Sun – Solar Activity (Jean C. Santos)

Summary

The Sun exhibited low activity despite the presence of six active regions with high magnetic complexity (beta-gamma, beta-delta, and beta-gamma-delta) on the solar disk during the week. One M-class solar flare occurred during the period, but no X-class flares were recorded. The Cactus software identified 10 CMEs, one of which was a halo-type CME (angular width greater than 180 degrees). Two coronal holes with significant area (>2.0% of the solar disk area) were identified crossing the solar disk during this interval.

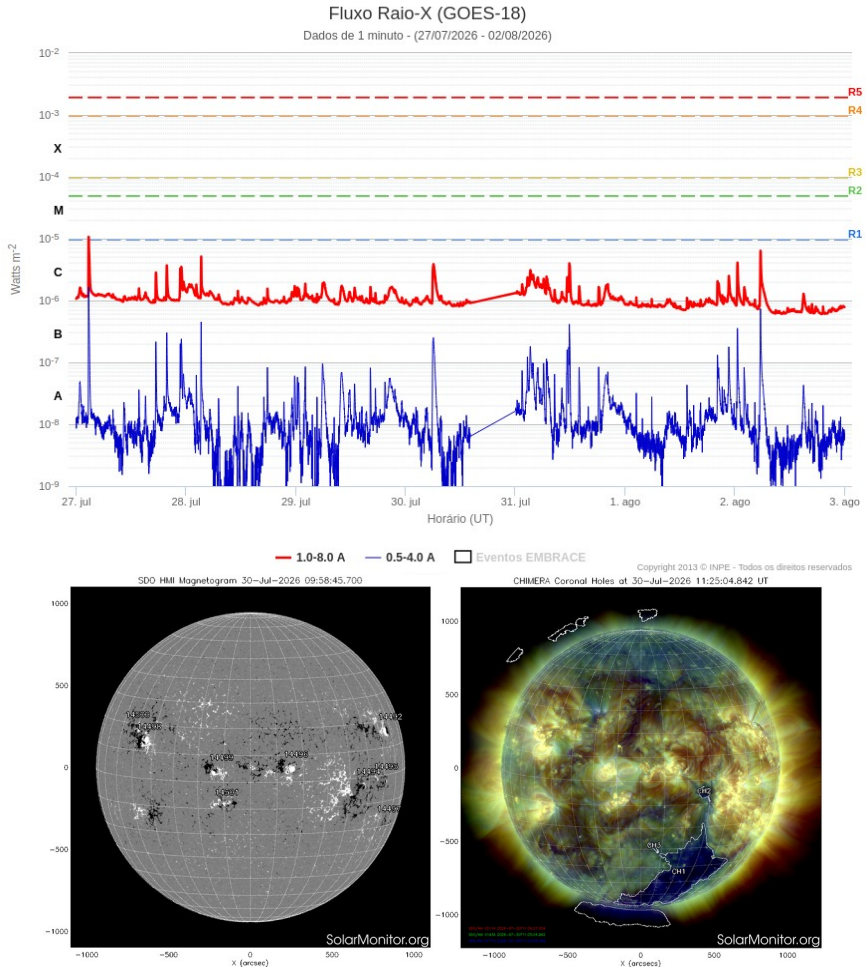


Figure 1 – X-ray flux measured by the GOES satellite (top panel) for the period from July 27 to August 2, line-of-sight magnetic field (bottom left panel), and 193-angstrom image (bottom right panel) measured on July 30, 2026.

Interplanetary Medium – IM – Daniele da S. F. Medeiros and Paulo R. Jauer
Period: July 27th to August 3rd

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 CME identified by the SOLAR 1 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 August 2nd at 15:30 UT at +17.45 nT.

- The BxBy components presented variations in the analyzed period, keeping both oscillating within the interval [-11.57, +14.41] nT. Showing thirteen rotations of the By component.

- The Bz component presents negative values for most of the week with a maximum negative -12.21 nT at 15:30 UT on August 2nd. It presented positive value of +9.68 nT on August 2nd at 22:30 UT.

- The solar wind density maximum peaked on August 2nd at 13:30 UT, reaching 28.68 protons/cm^3.

- The solar wind speed fluctuated between 265 to 469 km/s. An increase was observed on August 2nd.

- The modeled and measured Kp index began the week with values below 3 (Kp < 3), indicating a calm period. However, on August 2nd, the measured Kp index reached values above 5 (Kp > 5), indicating a minor storm (level G1), while the modeled Kp index reached values above 7 (Kp > 7), indicating a strong storm (level G3). After this storm, the indices fluctuated between calm and active periods.

Figure 1 illustrates a set of parameters observed in the solar wind by the SOLAR 1 satellite. The measured solar wind parameters can be identified in the following order starting: Interplanetary magnetic field modulus (IMF), the Bx, By, Bz components, Ey component, Solar wind density, speed and temperature.

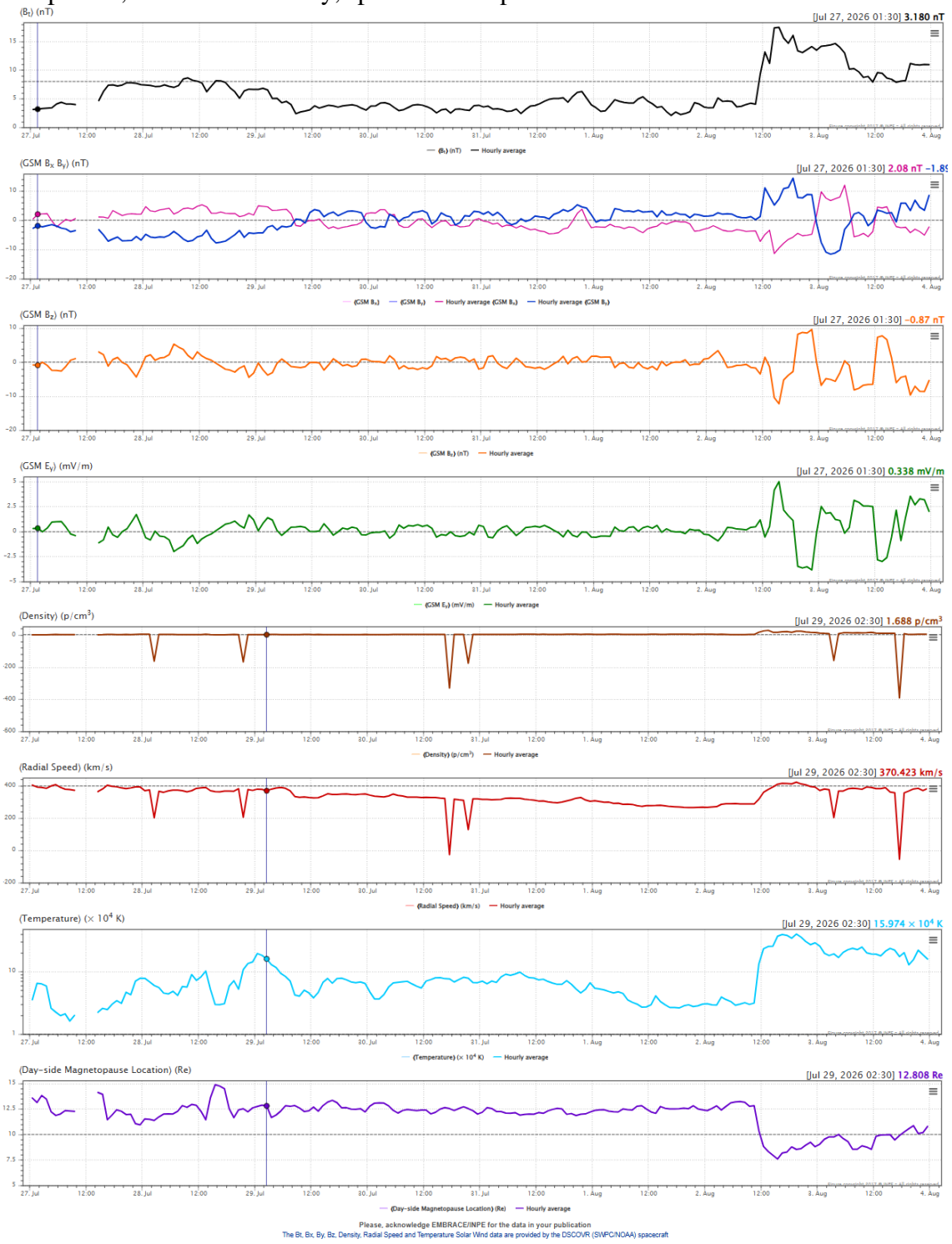


Figure 1: Illustrates a set of parameters observed in the solar wind by the SOLAR 1 satellite.

Figure 2 illustrates a set of parameters observed in the solar wind by the SOLAR 1 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.

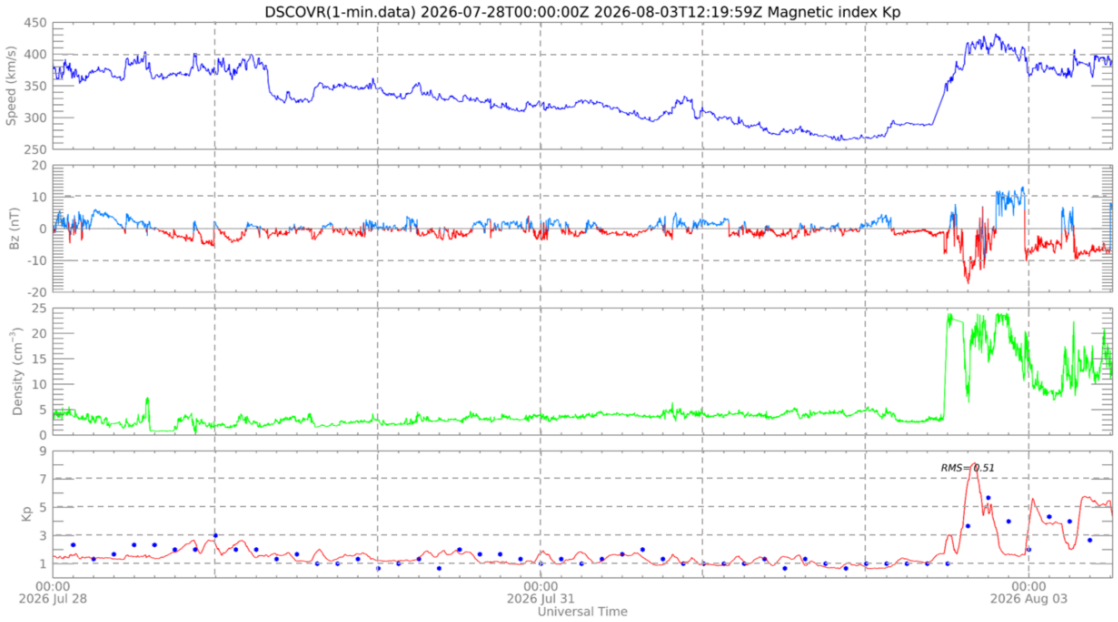


Figure 2: Illustrates a set of parameters observed in the solar wind by the SOLAR 1 satellite and the Kp index by NOAA/SWPC, blue dot, and the modeling, red line.

EARTH'S RADIATION BELT

Responsible: Ligia Da Silva

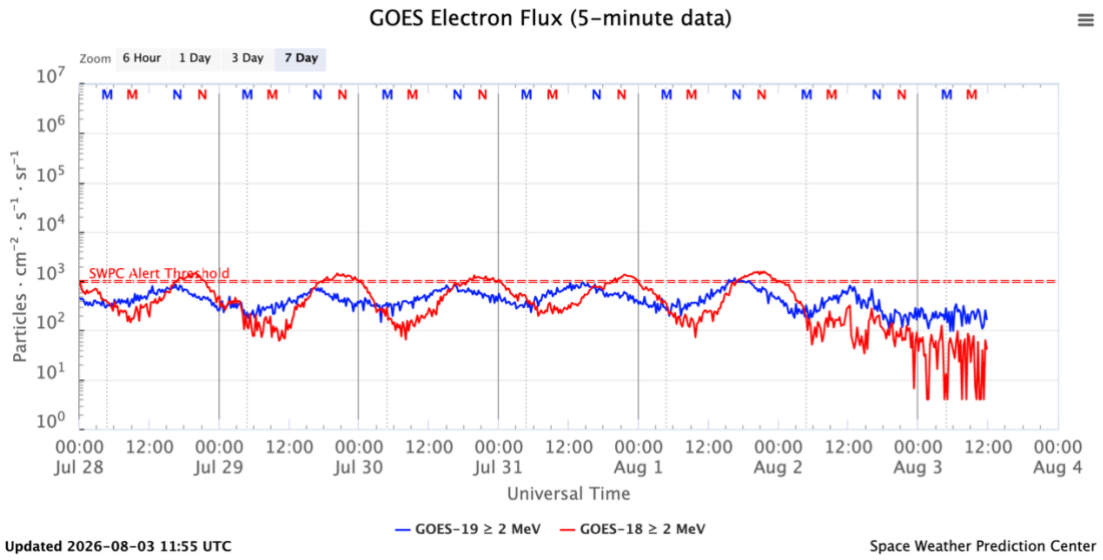


Figure 1: High-energy electron flux (> 2MeV) obtained from GOES-18 and GOES-19 satellite. Source: https://www.swpc.noaa.gov/products/goes-electron-flux

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) remains close to the minimum alert threshold [10^3 particles/(cm^2 s sr)] for almost the entire period analyzed. A dropout is observed starting on August 2, persisting below the alert threshold to the present day.

Ionospheric F2-Layer Irregularities

Summary

During the period from July 26 to August 01, 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), ionospheric scintillation index (S4), and images of the atomic oxygen red-line emission (OI 630 nm) 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 418 to 508 km, while the vertical drift velocity varied between 15 and 28 m/s (Figura 1).

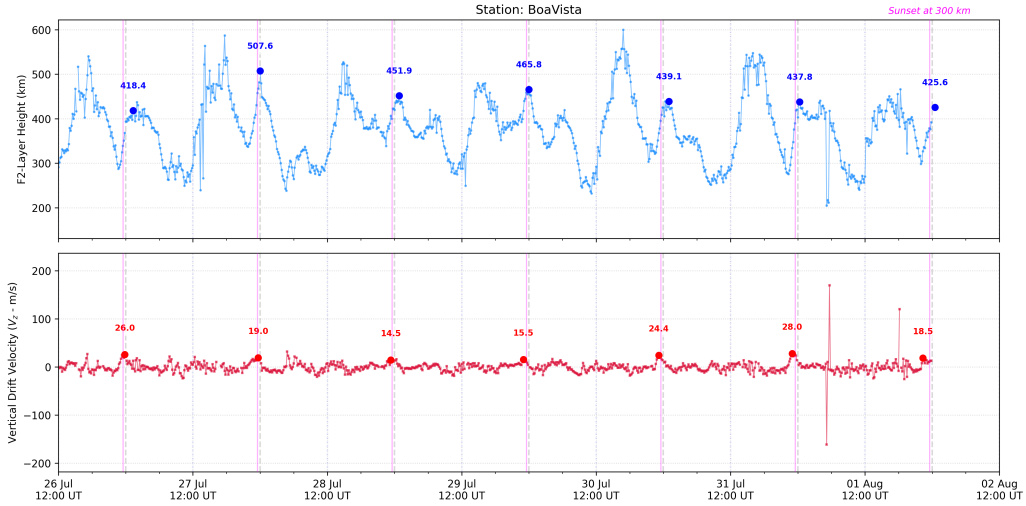


Figure 1: F2-layer height (upper panel) and vertical drift velocity (lower panel).

The Equatorial Ionization Anomaly (EIA) was presented only on July 27 and 29. TEC reached maximum values of approximately 60 TECU. No signatures of equatorial plasma bubble (EPB) events were detected in the TEC maps. Furthermore, S4 values remained low throughout the week (S4 < 0.5), indicating quiet conditions (Figura 2).

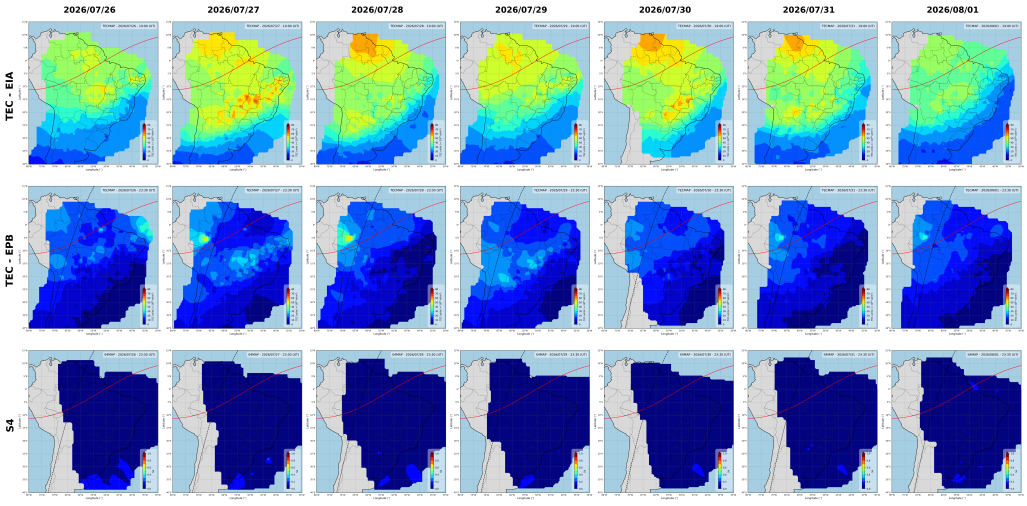


Figure 2: Total electron content (TEC) maps (upper and middle panels) and S4 index (lower panel).

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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/

No OI 630 nm images of sufficient quality were available for analysis throughout the week.

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