GPS RO Soundings for DYNAMO

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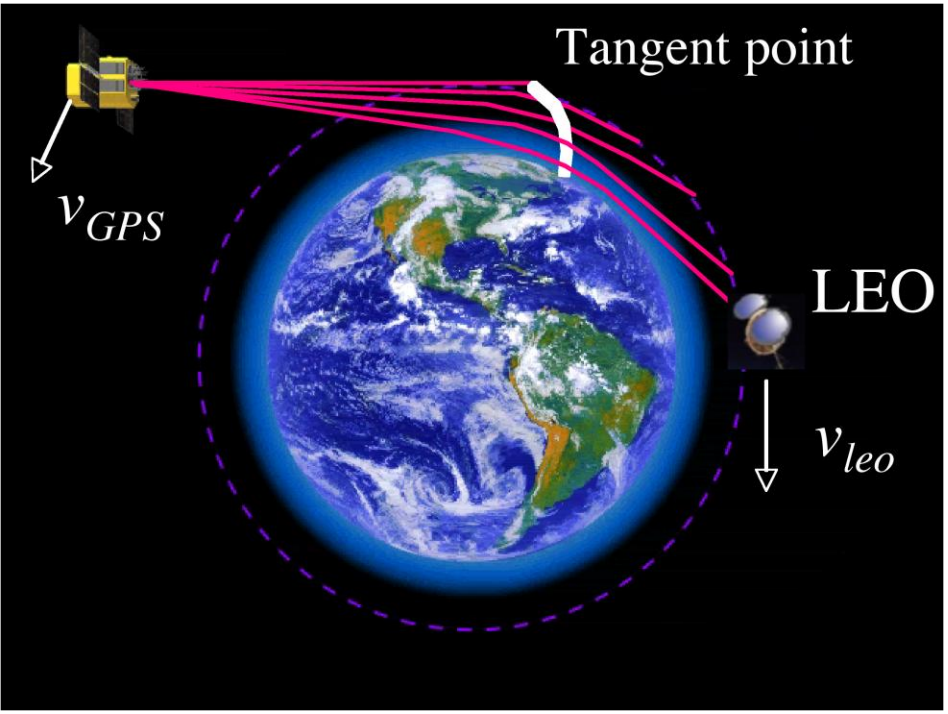
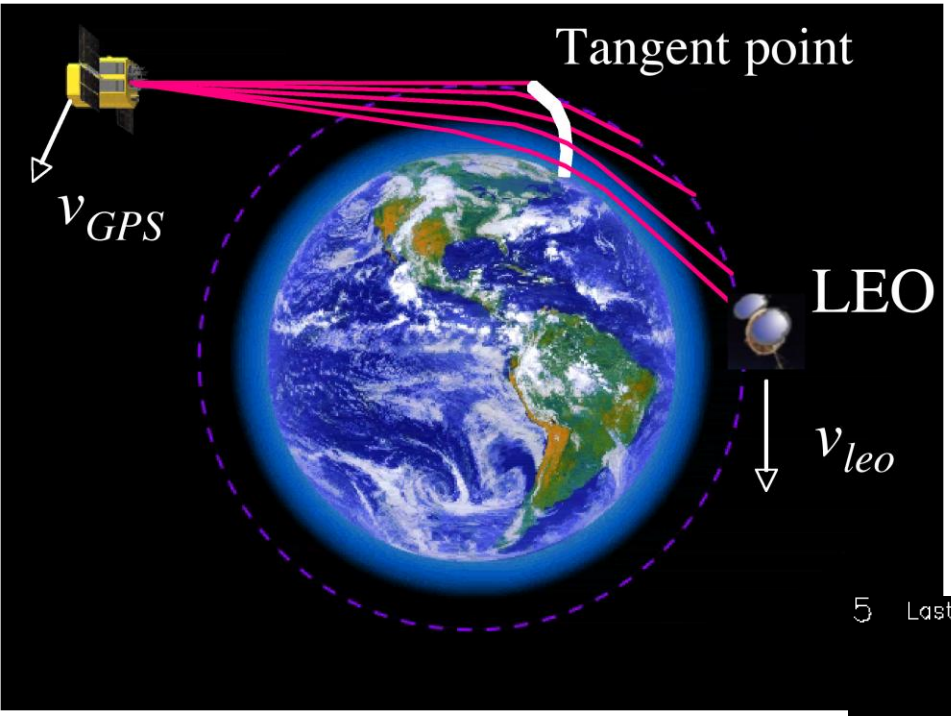
UCAR COSMIC



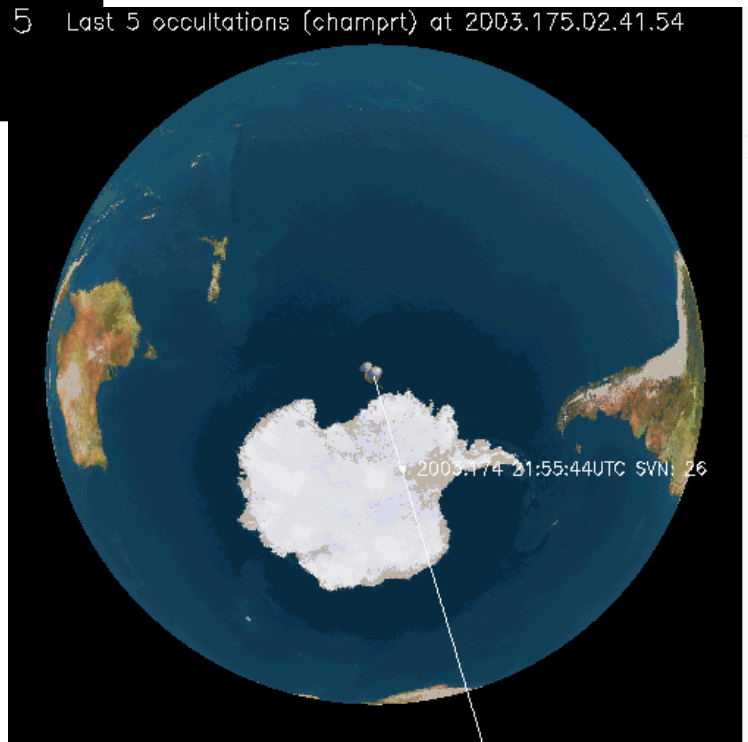
The LEO tracks the GPS phase while the signal is occulted to determine the Doppler

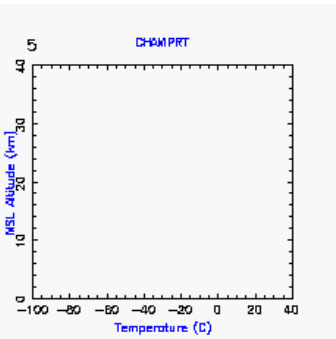
The velocity of GPS relative to LEO must be estimated to ~0.2 mm/sec (velocity of GPS is ~3 km/sec and velocity of LEO is ~7 km/sec) to determine precise temperature profiles



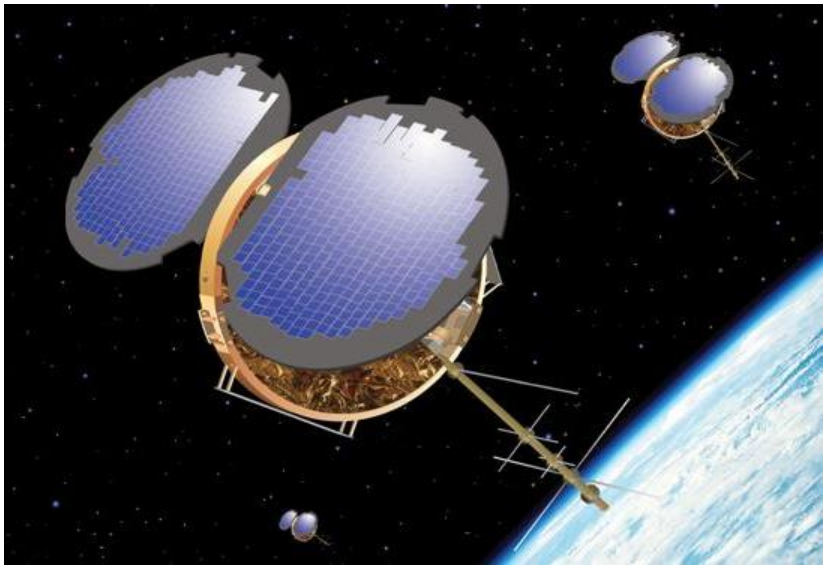
The LEO tracks the GPS phase while the signal is occulted to determine the Doppler

The velocity of GPS relative to LEO must be estimated to **~0.2 mm/sec** (20 ppb) to determine precise temperature profiles





COSMIC (Constellation Observing System for Meteorology, Ionosphere and Climate)



- 6 Satellites was launched:
  01:40 UTC 15 April 2006
- Three instruments:
  GPS receiver, TIP, Tri-band beacon
- Weather + Space Weather data
- Global observations of:
  Pressure, Temperature, Humidity
  Refractivity
  Ionospheric Electron Density
  Ionospheric Scintillation
- Demonstrate quasi-operational GPS limb sounding with global coverage in near-real time
- Climate Monitoring
- COSMIC's expected mission life is April 2011. However, we anticipate it will continue to operate through 2014, with possibility of some degradation.

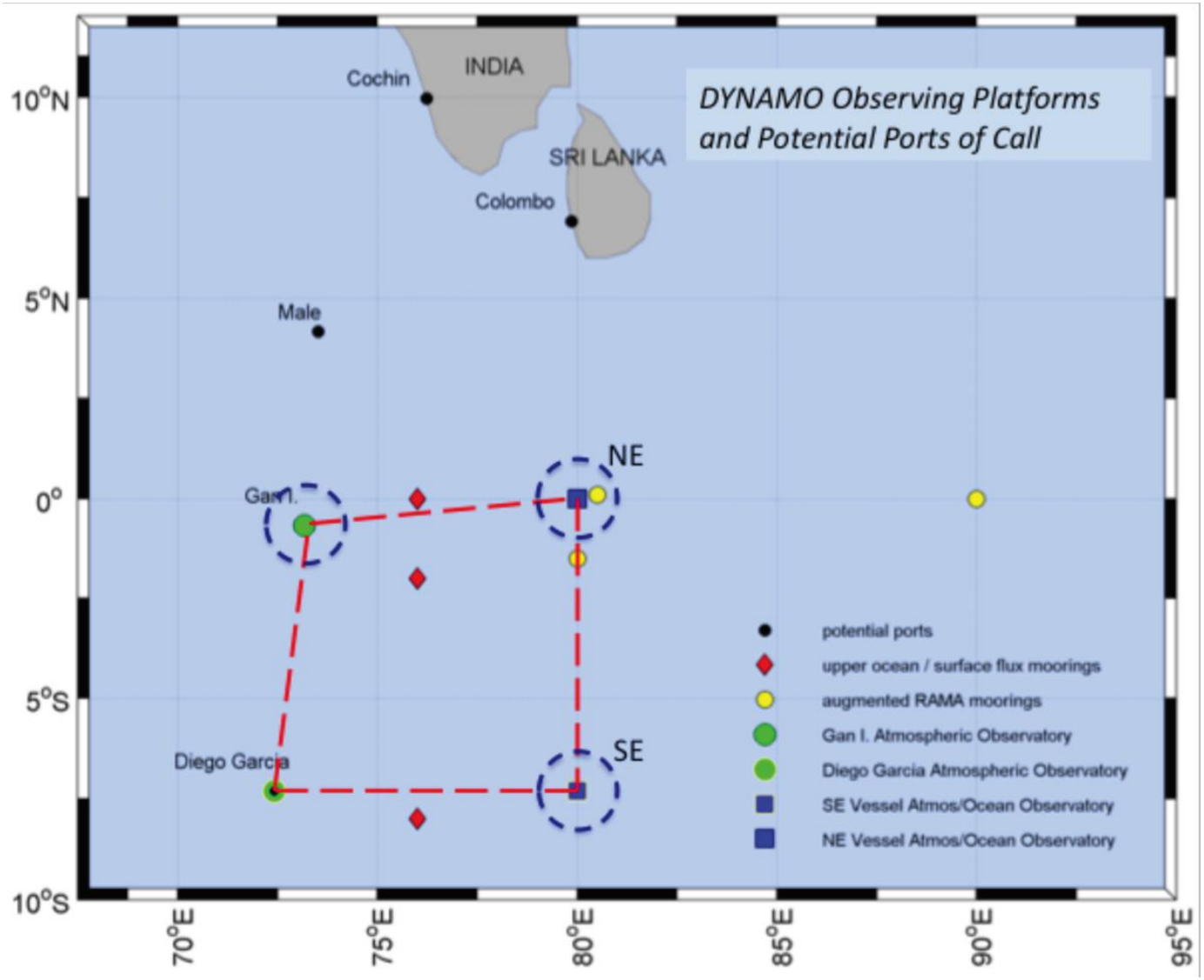
A Joint Taiwan-U.S. Mission

FORMOSAT-3 in Taiwan

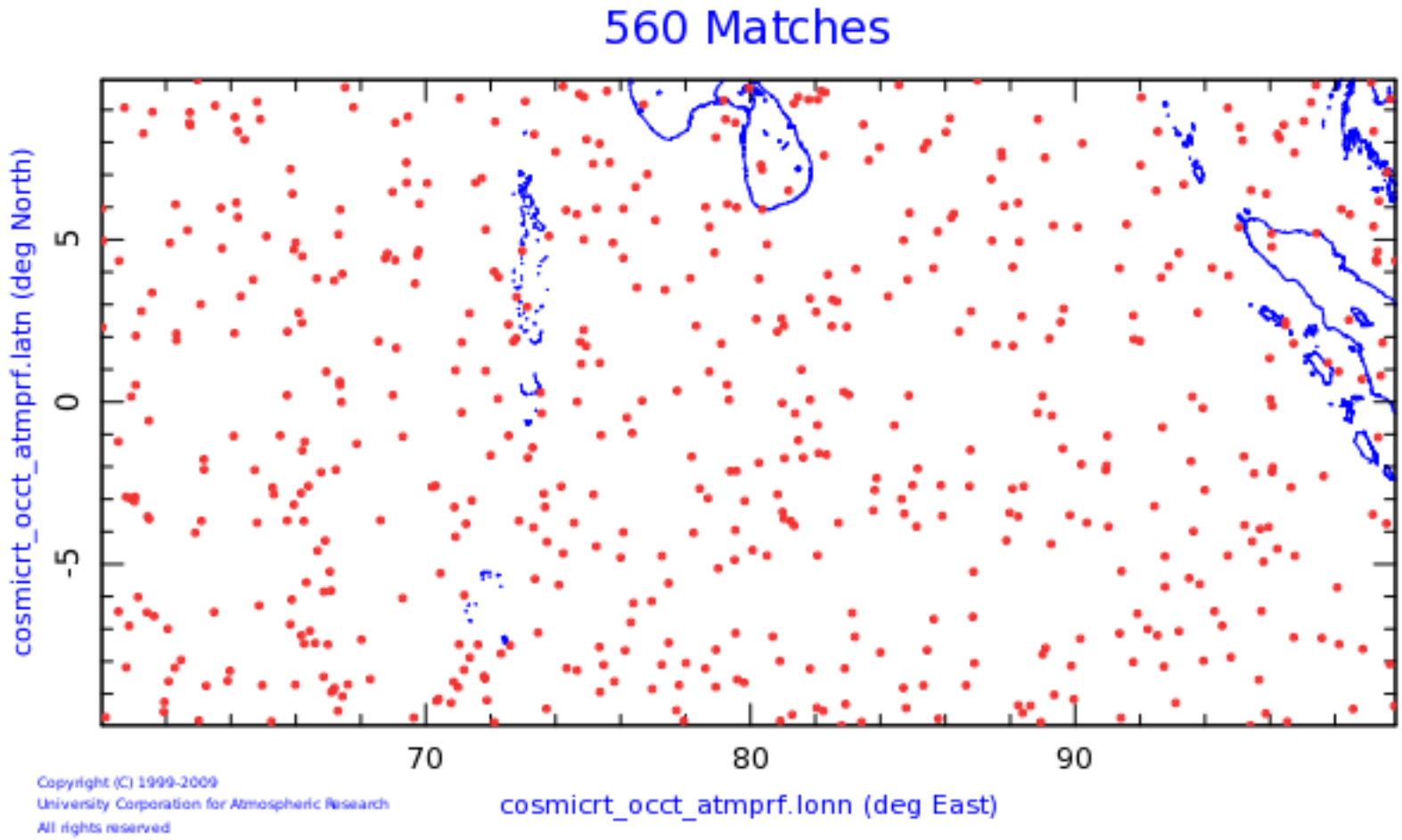
What does COSMIC provide?

- COSMIC provide GPS radio occultation soundings (as a function of height):
  - Bending angles
  - Refractivity (e.g., density)
  - Retrieved temperature and moisture (through 1-D Var)
- Derived products:
  - PBL height
  - Tropopause height
- Provide COSMIC soundings in real-time during DYNAMO
- Predicted COSMIC sounding location in the next two weeks

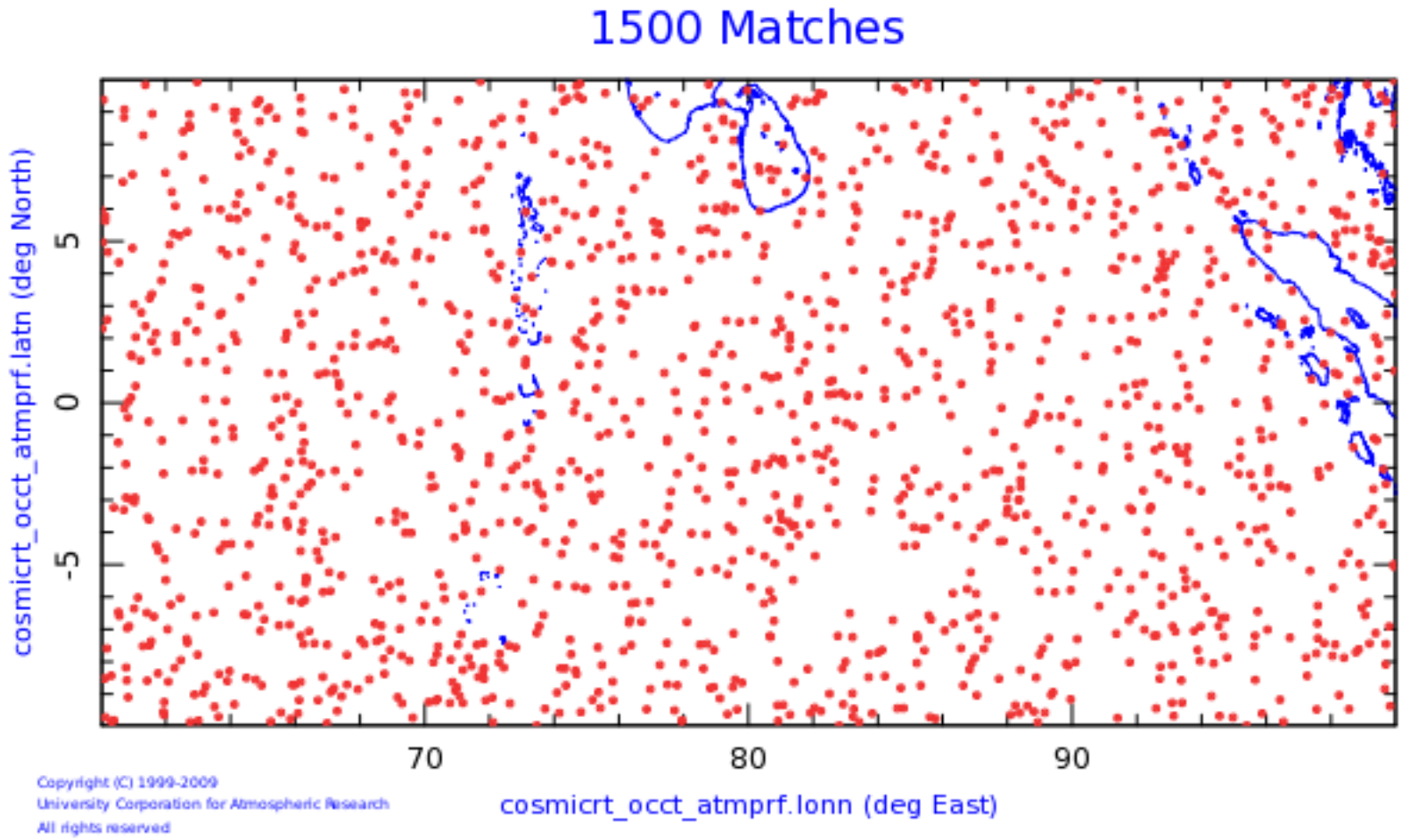
DYNAMO Observing Platforms



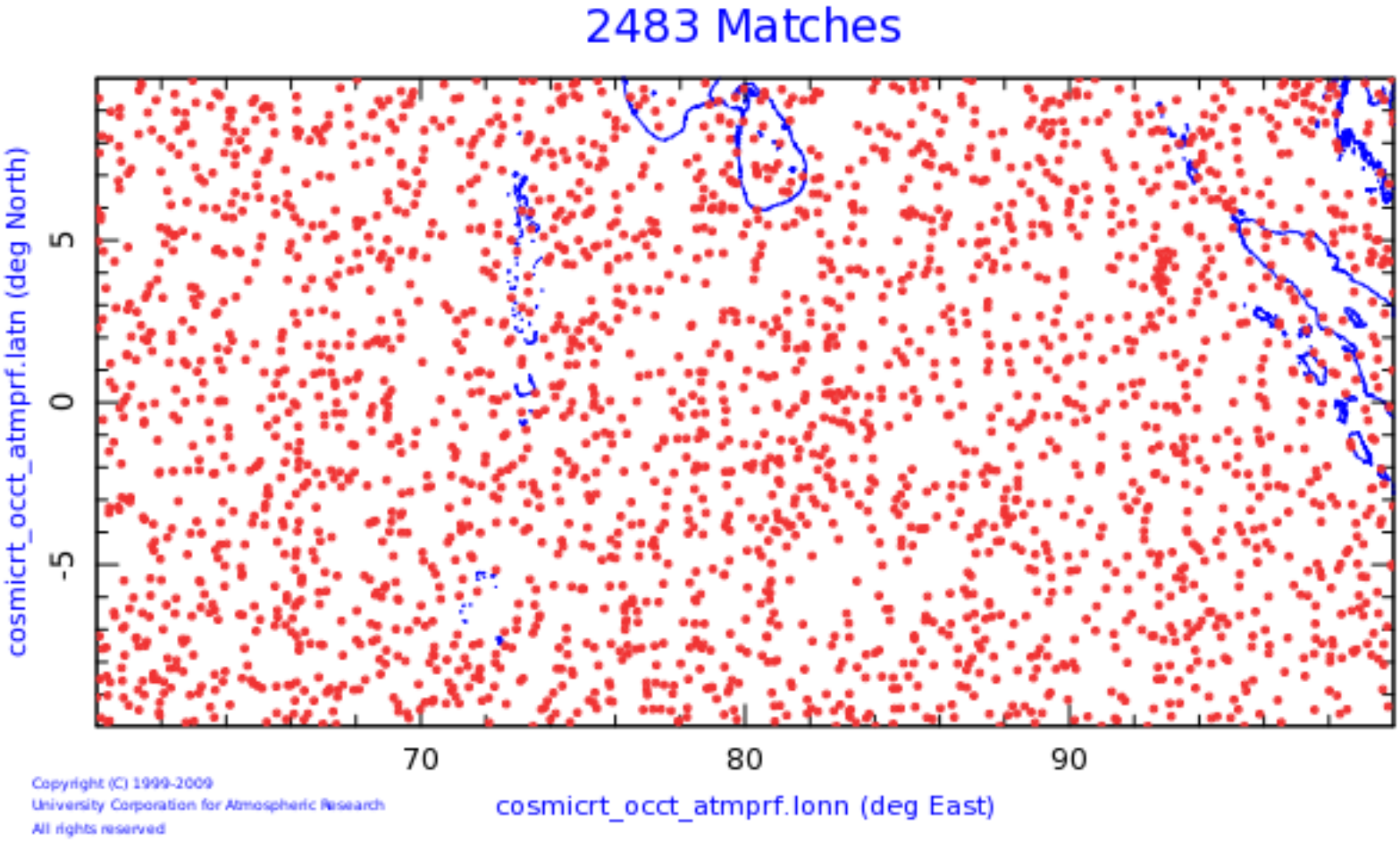
October 1, 2009 – November 9, 2009



October 1, 2009 – January 15, 2010



October 1, 2009 – March 31, 2010



Typical Skew-T plot from COSMIC