

Sun – Solar Activity (Jean C. Santos)

Summary

This week the Sun began with a group of active regions, of high magnetic complexity, very close to each other entering the solar disk. These active regions gave rise to 6 M- and 2 X-class solar flares, and 4 halo-type coronal mass ejections (angular width greater than 90 degrees). During this period there was also the presence of a coronal hole with a significant area and located at low latitudes. This coronal hole originated a high-speed beam in the solar wind, which may have reached Earth from December 3rd onwards.

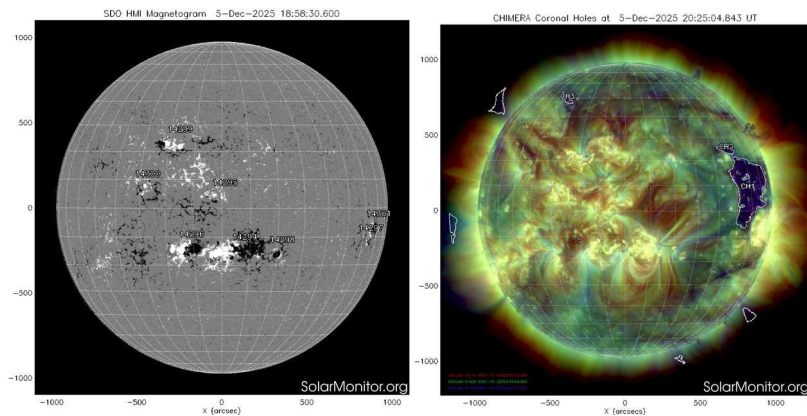
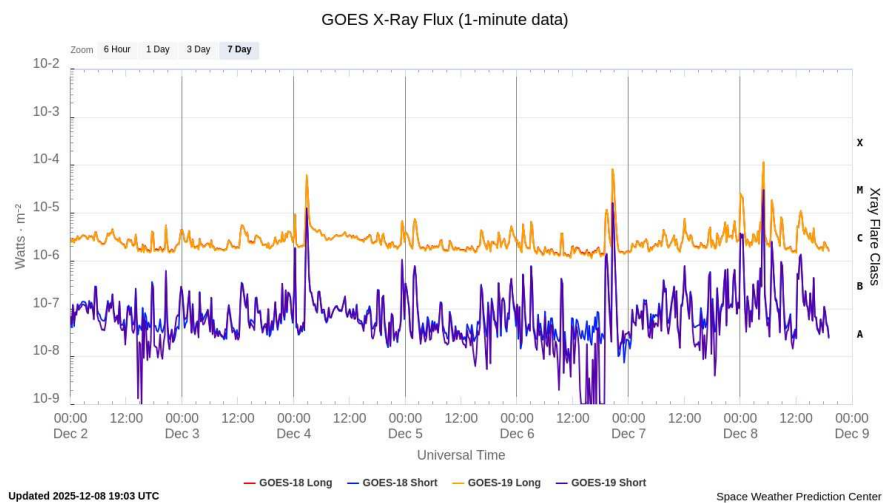


Figure 1 – X-ray flux measured by GOES (top panel) for the period from December 2nd to 8th, magnetic field in the line of sight (bottom left panel) and image at 193 angstroms (bottom right panel) measured on December 5th, 2025, showing, respectively, active regions and coronal holes present in the solar disk.



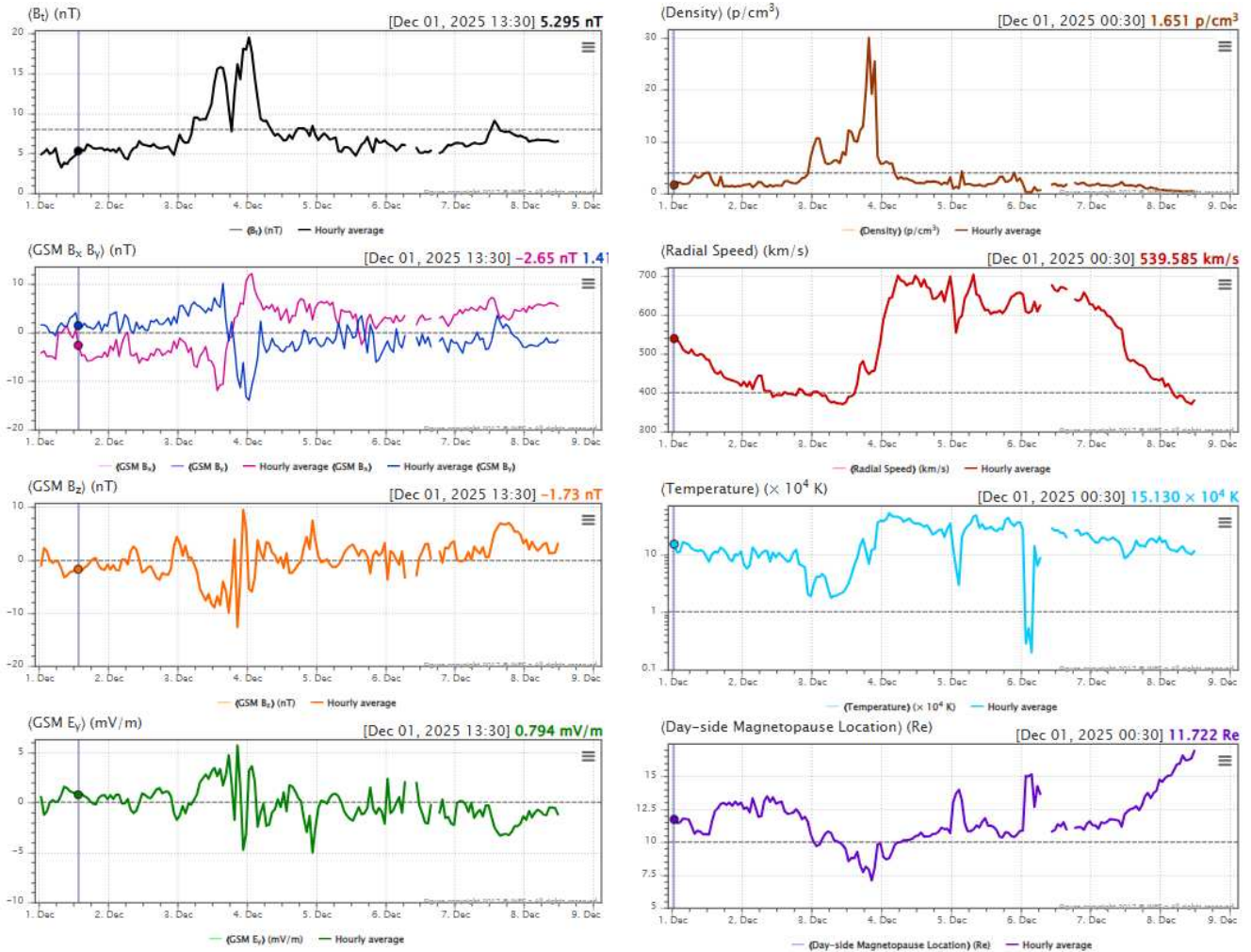
Interplanetary Medium – IM – Daniele da S. F. Medeiros and Paulo R. Jauer
Period: December 1st to December 8th.

Summary

Summary of IM conditions for the last week. The interplanetary medium region in the last week showed a moderate level of plasma disturbances due to the possible interaction with CME and HSS identified by the DSCOVR satellite in the interplanetary medium. The Kp index obtained by NOAA/SWPC and the modeling.

- The magnitude of the interplanetary magnetic field component peaked on December 4th at 00:30 UT at +19.50 nT due CME and HSS.
- The BxBy components presented variations in the analyzed period, keeping both oscillating within the interval [-13.95, +12.08] nT. Showing three rotations of the By component.
- The Bz component presents negative values for most of the week with a maximum negative -12.65 nT at 20:30 UT on December 3rd. It presented positive value of +9.54 nT on December 3rd at 22:30 UT.
- The solar wind density maximum peaked on December 3rd at 19:30 UT at 29.99 protons/cm³.
- The solar wind speed fluctuated between 371 to 704 km/s, with a increase on December 3rd starting at 21:30 UT and a decrease on December 6th starting at 21:30 UT due to CME and HSS.
- The magnetopause position remained relaxed almost throughout the analyzed period, reaching maximum compression (7.09 RE) at 20:30 UT on December 3rd.
- The measured interplanetary Kp reached a peak of approximately 7 on December 3rd, and the modeled Kp exceeded the limit of 6 on December 3rd.

Figure 1 illustrates a set of parameters observed in the solar wind by the DSCVR satellite. The measured solar wind parameters can be identified in the following order starting in column 1: Interplanetary magnetic field modulus (IMF), the Bx and By components, Bz component, convection electric field Ey. Column 2: Solar wind density, speed, temperature and the last graph represents the position of the subsolar magnetopause.



Please, acknowledge EMBRACE/INPE for the data in your publication
The Bt, Bx, By, Bz, Density, Radial Speed and Temperature Solar Wind data are provided by the DSCOVER (SWPC/NOAA) spacecraft

Figure 1: Illustrates a set of parameters observed in the solar wind by the DSCVR satellite.

Figure 2 illustrates a set of parameters observed in the solar wind by the DSCOVR satellite. The measured solar wind parameters can be identified in the following order, starting with the panels below: solar wind speed, Bz component of the interplanetary magnetic field (IMF), solar wind density, and the last graph represents the Kp index obtained by NOAA/SWPC and the modeling.

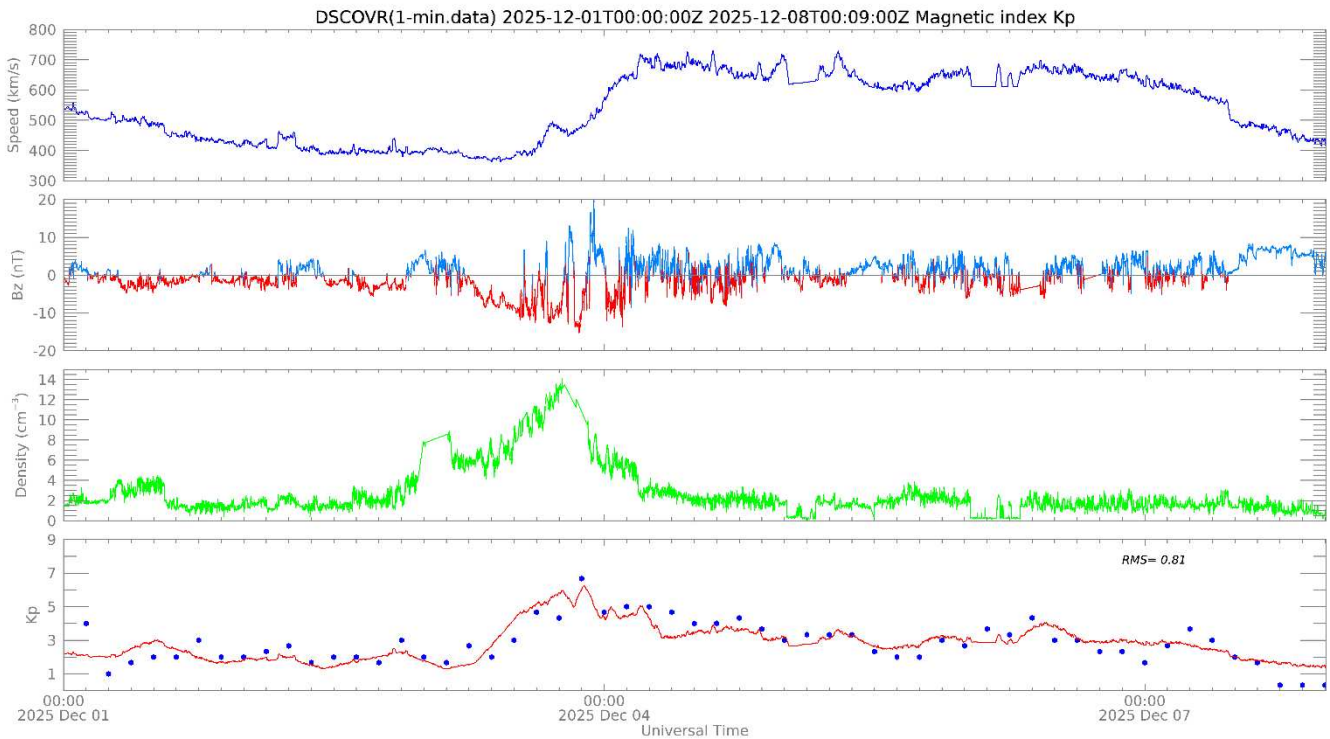


Figure 2: Illustrates a set of parameters observed in the solar wind by the DSCVR satellite and the Kp index by NOAA/SWPC, blue dot, and the modeling, red line.

Campo Geomagnético

Responsável: Karen Sarmiento /Livia Alves/Sony Su Chen

Resumo

Entre os dias 1 e 7 de dezembro, a atividade geomagnética variou entre condições de instabilidade até atingir tempestade magnética forte (nível G3) em 03/12 e tempestade menor (nível G1) em 04/12. Entre 3 e 4 de dezembro, registraram-se flutuações rápidas na componente norte do campo magnético detectadas pelo satélite GOES-18, incluindo um valor máximo de aproximadamente 206 nT no lado diurno, entre as 20:15 UT e 22:15 UT, coincidente com uma mudança drástica entre valores positivos e negativos da componente Bz do campo magnético interplanetário. Também foi registrado um valor mínimo próximo de 35 nT (GOES-19) no dia 04/12, no lado noturno, às 06:45 UT. O índice AE apresentou variações abruptas, com picos acima de 2500 nT em 03/12 entre 13 e 15 UT, coincidindo com o aumento da velocidade, densidade e temperatura do vento solar, seguido de forte compressão da magnetosfera e aumento abrupto do campo magnético. O índice AE permaneceu predominantemente acima de 500 nT, com assinaturas claras de subtempestades e padrões compatíveis com episódios de atividade auroral de alta intensidade e curta duração. O índice Dst atingiu um valor mínimo de aproximadamente -69 nT às 24h de 03/12, alcançando o nível de tempestade moderada, e manteve-se predominantemente negativo ao longo da semana, sem voltar a atingir essa intensidade. O índice Kp atingiu 7- no final do dia 03/12, entre 18 e 21 UT, indicando condições de forte perturbação geomagnética características de tempestade (nível G3). Os magnetômetros da rede Embrace registraram um leve aumento na componente H marcando o impacto de um fluxo de alta velocidade às 10:41 UT, seguido de uma diminuição que atingiu um valor mínimo de aproximadamente -153 nT às 16:38 UT na estação de Porto Velho, variações amplificadas pelo efeito do Eletrojato Equatorial, já que a estação está localizada dentro dessa região de influência. Em seguida, a componente H apresentou variações rápidas em resposta às oscilações da componente Bz do campo magnético interplanetário. Essas flutuações podem estar associadas à atuação de um fluxo de vento solar de alta velocidade desde 03/12, à passagem de uma região de interação co-rotante (CIR) e ao impacto possivelmente lateral de uma ejeção de massa coronal.

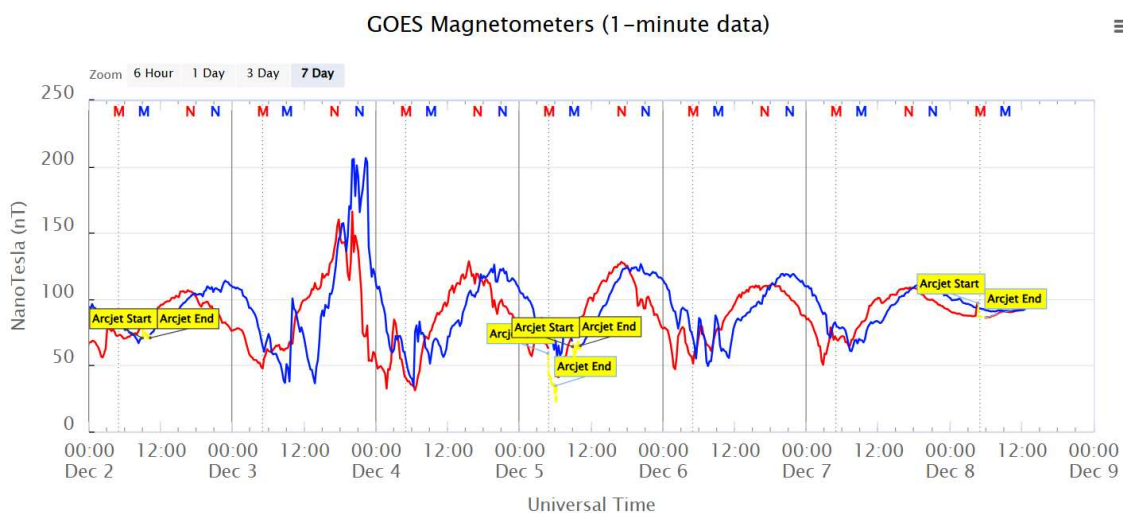


Figura 1- Medida de campo magnético na posição do satélite GOES.

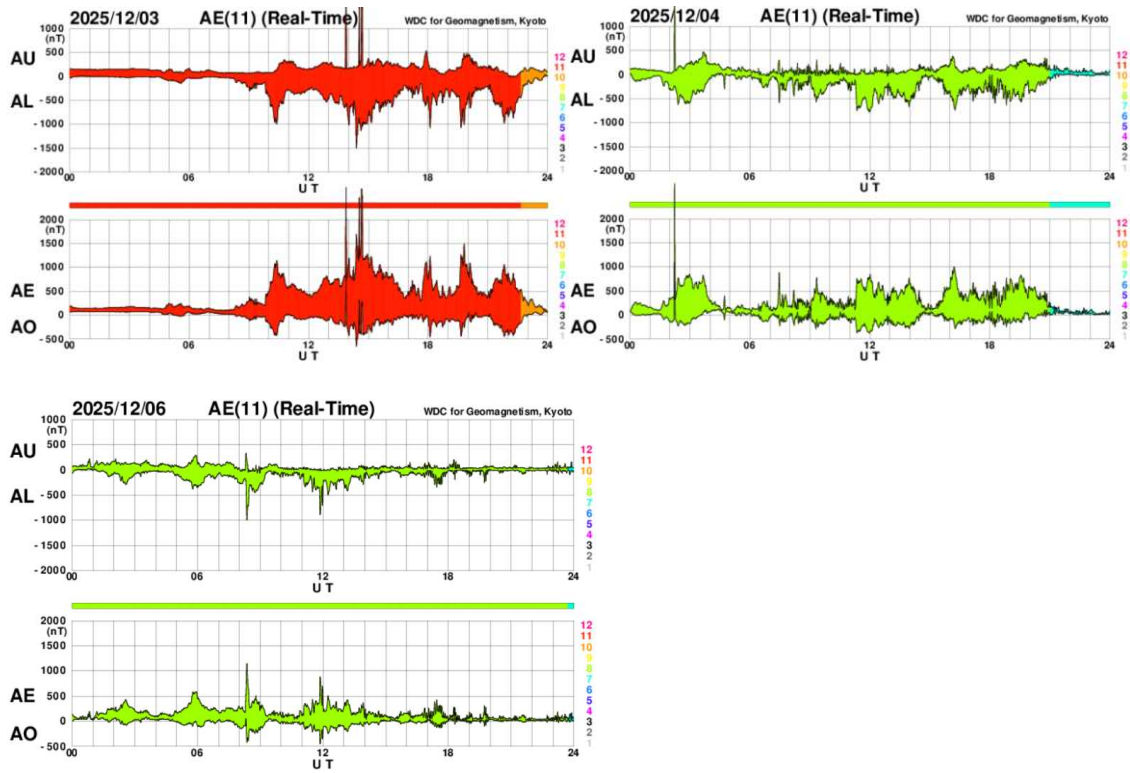


Figura 2- Índice AE para os dias da semana com maior atividade auroral.

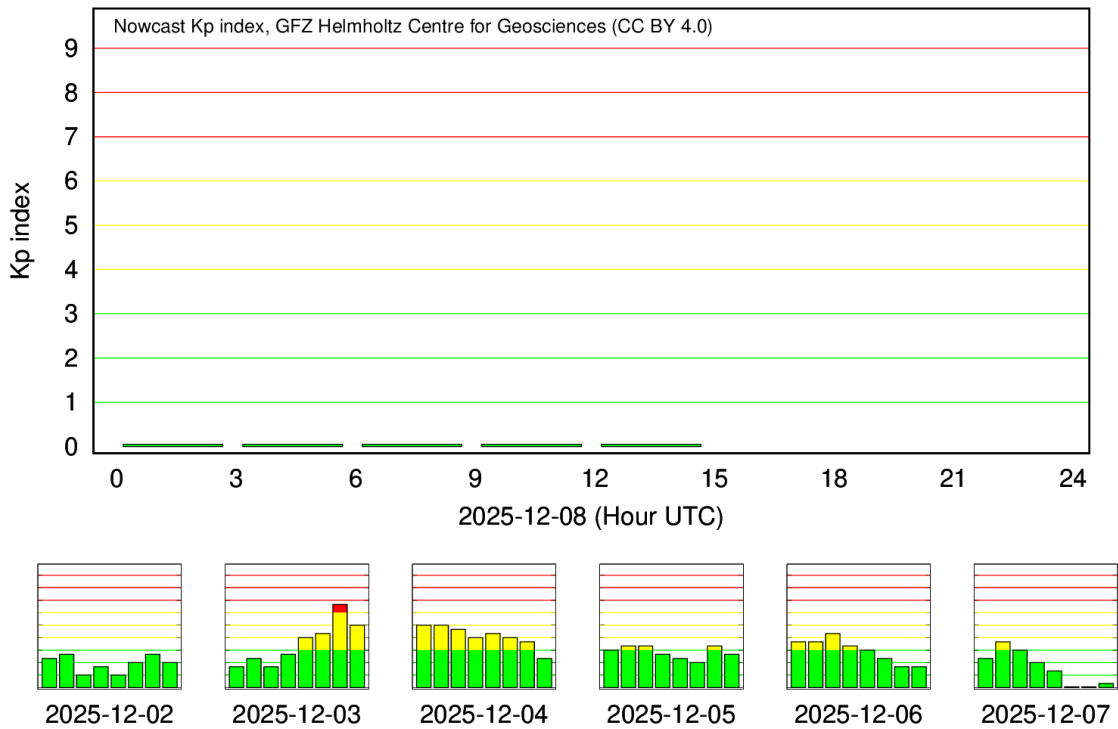


Figura 3- Índice Kp em escala logarítmica.

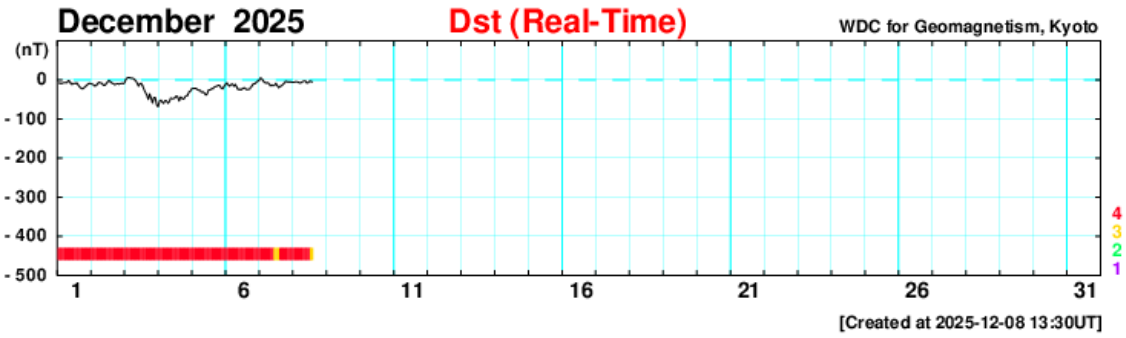


Figura 4-índice Dst.

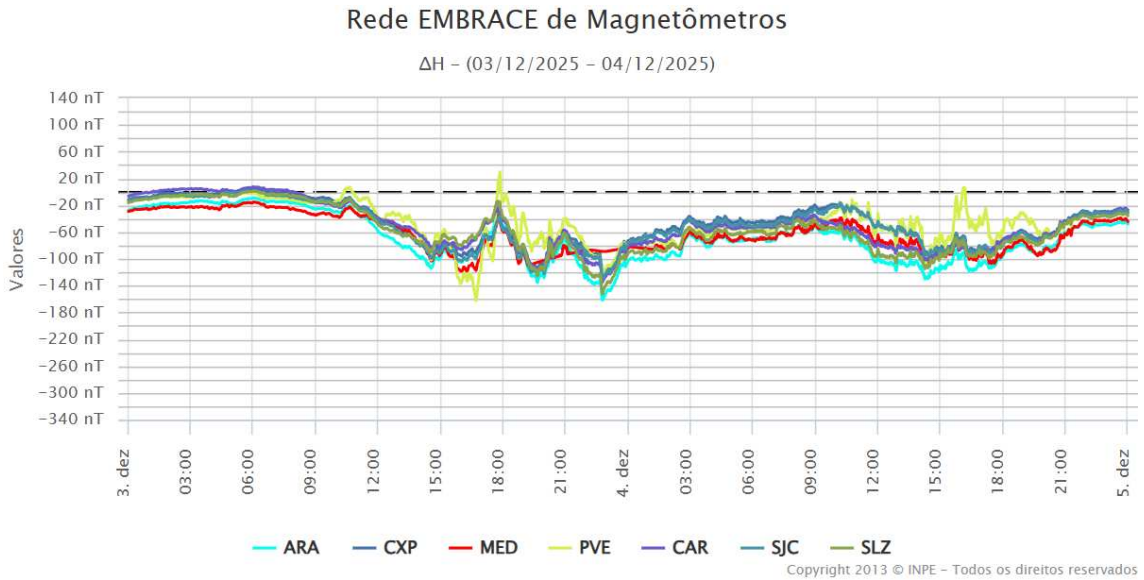
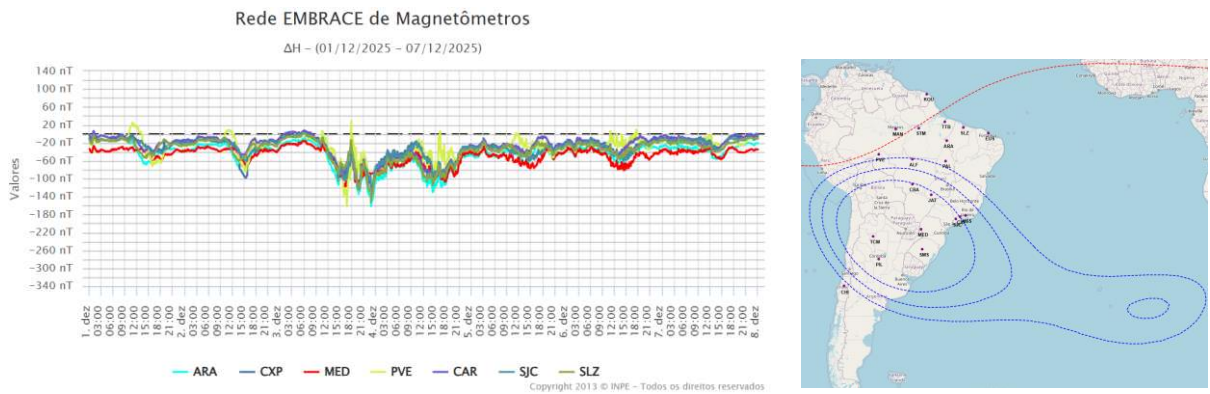


Figura 5- Variação diurna da componente geomagnética H(nT) nas estações da rede Embrace.

Ionosfera – Digisonde (Laysa Resende)

Summary

This week, spread-F was not detected at Cachoeira Paulista and São Luís on December, 03, suggesting suppression of plasma bubble development. At São Luís and Cachoeira Paulista, the Es layer intensified and reached scale 4 on December 05 (Figure 1). The MUF variation did not reach the threshold for a moderate index.

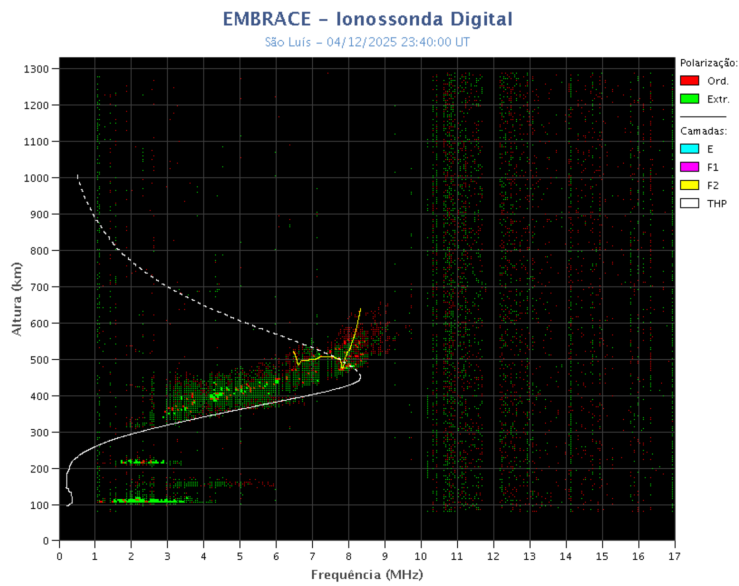


Figure 1 – Ionogram over São Luís, showing the strong Es layer.

Ionosphere - ROTI Summary for Week 2395 (November 30 - December 6, 2025)

Carolina de Sousa do Carmo

In the week 2395 (November 30 to December 6, 2025) there were ionospheric irregularities (plasma bubble), on all analyzed days except December 3. Figure 1 shows the ROTI time series for four stations in the Brazilian sector (Boa Vista (BOAV), Bacabal (MABB), Cuiabá (CUIB) and Cachoeira Paulista (CHPI)).

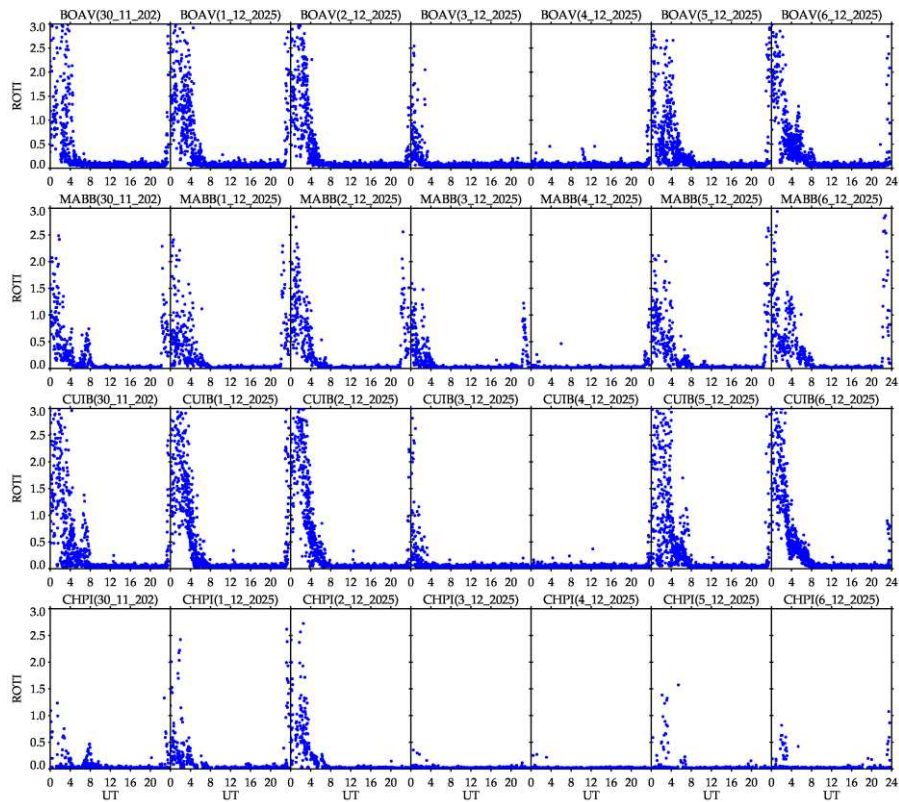


Figure 1 – ROTI time series for four stations in the Brazilian sector (Boa Vista (BOAV), Bacabal (MABB), Cuiabá (CUIB) and Cachoeira Paulista (CHPI)), from November 30 to December 06, 2025.