Sun – Solar Activity (Jean C. Santos)

Summary

Solar activity was low, with two active regions of high magnetic complexity (beta-gamma) present on the solar disk during the week. Four M-class solar flares occurred during the period. The Cactus software identified 20 CMEs, none of which were of the halo type (angular width greater than 180 degrees). Three coronal holes with significant area (>2.0% of the solar disk area) were identified crossing the solar disk at low latitudes during this interval.

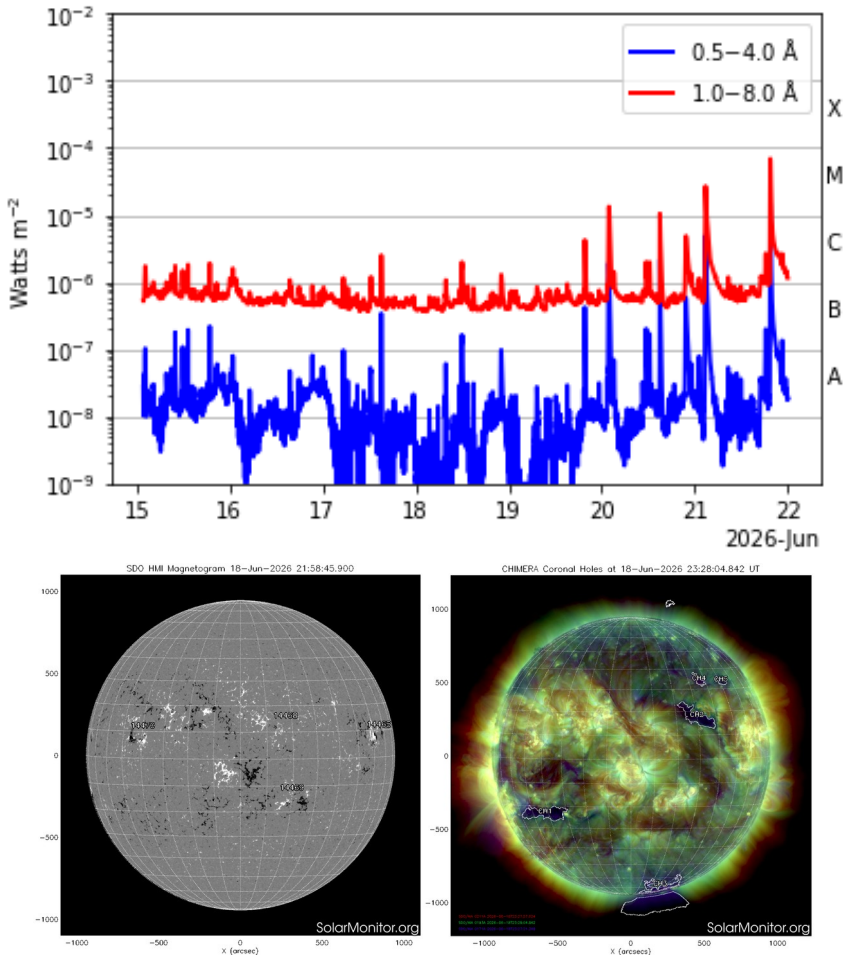

Figure 1 – X-ray flux measured by the GOES satellite (top panel) for the period of June 15–21, line-of-sight magnetic field (bottom left panel), and 193-angstrom image (bottom right panel) measured on June 18, 2026.

Interplanetary Medium – IM – Daniele da S. F. Medeiros and Paulo R. Jauer
Period: June 15th to 22th

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 two CIRs 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 June 17th at 05:30 UT at +11.73 nT.
- The BxBy components presented variations in the analyzed period, keeping both oscillating within the interval [-7.80, +8.80] nT. Showing seven rotations of the By component.
- The Bz component presents negative values for most of the week with a maximum negative -5.20 nT at 22:30 UT on June 18th. It presented positive value of +9.88 nT on June 17th at 04:30 UT.
- The solar wind density maximum peaked on June 17th at 02:30 UT, reaching 14.98 protons/cm^3.
- The solar wind speed fluctuated between 340 to 474 km/s, with an decrease beginning at 12:30 UT on June 19th.
- The magnetopause position remained relaxed almost throughout the analyzed period, reaching maximum compression (9.32 RE) at 02:30 UT on June 17th.
- During the early part of the week, the measured and modeled interplanetary Kp index remained fluctuating between 1 and 3 (Kp < 3), characterized a calm period. This situation persists as of the time of writing this briefing.

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.

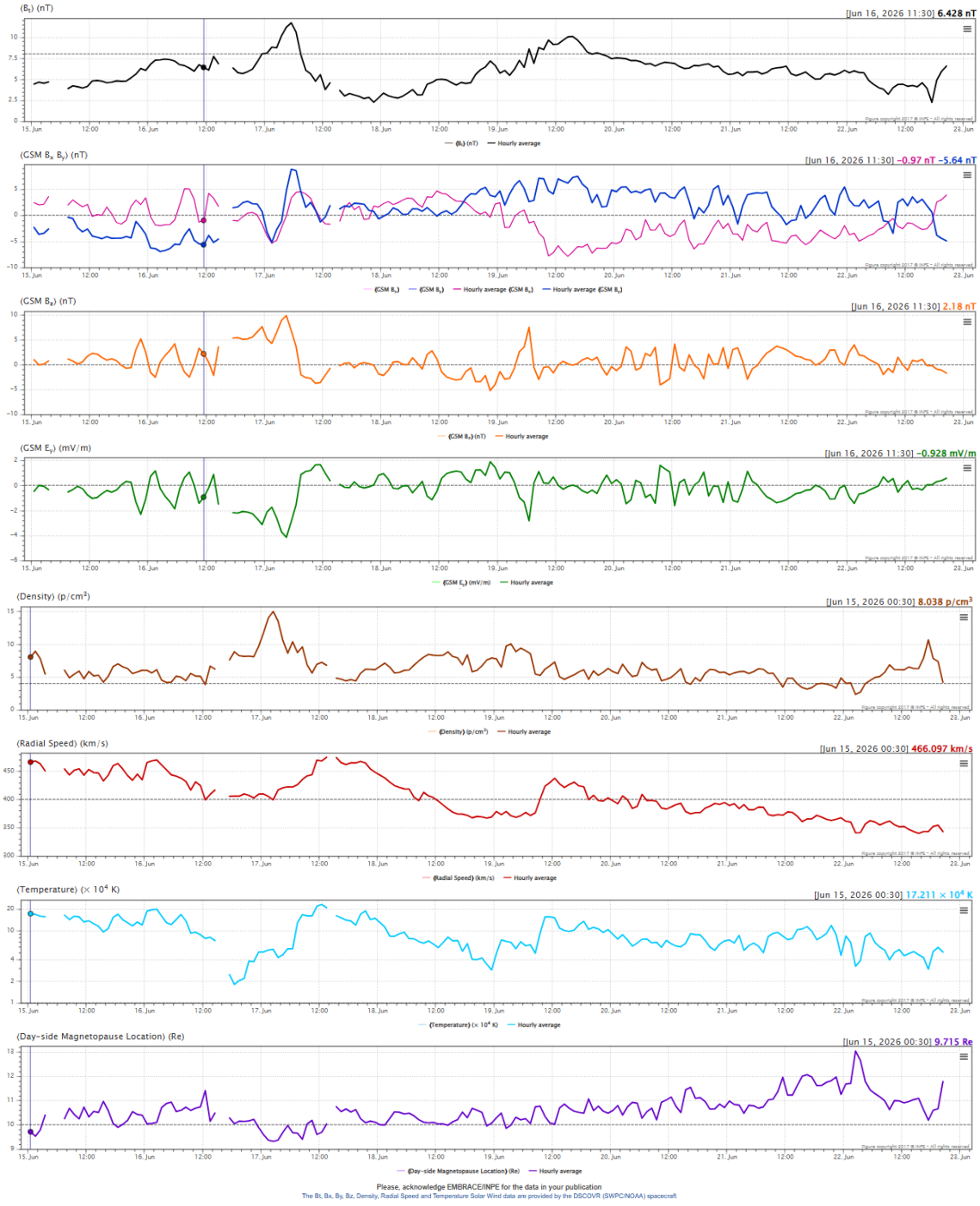

Figure 1: Illustrates a set of parameters observed in the solar wind by the DSCVR satellite.

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.

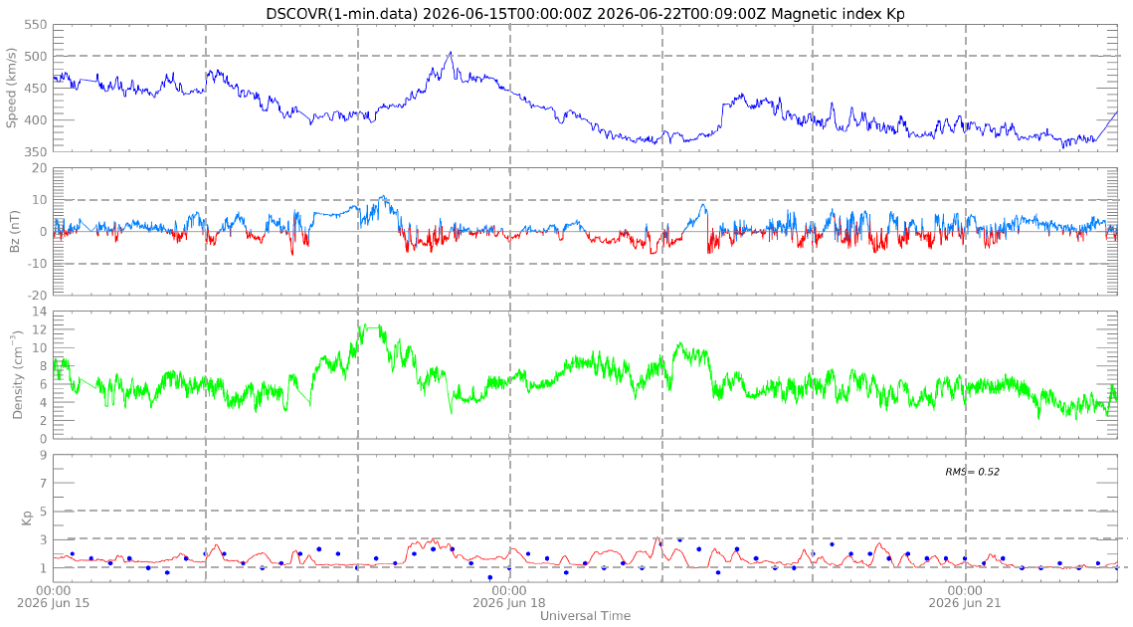

Figure 2: Illustrates a set of parameters observed in the solar wind by the DSCVR satellite and the Kp index by NOAA/SWPC, blue dot, and the modeling, red line.

EARTH'S RADIATION BELT

Responsible: Ligia Da Silva

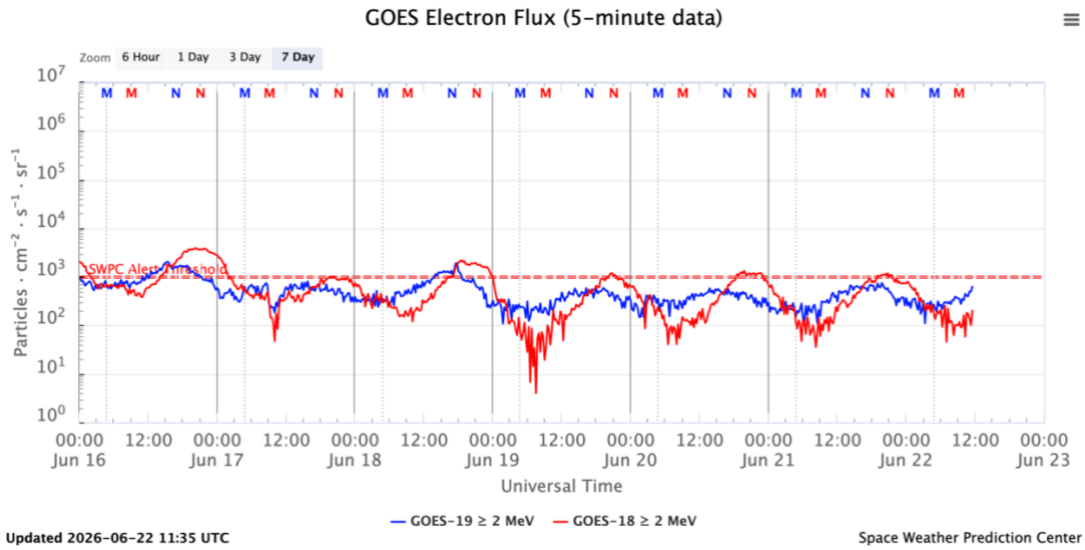

Figure 1: High-energy electron flux (> 2MeV) obtained from GOES-18 and GOES-19 satellite. Source: https://www.swpc.noaa.gov/products/goes-electron-flux

Summary

The high-energy electron flux (>2 MeV) in the outer boundary of the outer radiation belt obtained from the GOES-18 and GOES-19 geostationary satellites (Figure 1) shows two dropouts, the first between June 16th and 17th and the second between June 18th and 19th. After the second dropout, the electron flux oscillated between the minimum alert threshold (particles/(cm^2 s sr)) and values below this until today.

Ionosfera – Digisonde (Laysa Resende)

Summary

During this week, spread-F and an F3 layer were detected over Boa Vista. In contrast, spread-F traces over Cachoeira Paulista were observed only on June 17 and 19. Sporadic E (Es) layers remained very weak over Cachoeira Paulista but reached the maximum intensity level, corresponding to index 5, over Boa Vista (Figure 1). Variations in the Maximum Usable Frequency (MUF) remained below the threshold required for classification as moderate.

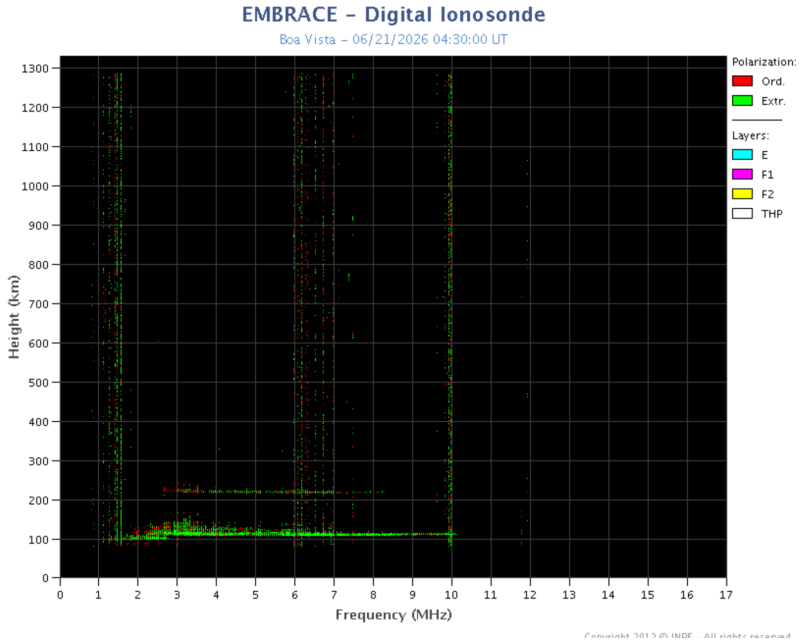

Figure 1 – Ionogram over Boa Vista, showing the strong Es layer.

Ionospheric F2-Layer Irregularities

Summary

During the period from June 14 to June 20, 2026, the parameters of F2-layer height (derived from the mean ionosonde fixed frequencies in the 3–10 MHz range), vertical drift velocity, total electron content (TEC), and ionospheric scintillation index (S4) were analyzed in order to monitor F2-layer ionospheric irregularities over South America.

The maximum F2-layer height associated with the pre-reversal enhancement ranged from 399 to 454 km, while the vertical drift velocity varied between 15 and 25 m/s (Figure 1).

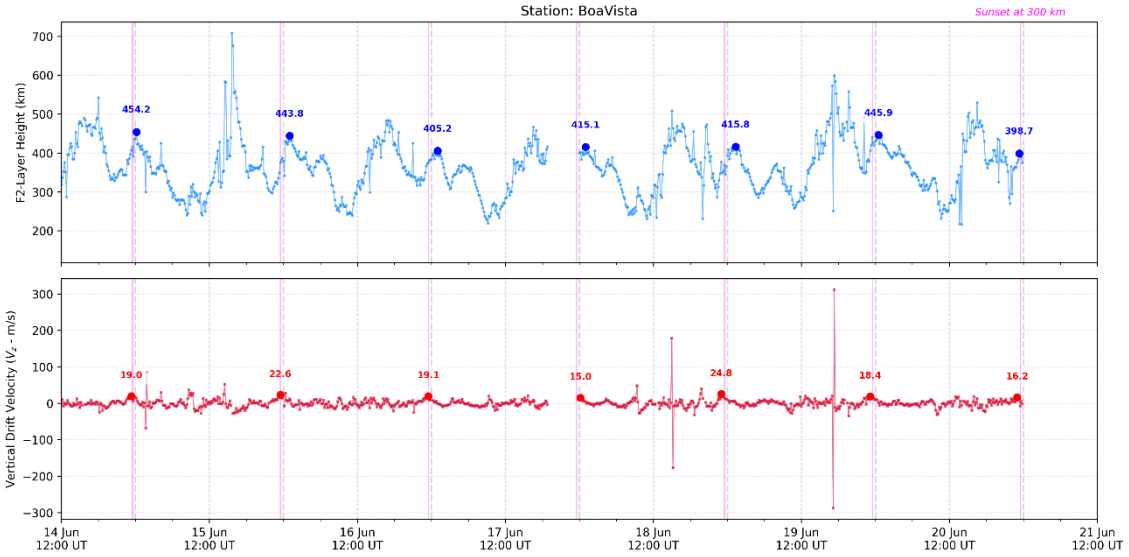

Figure 1 – F2-layer height (upper panel) and vertical drift velocity (lower panel).

The Equatorial Ionization Anomaly (EIA) was not present on all days of the analyzed period. TEC values reached maxima of approximately 55 TECU. Scintillation levels remained low throughout the week (S4 < 0.5), indicating a relatively stable ionospheric environment. In addition, no events associated with equatorial plasma bubbles were detected in the observations (Figure 2).

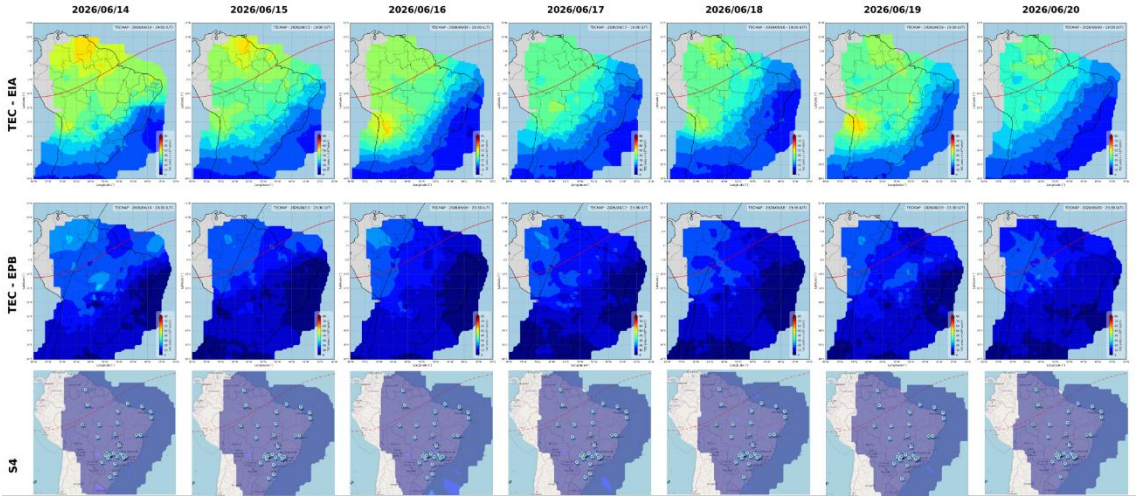

Figure 2 – Total electron content (TEC) maps (upper and middle panels) and S4 index (lower panel).

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2. The figures presented were selected to represent ionospheric dynamics and may correspond to different times. *As figuras apresentadas foram selecionadas para representar a dinâmica ionosférica e podem corresponder a horários distintos entre si.*
3. For additional information and access to the complete dataset, please visit: https://www2.inpe.br/climaespacial/portal/en/home/. *Para informações adicionais e acesso aos dados completos, consulte: https://www2.inpe.br/climaespacial/portal/.*

Although no signatures of equatorial plasma bubbles were identified in the previously analyzed parameters, images of the atomic oxygen red-line emission (OI 630 nm) recorded at Bom Jesus da Lapa revealed the presence of these ionospheric irregularities on the nights of June 15–16, 18–19, and 19–20, 2026.

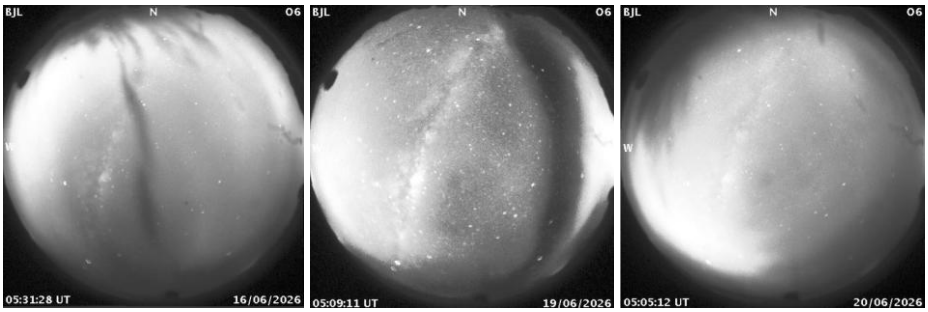

Figure 3 – Atomic oxygen red-line emission (OI 630 nm) images acquired by the Bom Jesus da Lapa all-sky imager on the nights of (a) June 15–16, (b) June 18–19, and (c) June 19–20, 2026.

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