# Plasmasphere Contribution to GNSS TEC


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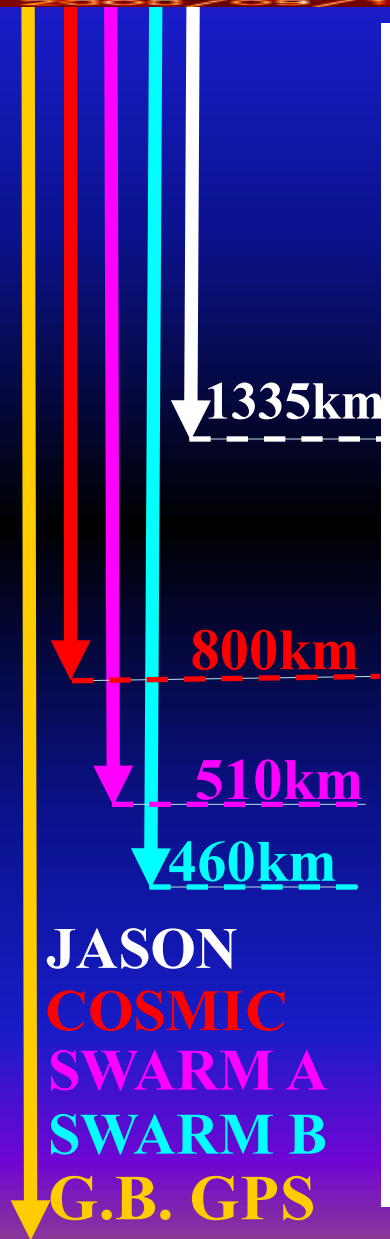
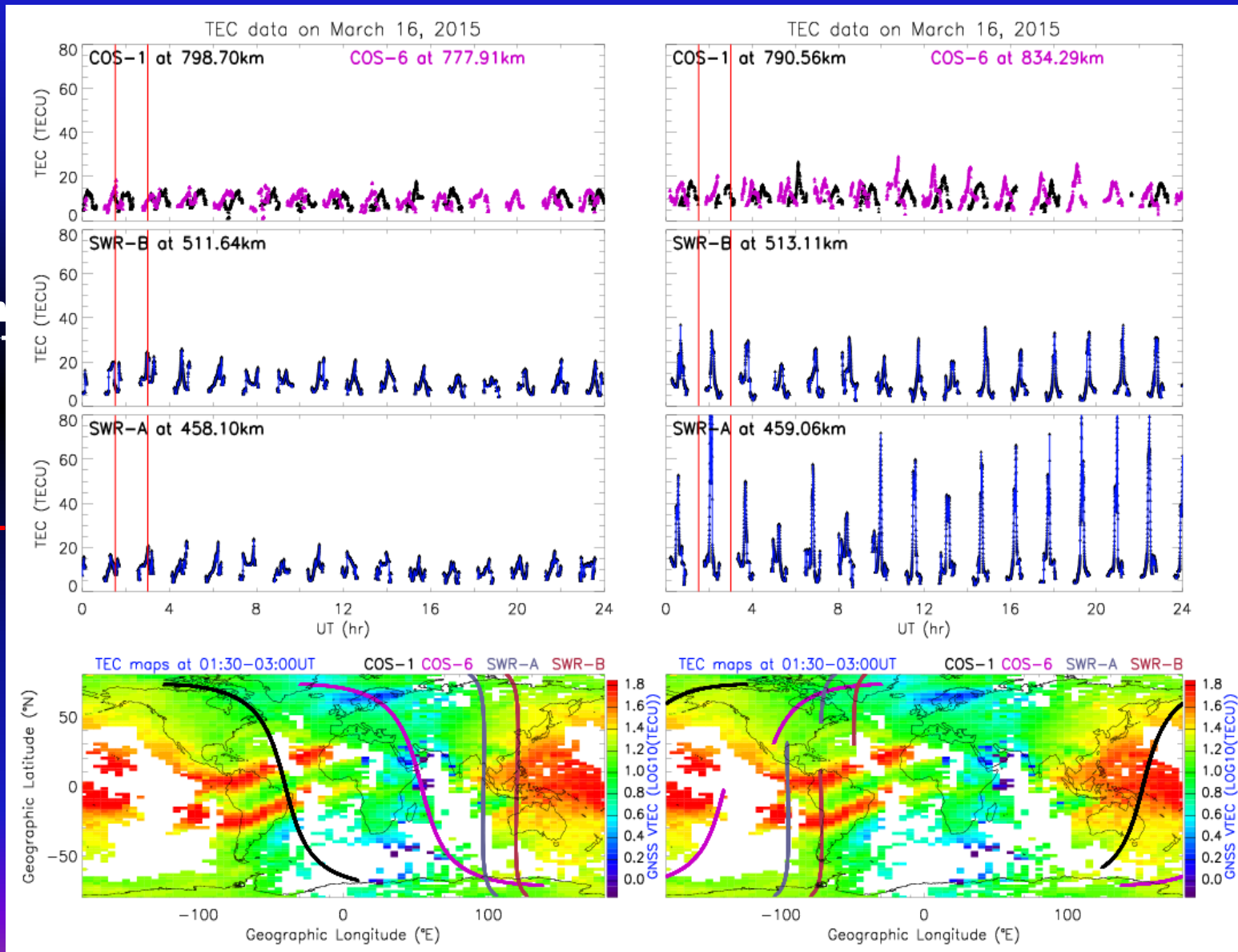
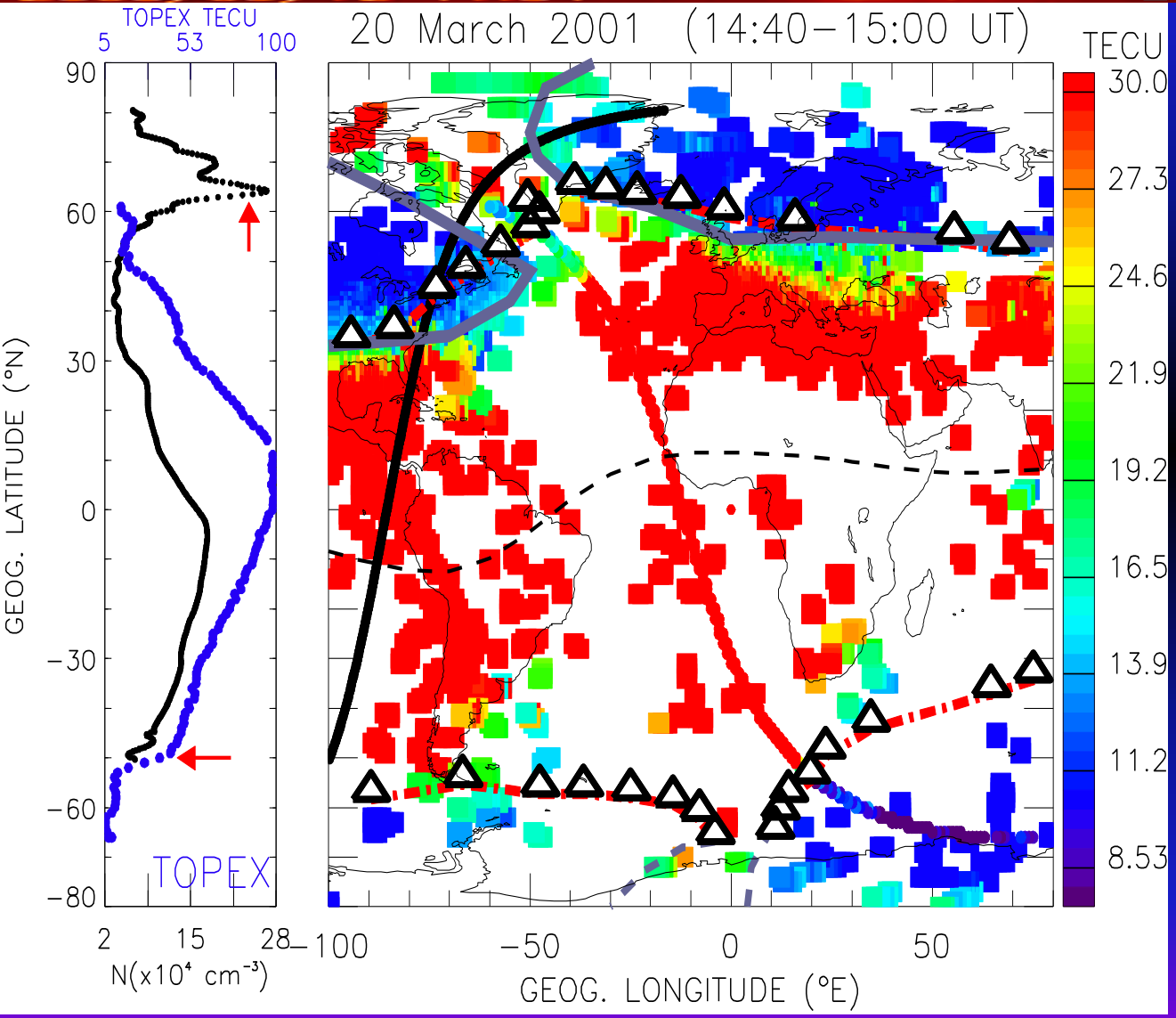
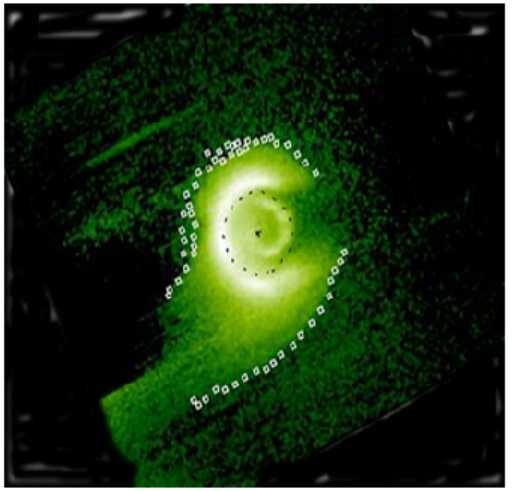
# Challenge #1: How much the plasmasphere contribute to the topside LEO TEC?

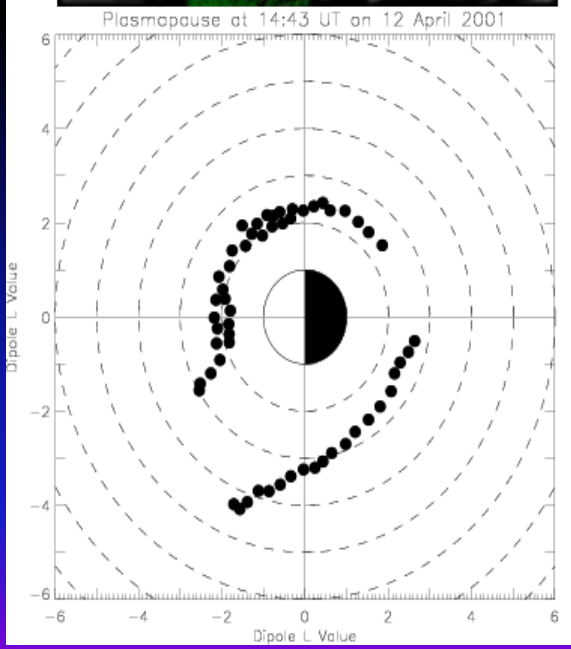


# Challenge #2: Does the plasmasphere contribute to the SED plume?

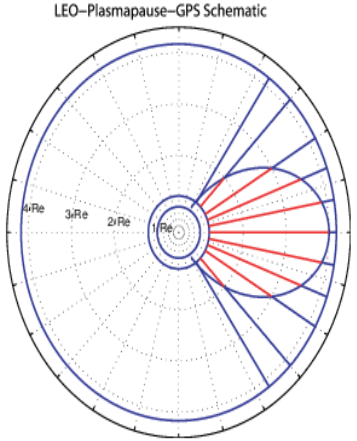


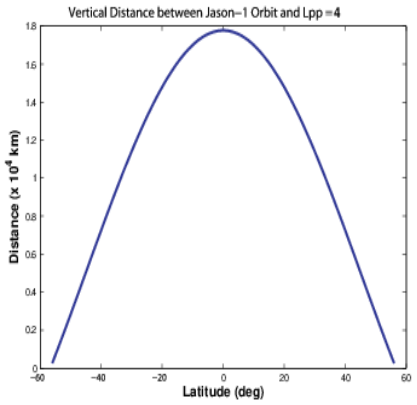



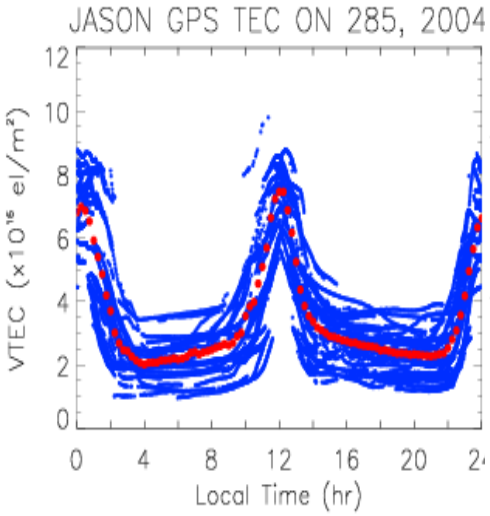


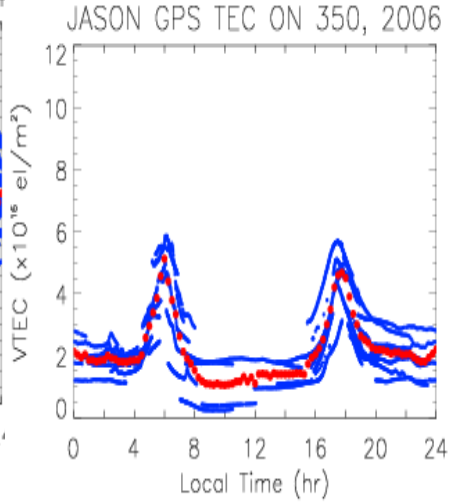

*Yizengaw et al., JGR, 2008*

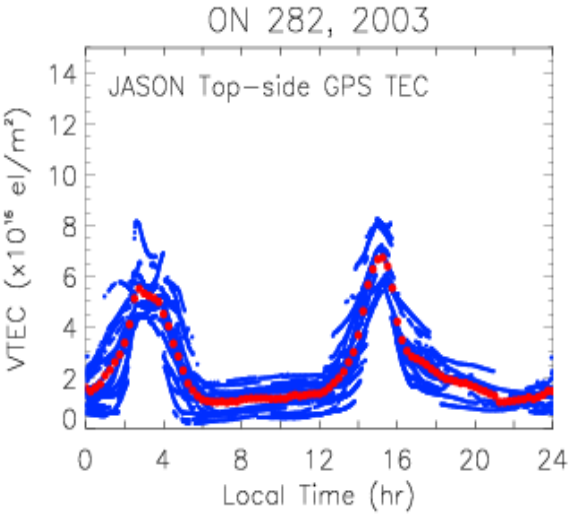
# Challenge #3: How much the plasmasphere contribute to GNSS TEC at different latitudes?

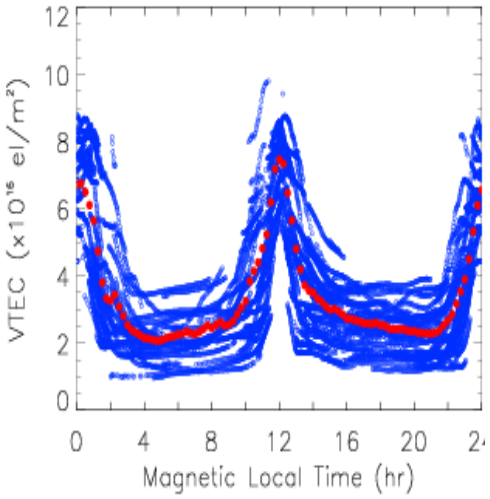


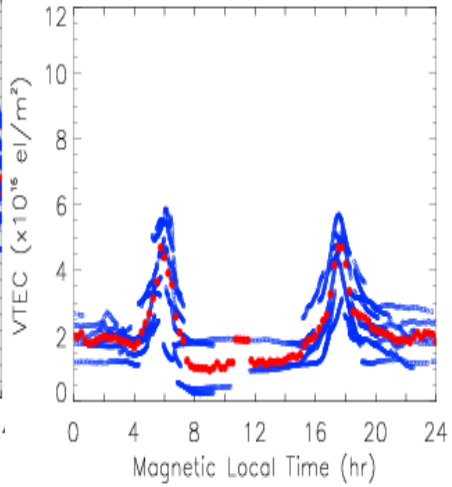



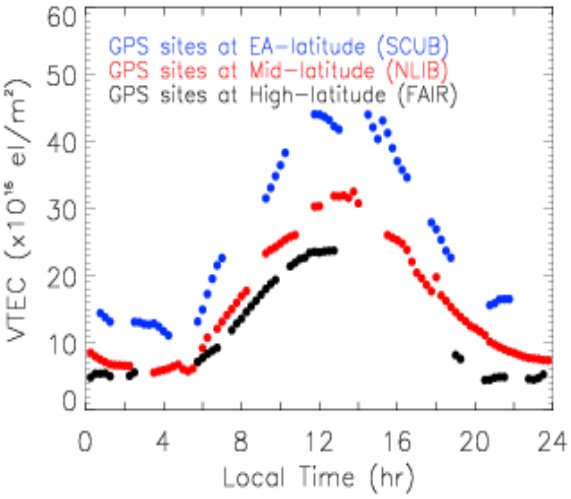



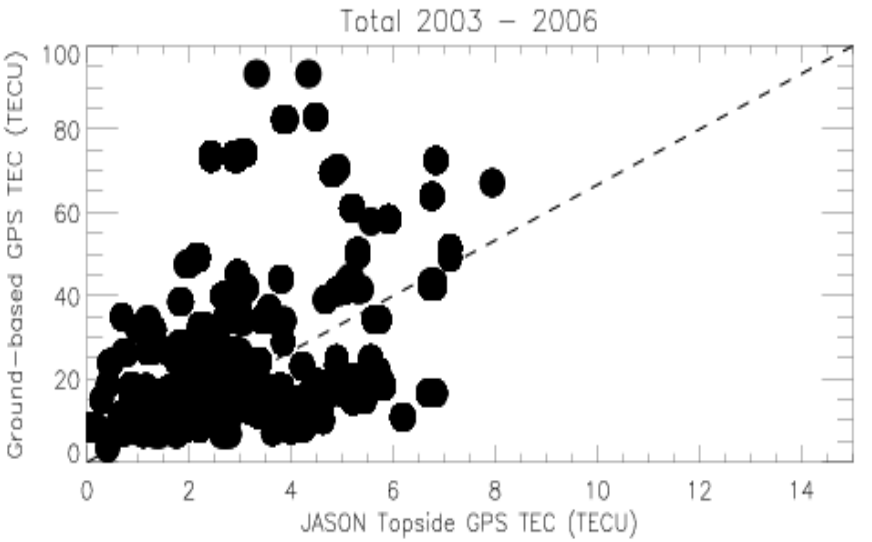



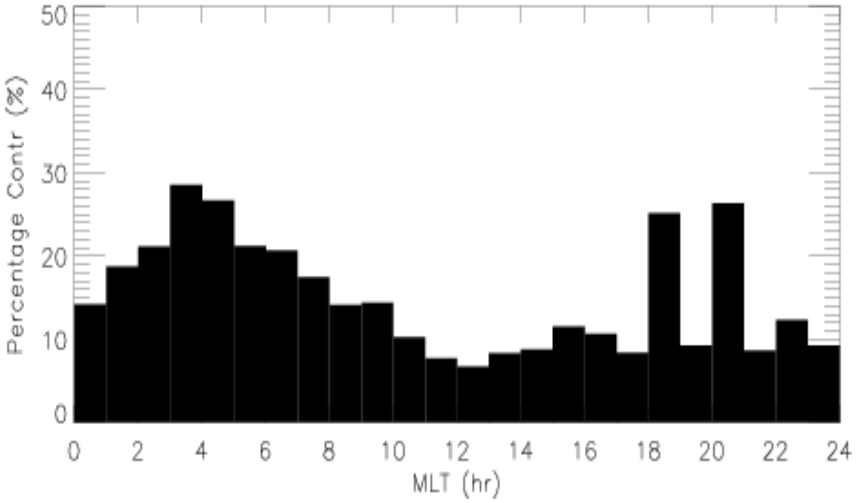



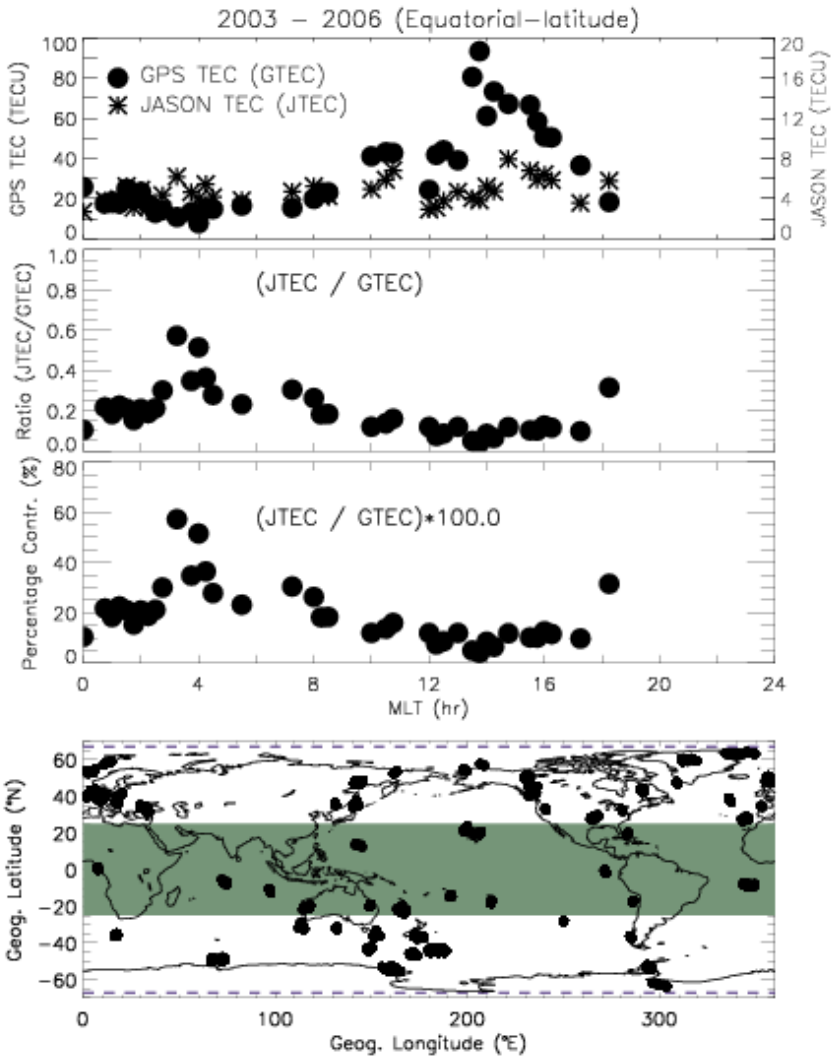




*Yizengaw et al., JASTP, 2008*

# Challenge #3: How much the plasmasphere contribute to GNSS TEC at different latitudes?

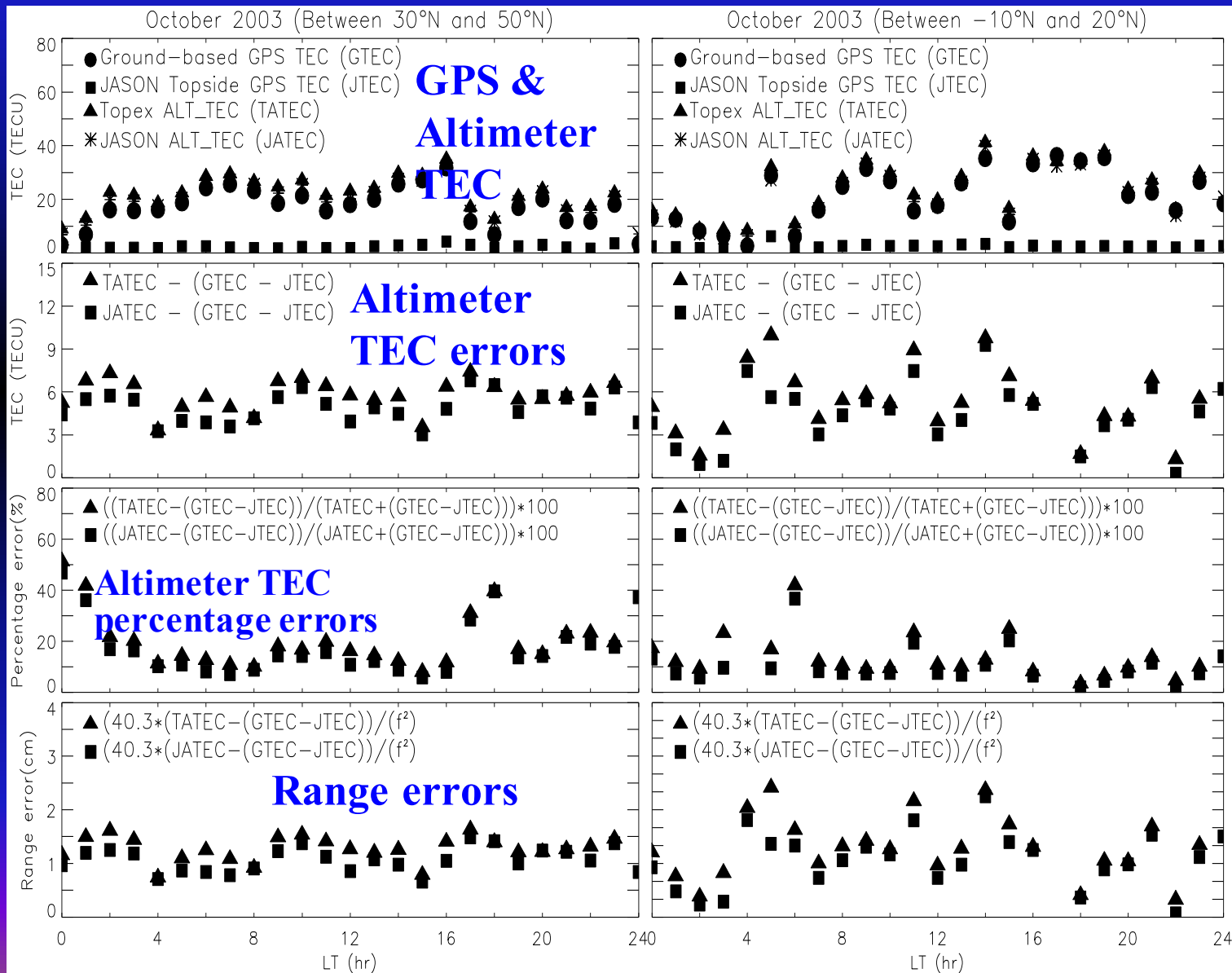



*Yizengaw et al., JASTP, 2008*

# Complementary challenge: How accurate are the GNSS and/or Altimeter TECs?

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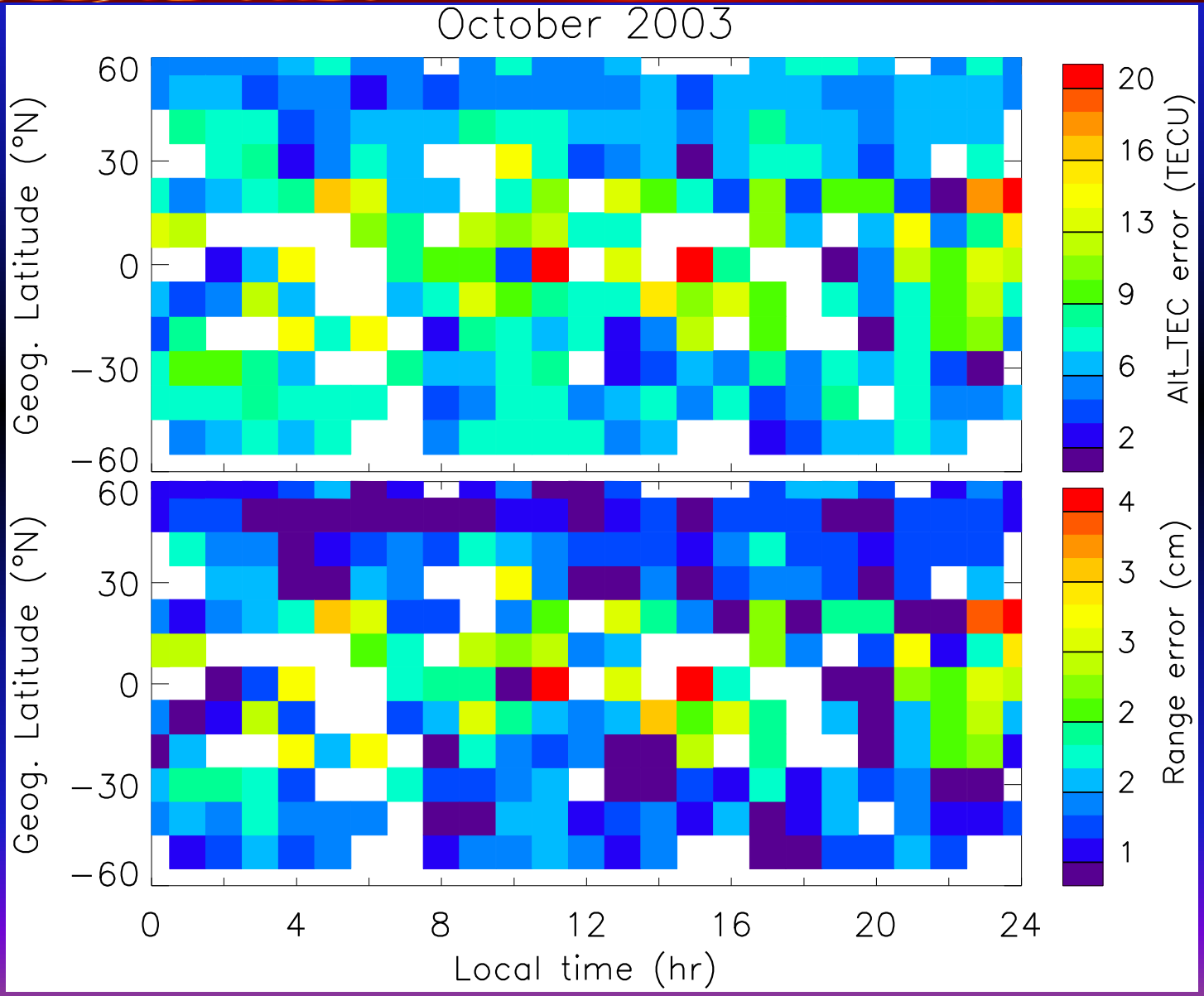

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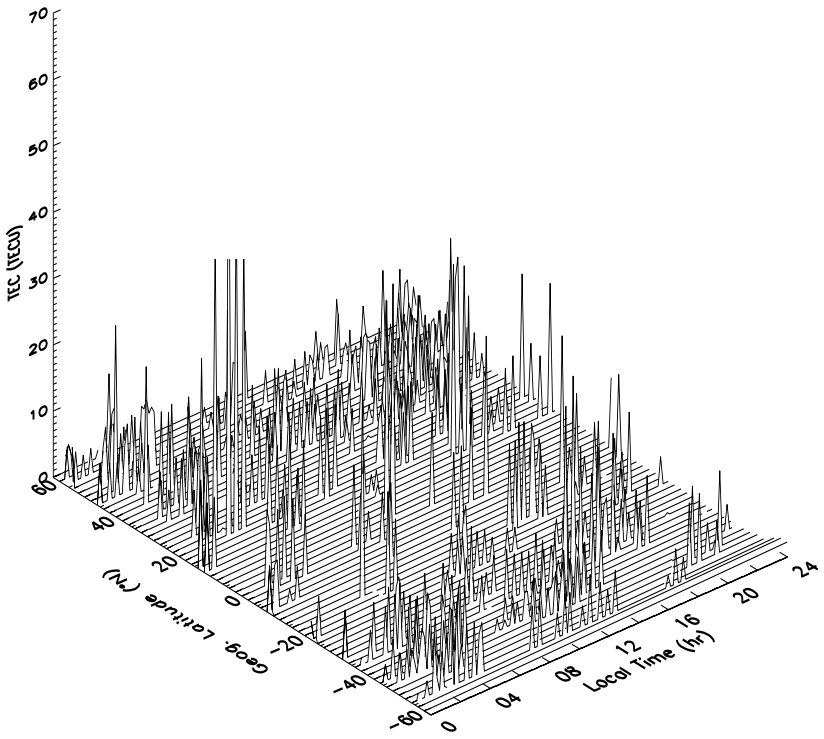
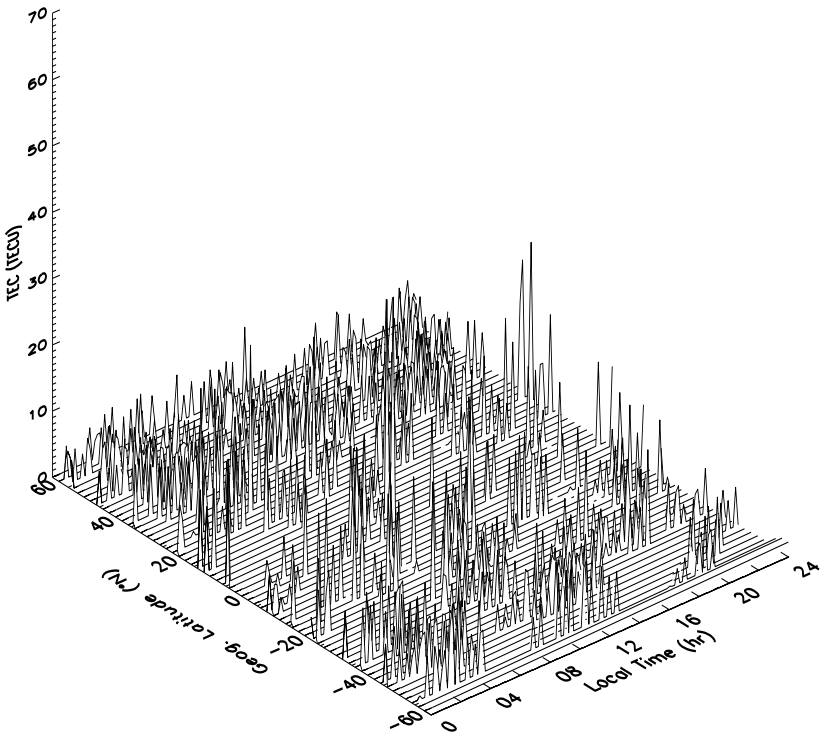
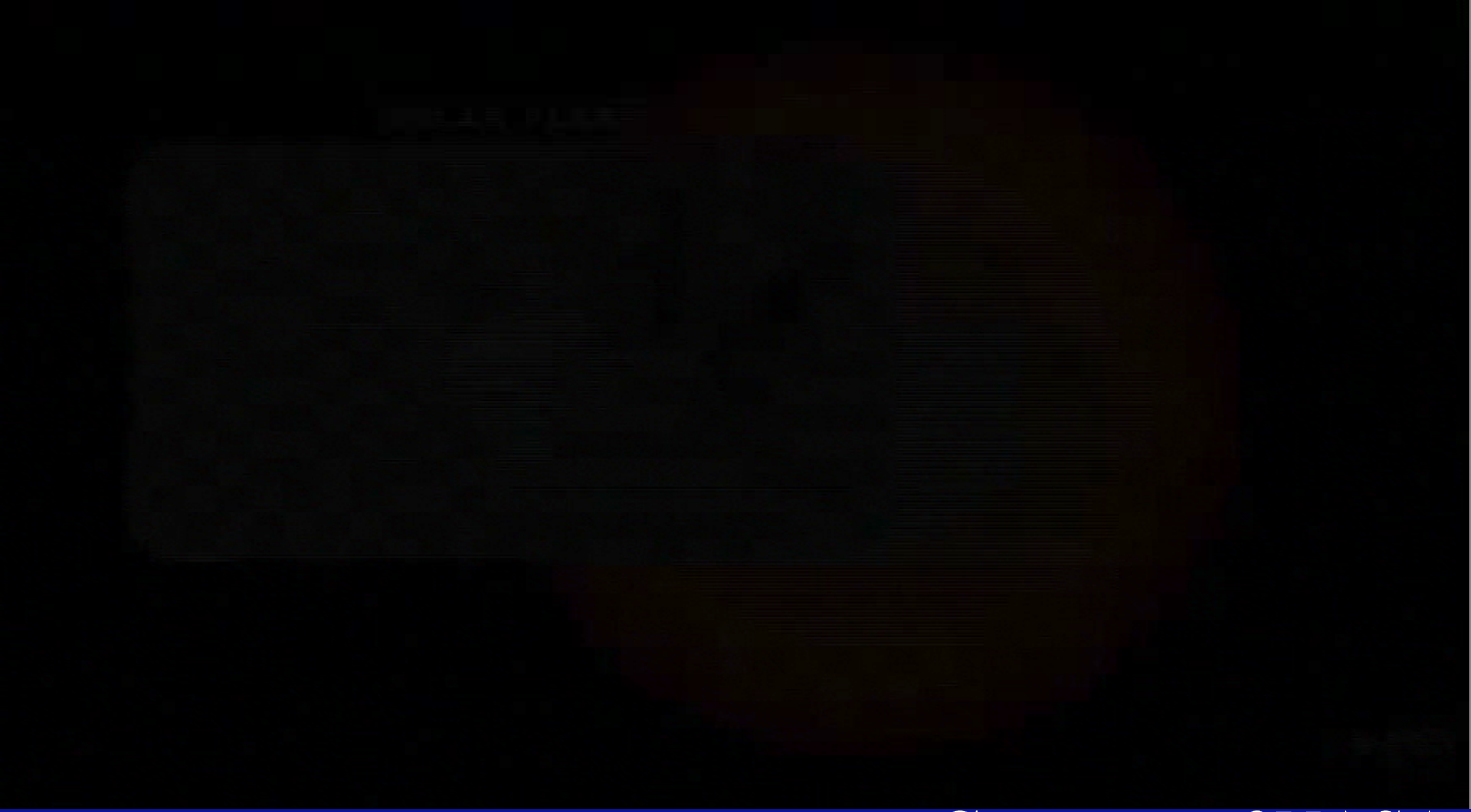


# Conclusion

- The general conclusion from the current global investigation is that the plasmasphere contributes significantly to total TEC, especially at night where its contribution can reach upto 60% at low latitudes.

- The plasmaspheric contribution appears to be higher at low latitudes where the GPS raypath traverse longer distance through the plasmasphere compared to its distance in the mid- and high-latitude region

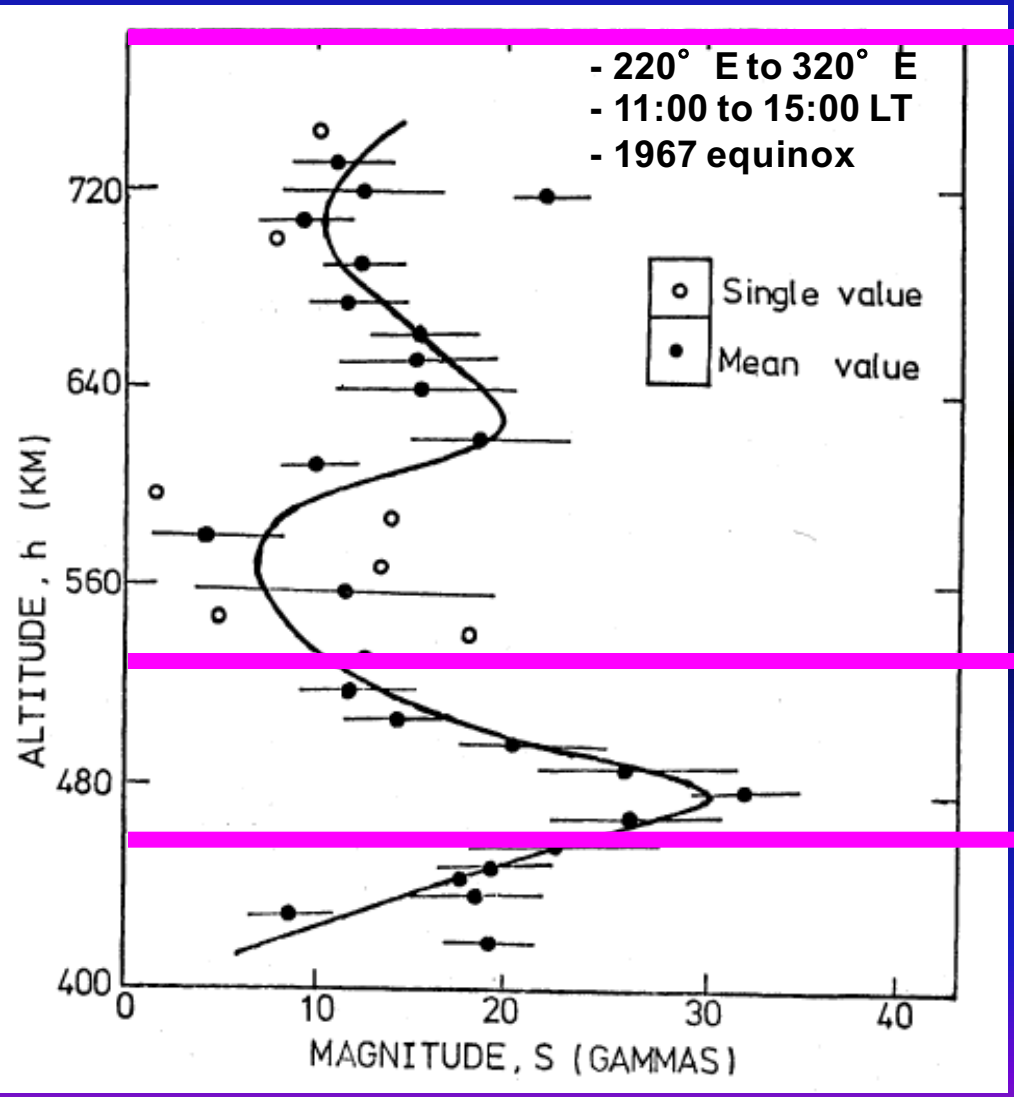


Courtesy of NASA

# Thank you!

# Altitude variability of Electrodynamics

**Altitude variation of the EEJ magnitude estimated from the Polar Orbiting Geophysical Observatory (POGO) satellite**




**DMSP 16 at ~ 870km altitude**
**Suitable Local time coverage**
**16:00 – 17:00 LT**

**SWARM B at ~ 530km altitude**
**Suitable Local time coverage**
**10:30 – 11:30 LT**

**SWARM A at ~ 460km altitude**
**Suitable Local time coverage**
**10:30 – 11:30 LT**

*Onwumechili, JGG, 1985*

# Electrodynamics at different altitudes

**SWARM A @ 11:00 LT** **SWARM B @ 11:00 LT** **DMSP 16 @ 16:30 LT**