Sun – Solar Activity (Jean C. Santos)

Summary

The Sun was quite active this week, giving rise to 48 M-class solar flares and 3 X-class flares. The active region NOAA 14366 was responsible, exhibiting high magnetic complexity (beta-gamma-delta) during its passage across the solar disk. Several CMEs also occurred during this period, including one halo-type flare (angular width greater than 180 degrees). A coronal hole with a significant area (>2.0% of the solar disk area) was also identified during this time.

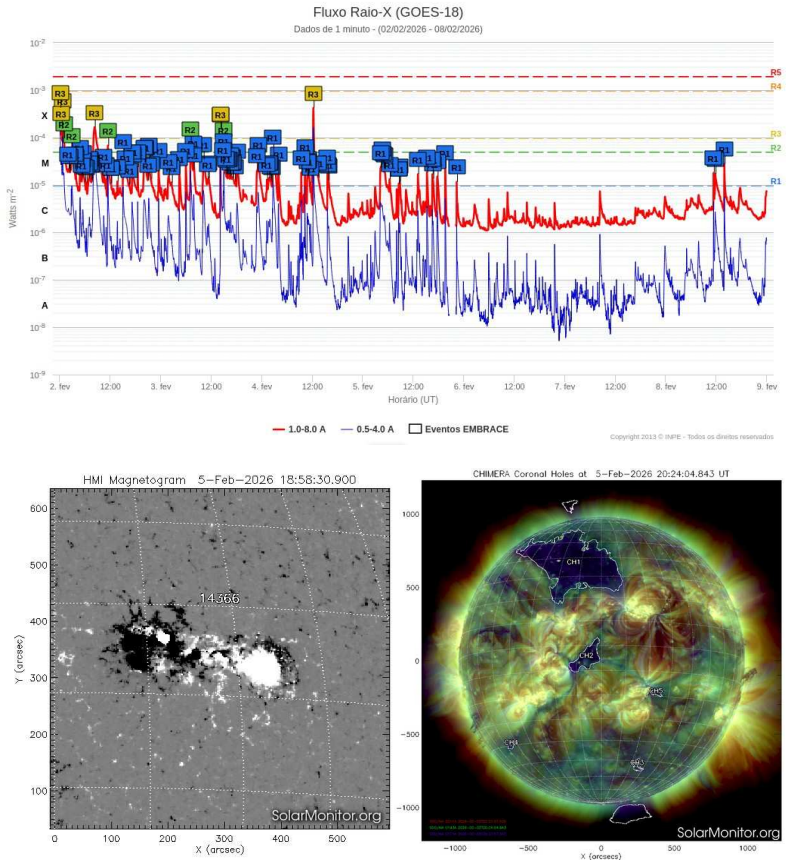

Figure 1 – X-ray flux measured by the GOES satellite (top panel) for the period of February 2-8, magnetic field in the line of sight (bottom left panel) associated with NOAA active region 14366 and image at 193 angstroms (bottom right panel) measured on February 5, 2026.

Interplanetary Medium – IM – Daniele da S. F. Medeiros and Paulo R. Jauer
Period: February 2nd to February 9th.

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 a CME and HSS identified by the DSCOVR satellite in the interplanetary medium. The interplanetary Kp index obtained by NOAA/SWPC and the modeling.

- The magnitude of the interplanetary magnetic field component peaked on February 4th at 15:30 UT at +20.08 nT due to CME and HSS.

- The BxBy components presented variations in the analyzed period, keeping both oscillating within the interval [-13.32, +16.73] nT. Showing two rotations of the By component.

- The Bz component presents negative values for most of the week with a maximum negative -15.42 nT at 03:30 UT on February 5th. It presented positive value of +13.26 nT on February 5th at 06:30 UT.

- The solar wind density maximum peaked on February 4th at 22:30 UT, reaching 24.09 protons/cm^3.

- The solar wind speed fluctuated between 283 to 604 km/s, with a increase on February 4th starting at 13:30 UT due to CME and HSS.

- The magnetopause position remained relaxed almost throughout the analyzed period, reaching maximum compression (7.39 RE) at 22:30 UT on February 4th.

- The measured interplanetary Kp index reached a peak above to 5 (Kp > 5) on February 4th, corresponding to a G1-level geomagnetic storm (minor geomagnetic storm), while the modeled interplanetary Kp index exhibited values above 6 (Kp > 6) characterizing a moderate geomagnetic storm (G2-level) on February 4th due to CME.

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.

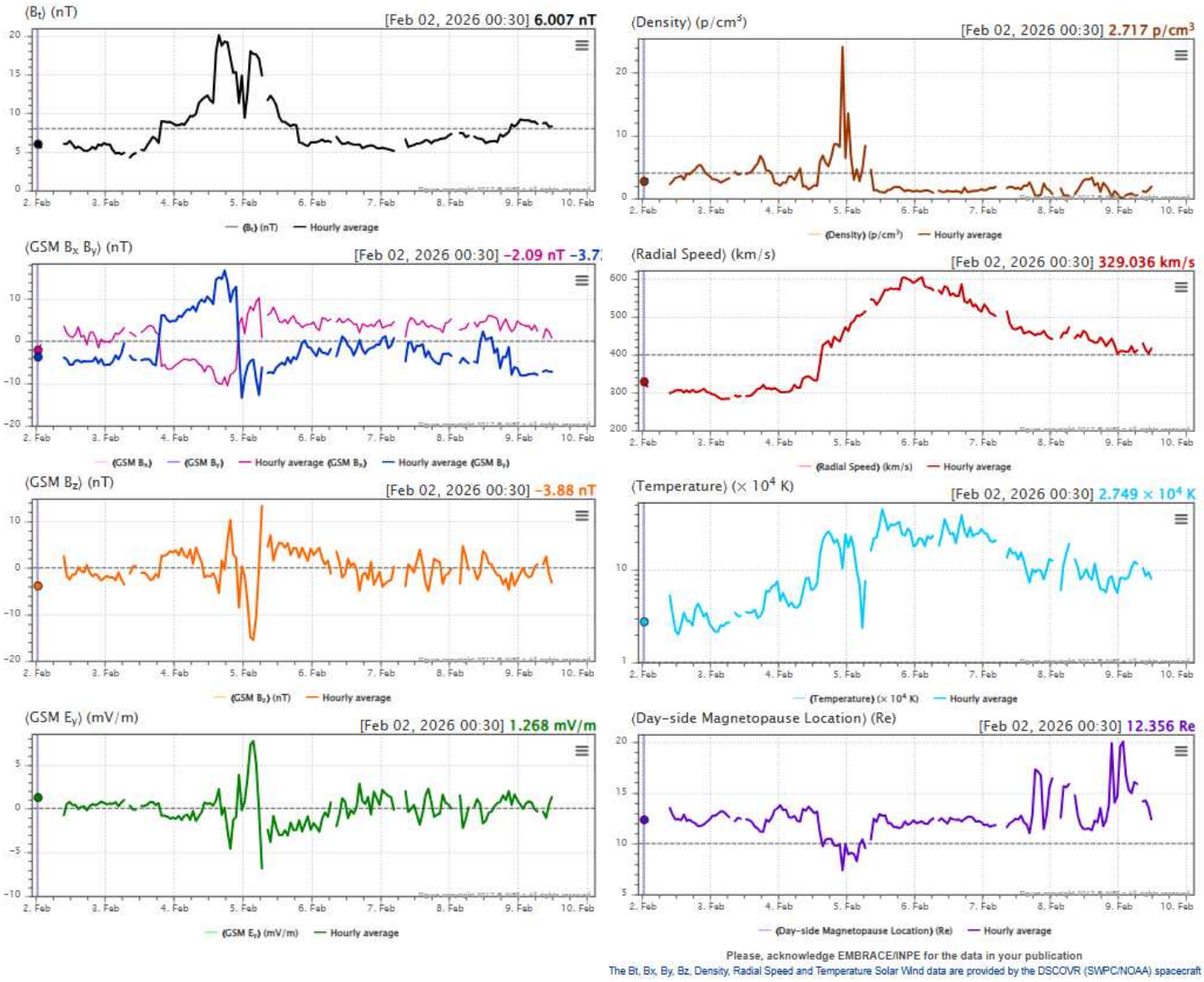

Figure 1: Illustrates a set of parameters observed in the solar wind by the DSCVR satellite.

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.

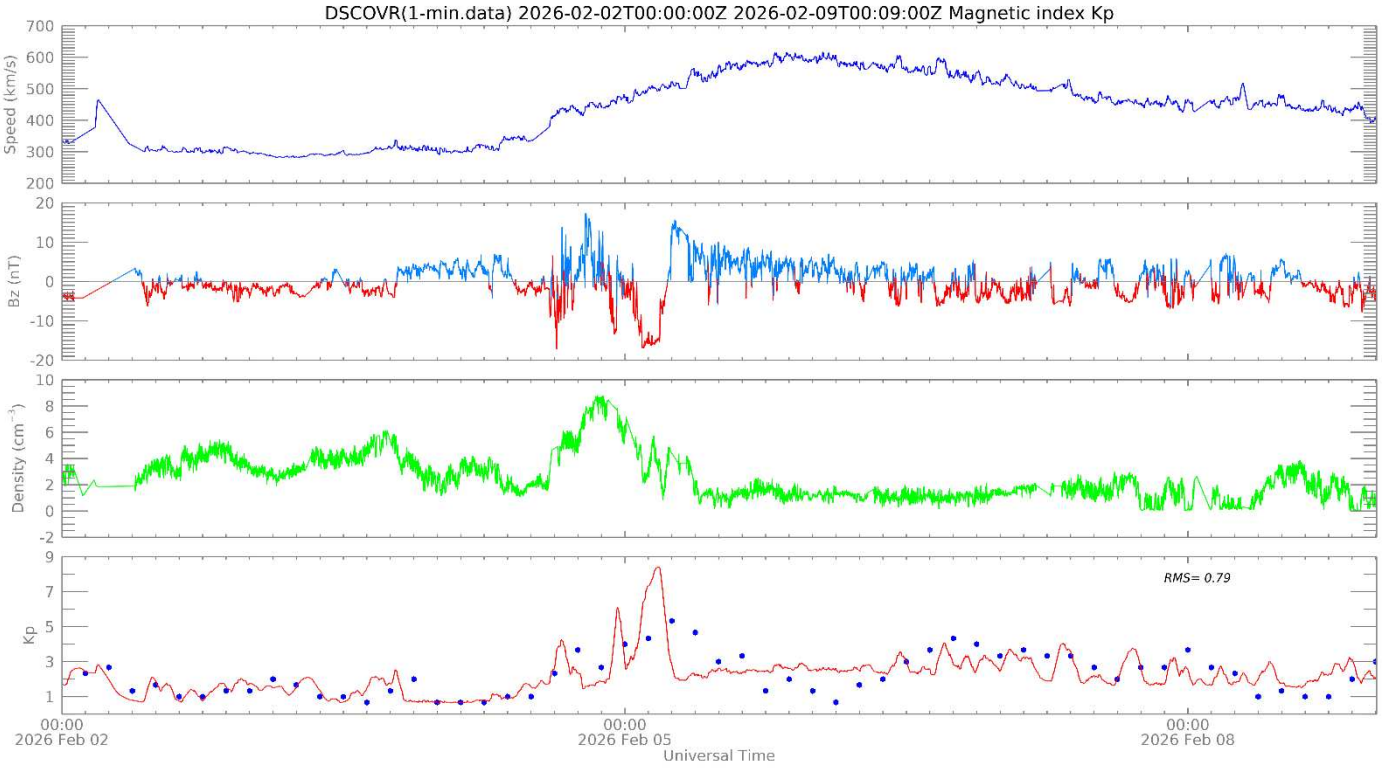

Figure 2: Illustrates a set of parameters observed in the solar wind by the DSCVR satellite and the Kp index by NOAA/SWPC, blue dot, and the modeling, red line.

Responsible: Ligia Da Silva

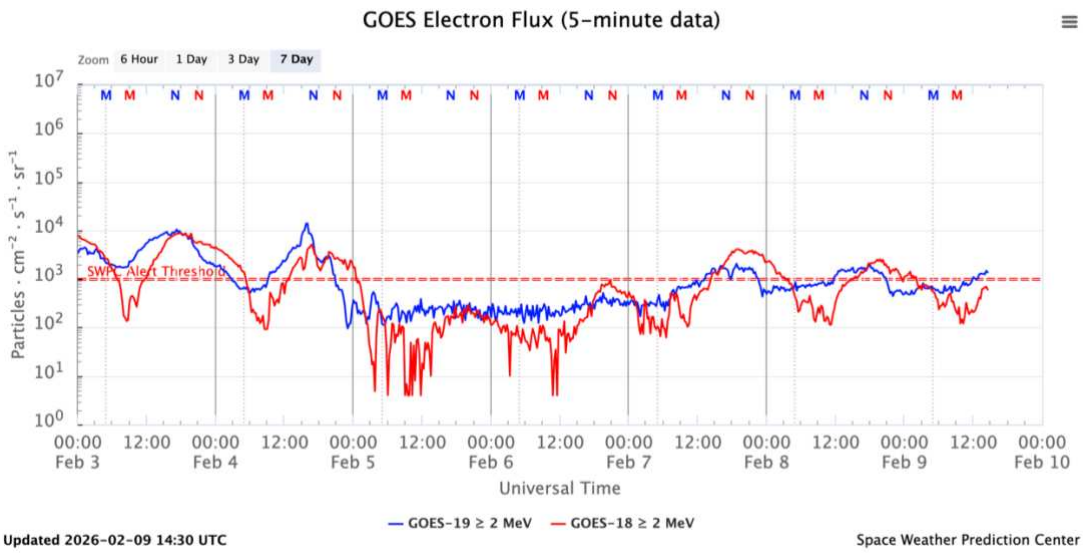

Figure 1: High-energy electron flux (> 2MeV) obtained from GOES-18 and GOES-19 satellite. Source: https://www.swpc.noaa.gov/products/goes-electron-flux

Summary

The high-energy electron flux (>2 MeV) in the outer boundary of the outer radiation belt obtained from the GOES-18 and GOES-19 geostationary satellites (Figure 1) exhibits a dropout of more than three orders of magnitude, beginning on February 4th and persisting below the alert threshold (103 particles/(cm2 s sr)) until mid-February 7th. This dropout is associated with the arrival of solar wind structures.

Geomagnetic Field / Campo Geomagnético

Summary

In the week of February 03-10, the Embrace magnetometer network data recorded several instabilities, with emphasis on:

- February 04-06: The magnet Embrace Magnetometers recorded an SI on February 4 at 15:00 UT, followed by a decrease in the H-component and several instabilities through the period.
- February 04-06: AE index was active, above 1000 nT. The minimum Dst index was increased to -62 nT. The highest Kp of the week was 5+.

Resumo

Na semana de 03-10 de Fevereiro, os dados provenientes da rede de magnetômetros Embrace registraram várias instabilidades, com destaque para:

- 04 a 06 de Fevereiro: Os magnetometros da rede Embrace MagNet registraram um SI no dia 4 às 15:00 UT, seguido de decréscimo na componente H e várias instabilidades.
- 04 - 06 de Fevereiro: índice AE esteve ativo, acima de 1000 nT, no dia 05. O índice Dst atingiu -62 nT. O Kp mais alto da semana foi 5+.

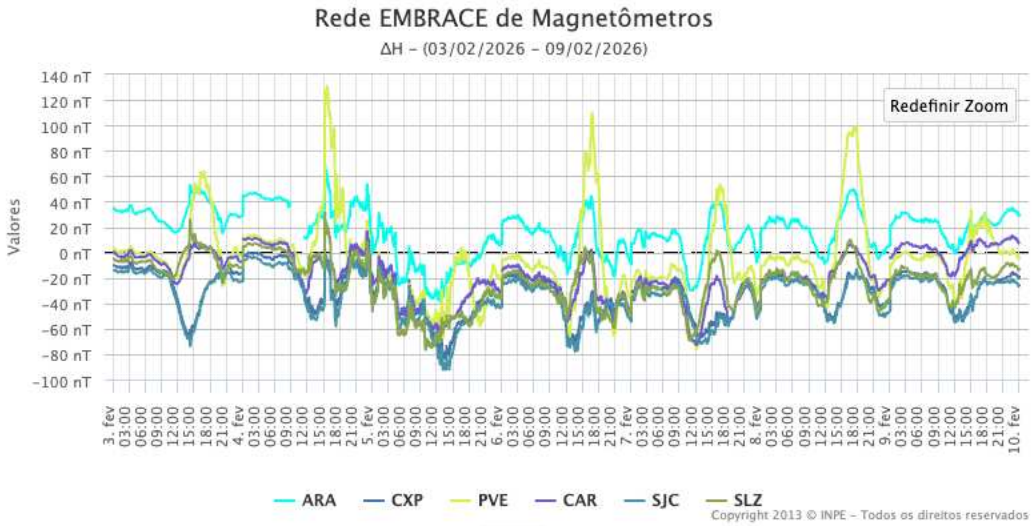

Figura 1.: Variação diurna da componente geomagnética H (nT) das estações da rede Embrace

Figure 1.: Daily variation of the geomagnetic field from H (nT) measured at Embrace MagNet

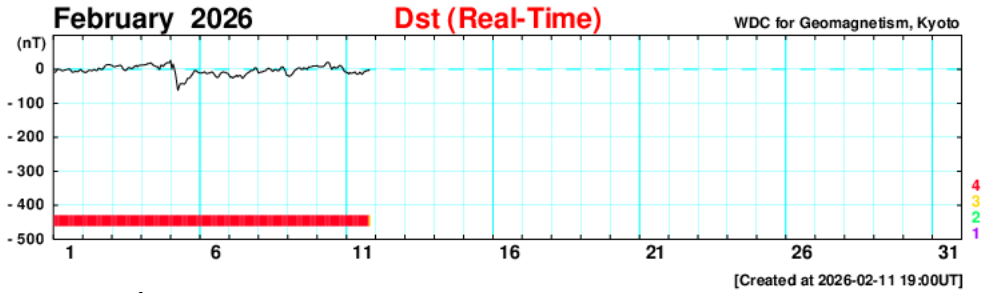

Figura 2.: Índice Dst.
Figure 2: Dst index

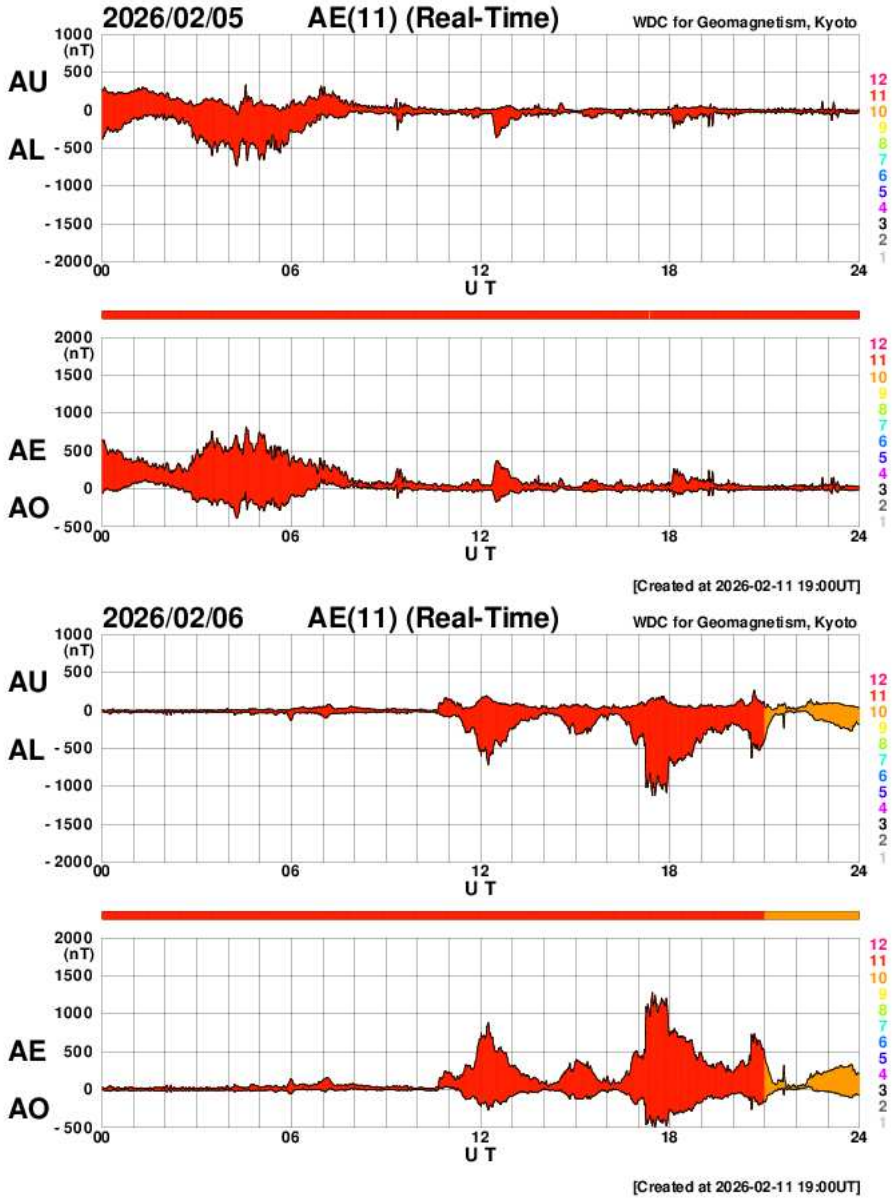

Figura 3.: Índice AE para os dias mais perturbados da semana.
Figure 3.: AE index for the most disturbed days in the current week.

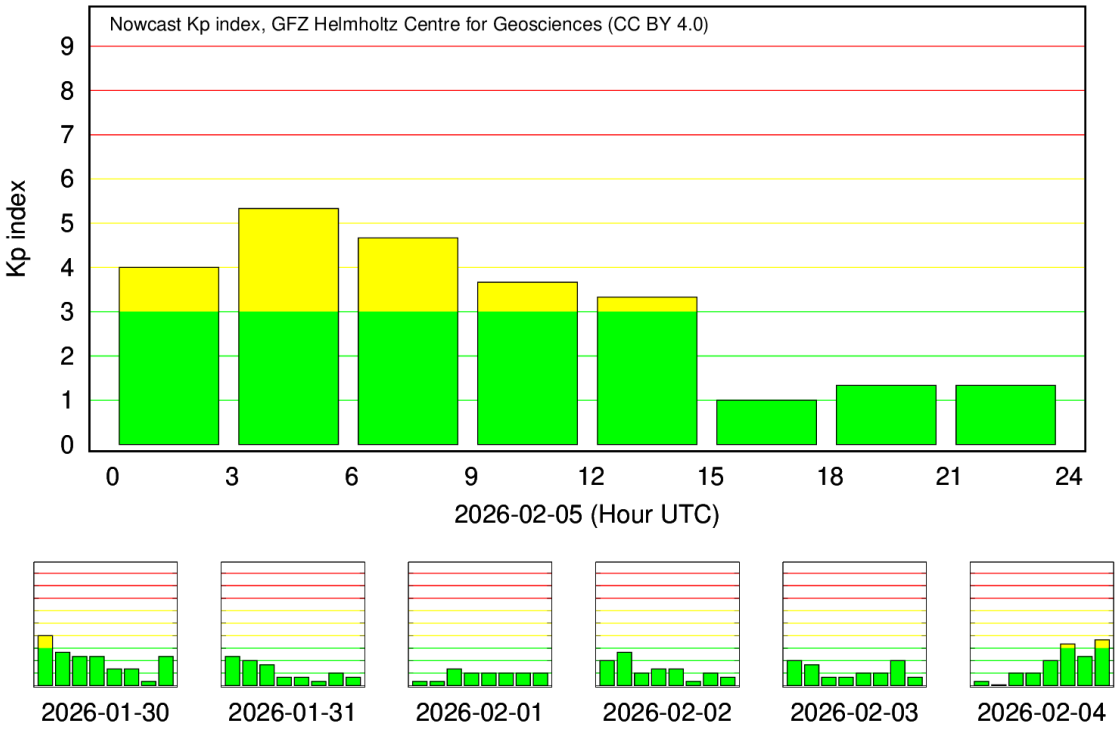

Figura 4.: Índice Kp.
Figure 4: Kp index for the current week

Ionosfera – Digisonde (Laysa Resende)

Summary

This week, Spread F was observed across all Brazilian latitudes, including Boa Vista, São Luís, and Cachoeira Paulista. Strong sporadic E (Es) layers persisted over Boa Vista and Cachoeira throughout the week, reaching scale 5. On February 3, a total blackout was recorded at all Brazilian stations due to an X-class solar flare (Figure 1). MUF variations remained below the threshold required for a moderate index.

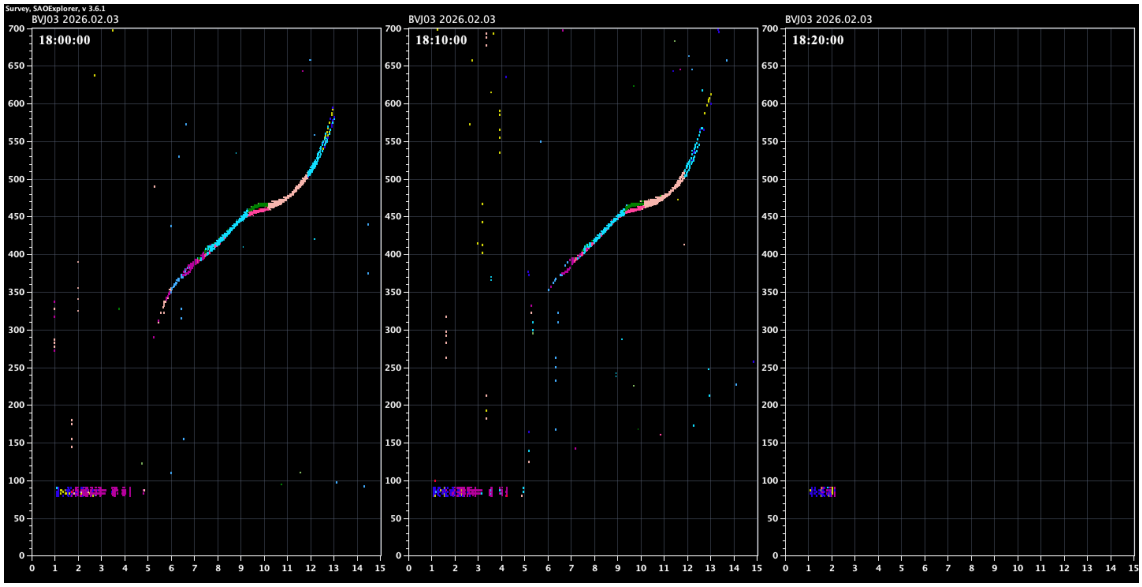

Figure 1 – Sequence of ionograms over Boa Vista, showing the total blackout due to an X-class solar flare.

Summary: Ionosphere Retrospective (Scintillation S4) February 02-06, 2026

In this report on the S4 scintillation index, data from SLMA in São Luiz/MA, STMN in Manaus/AM, STCB in Cuiabá/MT and SJCE in São José dos Campos/SP are presented. The S4 index tracks the presence of irregularities in the ionosphere having a spatial scale ~ 400 m.

The recorded S4 index scintillation values above 0.8 throughout the week (very strong scintillation) at all stations. The days with the most moderate behavior at the SLMA and STMN stations were February 8th and 9th. (Figure 1, top panel). An opposite behavior was recorded for the stations located further south (STCB and SJCE). The days with the most pronounced scintillation were February 8th and 9th. (Figure 1, lower panel).

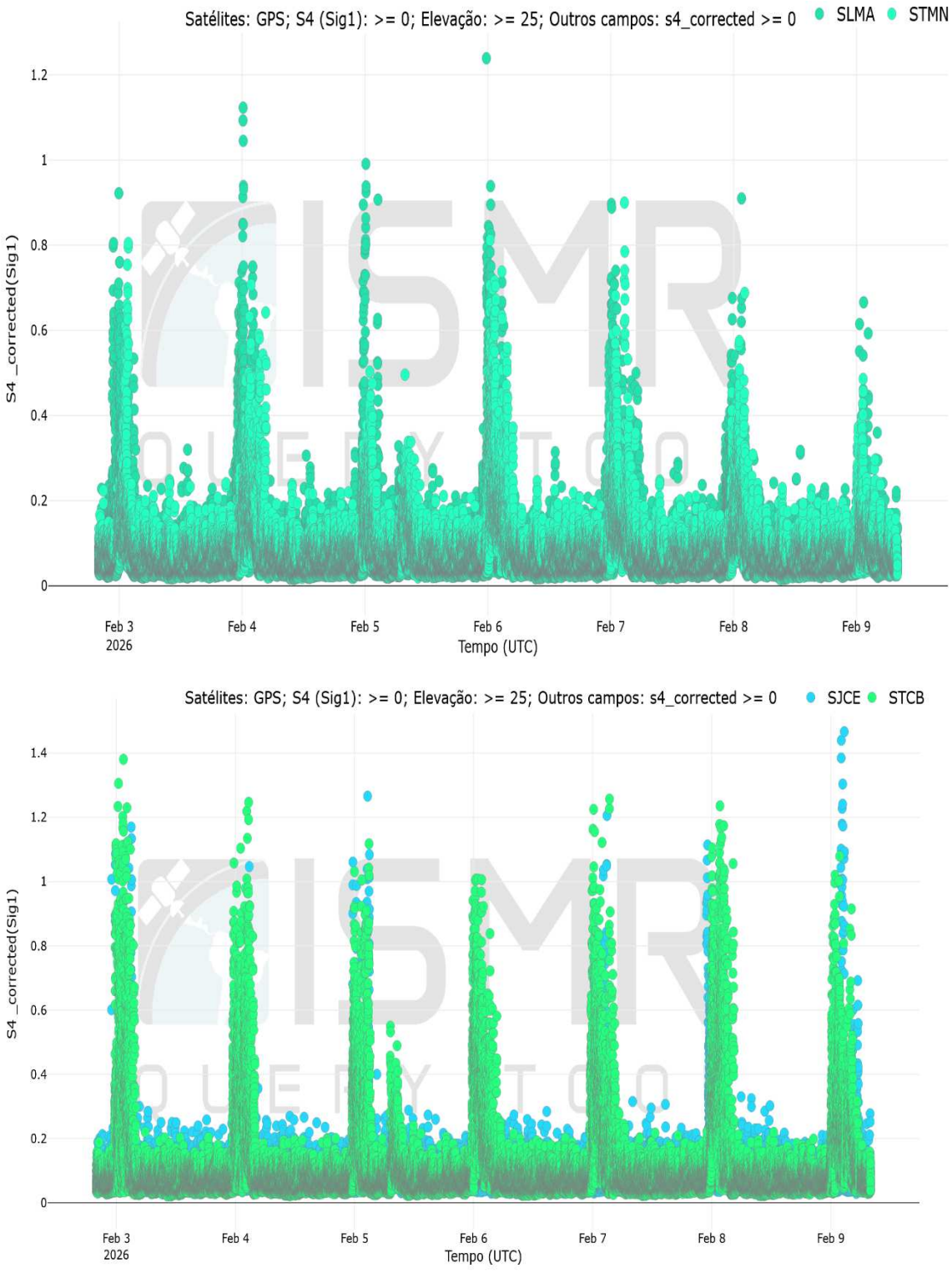

Figure 1: S4 index values for the GPS constellation measured at SLMA (dark green) and STMN (light green) in the upper panel. Stations STCB (light green) and SJCE (blue) appears in the lower panel. The data corresponds to 02/02—09.