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# ***The São Luís VHF coherent backscatter ionospheric radar results during solar maximum***

*Eurico Rodrigues de Paula<sup>1</sup>, David L. Hysell<sup>2</sup>, and Fabiano da Silveira Rodrigues<sup>1</sup>*

<sup>1</sup>*Instituto Nacional de Pesquisas Espaciais, São José dos Campos, SP, Brazil*

<sup>2</sup>*Department of Earth and Atmospheric Sciences, Cornell University, Ithaca, NY, USA*

## ***Abstract:***

On December 2000 a new 30 MHz coherent scatter radar was setup at São Luís (2.33° S, 44.00° W, dip latitude 1.3° S), a Brazilian equatorial station. Since May 2001 this radar has been operated continuously. It has 8 Kw peak power and uses coded pulses transmitted by two magnetic east-west spaced arrays of 16 element vertical Yagi antennas. The backscattered signal from the E and F region were measured and plotted as RTI (Range-Time Intensity) graphics and their vertical (using Doppler) and zonal velocities (using interferometry) were determined. Using this radar, many characteristics of the E and F region were studied during a period of solar maximum activity when a large occurrence of ionospheric irregularities was observed. The electrojet RTI echoes were strong at almost all days from the height range of 94 to 108 km, being stronger at about 104 km and presented an upward movement in the afternoon, what was also observed by the INPE's 50 MHz backscatter radar located at the same site. The so called 150 km echoes were observed during many observation days and they presented quasi-periodic echoes with periods of 10 to 15 minutes and normally they appeared at about 165 km of altitude at 12 UT, presented a descending movement up to about 145 km at noon and moved back to about 160 km in the afternoon and disappeared at about 17 UT, presenting the necklace shape as observed at other sites. During magnetically quiet periods the F region topside irregularities echoes (plumes), that reached in many cases an altitude larger than 1,200 km, were normally preceded by the bottom-type thin layers around 400 km that were confined in altitude and were moving to west driven by the E region dynamo. Later these topside plumes evolved to bottomside layers which were more structured than the bottom-type ones. These F region plumes presented upward and downward portions and a predominantly eastward velocity. During some magnetically disturbed days the topside plumes appeared without the precursor bottom-type layers and had westward velocities. The spectral characteristics of some ionospheric irregularities will be presented.