SOL (Cecatto)

Summary

09/18 – No M/X flare; Fast (< 600 km/s) wind stream; 19 CME can have component toward the Earth;
09/19 – M1.1, M1.8, M4.0 flares; Fast (< 600 km/s) wind stream; 9 CME can have component toward the Earth *;
09/20 – M8.2 flare; Fast (< 550 km/s) wind stream; 11 CME can have component toward the Earth ;
09/21 – M8.7 flare; Fast (< 450 km/s) wind stream; 7 CME can have component toward the Earth;
09/22 – M1.2, M1.4, M1.5, M1.9 flares; Fast (< 450 km/s) wind stream; 14 CME can have component toward the Earth *,*;
09/23 – M1.5 flare; No fast wind stream; 6 CME can have component toward the Earth *;
09/24 – M4.4, M1.0 flares; Fast (< 450 km/s) wind stream; 11 CME can have component toward the Earth *,*;
09/25 – M1.0*(C9.9) flare; Fast (< 500 km/s) wind stream; 1 CME can have component toward the Earth;
Prev.: Fast wind stream for today and next 1-2 days; for while medium (40% M, 15% X) probability of M / X flares for today and next day; also, occasionally some other CME(s) can present a component toward the Earth.

Resumo

18/09 – Sem "flare" M/X; Vento rápido (< 600 km/s); 10 CME podem ter uma componente para a Terra;
19/09 – "Flares" M1.1, M1.8, M4.0; Vento rápido (< 600 km/s); 9 CME podem ter uma componente para a Terra *;
20/09 – "Flare" M8.2; Vento rápido (< 550 km/s); 11 CME podem ter uma componente para a Terra;
21/09 – "Flare" M8.7; Vento rápido (< 450 km/s); 7 CME podem ter uma componente para a Terra;
22/09 – "Flares" M1.2, M1.4, M1.5, M1.9; Vento rápido (< 450 km/s); 14 CME podem ter uma componente para a Terra *,*;
23/09 – "Flare" M1.5; Sem vento rápido; 6 CME podem ter uma componente para a Terra *;
24/09 – "Flares" M4.4, M1.0; Vento rápido (< 450 km/s); 11 CME podem ter uma componente para a Terra *,*;
25/09 – "Flare" M1.0*(C9.9); Vento rápido (< 500 km/s); 1 CME podem ter uma componente para a Terra;
Prev.: Vento rápido para hoje e próximos 1-2 dias; moderada probabilidade de “flares” (40% M, 15% X) nos próximos 02 dias; eventualmente alguma(s) outra(s) CME pode(m) apresentar componente dirigida para a Terra.

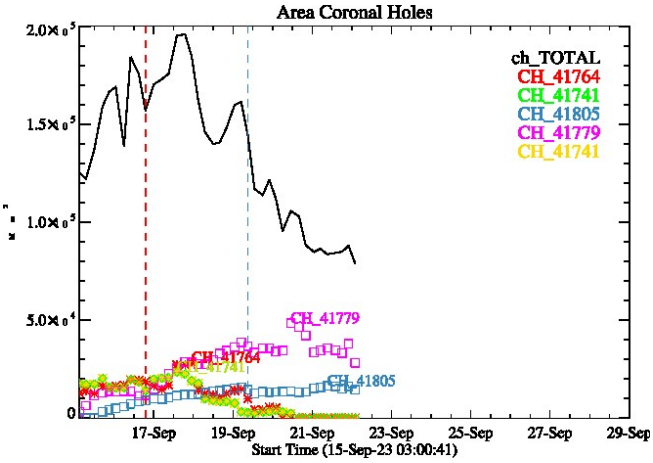
Solar - WSA-ENLIL

EMC (https://ccmc.gsfc.nasa.gov/donki/):

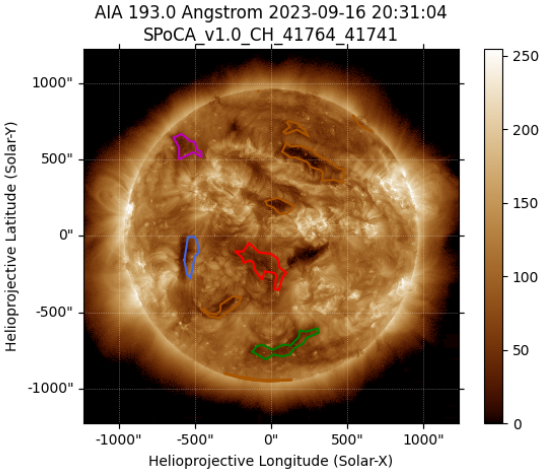
WSA-ENLIL(CME 2023-09-20 15:05:00 UT)
The simulation results indicate that the flank of CME will reach the DSCOVR mission between 2023-09-23 13:00:00 UT and 2023-09-24 03:00:00 UT.

WSA-ENLIL(CMEs (2023-09-22 02:24:00 UT, 2023-09-22 07:12:00 UT,2023-09-22 07:36:00 UT))
The simulation results indicate that the flank of CME will reach the DSCOVR mission between 2023-09-24 01:42:00 UT and 2023-09-24 15:42:00 UT.

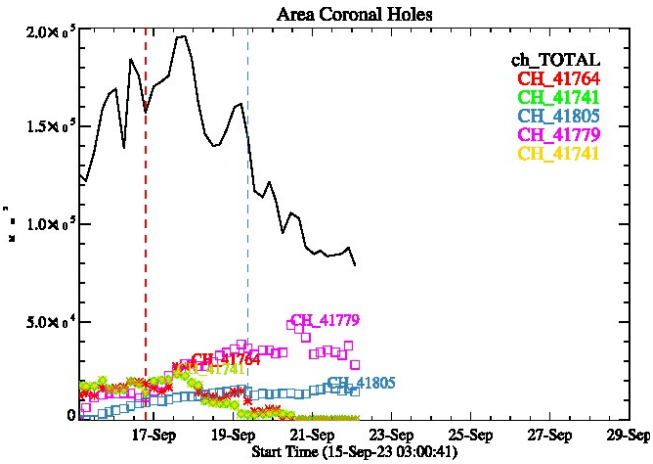
Solar - Coronal holes Spatial Possibilistic Clustering Algorithm (SPoCAS):



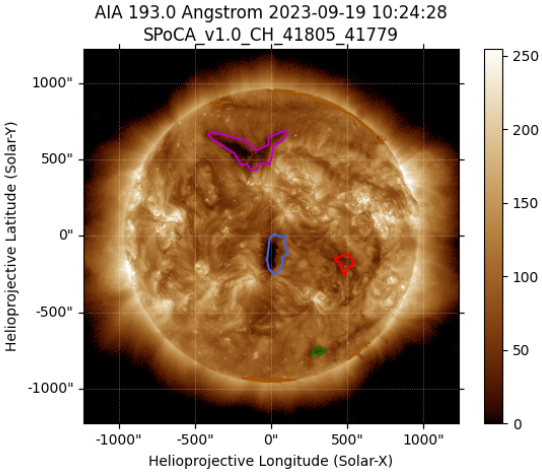
(a) The solid black line depicts the products of the sum of areas for each detection interval performed by SPOCA between September 15 and 22, 2023.



(b) Above the 193 r$\AA\$ image of the Sun are highlighted coronal holes observed by SPOCA around 20:30 UT on September 16, 2023 (red dot line).

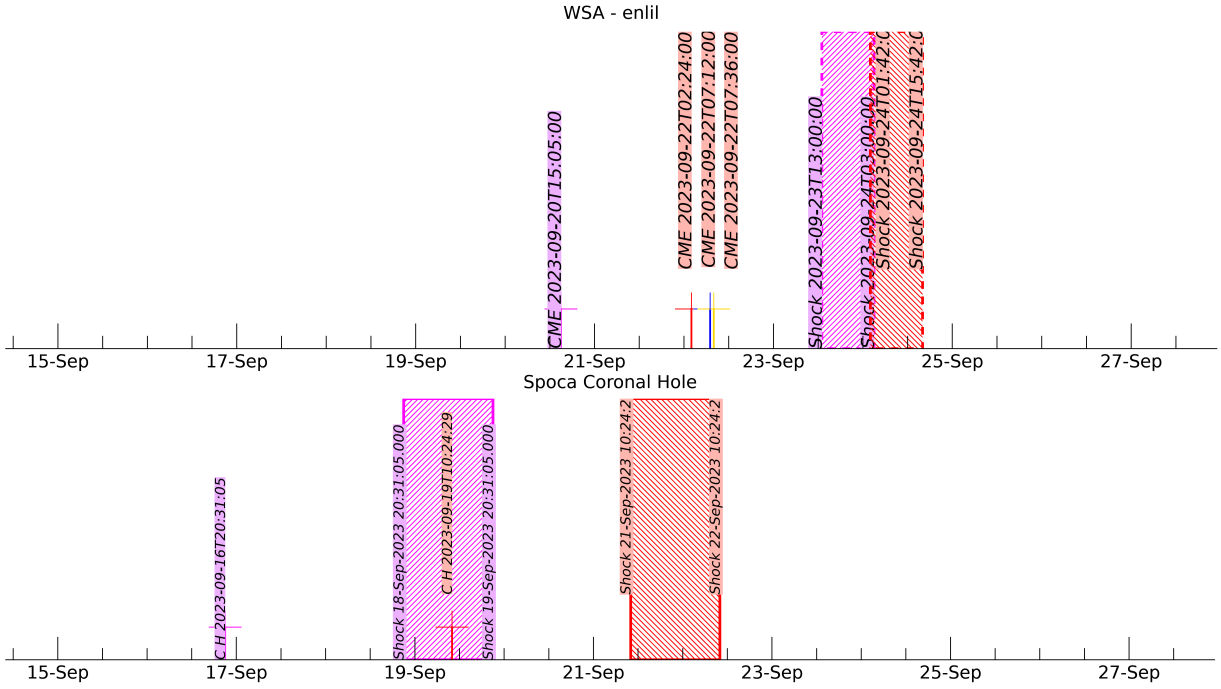


(a) The solid black line depicts the products of the sum of areas for each detection interval performed by SPOCA between September 15 and 22, 2023.



(b) Above the 193 r$\AA\$ image of the Sun are highlighted coronal holes observed by SPOCA around 10:20 UT on September 19, 2023 (blue dot line).

Solar - WSA - ENLIL and SPoCA



Meio interplanetário – IM – Paulo Ricardo Jauer 18/09 to 25/09 2023

Summary

Summary of IM conditions for the last week. The interplanetary medium region in the last week showed a moderate to high level of plasma disturbances due to the possible interaction of complex HSS-CME-like structures identified by the DSCOVR satellite in the interplanetary medium.

- The magnitude of the interplanetary magnetic field component showed two significant peaks: On September 18th and 25th at 15:30 UT and 09h30 UT of 21 and 33 nT respectively during the analyzed period.

- The BxBy components showed variations in the analyzed period, keeping both oscillating within the range BxBy[(Min,Max); (Min,Max)] [(-7,5.2);(-21,27)] nT, without the presence of sector boundary crossing .

- The bz field component showed two negative peaks on Sept 18/24 at 4h30 pm/9:30 pm UT giving – 13/-14 nT respectively. The bz component also presented two positive peaks on 18/24 Sep at 20:30/07:30 UT giving +13/+21 nT respectively.

- The density of the solar wind showed fluctuations with a maximum peak recorded on 18/Sep at 1:30 pm of 16.8 p/cm³ and on 24/Sep at 8:30 pm of 27.6 p/cm³. During the remainder of the period, the density fluctuated on average below 5 p/cm³.

- The average speed of the solar wind remained on average above 400 km/s. The speed had a maximum value on 19/Sep at 01:30 UT of 606 km/s and a minimum value on 24/Sep at 15:30 UT of 296 km/s. Discontinuities in the velocity component were found due to interactions of interplanetary structures.

- The position of the magnetopause fluctuated on average above the equilibrium position. It presented abrupt compressions whose minimum values recorded were on the days: 18-24 September at 16:30 and 21:30 UT of 6.8-6.7 Re respectively.

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, solar wind density, speed, temperature and the last graph represents the position of the subsolar magnetopause. Note that some profile are repeated in column 2.

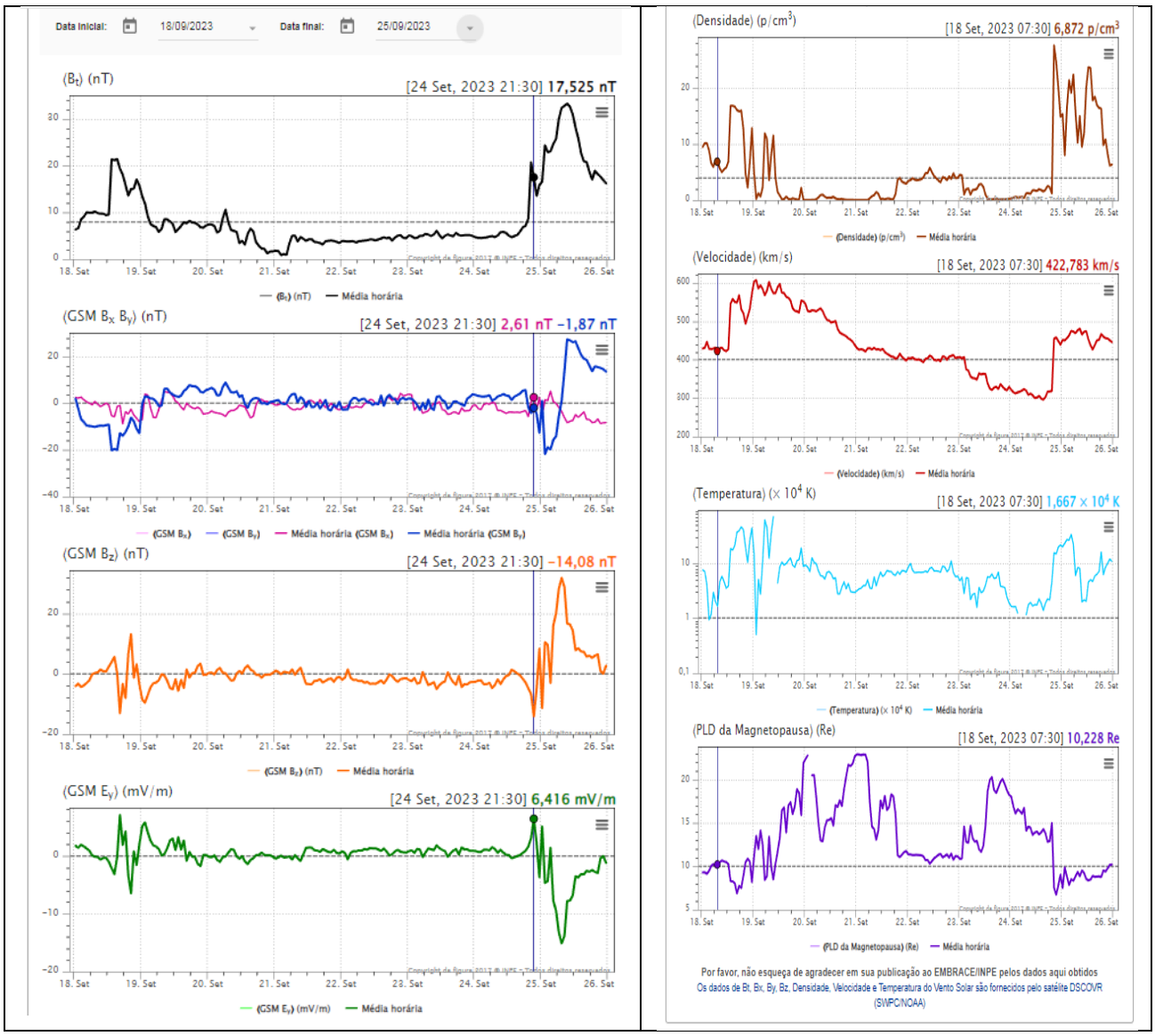
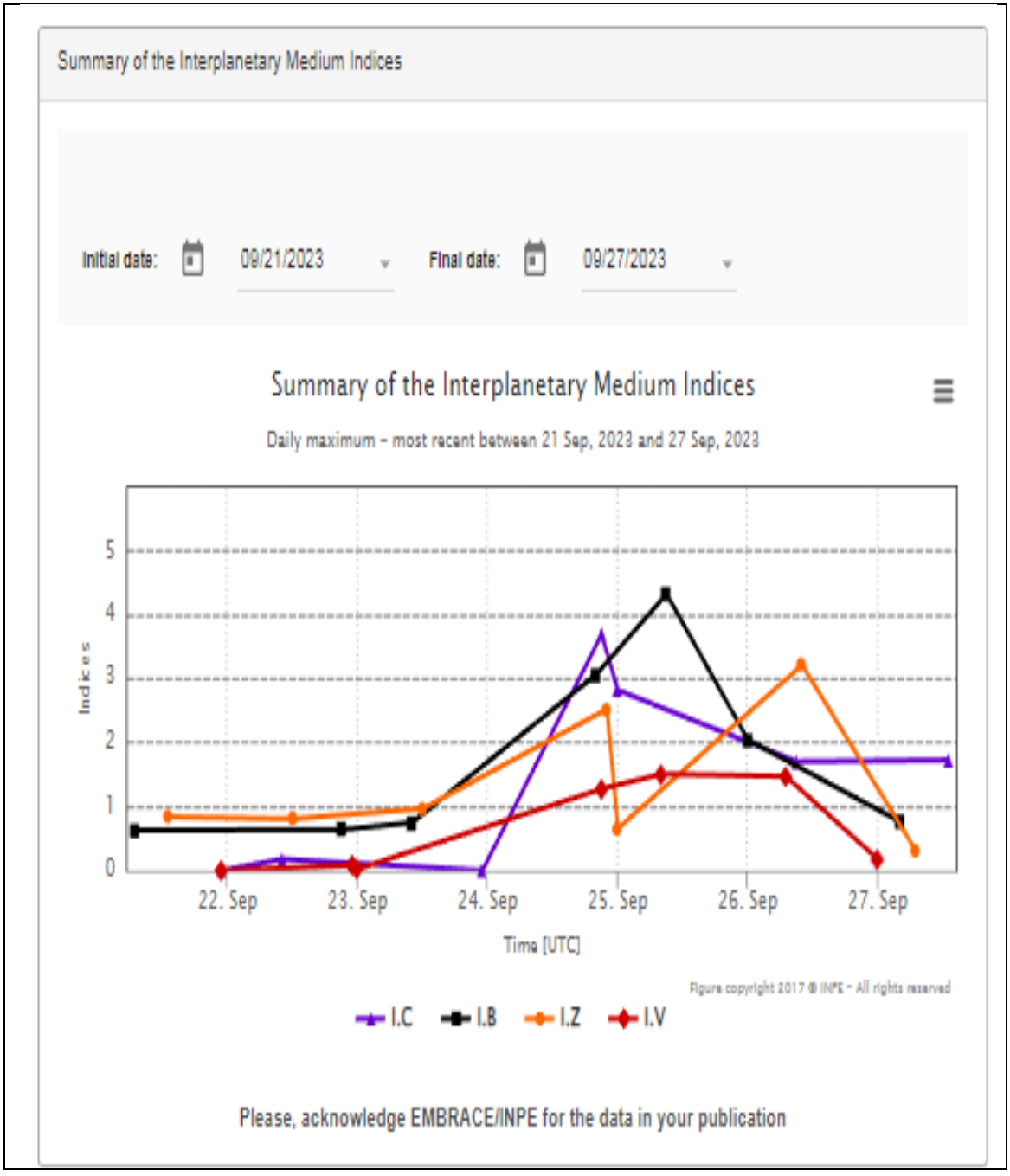


Figure 1 – illustrates a set of parameters observed in the solar wind by the DSCVR satellite.

Figure 3- illustrates a set of parameters/indices that represents the response to the interplanetary medium conditions and the global magnetosphere. The parameters are the compression of the magnetopause (I.C), the modulus of the interplanetary magnetic field (I.B), the Variation of the Bz component of the IMF (I.Z) and finally an index that responds to variations in the speed of the Solar wind (I.V).



EARTH'S RADIATION BELT

Responsible: Ligia Da Silva

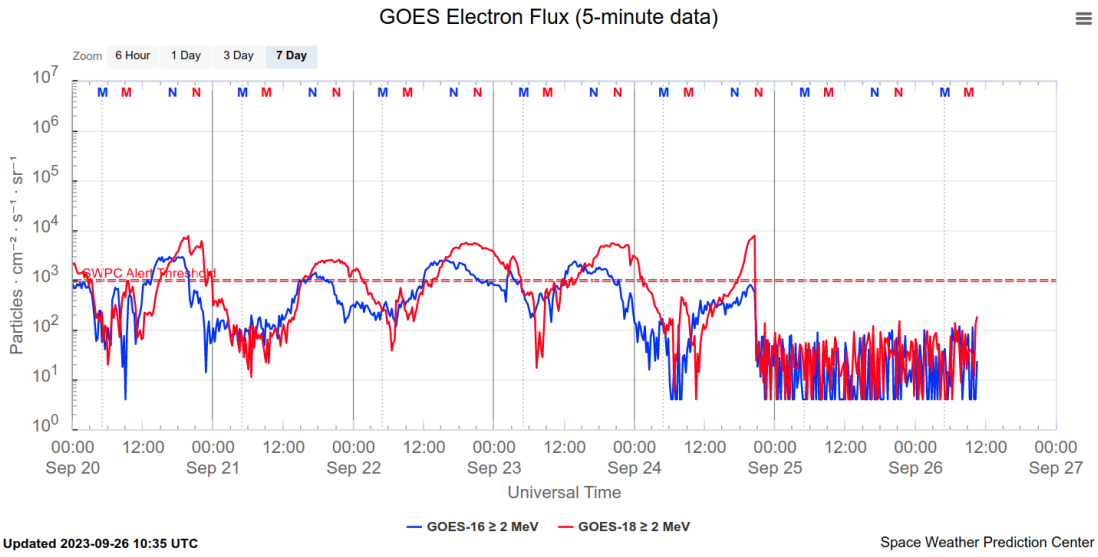


Figure 1: High-energy electron flux (> 2MeV) obtained from GOES-16 and GOES-18 satellite. Source: https://www.swpc.noaa.gov/products/goes-electron-flux

Summary

The high-energy electron flux (>2 MeV) in the outer boundary of the outer radiation belt obtained from geostationary satellite data GOES-16 and GOES-18 (Figure 1) shows presents a significant variability between 10^2 particles/(cm^2 s sr) and 10^4 particles/(cm^2 s sr) since September 20th. "Dropouts" were observed every day, however, the most significant and abrupt one was observed at 21:00 UT on September 24th. This confined the electron flux below 10^2 particles/(cm^2 s sr) until the end of the analysis period and occurred concomitantly with the strong compression of the magnetopause associated with the arrival of a coronal mass ejection.

Ondas ULF – Graziela B. D. Silva

Summary

- The GOES 16 satellite in geosynchronous orbit (L ~ 6.6) registered significant activity of Pc5 ULF waves over the week, especially from Sep. 18 to 21 (first hours), and as of Sep. 24 at 1859 UT.
- As observed on the ground, the ISLL station at high latitude registered intense ULF wave activity over the week.
- The PVE station from Embrace MagNet, located under the dip equator, registered regular activity of the waves during the week, along with disturbances due to the geomagnetic storms on Sep. 18-20, and during Sep. 24-25.
- The ARA and CXP stations at low latitude of Brazil registered an intense activity of the waves following the two geomagnetic storms.
- The dB/dt rates were higher than 250 nT/min in magnitude at ISLL (high latitude) on Sep. 19. The rates were above 15 nT/min at the Embrace stations in lower latitudes, especially on Sep. 18-19 (see PVE station) and from Sep. 24.

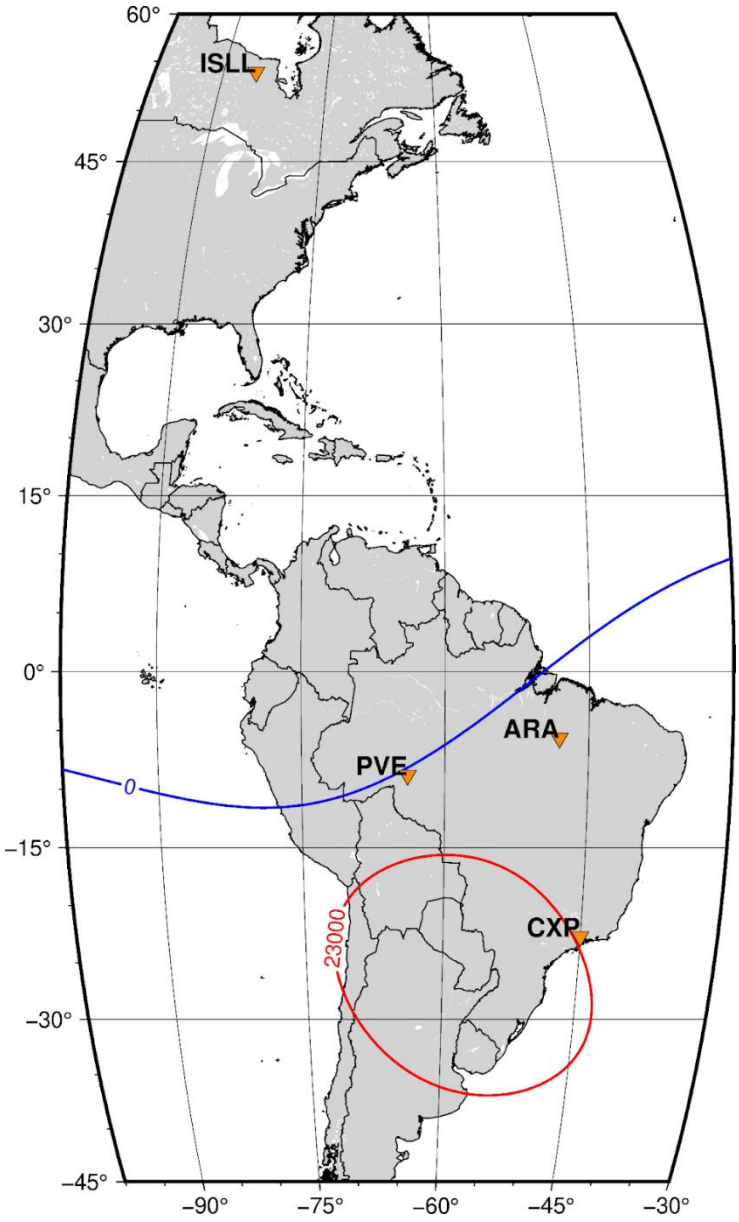


Figure 1: Map describing the geographic location of the stations together with the magnetic isolines to show the magnetic equator (blue) and the SAMA region (red).

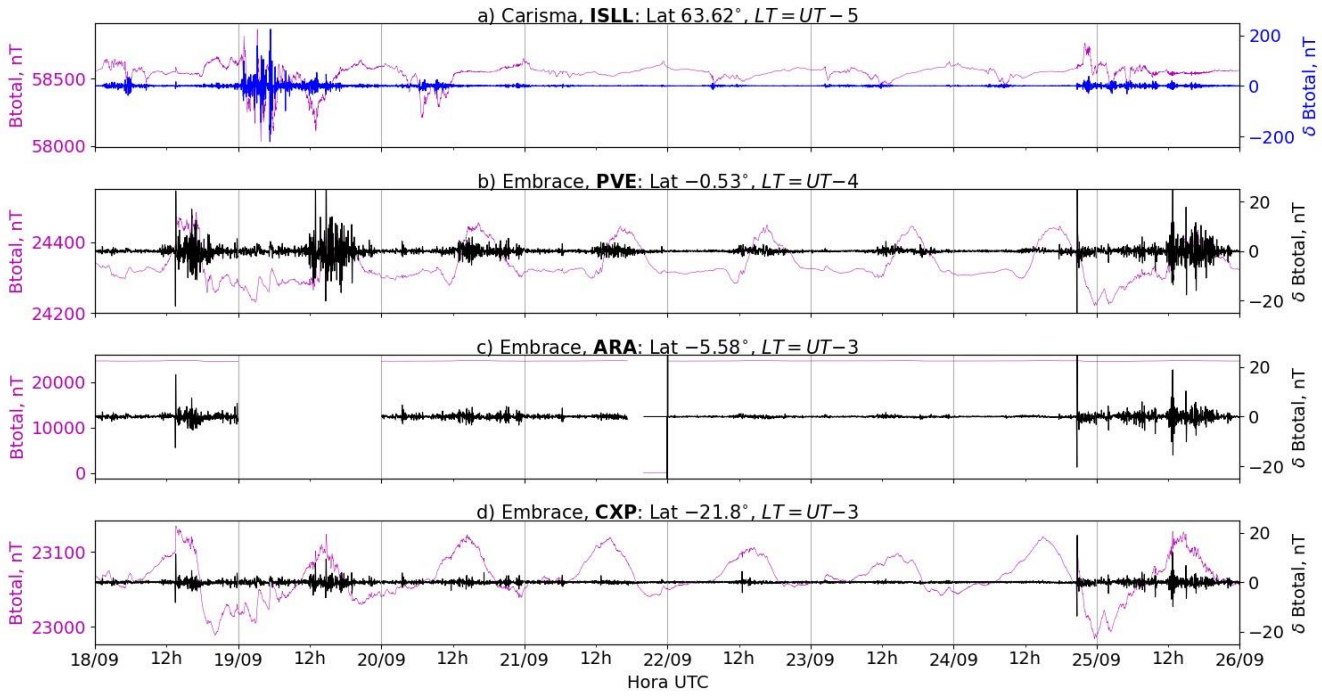


Figure 2: a) Timeseries of the geomagnetic field total component measured at ISLL station (Island Lake) of the CARISMA magnetometer network in magenta, along with the associated perturbation in the Pc5 band shown in blue. b-d) timeseries of the geomagnetic field total component measured at stations PVE (Porto Velho), ARA (Araguatins), and CXP (Cachoeira Paulista) of the EMBRACE network in magenta, along with the Pc5 perturbation in blue.

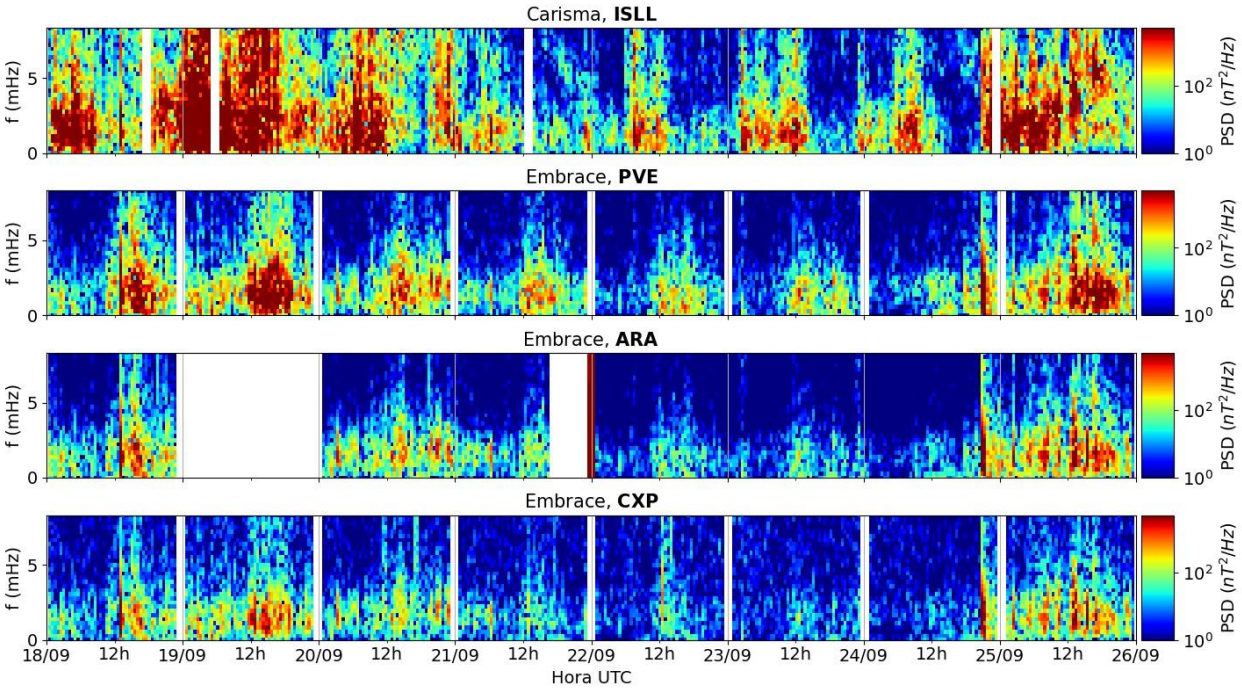


Figure 3: From top to bottom: Time evolution of the power spectral density obtained from the filtered timeseries of the geomagnetic field total component (δBtotal) for a) the high latitude

station (ISLL-CARISMA), and b-d) for the low latitude stations of EMBRACE (PVE, ARA, CXP).

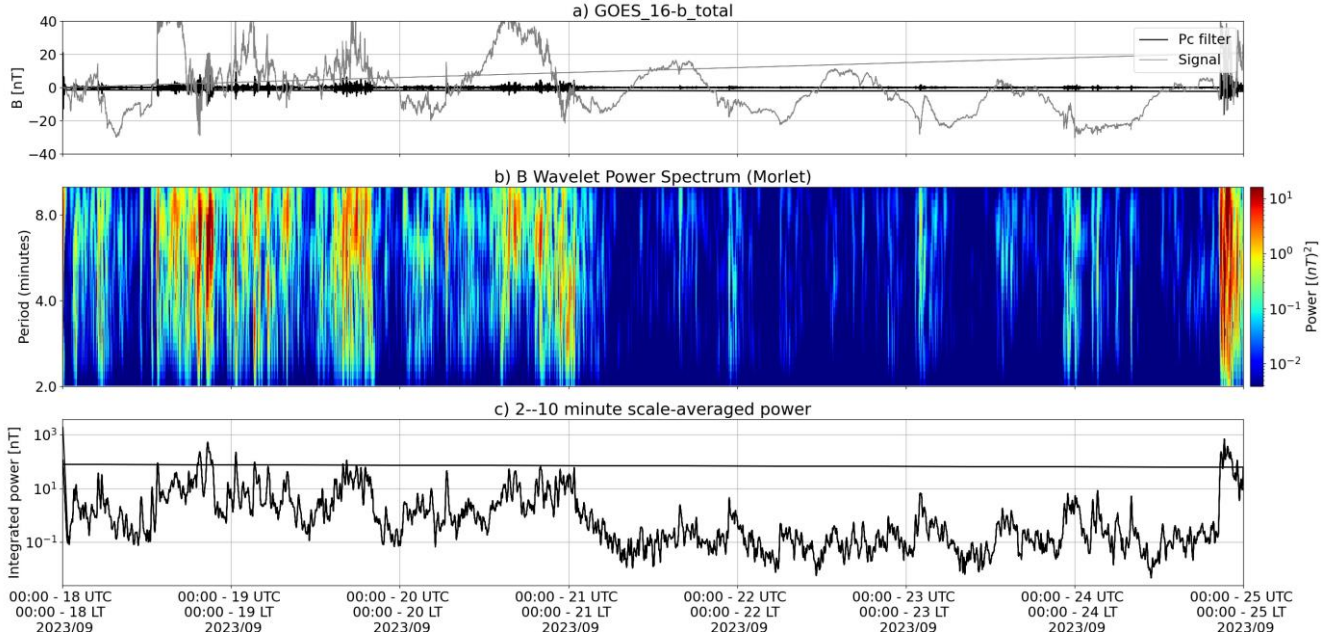


Figure 4: a) Timeseries of the geomagnetic field total component measured by GOES 16, together with the Pc5 fluctuation in black. b) Wavelet power spectrum of the filtered timeseries. c) Average ULF power in the period range from 2 to 10 minutes.

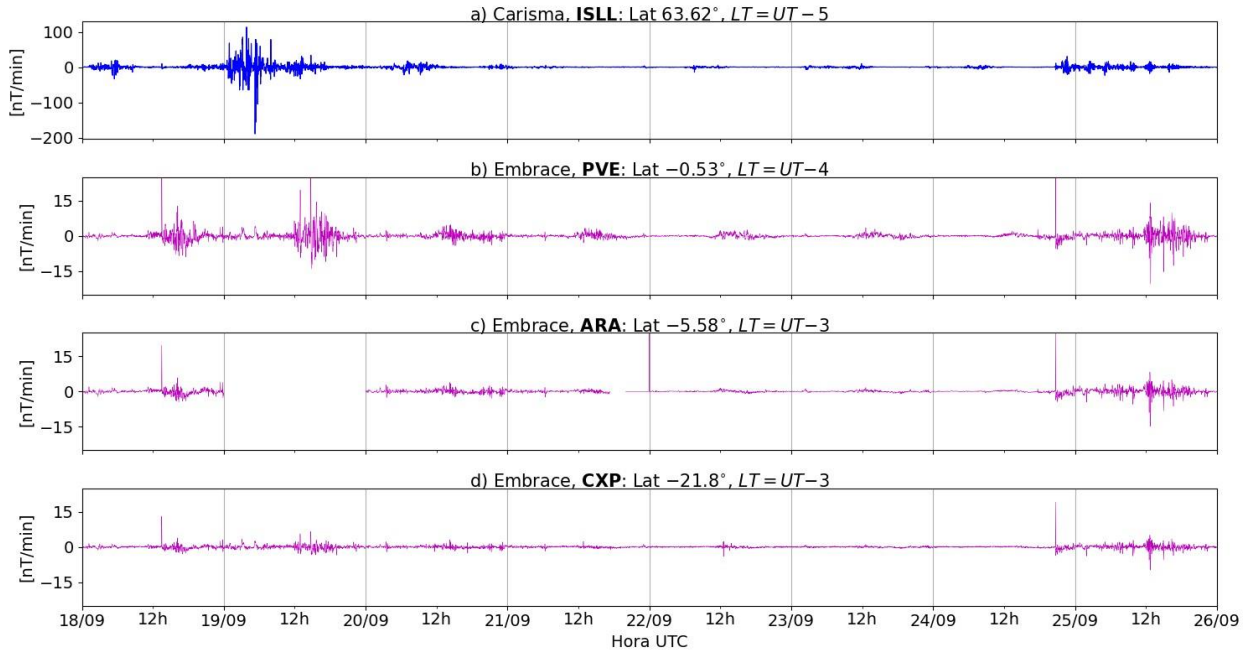


Figure 5: a-d) The rate of change of the geomagnetic field total component (dB/dt) obtained for a) the high latitude station (ISLL-CARISMA), and b-d) for the low latitude stations of EMBRACE (PVE, ARA, CXP).

Geomagnetic Field

Summary

In the week of Sep 19-25, the following events related to geomagnetic activity stand out:

- 19 and 25/09: the data from the Embrace magnetometer network registered a SSC of 85 nT at PVE, and a drop of -120 nT in JAT
- The AE index reached 1500 nT on 19 and 25/09. The Dst index reached -82 nT on Sep.19. The highest Kp of the week was 6-.

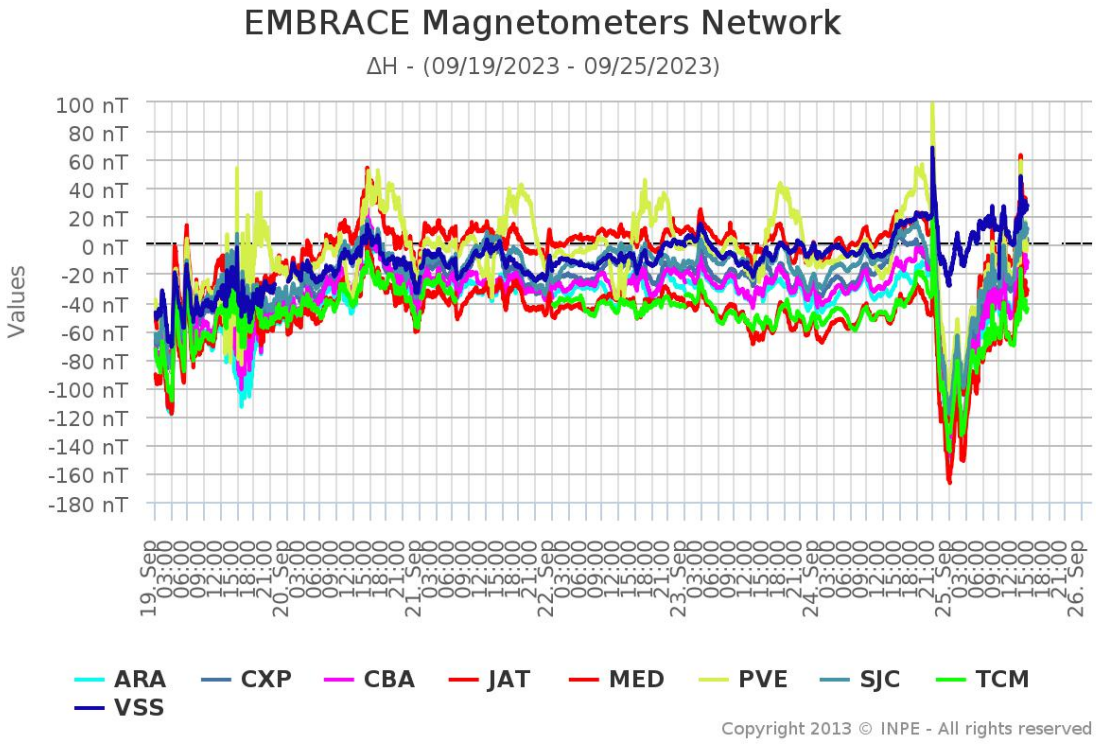
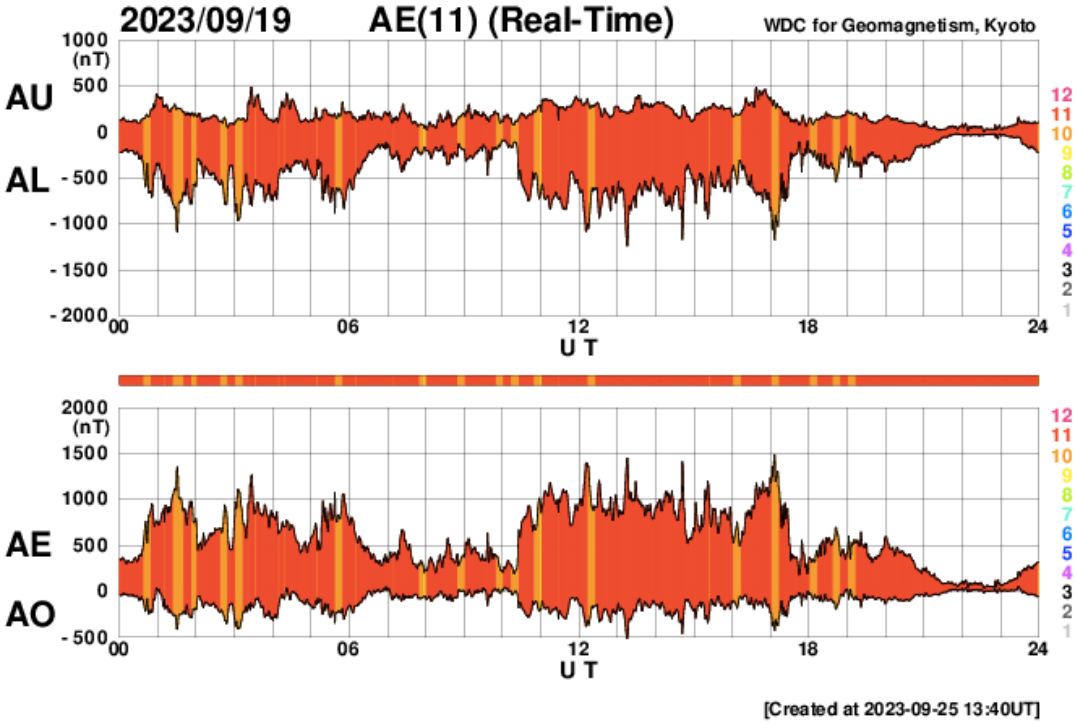
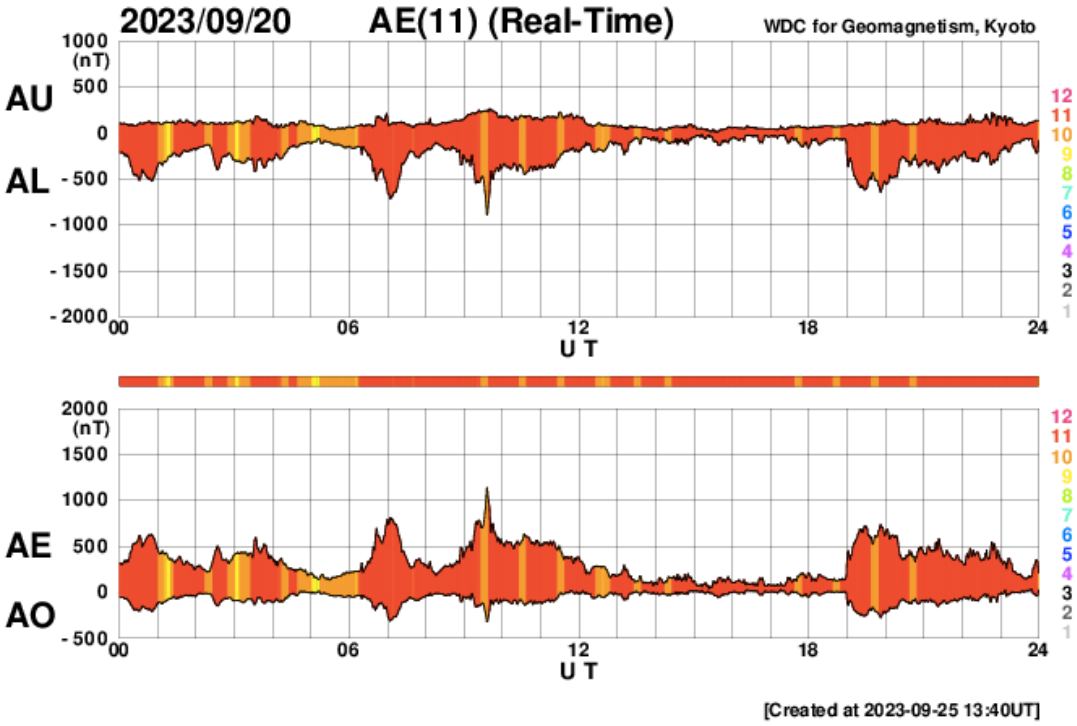


Figure 1.: Daily variation of the geomagnetic field from H (nT) measured at Embrace MagNet from 19 to 25 September 2023

Figure 2: Dst index for September 2023





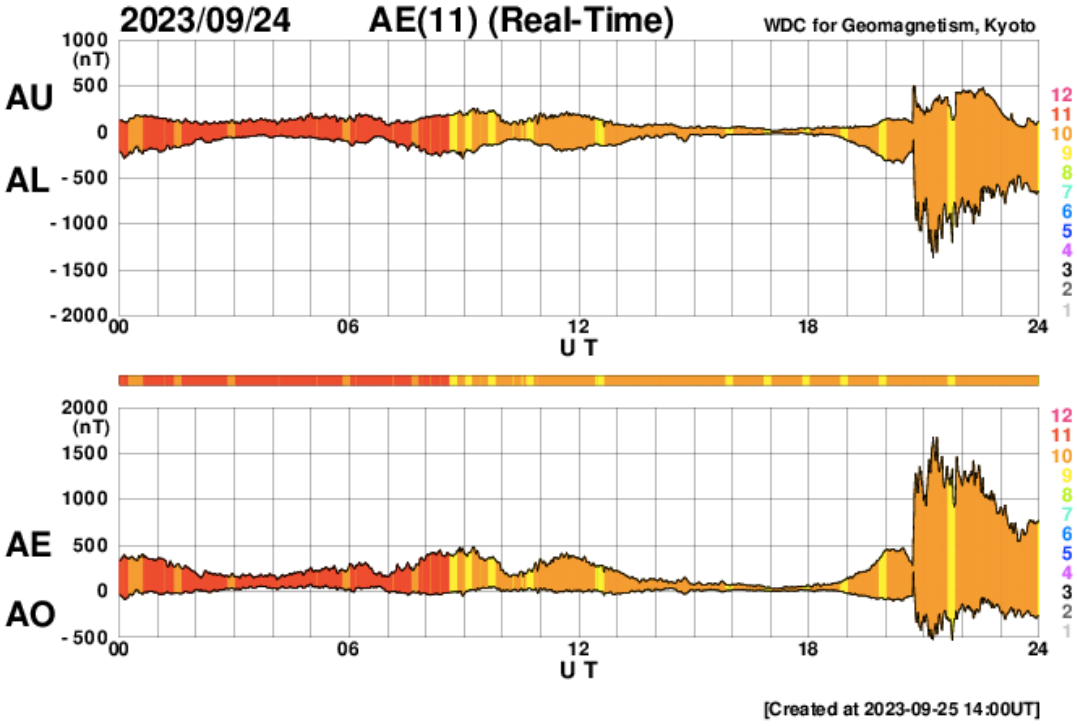


Figure 3.: AE index for the most disturbed days in the current week.

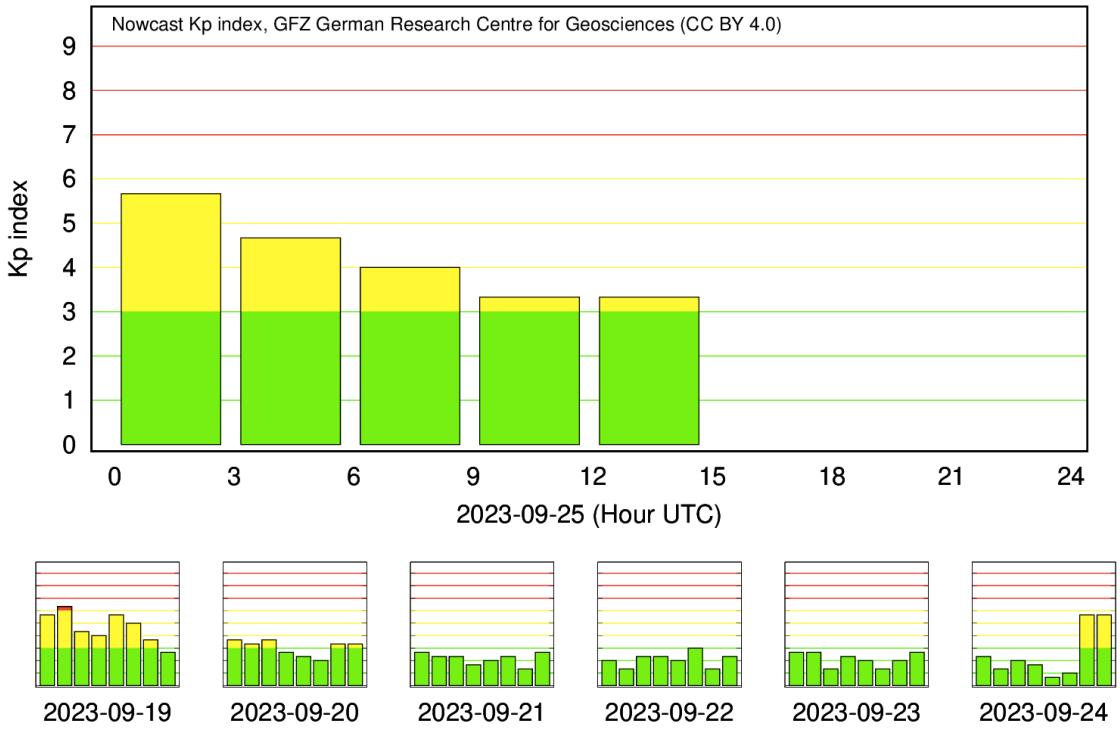


Figure 4: Kp index for the current week (19-25 September 2023)

Ionosfera – Digissonda (Laysa Resende)

Summary

We observed the F spread in Fortaleza every day during this week. In Cachoeira Paulista, it was only on September 23rd that we observed F-spread (Figure 1). The Es layers reached a maximum of scale 2 in Cachoeira Paulista and a maximum of scale 3 in Fortaleza (Figure 2).

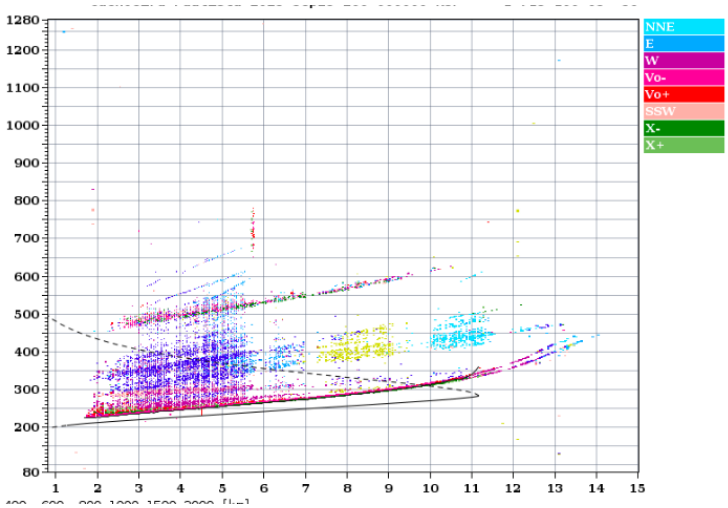


Figure 1 – Ionogram over Cachoeira Paulista, showing the spread F occurrence on September 24, 2023.

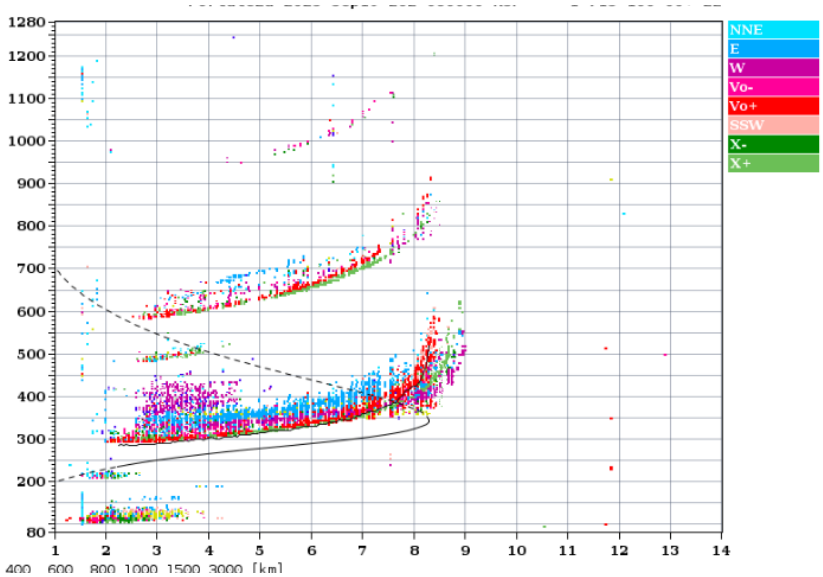


Figure 2 – Ionogram over Fortaleza, showing the Es layer occurrence.

Ionosphere - ROTI
Summary for Week 2280 (September 17 to 23, 2023)

Carolina de Sousa do Carmo

In the week 2280 (September 17 to 23, 2023) there were ionospheric irregularities (plasma bubble), except on the night of the 18th and 19th. Furthermore, on the 18th there was a late appearance of these irregularities in CUIB and MABB. The Figure below shows the ROTI time series for four stations in the Brazilian sector (Natal (RNNA), Bacabal (MABB), Cuiabá (CUIB) and São José dos Campos (SJSP)).

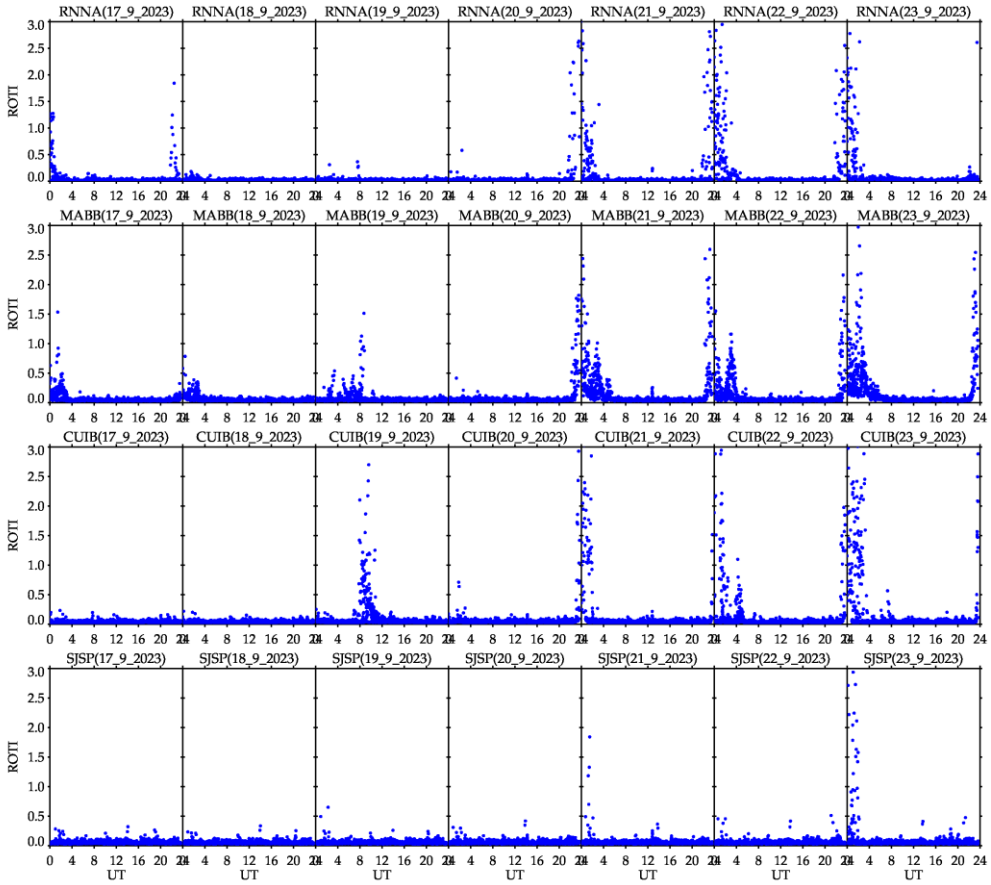


Figure – ROTI time series for four stations in the Brazilian sector (Natal (RNNA), Bacabal (MABB), Cuiabá (CUIB) and São José dos Campos (SJSP)), from September 17 to 23, 2023.