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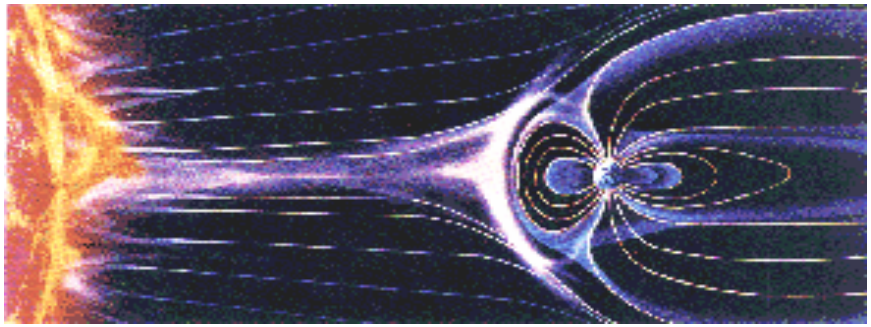
FYS 3610
Research infrastructure and substorm aurora



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Research Infrastructure

Main installations for Space Research in North Norway and Svalbard

Longyearbyen

UNIS, EISCAT Svalbard Radar

The auroral station

Ny-Ålesund

Norwegian polar institute, SvalRak

North-Norway

ARS, EISCAT

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The Earth rotates underneath the auroral oval

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The Uniqueness about Svalbard

- Ideally located for daytime auroral measurements
- Well developed research infrastructure
- Multi-instrument observations

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UNIS
14 full-time scientists
And ~100 students

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The auroral station, LYR

- **Owned by the University of Tromsø**
- **Operated by UNIS**
- **Ca. 22 instruments, 16 institutions from 8 nations**

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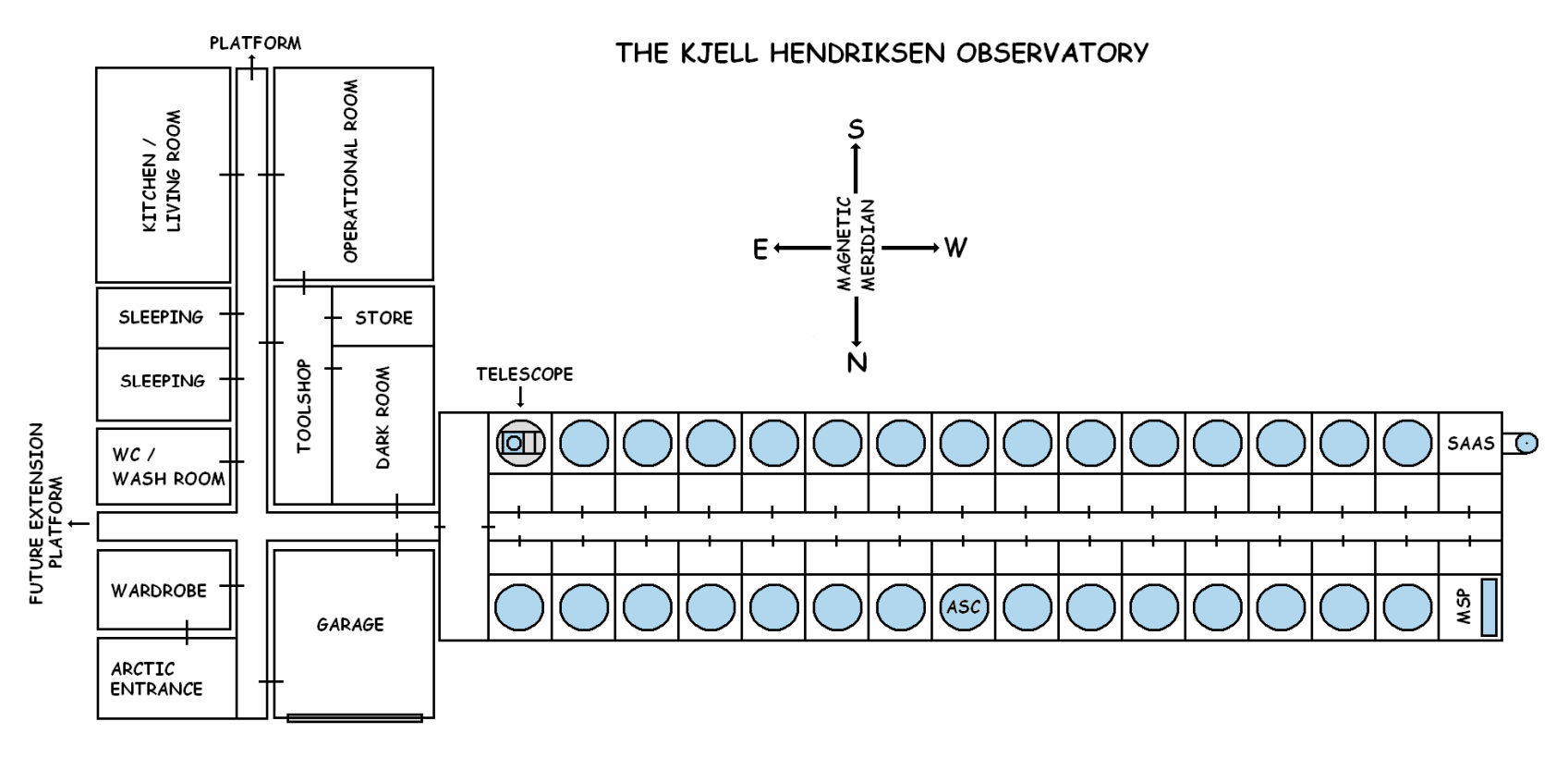
The new auroral station, LYR



15 out of 32 domes will be used after moving the instruments from Adventdalen.

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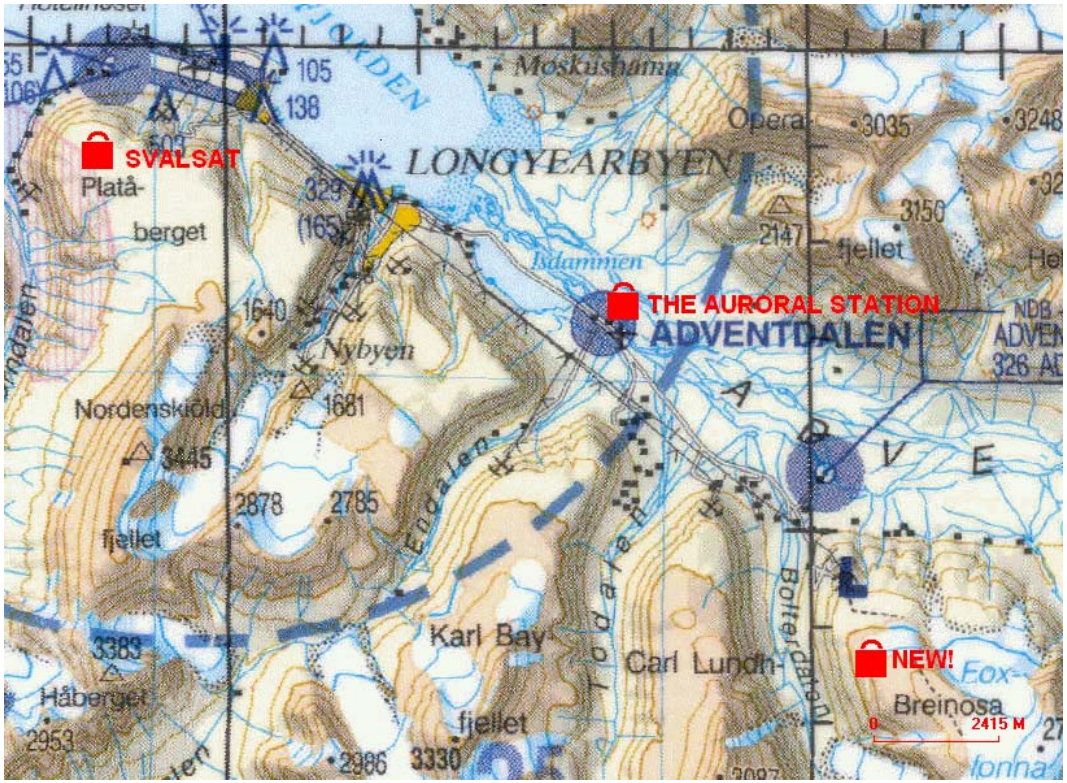
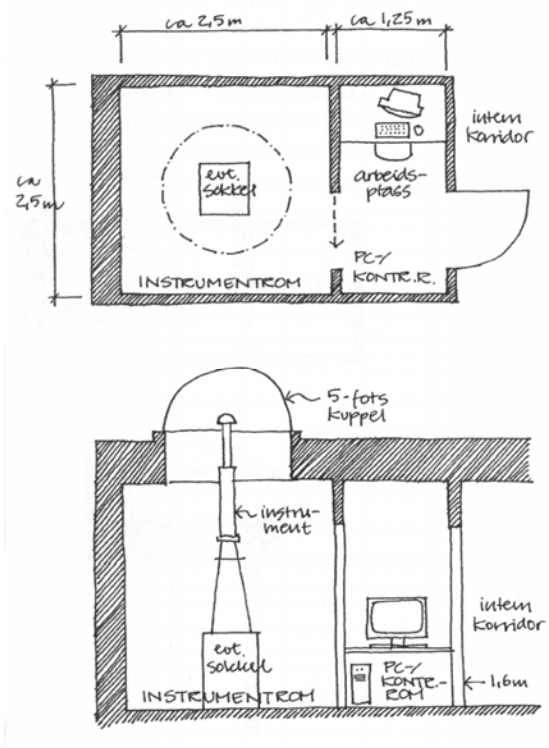
Location of the new station





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Why?

- Old station in Adventdalen is too small!
- Light pollution from Longyearbyen has increased!
- We need new improved working conditions!
- Space to accommodate new instruments and partners!
- Co-location with EISCAT and others
- Improved teaching and training facilities
- Continue and quality improve our long term measurements
- Keep the old station’s scientific momentum
- Get away from sand storms in Adventdalen during autumn and spring
- Secure the field of auroral optics!

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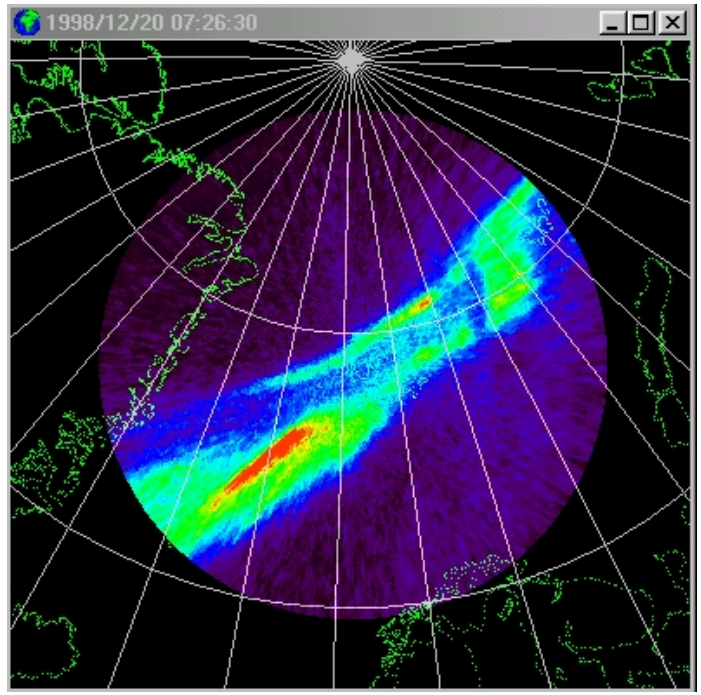
Ny-Ålesund Auroral Platform



Key instruments:

- Meridian Scanning Photometer – 4 channels
- All-Sky Camera (5 positions filter wheel)

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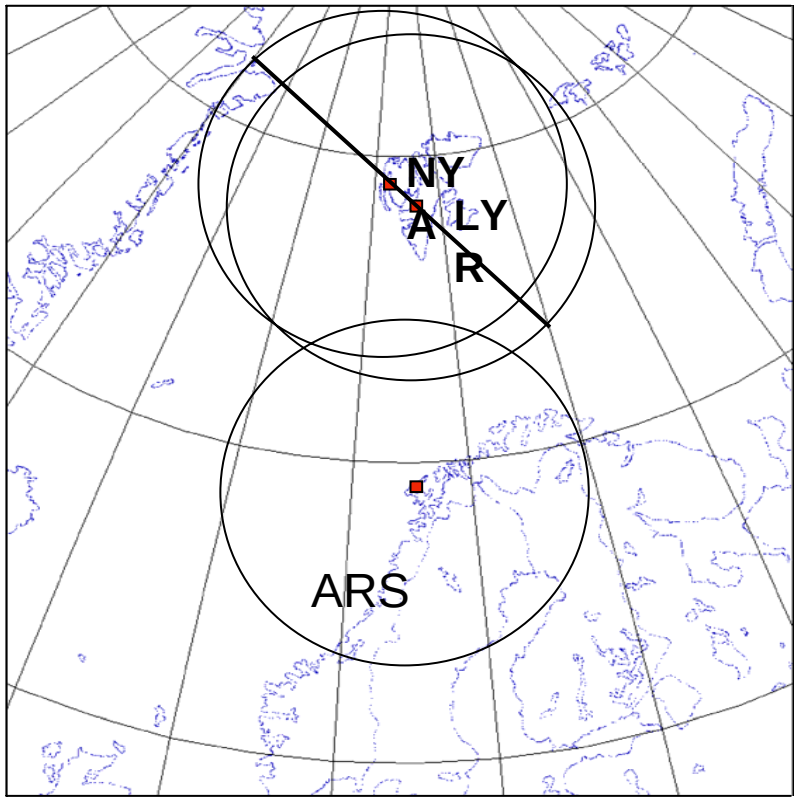
All-sky field of view coverage



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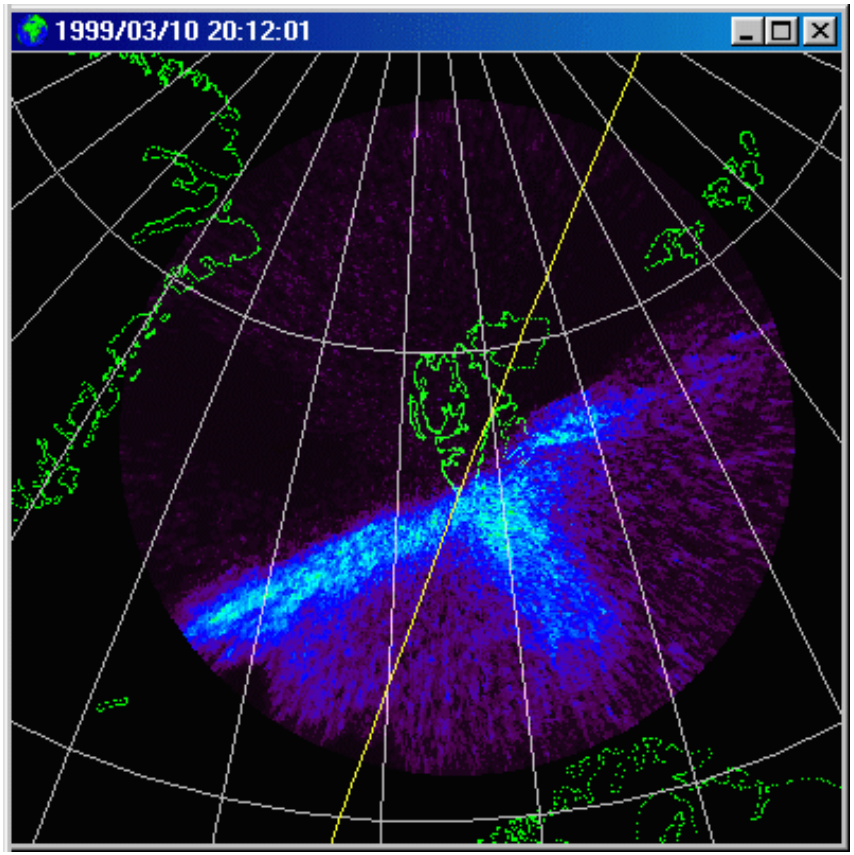
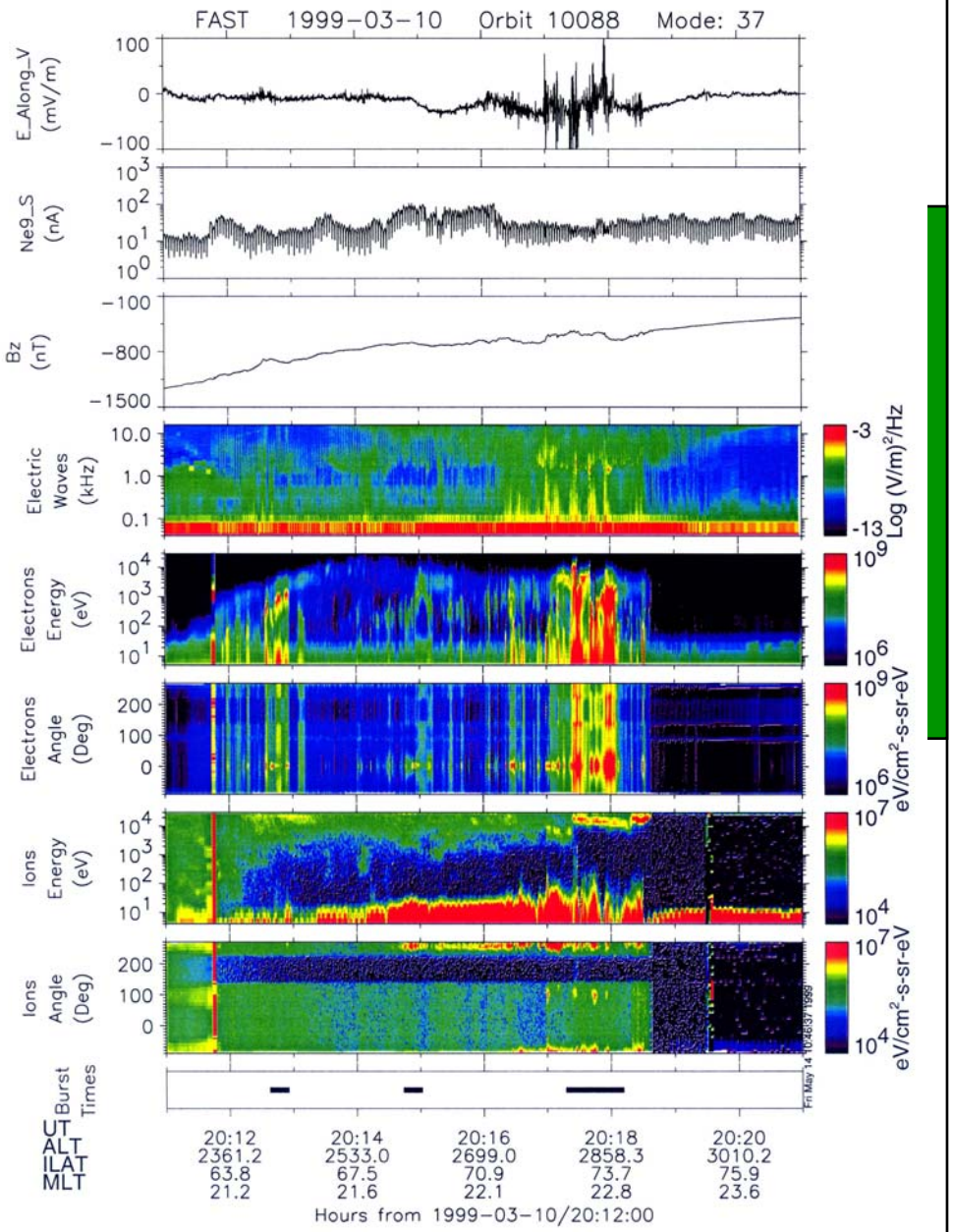
FAST – passasje gjennom Nordlyset





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EISCAT Scientific Association

3 Incoherent Scatter Radar Systems:

- Tromsø UHF (933 MHz) - 3-static with receivers at Kiruna and Sodankylä
- Tromsø VHF (224 MHz)
- Eiscat Svalbard Radar - dual antenna system (500 MHz)

Associated countries:

Germany, France, Finland, Japan, Norway, Sweden, UK

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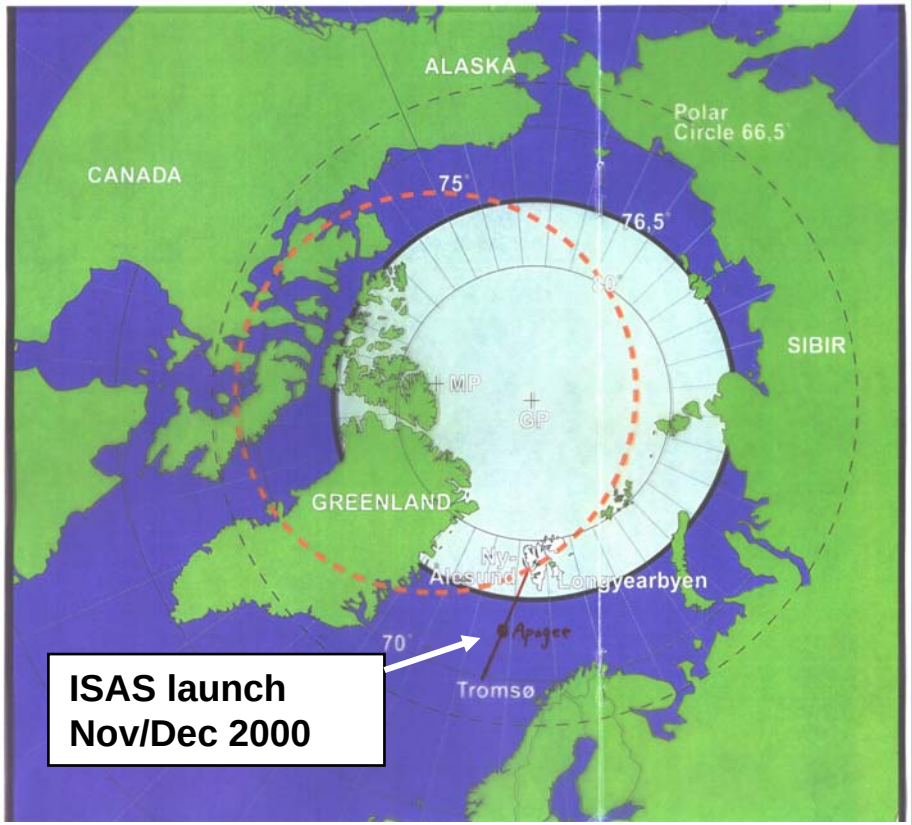
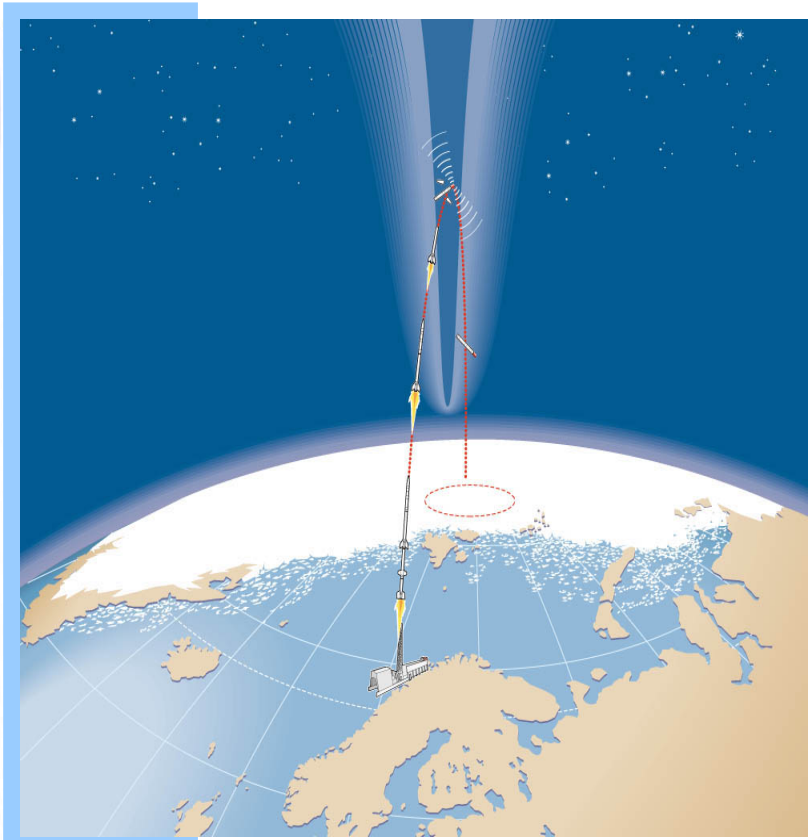
ARS and Svalrak





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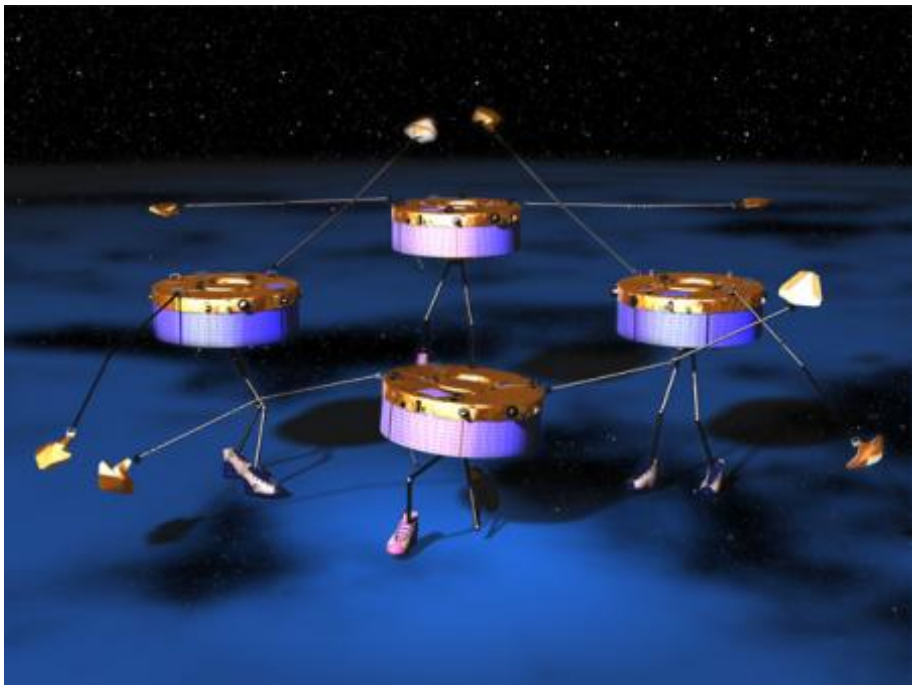
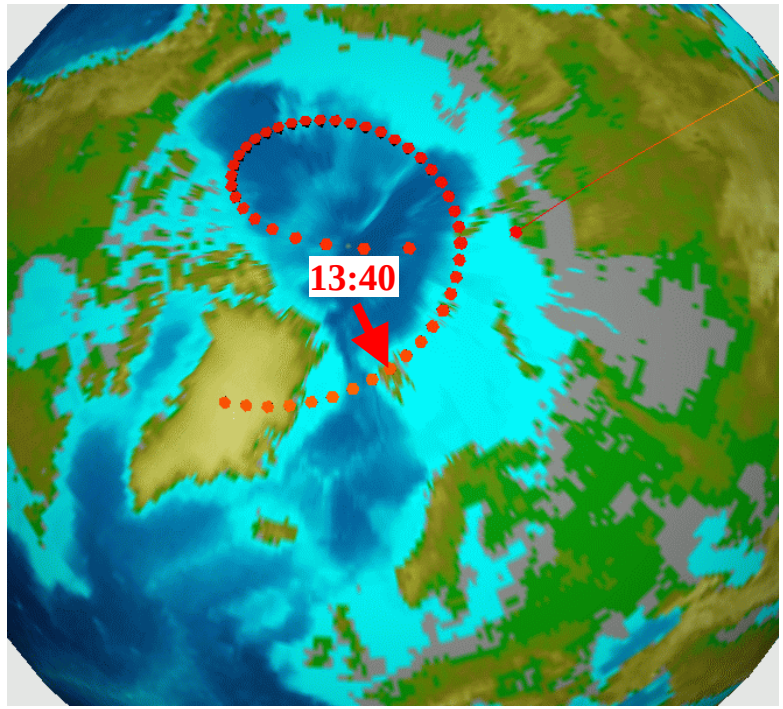
Ground support for CLUSTER





30 Nov, 2000

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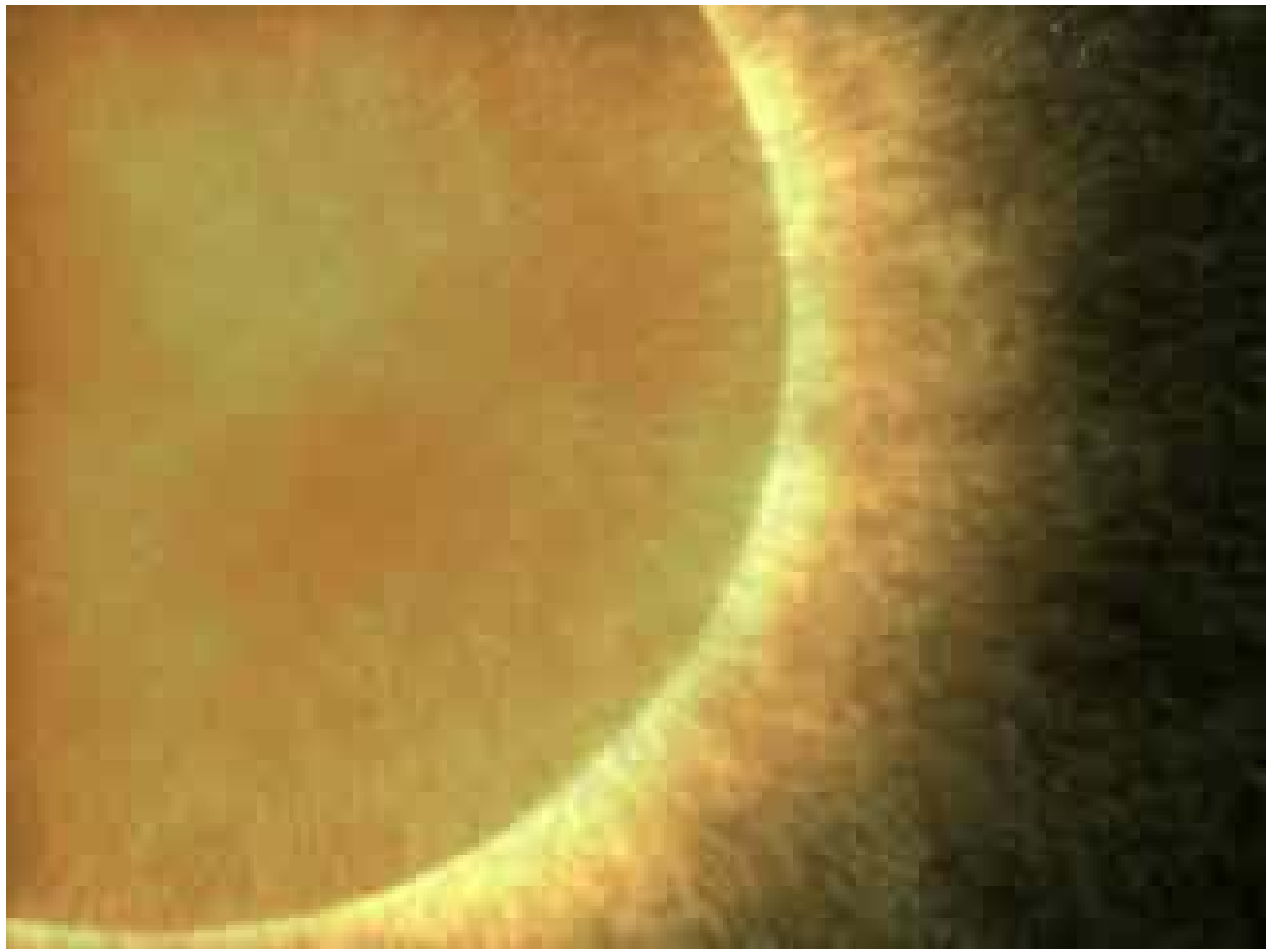
Solar-Terrestrial interaction



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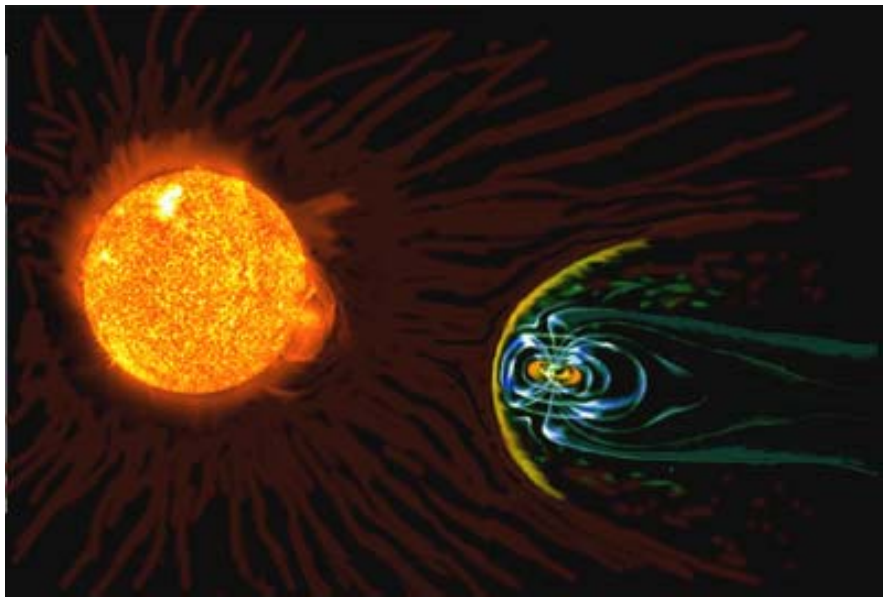

The Terella Experiment

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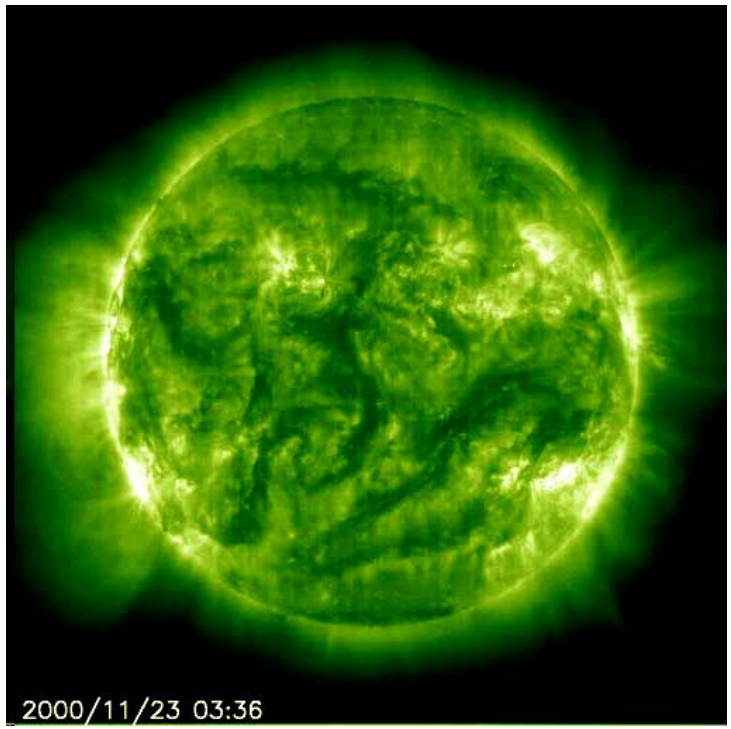
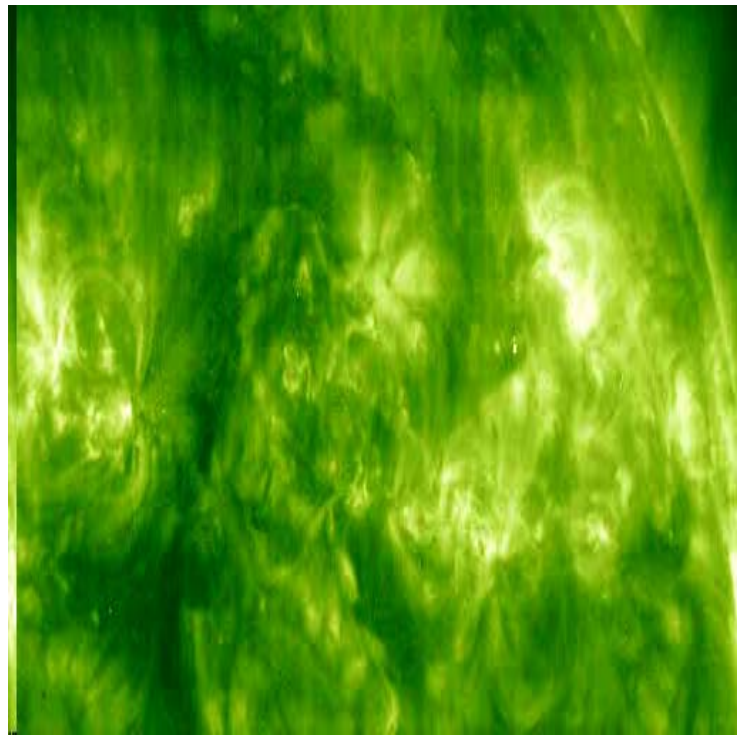
The Sun- ”A boiling soup of plasma”





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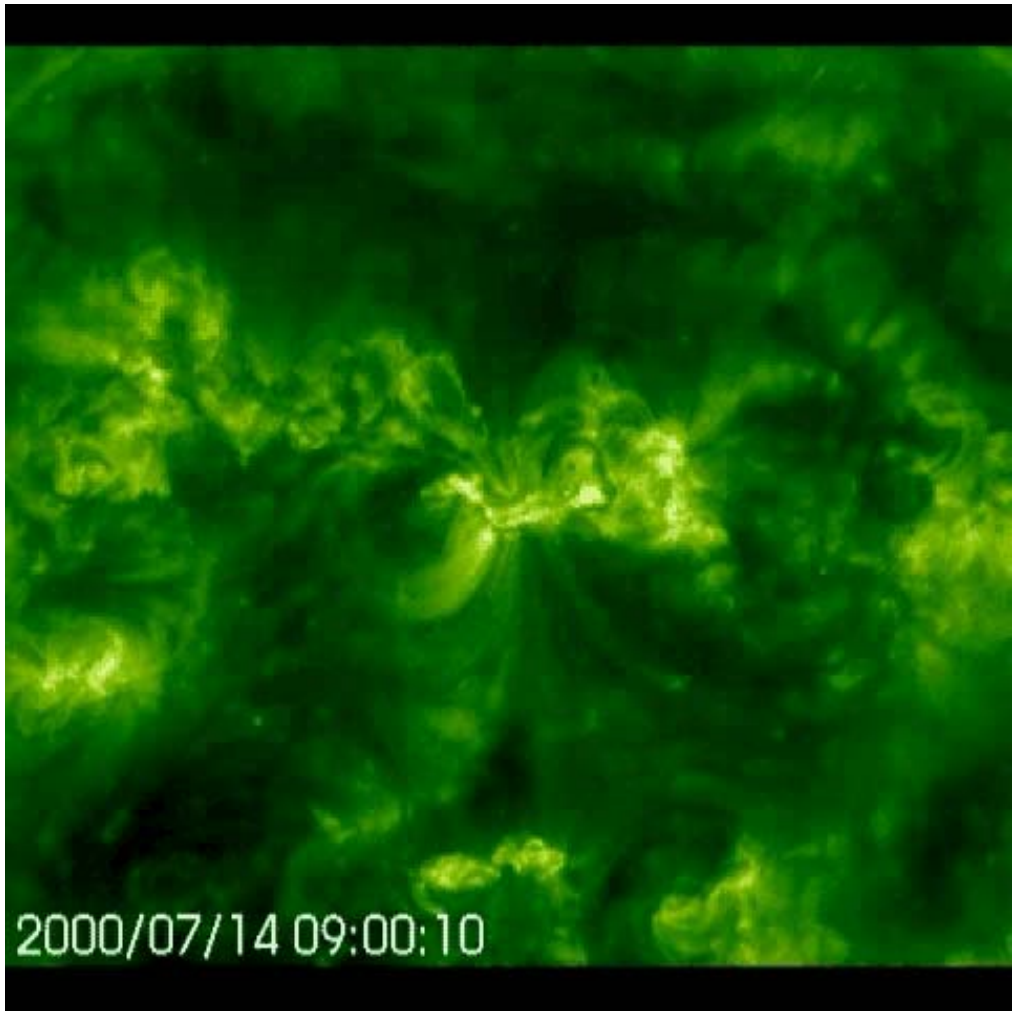
CME



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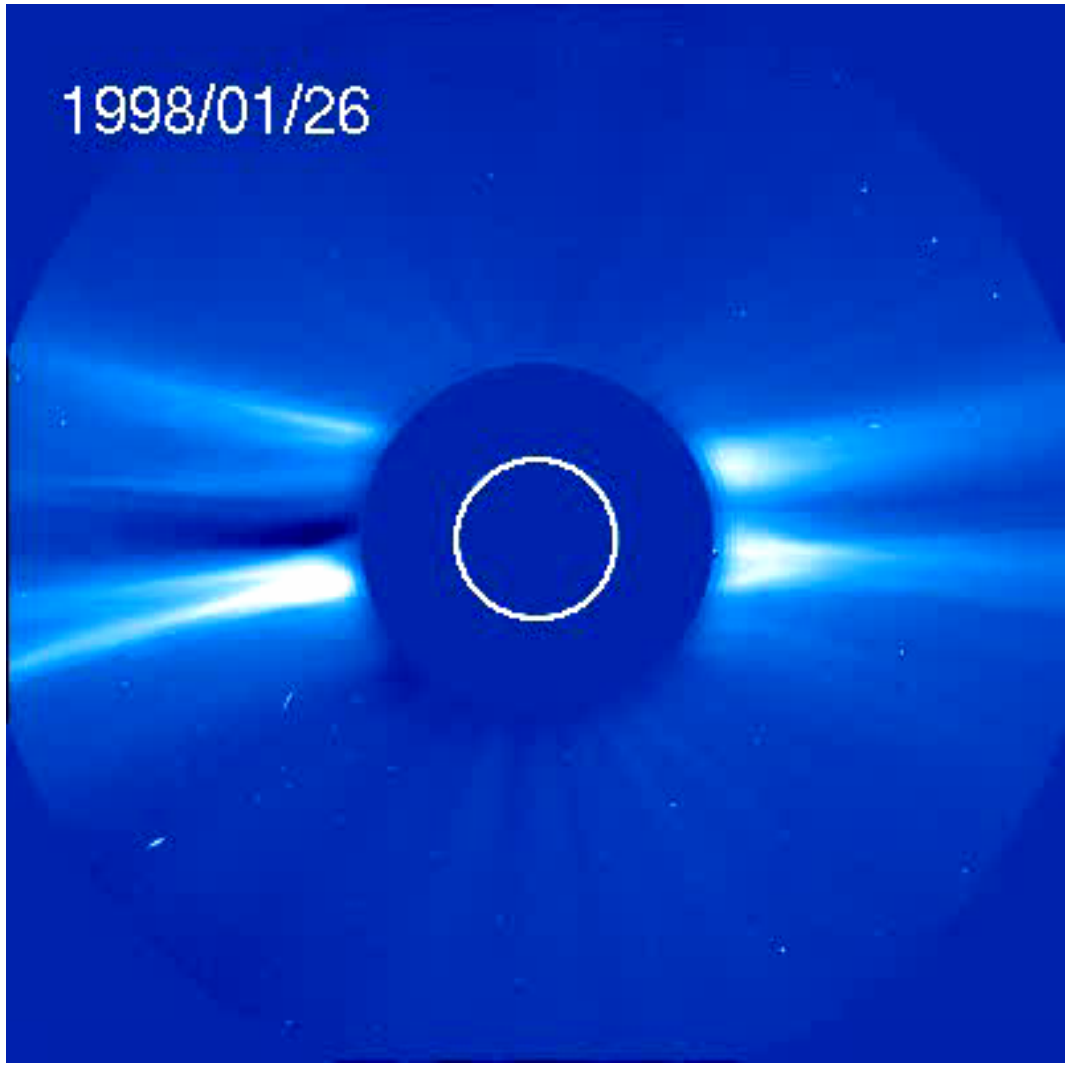
The solar wind



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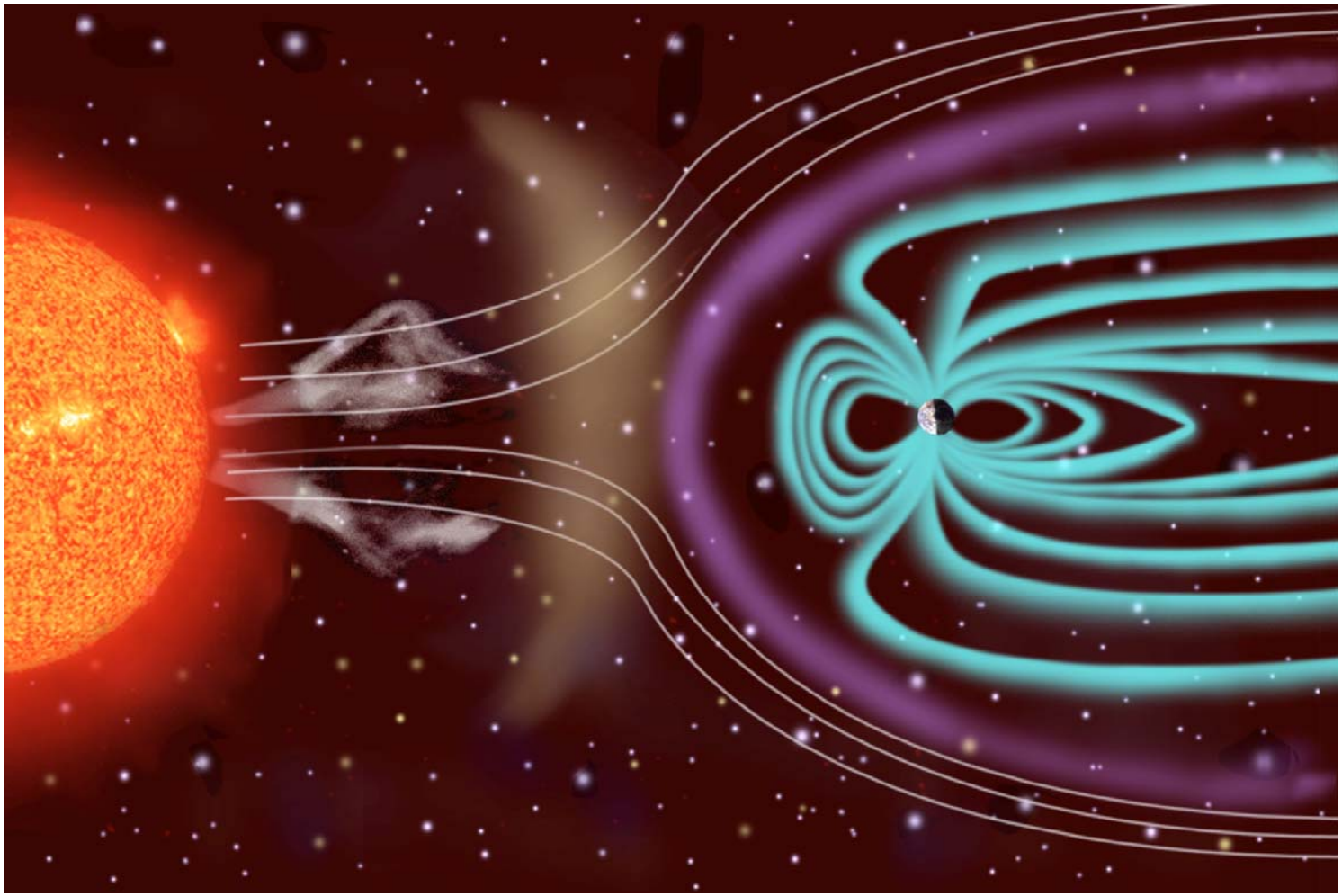
Aurora – a visualisation of solar terrestrial coupling



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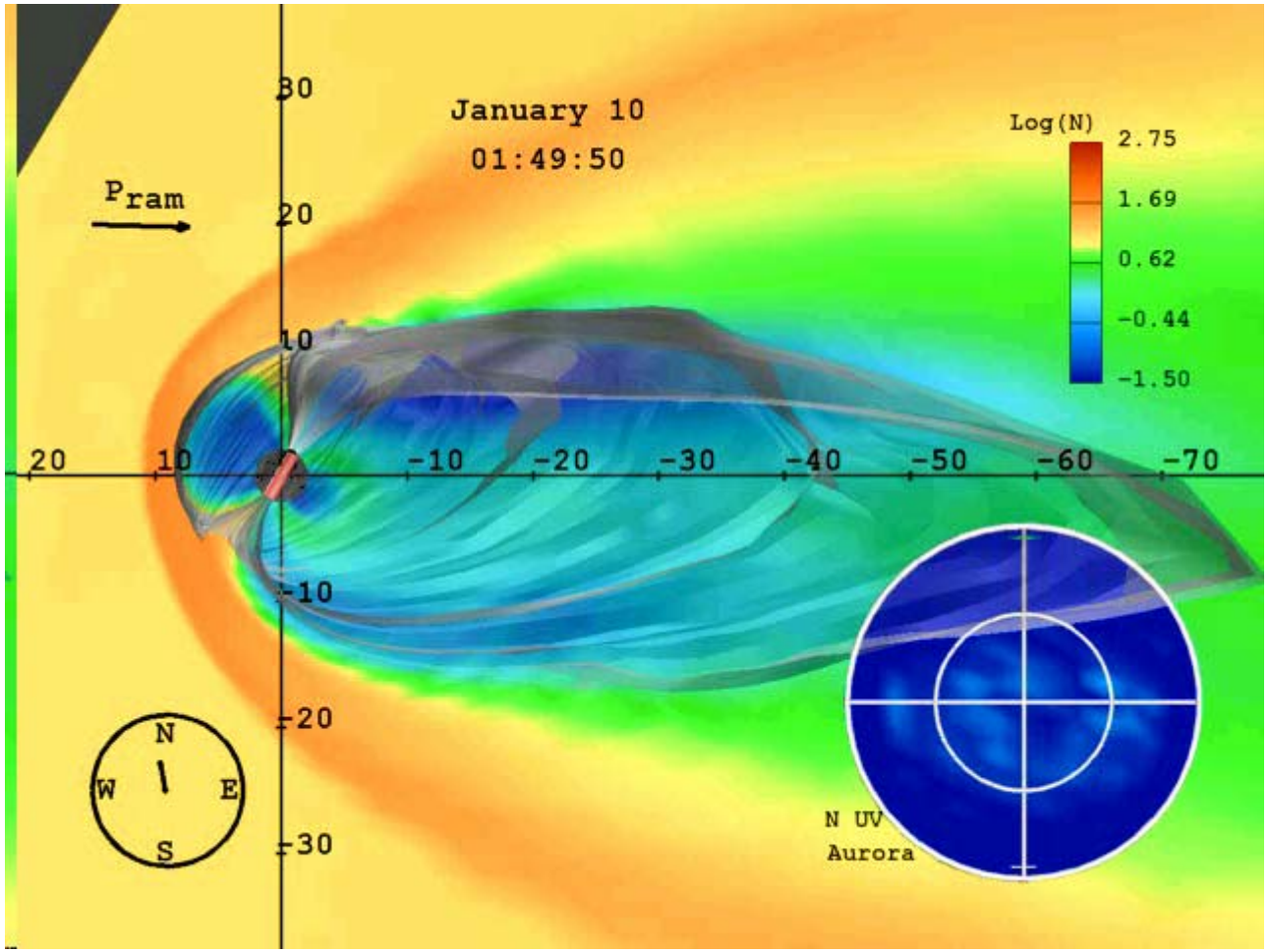
Solar wind interaction with the Earth's magnetic field



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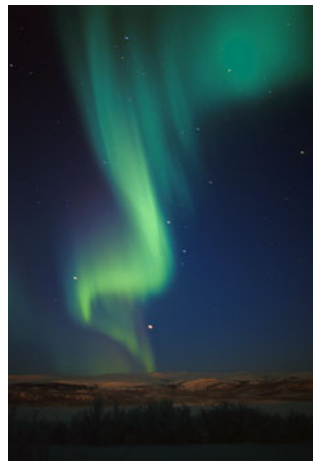
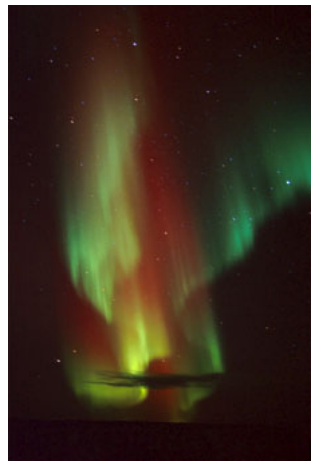
NORDLYS

Nordlys sett fra romferga Challenger





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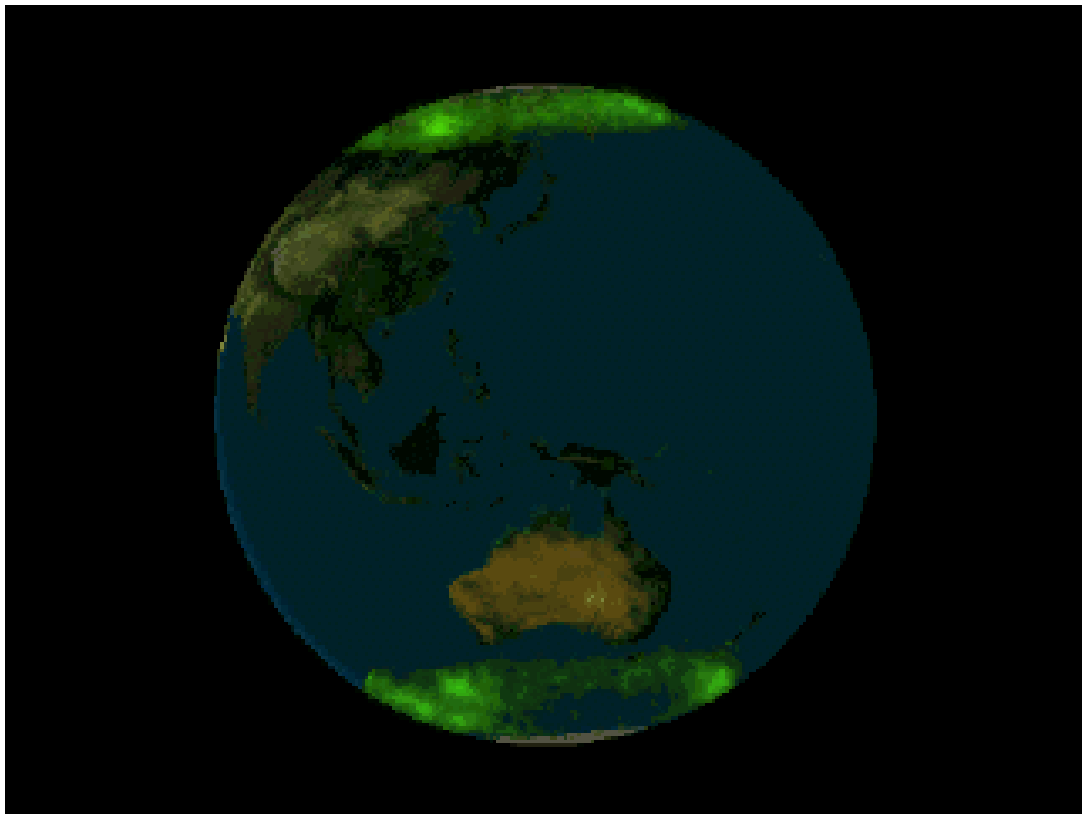
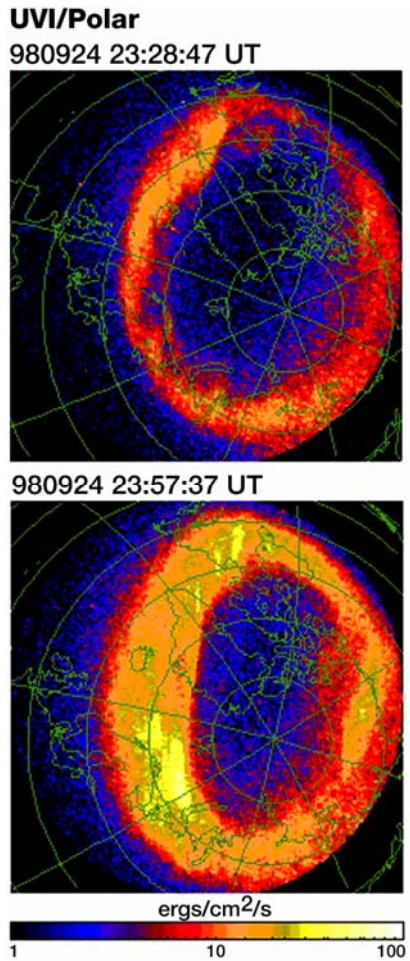
Aurora Borealis – Aurora Australis





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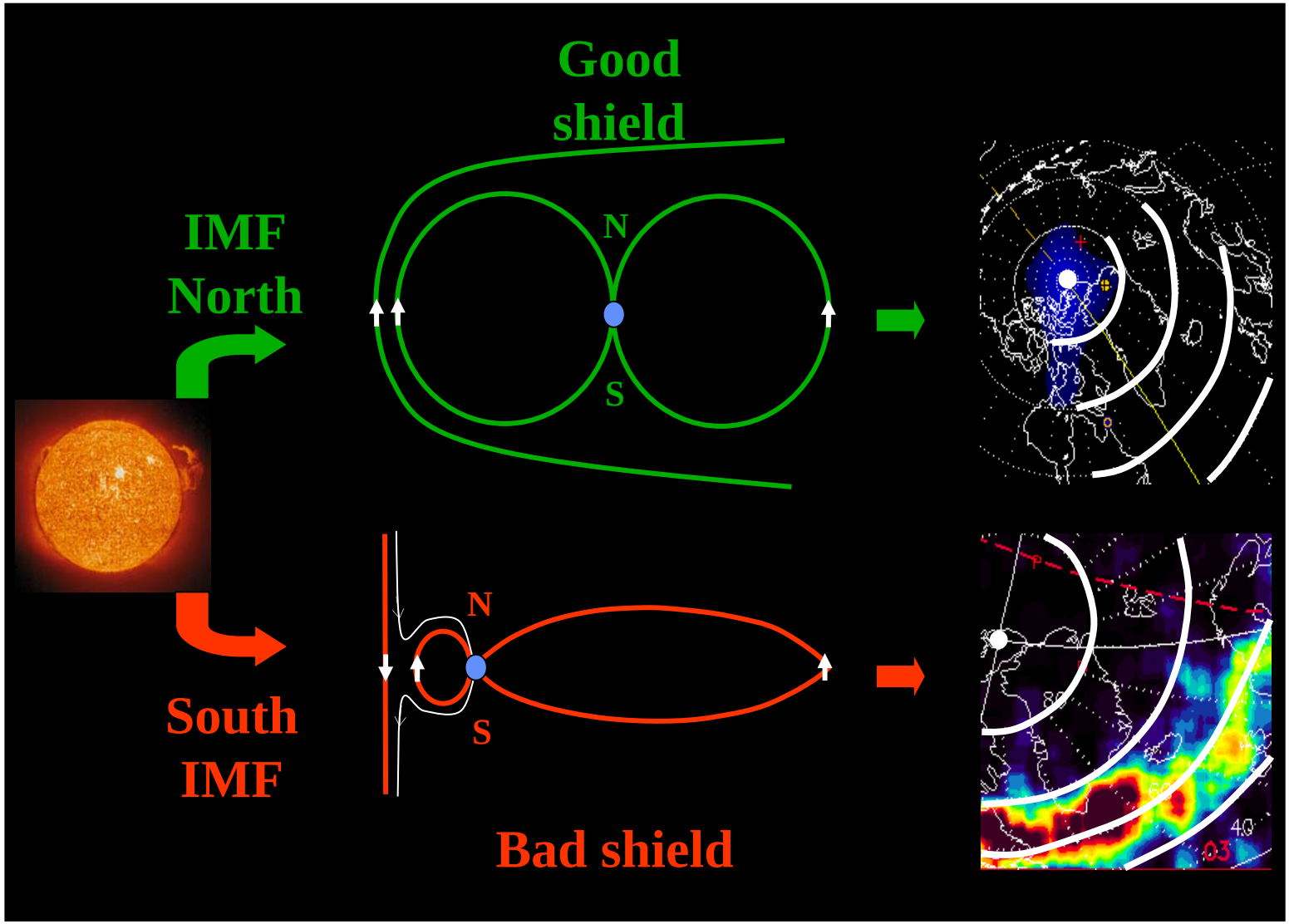

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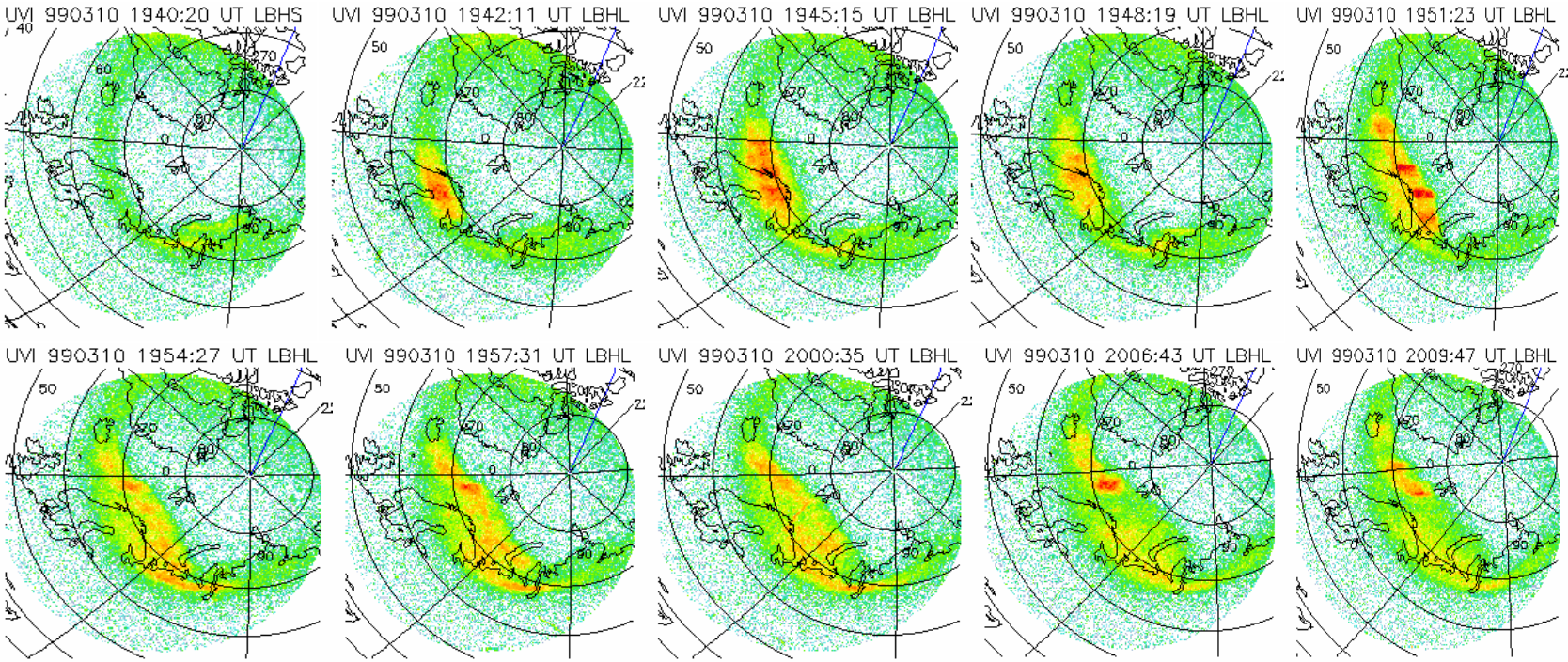
Dynamics of thesubstorm expansion phase



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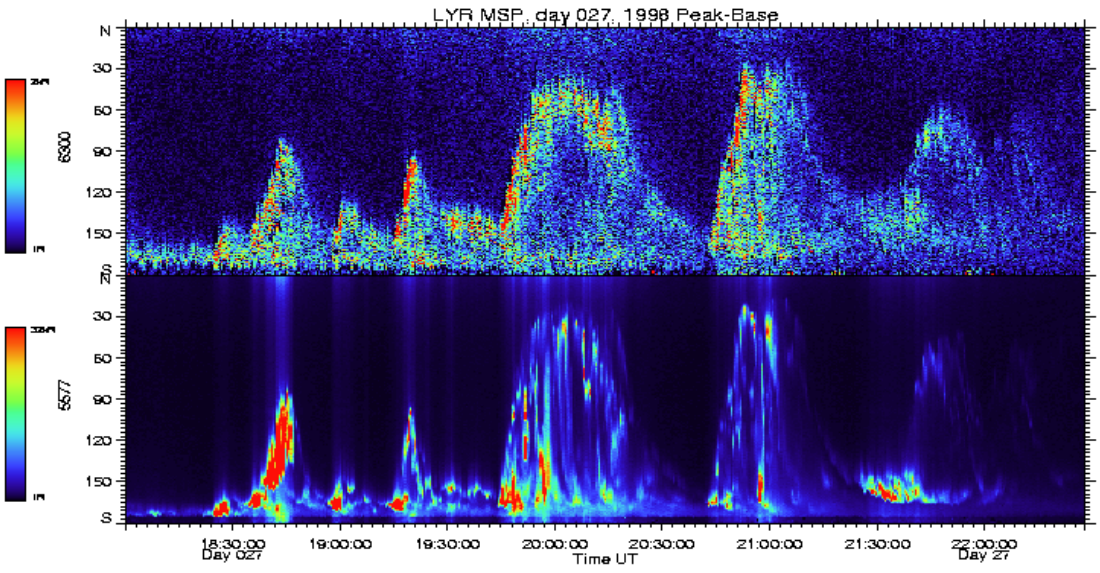
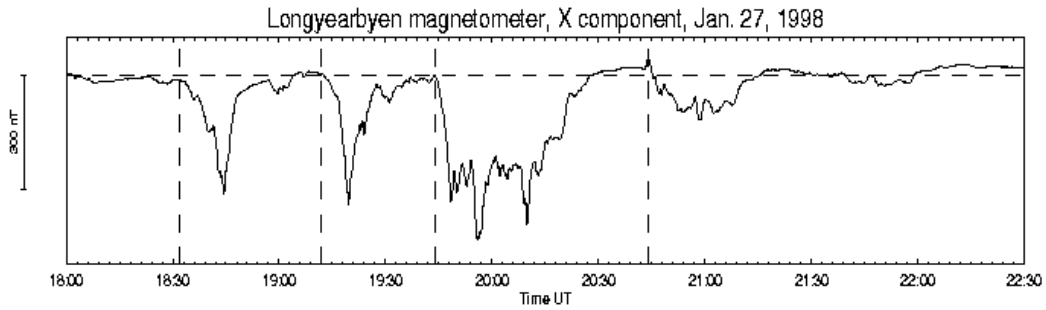
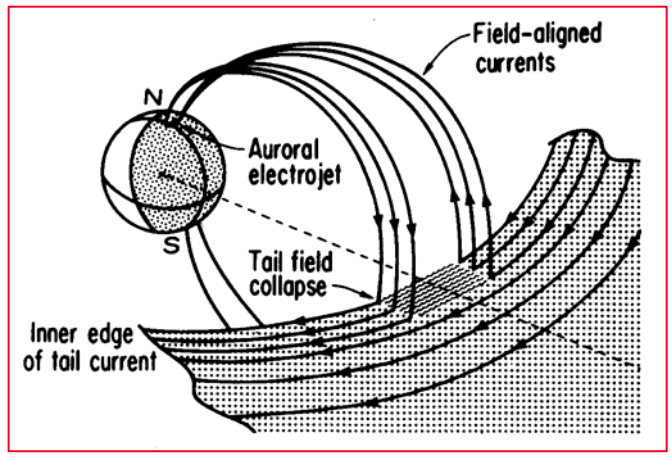
Auroral and Magnetic Signatures associated with substorm onset







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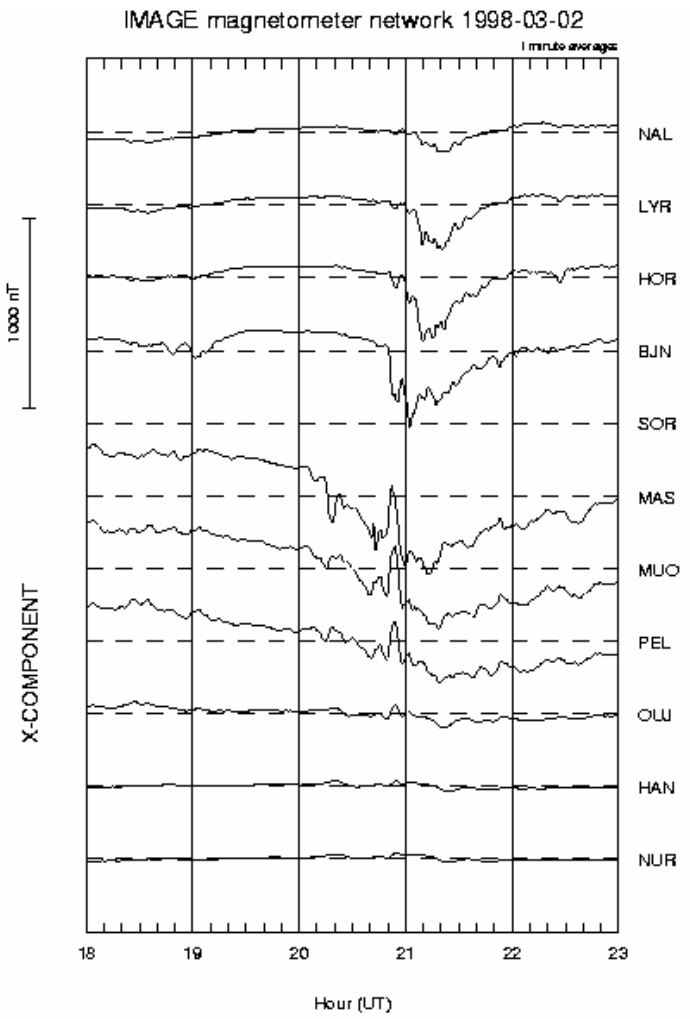
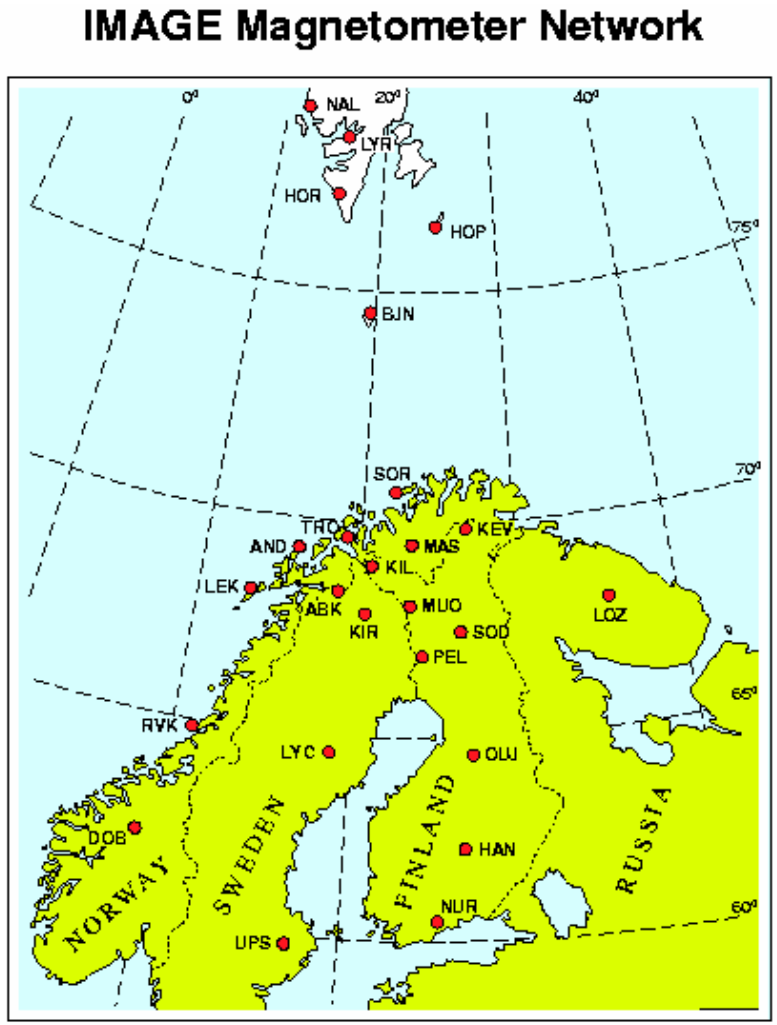
Magnetometers





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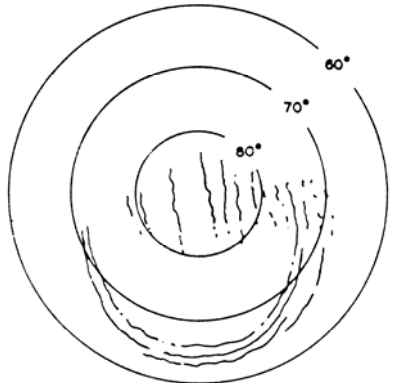
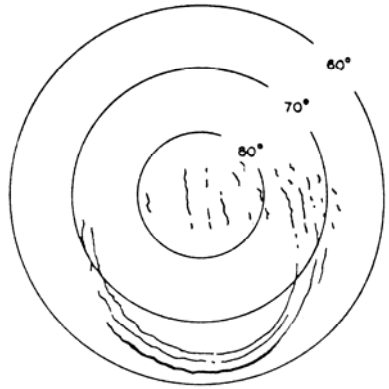
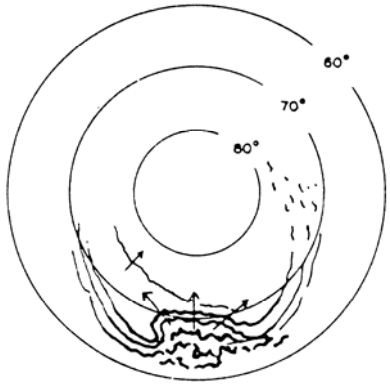
Subtorm phases



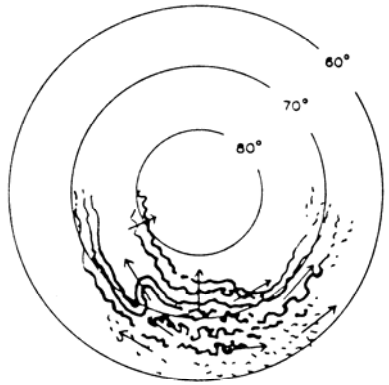
T=0



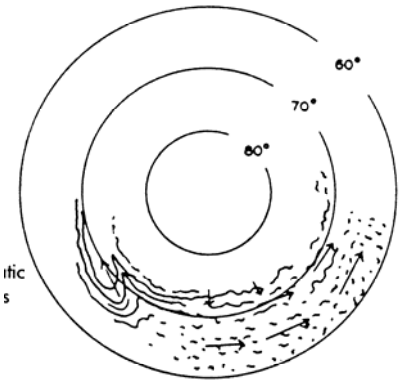
T=0-5 min



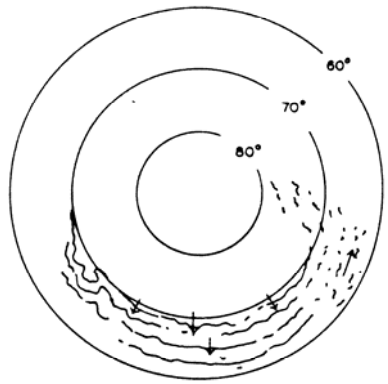
T=5-10 min



T=10-30 min



T=30-60 min



T=1-2 hours

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Colors in the aurora

630.0 nm – red upper border

Atomic oxygen: ^1D-^1S transition

557.7 nm – green

Atomic oxygen : ^1D - ^3P transition

427.8 nm – magenta bottom border

N_2^+ - 1st negative band