Sun – Solar Activity (Jean C. Santos)

Summary

The Sun showed little activity during the week, with the presence of some regions of high magnetic complexity (beta-gamma) on the solar surface. During this period, two M-class solar flares and thirty-six CMEs occurred, but none of the halo type (angular width greater than 180 degrees). The presence of some coronal holes with significant area (>2.0% of the solar disk area) was identified on the Sun's surface.

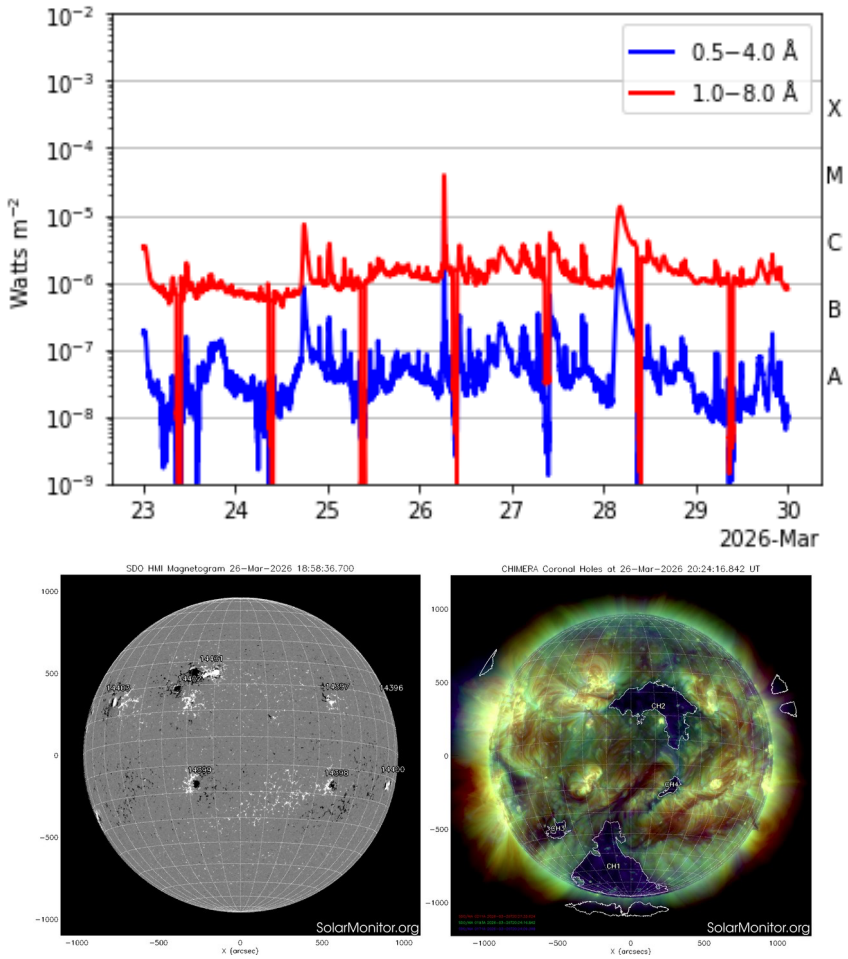

Figure 1 – X-ray flux measured by the GOES satellite (top panel) for the period of March 23-29, magnetic field in the line of sight (bottom left panel) and image at 193 angstroms (bottom right panel) measured on March 26, 2026.

Interplanetary Medium – IM – Daniele da S. F. Medeiros and Paulo R. Jauer
Period: March 23rd to 30th

Summary

Summary of interplanetary medium (IM) conditions for the last week. The IM region in the last week showed a moderate level of plasma disturbances due to the possible interaction with perturbed solar wind 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 March 29th at 16:30 UT at +12.56 nT.

- The BxBy components presented variations in the analyzed period, keeping both oscillating within the interval [-8.64, +8.01] nT. Showing eight rotations of the By component.

- The Bz component presents negative values for most of the week with a maximum negative -7.02 nT at 21:30 UT on March 28th. It presented positive value of +8.96 nT on March 29th at 16:30 UT.

- The solar wind density maximum peaked on March 29th at 13:30 UT, reaching 7.59 protons/cm^3.

- The solar wind speed fluctuated between 338 to 678 km/s, with a decrease beginning at 10:30 UT on March 25th.

- The magnetopause position remained relaxed throughout the analyzed period.

- During the early part of the week, the measured interplanetary Kp index fluctuated between 3 and 5, indicating disturbed geomagnetic conditions. On March 23rd, the index reached around 5 (Kp = 5), characterizing a minor geomagnetic storm (G1 level), while the modeled interplanetary Kp index showed a peak close to 6 (Kp = 6), corresponding to a moderate storm (G2). On March 25th, it reached values of approximately 6 (Kp = 6), while the modeled interplanetary Kp index presented a value of 3 (Kp = 3), corresponding to a quiet period, ending the week with values fluctuating between 1 and 4 for both the measured and modeled Kp indices.

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.

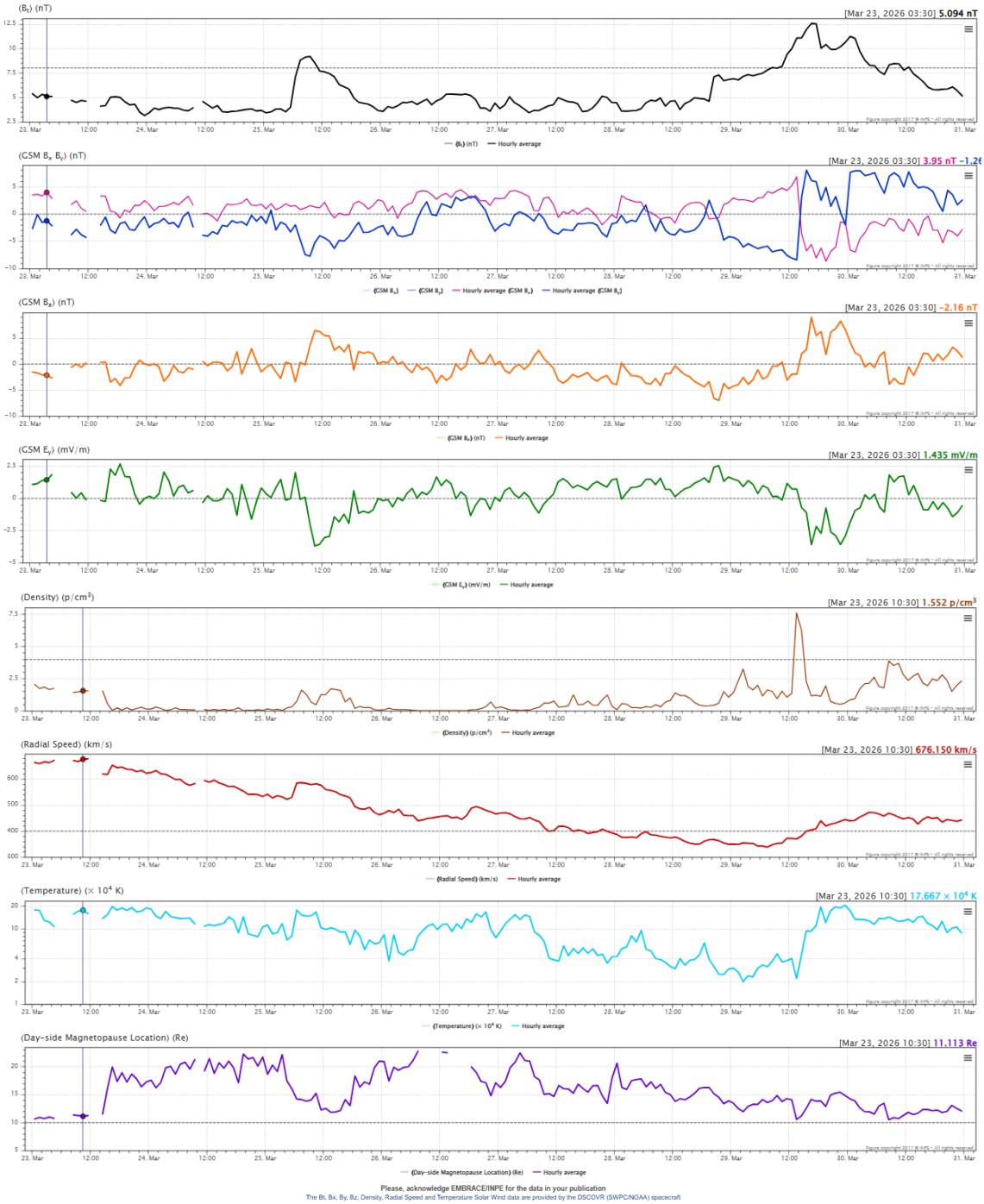

Figure 1: Illustrates a set of parameters observed in the solar wind by the DSCVR satellite.

EARTH'S RADIATION BELT

Responsible: Ligia Da Silva

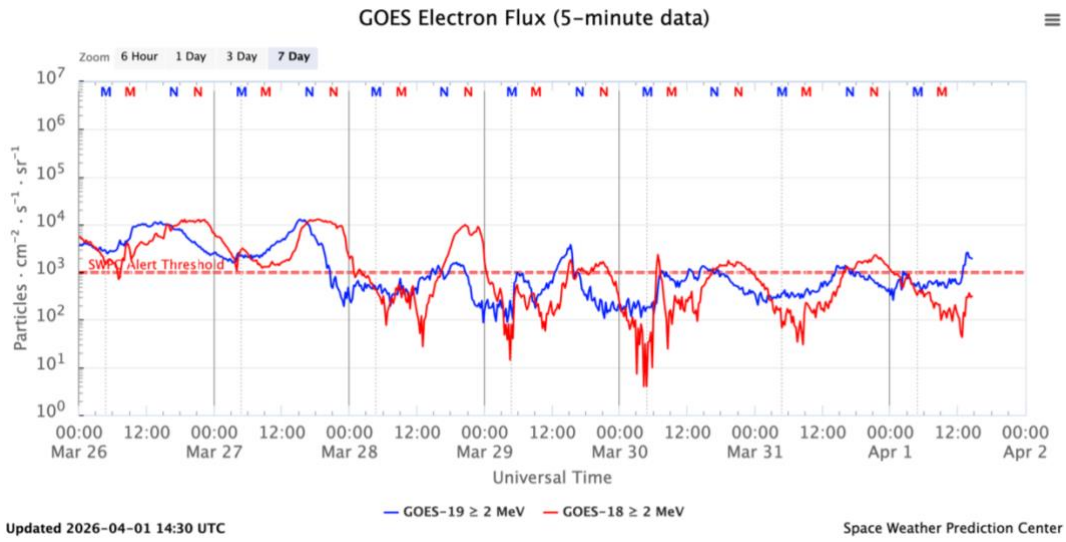

Figure 1: High-energy electron flux (> 2MeV) obtained from GOES-18 and GOES-19 satellite. Source: https://www.swpc.noaa.gov/products/goes-electron-flux

Summary

The high-energy electron flux (>2 MeV) in the outer boundary of the outer radiation belt obtained from the GOES-18 and GOES-19 geostationary satellites (Figure 1) is slightly above the alert threshold (103 particles/(cm2 s sr)) in the first days of the analyzed period. Three dropouts are observed from March 28th onwards, which decrease the electron flux by more than 3 orders of magnitude, also showing evidence of the presence of ultra-low frequency (ULF) waves.

Geomagnetic field

Responsible: Karen Sarmiento /Lívia Alves/Sony Su Chen

Summary

The period from March 23 to 30 was characterized by instabilities in geomagnetic activity. Throughout these days, G1-level geomagnetic storm alerts were issued at various intervals, as a result of an event that had begun in the preceding days.

The main highlight occurred between March 23 and 25, when the Kp index reached the G1 level (Kp = 5o). On the remaining days, this index fluctuated below this threshold, reaching minimum values of 1-. In turn, the Ksa index reached the G1 level only on March 23 (Ksa = 5+), remaining between 3- and values below the storm threshold during the other intervals.

In the auroral region, the AE index showed fluctuations around 500 nT at several moments, with peaks exceeding 1000 nT recorded on March 23 and 25.

Between March 27 and 29, the Kp index reached 4- during the 03–06 UT interval on March 29, representing the highest value observed in this specific period, and remained below this level at other times. The Ksa index, on the other hand, exhibited greater variability, reaching 5- during the intervals 15–18 UT on March 27, 21–24 UT on March 28, and again between 15–18 UT and 18–21 UT on March 29.

The Dst index recorded its minimum value of -38 nT at 24 UT on March 28, while dHsa reached -58 nT at the same time. Despite these variations, both Kp and Ksa remained below the G1 storm threshold during this interval.

Over the past 24 hours, the geomagnetic field has continued to show instabilities.

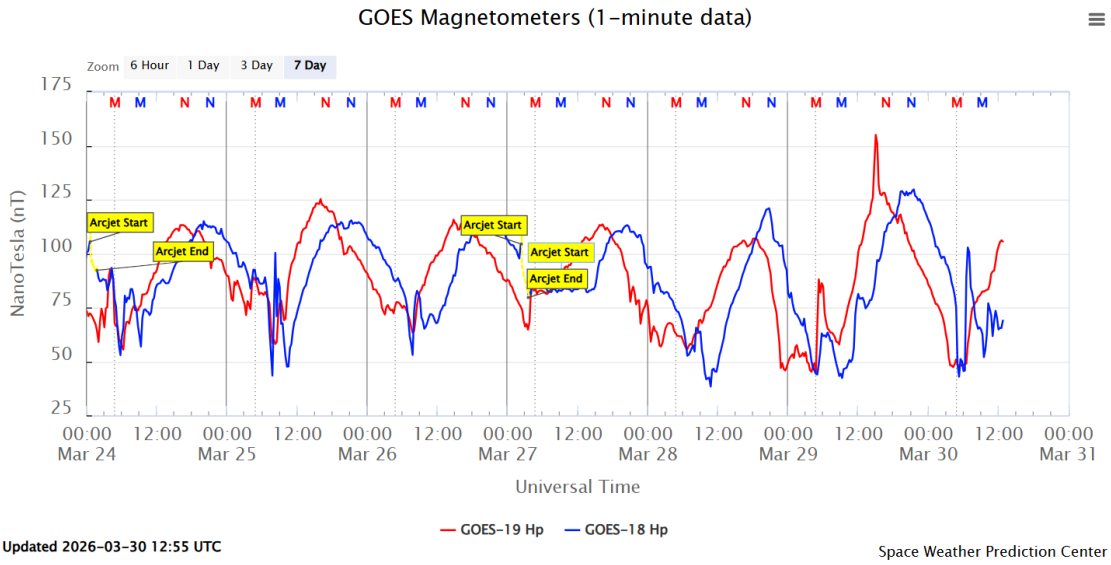

Figure 1 - Magnetic field measurement at the GOES satellite position.

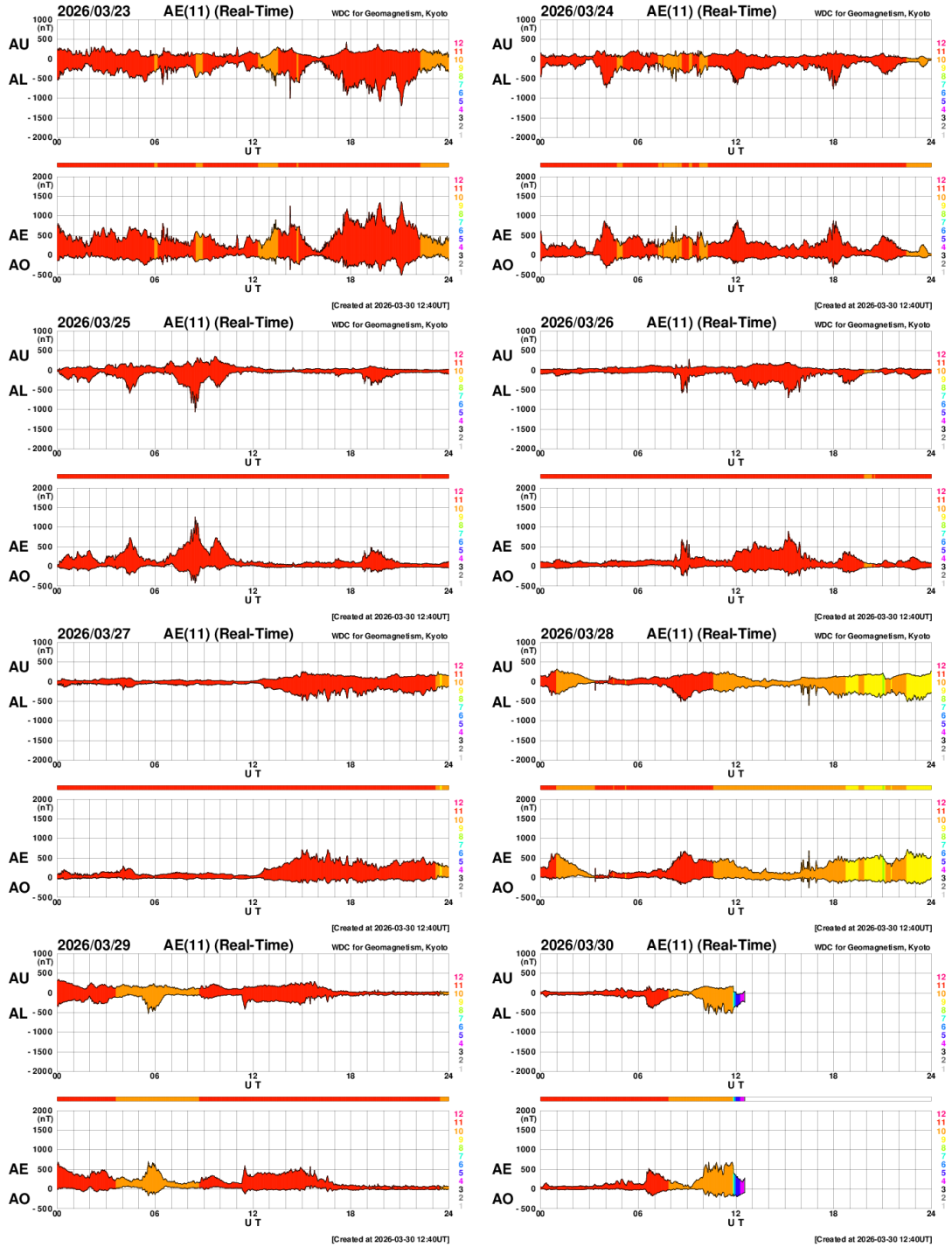

Figure 2 - AE index for the days of the week.

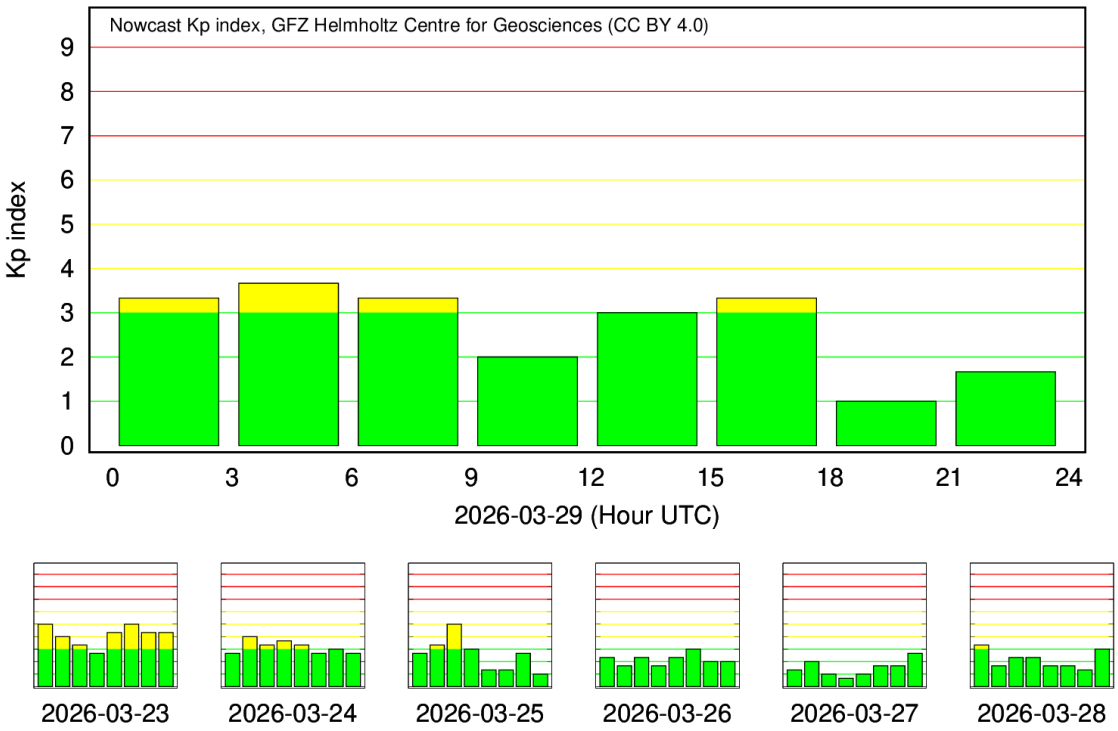

Figure 3 - Kp index on a logarithmic scale.

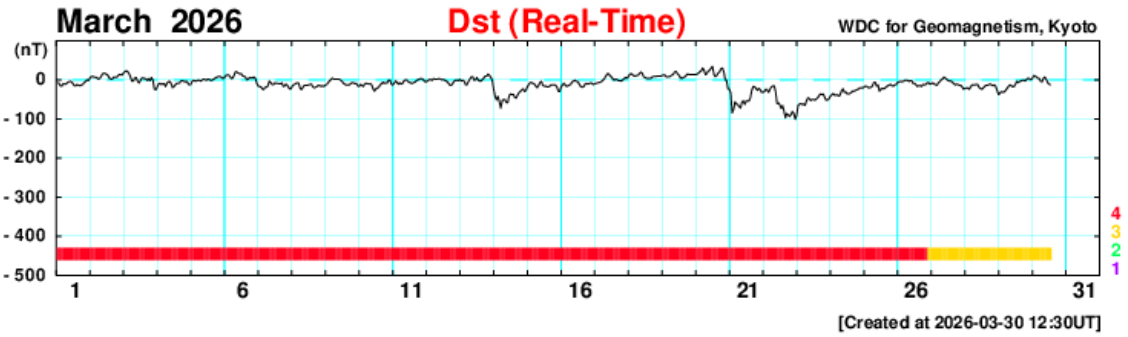

Figure 4 - Dst index.

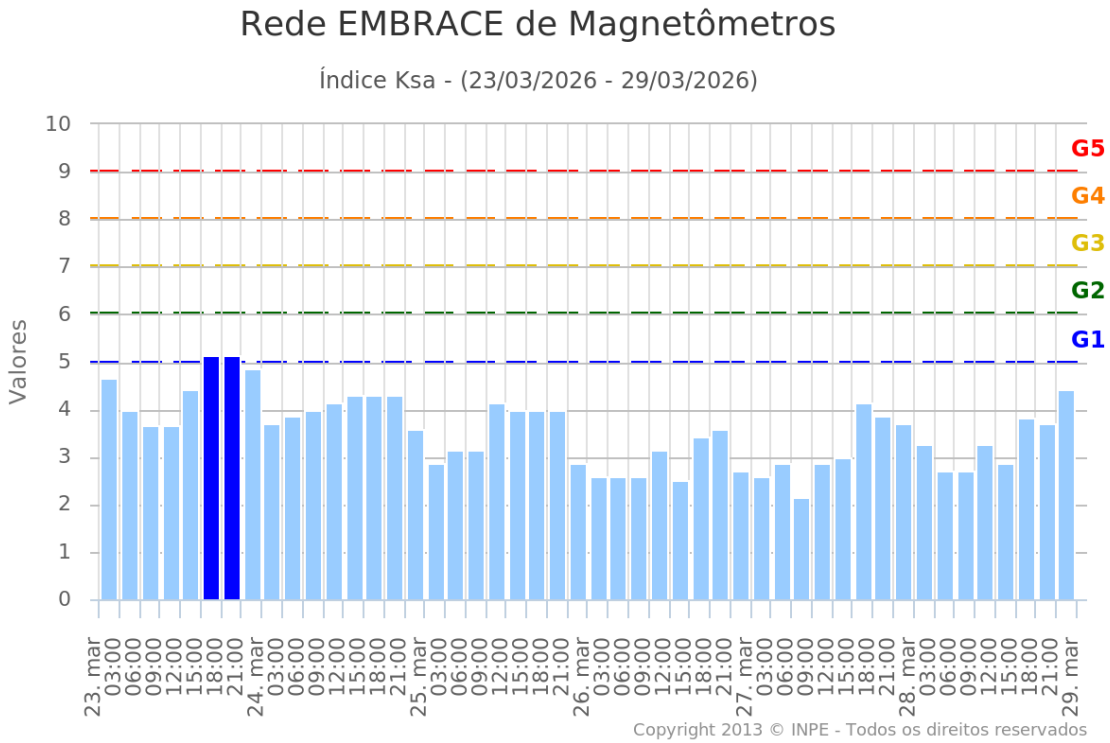

Figure 5 - Geomagnetic index in South America - Ksa Index.

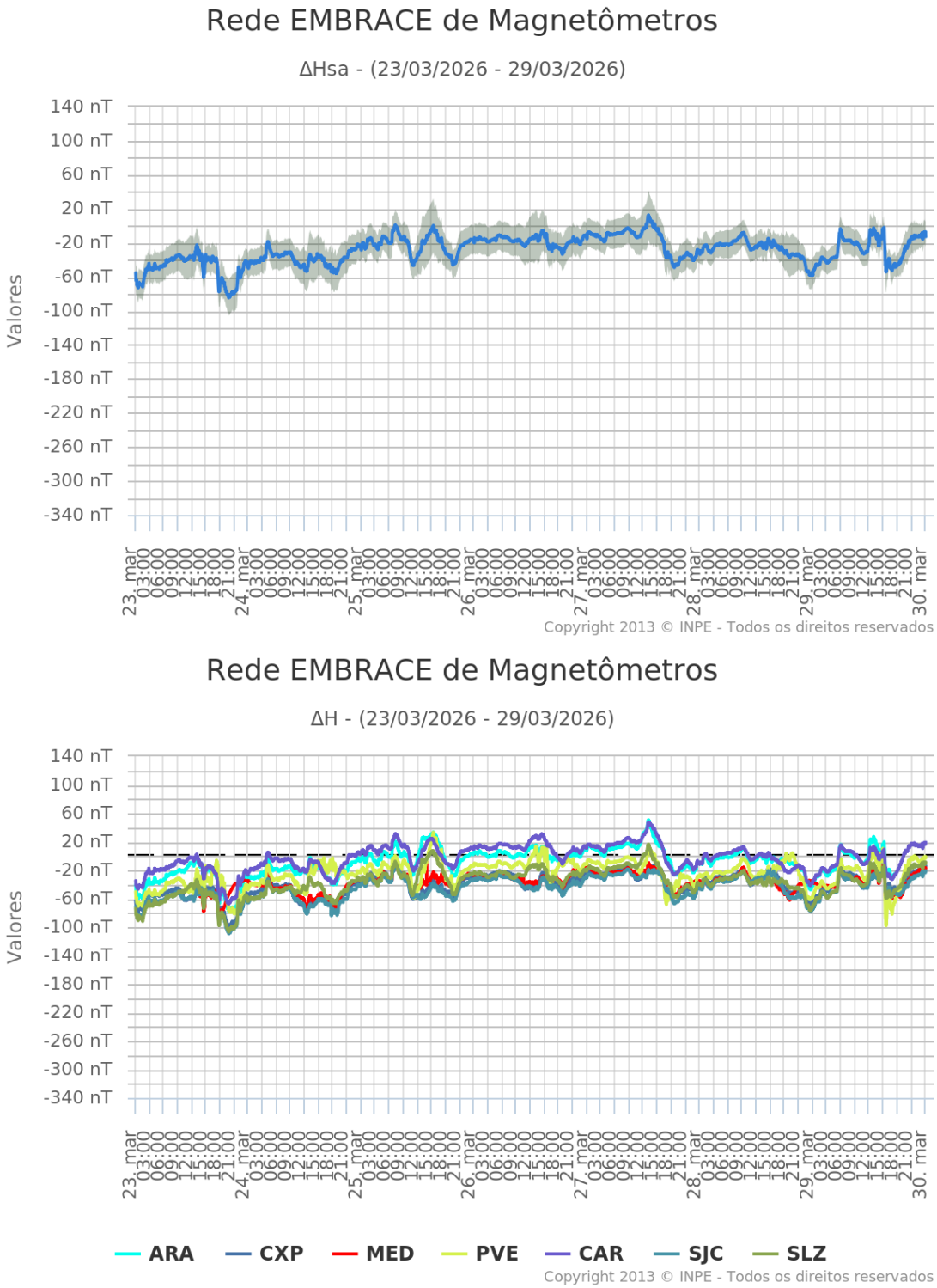

Figure 6 - Geomagnetic index in South America - ΔH index and at magnetic stations of the EMBRACE Program.

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.

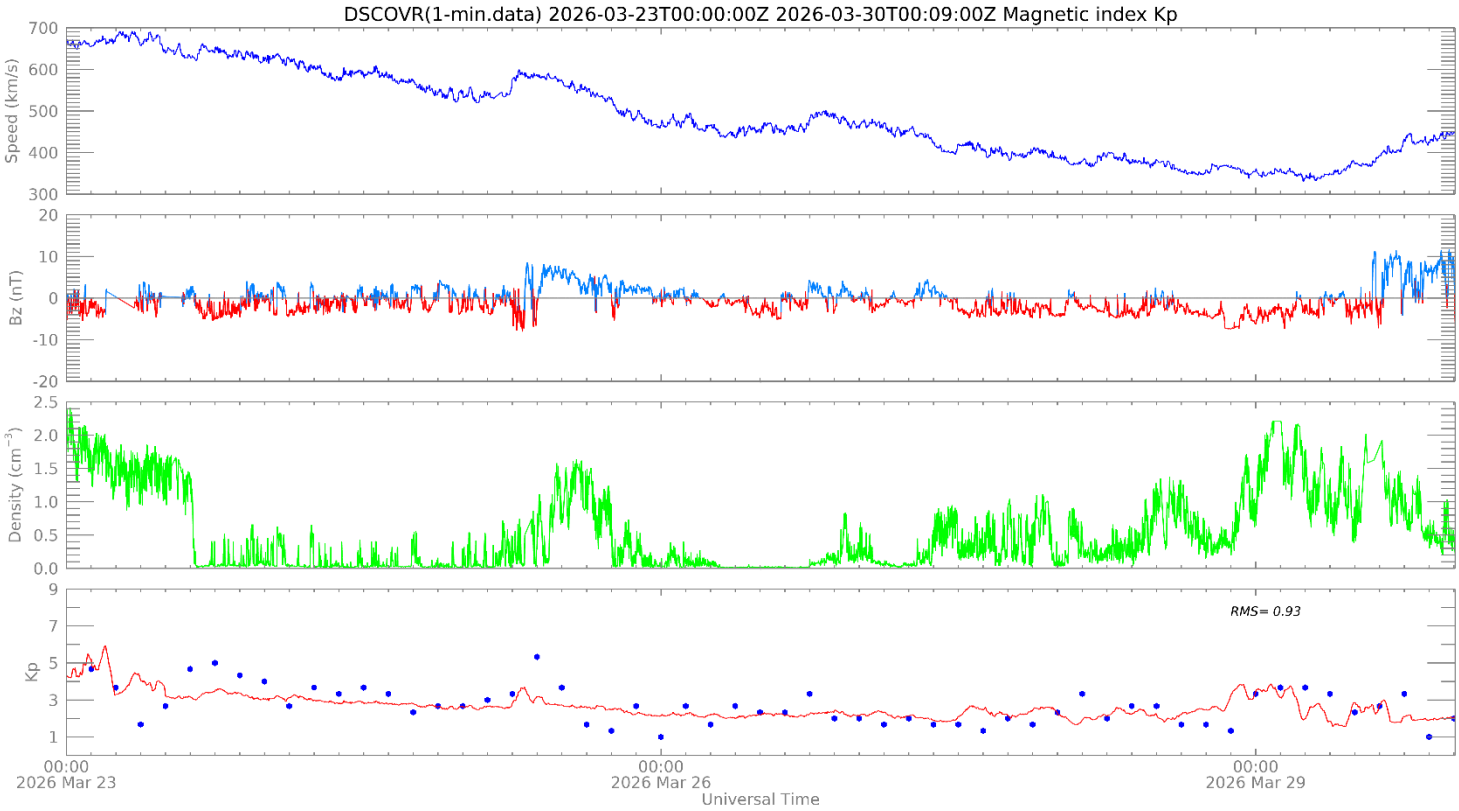

Figure 2: Illustrates a set of parameters observed in the solar wind by the DSCVR satellite and the Kp index by NOAA/SWPC, blue dot, and the modeling, red line.

Ionosfera – Digisonde (Laysa Resende)

Summary

During this week, spread F was observed at Brazilian stations located near the magnetic equator, such as Boa Vista and São Luís. On most days, no spread F was detected over Cachoeira Paulista, except on March 29 (Figure 1). Sporadic E (Es) layers were also recorded during this week over Boa Vista, São Luís, and Cachoeira Paulista, although they were generally weak. Variations in the Maximum Usable Frequency (MUF) remained below the threshold required to classify the ionospheric conditions as moderate.

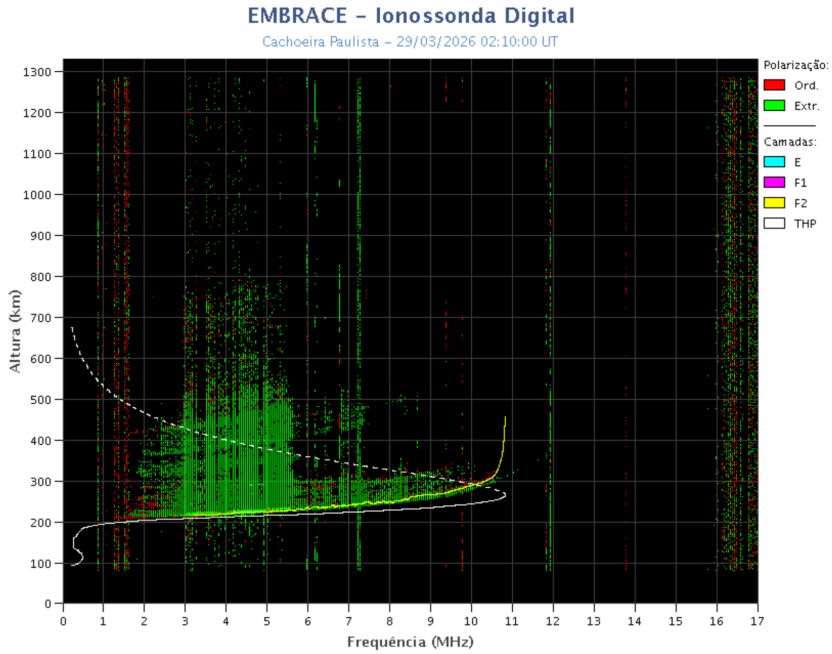

Figure 1 – Ionograms over Cahoeira Paulista showing the spread F on March, 29.