EISCAT
Radar remote sensing of Geospace

Craig J. Heinselman

EISCAT Scientific Association

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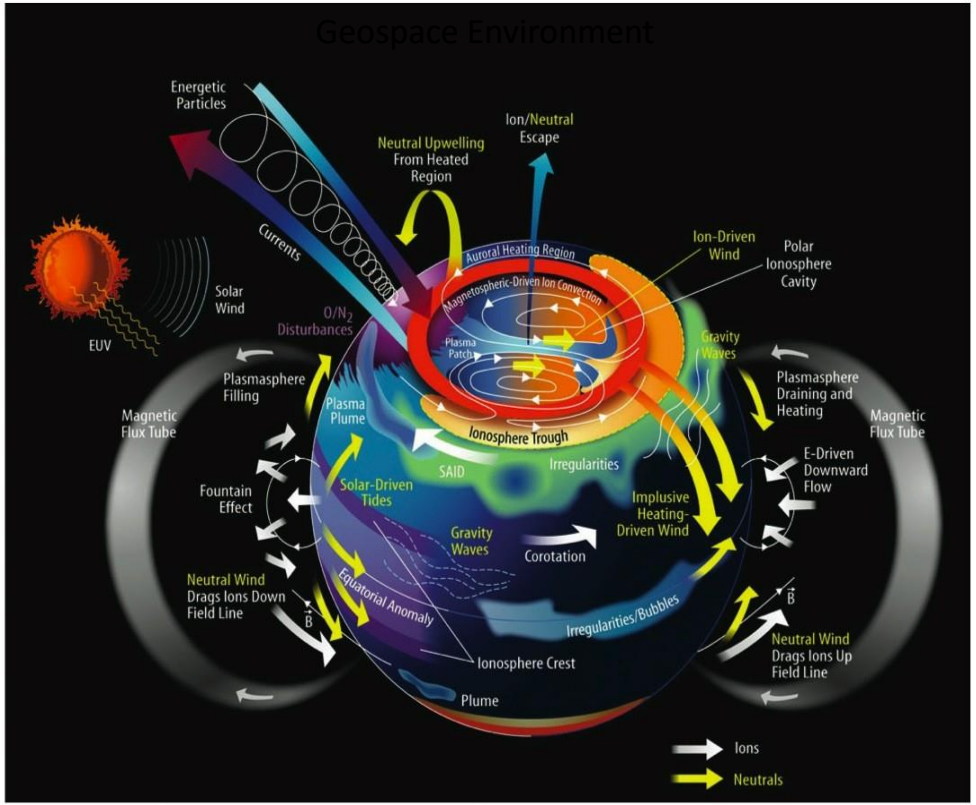
- European Incoherent SCATter
- Associates: China, Finland, Japan, Norway, Sweden, U.K.
- Affiliates: France, S. Korea, Ukraine
- Founded in 1975, first operations 1981, first Svalbard operations 1996
- "The aim of the Association is to provide access to radar, and other, high-latitude facilities of the highest technical standard for non-military scientific purposes".
- Locations: Tromsø (NO), Sodankylä (FI), Kiruna (SE), Longyearbyen (Svalbard).
- Headquarters in Kiruna, Sweden



Credit: J. Grebowsky NASA/GSFC

Incoherent Scatter Radars

Clustering of instrumentation

- Optical
- Radio wave

EISCAT Mainland

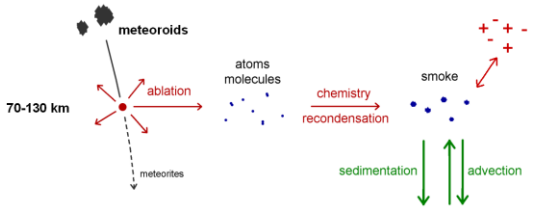
EISCAT Svalbard Radar

EISCAT, Svalbard 1996, 1999

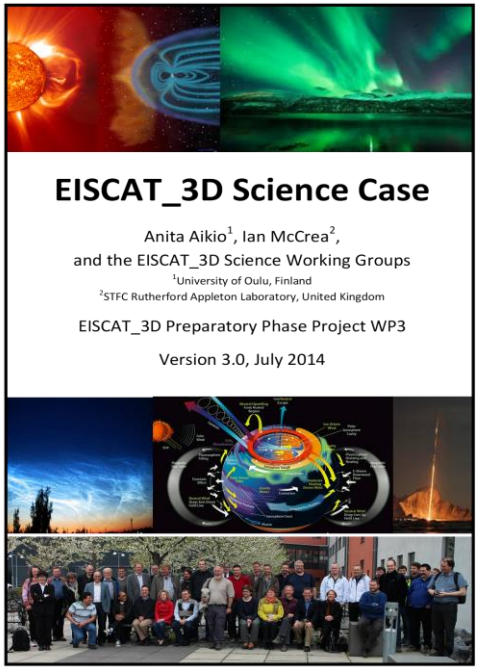
Diverse Science Topics

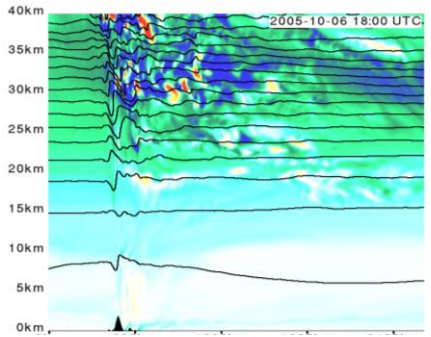
St. Patrick's Day Storm

- Extremely versatile and largely software-defined instruments
- Specific science plans are developed within national user communities
- Easy expansion to new fields
- Easy inclusion of new nations



Schematic of the fate of meteoric material in the mesosphere (adapted from Gumbel et al. 2005).





Model of a mountain wave breaking in the stratosphere. The contours show the flow of air (from left to right) across the mountains and the color scale shows potential vorticity. E3D will be the only radar in the world able to study vorticity structures in the lee of a major mountain chain.

Kinds of measurements - Auroral Structure

Power profile: 0.44 sec, 0.9 km range

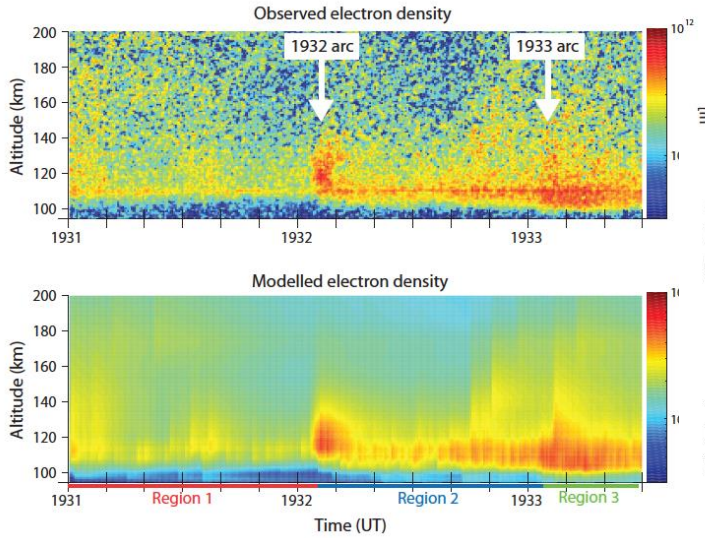


Fig. 7. Top: E-region enhancements in electron density co sponding to auroral arcs drifting over EISCAT. Bottom: mode electron density.

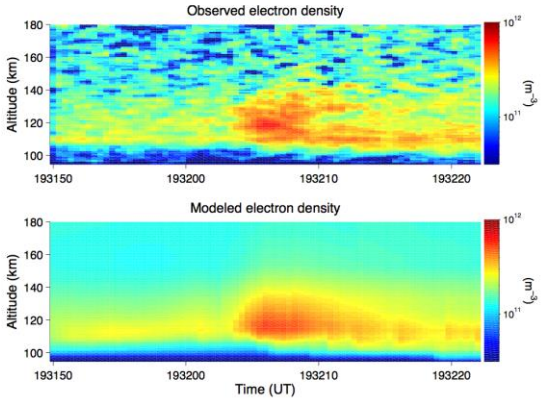
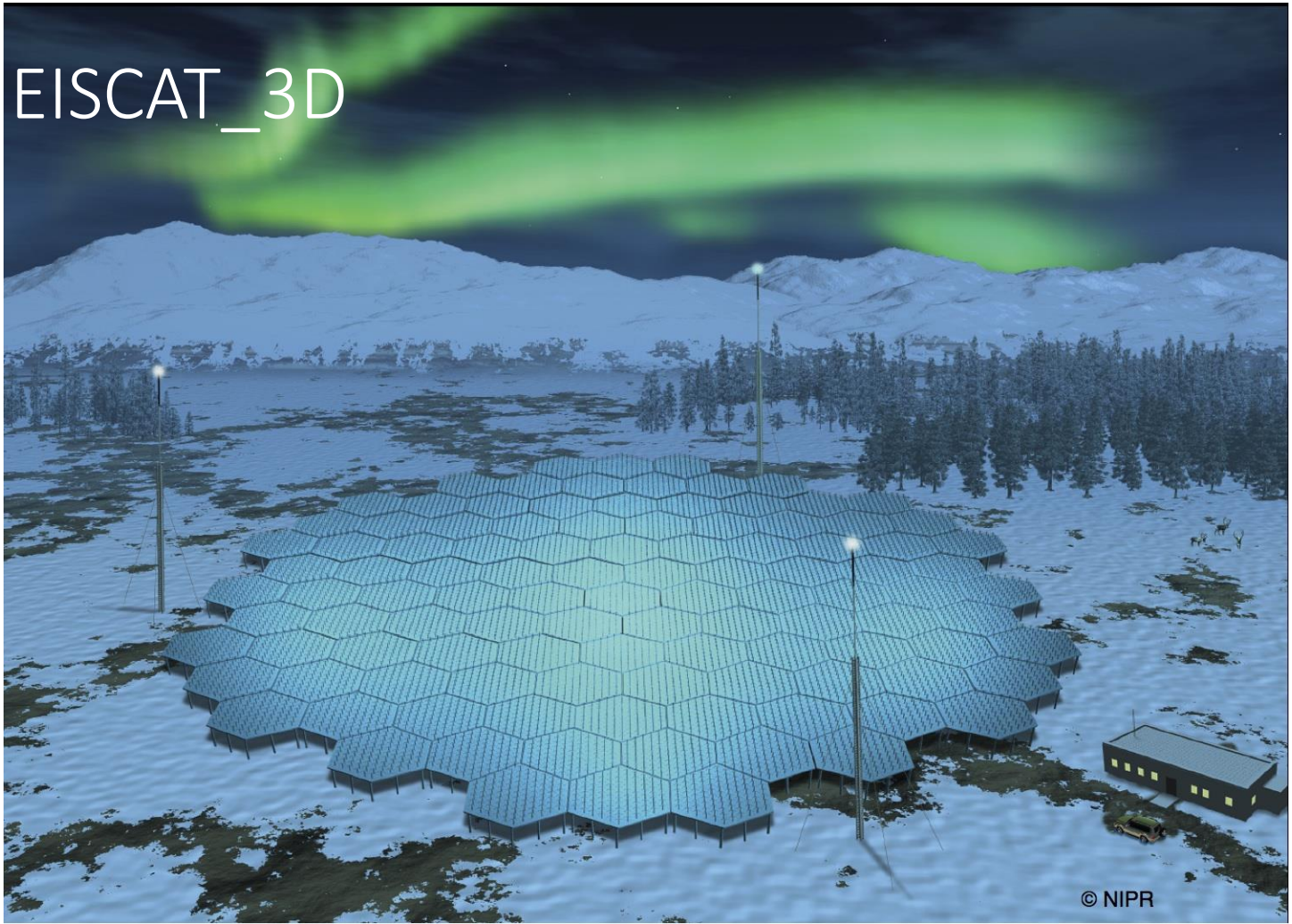


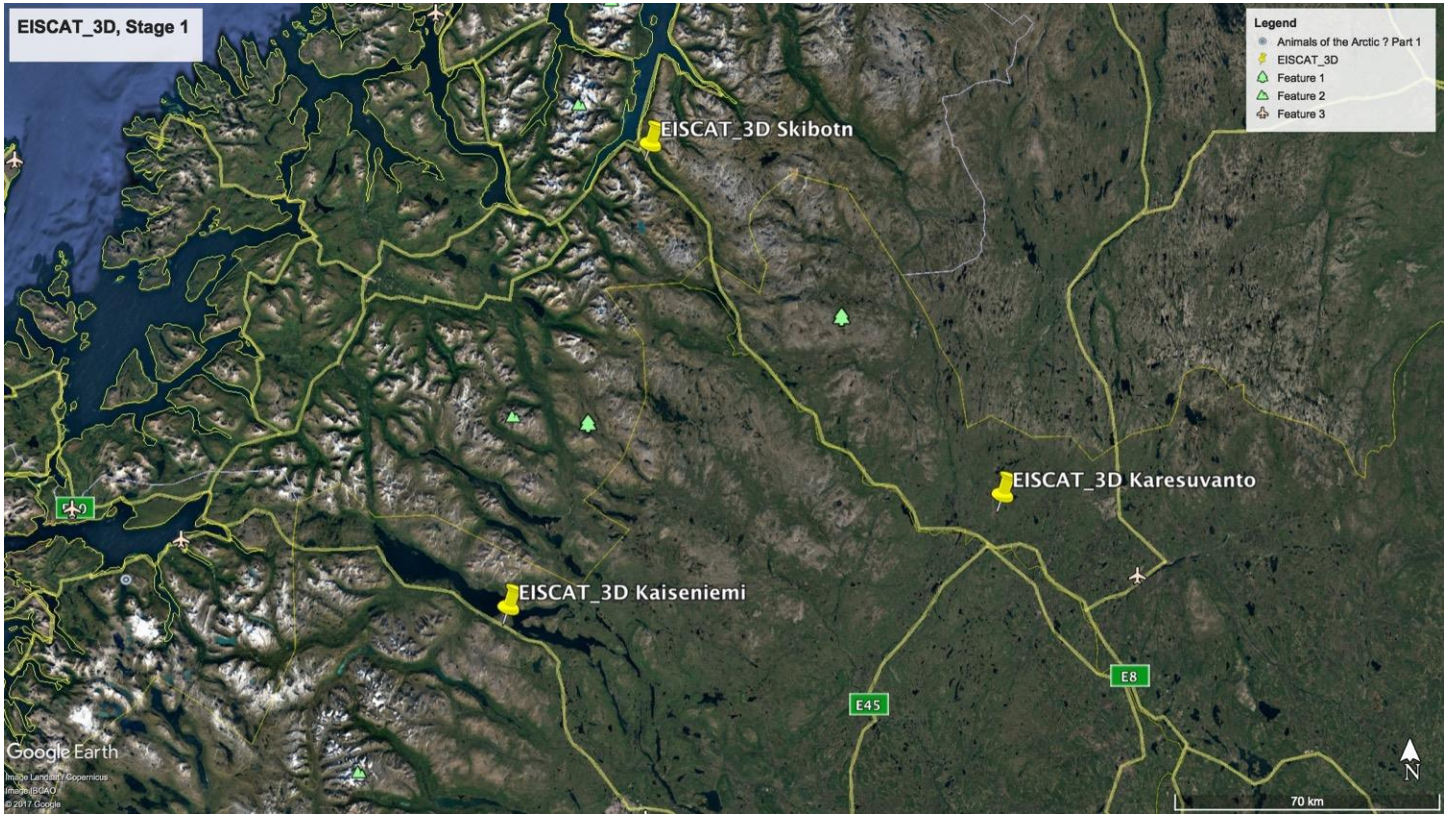
Fig. 12. Top: electron density profiles from EISCAT measurements, for the 1932 arc. Bottom: corresponding modelled electron density. The bite-out in the data at 19:32:10 UT is not reproduced by the model, and is believed to be caused by horizontal convection of plasma near the arc.

Dahlgren et al., 2011

EISCAT_3D

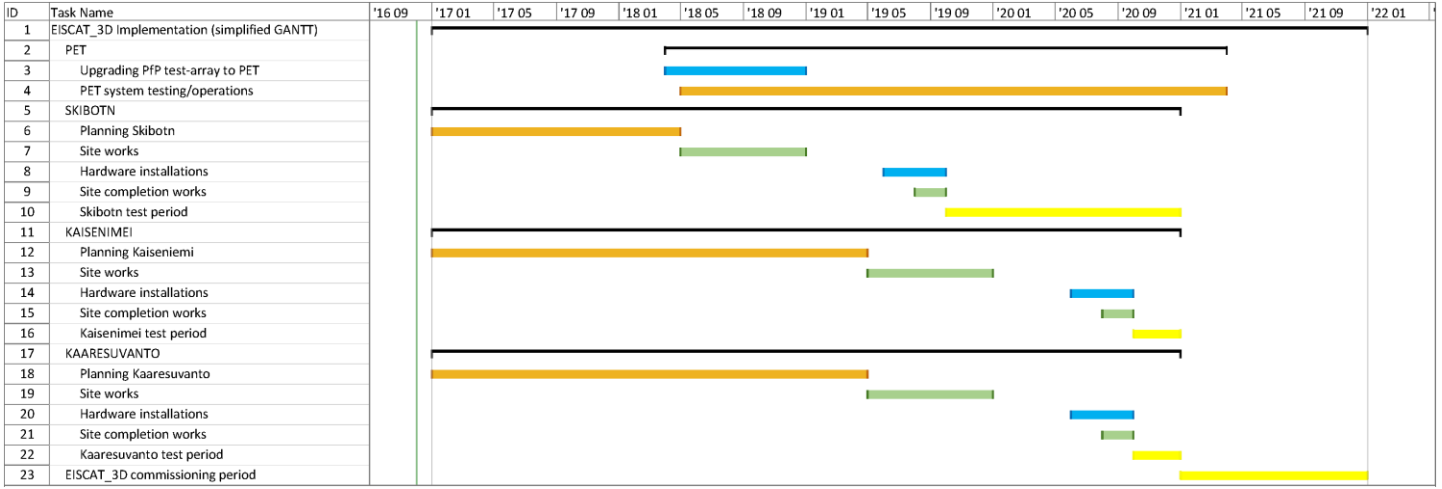


Stage 1 Locations



EISCAT_3D Grid

EISCAT_3D - Stage 1 Schedule



ID	Task Name
1	EISCAT_3D Implementation (simplified GANTT)
2	PET
3	Upgrading PfP test-array to PET
4	PET system testing/operations
5	SKIBOTN
6	Planning Skibotn
7	Site works
8	Hardware installations
9	Site completion works
10	Skibotn test period
11	KAISENIMEI
12	Planning Kaiseniemi
13	Site works
14	Hardware installations
15	Site completion works
16	Kaisenimei test period
17	KAARESUVANTO
18	Planning Kaaresuvanto
19	Site works
20	Hardware installations
21	Site completion works
22	Kaaresuvanto test period
23	EISCAT_3D commissioning period

- Site preparation in Skibotn summer/autumn 2018
- Site building installation Skibotn spring/summer 2019
- Site preparation Karesuvanto and Kaiseniemi summer 2019
- Antenna installation Skibotn late summer 2019
- Antenna installation Karesuvanto and Kaiseniemi summer 2020
- Installation completion and commissioning 2021
- Open for operations 2022