Observation for the neutral wind and temperature in the polar upper atmosphere by Fabry-Perot interferometer at Jang Bogo Station, Antarctica

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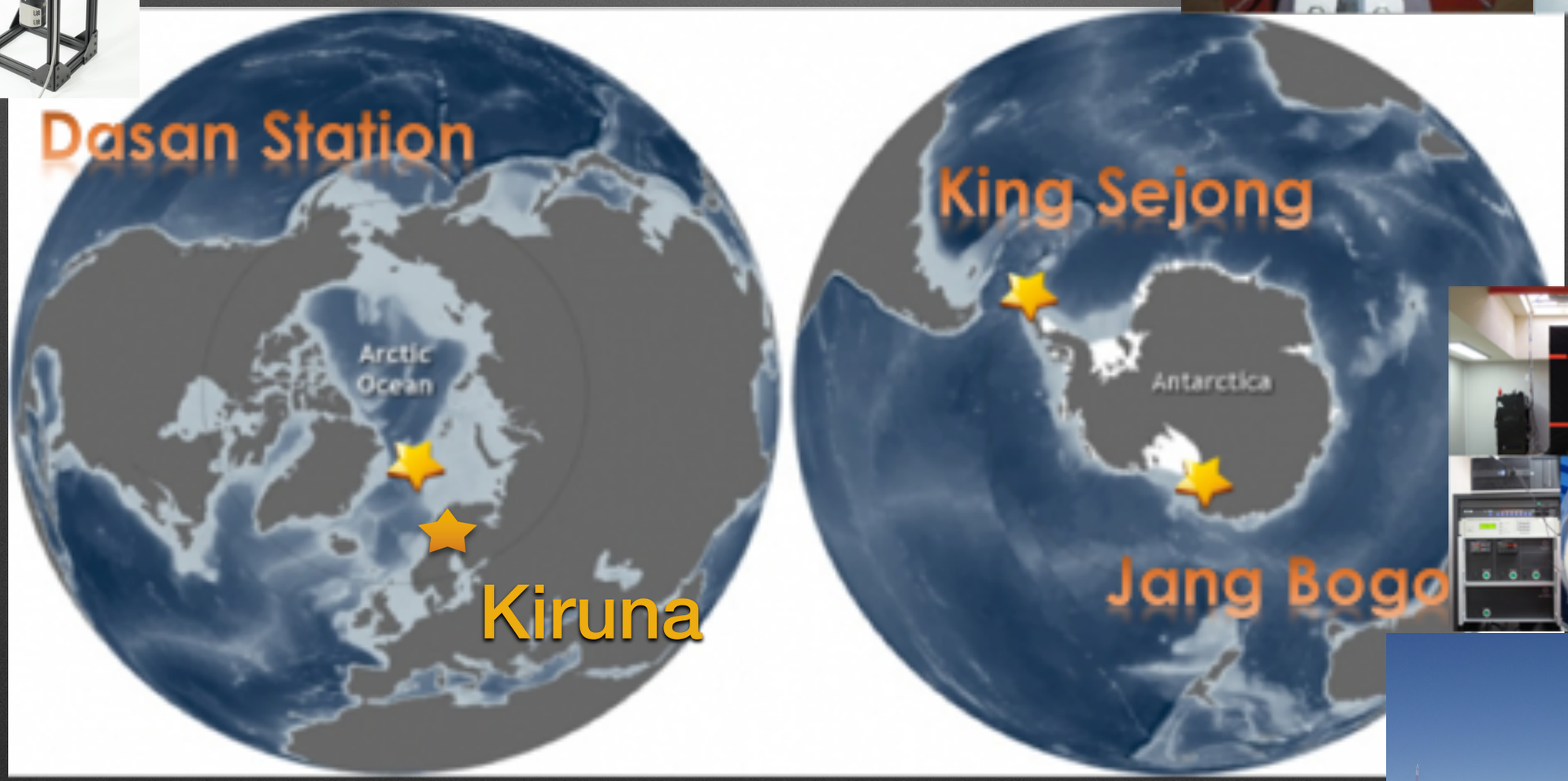
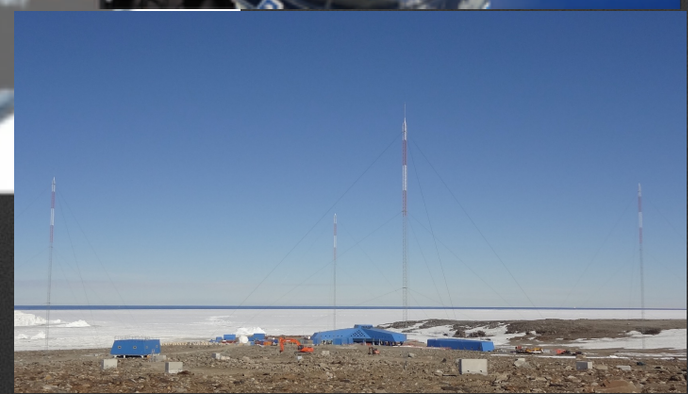
Upper Atmospheric Observations





Arctic

Antarctica

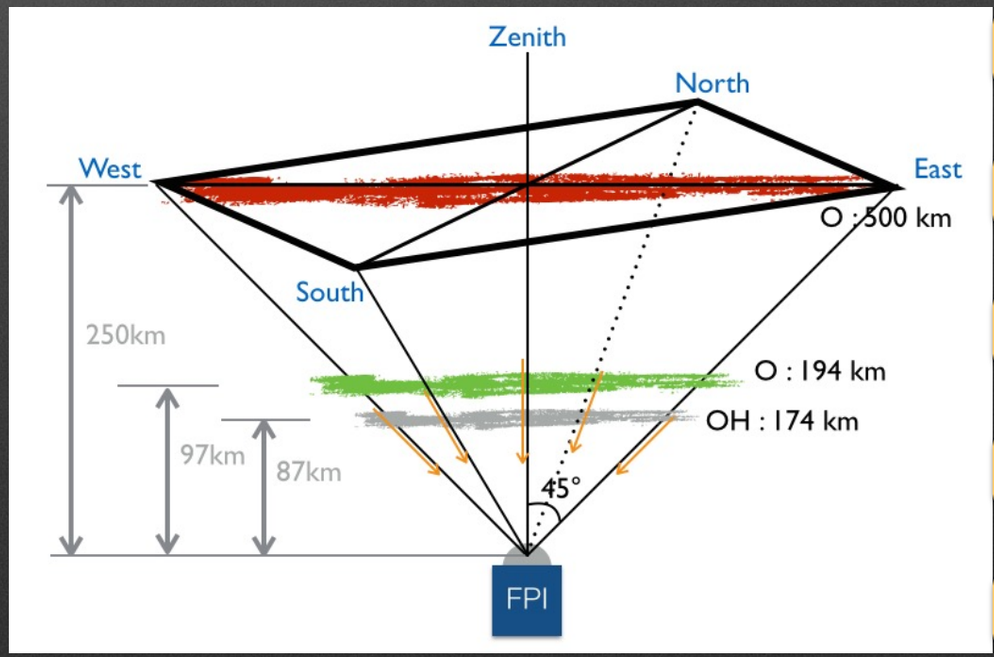
JBS Fabry-Perot Interferometer (FPI)

- Operation since Mar. 2014
- Airglow observation from

  87 / 97 / 250 km height
- Unique facility to obtain

  Neutral wind (87 / 97 / 250 km)

  Temperature



Zenith → East → West → North → South

Neutral winds

- Winds @ 250 km

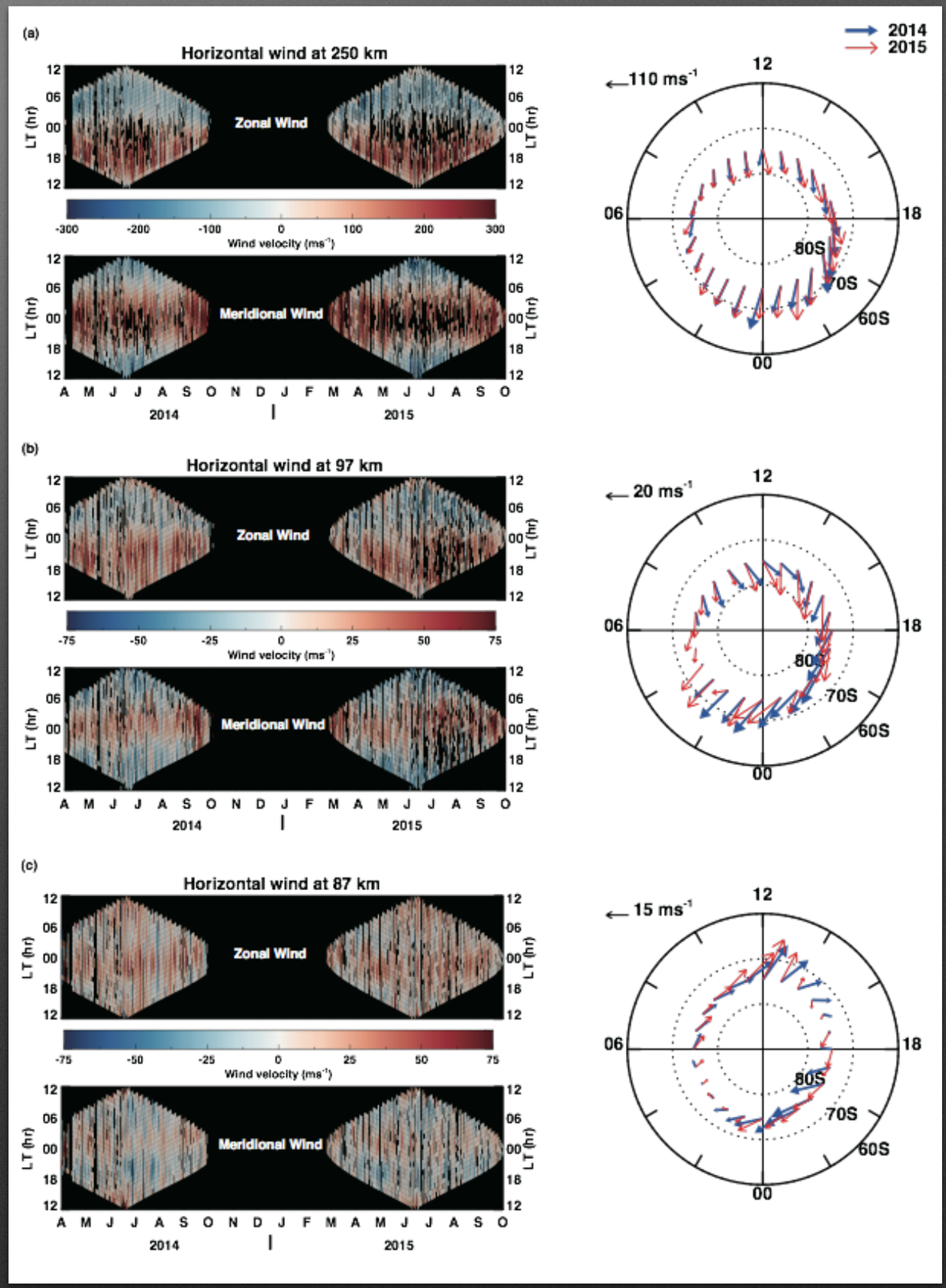
  Anti-sunward & Diurnal variation

  typical thermospheric wind

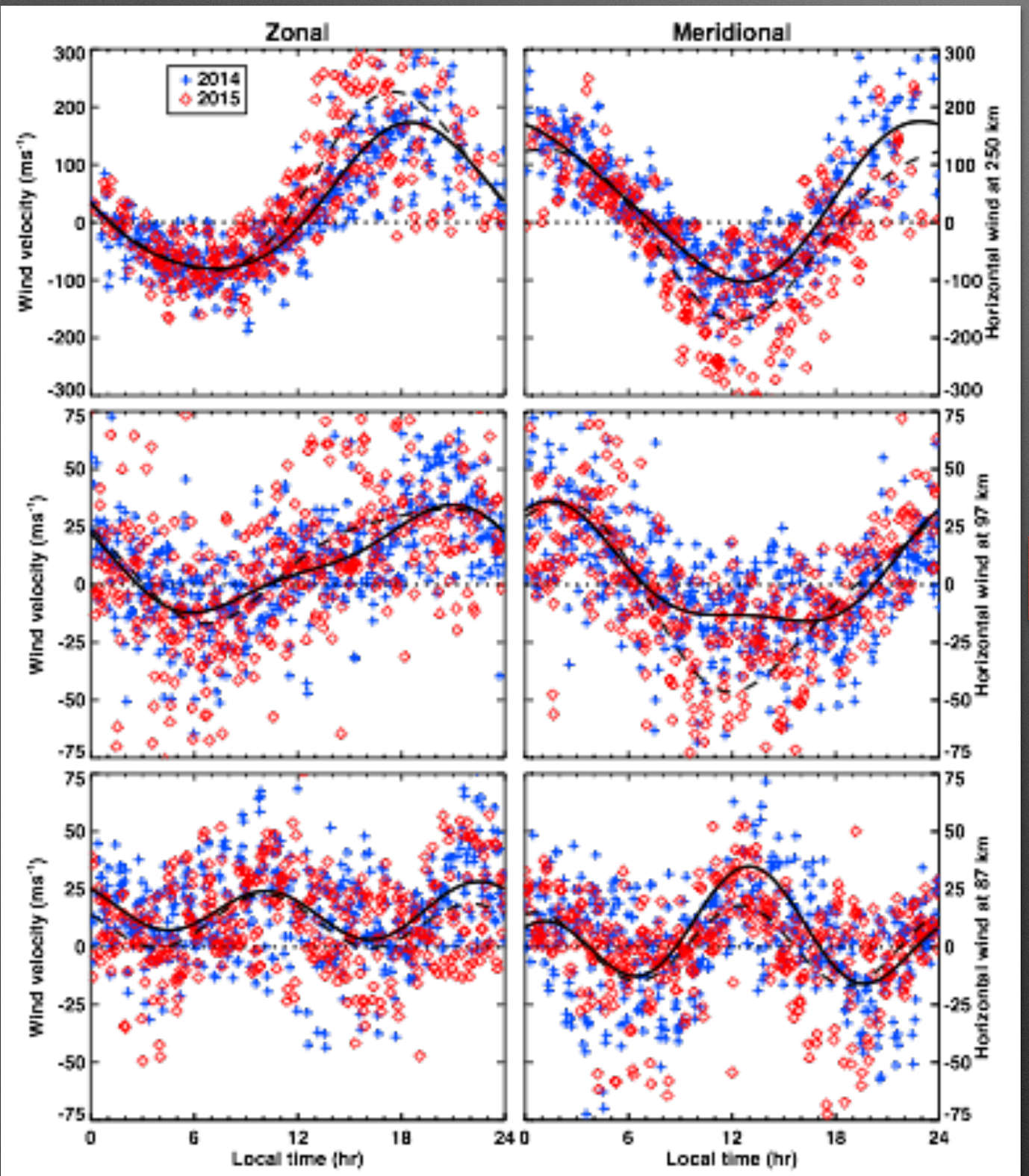
- Winds at 87 km

  Main driver - semidiurnal tide

  Strong winds appear @ midnight/noon



Local time variation in winter



24hr

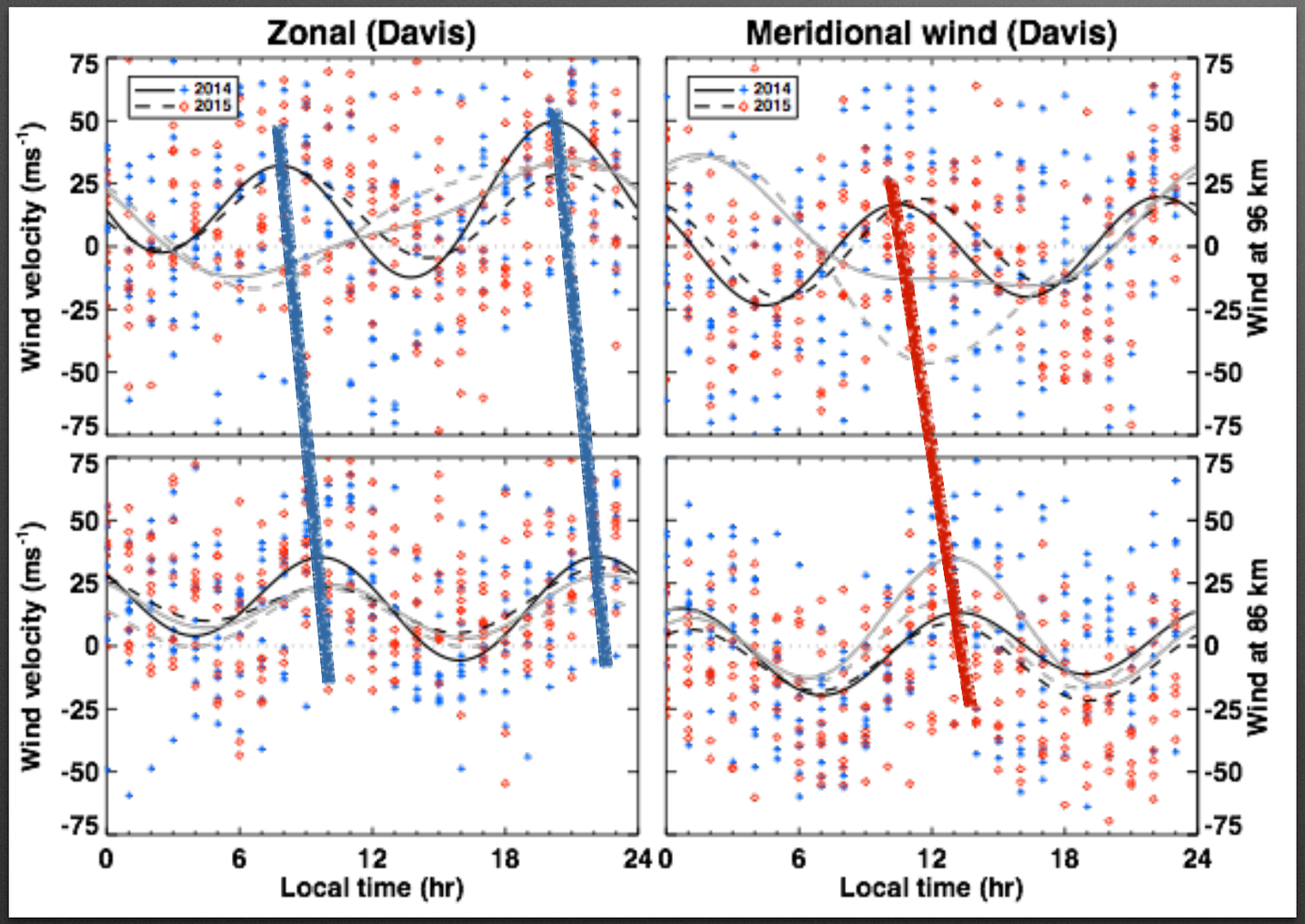
24hr+12hr

Is this real ?

12hr

Neutral wind from meteor radar

- Semidiurnal winds are dominant.



Davis (GLAT: 75)

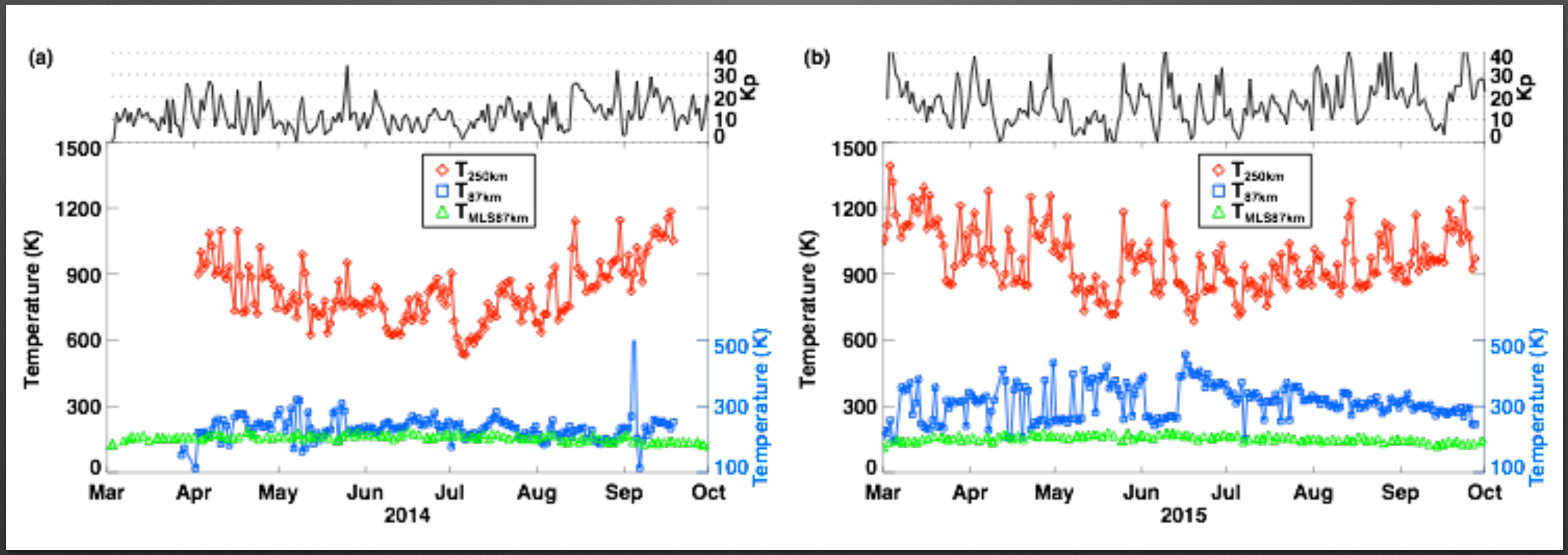
- 12hr-tides are main driver from Davis MR.
- FPI wind from 557.7 nm

  combined form of 12hr & 24hr

  severely affected by aurora emission

  careful interpretation required

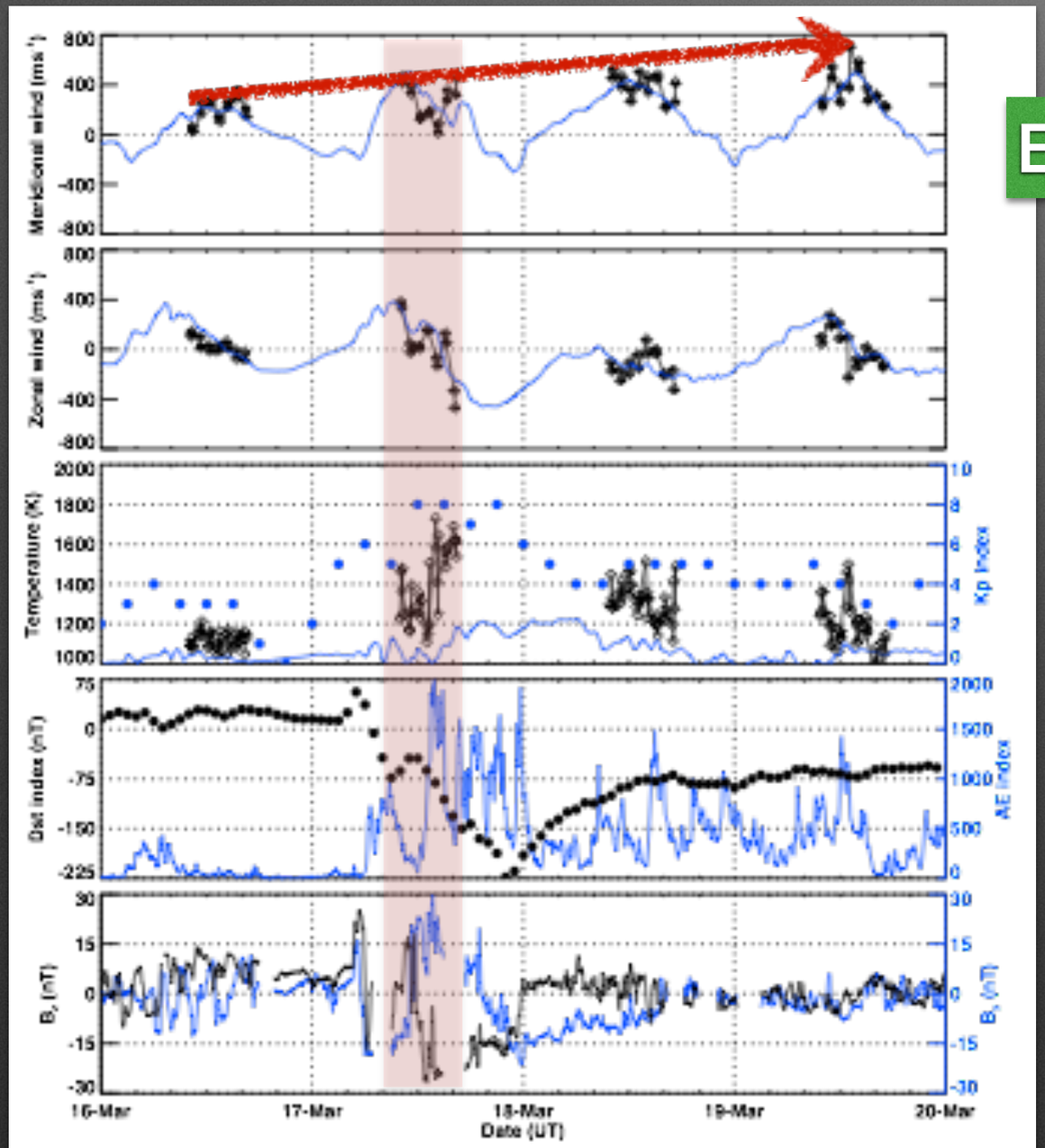
FPI Temperatures



- Temperature at 250 km immediately react to geomagnetic activity

Thermospheric response

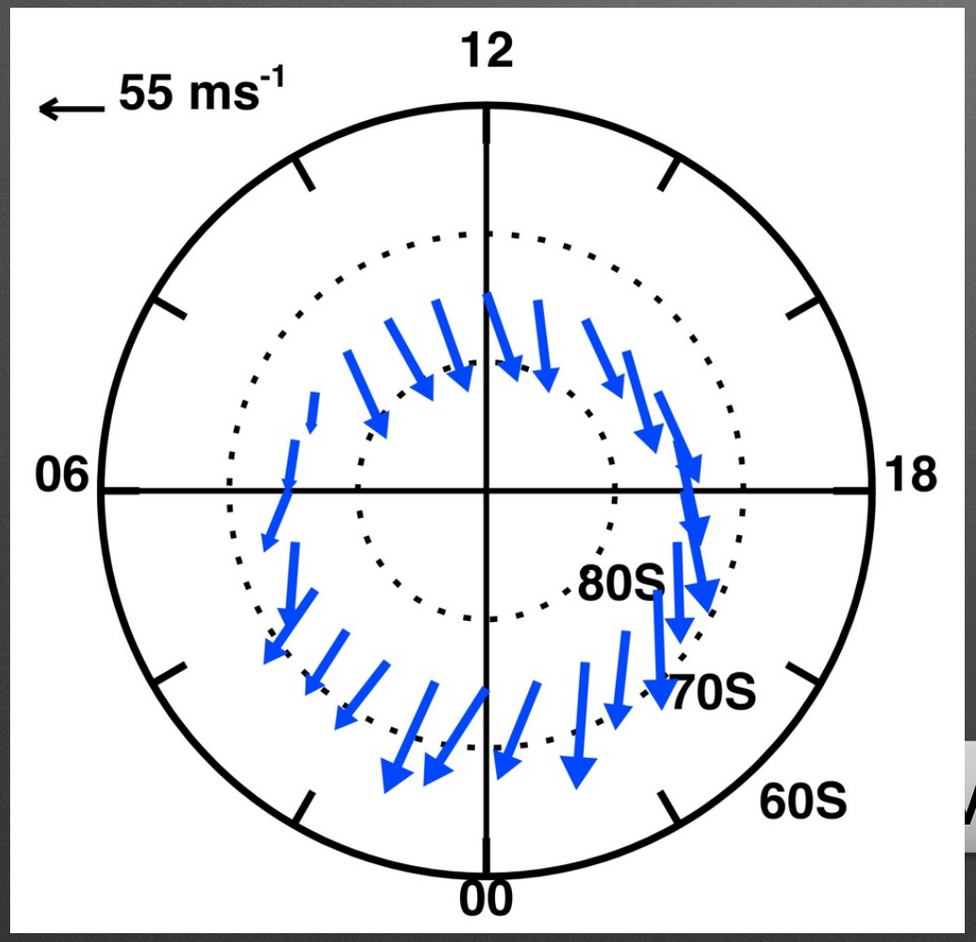
- During Great storm on 17 March 2015

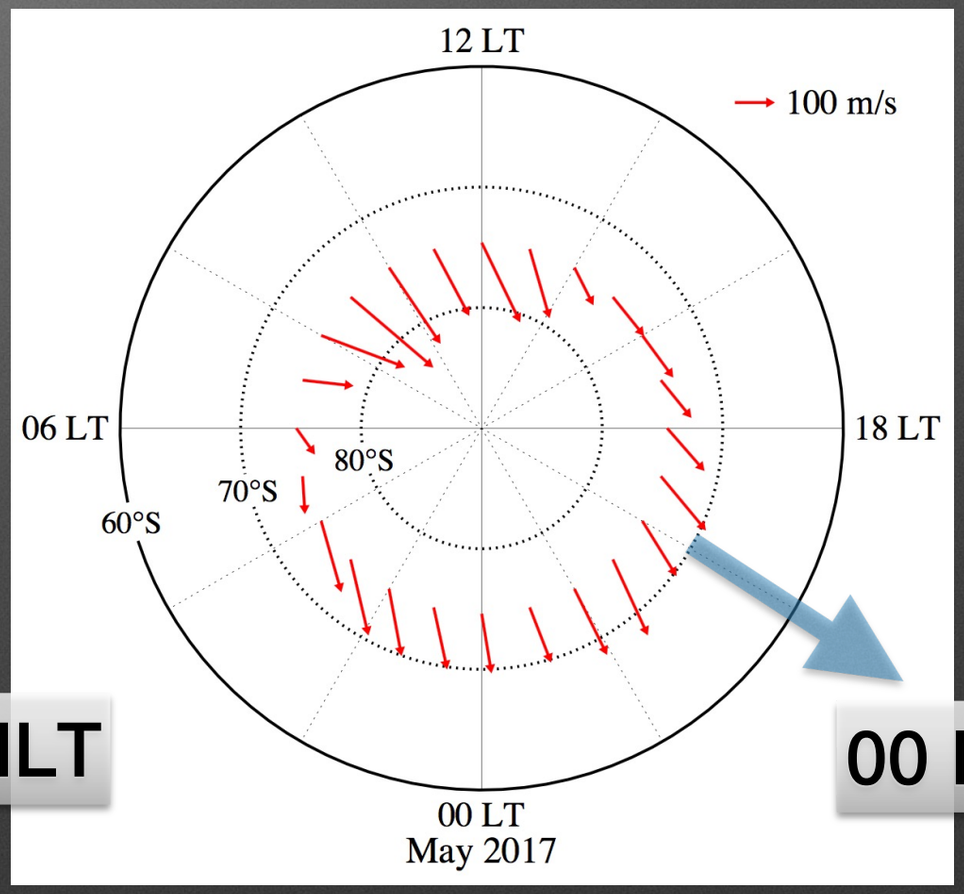


Enhanced equator ward motion

Plasma drift

FPI wind @ 250 km



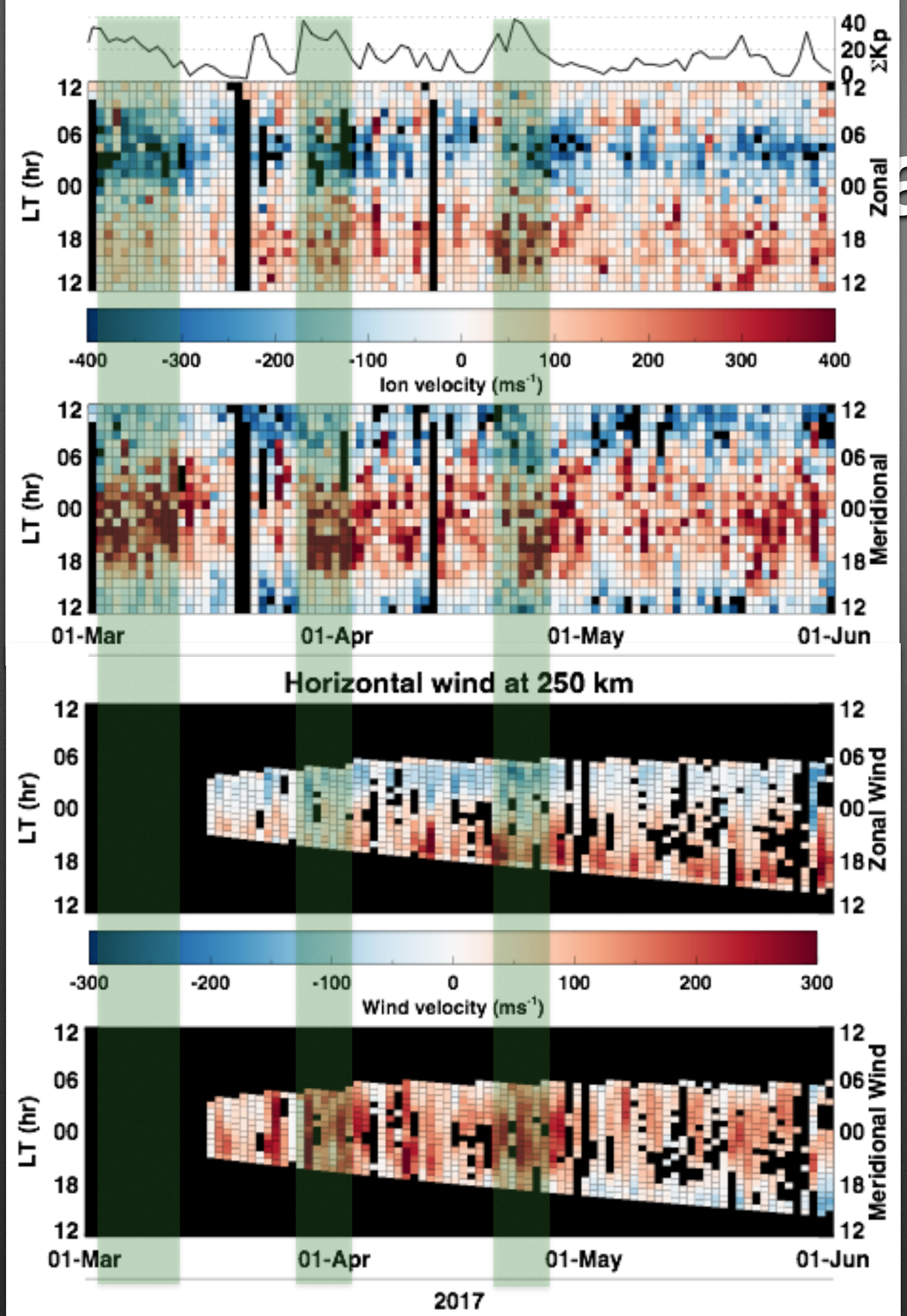


MLT

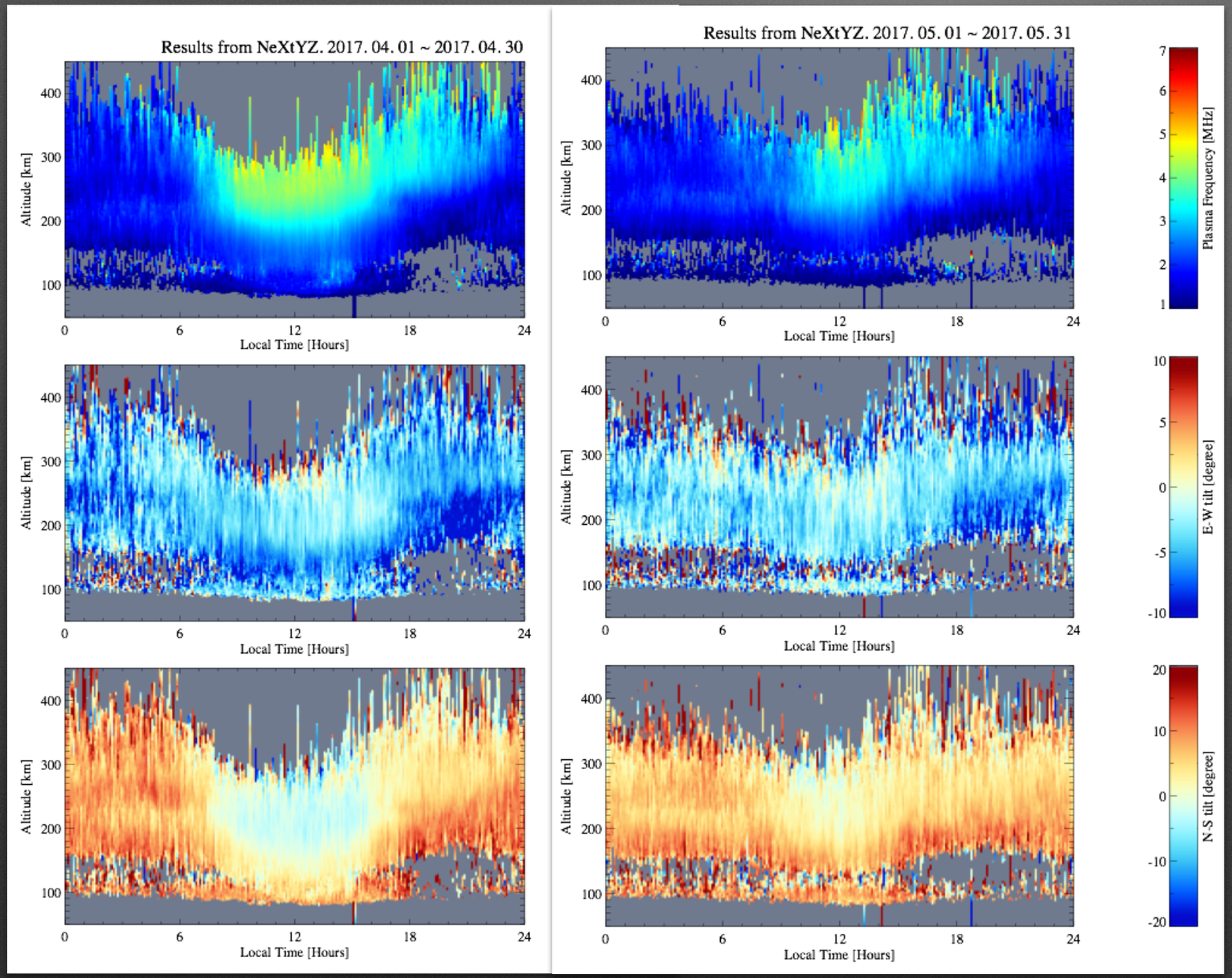
00 MLT

- from Dynasonde analysis at JBS ionosonde (VIPIR)
- Well-aligned antisunward (High-lat. convection)

a drift


ΣKp
40
20
0
LT (hr)
12
06
00
18
12
Zonal
-400
-300
-200
-100
0
100
200
300
400
Ion velocity (ms-1)
Meridional
01-Mar
01-Apr
01-May
01-Jun
Horizontal wind at 250 km
Zonal Wind
-300
-200
-100
0
100
200
300
Wind velocity (ms-1)
Meridional Wind
2017

Ionospheric tilt



Ionospheric tilt

↑

horizontal gradient of [e^-]

↑

Thermospheric wind

Daytime: southward tilt Nighttime: northward tilt

Thank you