

ISR DATA GROUP EXERCISES

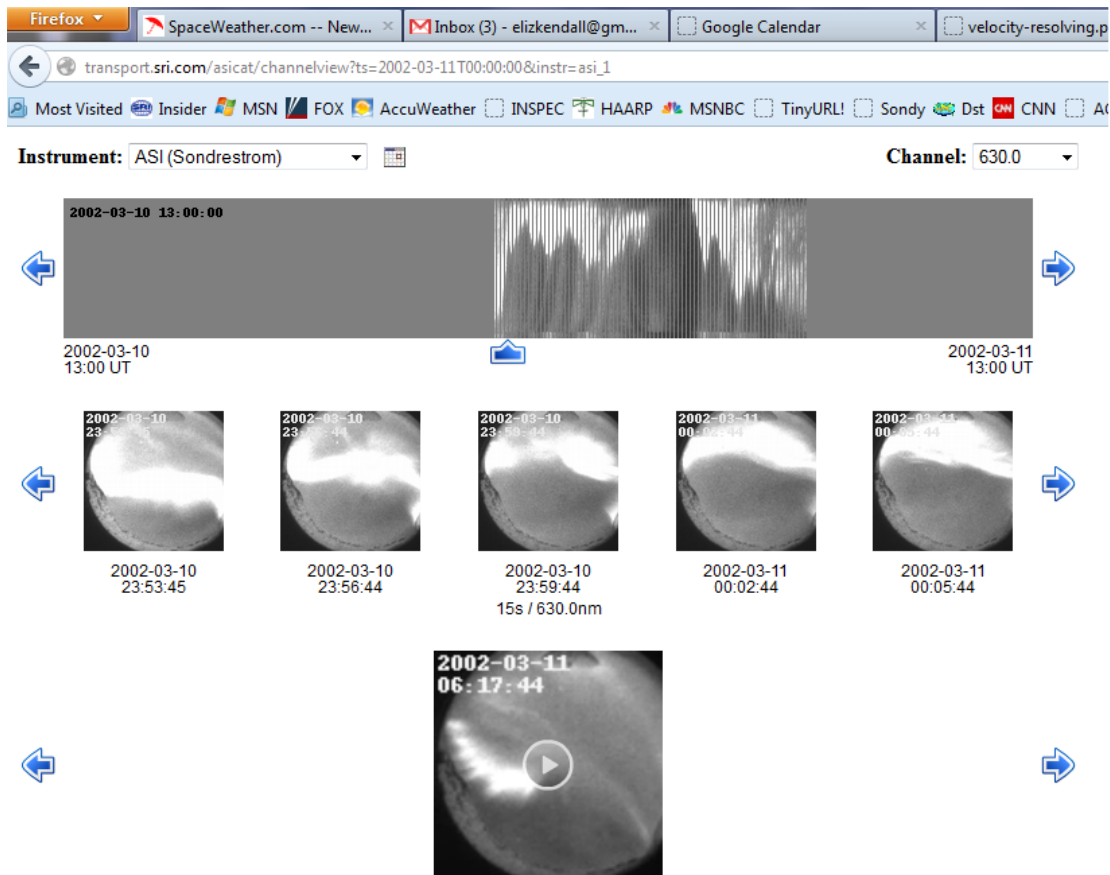
Tuesday, July 31

EXERCISE 1

- Sondrestrom profiles
- Plot 1 is raw power. It is highly oversampled (faster than the pulse length)
- Plot 2 is ion velocity
- Plot 3 is raw and fitted density with the proper sampling. The fitted plot includes a Debye correction (an iterative process including derived temperature).
- Plot 4 is electron and ion temperature
- Note that errors increase with altitude and no information below about 100 km.

Exercise 2

- E-region electron density enhancement extending into the F-region
- This is an example of auroral precipitation



Exercise 3

- Plot 1 shows convection occurring around 12-13 UT
- Plot 2 shows electron density enhancement at the same latitude
- Plot 3 shows electron temperature enhancement
- Plot 4 shows ion temperature enhancement
- Since the electron density is increasing while the electron temperature is increasing, there must be an influx of particles
- This is an example of Joule heating (heat due to electric current flow)

Exercise 4

- This is an example of storm versus quiet days in the mid-latitudes.
- Left two plots show electron density as a function of time and altitude April 1 and 3, 2004
- Right plot (top), electron density as a function of time of day for April 1-3, 2004.
- Right plot (bottom), electron temperature as a function of time of day for April 1-3, 2004.
- April 3, 2004 is a “disturbed day.” Starting 12 UT, geomagnetic index K_p becomes moderately large ($K_p = 5-$). April 1-2, 2004 are “quiet days.”
- On disturbed day, electron density is increasing while the electron temperature is decreasing. Not necessarily clear why electron temperature decreasing.