SOL (Cecatto)

Summary – Week October 30 to November 06

10/30 – No M/X flare; Fast (=< 600 km/s) wind stream; 4 CME can have component toward the Earth;
10/31 – No M/X flare; Fast (=< 550 km/s) wind stream; 3 CME can have component toward the Earth *,*;
11/01 – Flares M1.1, M1.4; Fast (=< 500 km/s) wind stream; 2 CME can have component toward the Earth;
11/02 – Flares M1.6, M1.0; Fast (=< 500 km/s) wind stream; 4 CME can have component toward the Earth *,*;
11/03 – No M/X flare; Fast (=< 500 km/s) wind stream; 10 CME can have component toward the Earth *,*,*;
11/04 – No M/X flare; No fast wind stream; 3 CME can have component toward the Earth;
11/05 – Flares M1.8, M1.6; Fast (=< 500 km/s) wind stream; 10 CME can have component toward the Earth;
11/06 – No M/X flare; Fast (=< 600 km/s) wind stream; 3 CME can have component toward the Earth *
Prev.: Fast wind stream for today and next 1-2 days; for while low (25% M, 05% X) probability of M / X flares next 2 days; also, occasionally some other CME can present a component toward the Earth.

Resumo – Semana de 30 de Outubro a 06 de Novembro

30/10 – Sem "flare" M/X; Vento rápido (< 600 km/s); 4 CME podem ter uma componente para a Terra;
31/10 – Sem "flare" M/X; Vento rápido (< 550 km/s); 3 CME podem ter uma componente para a Terra *,*;
01/11 – "Flares" M1.1, M1.4; Vento rápido (< 500 km/s); 2 CME podem ter uma componente para a Terra;
02/11 – "Flares" M1.6, M1.0; Vento rápido (< 500 km/s); 4 CME podem ter uma componente para a Terra *,*;
03/11 – Sem "flare" M/X; Vento rápido (< 500 km/s); 10 CME podem ter uma componente para a Terra *,*,*;
04/11 – Sem "flare" M/X; Sem vento rápido; 3 CME podem ter uma componente para a Terra;
05/11 – "Flares" M1.8, M1.6; Vento rápido (< 500 km/s); 10 CME podem ter uma componente para a Terra;
06/11 – Sem "flare" M/X; Vento rápido (< 600 km/s); 3 CME podem ter uma componente para a Terra *
Prev.: Vento rápido para hoje e próximos 1-2 dias; baixa probabilidade de "flares" (25% M, 05% X) nos próximos 02 dias; eventualmente alguma outra CME pode apresentar componente dirigida para a Terra.

Solar - WSA-ENLIL

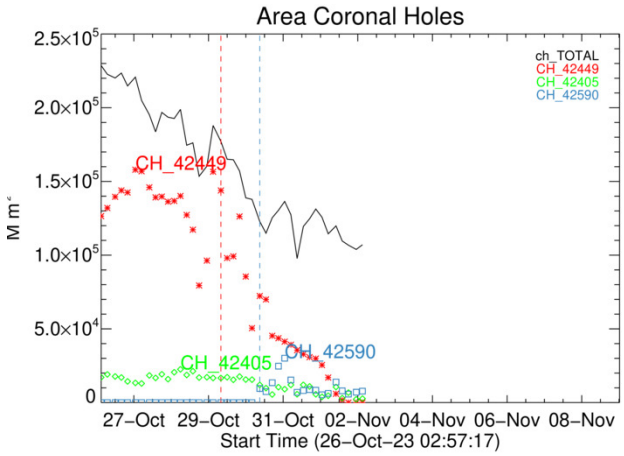
EMC (https://ccmc.gsfc.nasa.gov/donki/):

WSA-ENLIL(CME 2023-10-31 22:12:00 UT)
The simulation results indicate that the flank of CME will reach the DSCOVR mission between 2023-11-03 20:00:00 UT and 2023-11-04 10:00:00 UT.

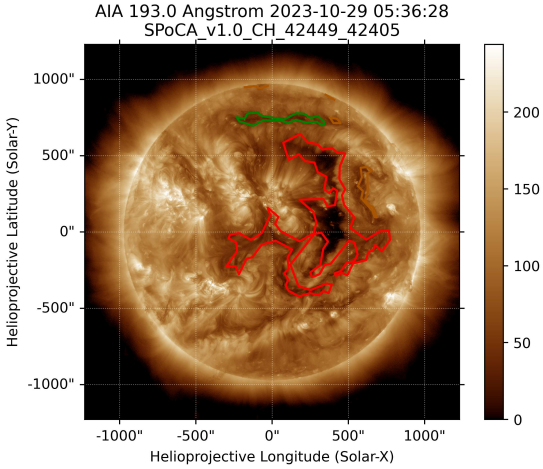
WSA-ENLIL(CME 2023-11-02 03:36:00 UT)
The simulation results indicate that the CME will reach the DSCOVR mission between 2023-11-04 17:28:00 UT and 2023-11-05 07:28:00 UT.

WSA-ENLIL(CME 2023-11-03 05:48:00 UT and 2023-11-02 23:12:00 UT)
The simulation results indicate that the CME will reach the DSCOVR mission between 2023-11-05 01:58:00 UT and 2023-11-05 15:58:00 UT.

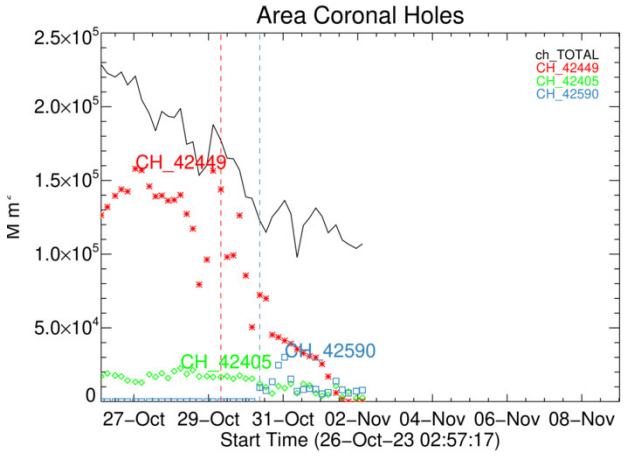
Solar - Coronal holes Spatial Possibilistic Clustering Algorithm (SPoCAS):



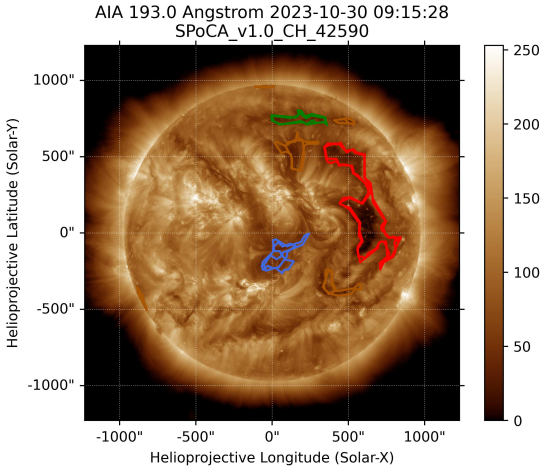
(a) The solid black line depicts the products of the sum of areas for each detection interval performed by SPOCA between October 26 and November 02, 2023.



(b) Above the 193 Å image of the Sun are highlighted coronal holes observed by SPOCA around 05:36 UT on October 29, 2023 (red dot line).

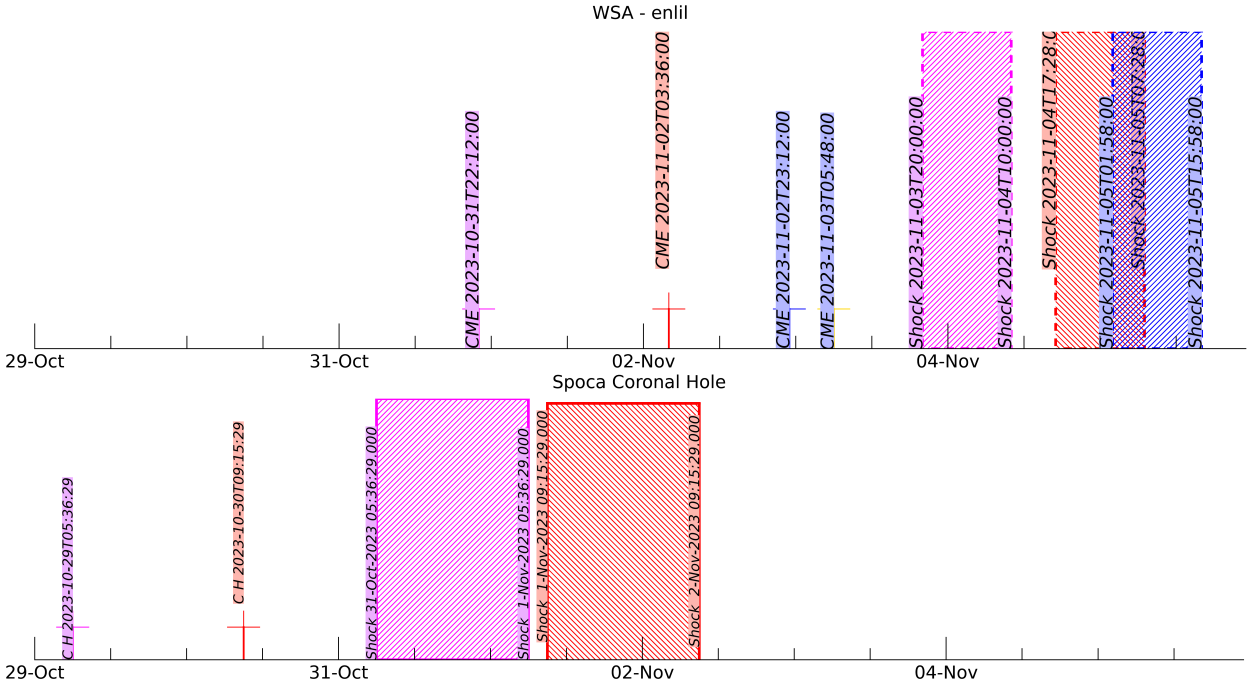


(a) The solid black line depicts the products of the sum of areas for each detection interval performed by SPOCA between October 26 and November 02, 2023.



(b) Above the 193 Å image of the Sun are highlighted coronal holes observed by SPOCA around 09:15 UT on October 30, 2023 (blue dot line).

Solar - WSA - ENLIL and SPoCA



Meio interplanetário – IM – Paulo Ricardo Jauer 30/10 to 06/11 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 November 5th at 12:30 UT of 37.3 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 ; 14);(-31.05; 11)] nT, without the presence of border crossing.

> The bz field component presented a maximum negative peak on November 5th at 15:30 UT of – 17 nT and a positive peak on the same day at 11:30 UT of 25 nT. The bz component on average remained with negative values during the analyzed period.

> The density of the solar wind showed fluctuations with two maximum peaks recorded on 04-05/Nov at 5:30 pm and 2:30 pm of 45 - 50 p/cm³ respectively. During the remainder of the period, the density fluctuated on average below 10 p/cm³.

> The average speed of the solar wind remained above 400 km/s. The speed presented a minimum value on 05/Nov at 06:30 UT of 315 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 positions. It presented strong compressions whose minimum value recorded was on November 4th-05th at 5:30 pm and at 2:30 pm of 6.7- 5.8 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.

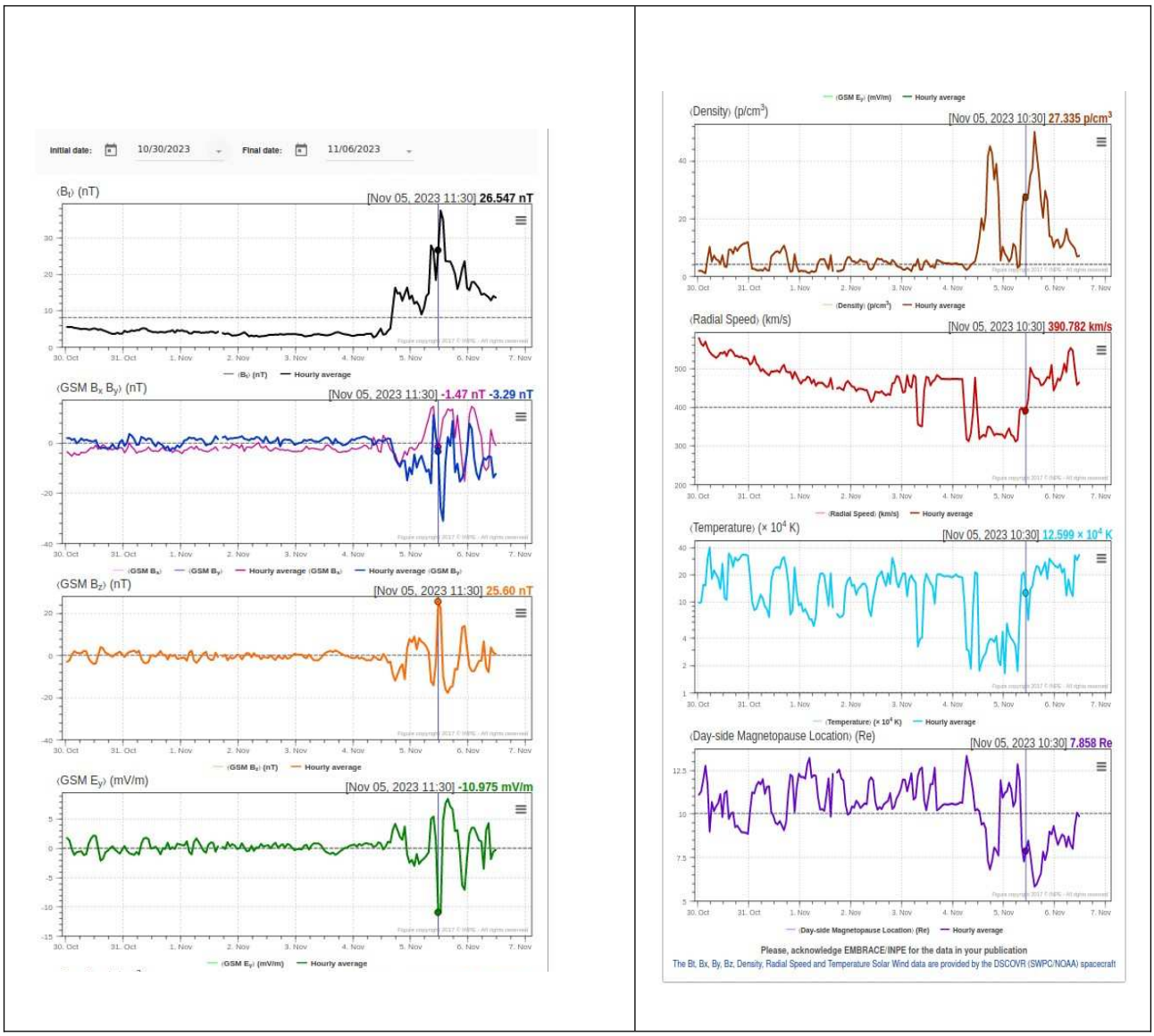
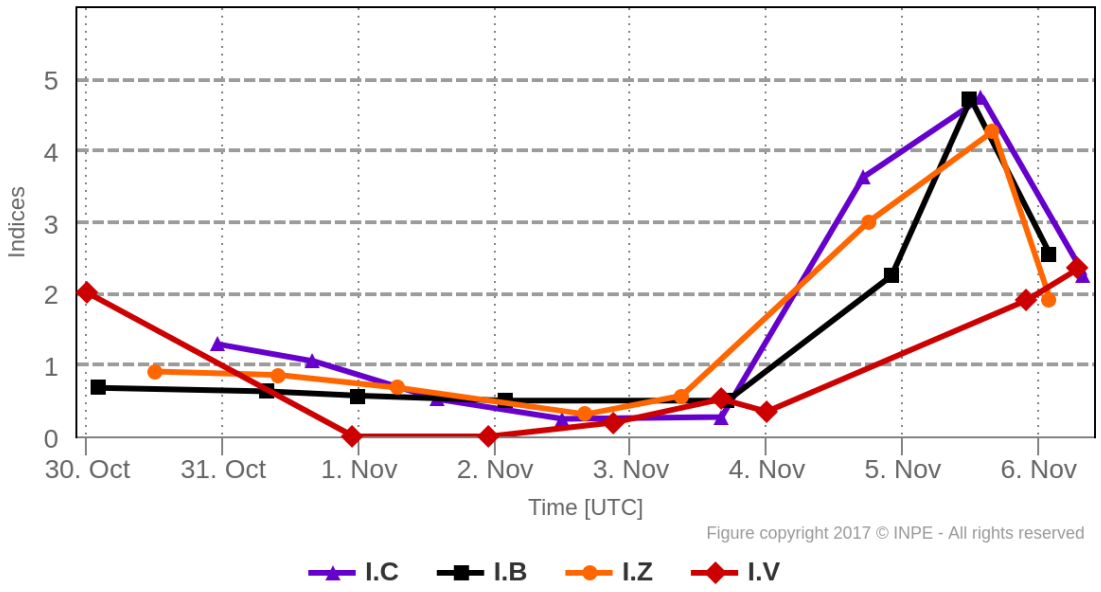


Figure 1 – illustrates a set of parameters observed in the solar wind by the DSCOVR satellite.

Summary of the Interplanetary Medium Indices

Daily maximum - most recent between 30 Oct, 2023 and 6 Nov, 2023



I.C I.B I.Z I.V

EARTH'S RADIATION BELT

Responsible: Ligia Da Silva

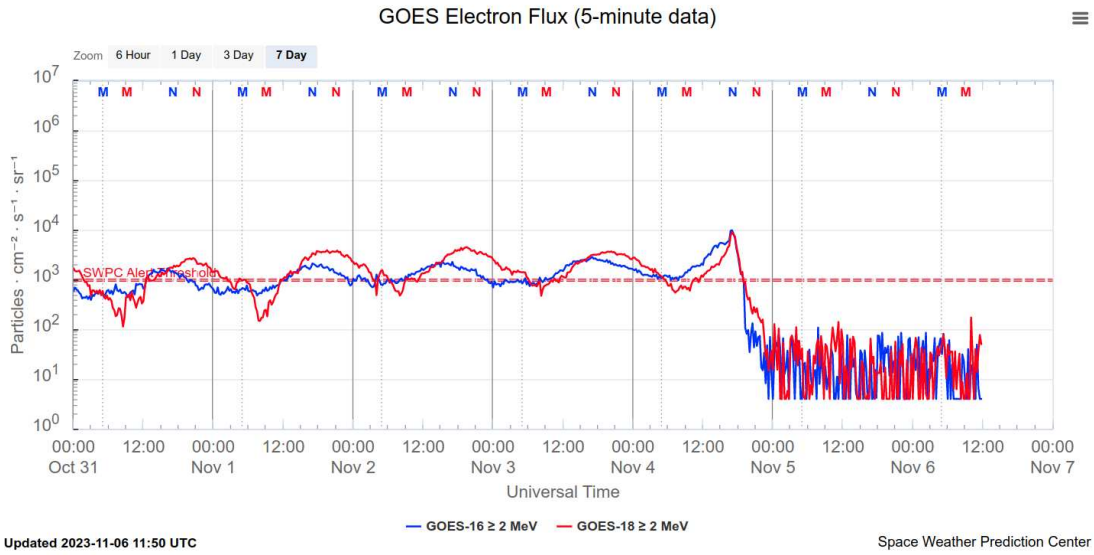


Figure 1: High-energy electron flux (> 2MeV) obtained from GOES-16 and GOES-18 satellite. Source: https://www.swpc.noaa.gov/products/goes-electron-flux

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 around 10^3 particles/(cm^2 s sr) up to the beginning of November 4th, followed by a peak at 17:00 UT that reached 10^4 particles/(cm^2 sr). After this peak in flux, a dropout of more than two orders of magnitude is observed, persisting below 10^2 particles/(cm^2 sr) until today. Variabilities in electron flux occurred during the influence of a coronal mass ejection, which caused a strong magnetic storm followed by auroral expansion in both hemispheres.

Geomagnetic Field / Campo Geomagnético

Summary

In the week of 31/10-06/11, the Embrace magnetometer network data recorded instabilities throughout the week, with emphasis on:

- 04 and 05/11: The magnetometers of the Embrace network recorded a SI of +20 nT followed by a drop of -81 nT at the H-component at VSS. During the recovery a phase of the storm, a second SI of + 27 nT was recorded, followed by a second drop of -200 nT at VSS.
- AE index was active, above 1500 nT on the 05 Nov . The minimum Dst index was -165 nT. The highest Kp of the week was 7o.

Resumo

Na semana de 31/10 a 06/11, os dados provenientes da rede de magnetômetros Embrace registraram instabilidades ao longo de toda semana, com destaque para:

- 04 e 05/11: Os magnetometros da rede Embrace MagNet registraram duas tempestades geomagnéticas subsequentes. No dia 04/11 houve um SI de +20 nT na estação de VSS, seguido de queda na componente H de cerca de -80 nT. Em seguida, durante a fase de recuperação, houve um segundo SI de cerca de +27 nT seguindo de queda na componente H de -200 nT, na estação VSS.
- índice AE esteve ativo, acima de 1500 nT no dia 05. O índice Dst mínimo foi -165 nT. O Kp mais alto da semana foi 7o.

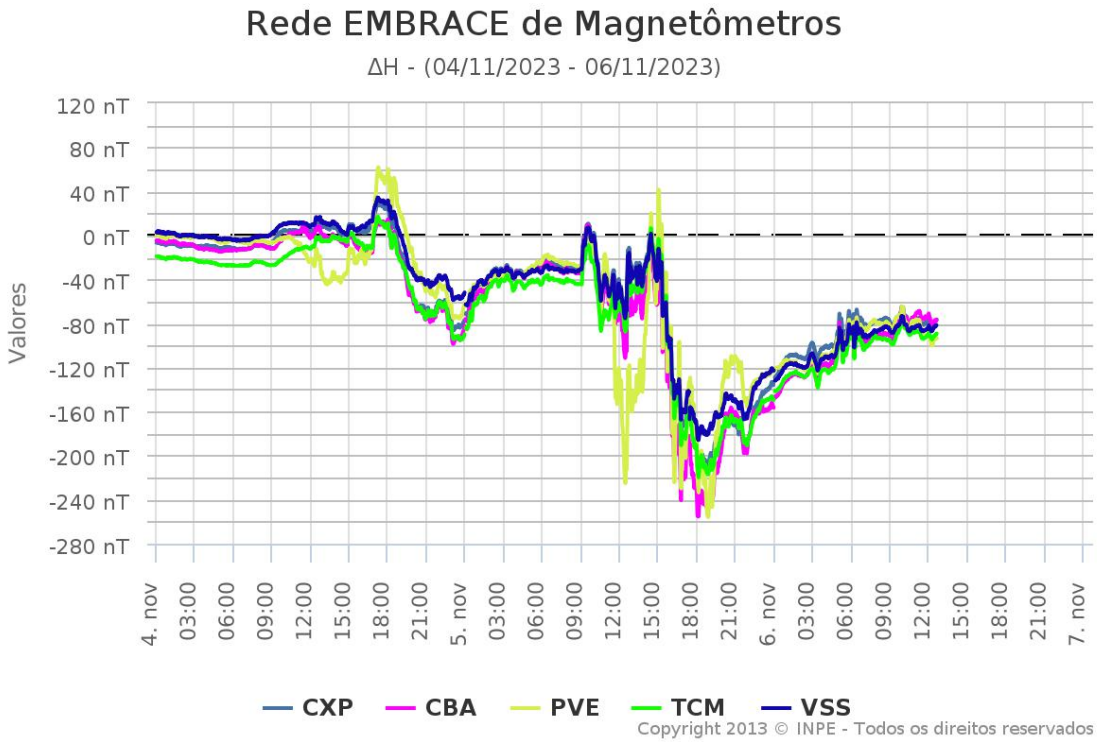


Figura 1.: Variação diurna da componente geomagnética H (nT) das estações da rede Embrace para o período de 31 de Outubro a 05 de Novembro de 2023
Figure 1.: Daily variation of the geomagnetic field from H (nT) measured at Embrace MagNet from 31 October to 05 November 2023

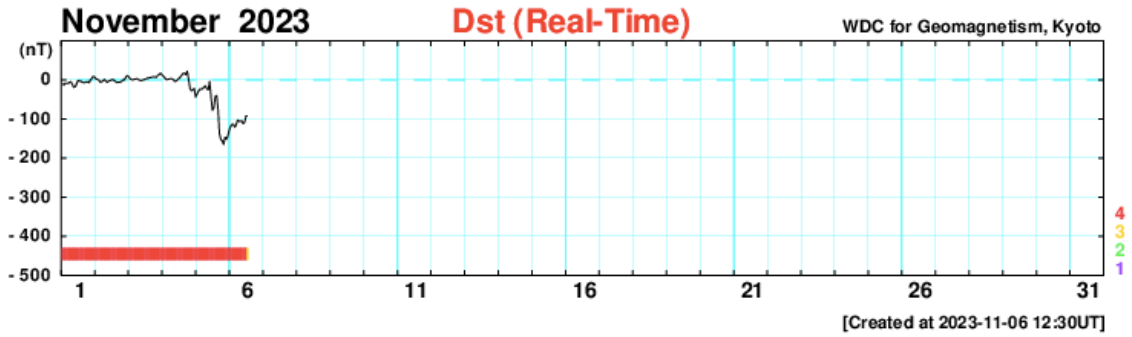
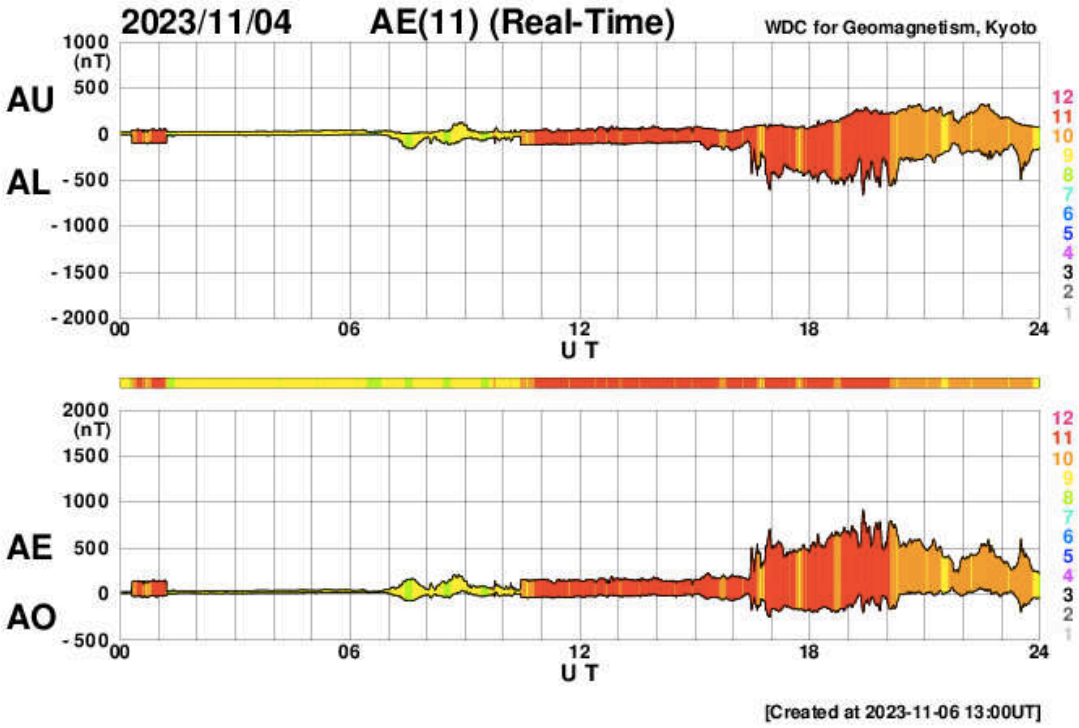


Figura 2.: Índice Dst para o mês de Novembro de 2023.
Figure 2: Dst index for November 2023



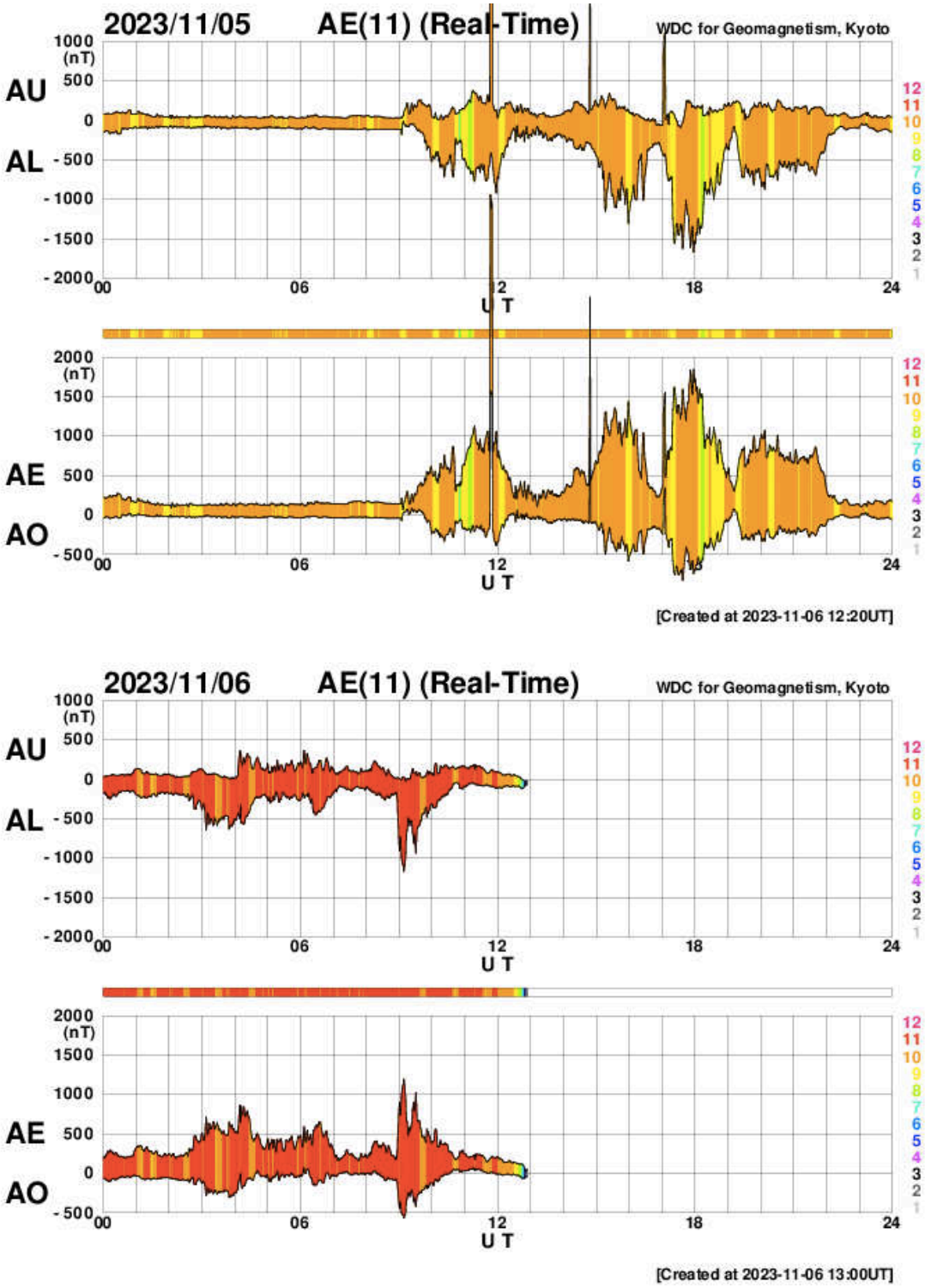


Figura 3.: Índice AE para os dias mais perturbados da semana.
Figure 3.: AE index for the most disturbed days in the current week.

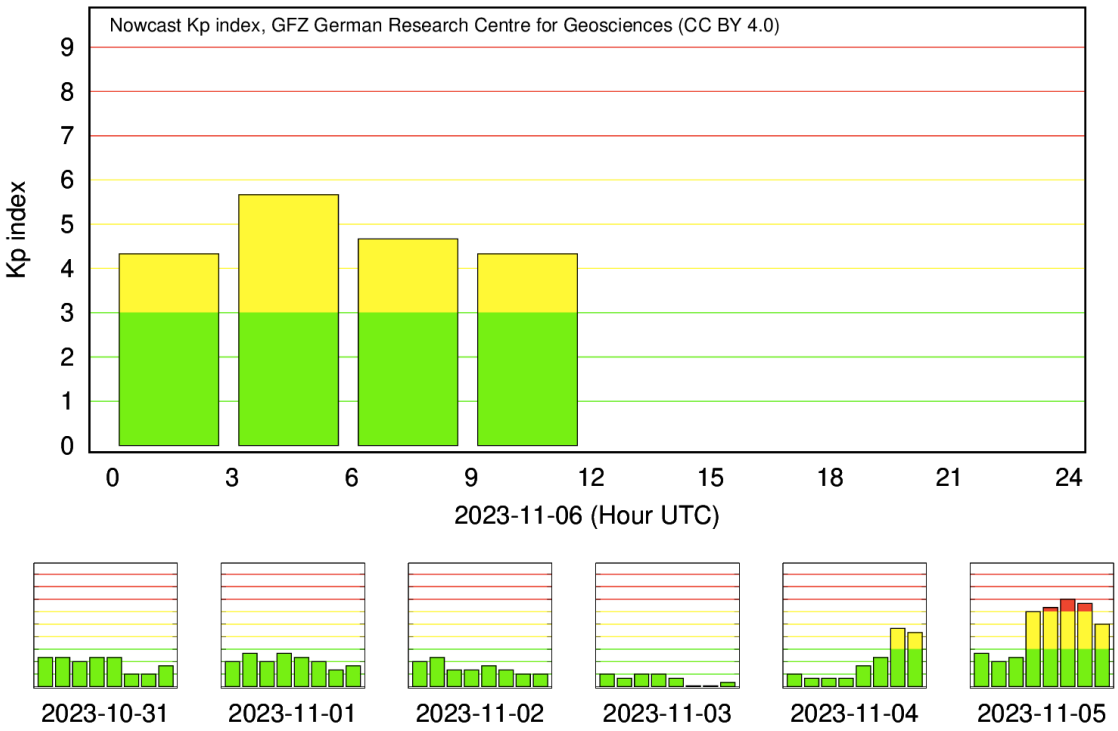


Figura 4.: Índice Kp referente a semana de 31 de Outubro a 06 de Novembro de 2023.
Figure 4: Kp index for the current week (31 October to 06 November 2023)

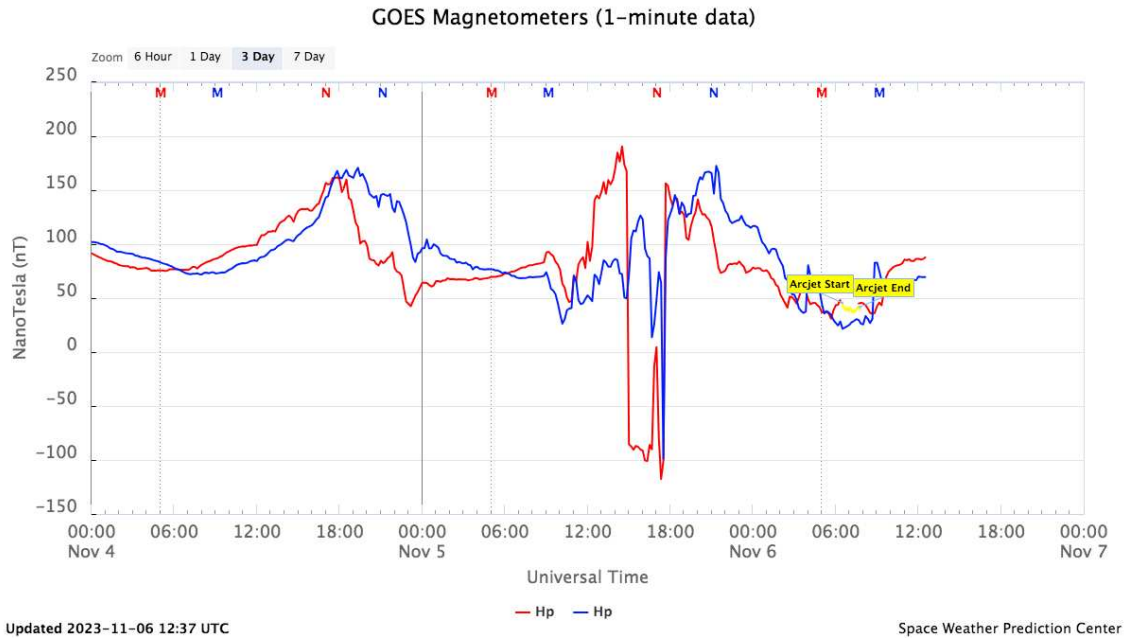


Figura5. Medida de Campo magnético na posição do satélite GOES na semana de 31 de Outubro à 06 de Novembro de 2023
Figure 5.: Magnetic field horizontal component at the GOES satellite orbit through 31 October to 06 November 2023

Ionosfera – Digissonda (Laysa Resende)

Summary

We observed the F spread-F in Fortaleza and Cachoeira Paulista (Figure 1) every day during this week (Figure 1). The Es layers reached a maximum of scale 4 in Cachoeira Paulista and a maximum of scale 5 in Fortaleza (Figure 2).

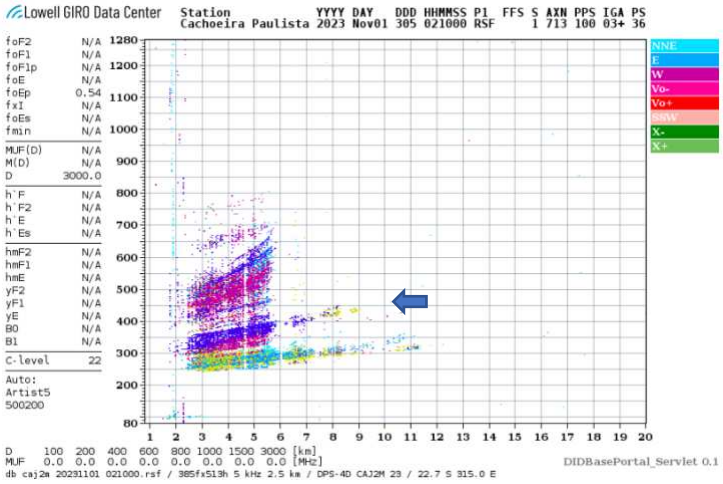


Figure 1 – Ionogram over Cachoeira Paulista, showing the spread F occurrence on November 01, 2023.

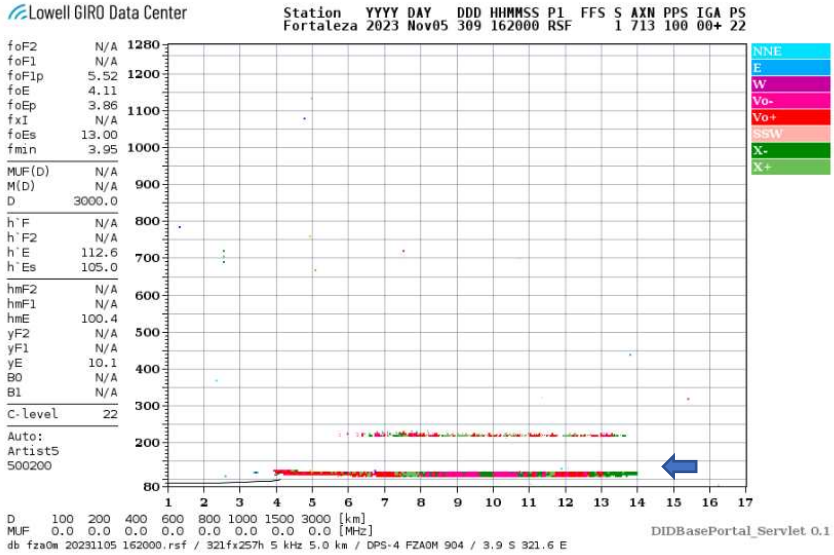


Figure 2 – Ionogram over Fortaleza, showing the Es layer.

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.

This week, UFBA station did not record data in the last two days. The other stations showed S4 values above 0.9 (strong scintillation) between 10/30 and 11/04. There was no evidence of scintillation on 05/11 at stations SLMA, STCB and SJCE (Figure 1); coinciding with the G3 type magnetic storm (Kp = 7). The above indicates a possible suppression of the plasma bubble generating mechanism which, in turn, causes the scintillation events normally detected after sunset on the remaining days of the period analyzed in this report.

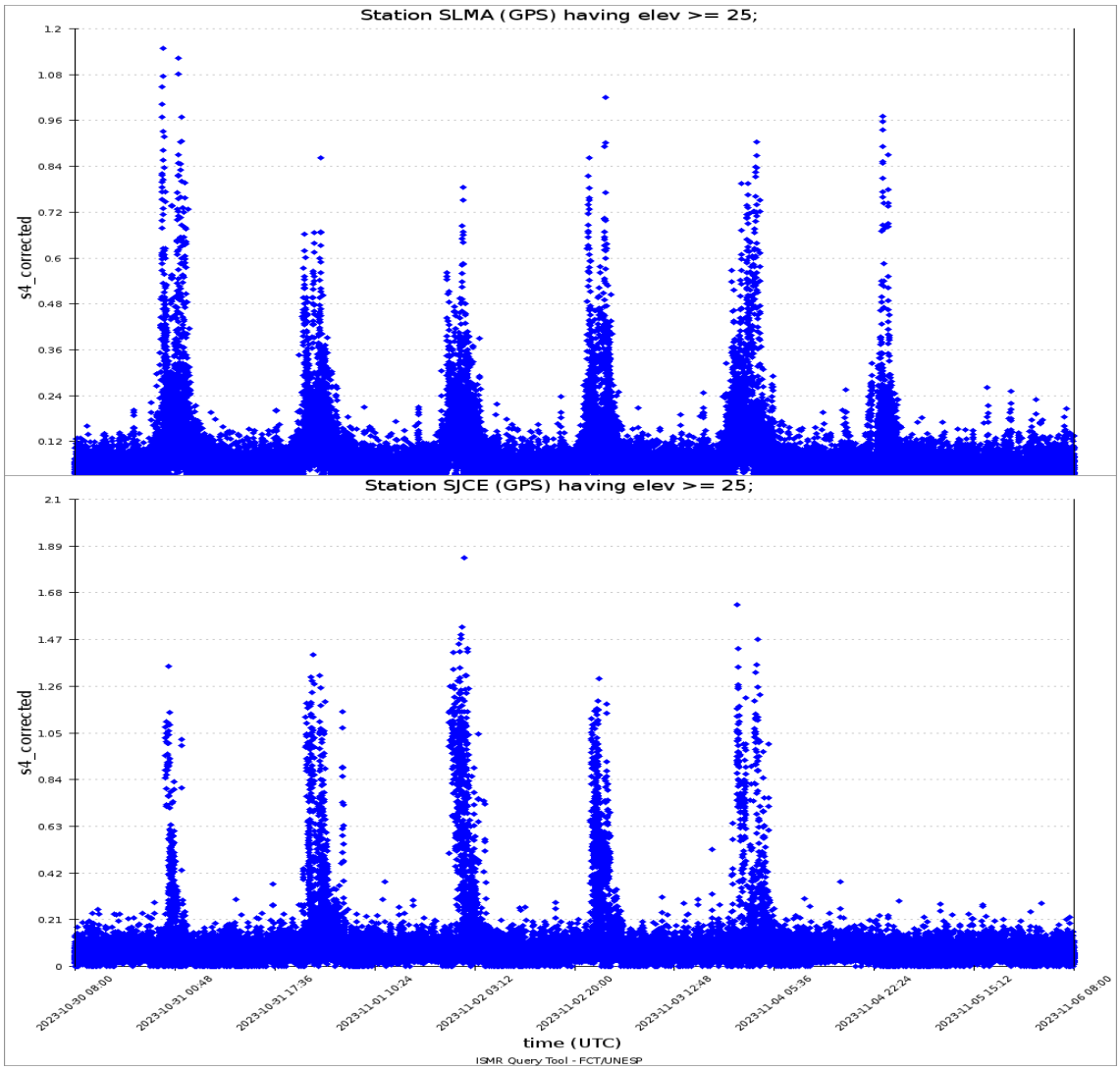


Figure 1 – S4 index values for the GPS constellation measured at SLMA (upper panel) and SJCE (lower panel), during the week 11/30—06. A similar behavior was observed in STCB.

Ionosphere - ROTI
Summary for Week 2286 (October 29 to November 4, 2023)

Carolina de Sousa do Carmo

In the week 2286 (October 29 to November 4, 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)).

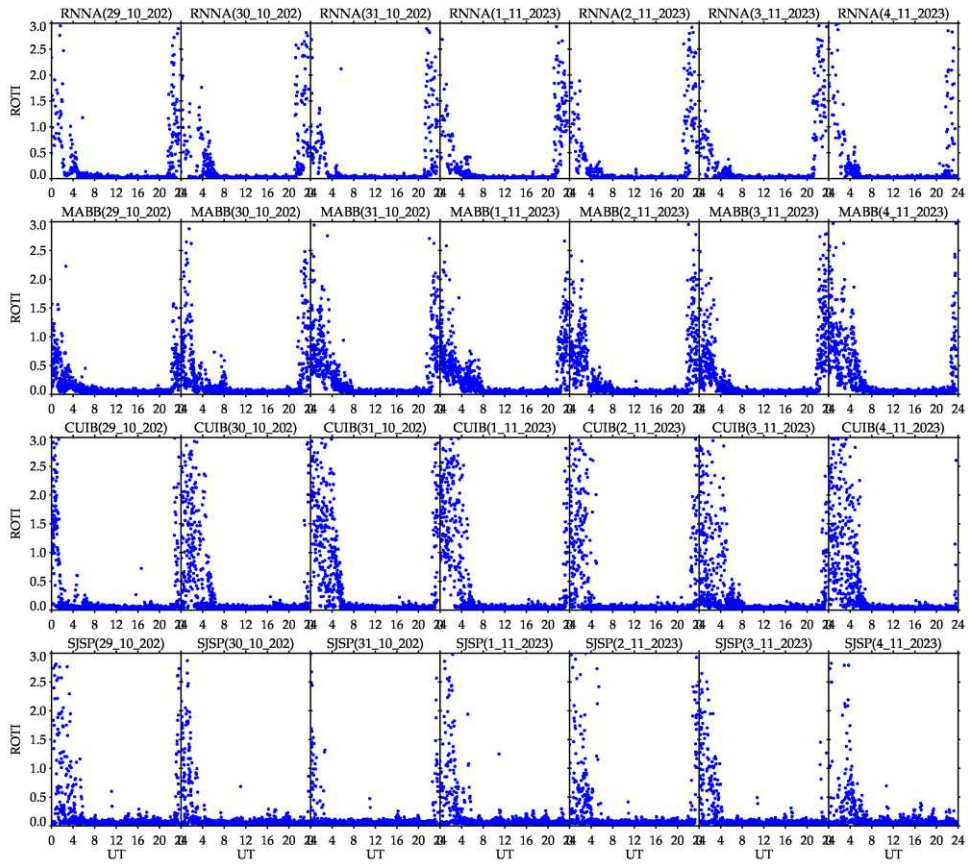


Figure – ROTI time series for four stations in the Brazilian sector (Natal (RNNA), Bacabal (MABB), Cuiabá (CUIB) and São José dos Campos (SJSP)), from October 29 to November 4, 2023.