

**First Results From the
Coherent-scatter Atmospheric Passive Radar Imager (CAPRI)
for Passive Radio Sensing of Equatorial Plasma Instabilities
Near the Peruvian Andes**

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At equatorial latitudes, near the geomagnetic equator, the detection of coherent scatter echoes from E and F region B-field aligned irregularities (FAI), where the radar k vector is oriented perpendicular to the Earth's magnetic field (B), is relatively easy. Although, the Jicamarca Radio Observatory (JRO) is extremely useful to study the coherent equatorial low-latitude atmosphere and the systems to which they are coupled, alternatively, the detection of field aligned irregularity (FAI) scattering from “transmitters of opportunity” can be utilized using a passive radar receiver system. This approach to monitoring the ionosphere can operate continuously and be used to provide wide spatial coverage of the unstable ionosphere. Also, utilization of the third party transmitters reduce the cost of the instrument and provides diversity in frequency and scattering geometry.

We have recently developed and deployed a passive radar system named “Coherent-scatter Atmospheric Passive Radar Imager” (CAPRI) between Lima and Huancayo in Peru, for the passive observation of the unstable equatorial ionosphere using FM radio signals. CAPRI, the first passive radar in the Andes region, is unique with the operation at the VHF FM frequency band. In this paper, we present an overview of the design of CAPRI and also first observations of equatorial plasma irregularities obtained with this passive system. We will describe the general characteristics of echoes detected with CAPRI and compare them with Jicamarca events obtained with their JULIA mode of operation. We discuss the similarities and differences of the geophysical events collected with these two systems.