

Sun – Solar Activity (Jean C. Santos)

Summary

The Sun exhibited moderate activity during the week, with the presence of two active regions of high magnetic complexity (beta-gamma-delta) on the solar disk. During this period, 15 M-class solar flares and two X-class flares occurred. The Cactus software identified forty-six CMEs, two of which were halo-type (angular width greater than 180 degrees). A few coronal holes with significant area (>2.0% of the solar disk area) were identified on the Sun's surface during this period.

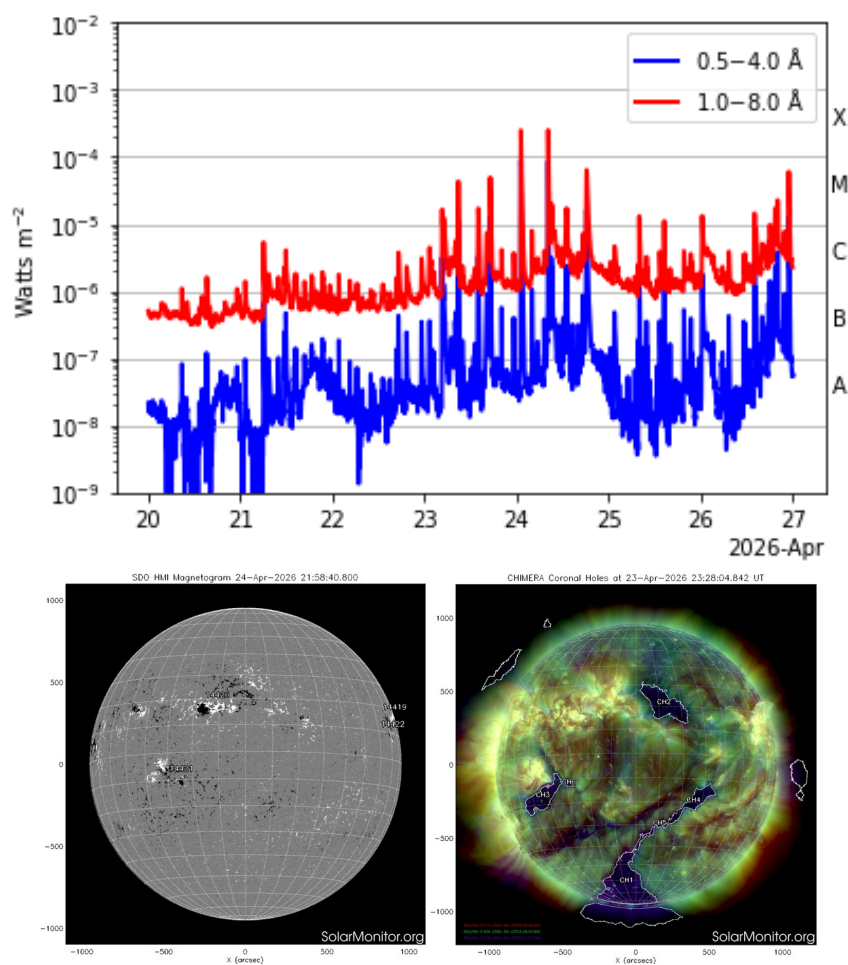


Figure 1 – X-ray flux measured by the GOES satellite (top panel) for the period of April 20-26, magnetic field in the line of sight (bottom left panel) and image at 193 angstroms (bottom right panel) measured on April 23, 2026.



Interplanetary Medium – IM – Daniele da S. F. Medeiros and Paulo R. Jauer

Period: April 20th to 27th

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 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 April 26th at 03:30 UT at +12.18 nT.
- The BxBy components presented variations in the analyzed period, keeping both oscillating within the interval [-8.68, +7.17] nT. Showing nineteen rotations of the By component.
- The Bz component presents negative values for most of the week with a maximum negative -7.41 nT at 20:30 UT on April 25th. It presented positive value of +7.30 nT on April 26th at 04:30 UT.
- The solar wind density maximum peaked on April 26th at 19:30 UT, reaching 13.68 protons/cm³.
- The solar wind speed fluctuated between 363 to 540 km/s, with a decrease beginning at 17:30 UT on April 21st.
- The magnetopause position remained relaxed almost throughout the analyzed period, reaching maximum compression (8.82 RE) at 20:30 UT on April 26th.
- During the early part of the week, the measured and modeled interplanetary Kp index fluctuated between 3 and 5, reaching values above 5 (Kp > 5) on April 20th, corresponding to a minor storm (G1 level). On April 25th, 26th and 27th, the index reached above 4 (Kp > 4) for both the measured and modeled Kp indices.

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.

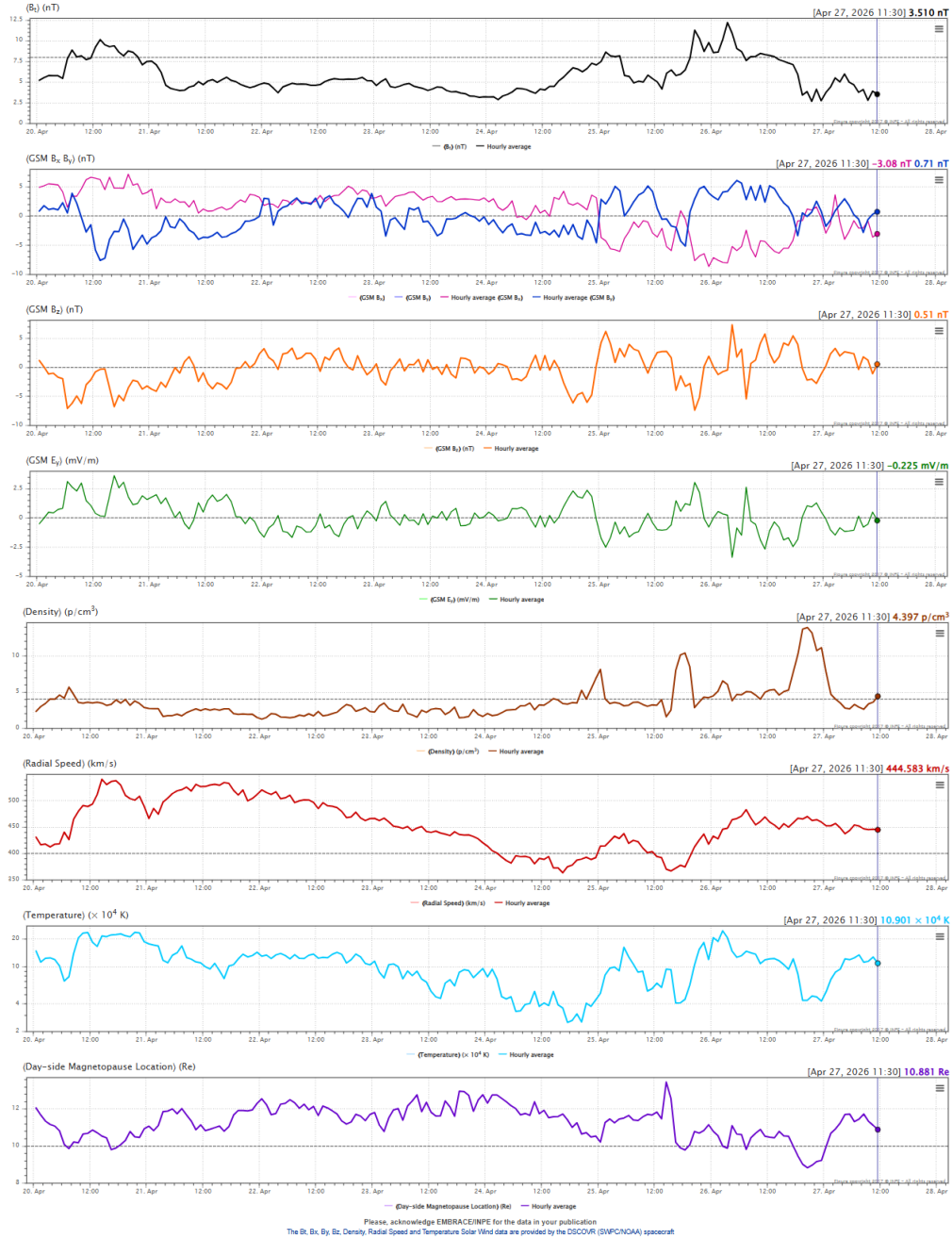


Figure 1: Illustrates a set of parameters observed in the solar wind by the DSCVR satellite.

Geomagnetic Field / Campo Geomagnético

Summary

From April 14 to March 27, geomagnetic indices and data from the Embrace Mag-Net magnetometer network recorded several instabilities, with highlights including:

- **April 17-18:** The Embrace MagNet network magnetometers recorded a sudden impulse (SI) on the 17th at approximately 19:04 UT, consistent with the arrival of an ICME. This was followed by a main phase that reached a minimum H-component level of -100 nT (CAR) at 15 UT. Throughout the main phase, several instabilities were observed, possibly related to the occurrence of waves in the Pc5 pulsation frequency range. The Dst index reached -88 nT, with auroral activity ranging from 500 nT to 1500 nT. The Kp index was 5+

- **April 20:** Magnetometers recorded an increase in the H-component consistent with the arrival of a CIR. Following the increase, I was recorded a drop around 15:00 UT and a short main phase, with the H-component minimum of approximately -122 nT (CAR), registered at 18:30 UT. The Dst index ranged from -51 nT to -7 nT, and the AE index fluctuated between 500 and 1000 nT for over 15 hours. The maximum Kp index for this day was 5o.

- **April 21:** Magnetometers recorded a third drop in the H-component of approximately -90 nT (CAR), followed by a recovery phase. The Dst index ranged from -53 nT to -30 nT, and the AE index fluctuated between 500 and 1000 nT throughout the day. The maximum Kp index for this day was 5-.

Resumo

No período de 14 de abril a 27 de março, os índices geomagnéticos e os dados provenientes da rede de magnetômetros Embrace Mag-Net registraram várias instabilidades, com destaque para:

- 17-18 de Abril: Os magnetômetros da rede Embrace MagNet registraram um SI no dia 17 por volta das 19:04 UT, compatível com a chegada de uma ICME, seguido de fase principal que atingiu o nível mínimo da componente H de -100 nT (CAR) às 15 UT. Ao longo da fase principal pode-se observar várias instabilidades possivelmente relacionada à ocorrência de ondas na faixa de frequência das pulsações Pc5. O índice Dst atígiu -88 nT, com atividade auroral variando de 500 nT a 1500 nT. O índice Kp foi 5+
- 20 de abril: Os magnetômetros registraram aumento da componente H compatível com a chegada de uma CIR, seguido de queda por volta das 15 UT, seguido de fase principal curta, com mínimo da componente H de cerca de -122 nT (CAR), às 18h30. O índice Dst variou de -51 a -7 nT e o índice AE oscilou de 500 a 1000 nT por mais de 15 horas. O índice Kp máximo desse dia foi de 5o
- 21 de Abril: Os magnetômetros registraram uma terceira queda na componente H de cerca de -90 nT em CAR, seguido de recuperação. O índice Dst variou de -53 a -30 nT e o índice AE oscilou de 500 a 1000 nT ao longo do dia. O índice Kp máximo desse dia foi 5-.

Rede EMBRACE de Magnetômetros

ΔH - (16/04/2026 - 22/04/2026)

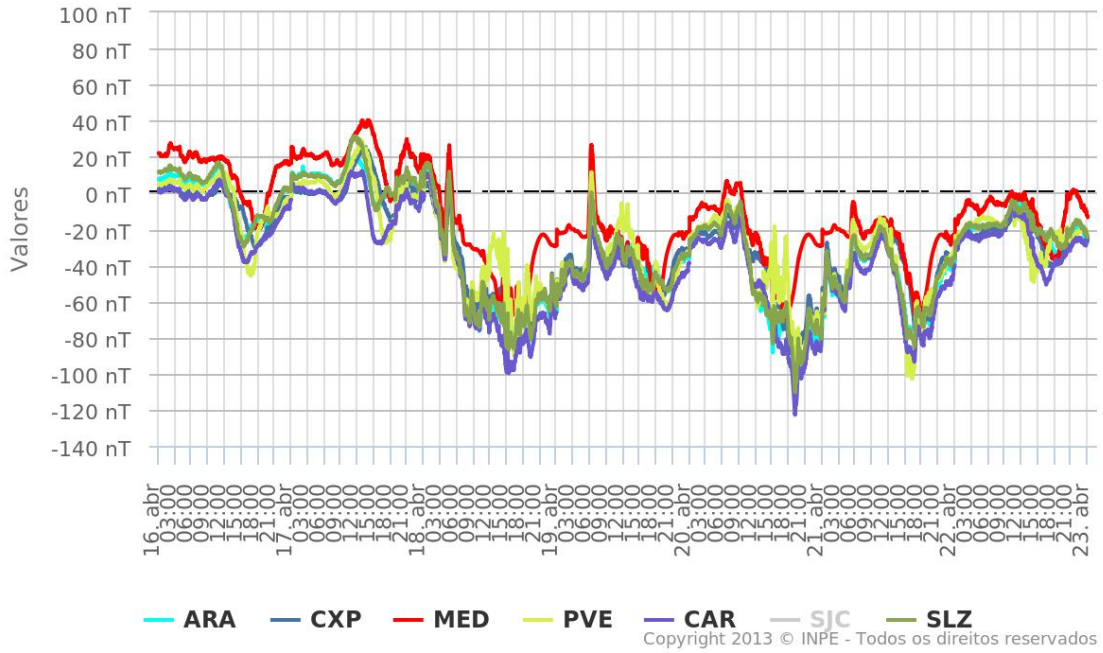


Figura 1.: Variação diurna da componente geomagnética H (nT) das estações da rede Embrace

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

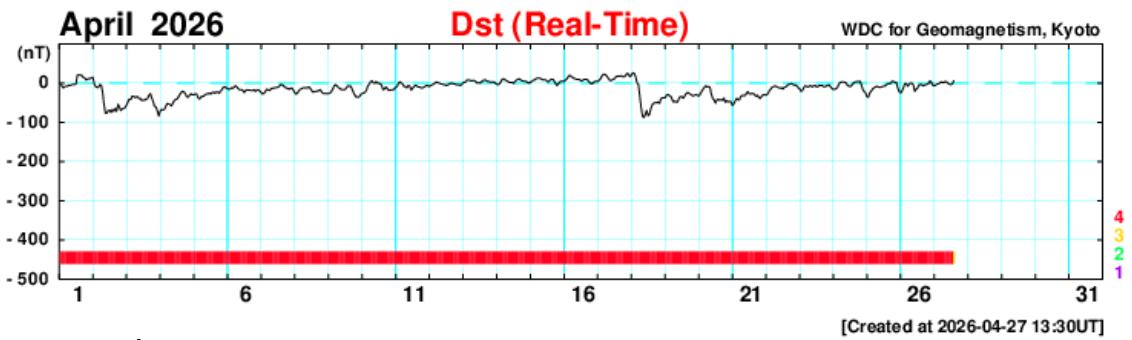


Figura 2.: Índice Dst.

Figure 2: Dst index

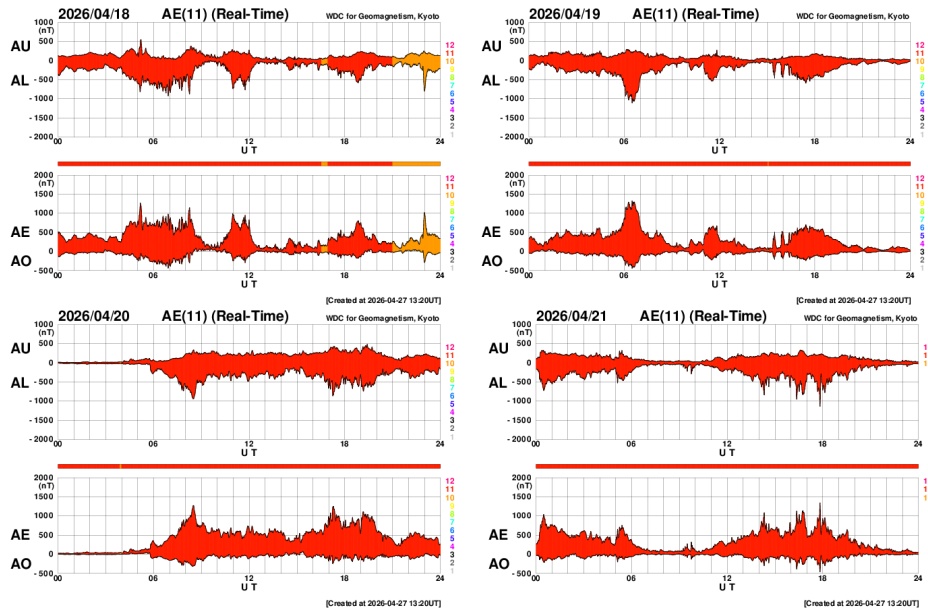


Figura 3.: Índice AE para os dias mais perturbados da semana.
 Figure 3.: AE index for the most disturbed days in the current week.

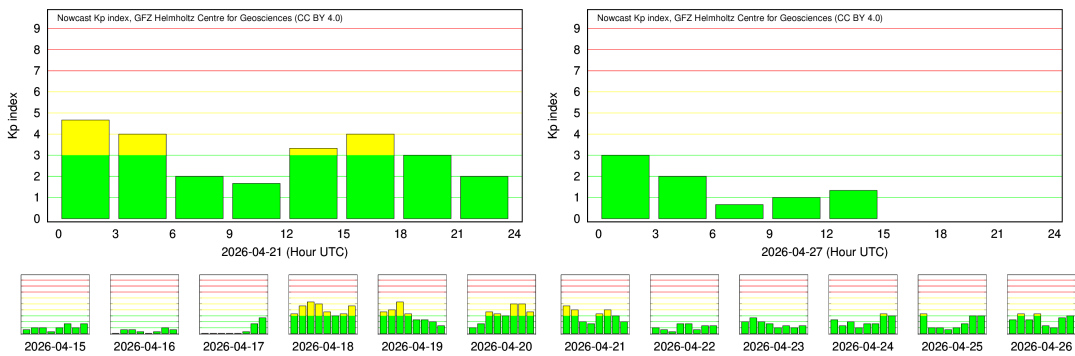


Figura 4.: Índice Kp.
 Figure 4: Kp index for the current week

Ionosfera – Digisonda (Laysa Resende)

Summary

During this week, spread F was observed over Boa Vista; however, no spread F was detected over Cachoeira Paulista. Sporadic E (Es) layers were recorded over both Boa Vista and Cachoeira Paulista. At Boa Vista, the scale reached level 4 on April 23 (Figure below). Variations in the Maximum Usable Frequency (MUF) remained below the threshold required to classify the ionospheric conditions as moderate.

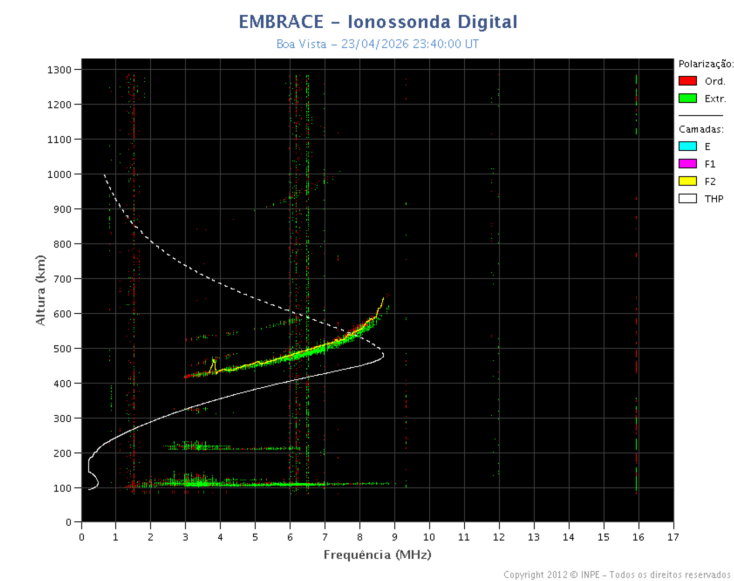


Figure 1 – Ionograms over Boa Vista showing the strong Es on April, 23.

Ionospheric F2-Layer Irregularities

Summary

During the period from April 19 to April 26, 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 420 to 490 km, while the vertical drift velocity varied between 12 and 20 m/s (Figure 1).

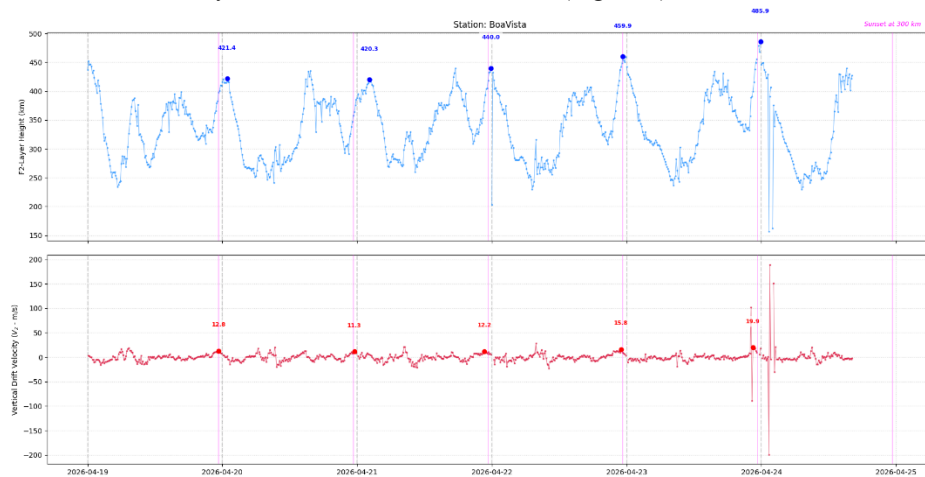


Figure 1 – F2-layer height (upper panel) and vertical drift velocity (lower panel).

The equatorial ionization anomaly (EIA) was observed on all days except April 21. TEC reached maximum values of approximately 70 TECU at the southern crest of the EIA. Regarding scintillation, S4 values remained low ($S4 < 0.5$), indicating quiet conditions. No events associated with equatorial plasma bubbles were observed (Figure 2).

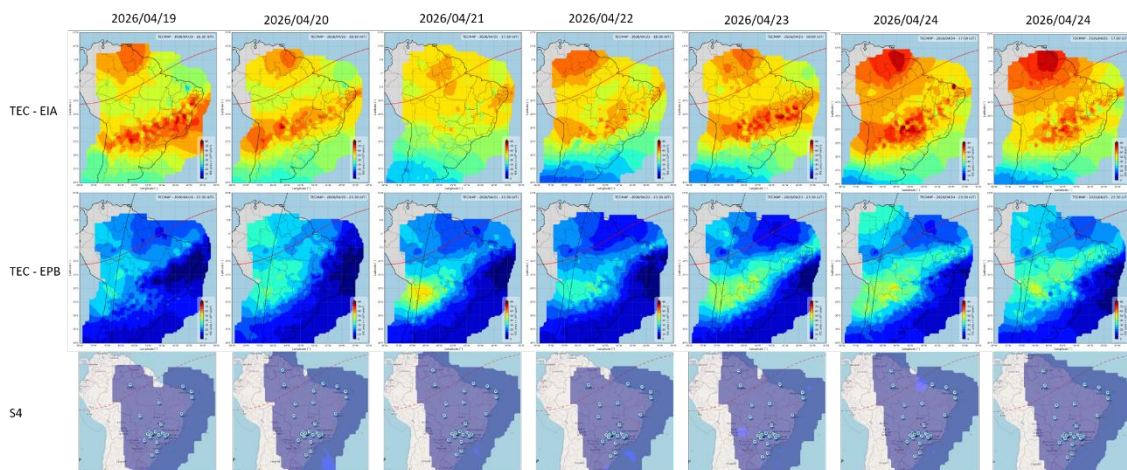


Figure 2 – Total electron content (TEC) maps (upper and middle panels) and S4 index (lower panel).

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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/>.

Mesospheric & Thermospheric/Ionospheric Optical Observation: *Atmospheric Wave / Plasma Bubble Activity*

Summary

During the period from April 19 to April 26, 2026, the parameters of atmospheric gravity waves could not be characterized due to cloudy sky across the all-sky imager observation site except Cachoeira Paulista, which presented clear sky on the 25th and 26 of April with a reduced observation time due to the phase of the moon.

For equatorial plasma bubble (EPB) observations, no event was observed as well due to cloud cover and the season. The occurrence of EPBs mostly from April to August are less frequent. As a result, not EPB was detected during this period.

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