Sun – Solar Activity (Jean C. Santos)

Summary

The Sun exhibited moderate activity with the presence of four active regions of high magnetic complexity (beta-gamma and beta-gamma-delta) in the solar disk during the week. Six M-class solar flares and one X-class flare occurred during this period. The Cactus software identified 47 CMEs, one of which was a halo (angular width greater than 180 degrees). Two coronal holes with significant area (>2.0% of the solar disk area) crossing the solar disk at low latitudes were identified during this interval.

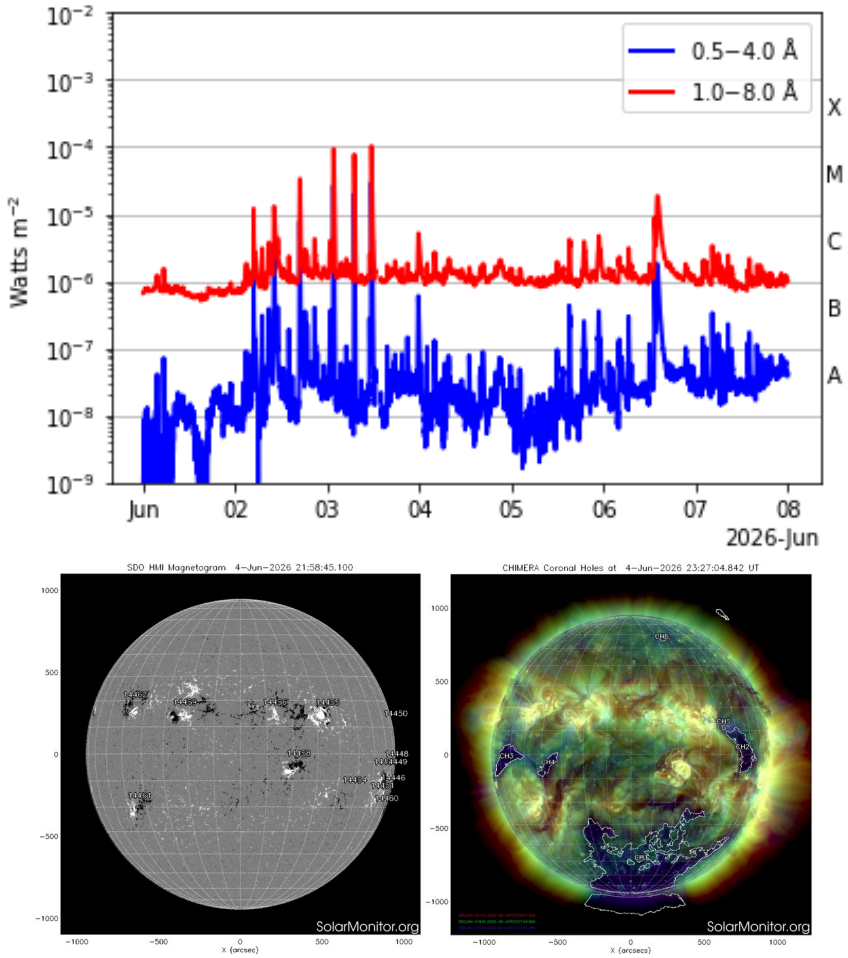

Figure 1 – X-ray flux measured by the GOES satellite (top panel) for the period of June 1-7, magnetic field in the line of sight (bottom left panel) and image at 193 angstroms (bottom right panel) measured on June 4, 2026.

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

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 a CIR 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 5th at 05:30 UT at +17.51 nT.

- The BxBy components presented variations in the analyzed period, keeping both oscillating within the interval [-10.18, +13.82] nT. Showing thirteen rotations of the By component.

- The Bz component presents negative values for most of the week with a maximum negative -9.63 nT at 12:30 UT on June 5th. It presented positive value of +14.31 nT on June 5th at 05:30 UT.

- The solar wind density maximum peaked on June 5th at 06:30 UT, reaching 9.39 protons/cm^3.

- The solar wind speed fluctuated between 362 to 661 km/s, with a decrease beginning at 20:30 UT on June 5th.

- The magnetopause position remained relaxed almost throughout the analyzed period, reaching maximum compression (9.80 RE) at 14:30 UT on May 29th.

- During the early part of the week, the measured and modeled interplanetary Kp index remained fluctuating between 1 and 4. On June 5th, the measured and modeled interplanetary Kp index increased, reached a value above 7 (Kp > 7), modeled Kp index, corresponding to a strong storm (G3 level), while measured Kp index reached a value above 6 (Kp > 6), corresponding to a moderate storm (G2 level). On June 6th, both the measured and modeled Kp values showed a decreasing trend, and the week concluded with values ranging between 0 and 3 (Kp < 3).

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.

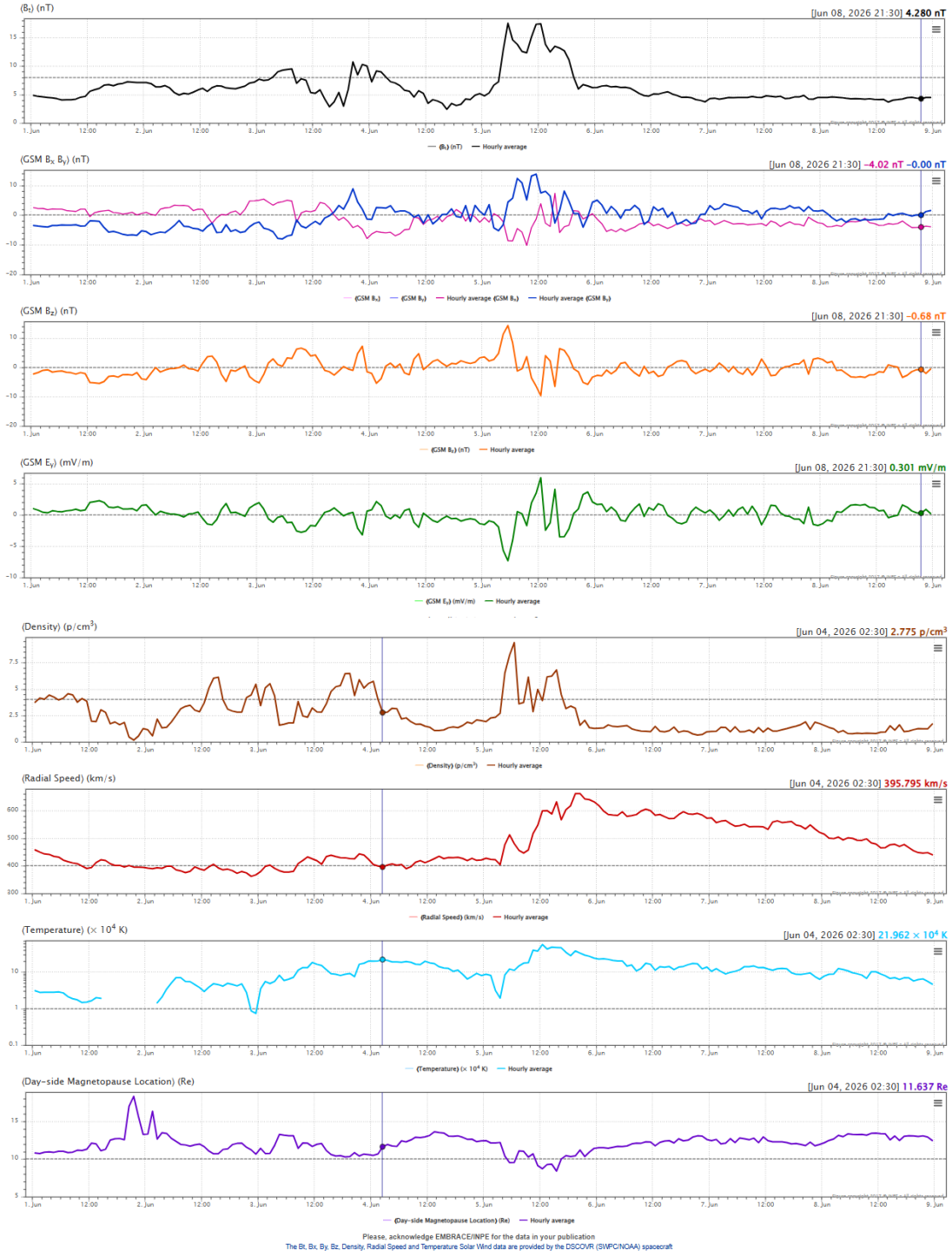

Figure 1: Illustrates a set of parameters observed in the solar wind by the DSCVR satellite.

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.

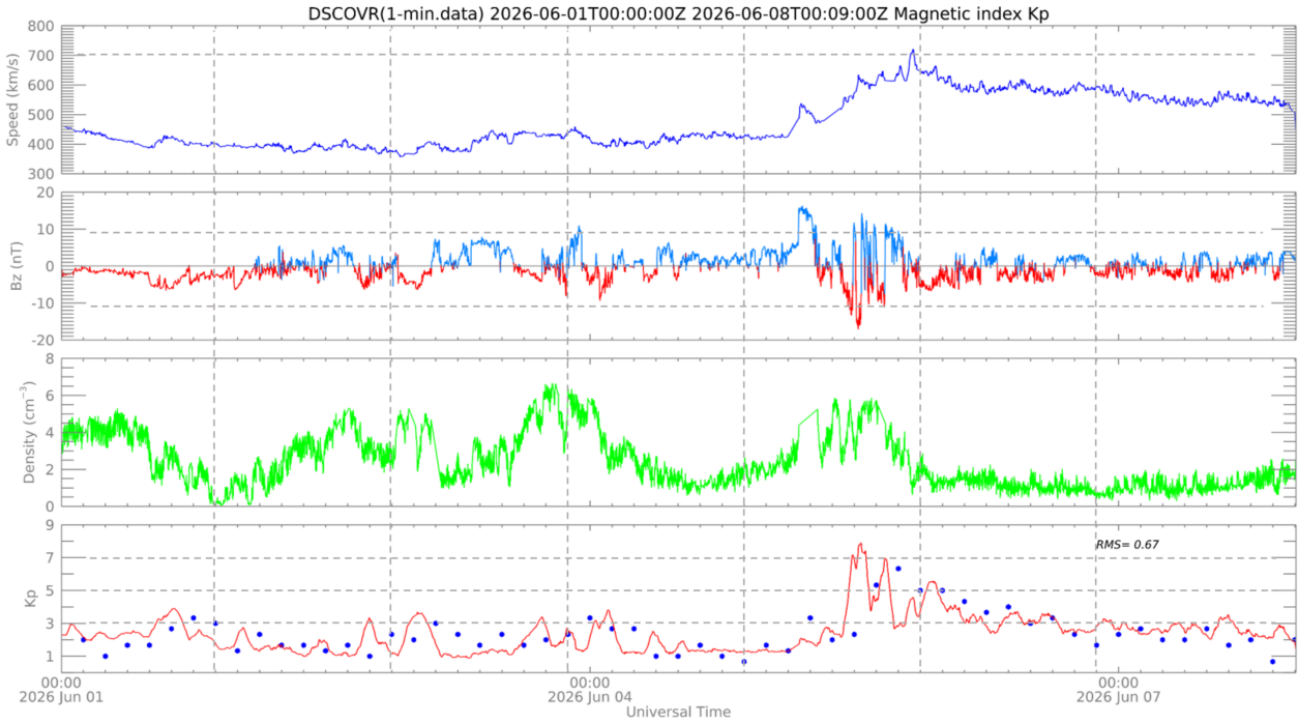

Figure 2: Illustrates a set of parameters observed in the solar wind by the DSCVR satellite and the Kp index by NOAA/SWPC, blue dot, and the modeling, red line.

EARTH'S RADIATION BELT

Responsible: Ligia Da Silva

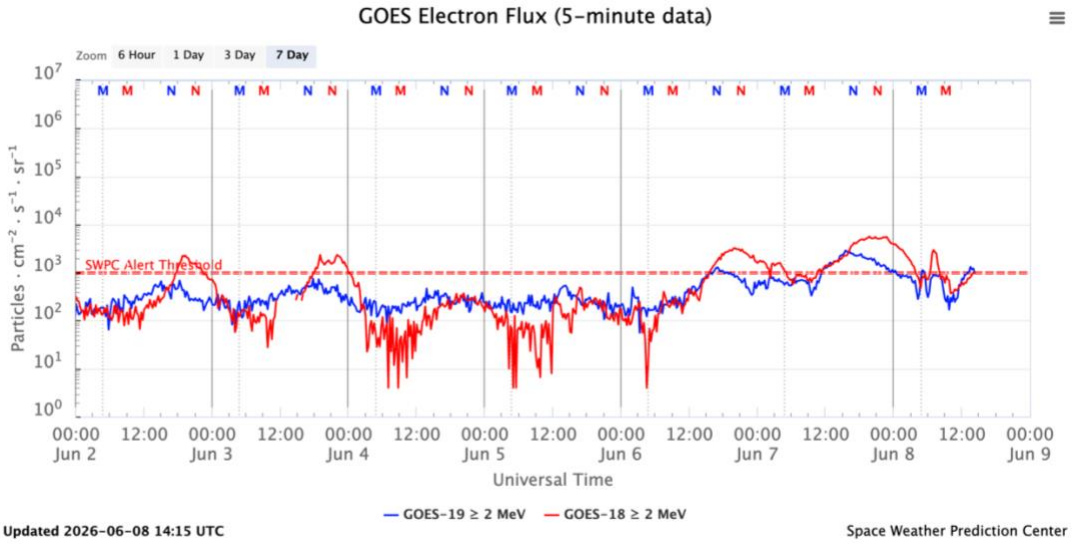

Figure 1: High-energy electron flux (> 2MeV) obtained from GOES-18 and GOES-19 satellite. Source: https://www.swpc.noaa.gov/products/goes-electron-flux

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) showed a dropout on June 4th, remaining below the alert threshold (10^3 particles/(cm^2 s sr)) for more than 48 hours. An electron flux increase was observed on June 6th, persisting above the alert threshold until today.

Ionosfera – Digisonde (Laysa Resende)

Summary

During this week, spread F was observed over Boa Vista, while spread F signatures were also detected over Cachoeira Paulista on several days, specifically June 1, 3, 4, 6, and 7 (Figure 1). Strong sporadic E (Es) layers were recorded over Boa Vista, reaching intensity index 4. Variations in the Maximum Usable Frequency (MUF) remained below the threshold required to classify the ionospheric conditions as moderate.

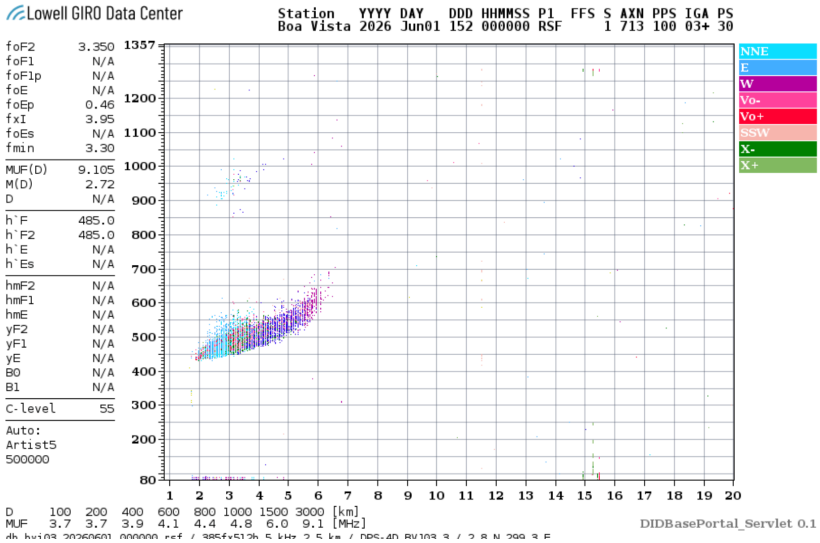

Figure 1 – Ionograms over Cachoeira Paulista, showing the spread F.

Ionospheric F2-Layer Irregularities

Summary

During the period from May 31 to June 6, 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 444 to 599 km, while the vertical drift velocity varied between 15 and 22 m/s (Figure 1).

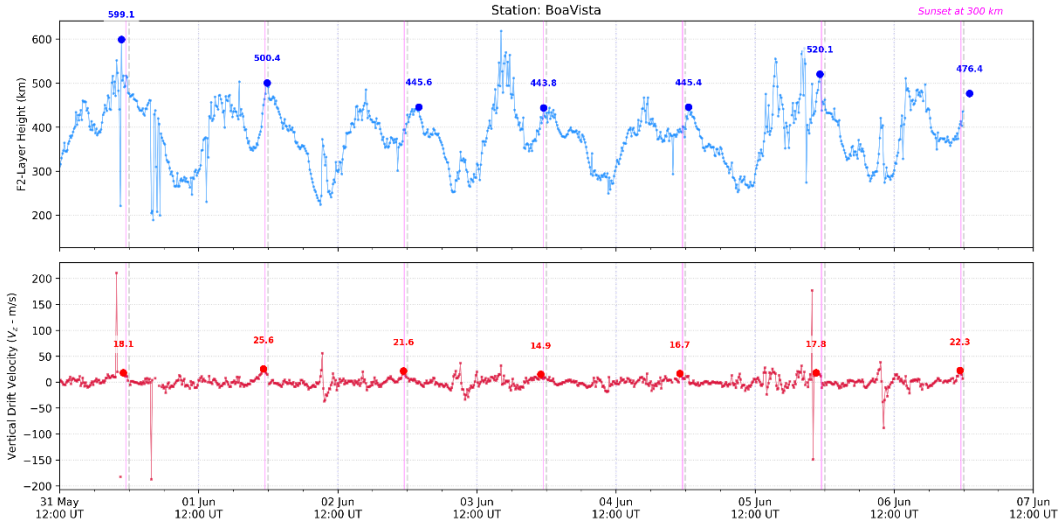

Figure 1 – F2-layer height (upper panel) and vertical drift velocity (lower panel).

The equatorial ionization anomaly (EIA) was observed on all days except June 2. TEC reached maximum values of approximately 70 TECU at the southern crest of the anomaly. On June 5, the TEC map showed the presence of equatorial plasma bubbles. Scintillation levels remained low (S4 < 0.5) throughout the week, indicating quiet ionospheric conditions. However, on June 5, S4 values exceeded 0.8, coinciding with the occurrence of the equatorial plasma bubbles identified in the TEC map (Figure 2).

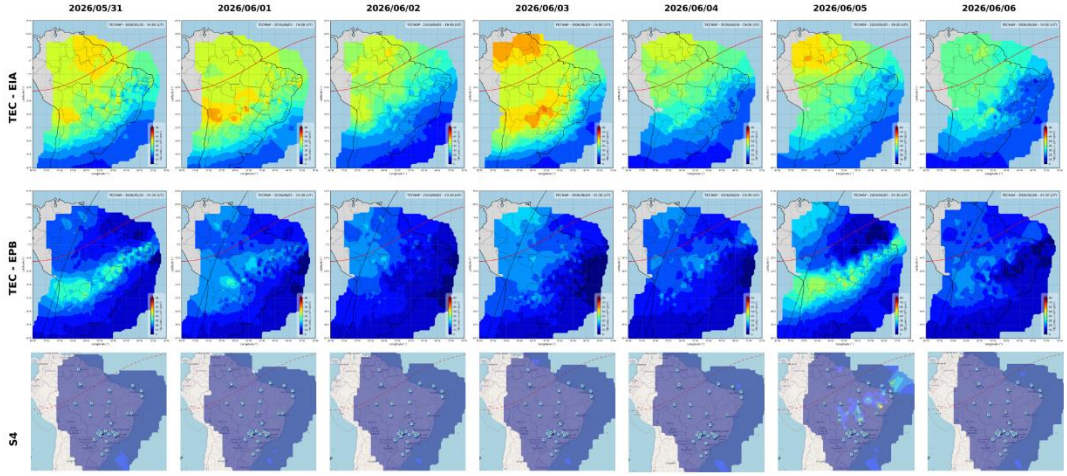

Figure 2 – Total electron content (TEC) maps (upper and middle panels) and S4 index (lower panel).

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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/.*