Sun – Solar Activity (Jean C. Santos)

Summary

The Sun exhibited low activity with the presence of active regions of low (alpha) and medium (beta) magnetic complexity in the solar disk. During this period, three M-class solar flares occurred. The Cactus software identified 39 CMEs, one of which was a halo (angular width greater than 180 degrees). Coronal holes with significant area (>2.0% of the solar disk area) located at low latitudes and crossing the center of the solar disk were identified during this period, which may have affected the characteristics of the solar wind.

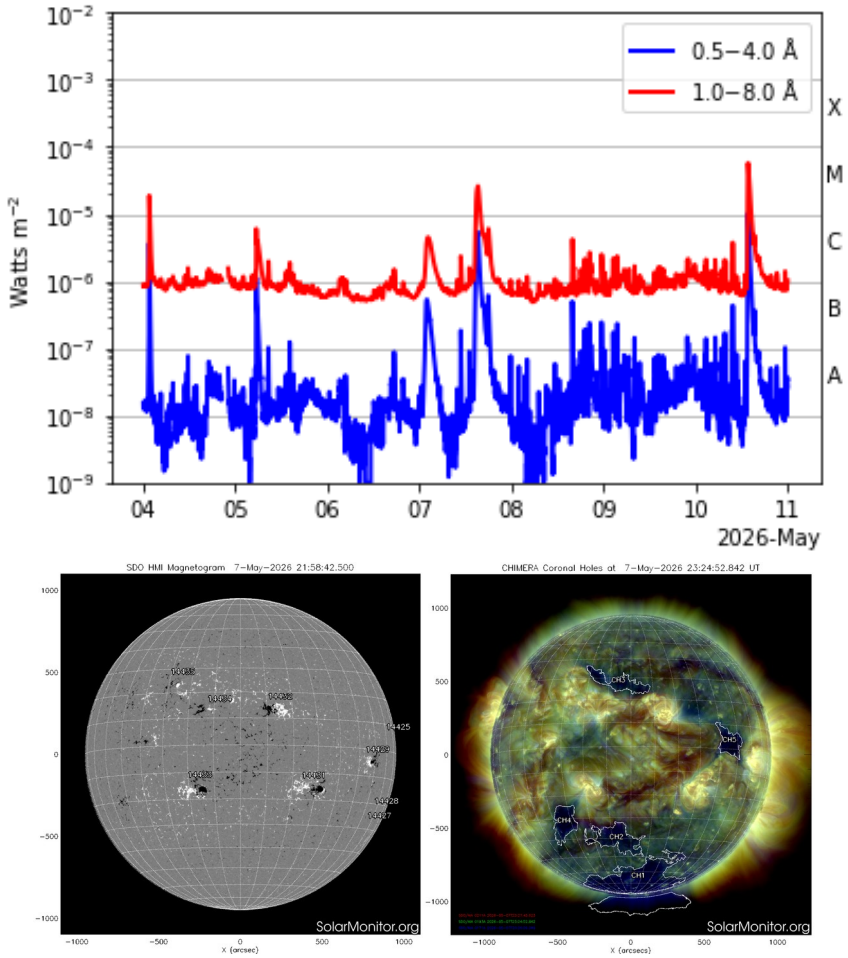

Figure 1 – X-ray flux measured by the GOES satellite (top panel) for the period of May 4-10, magnetic field in the line of sight (bottom left panel) and image at 193 angstroms (bottom right panel) measured on May 7, 2026.

Interplanetary Medium – IM – Daniele da S. F. Medeiros and Paulo R. Jauer
Period: May 4th to 11th

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 complex structures and a sector change By 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 May 8th at 01:30 UT at +19.08 nT.

- The BxBy components presented variations in the analyzed period, keeping both oscillating within the interval [-9.46, +17.25] nT. Showing eleven rotations of the By component.

- The Bz component presents negative values for most of the week with a maximum negative -9.65 nT at 15:30 UT on May 4th. It presented positive value of +11.67 nT on May 7th at 16:30 UT.

- The solar wind density maximum peaked on May 7th at 15:30 UT, reaching 27.38 protons/cm^3.

- The solar wind speed fluctuated between 332 to 572 km/s, with a decrease beginning at 03:30 UT on May 9th.

- The magnetopause position remained relaxed almost throughout the analyzed period, reaching maximum compression (8.86 RE) at 17:30 UT on May 9th.

- During the early part of the week, the measured and modeled interplanetary Kp index fluctuated above 3, reaching values above 6 (Kp > 6) on May 4th, characterizing a moderate storm (G2 level), while the modeled Kp index peaked at 9 (Kp = 9), corresponding to an extreme storm (G5 level). A decrease in the Kp index was observed on May 5th, with values below 2 (Kp < 2). On May 8th, the modeled Kp index peaked at 8 (Kp = 8), corresponding to a severe storm (G4 level), and remained active during the following hours. However, the measured Kp index did not exceed a value of 4 (Kp = 4). The week ending with values fluctuating between 0 and below 3 (Kp < 3) 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.

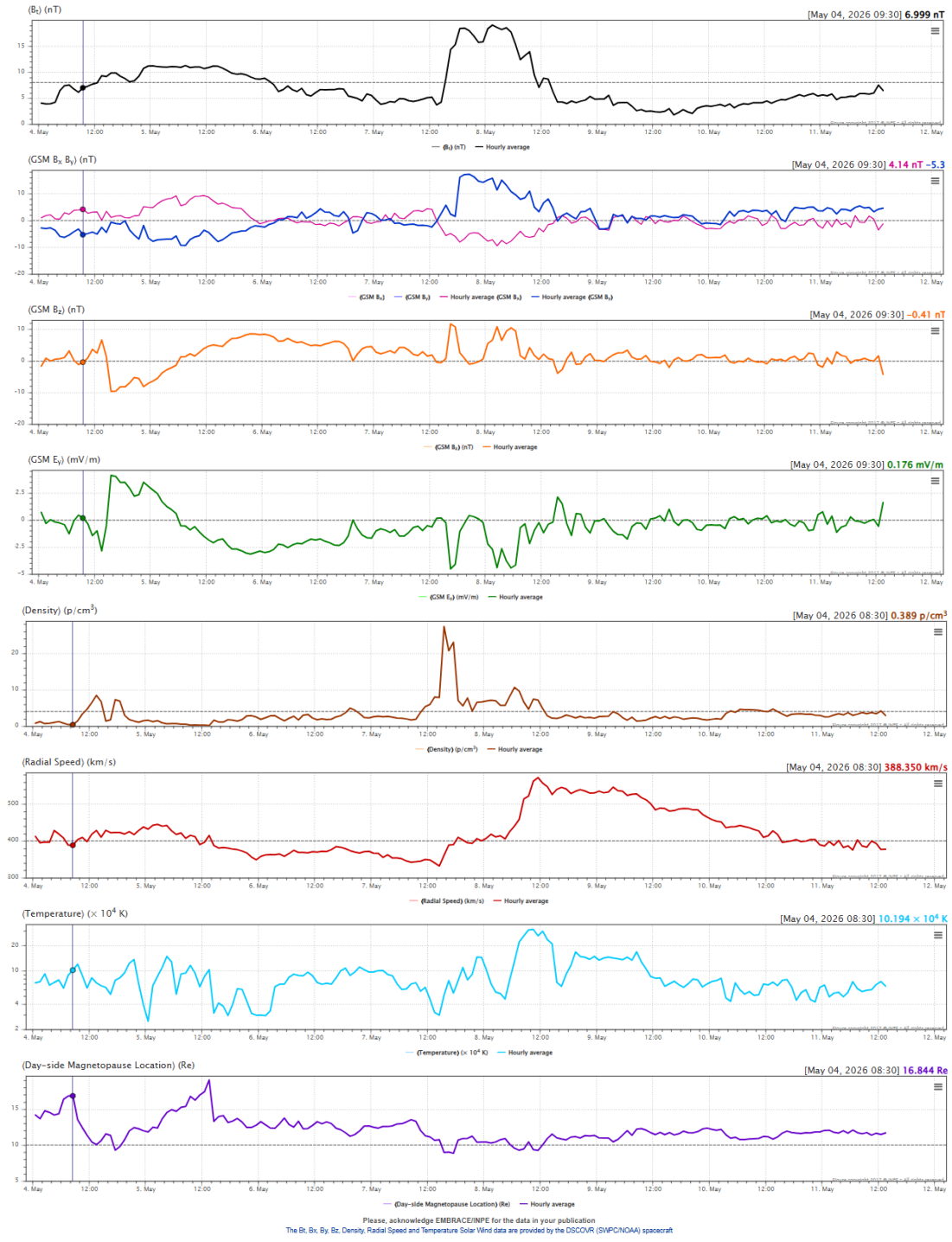

Figure 1: Illustrates a set of parameters observed in the solar wind by the DSCVR satellite.

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.

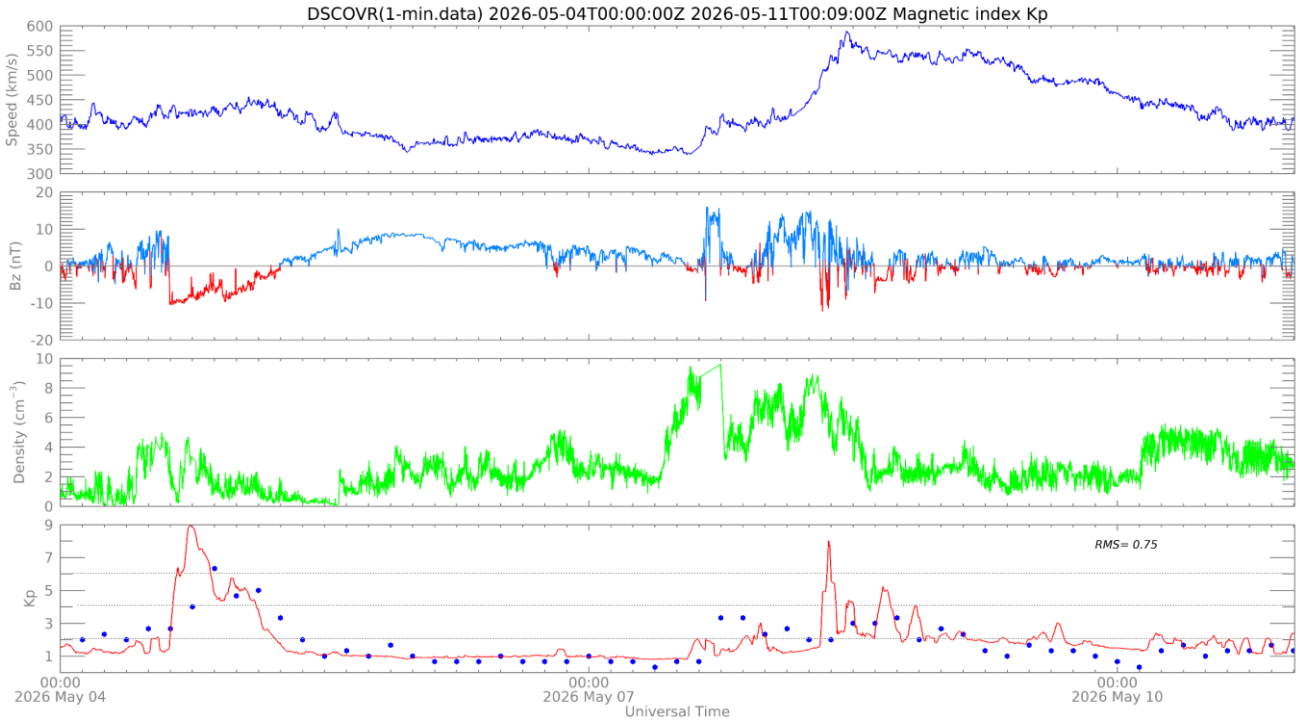

Figure 2: Illustrates a set of parameters observed in the solar wind by the DSCVR satellite and the Kp index by NOAA/SWPC, blue dot, and the modeling, red line.

EARTH'S RADIATION BELT

Responsible: Ligia Da Silva

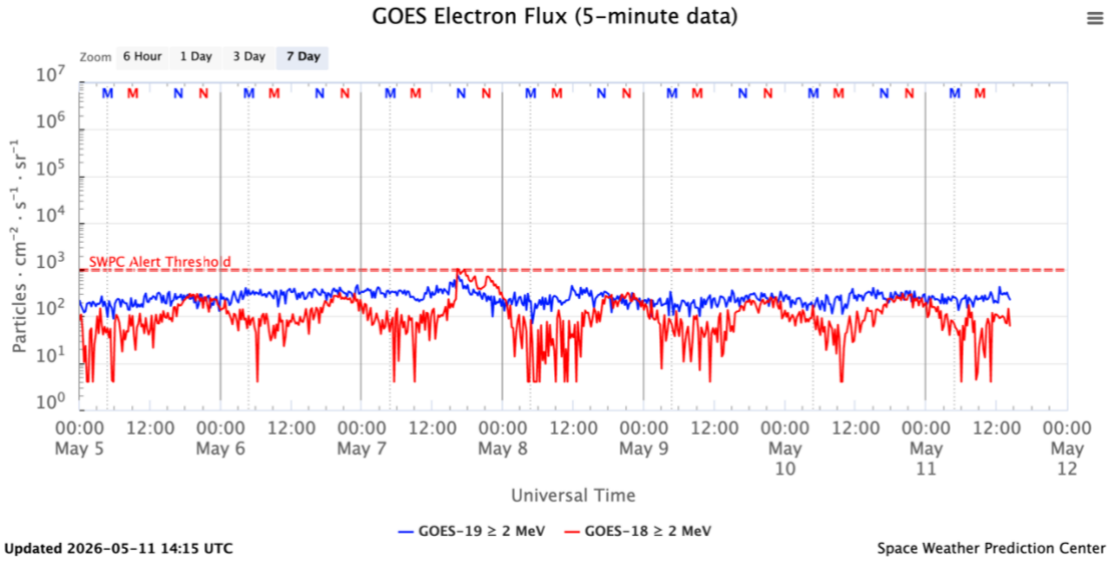

Figure 1: High-energy electron flux (> 2MeV) obtained from GOES-18 and GOES-19 satellite. Source: https://www.swpc.noaa.gov/products/goes-electron-flux

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) is below the alert threshold (10^3 particles/(cm^2 s sr)) throughout the analyzed period. A dropout is observed between May 7th and 8th, possibly associated with the arrival of solar wind structures.

Geomagnetic field

Responsible: Karen Sarmiento /Lívia Alves/Sony Su Chen

Summary

The period from May 4 to 11 was initially marked by the occurrence of a G1 (minor) geomagnetic storm, followed by a return to predominantly quiet geomagnetic conditions.

Between May 4 and 5, instabilities in the geomagnetic field evolved into G1 geomagnetic storm levels. The Kp index reached a maximum value of 5+ between 18h UT and 21h UT on May 4. During the same interval, the Ksa index reached G1 levels between 15h UT on May 4 and 03h UT on May 5, with a maximum value of 6-. In the auroral region, the AE index remained above 500 nT during several intervals, with the most significant enhancement occurring between 16h UT and 22h UT on May 4, when it approached 1000 nT. The Dst index reached a minimum of -66 nT between 01h UT and 02h UT on May 5, while the dHsa index recorded a minimum value of -102 nT at 20h30 UT on May 4.

Beginning on May 6, geomagnetic activity returned to predominantly quiet levels, with occasional instabilities. Between May 7 and 8, geomagnetic field instabilities were observed; however, they remained below the G1 geomagnetic storm threshold.

Over the last 24 hours, geomagnetic activity has remained quiet.

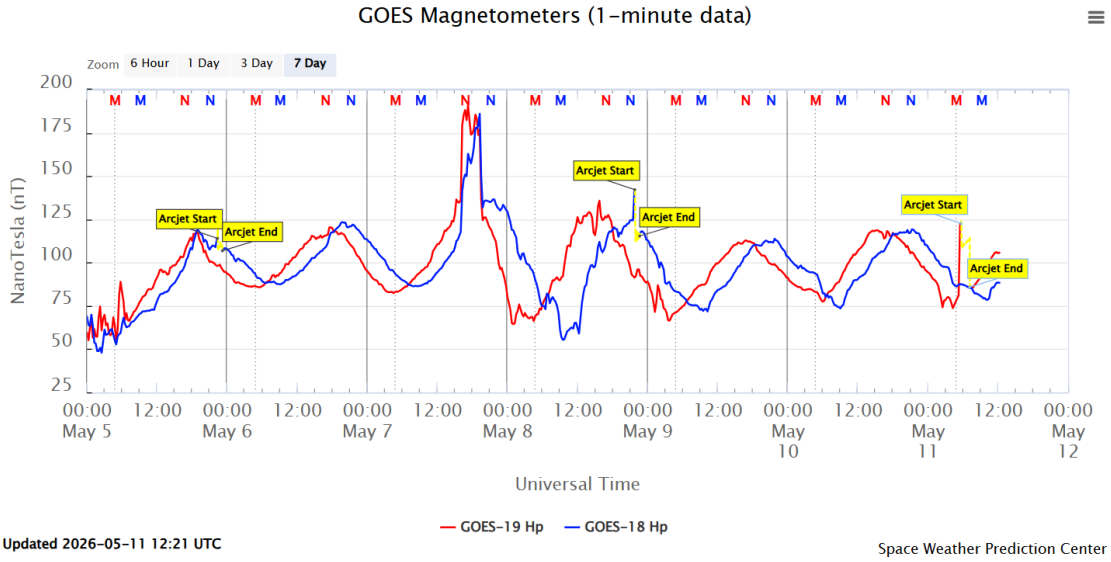

Figure 1 - Magnetic field measurement at the GOES satellite position.

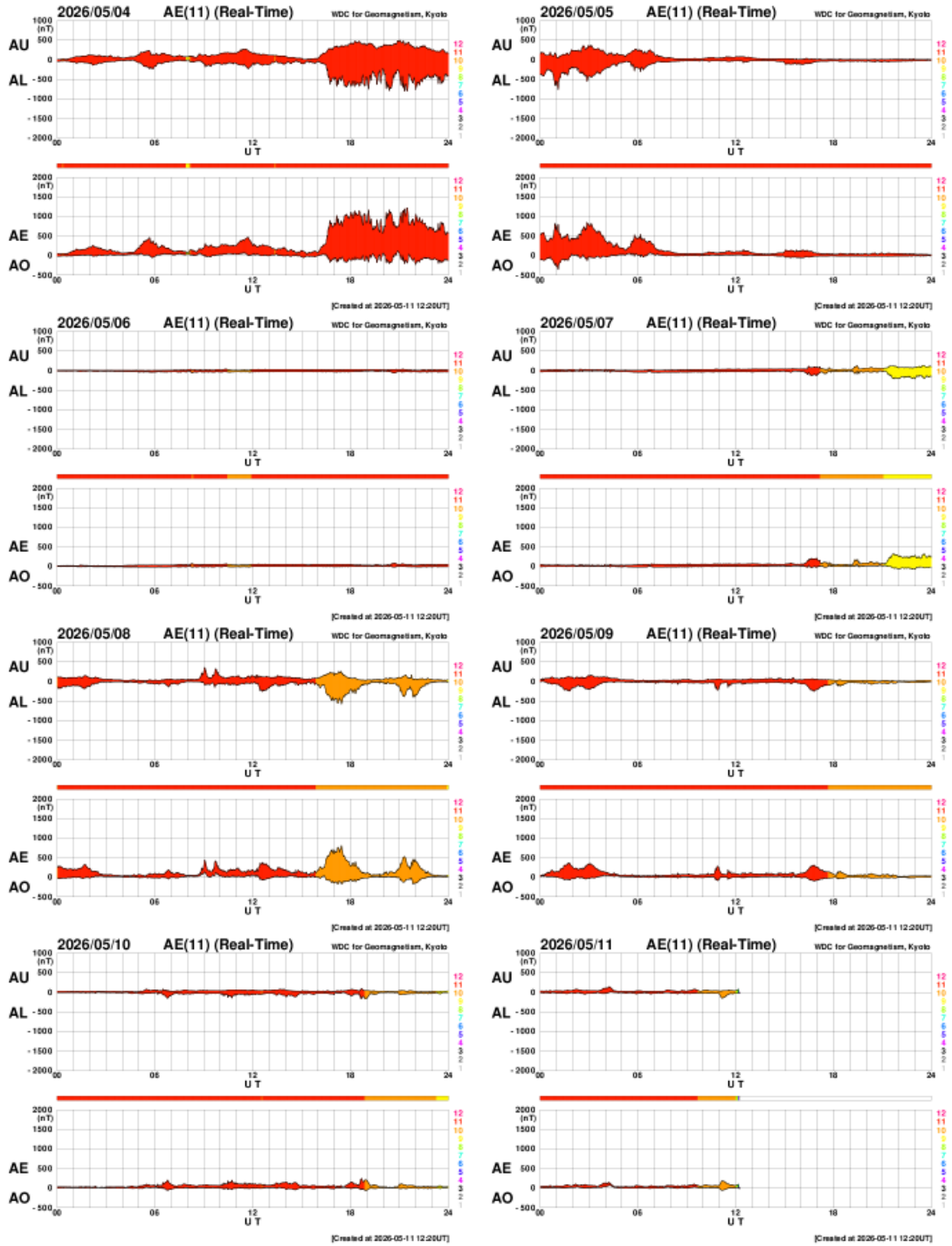

Figure 2 - AE index for the days of the week.

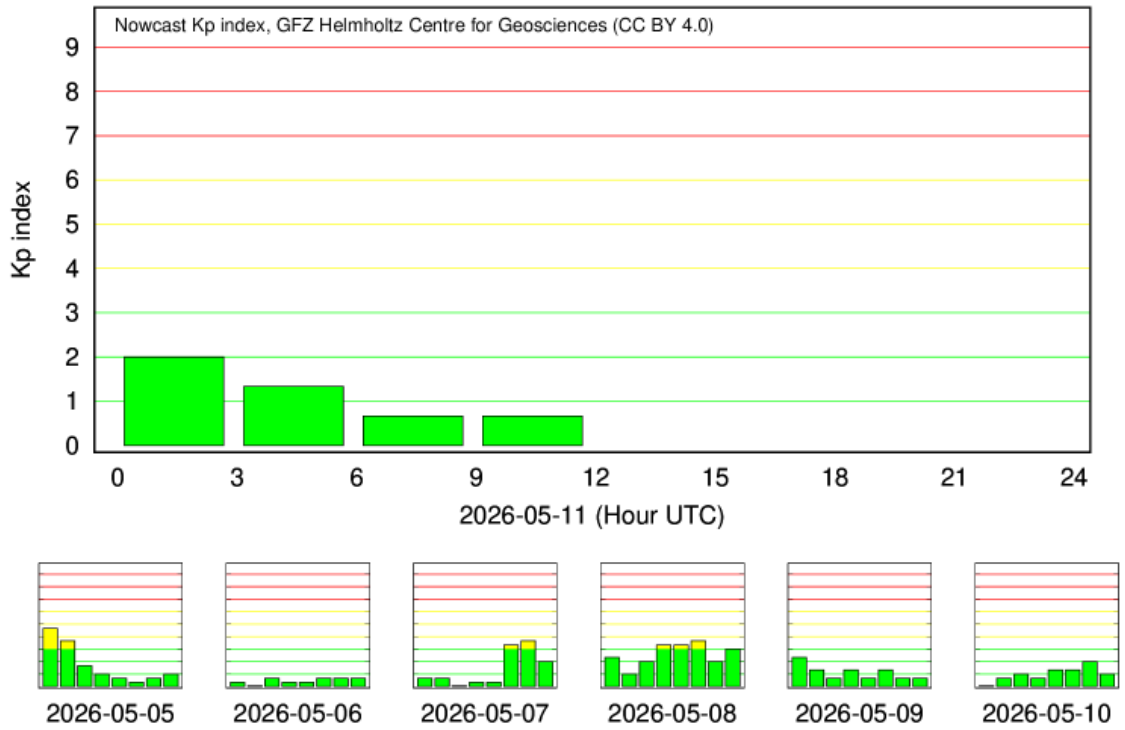

Figure 3 - Kp index on a logarithmic scale.

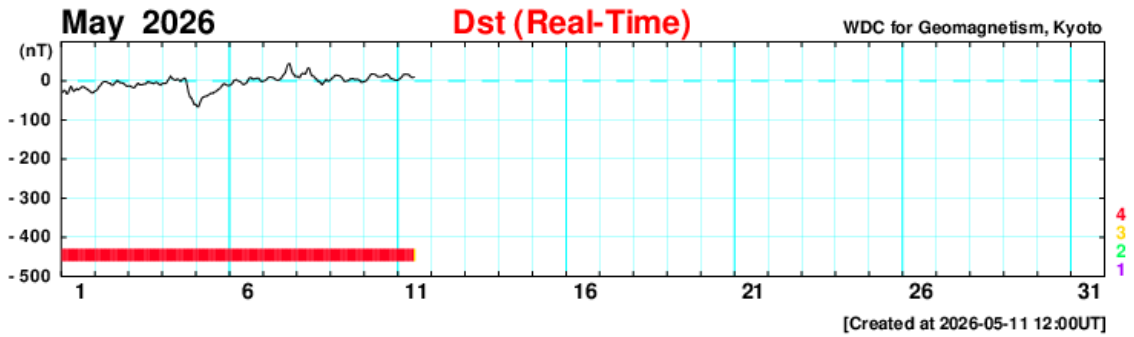

Figure 4 - Dst index.

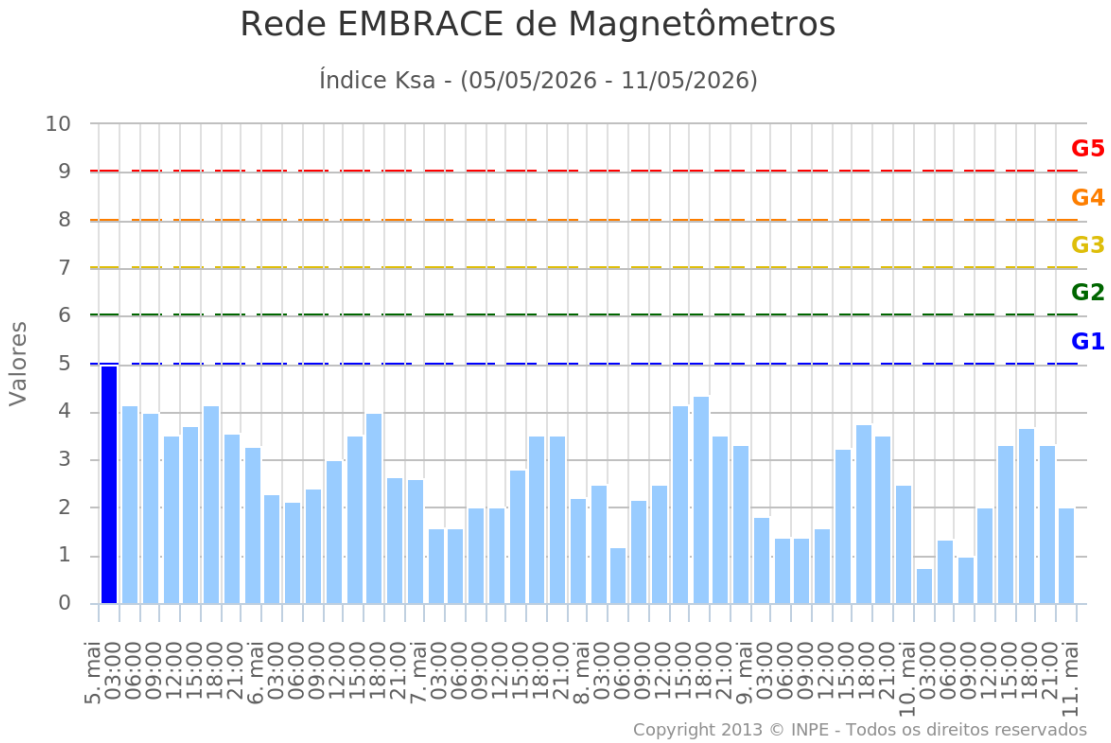

Figure 5 - Geomagnetic index in South America - Ksa Index.

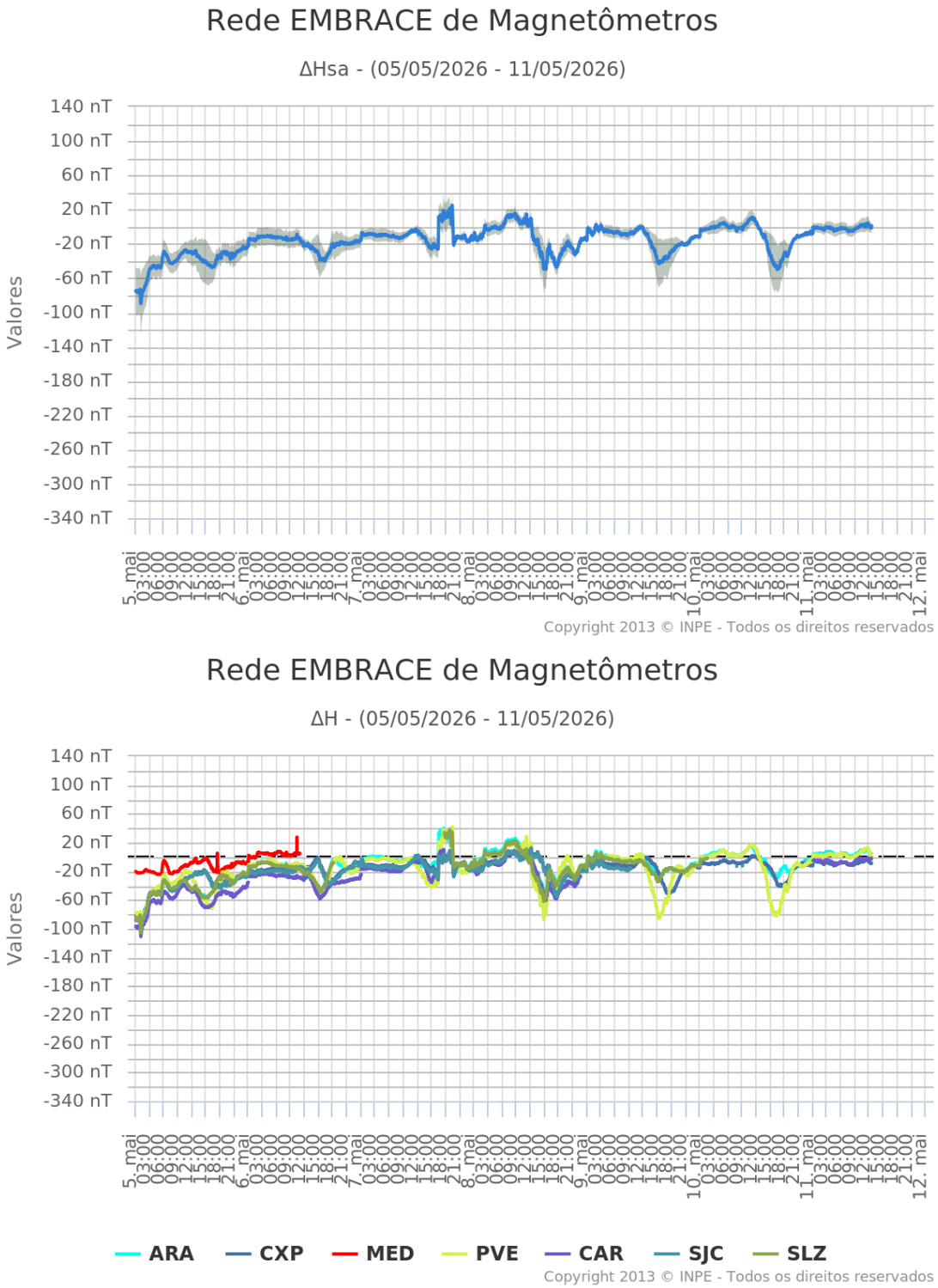

Figure 6 - Geomagnetic index in South America - ΔH index and at magnetic stations of the EMBRACE Program.

Ionosfera – Digisonde (Laysa Resende)

Summary

This week, spread F was observed over Boa Vista, whereas no spread F was detected over Cachoeira Paulista, a low-latitude station. A peculiar behavior was observed over Cachoeira Paulista and Santa Maria on May 5–6, characterized by the occurrence of a strong sporadic E (Es) layer and the disappearance of the F region (Figure 1). On the remaining days, Es layers were weak throughout the week over both Boa Vista and Cachoeira Paulista.

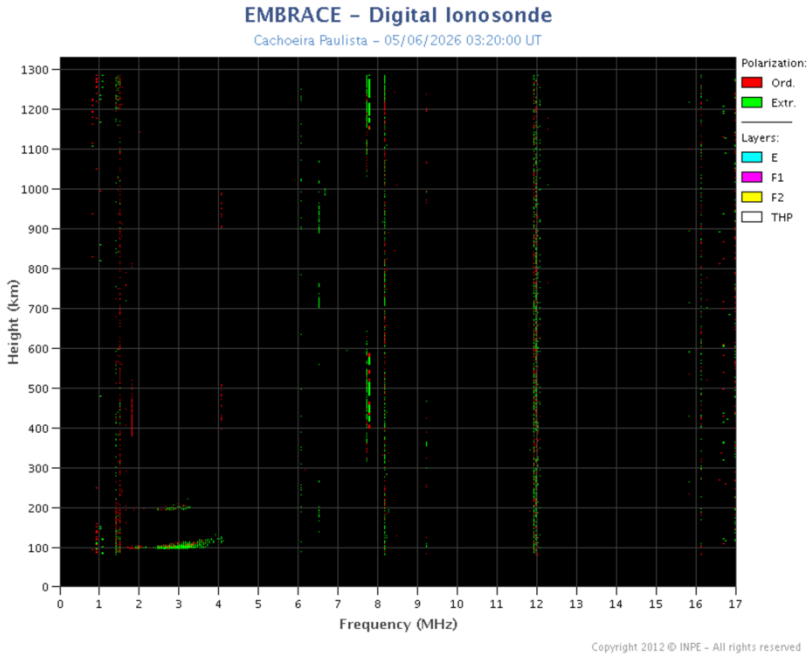

Figure 1 –Ionogram over Cachoeira Paulista, showing the absence of the F region.

Ionospheric F2-Layer Irregularities

Summary

During the period from May 03 to May 09, 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 445 to 475 km, while the vertical drift velocity varied between 12 and 28 m/s (Figure 1).

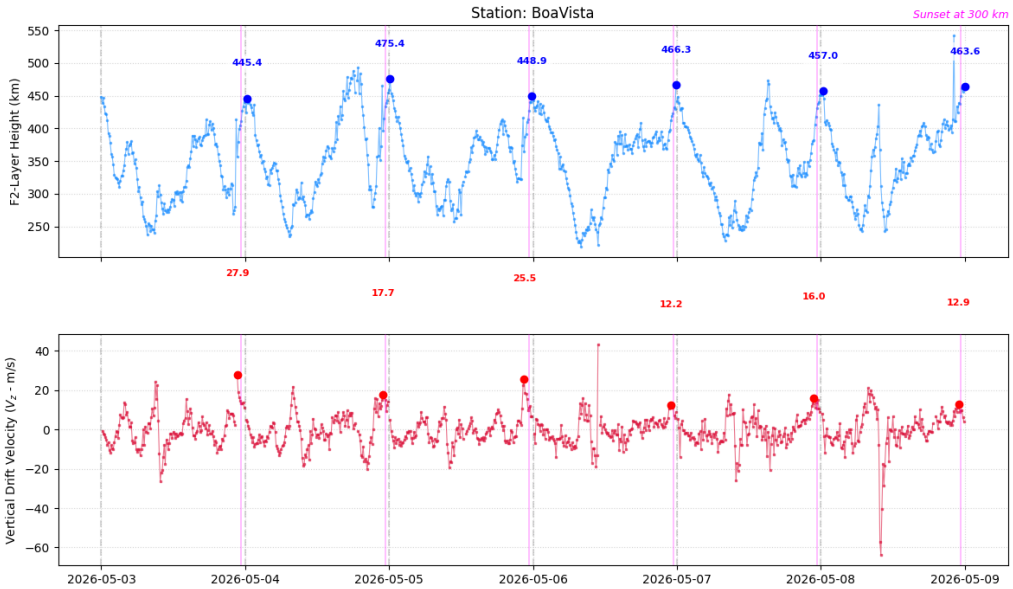

Figure 1 – F2-layer height (upper panel) and vertical drift velocity (lower panel).

The equatorial ionization anomaly (EIA) was observed on all days. TEC reached maximum values of approximately 65 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).

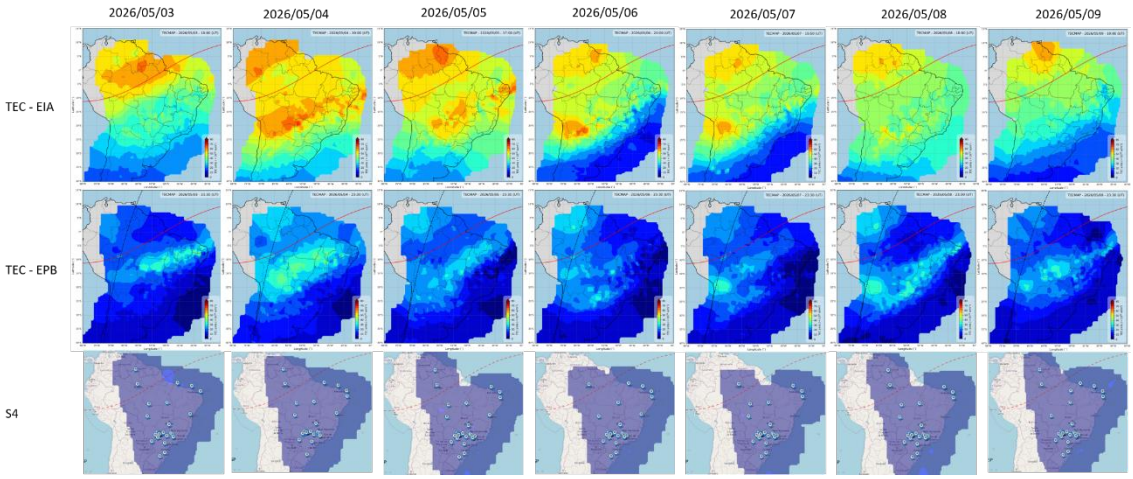

Figure 2 – Total electron content (TEC) maps (upper and middle panels) and S4 index (lower panel).

1. All data presented are under the domain and responsibility of the Embrace Program. *Todos os dados apresentados são de domínio e responsabilidade do Programa Embrace.*
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 May 04 to May 10, 2026, activities atmospheric gravity waves (GWs) were not observed throughout the entire week due to cloudy sky conditions and also short observation window due to full moon. As a result, wave parameters could not be computed.

For equatorial plasma bubble (EPB) observations, no event was observed due the cloudy sky. Beside the cloudy sky, the occurrence of EPBs are less prominent from April to August. As a result, no EPB was detected during this period.