SOL (Cecatto)

Summary

09/25 – No M/X flare; Fast (< 500 km/s) wind stream; No CME toward the Earth;
09/26 – No M/X flare; Fast (< 550 km/s) wind stream; No CME toward the Earth;
09/27 – No M/X flare; Fast (< 500 km/s) wind stream; 5 CME can have component toward the Earth;
09/28 – M1.2 flare; Fast (< 500 km/s) wind stream; 7 CME can have component toward the Earth;
09/29 – No M/X flare; Fast (< 500 km/s) wind stream; 3 CME can have component toward the Earth;
09/30 – M1.2 flare; Fast (< 450 km/s) wind stream; 4 CME can have component toward the Earth;
10/01 – M2.5 flare; Fast (< 450 km/s) wind stream; 2 CME can have component toward the Earth;
10/02 – M1.9 flare; No fast wind stream; 1 CME can have component toward the Earth;
Prev.: No fast wind stream for today and fast wind for next 1-2 days; for while low (45% M, 05% X) probability of M / X flares next 2 days; also, occasionally some other CME can present a component toward the Earth.

Resumo

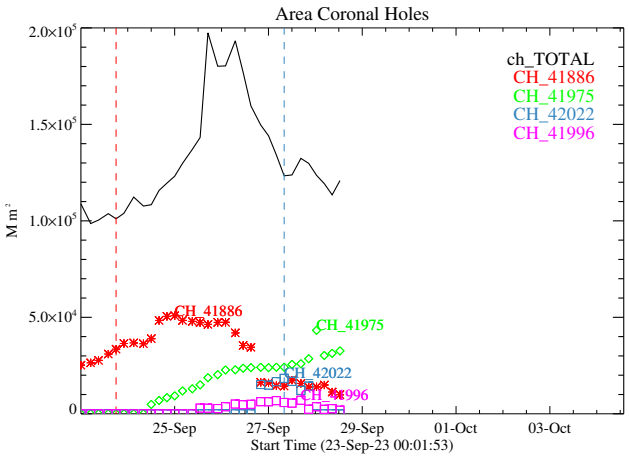
25/09 – Sem "flare" M/X; Vento rápido (< 500 km/s); Sem CME dirigida para a Terra;
26/09 – Sem "flare" M/X; Vento rápido (< 550 km/s); Sem CME dirigida para a Terra;
27/09 – Sem "flare" M/X; Vento rápido (< 500 km/s); 5 CME podem ter uma componente para a Terra;
28/09 – "Flare" M1.2; Vento rápido (< 500 km/s); 7 CME podem ter uma componente para a Terra;
29/09 – Sem "flare" M/X; Vento rápido (< 500 km/s); 3 CME podem ter uma componente para a Terra;
30/09 – "Flare" M1.2; Vento rápido (< 450 km/s); 4 CME podem ter uma componente para a Terra;
01/10 – "Flare" M2.5; Vento rápido (< 450 km/s); 2 CME podem ter uma componente para a Terra;
02/10 – "Flare" M1.9; Sem corrente de vento rápido; 1 CME podem ter uma componente para a Terra;
Prev.: Sem vento rápido para hoje e vento rápido p/ próximos 1-2 dias; baixa probabilidade de “flares” (45% M, 05% X) nos próximos 02 dias; eventualmente alguma outra CME pode apresentar componente dirigida para a Terra.

Solar - WSA-ENLIL

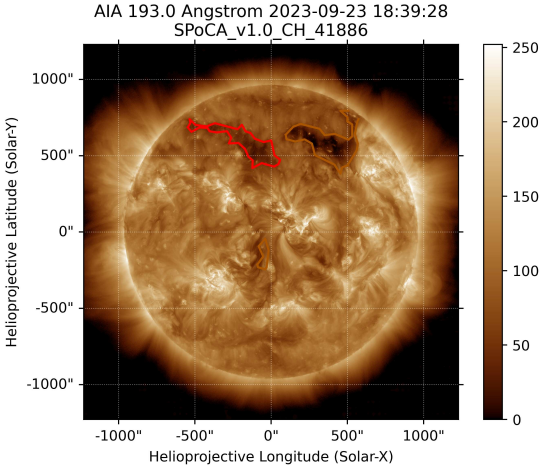
EMC (https://ccmc.gsfc.nasa.gov/donki/):

WSA-ENLIL(CME 2023-09-22 22:24:00 UT)
The simulation results indicate that the flank of CME will reach the DSCOVR mission between 2023-09-25 15:48:00 UT and 2023-09-26 05:48:00 UT.

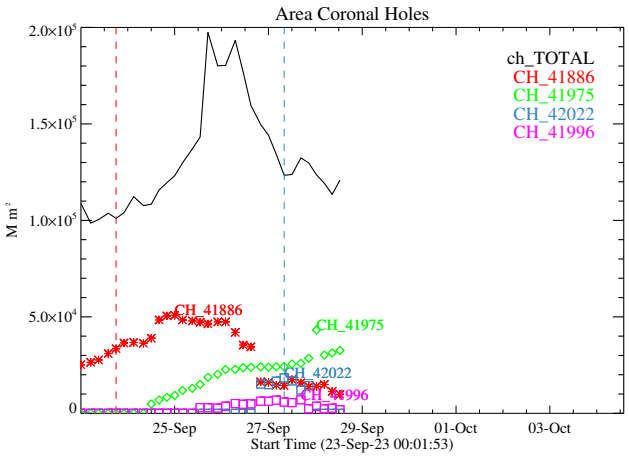
Solar - Coronal holes Spatial Possibilistic Clustering Algorithm (SPoCAS):



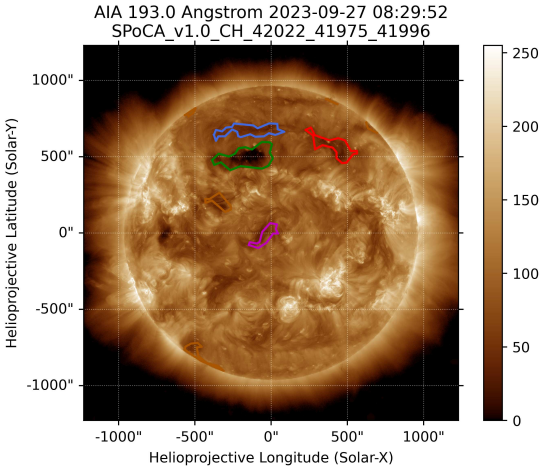
(a) The solid black line depicts the products of the sum of areas for each detection interval performed by SPOCA between September 23 and 29, 2023.



(b) Above the 193 Å image of the Sun are highlighted coronal holes observed by SPOCA around 18:39 UT on September 23, 2023 (red dot line).

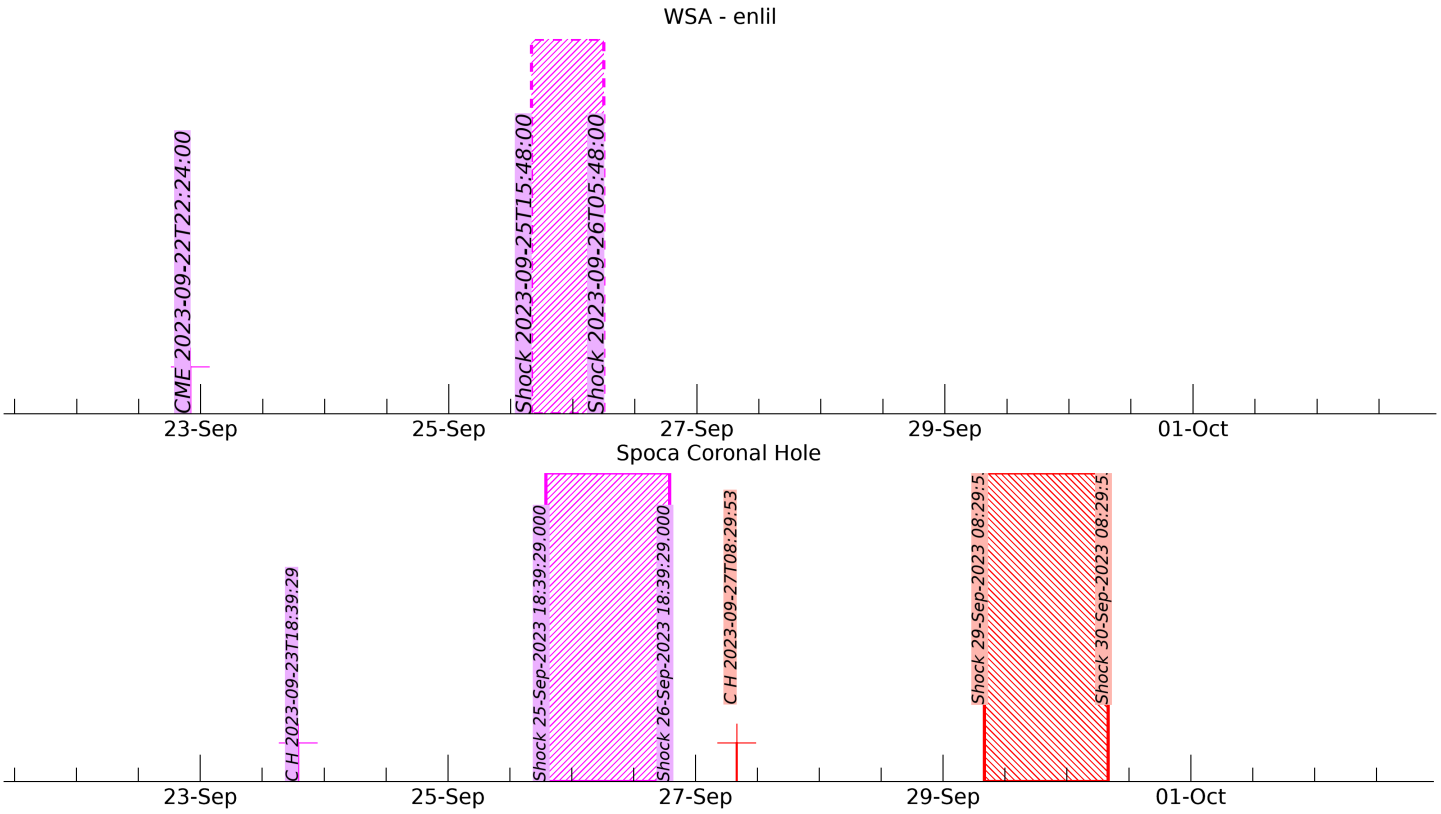


(a) The solid black line depicts the products of the sum of areas for each detection interval performed by SPOCA between September 23 and 29, 2023.



(b) Above the 193 Å image of the Sun are highlighted coronal holes observed by SPOCA around 08:29 UT on September 27, 2023 (blue dot line).

Solar - WSA - ENLIL and SPoCA



Meio interplanetário – IM – Paulo Ricardo Jauer 25/09 to 02/10 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 a significant peak on September 25th at 09:30 UT at 09:30 UT of 33 nT 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);(-21.7,27,5)] nT, without the presence of boundary crossing.

- The bz field component showed three negative peaks on Sept 25/26/29 at 00:30/10:30/08:30 UT giving – 11.38/-11/-6.44 nT respectively. The bz component also showed a significant positive peak on Sept 25th at 07:30 UT giving +31.8 nT.

- The density of the solar wind showed oscillations with a maximum peak recorded on September 25th at 12:30 pm of 23.7 p/cm³ and on September 27th at 1:30 pm of 22.9 p/cm³. During the remainder of the period, the density fluctuated on average below 10 p/cm³.

- The average speed of the solar wind remained on average above 400 km/s. The speed had a maximum value on 26/Sep at 17:30 UT of 519 km/s and a minimum value on 02/Oct at 06:30 UT of 349 km/s. Discontinuities in the velocity component were found due to interactions of interplanetary structures.

- The position of the magnetopause oscillated on average around the equilibrium position. He presented compressions whose minimum value recorded was on the day: 18-25 September at 00:30 am of 7.5 Re.

Figure 1 - 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 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.

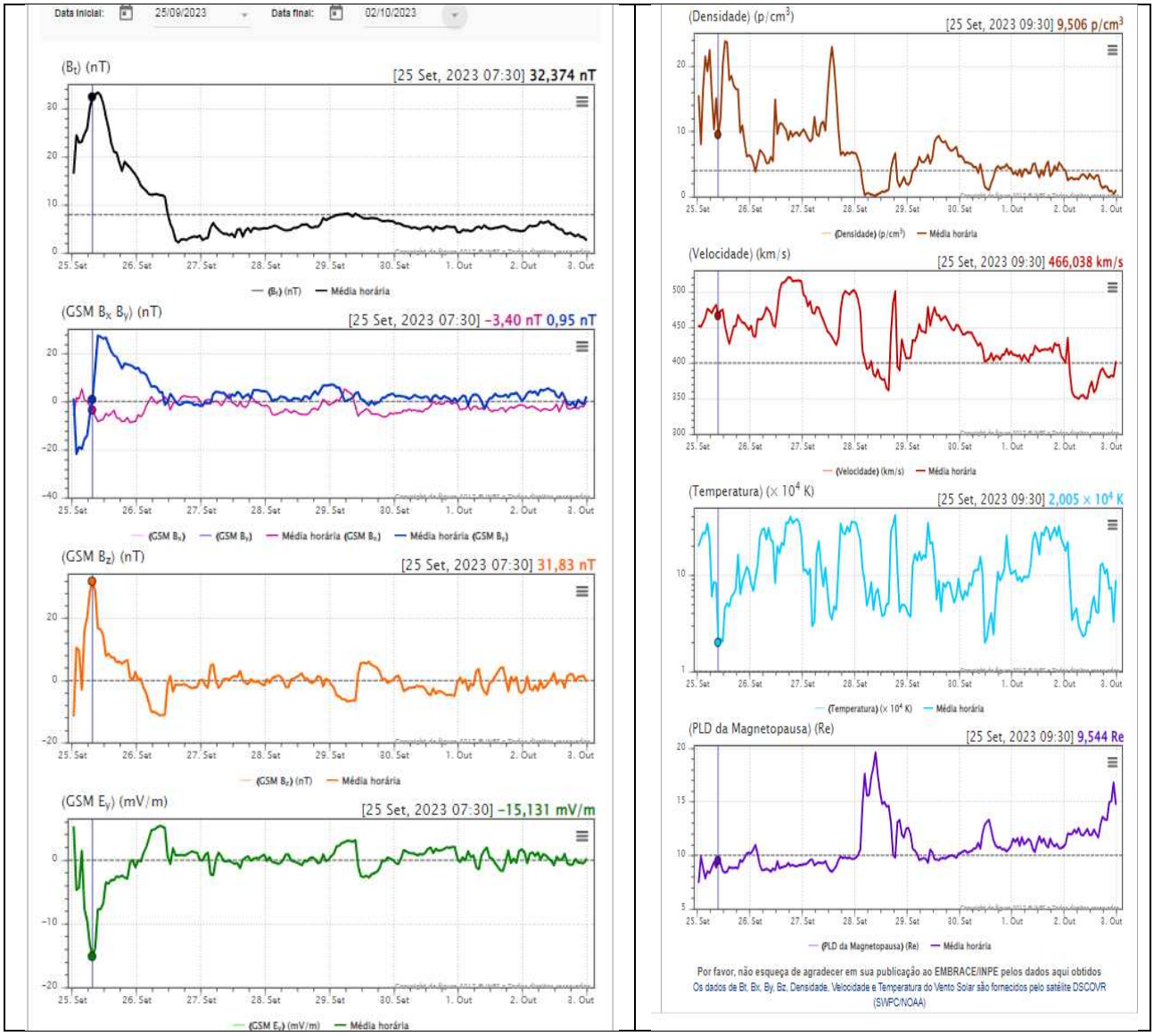
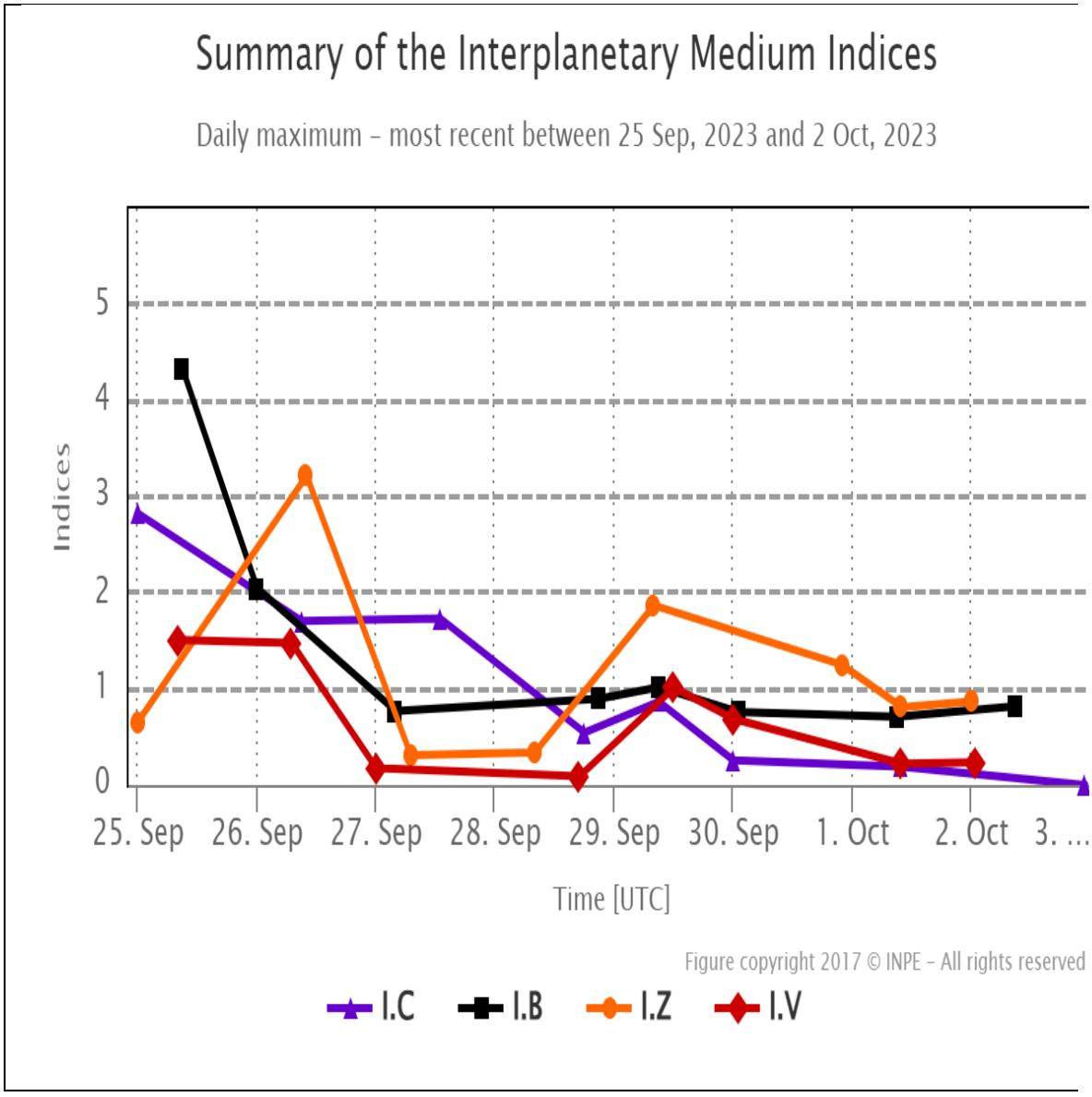


Figure 1 – illustrates a set of parameters observed in the solar wind by the DSCOVR satellite.

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

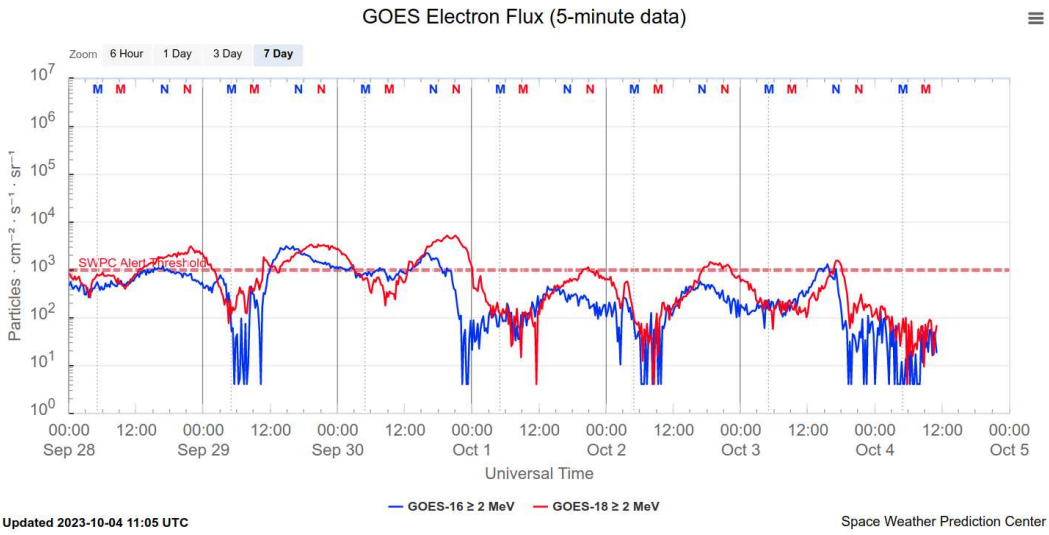


Figure 1: High-energy electron flux (> 2MeV) obtained from GOES-16 and GOES-18 satellite. Source: https://www.swpc.noaa.gov/products/goes-electron-flux

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) is varying around 10^3 particles/(cm^2 s sr) in the first three days, presenting a rapid dropout on September 29th. A second dropout was observed at the end of September 30th, in which the electron flux remained below 10^3 particles/(cm^2 s sr) for practically the entire remainder of the analyzed period. The observed dropouts occurred concomitantly with compressions in the magnetopause associated with the arrival of complex solar wind structures.

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.
- 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. 25-26.
- 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 200 nT/min in magnitude at ISLL (high latitude) on Sep. 26. The rates were below ~ 30 nT/min at the Embrace stations in lower latitudes, especially on Sep. 25-26 (see PVE station) .

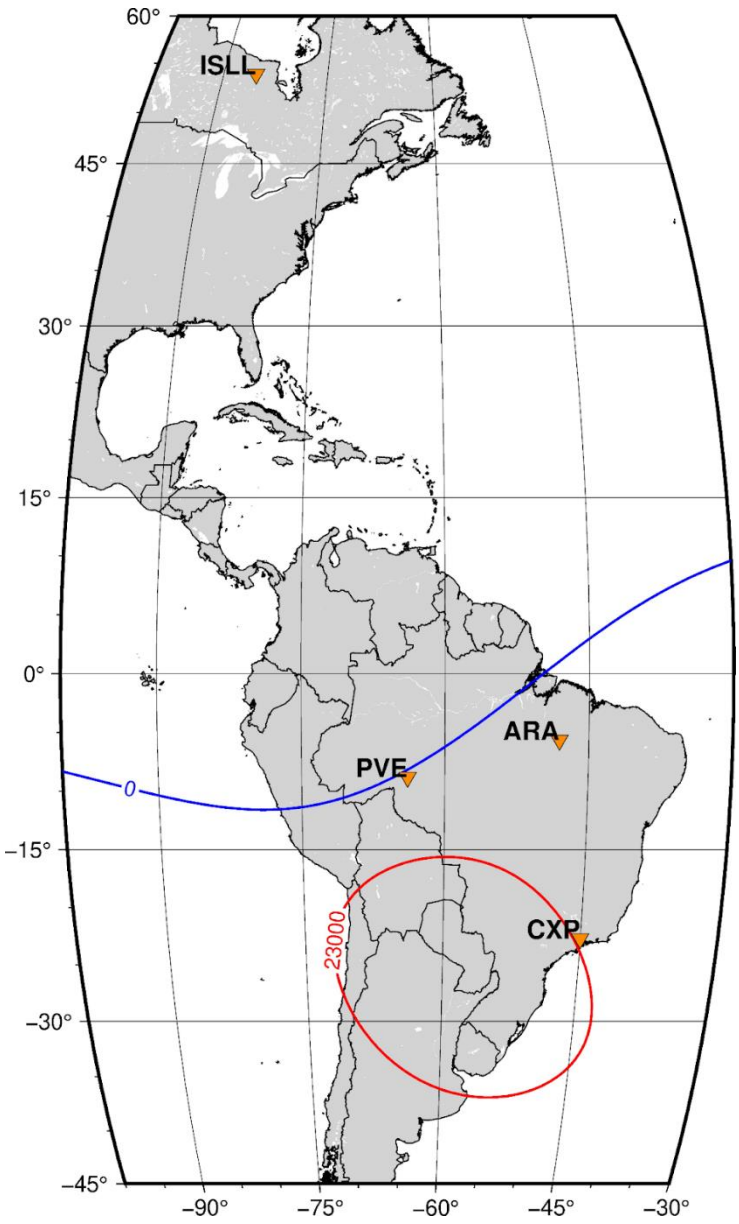


Figure 1: Map describing the geographic location of the stations together with the magnetic isolines to show the magnetic equator (blue) and the SAMA region (red).

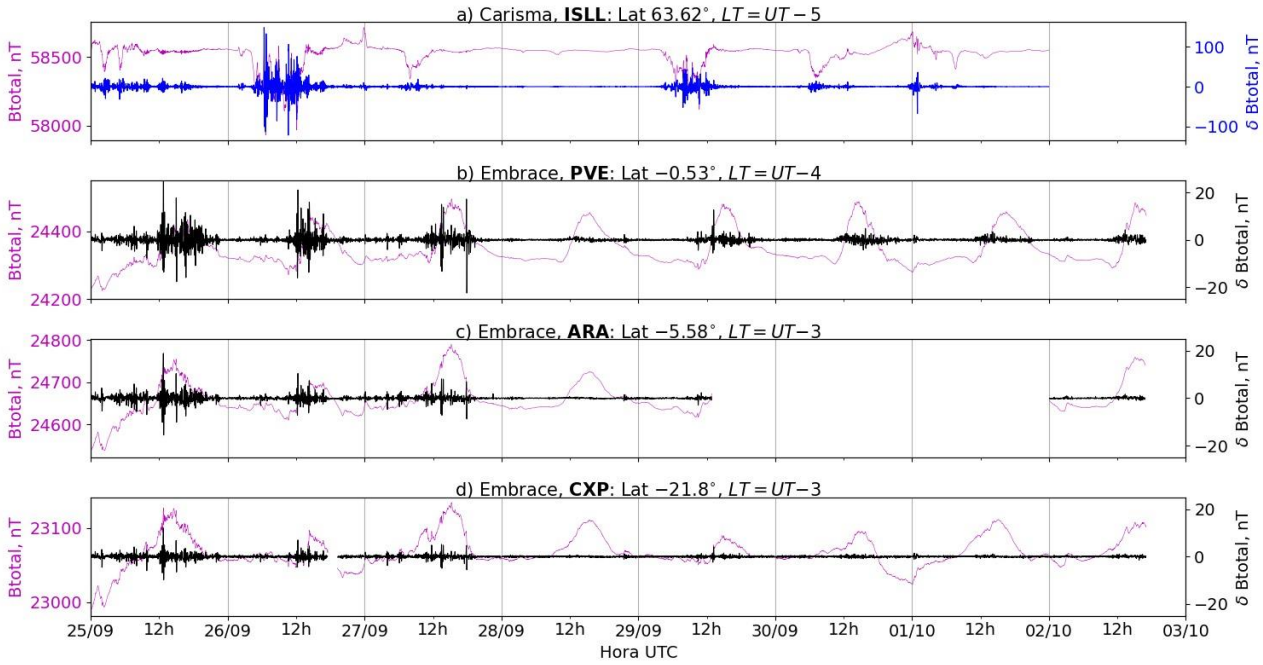


Figure 2: a) Timeseries of the geomagnetic field total component measured at ISLL station (Island Lake) of the CARISMA magnetometer network in magenta, along with the associated perturbation in the Pc5 band shown in blue. b-d) timeseries of the geomagnetic field total component measured at stations PVE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

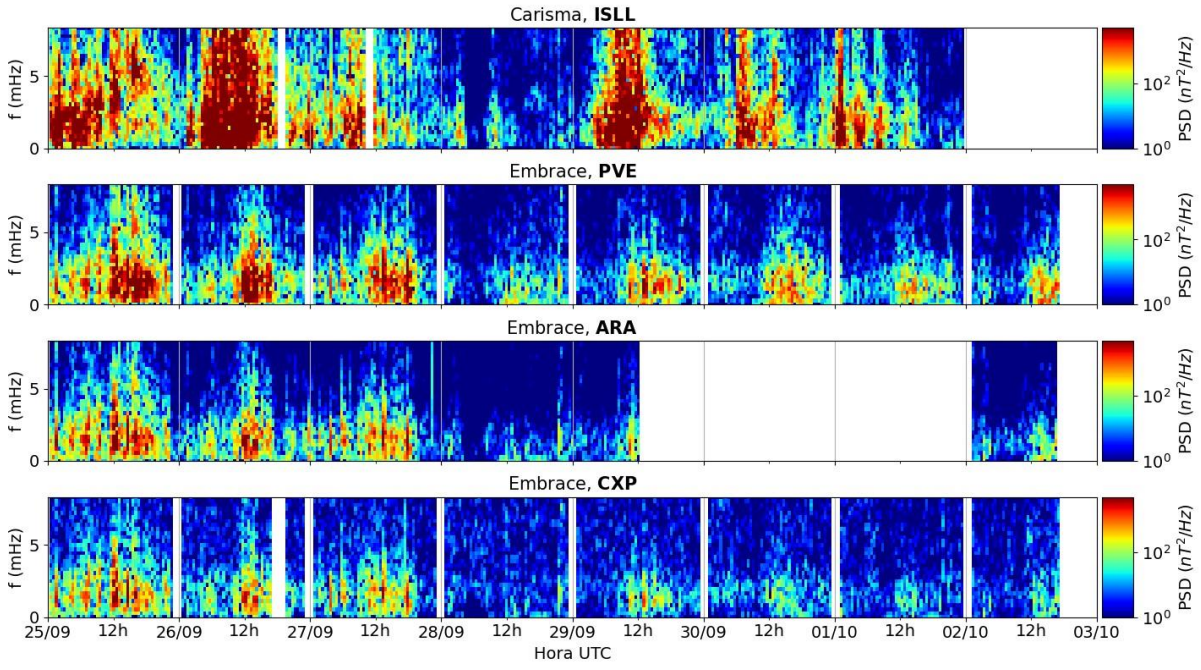


Figure 3: From top to bottom: Time evolution of the power spectral density obtained from the filtered timeseries of the geomagnetic field total component (δBtotal) for a) the high latitude

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

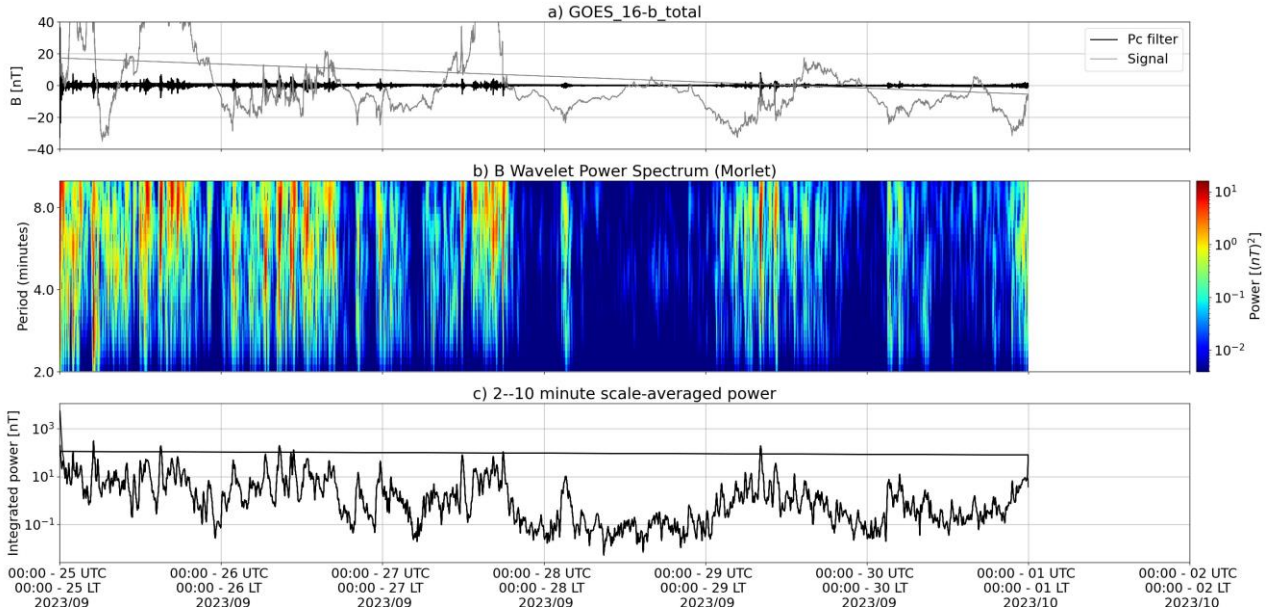


Figure 4: a) Timeseries of the geomagnetic field total component measured by GOES 16, together with the Pc5 fluctuation in black. b) Wavelet power spectrum of the filtered timeseries. c) Average ULF power in the period range from 2 to 10 minutes.

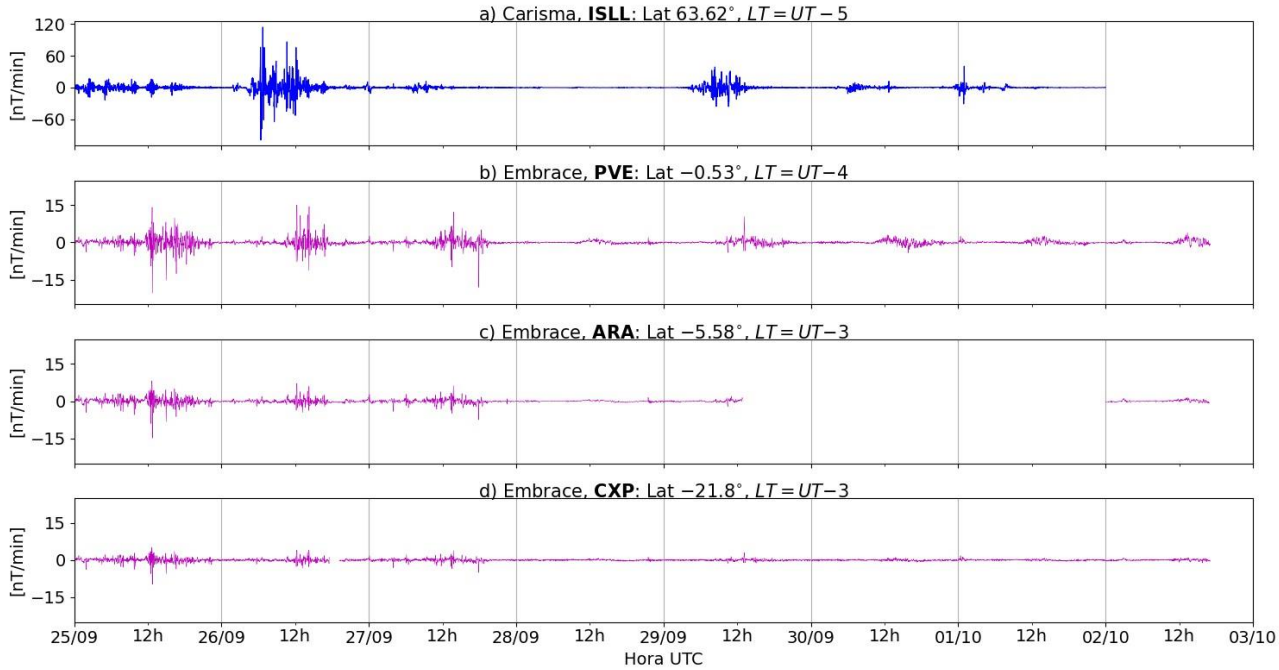


Figure 5: a-d) The rate of change of the geomagnetic field total component (dB/dt) obtained for a) the high latitude station (ISLL-CARISMA), and b-d) for the low latitude stations of EMBRACE (PVE, ARA, CXP).

Ionosfera – Digissonda (Laysa Resende)

Summary

We observed the F spread-F in Fortaleza every day during this week (Figure 1). Over Cachoeira Paulista, it was not observed spread-F on September 26, and September 27. The Es layers reached a maximum of scale 2 in Cachoeira Paulista and a maximum of scale 3 in Fortaleza (Figure 2).

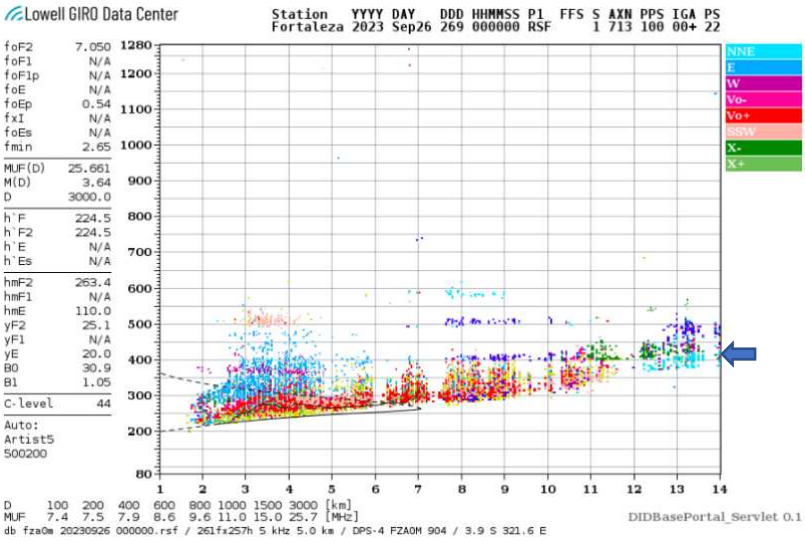


Figure 1 – Ionogram over Fortaleza, showing the spread F occurrence on September 26, 2023.

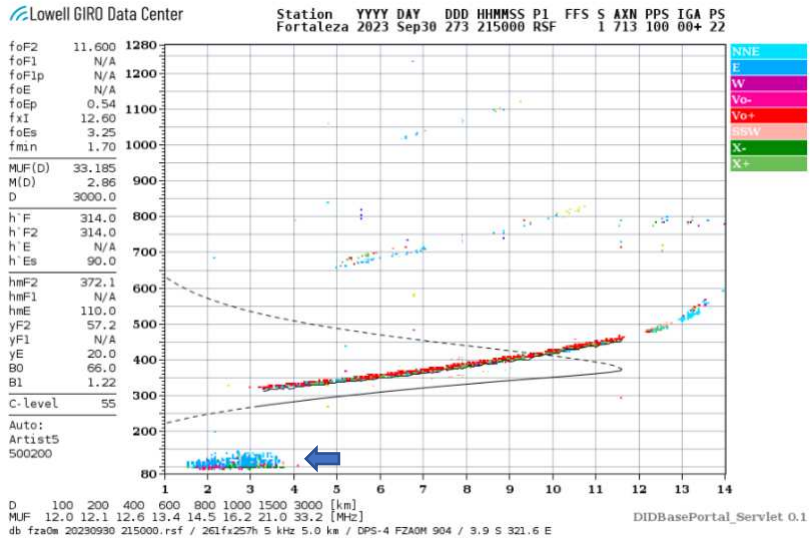


Figure 2 – Ionogram over Fortaleza, showing the Es layer occurrence.

Ionosfera –S4 (Cintilação receptores GNSS)

Summary

In this report on the S4 scintillation index, data from SLMA in São Luiz/MA, UFBA in Salvador/BA, STCB in Cuiabá/MT and SJCE in São José dos Campos/SP are presented. The S4 index tracks the presence of irregularities in the ionosphere having a spatial scale ~ 400 m.
All stations presented S4 values greater than 0.7 every day every day of the week (Figure 1), indicating that the emergence of plasma bubbles phenomenon after sunset is well established in the American sector corresponding to the 2023-2024 plasma bubble season.

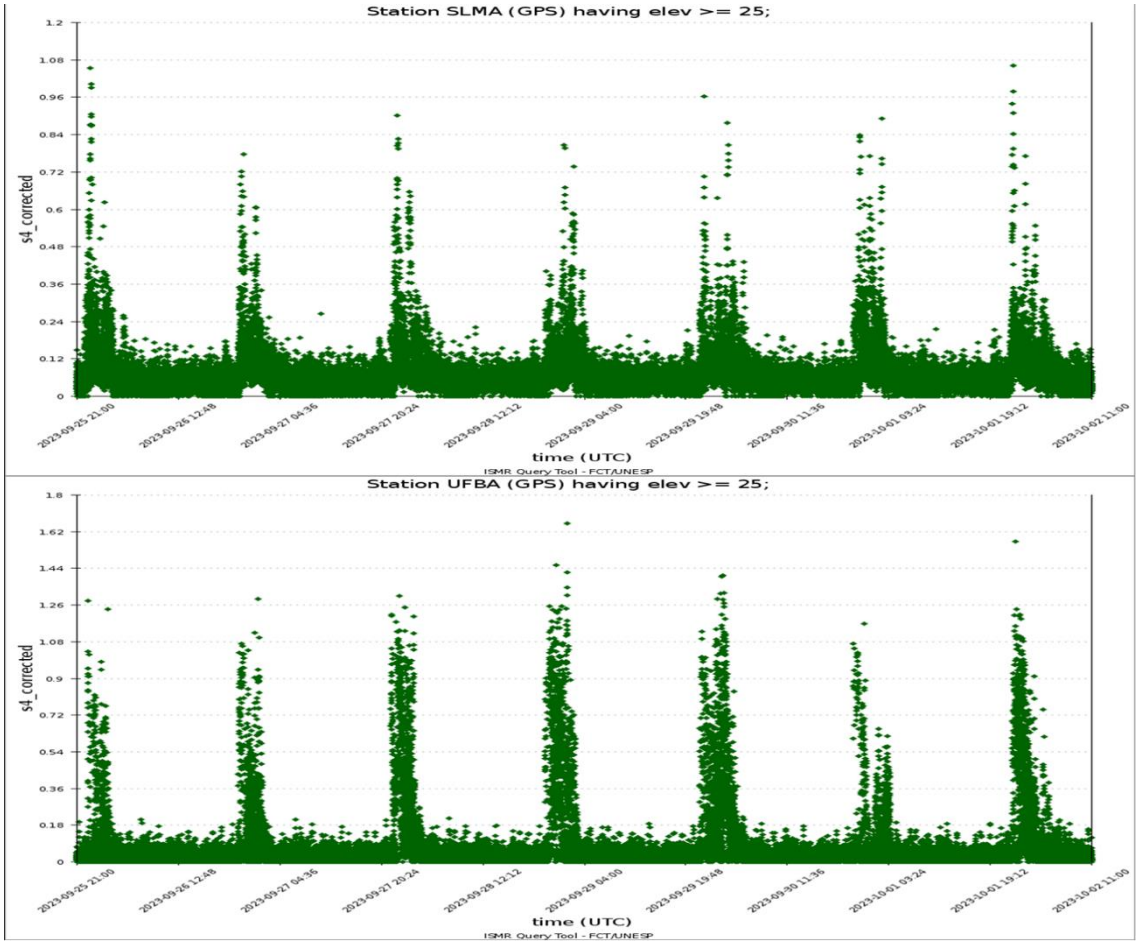


Figure 1 – S4 index values for the GPS constellation measured at SLMA (upper panel) and UFBA(lower panel), during the week 10/25—02. A similar behavior was observed in STCB and SJCE.

Ionosphere - ROTI
Summary for Week 2281 (September 24 to 30, 2023)

Carolina de Sousa do Carmo

In the week 2281 (September 24 to 30, 2023) there were ionospheric irregularities (plasma bubbles) on all nights analyzed. 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)).

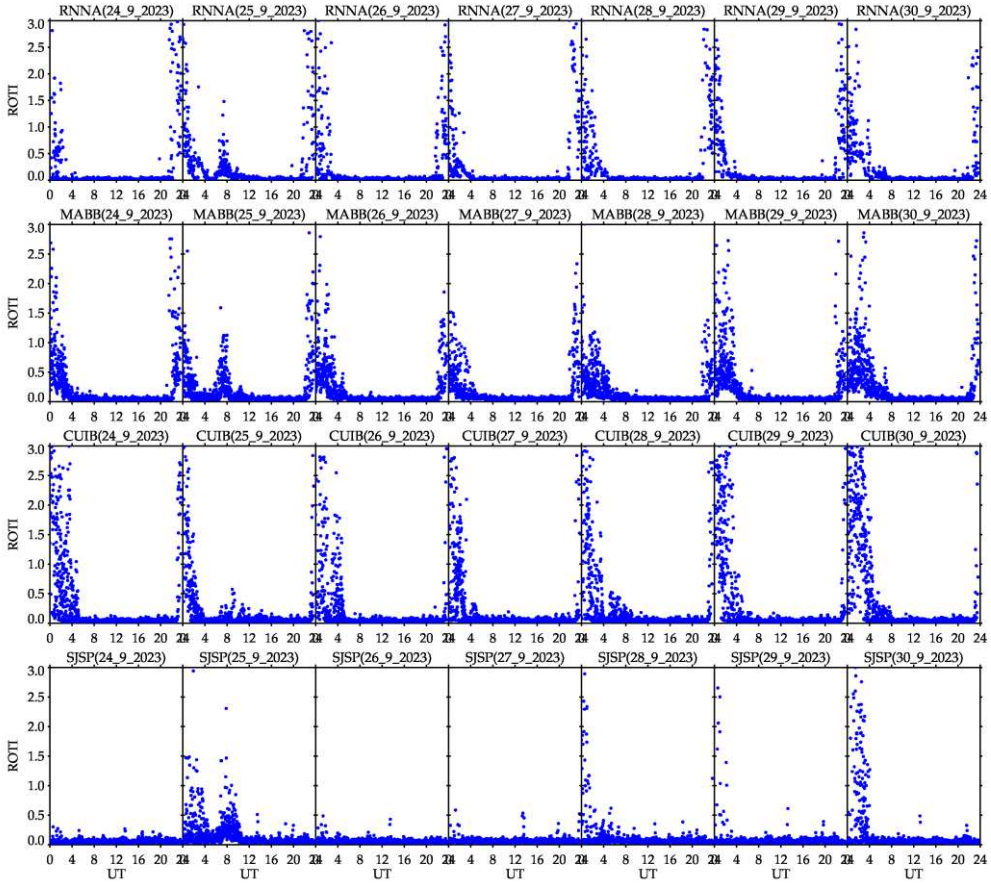


Figure – ROTI time series for four stations in the Brazilian sector (Natal (RNNA), Bacabal (MABB), Cuiabá (CUIB) and São José dos Campos (SJSP)), from September 24 to 30, 2023.