Sun – Solar Activity (Jean C. Santos)

Summary

This week the Sun started the week without much activity, but from the 28th and on the 29th a series of M-class solar flares occurred, associated with the increased magnetic complexity of the active regions present on the solar surface. During the week, the Cactus program identified the occurrence of six halo-type CMEs (angular width greater than 90 degrees), but none directed towards Earth. Throughout the period, large-area coronal holes were present in the solar disk, which may have originated the occurrence of a persistent fast beam in the solar wind. A large number of filaments were also observed in H-alpha images.

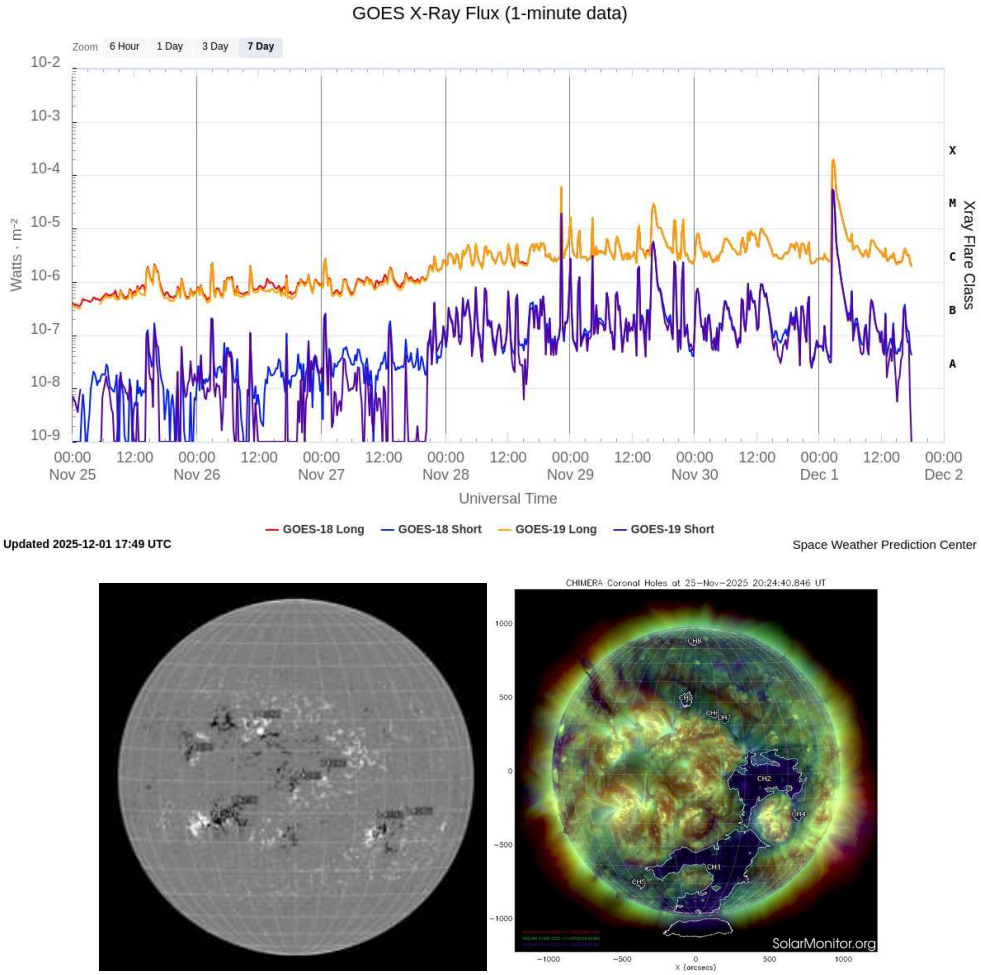

Figure 1 – X-ray flux measured by GOES (top panel) for the period from November 25 to December 1, magnetic field in the line of sight (bottom left panel) and image at 193 angstroms (bottom right panel) measured on November 25, 2025, showing, respectively, active regions and coronal holes present in the solar disk.

Interplanetary Medium – IM – Daniele da S. F. Medeiros and Paulo R. Jauer
Period: November 24th to December 1st.

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 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 November 24th at 11:30 UT at +13.24 nT due HSS.

- The BxBy components presented variations in the analyzed period, keeping both oscillating within the interval [-9.75, +9.25] nT. Showing six rotations of the By component.

- The Bz component presents negative values for most of the week with a maximum negative -7.70 nT at 11:30 UT on November 24th. It presented positive value of +4.68 nT on November 24th at 09:30 UT.

- The solar wind density maximum peaked on November 24th at 08:30 UT at 7.22 protons/cm^3.

- The solar wind speed fluctuated between 290 to 804 km/s, with a decrease on November 26th starting at 03:30 UT due to HSS.

- The magnetopause position remained relaxed almost throughout the analyzed period, reaching maximum compression (8.99 RE) at 11:30 UT on November 24th.

- The measured interplanetary Kp reached a peak of approximately 6 on November 25th, and the modeled Kp exceeded the limit of 6 on November 24th and November 25th.

Figure 1 ilustrates 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.

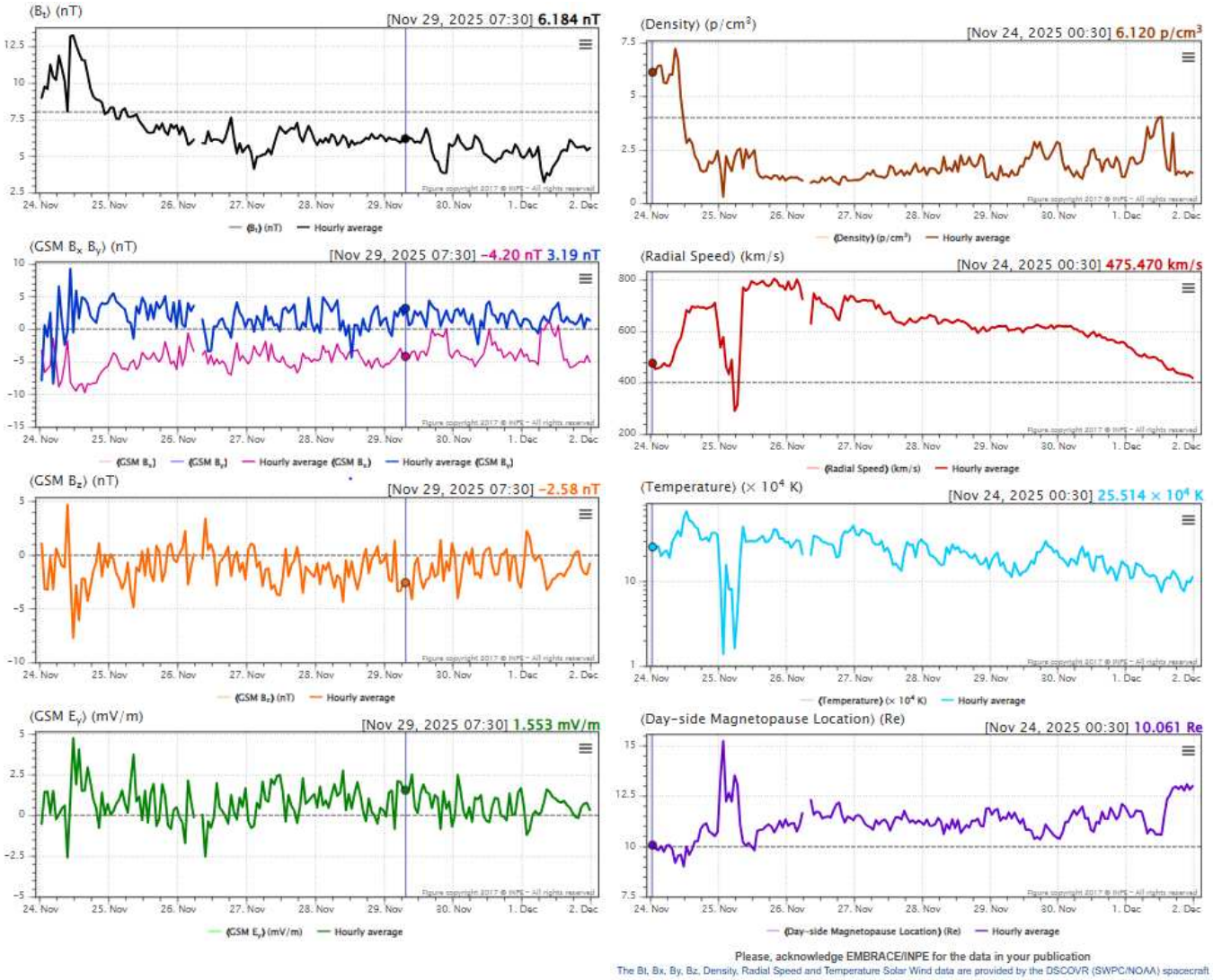

Figure 1: Illustrates a set of parameters observed in the solar wind by the DSCVR satellite.

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.

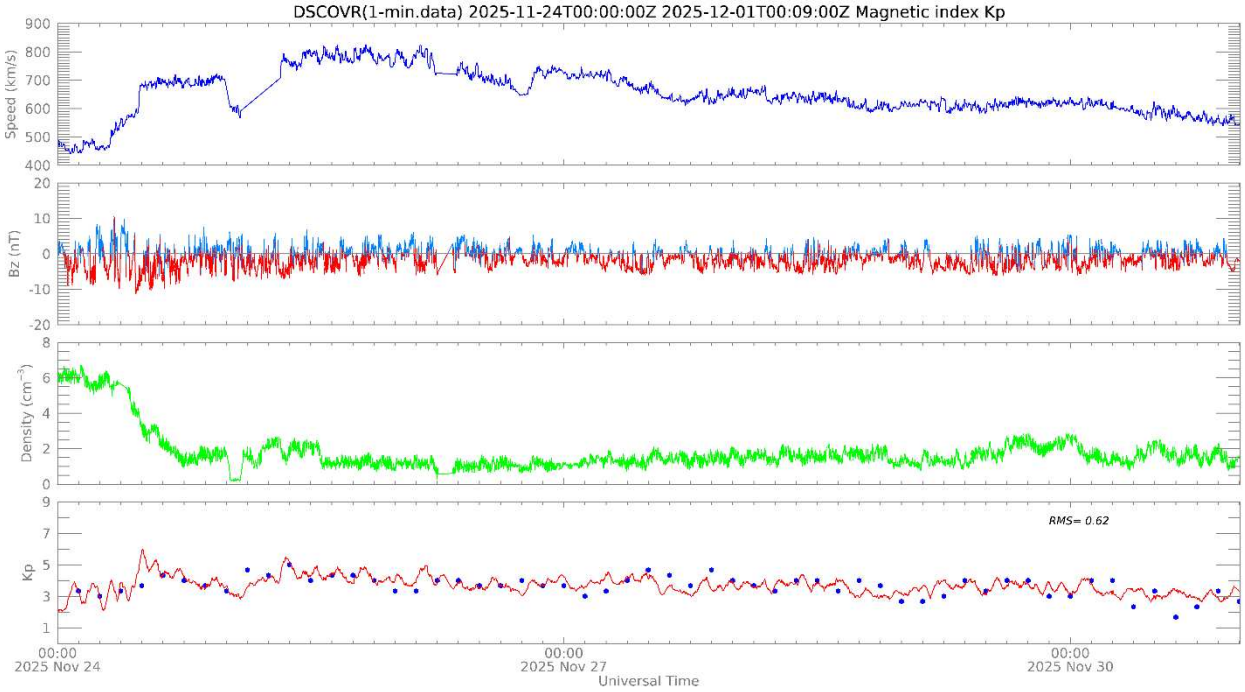

Figure 2: Illustrates a set of parameters observed in the solar wind by the DSCVR satellite and the Kp index by NOAA/SWPC, blue dot, and the modeling, red line.

EARTH'S RADIATION BELT

Responsible: Ligia Da Silva

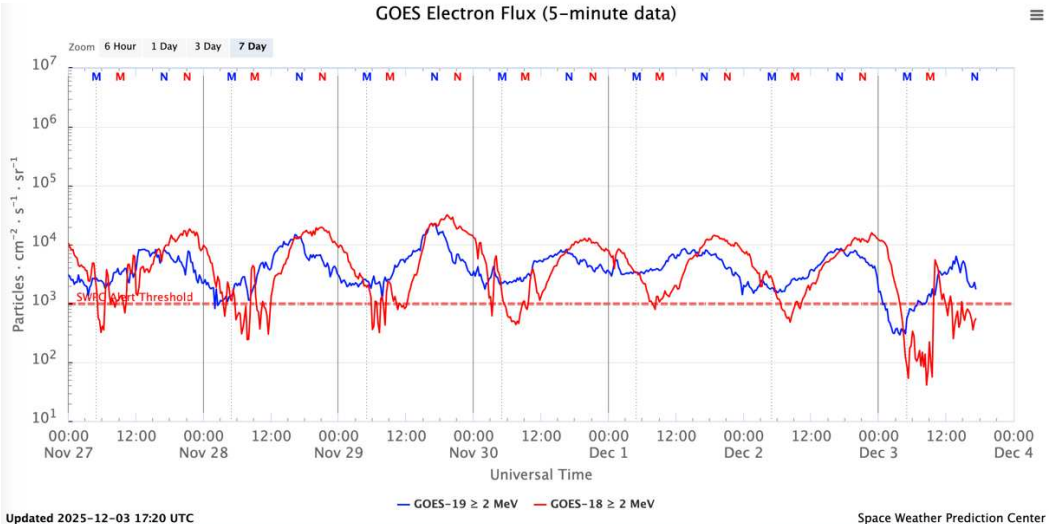

Figure 1: High-energy electron flux (> 2MeV) obtained from GOES-18 and GOES-19 satellite. Source: https://www.swpc.noaa.gov/products/goes-electron-flux

Summary

The high-energy electron flux (>2 MeV) in the outer boundary of the outer radiation belt obtained from geostationary satellite data GOES-19 (Figure 1) remains around the minimum threshold of 10^3 particles/(cm^2 s sr) for almost the entire week. A dropout in electron flux is observed on December 3rd.

Geomagnetic Field

Responsible: Karen Sarmiento/ Lívia Alves

Summary

Between 24 November and 1 December, geomagnetic activity ranged from weak geomagnetic storm conditions (G1 level) to periods of moderate activity, particularly from the 24th onward and throughout the beginning of the week. Between 24 and 29 November, rapid fluctuations were recorded in the northward component of the magnetic field detected by the GOES-18 satellite, including a minimum value near 41 nT on the night of 28 November, along with abrupt variations and AE index peaks above 500 nT. The Dst index remained negative throughout the entire period without reaching storm levels. The minimum value was approximately –42 nT, observed at 15:00 UT on 24 November, remaining negative for the rest of the week but without exceeding this intensity. The AE index stayed predominantly above 500 nT, showing clear signatures of substorms and patterns consistent with episodes of continuous auroral activity of high intensity and long duration (HILDCAA). This behavior was likely driven by a combination of southward Bz (-5 a 0 nT) and high-speed solar wind, resulting in prolonged substorm activity. The Kp index reached 5– early on 24 November and, in the following days, fluctuated between 4– and 5–. Magnetometers from the Embrace network recorded only instabilities in the horizontal component of the magnetic field, with notable rapid oscillations in the H component, including a stronger negative disturbance of approximately –110 nT observed in Porto Velho on the night of 26 November. These fluctuations may be associated with the influence of a high-speed solar wind stream since 24 November and the arrival of a co-rotating interaction region (CIR). In summary, the analyzed period was characterized by predominantly active geomagnetic conditions, marked by localized rapid oscillations and the occurrence of a single weak geomagnetic storm (G1) that influenced conditions throughout the week.

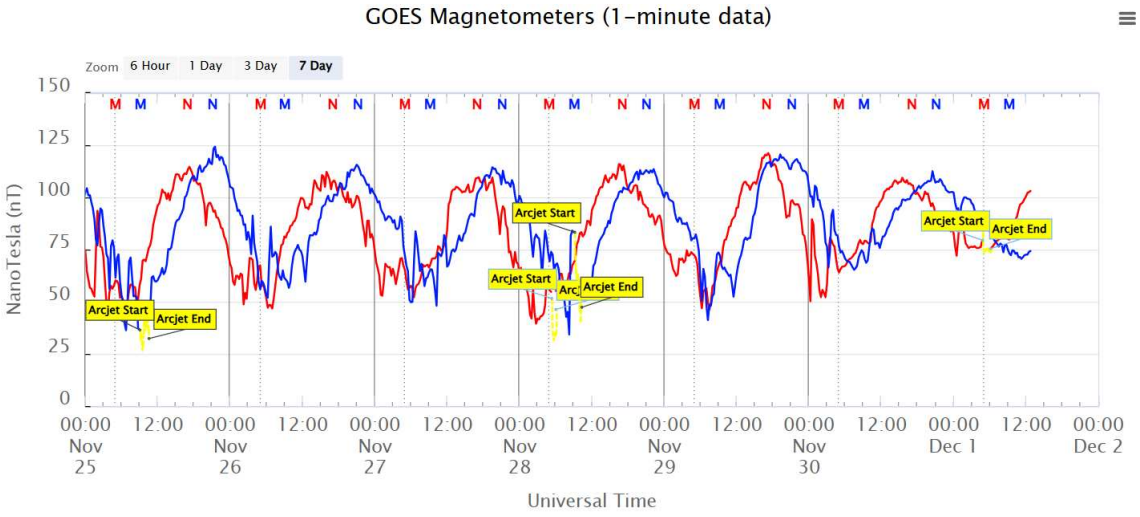

Figure 1- Magnetic field horizontal component at the GOES satellite orbit through.

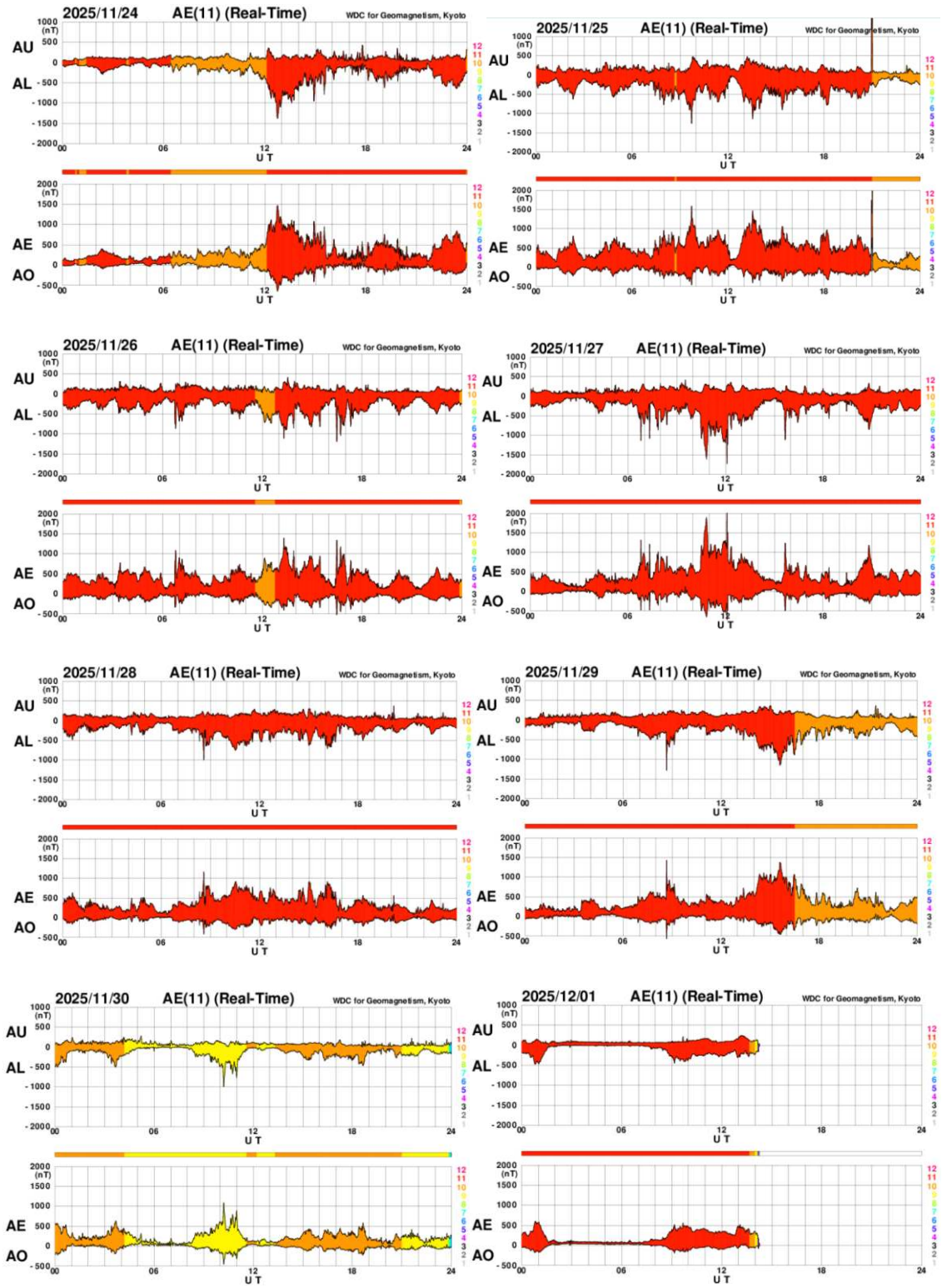

Figure 2- AE index.

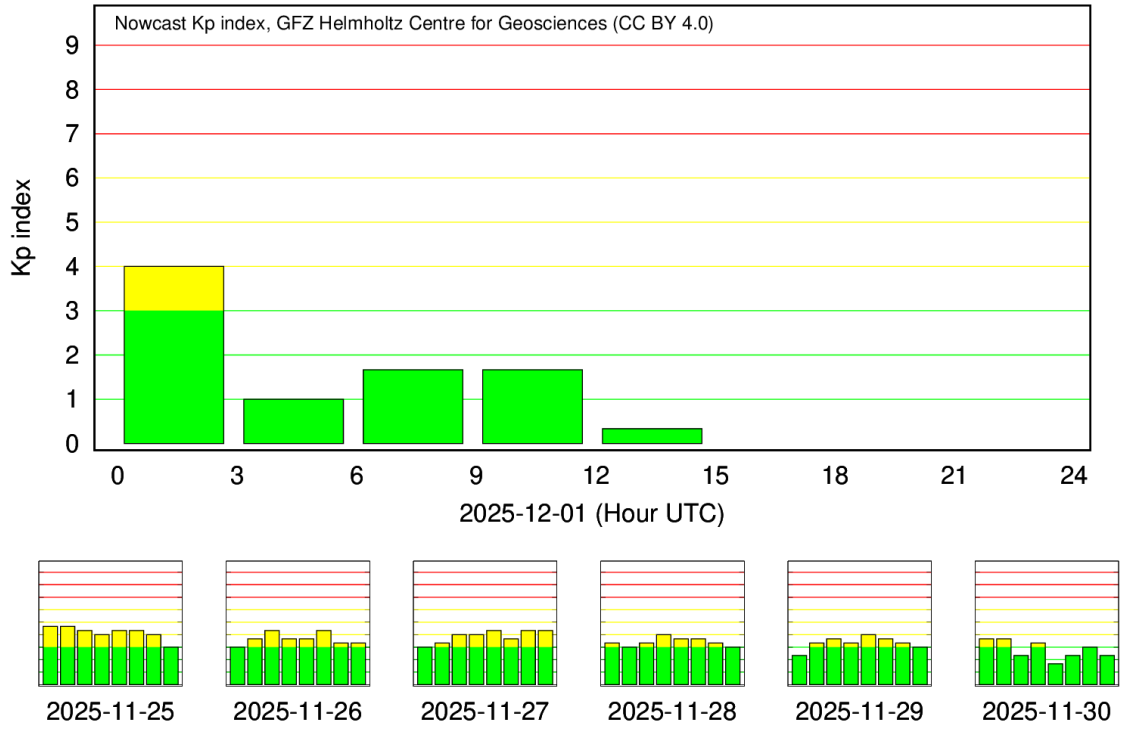

Figure 3- Kp index in logarithmic scale.

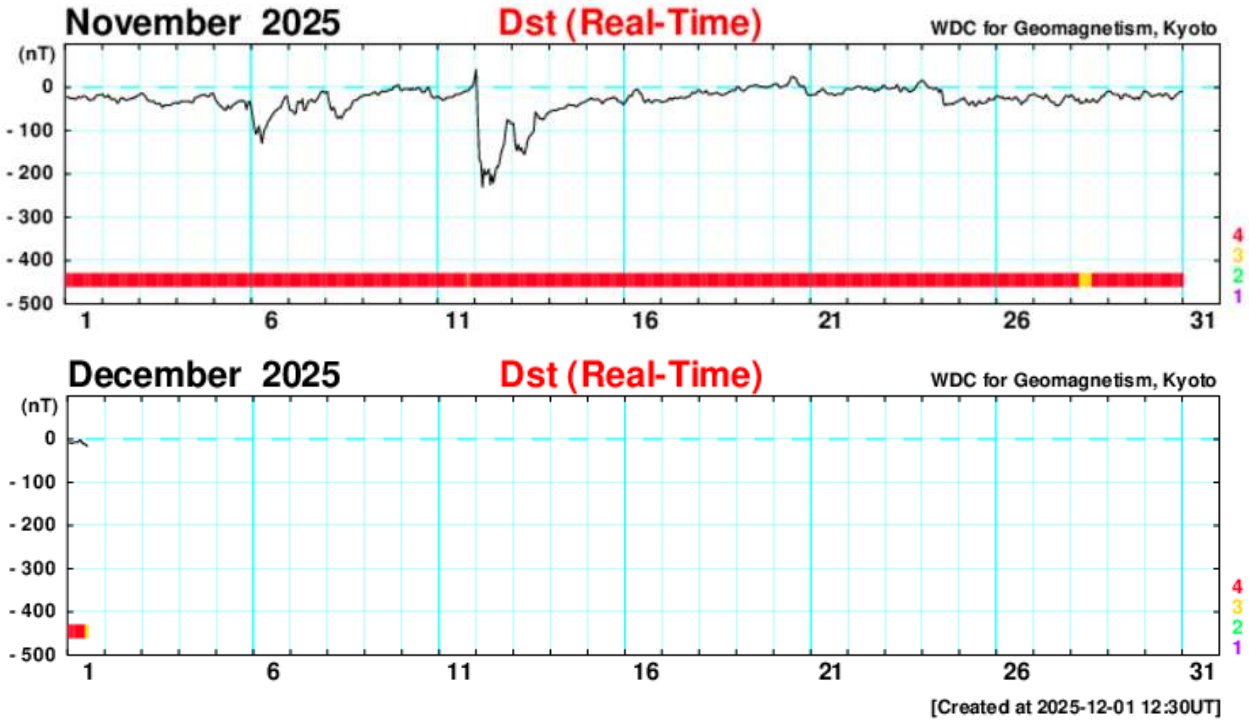

Figure 4- Dst Index

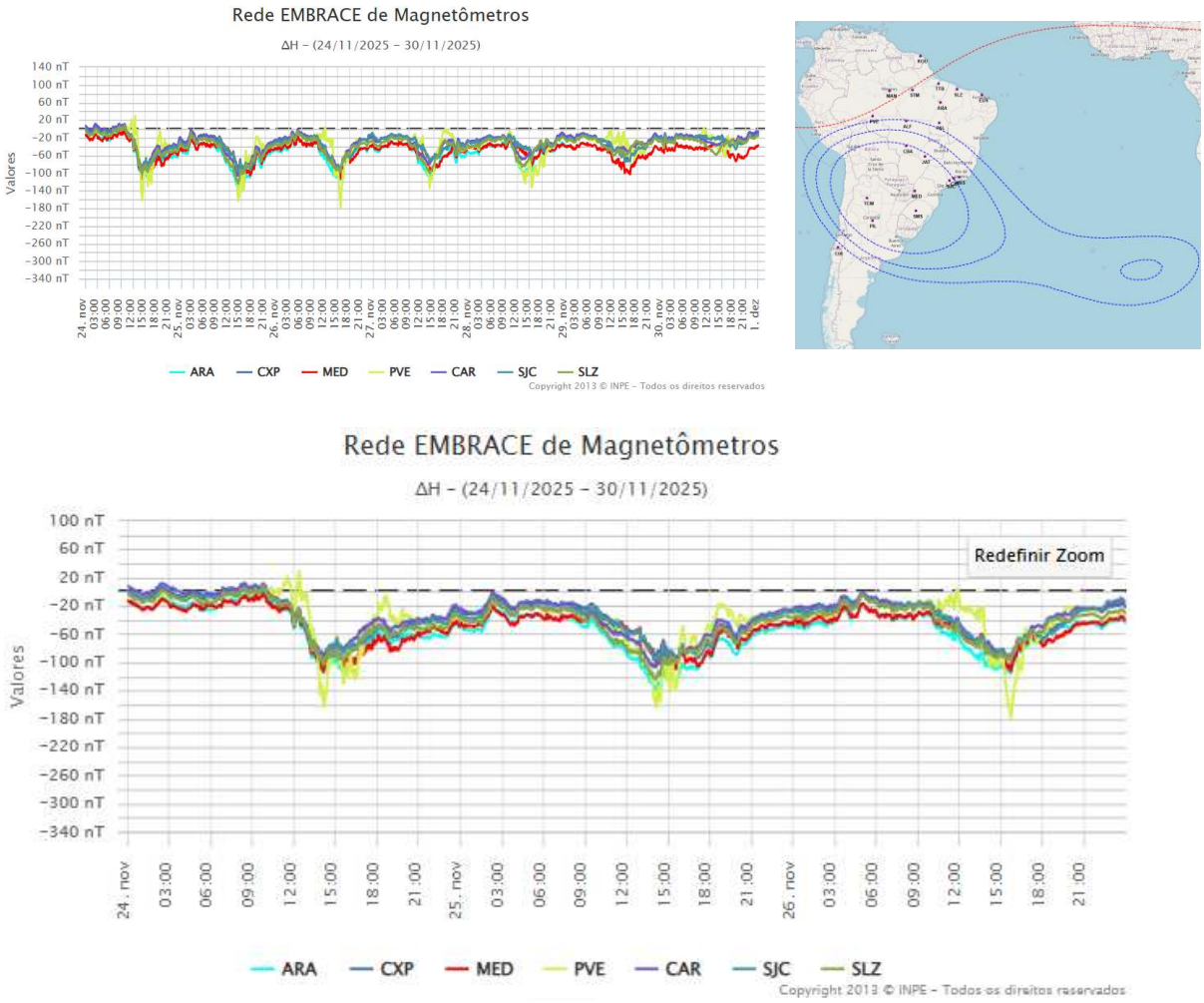

Figure 5- Daily variation of the geomagnetic field from H(nT) measured at Embrace MagNet.

Ionosfera – Digisonde (Laysa Resende)

Summary

This week, spread-F was detected at Cachoeira Paulista only after November 27 (Figure 1). On November 24 and 25, no spread-F signatures were observed at São Luís either, suggesting suppression of plasma bubble development during the magnetic storm. For the remainder of the week, São Luís exhibited typical conditions, characterized by weak Es layers. At Cachoeira Paulista, the Es layer intensified and reached scale 4 on November 29. The MUF variation did not reach the threshold for a moderate index.

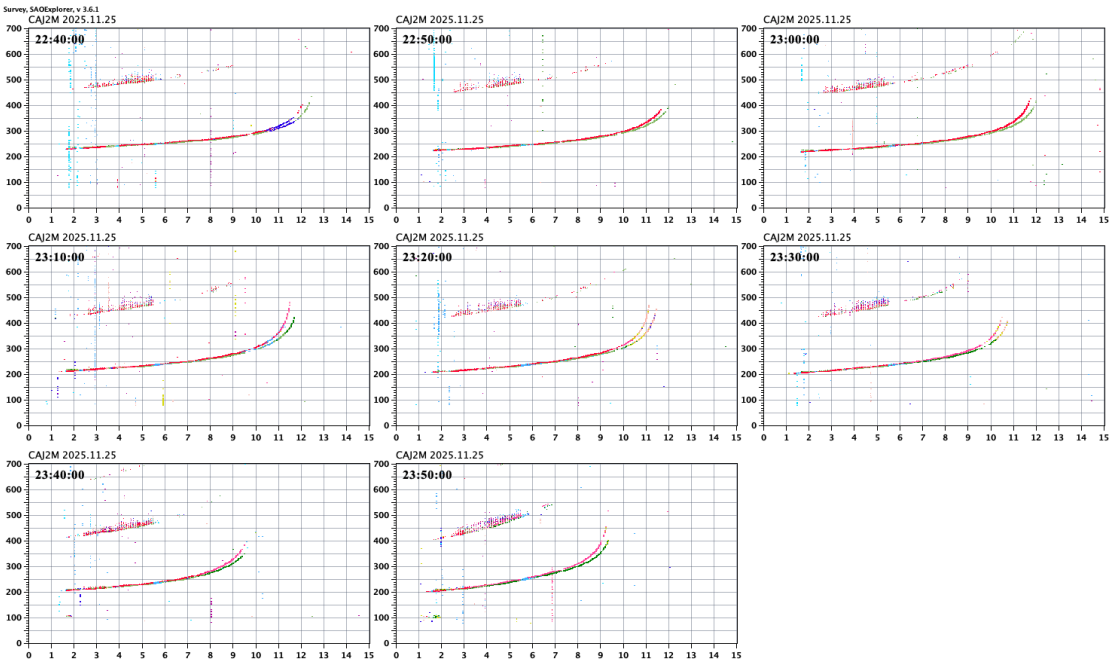

Figure 1 – Ionogram over Cachoeira Paulista, showing the spread F absence.