

An aerial photograph of a valley in Jicamarca, Peru. The foreground shows a small facility with several buildings and a paved area. The middle ground is a wide, flat valley floor. In the background, there are large, rugged mountains under a blue sky with some clouds.

A heating facility for Jicamarca

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- queried at various times by AFOSR, ONR, NRL, AFRL, NSF, others
- why here, why now?

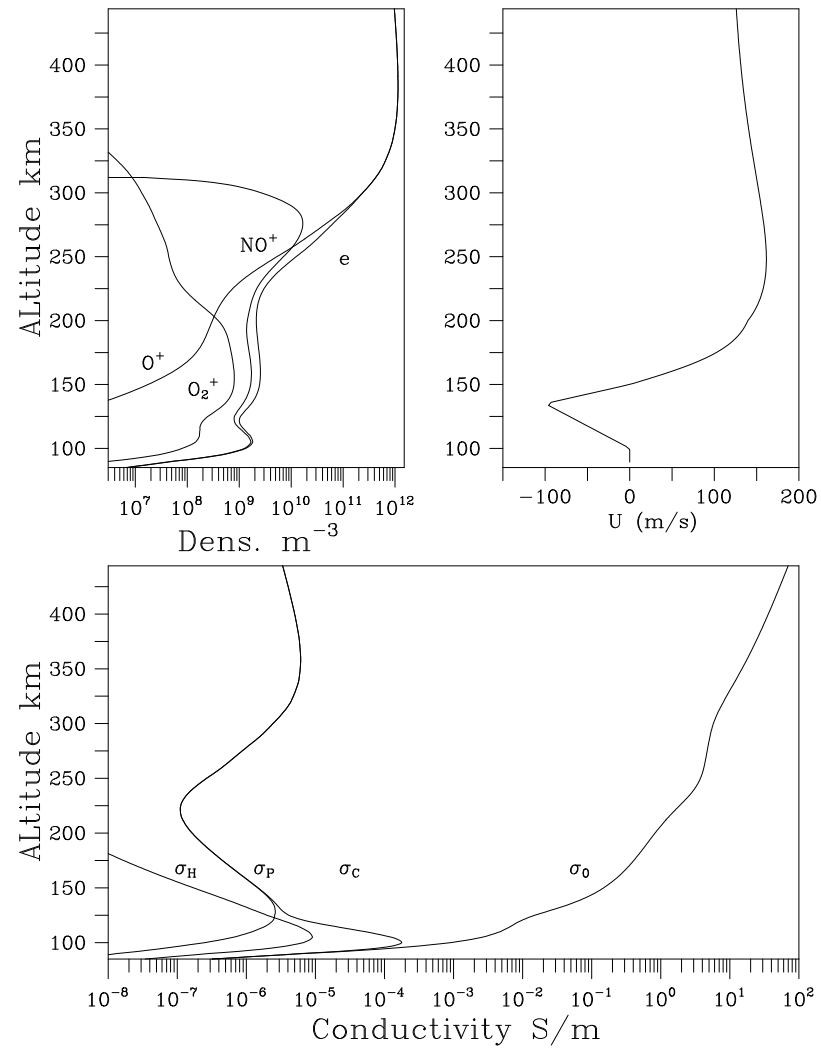
General advantages of magnetic equator:

- relatively stable background conditions
- less absorption, more ionization
- equatorial electrojet more reliable than auroral electrojet

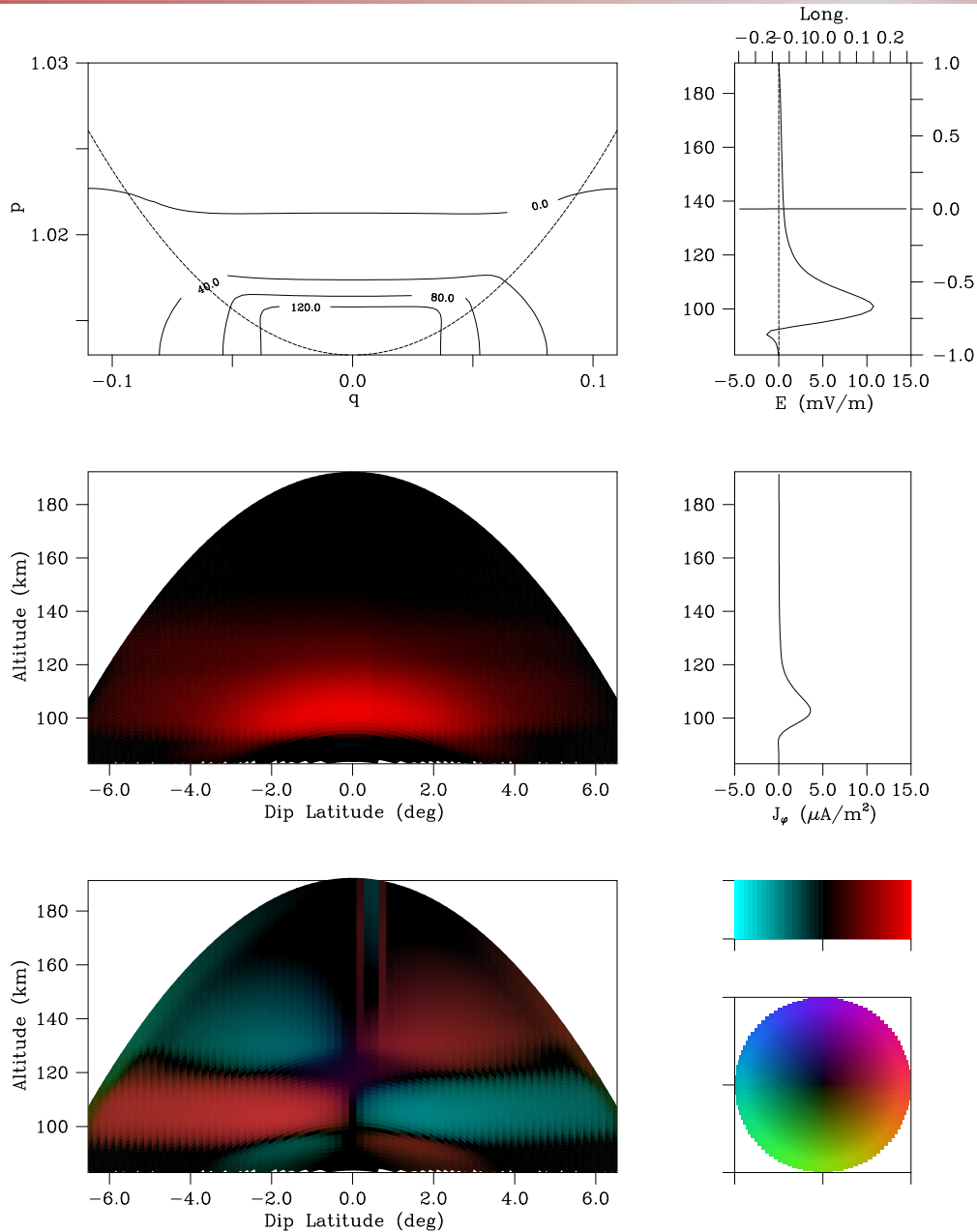
Specific features:

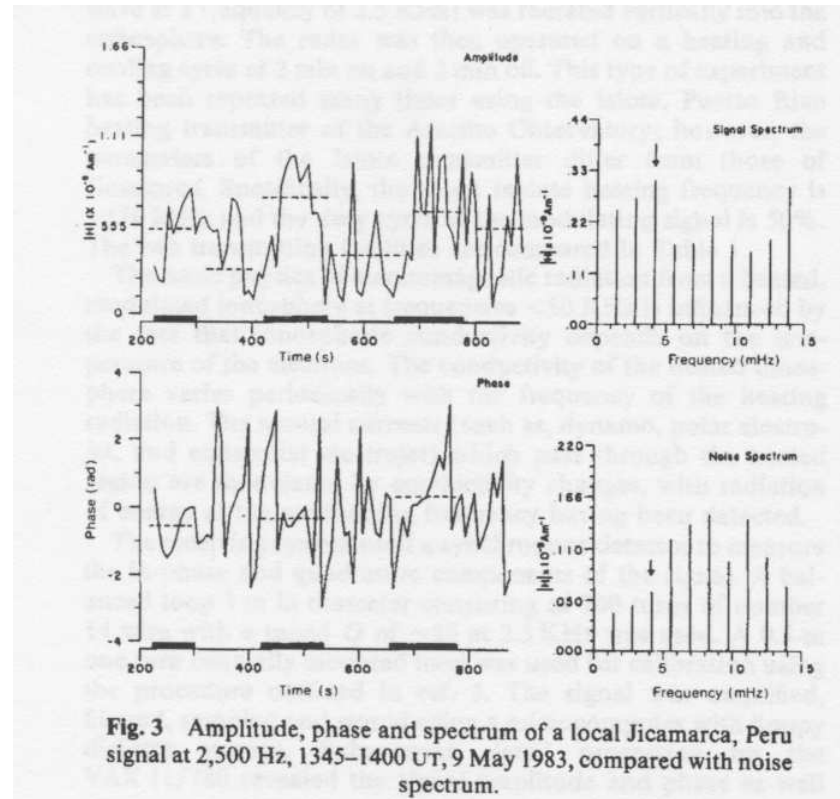
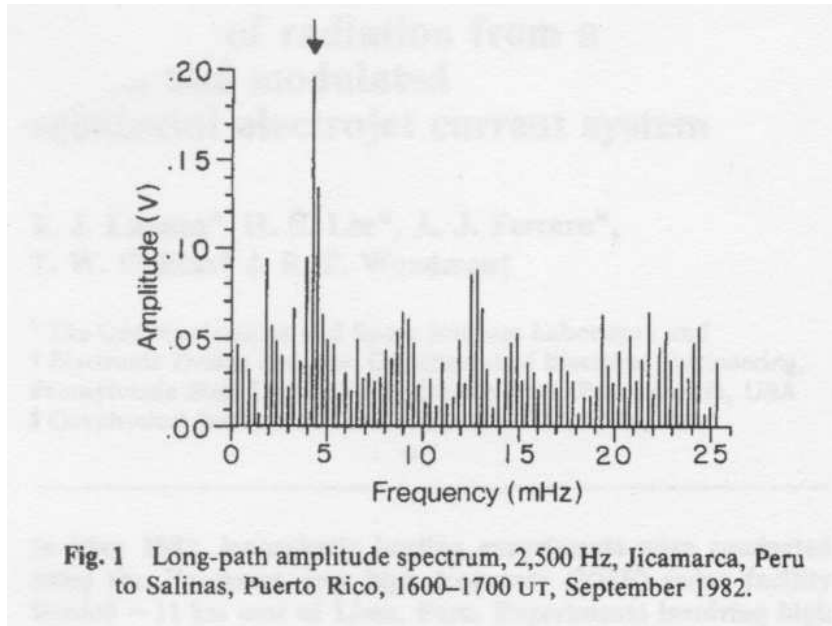
- VLF/ELF generation
- artificial periodic inhomogeneities and spread F
- electrojet thermal parametric instabilities
- Langmuir turbulence

VLF/ELF generation



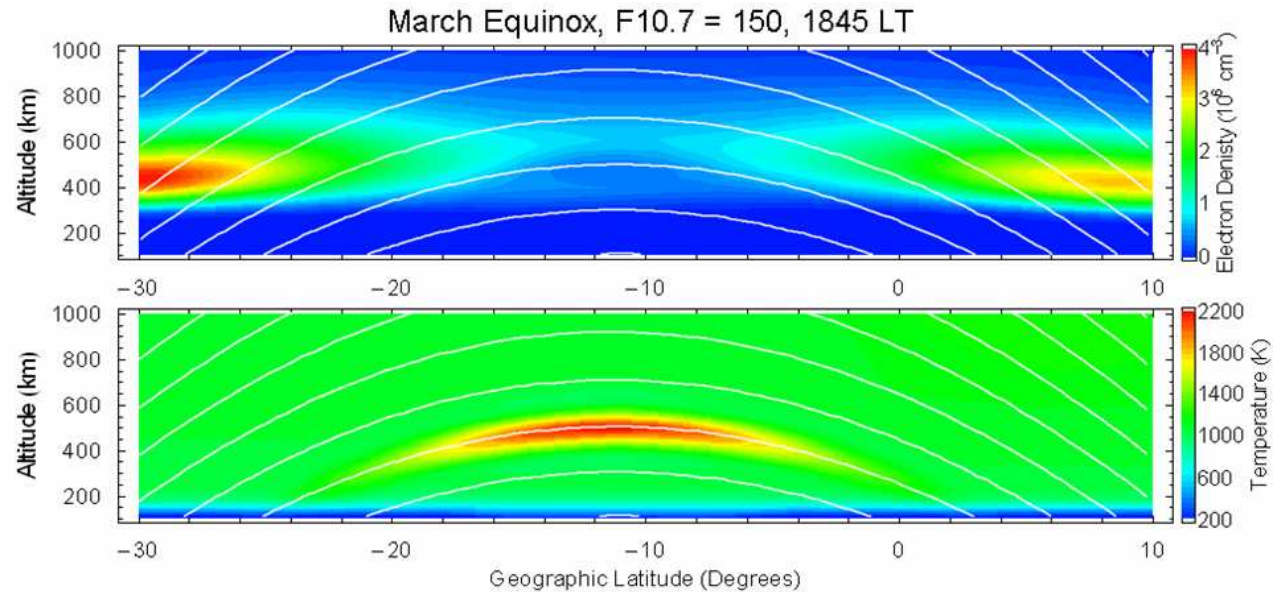
VLF/ELF generation

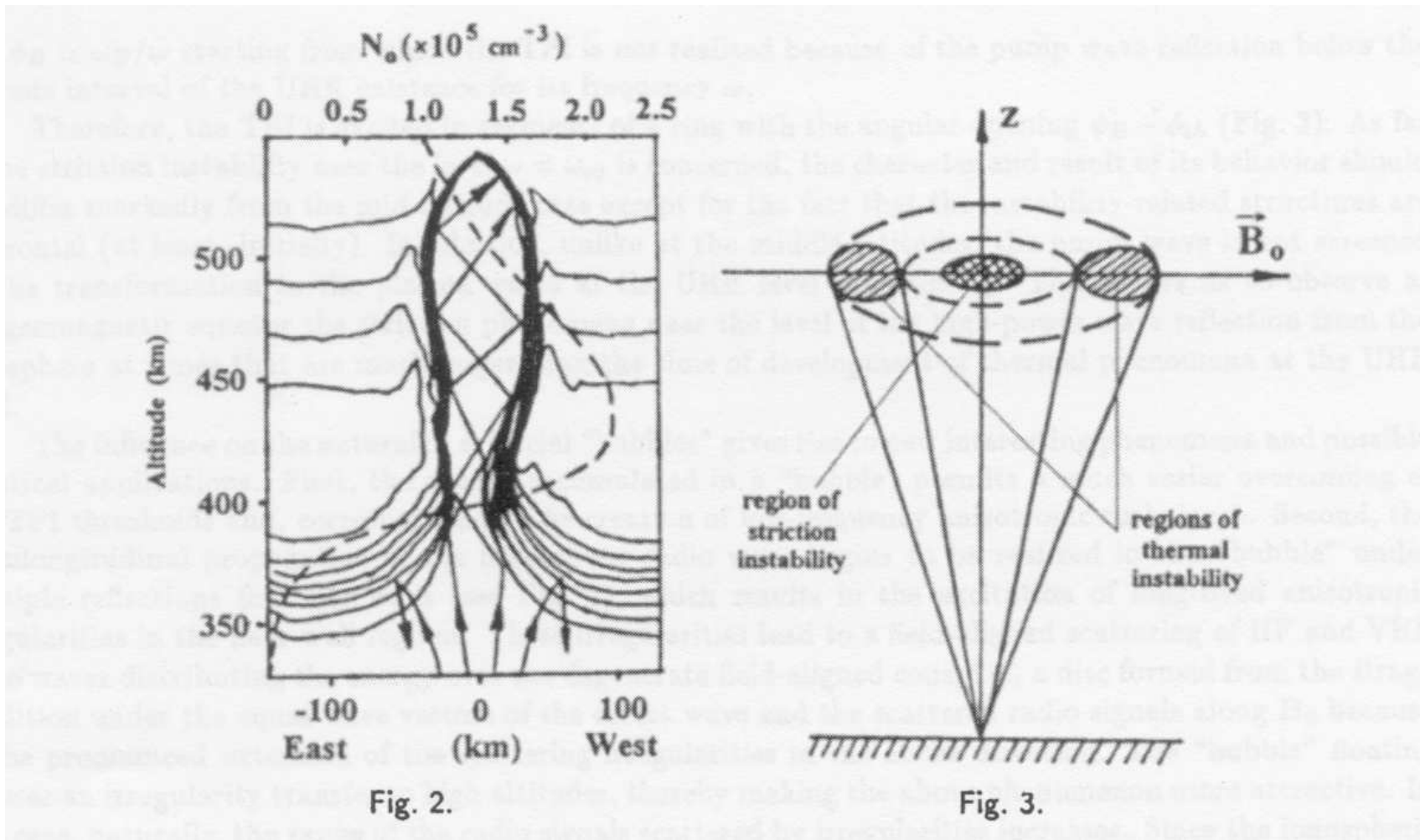




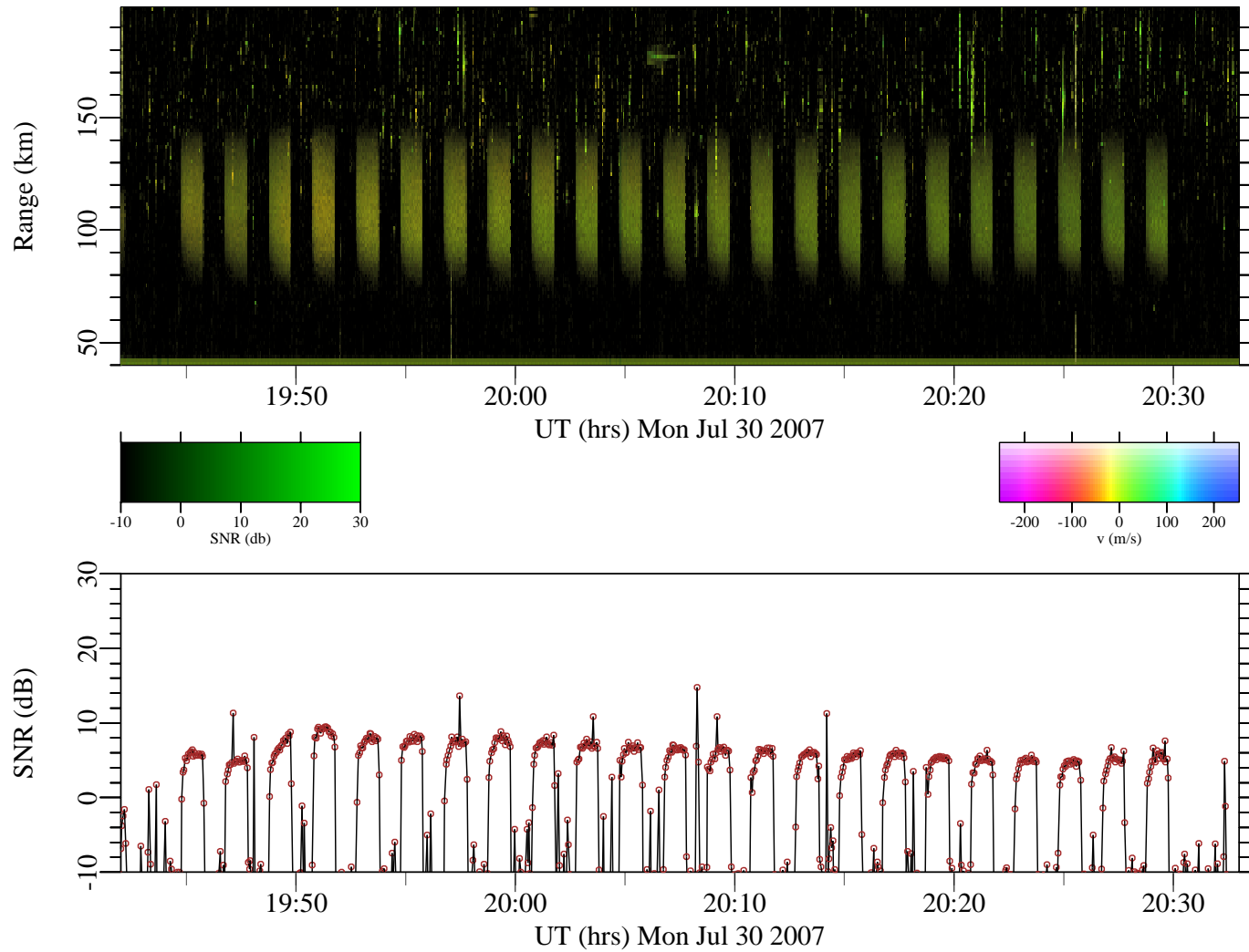
- Lunnen et al., *Nature*, 311(13), 134, 1984
- N. Lehtinen, URSI GA, Chicago, Aug. 11–16, 2008
- 2006 BAE Systems patent

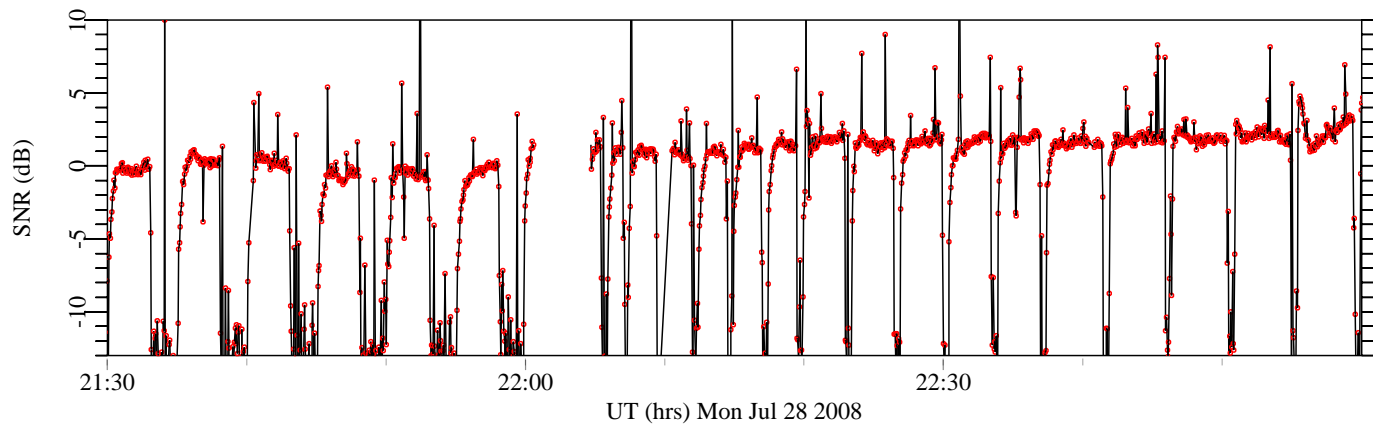
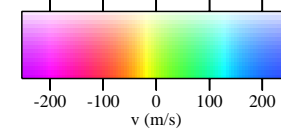
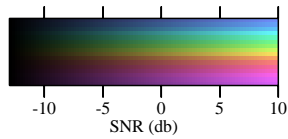
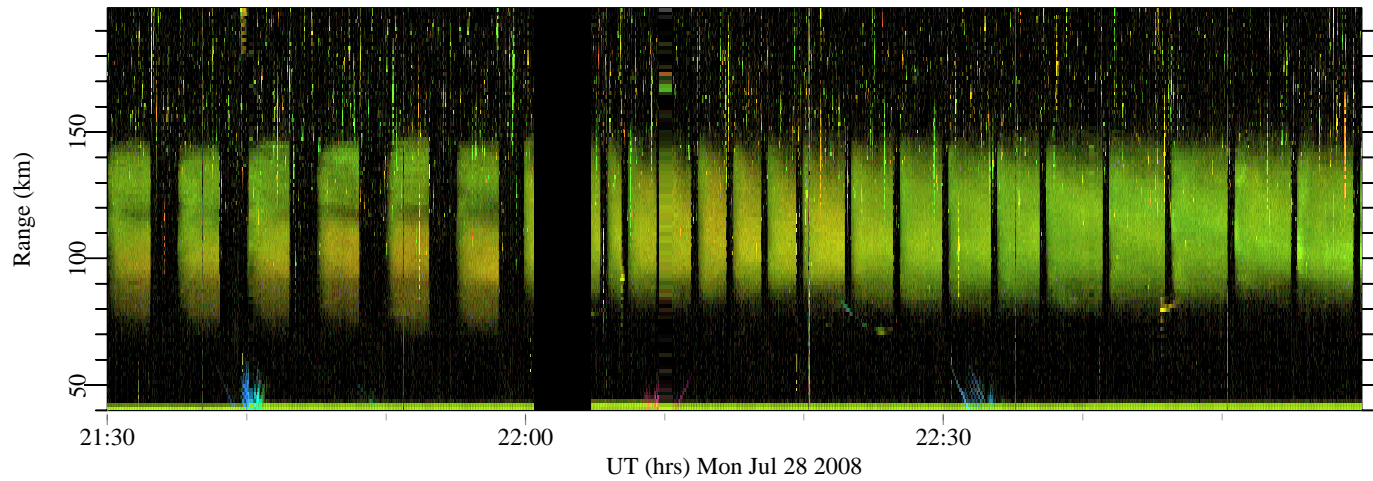
Heated Field Line at 7.9 MHz (7.8 10^5 cm⁻³) 283o Longitude Equatorial Ionosphere

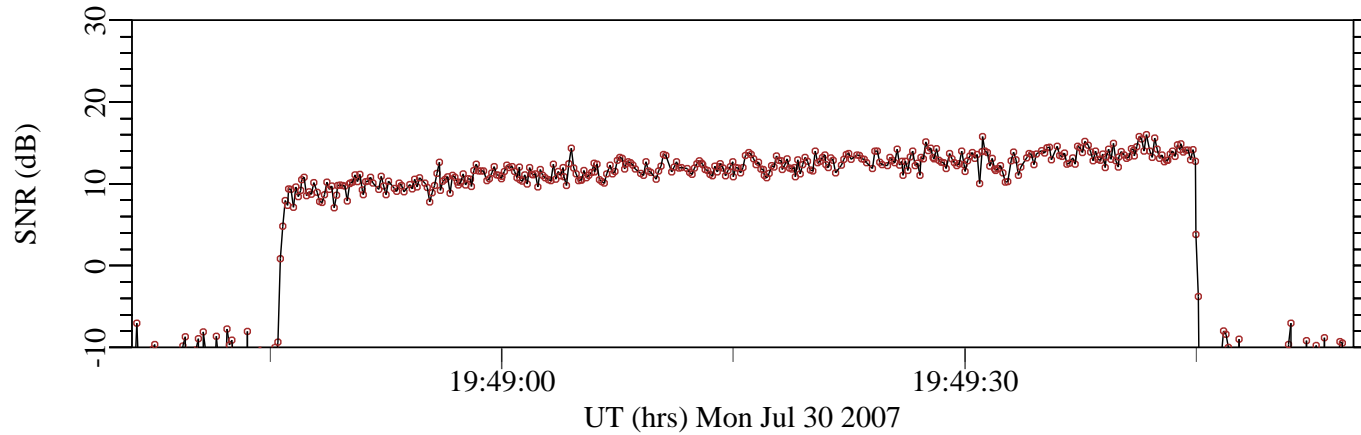
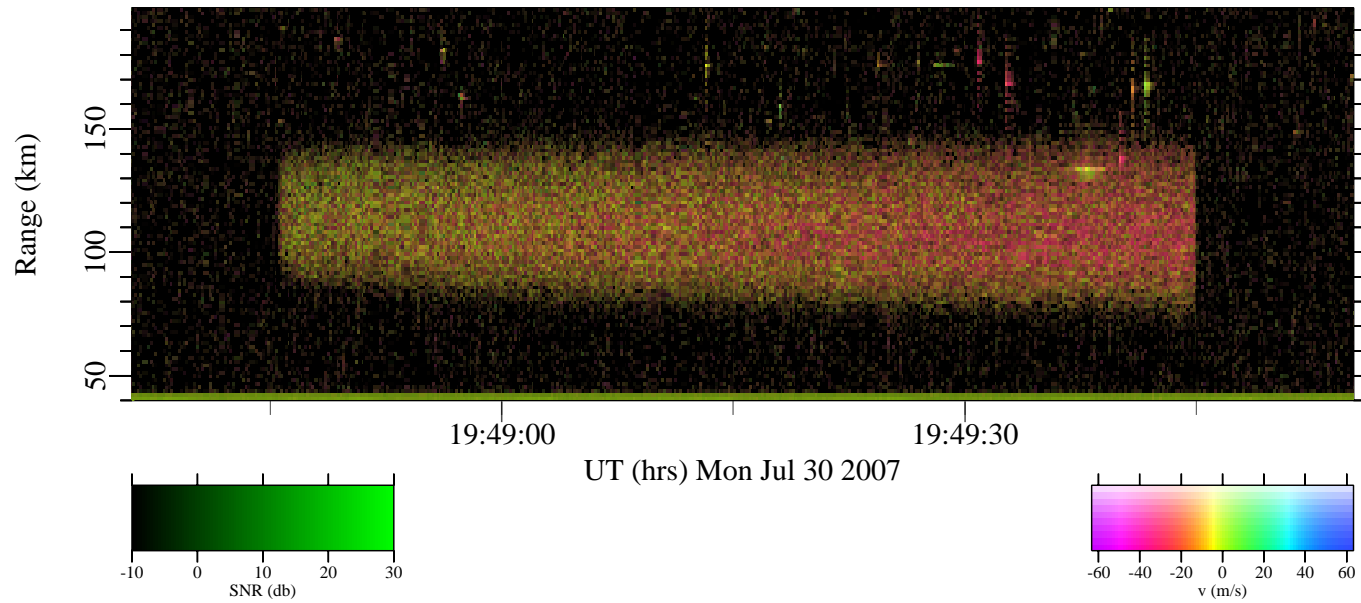




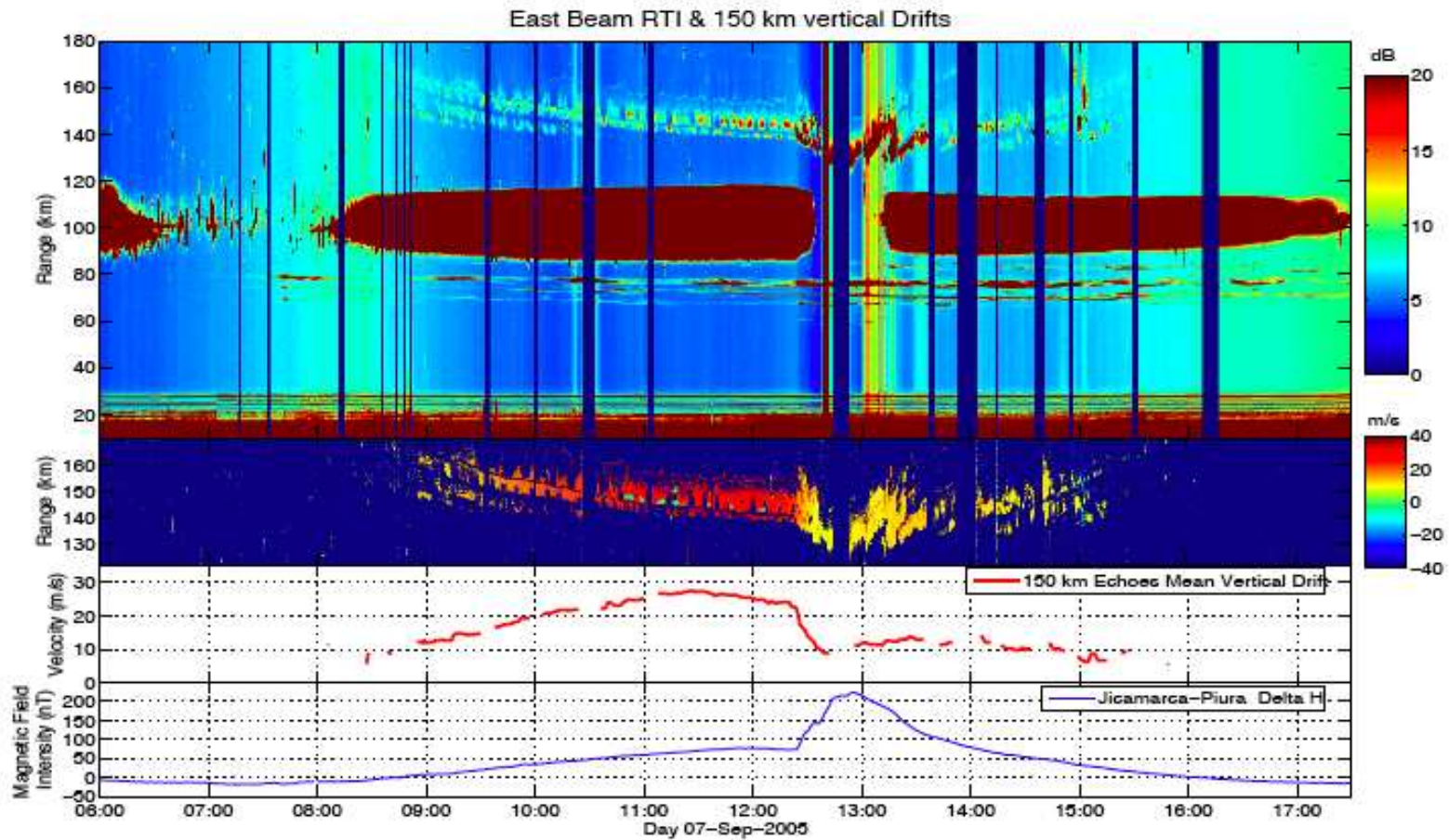
– L. Erukhimov et al., *Radiophys. Quant. Elect.*, 40 (1-2), 1997







Langmuir turbulence



implementation

- use surplus OTH transmitters (10), feed lines
- duplicate HIPAS crossed dipole antennas (9) $2\Omega_e$, $3\Omega_e$
- construct exciter/ control hardware locally (FPGA/DDS units)
- likewise HF receivers (Echotek)
- power improvement and conditioning
- upgrade diagnostics (AMISR-7, SEE receivers, VLF receivers, optics, magnetometer, ionosonde, ...)

