Sondrestrom Facility

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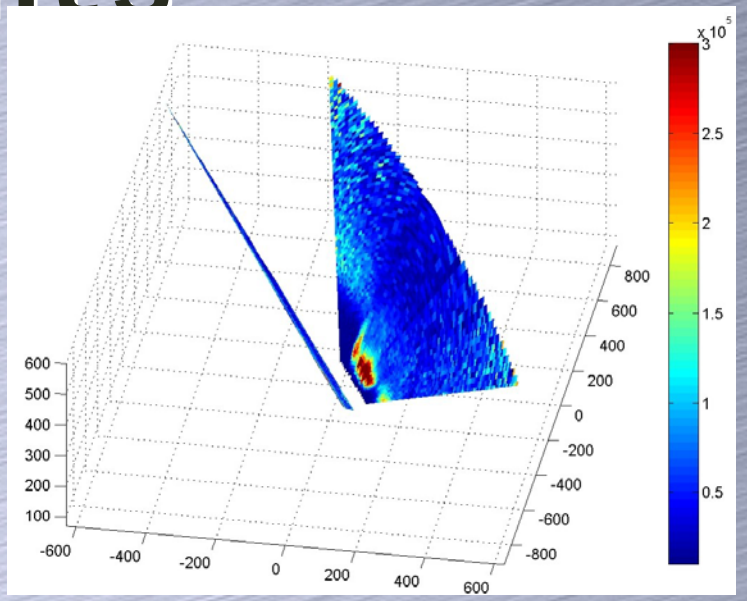
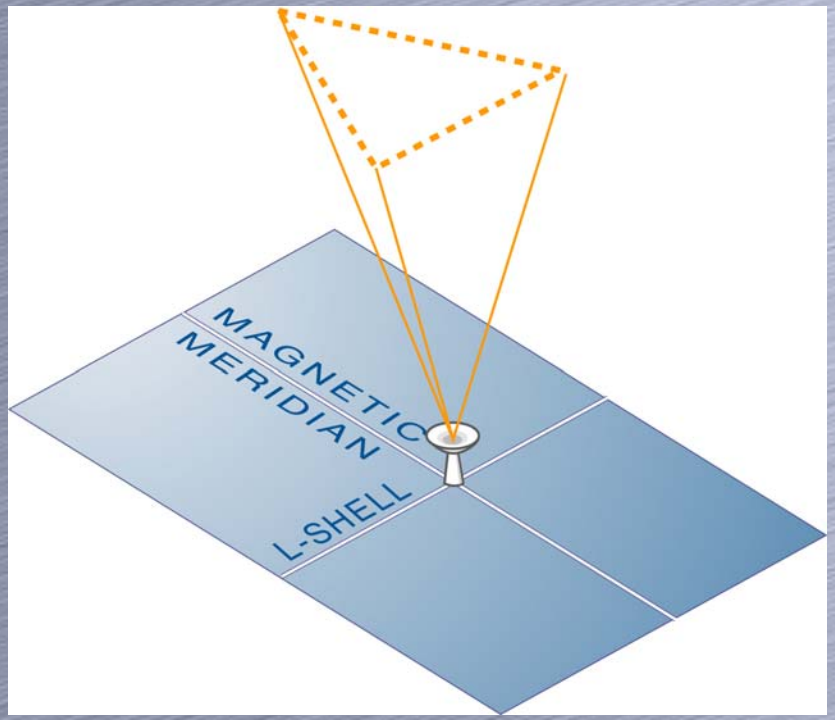
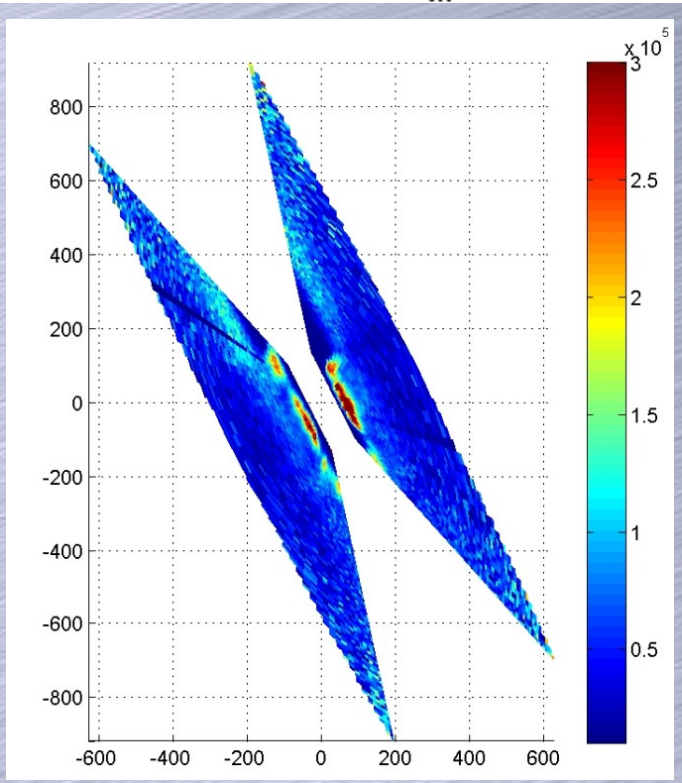
SRI International

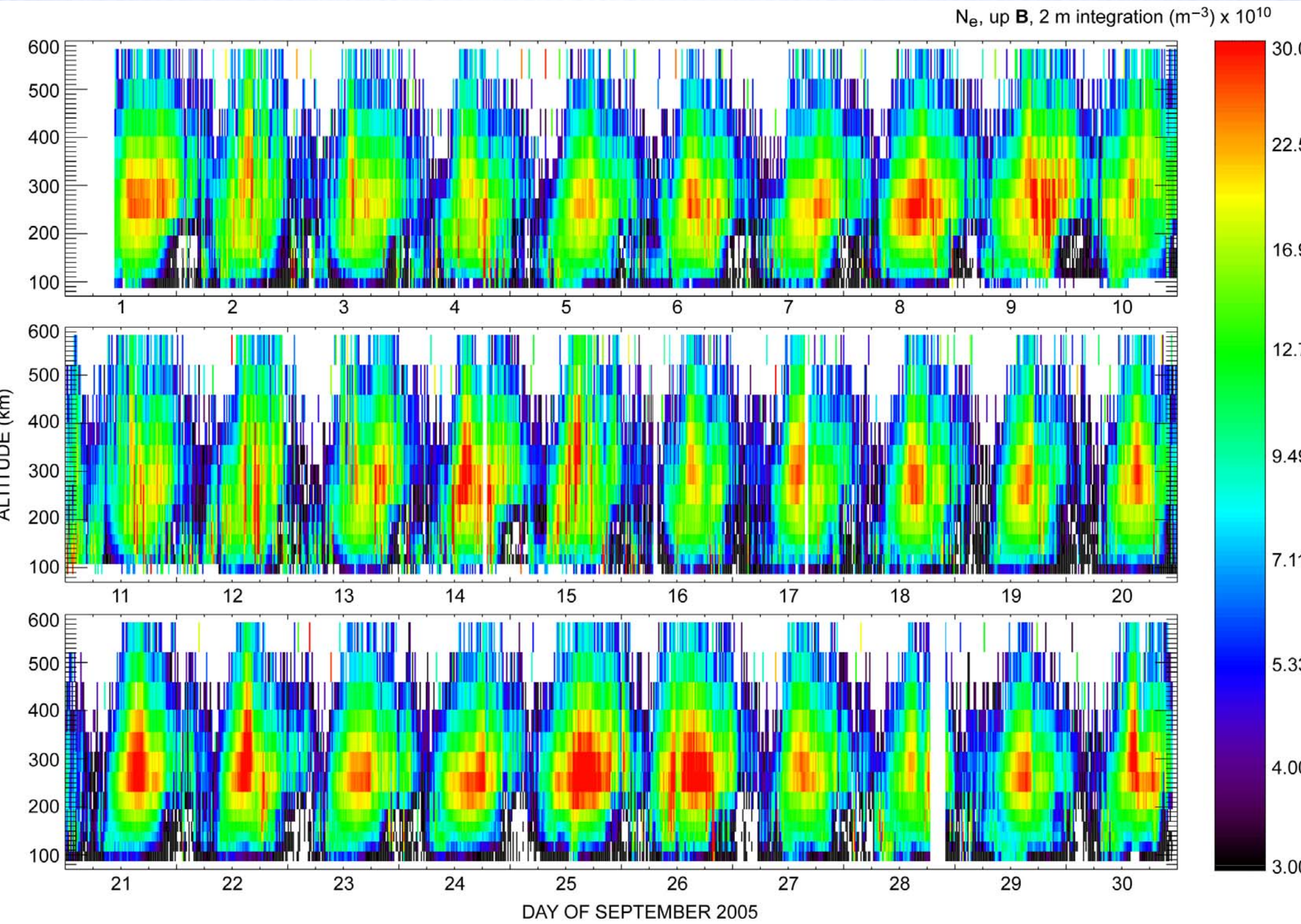
Sondrestrom Long-duration Experiments

- E- and F-region coverage (~3-6 km and ~50 km range resolution)
- Local measurements of electrodynamics and plasma parameters
- Latitudinal coverage of electrodynamics and plasma parameters
- Nearly continuous data for September 2005 and March/April 2006.



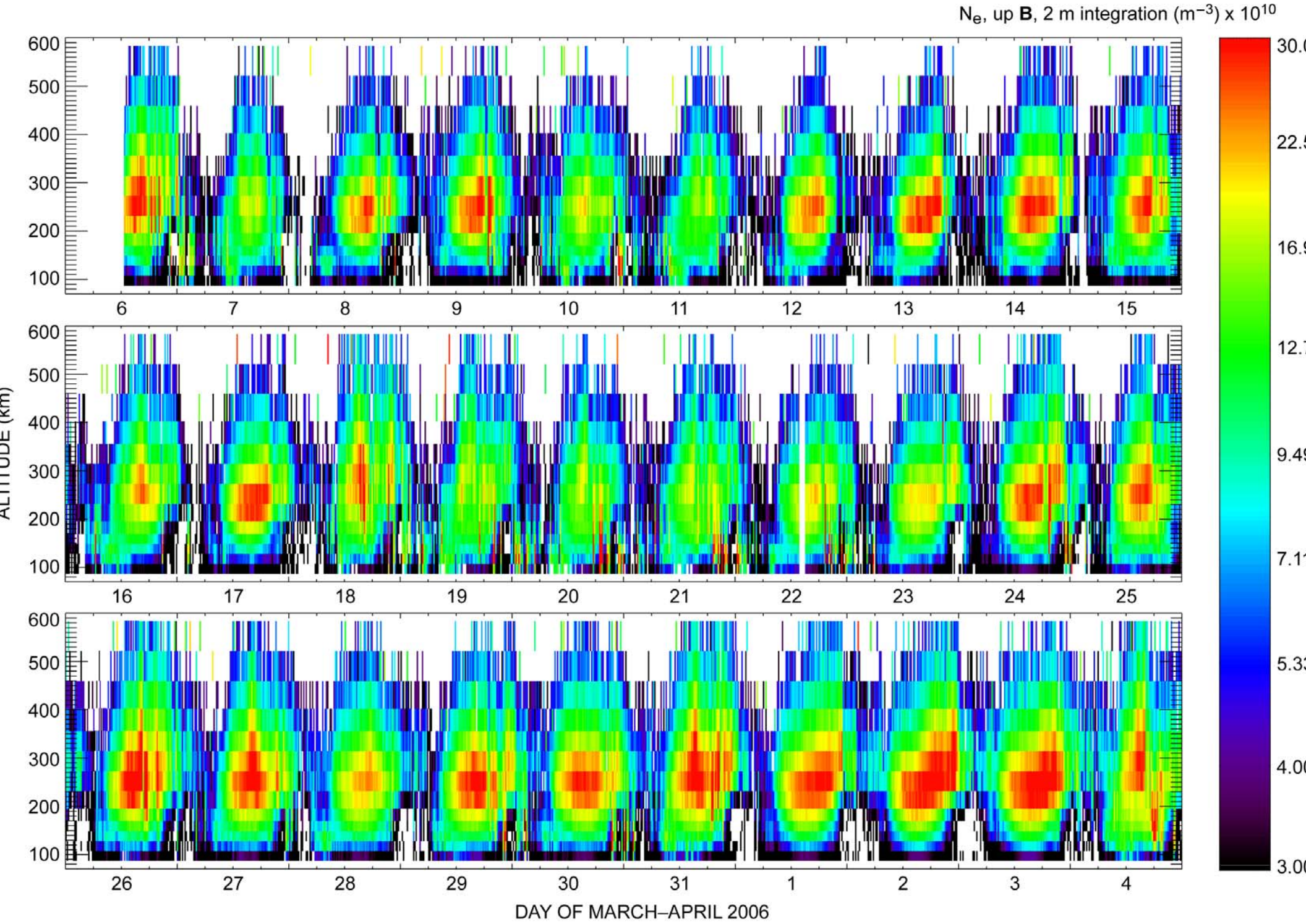






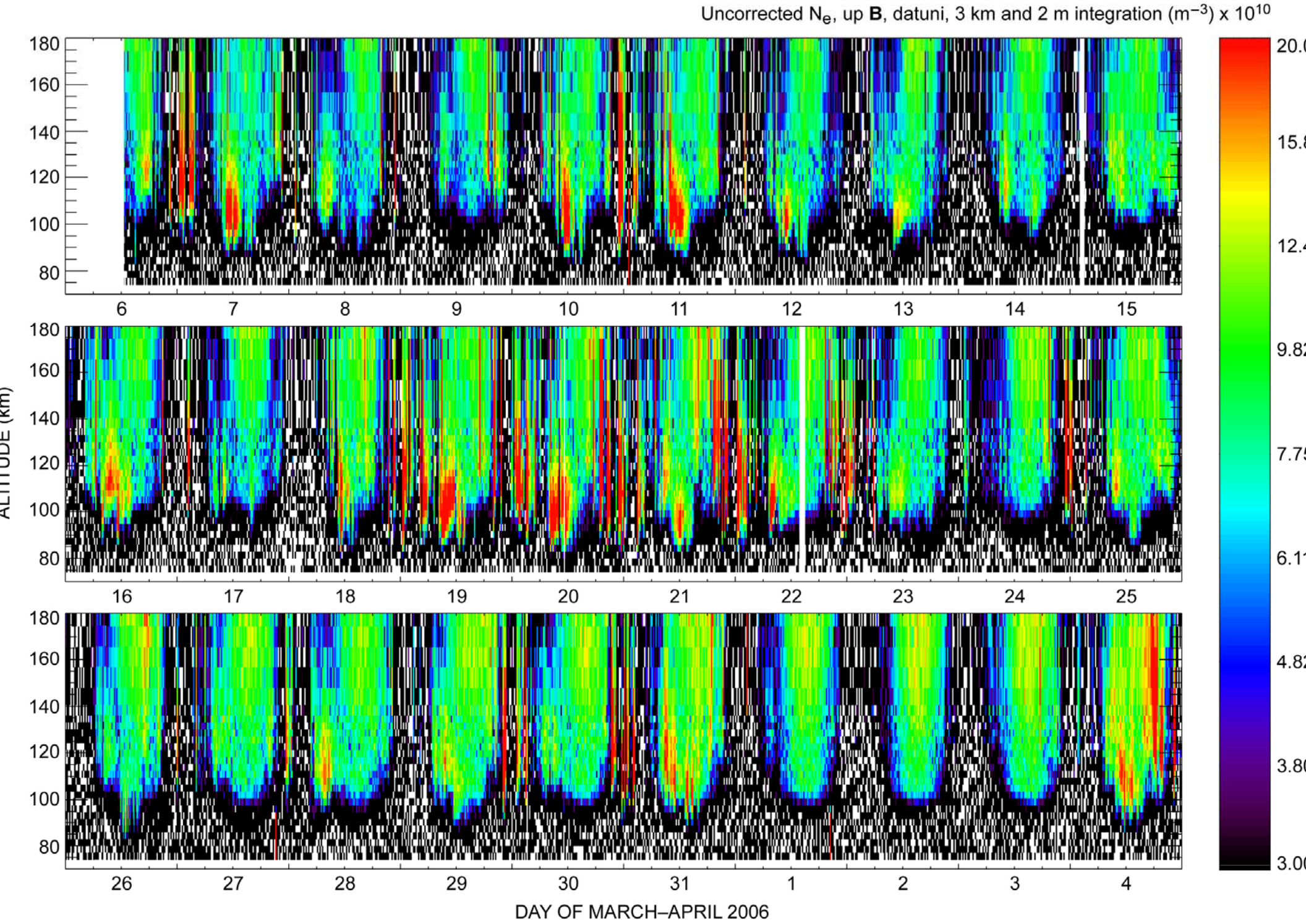
Relative error ≤ 30.0%

v06-016-1



Relative error ≤ 30.0%

v06-016-8



No error check

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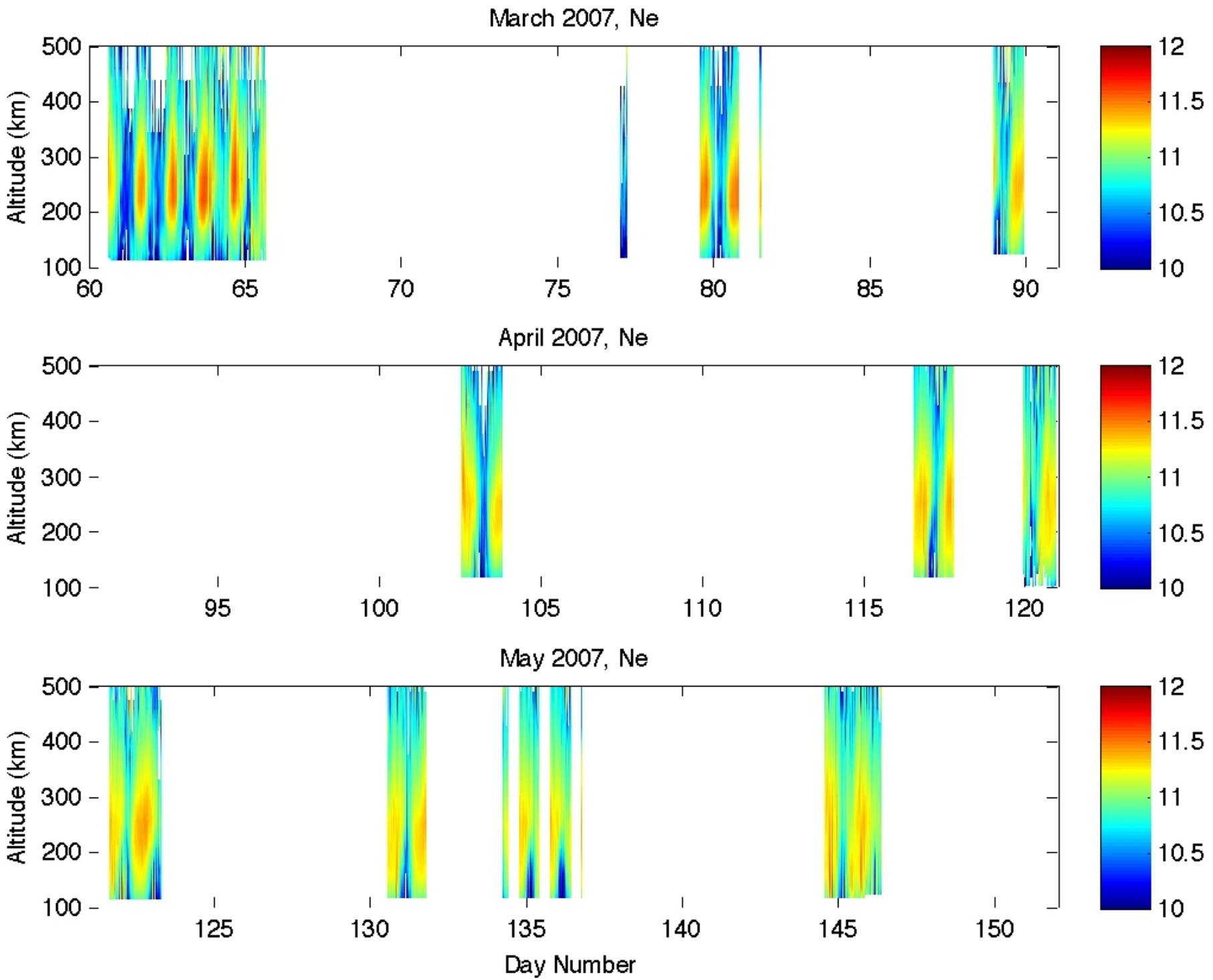
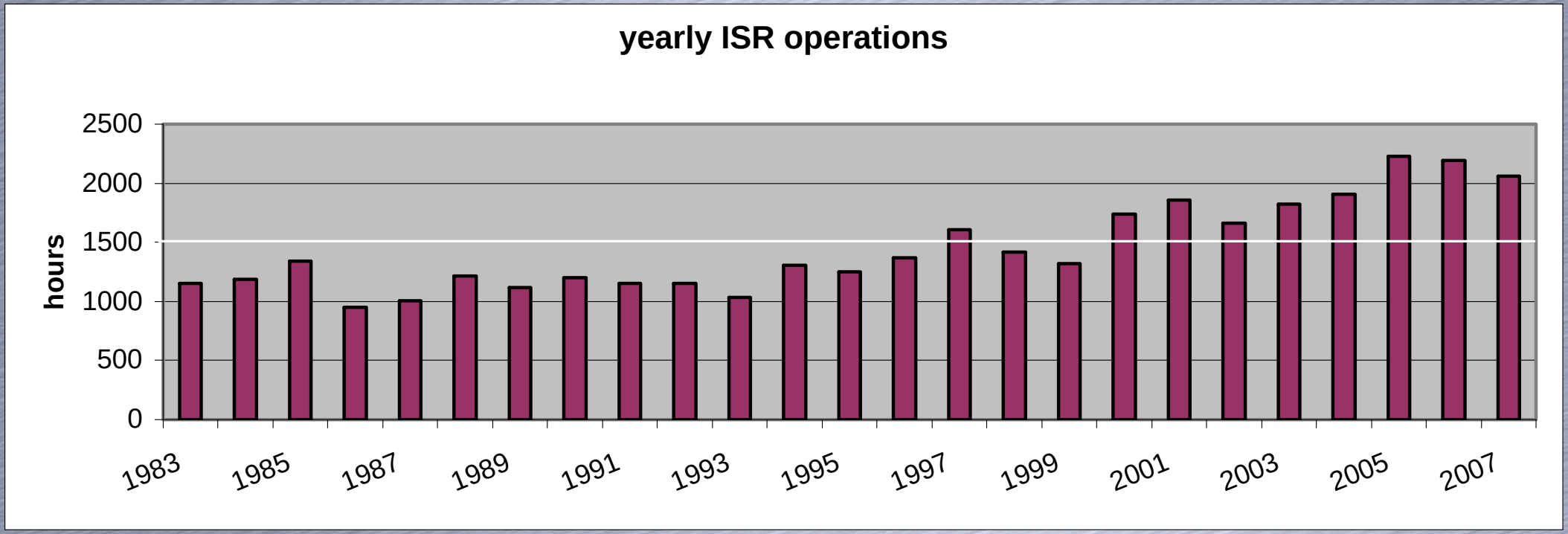

March 2007, Ne
Altitude (km)
500
400
300
200
100
60
65
70
75
80
85
90
12
11.5
11
10.5
10
April 2007, Ne
Altitude (km)
500
400
300
200
100
95
100
105
110
115
120
12
11.5
11
10.5
10
May 2007, Ne
Altitude (km)
500
400
300
200
100
125
130
135
140
145
150
Day Number
12
11.5
11
10.5
10

Coordinated Ops!

ISR Operations

Organization	2003	2004	2005	2006	2007	2008	Totals
World Day	535	557	1086	927	522	434	4061
IPY - Utah State University					701	413	1114
Aerospace Corporation		50	43		42		135
Air Force Research Laboratory			46			170	216
Boston College	46		42				88
Boston University			130	140	55	49	374
Coop. Inst. for Res. in Environ. Science						5	5
Cornell University			94	67			161
Danish Meteorological Institute	234	3					237
Embry-Riddle Aeronautical University	15	33	15	17	11		91
Hampton University	83	28					111
Johns Hopkins University	206	276	66	37	19	6	610
Leicester University, UK					33		33
Nagoya University, Japan				97	136	49	282
NASA	217	273	125	104			719
National Science Foundation	106	66	82		7		261
Naval Research Labs			6				6
Northwest Research Associates				24	24		48
Pennsylvania State University			26	20	2		48
Rutherford Appleton Labs, UK	12	248	139	107	119		625
SRI International	145	132	6	37		26	346
Swedish Institute of Space Physics	96						96
University of Alaska, Fairbanks	51	190	211	123			575
University of California, Los Angeles				477	337	348	1162
University of Colorado, Boulder	16		94				110
University of Michigan	59	30		13			102
University of Oulu, Finland			8				8
University of Tromsæ, Norway		18					18
Utah State University					19		19
Virginia Tech					39		39
testing	4	3	11	7	1	3	29
Totals	1825	1907	2230	2197	2067	1503	11,729

ISR Operations



Sondrestrom instruments during the last five years

Instrument	Principal Investigator(s)	Institution(s)
Absolute Gravimeter	Toni van Dam	ECGS, Luxembourg
Airglow Imager	Gary Swenson	U. of Illinois Urbana-Champaign
All-Sky Imager	Elizabeth Kendall	SRI International
All-Sky Imager	Gary Swenson	U. of Illinois Urbana-Champaign
Auroral Photometer	James Hecht	Aerospace Corporation
Digisonde	Bodo Reinisch & Georg Larsen	U. of Massachusetts & DMI
ELF/VLF Receivers	Tony Fraser-Smith	Stanford University
Fabry-Perot Interferometer	Rick Niciejewski	U. of Michigan
HIRISE Imaging Spectrograph	Pallamraju Duggirala	Boston University
HF Imager	James LaBelle	Dartmouth College
Imaging Riometer	Ted Rosenberg & Peter Stauning	U. of Maryland & DMI
Incoherent Scatter Radar	Craig Heinselman	SRI International
IR Lidar Channels	Jeff Thayer	U. of Colorado, Boulder
Meridian Imaging Spectrometer	Gary Swenson	U. of Illinois Urbana-Champaign
MF/HF Receiver	James LaBelle	Dartmouth College
Michelson Interferometer	Gulamabas Sivjee	Embry-Riddle Aeronautical U.
Multichannel Photometer	Gary Swenson	U. of Illinois Urbana-Champaign
Ozone Spectrometer	Paul Eriksen	Danish Meteorological Institute
Particle Sampler	Stefan Norra	University of Karlsruhe, Germany
Rayleigh Lidar	Craig Heinselman	SRI International
Resonance Lidar	Craig Heinselman & Brent Watkins	SRI International & U. of Alaska
Riometers, three frequencies	Peter Stauning	Danish Meteorological Institute
Scintillation Data Receiving System	Santimay Basu	Air Force Research Lab.
Search Coil Magnetometer	Mark Engebretson	Augsburg College
Seismograph	Søren Gregersen & Diana Arachi	Danish Seismological Survey & USGS
Simultaneous Multispectral Imager	G. Haerendel & Josh Semeter	Max Planck Institute & SRI
Solid Earth GPS	Oivind Ruud & David Stowers	NCAR & NASA
Spectrograph, CCD	Abas Sivjee	Embry-Riddle Aeronautical U.
Sun Photometer	Wayne Newcomb	NASA
Three-Axis Magnetometer	Hans Gleisner	Danish Meteorological Institute
Three-Axis Magnetometer	Peter Stauning	Danish Meteorological Institute
Tomographic GPS	Trevor Garner	U. of Texas, Austin
UV Spectrometer	Rick Niciejewski	U. of Michigan

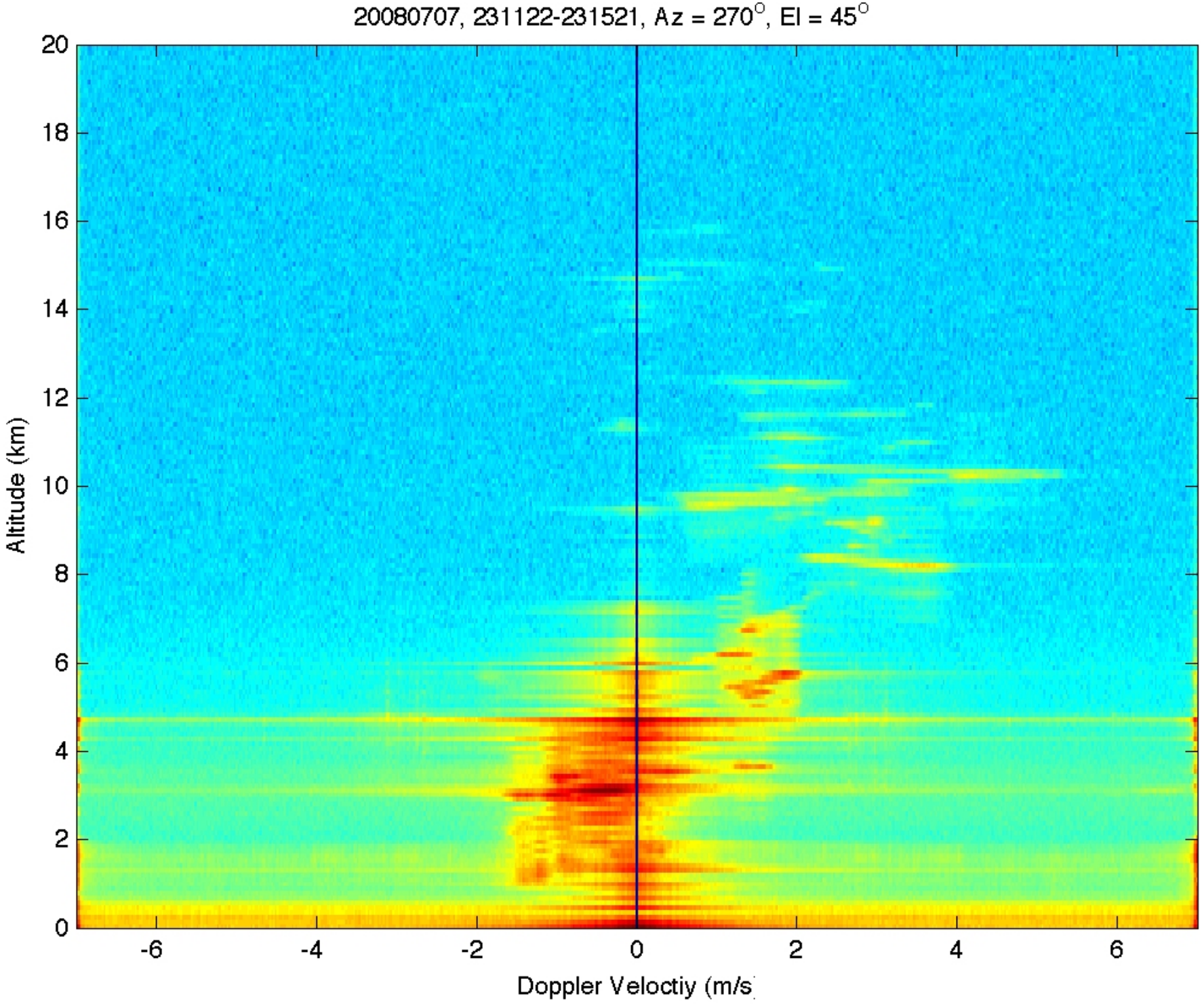
Usage of facilities

Facility	No. of Publications Using Facility or Facility Data	No. of Researchers Using the Facility or Facility Data	No. of Institutions Represented by Users	No. of Instruments Hosted at Facility	No. of Grad Students Helped	No. of Undergrads Helped	No. of Workshops Hosted	No. of Visiting Researchers Hosted
Sondrestrom (the last 5 years)	80	105 12 SRI 93 external	53	32	31	16	2	6 at SRI 84 on site
PFISR (since Jan 2007)	28	70 5 SRI 65 external	29	4 PFISR 8 others	14	7	3	5 at SRI 28 on site

Upgrades

A new solid-state klystron modulator was installed in 2003, replacing the original tube-based oil-filled modulator. This major upgrade removed the need for the HV crowbar (used to dump the system energy between pulses in cases of klystron arcing) and allows for the use of an additional class of klystron which can be produced at a significantly reduced cost.

The current Muscox system is being replaced by the RADAC system currently running on PFISR (and soon on RISR). This includes changing the first stage local oscillator to mix the first stage signal from 1290 MHz down to 450 MHz for compatiblity with the PFISR signal processing hardware. This will greatly improve the flexibility of the system, enable more channels, including simultaneous up- and down-shifted plasma line measurements, and make the Sondrestrom ISR data format identical to that of PFISR and RISR.


20080707, 231122-231521, Az = 270°, El = 45°
Altitude (km)
20
18
16
14
12
10
8
6
4
2
0
-6
-4
-2
0
2
4
6
Doppler Velocity (m/s)

Challenges

- Fuel Costs
- Exchange Rate
- Site Staffing (changes in Greenland requirements)
- Long term transmitter/system health

Fuel Costs

Exchange Rate

Site Staffing

- Site supervisor of 12 years recently left
- Strong job market in Scandinavia
- Renewed enforcement of labor restrictions in Greenland
- Presently have an on-site staff of 3
- Job offer to a good candidate
- Sending our Denmark-based employee to Greenland frequently

Org Chart

Distribution of Expenses