# GPS SCINTILLATION AT TWO LOW MAGNETIC LATITUDE STATIONS IN BRAZIL DURING THE 2008-2009 PROLONGED SOLAR MINIMUM

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GPS scintillations are caused by irregularities in the ionospheric plasma density. At low magnetic latitudes, irregularities occur mostly just after sunset, due to an increase in the eastward electric field, the pre-reversal enhancement electric field, a phenomenon due to the ionospheric dynamo. This intense eastward electric field drives the plasma up fast and usually causes the formation of plasma density irregularities. These plasma irregularities cause ionospheric scintillations, which are fluctuations in radio signals received from artificial satellites or natural sources like stars and galaxies.
Scintillations are intense during periods of maximum solar activity. Now, however, they are very weak, especially in GPS signals, since the Sun has stationed around a minimum of activity. It is believed that plasma bubbles originate at the magnetic equator and then "propagate" through higher latitudes by moving up and diffusing along magnetic field lines. For this reason, only very low latitudes show scintillations, now.
We have chosen two low latitude stations, almost aligned with the same magnetic meridian, São Luis (dip -4.5°, at 300 km) and Natal (dip -28°, at 300 km) both with a -20° declination. Scintillations were recorded at both stations at the rate of 50 samples per second per satellite, for the period of September/2008 through March/2009. To compare the scintillations at both stations the S4 index is averaged first hourly, for all satellites, and then for the whole night for all satellites. A surprising result is that it is not clear from the data that the irregularities are being produced at the lower latitude station and then moving to the higher latitude station. Some results show an increase of scintillations in Natal, which does not occur in São Luis. These results are discussed in terms of production of irregularities at Natal, at São Luis, and at other sites, estwards, and then moving west to these stations.

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