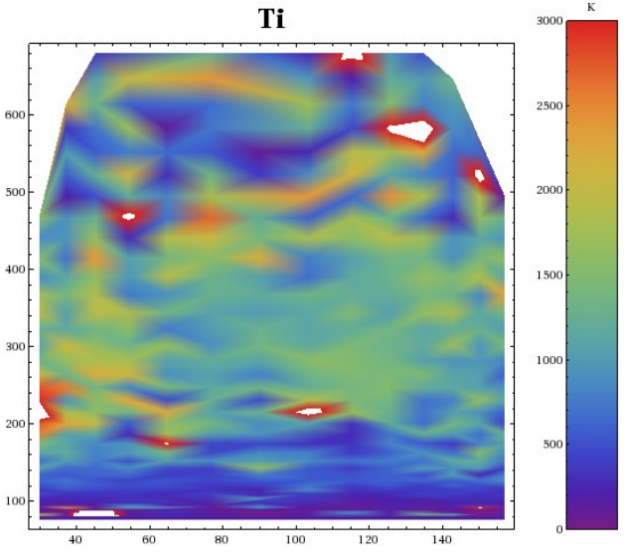


EISCAT
Scan 1 (and 2)



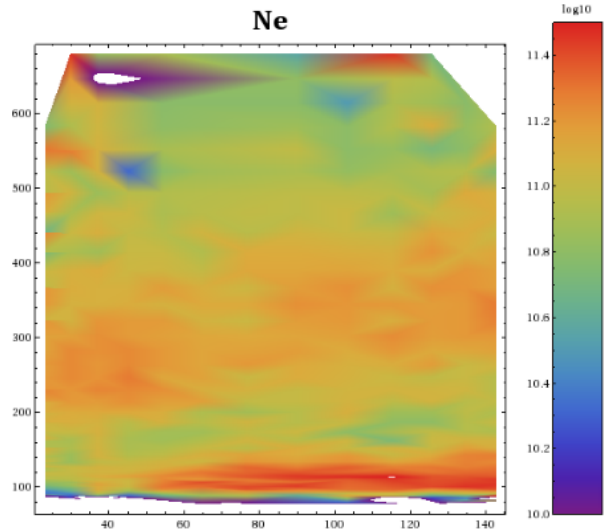


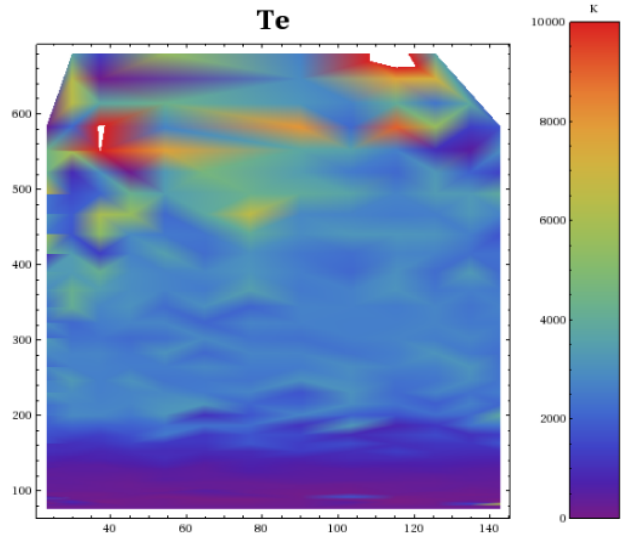


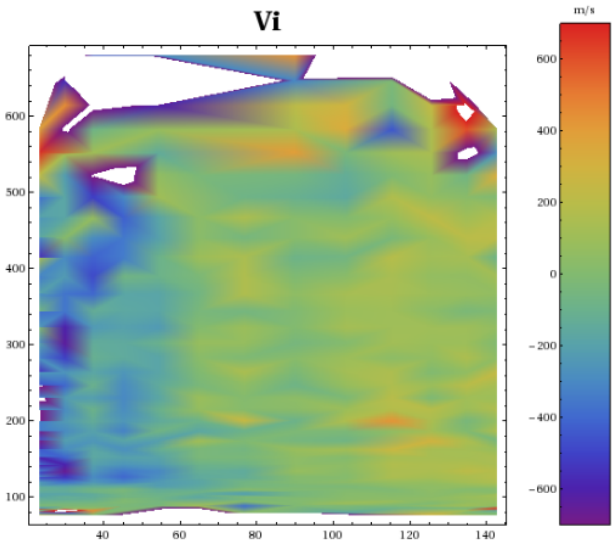


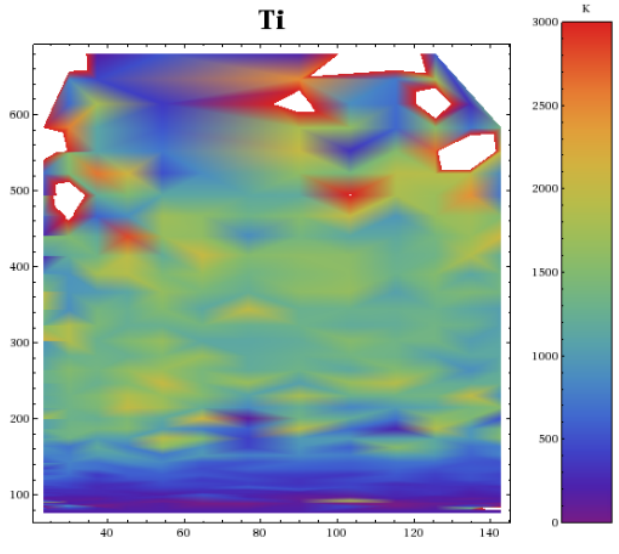
EISCAT

Scan 3



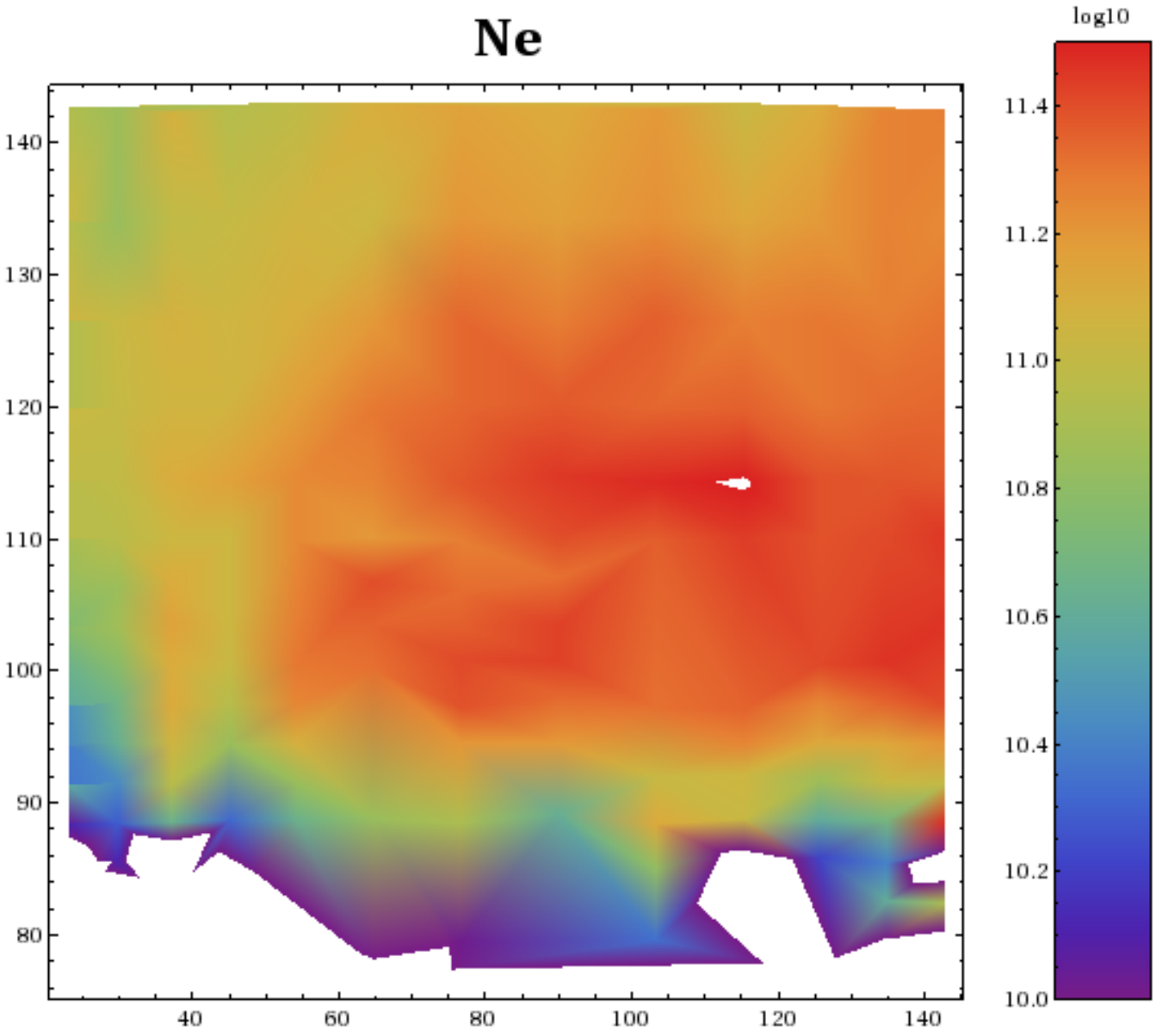




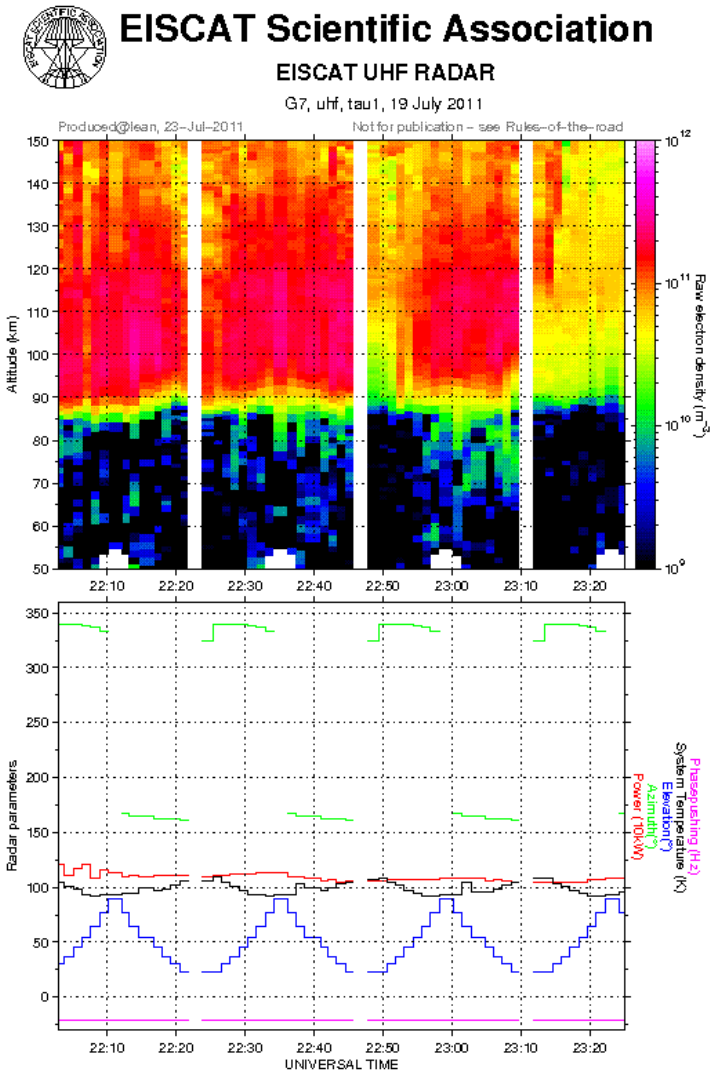


EISCAT

Scan 3 Zoomed



EISCAT
Electron Density



Conclusions

- Overall southward movement of plasma in agreement with convection pattern
- Energetic particle precipitation
- Clear F region
- Clear E region over EISCAT site.
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