

# Science enabled by all-sky imagers at low-latitudes

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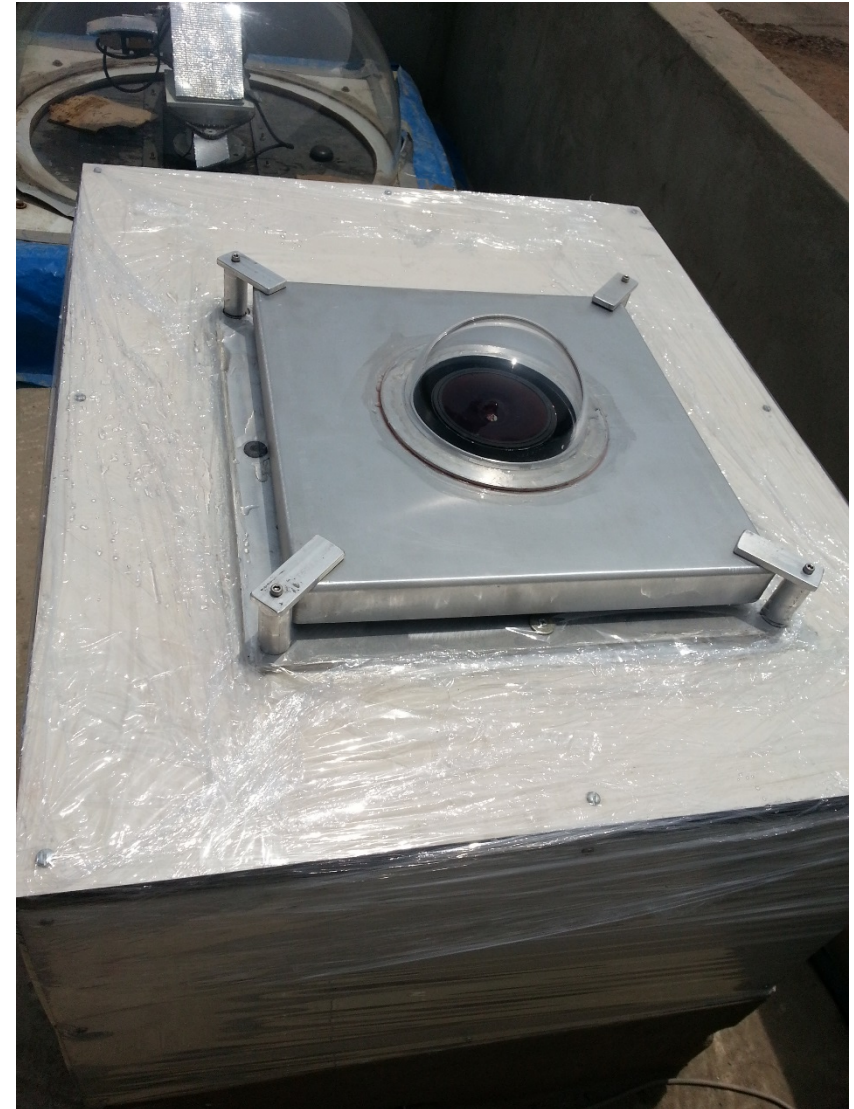
Collaborators: Carlos Martinis, Michael Mendillo, Jeff Baumgardner, Joei  
Wroten

# Outline

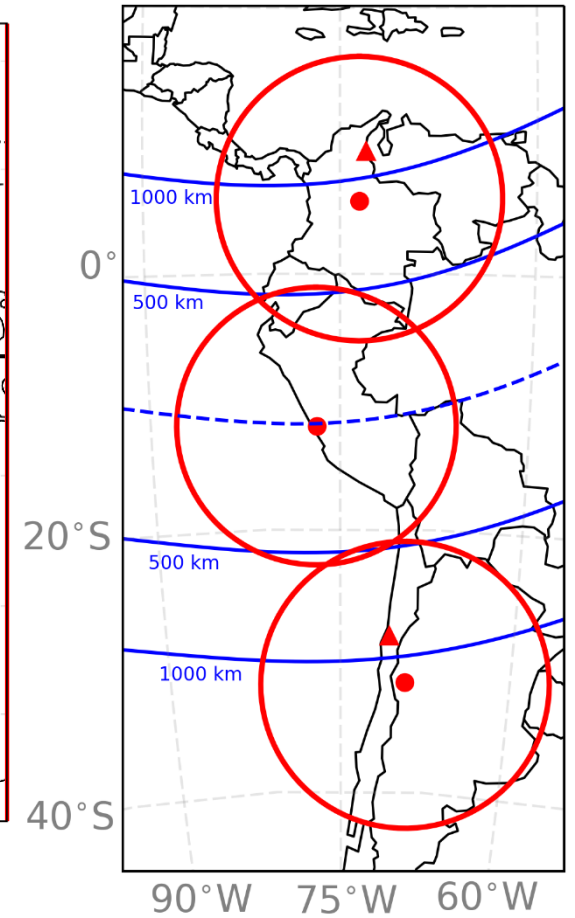
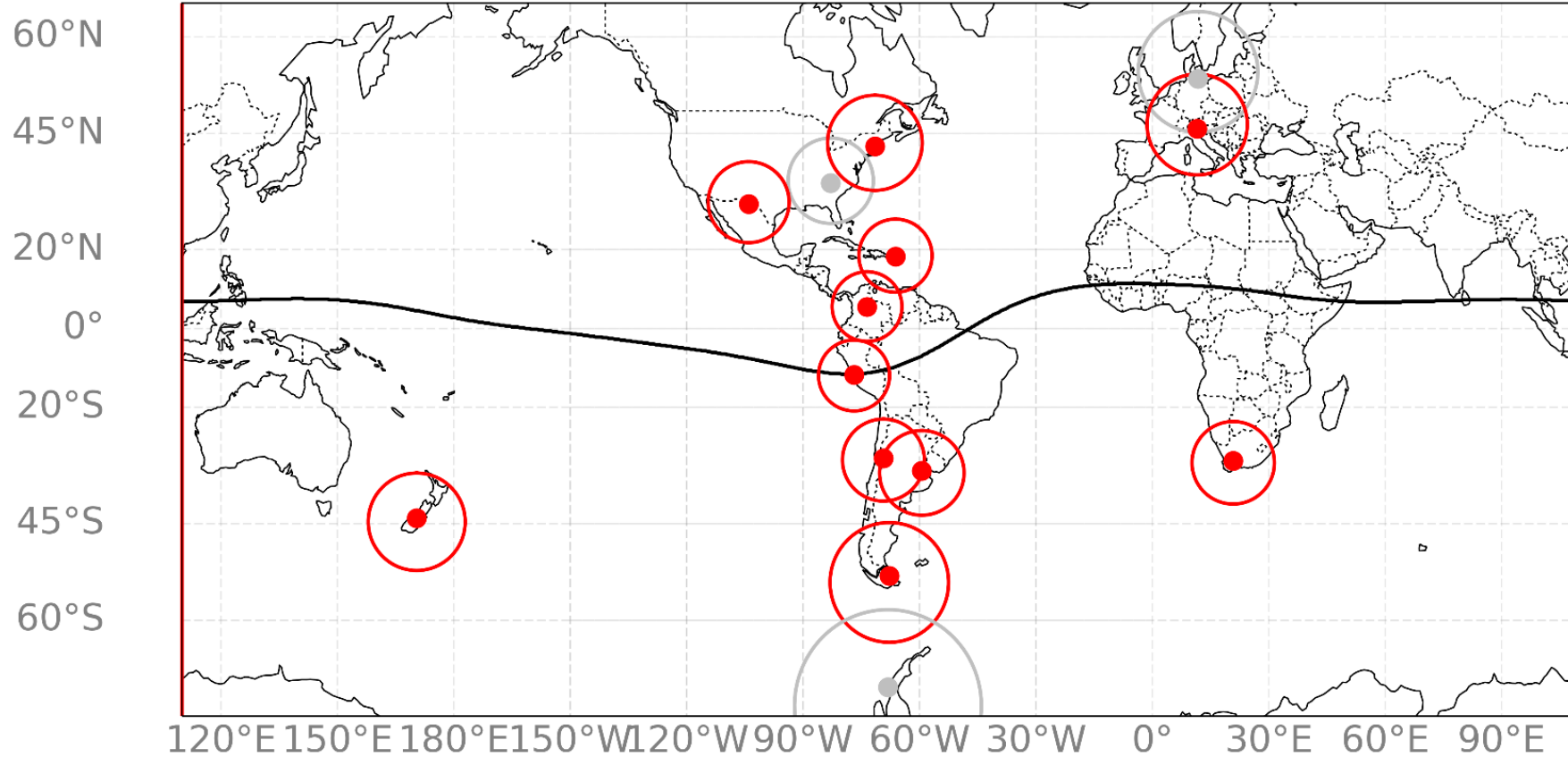
- Instruments
- Science Topics
  1. Gravity Waves
  2. Equatorial spread F (ESF) observations
  3. Conjugate Science
  4. Radar conjunction
  5. Midnight Temperature Maximum

# All-Sky Imagers (ASI)

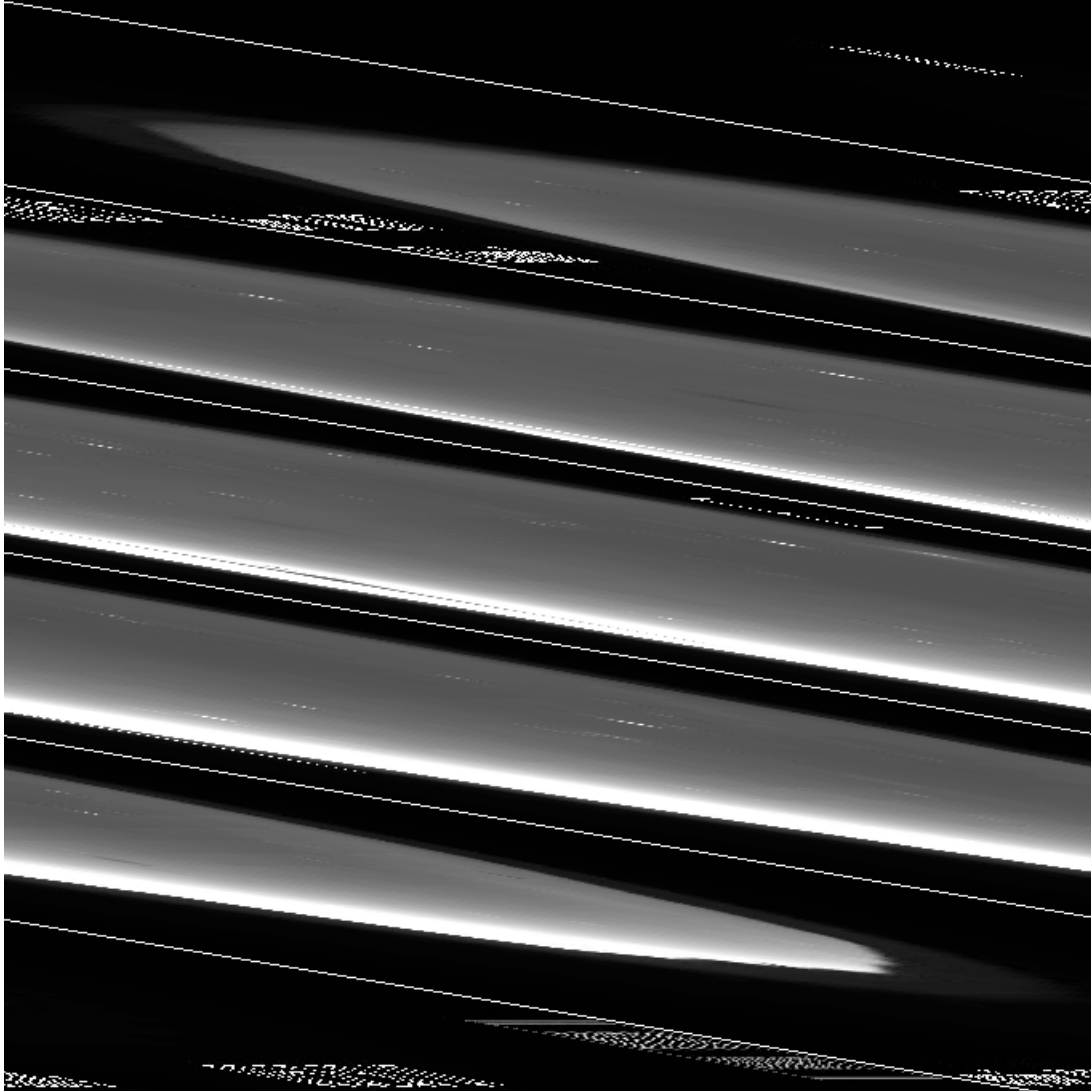
- Multiple filters to measure different processes
  - Oxygen recombination, 7775 Å, ~350 km
  - Oxygen, De-excitation, **6300 Å**, ~250 km
  - Oxygen, 5577 Å, ~97 km
  - OH emission, numerous bands, ~87 km
  - Na, doublet 5890 Å, 5896 Å
- Images are unwarped to show the correct size of the features



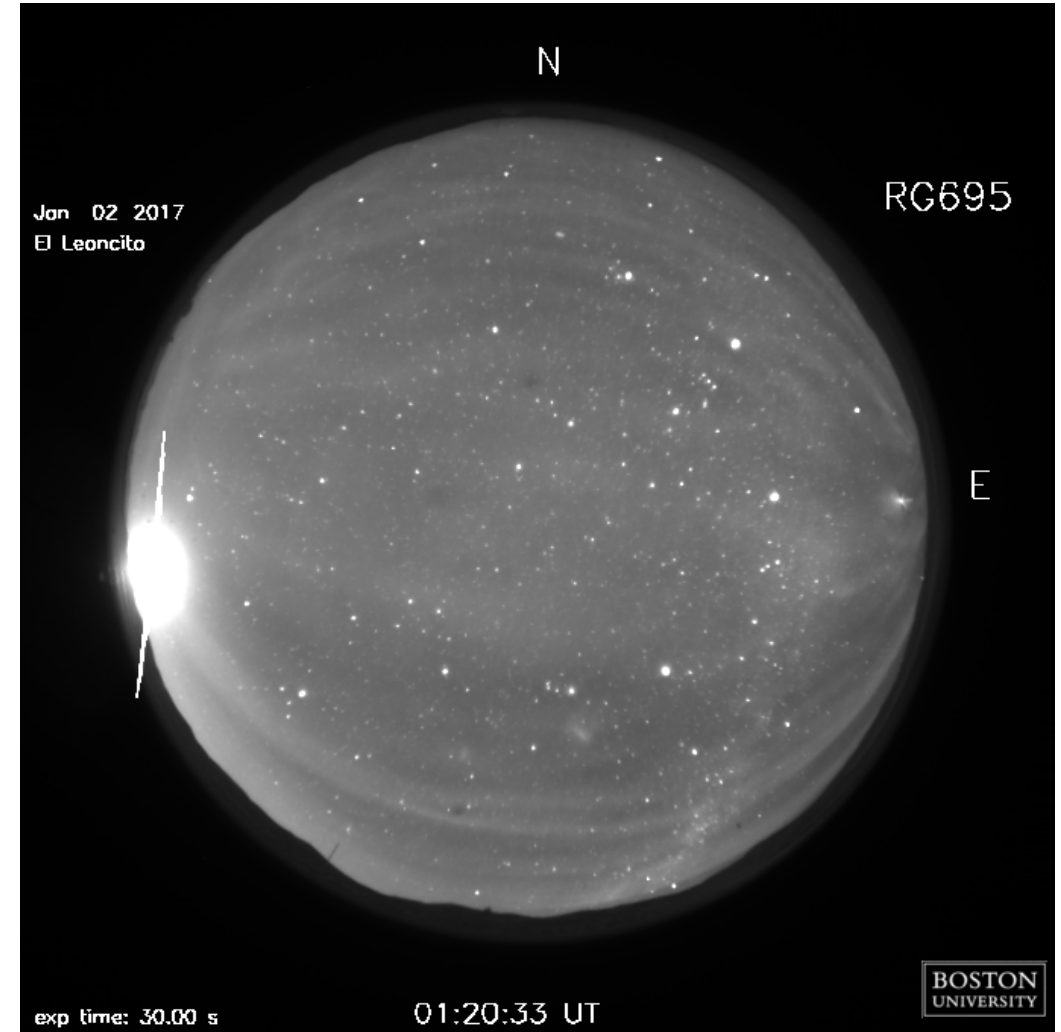
# BU ASI Locations



# 1.) Mesospheric gravity waves

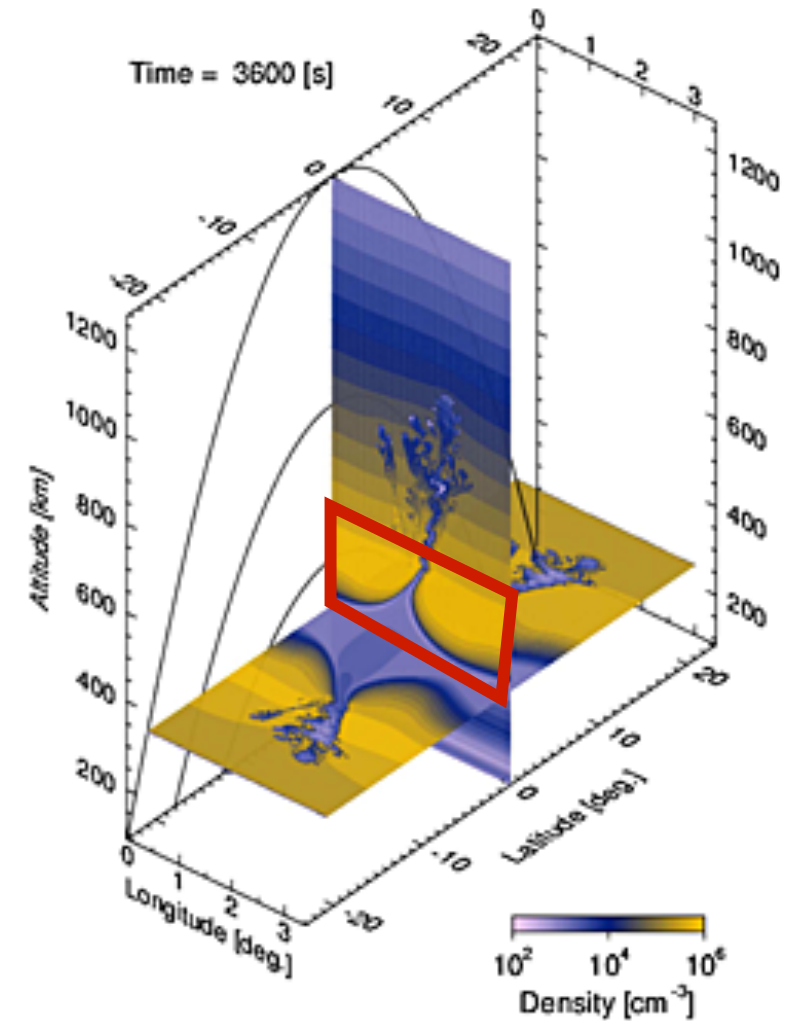
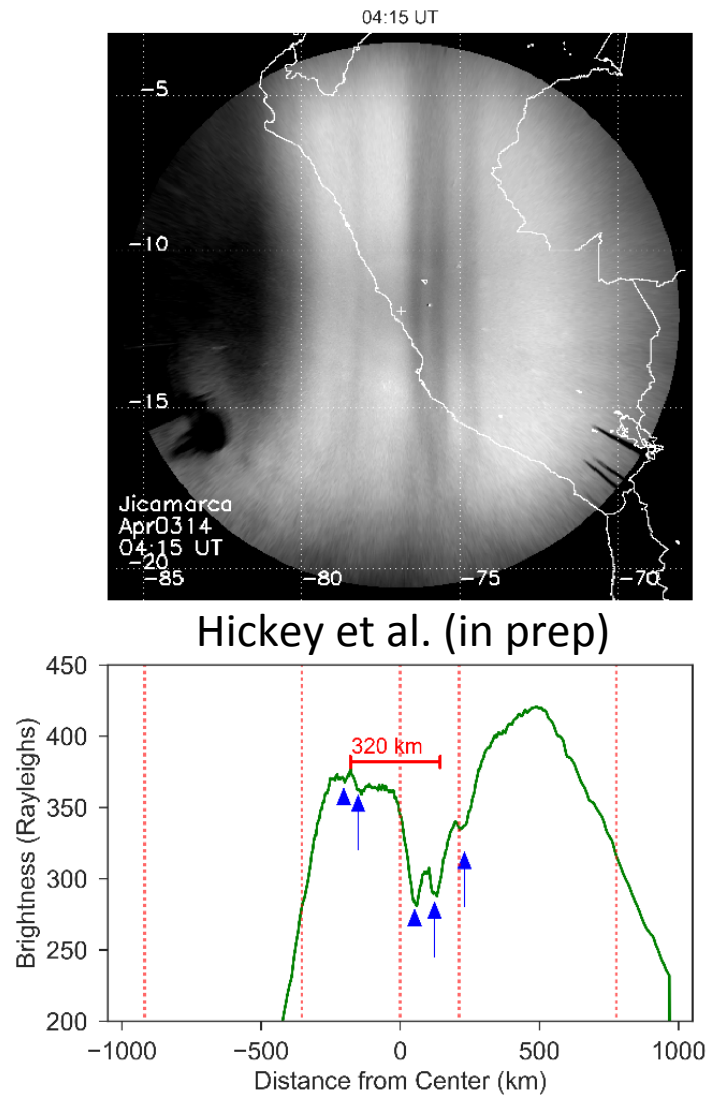


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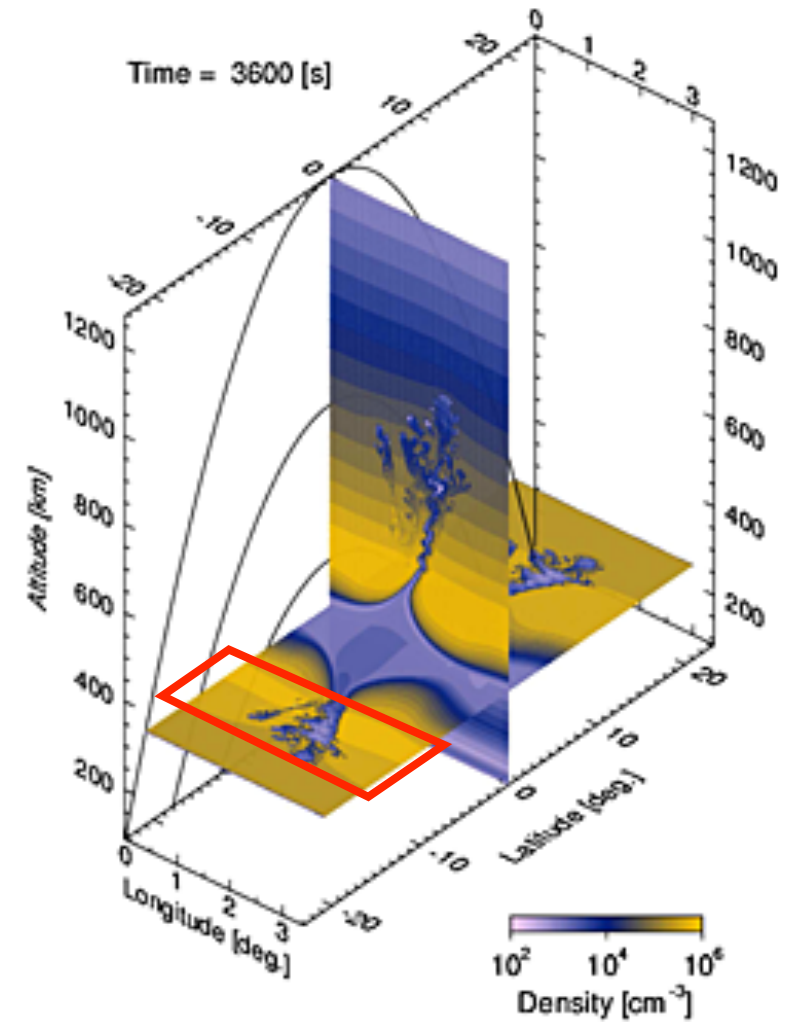
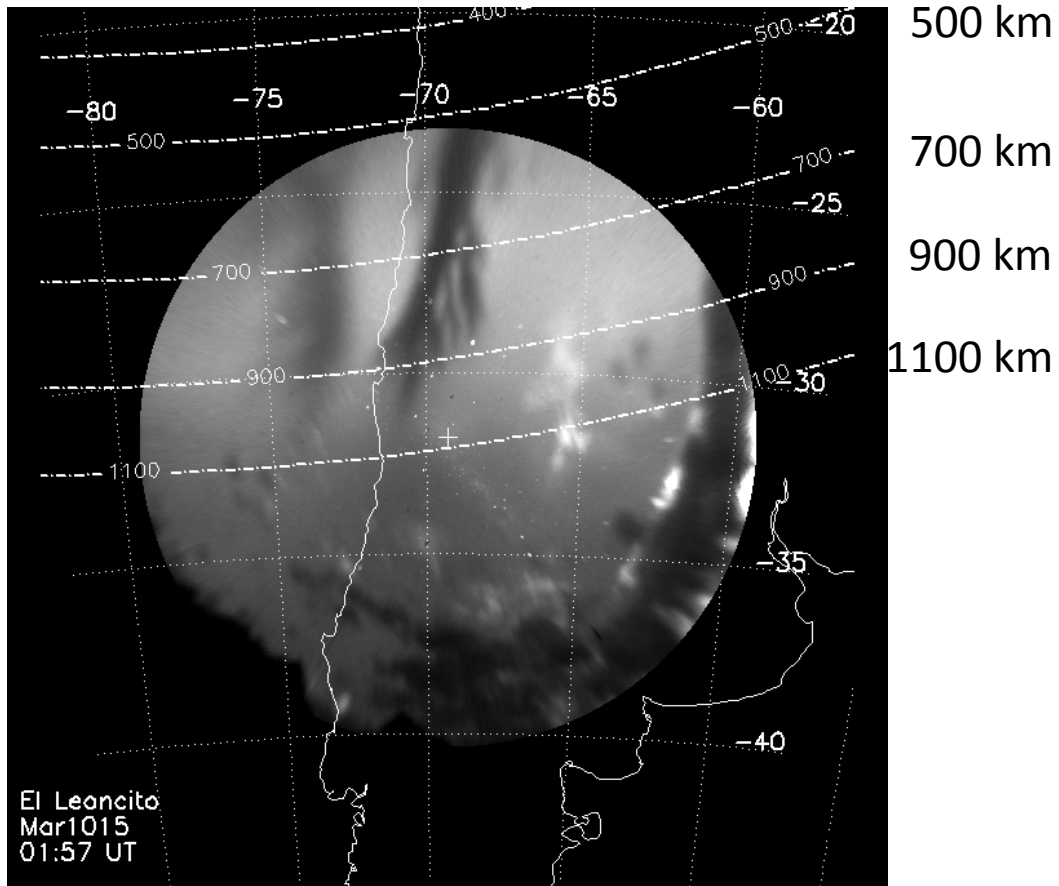
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## 2.) ESF: Bottomside Plasma Depletions



Yokoyama et al. , 2014

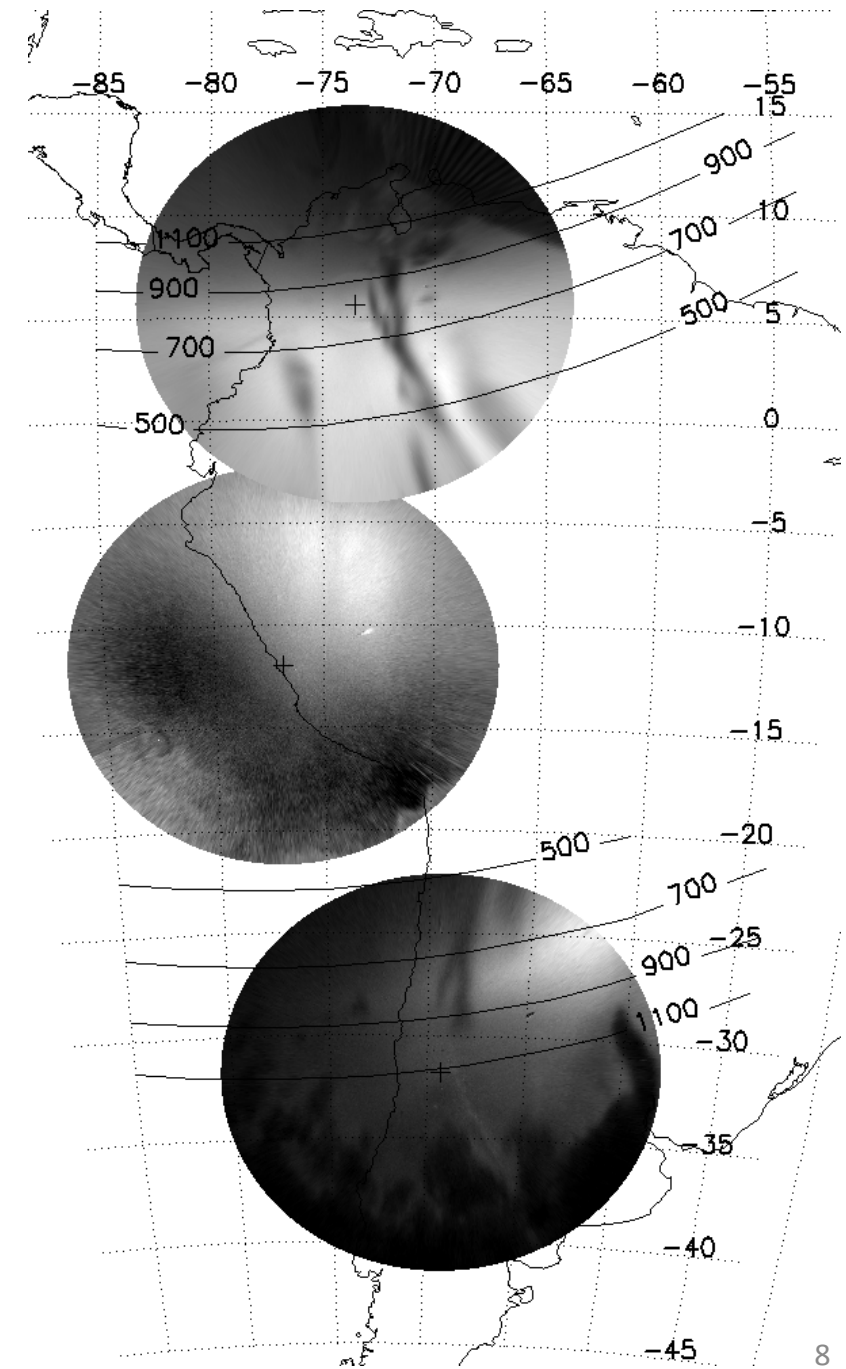
## 2.) ESF: Topside Plasma Depletions



Yokoyama et al. , 2014

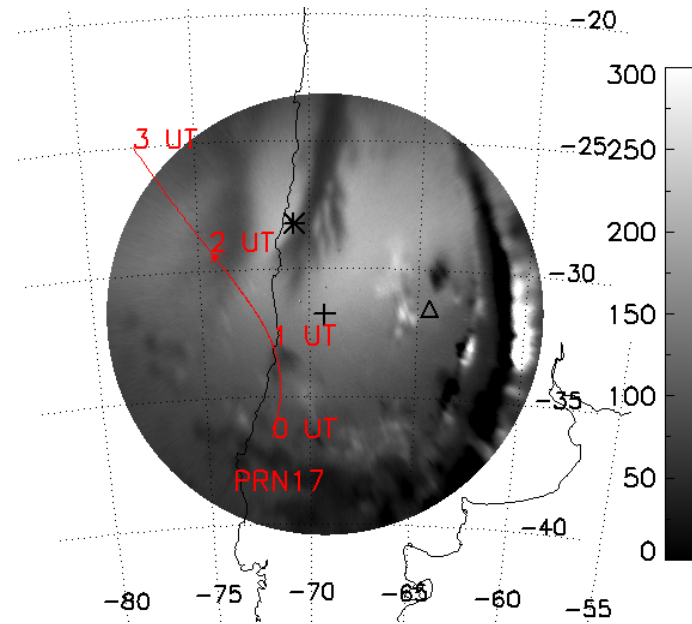
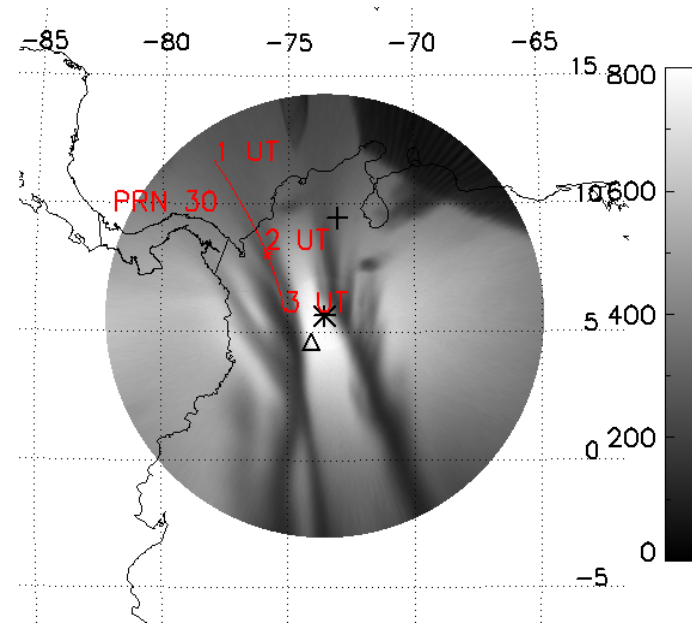
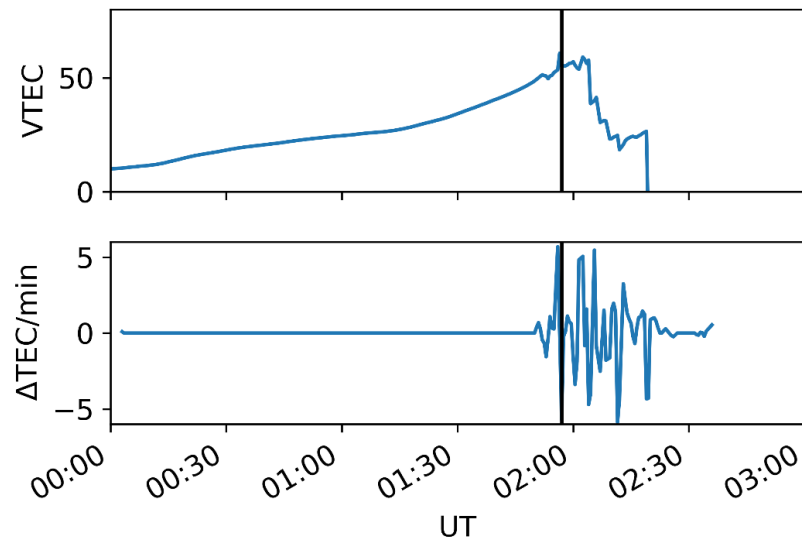
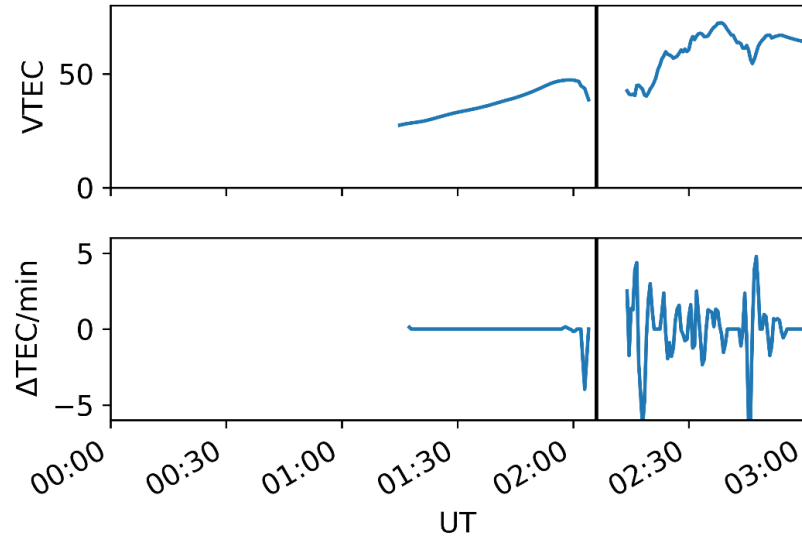
### 3.) Magnetic Conjugate Observations

- Background emission
- Conjugate ESF morphology
- Conjugate ESF motion





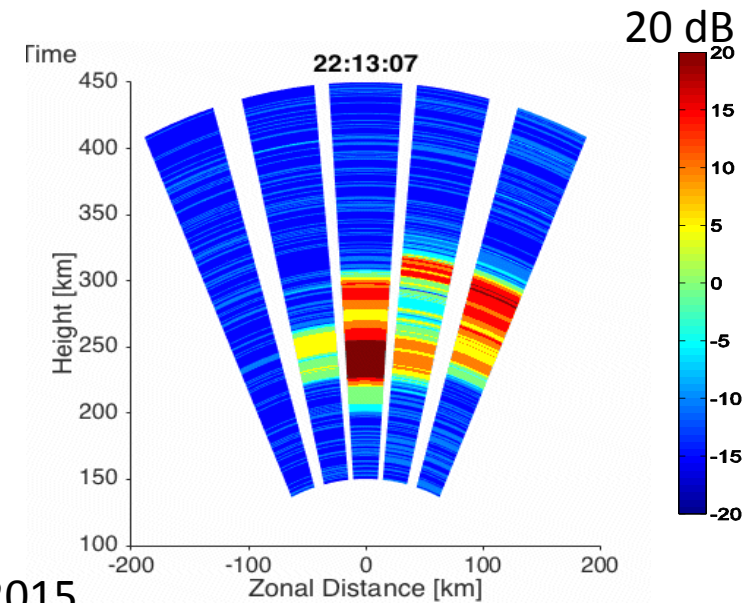
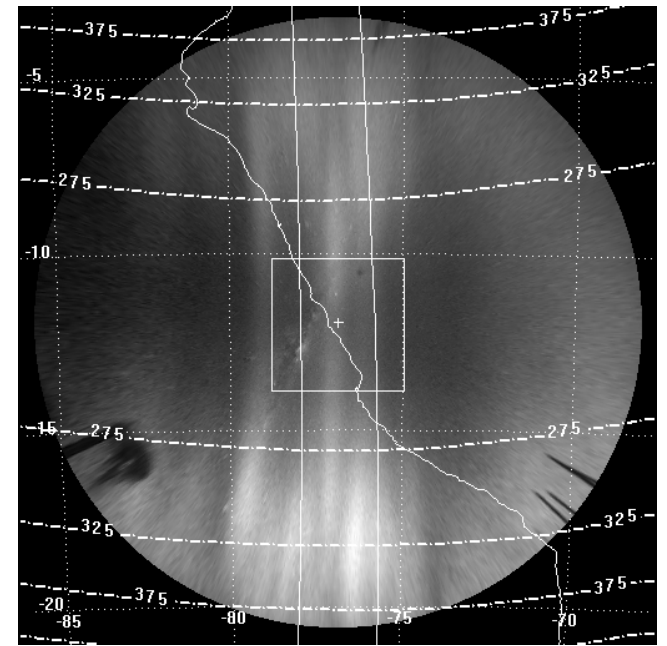
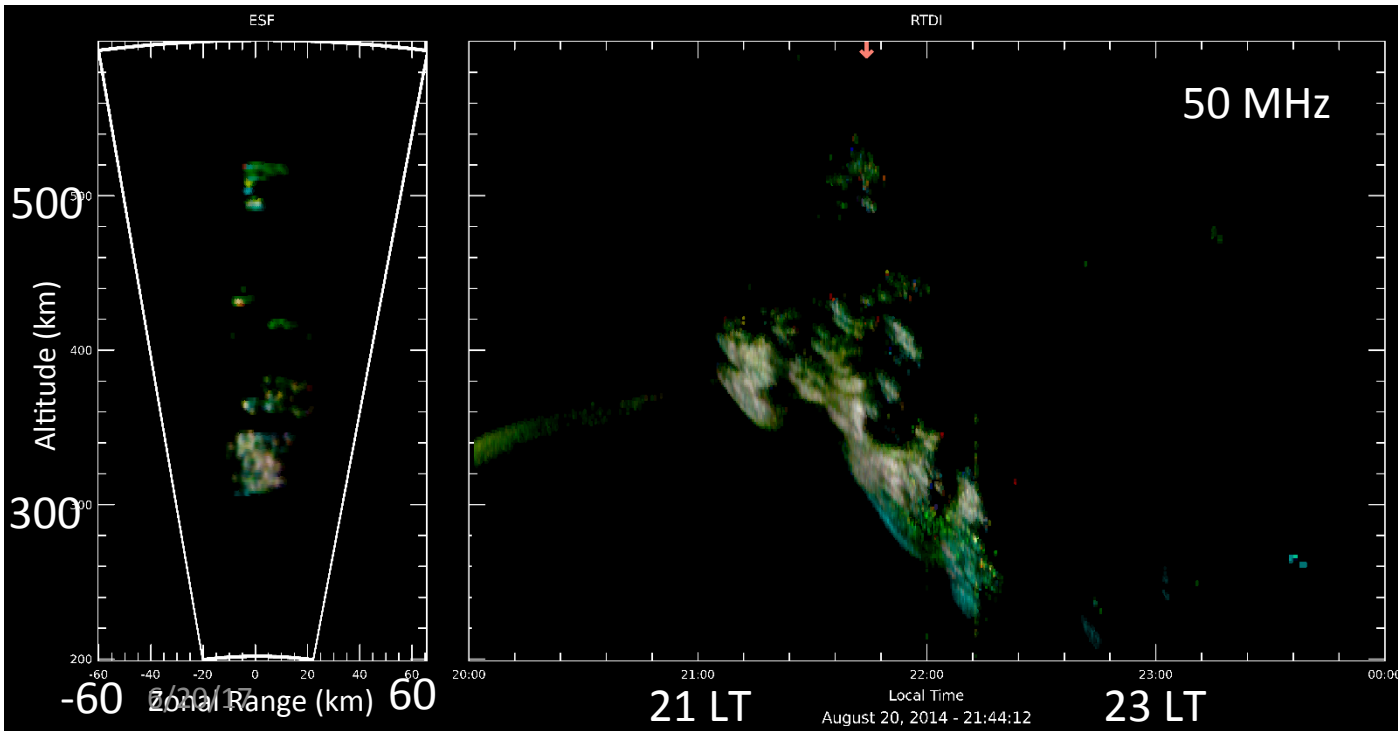
# Conjugate ASI and GPS



See poster IRRI-02  
on Wednesday for  
more details

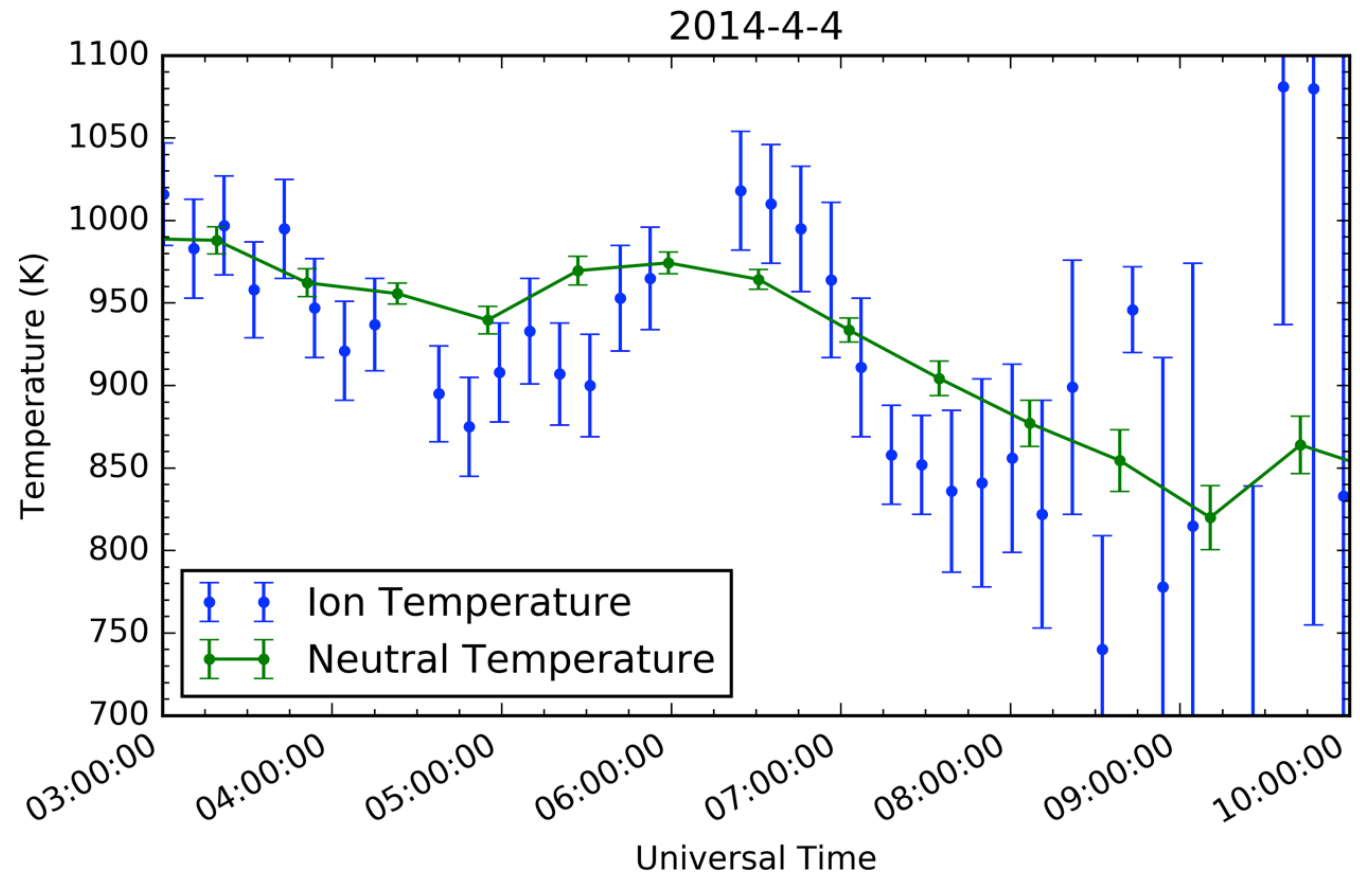
# 4.) Radar and ASI Conjunction

- Compare large scale structures (hundreds of km) with small scale irregularities (3 m and 0.34 m)



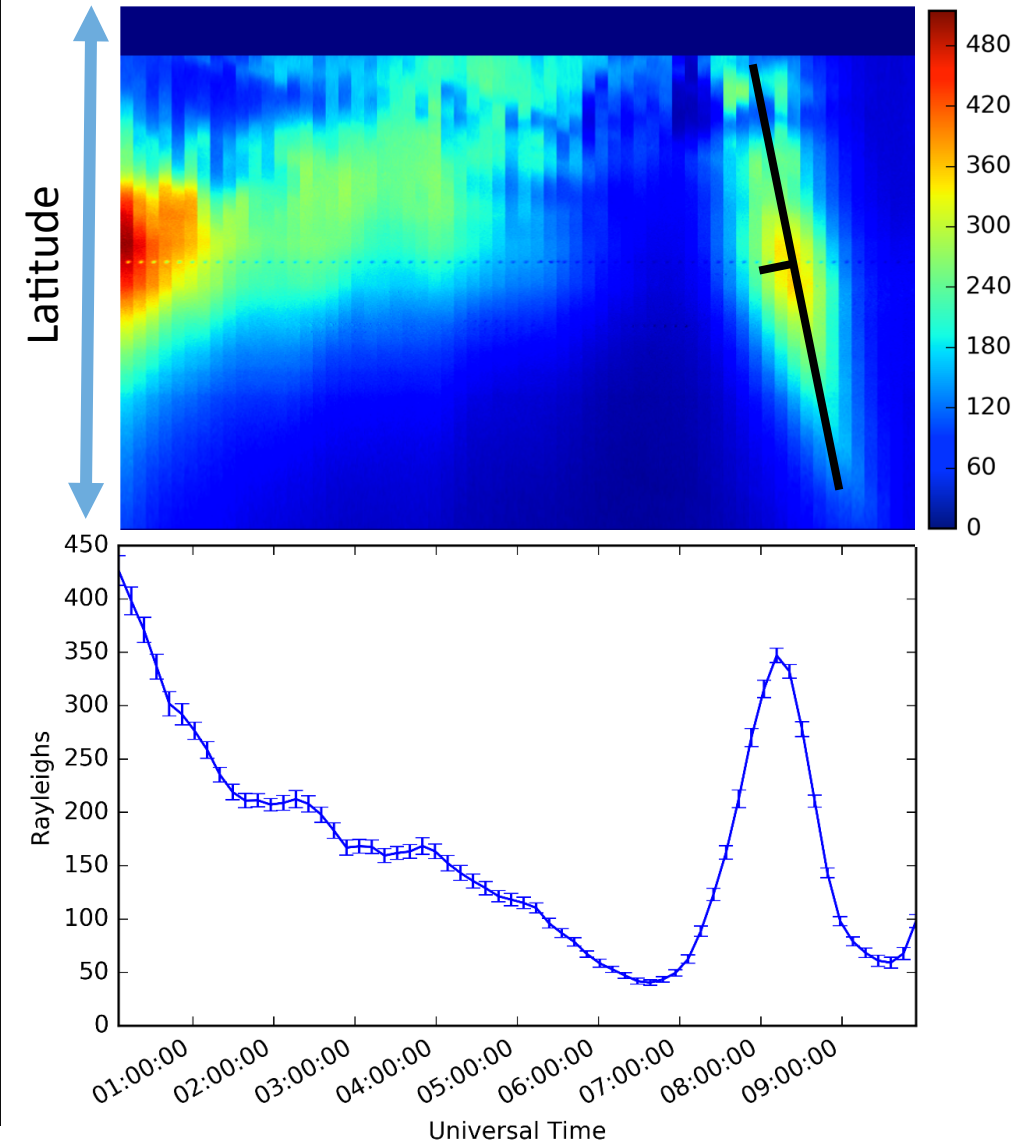
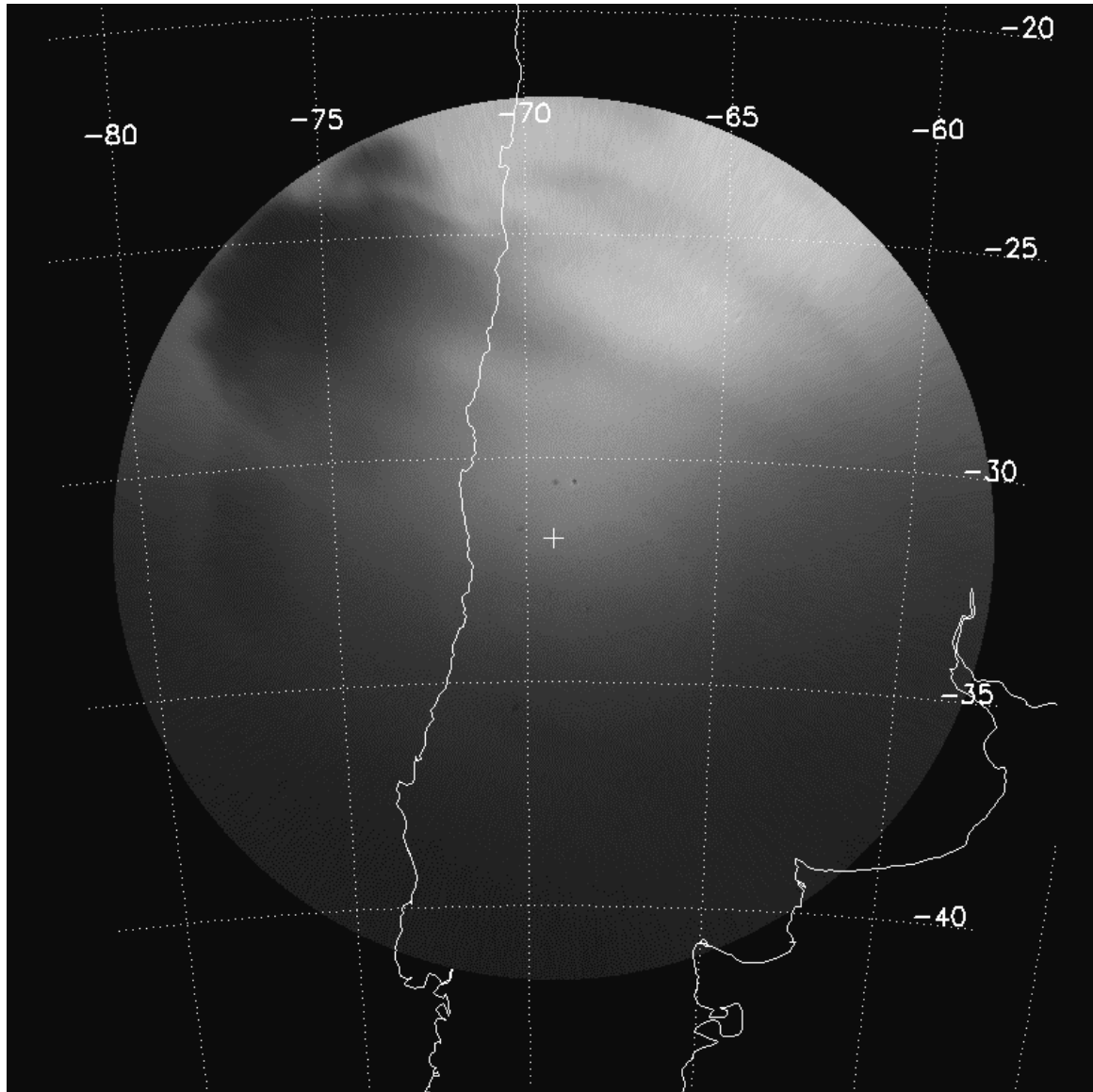
# 5.) Midnight Temperature Maximum (MTM)

- Temperature measurements at Jicamarca
- The MTM creates an increase in brightness known as the brightness wave (BW) in ASI images at higher latitudes



Hickey et al (in prep)

# MTM signature in ASIs



# Summary

- Network of ASIs for many different science questions
- Gravity wave observations
- Conjugate ESF science
- Multi-instrument ESF and MTM observations
- Plus many other topics not mentioned

Quick look images available at [www.buimaging.com](http://www.buimaging.com)