Briefing Space Weather - 2021/10/04

Briefing Space Weather - 2021/10/04

Sun

Responsible: José Roberto Cecatto

OBS: CME from Sept 23 at 05:48Z, assoc. M2.8-flare; Arrival time on Sept. 26 at 23:00Z
09/27 – Fast (=< 450 km/s) wind stream; 3 CME can have component toward the Earth;
09/28 – Fast (=< 550 km/s) wind stream; 4 CME can have component toward the Earth; CME from Sept 26 at 07:00Z ass
C1.6 flare, SB Pred arrival time Sept 30 / 06:00Z
09/29 – Fast (=< 500 km/s) wind stream; 1 CME can have component toward the Earth;
09/30 – Fast (=< 550 km/s) wind stream; No CME toward the Earth; CME from Sept 28 at 12:36Z, SB Pred arrival from Sept 30 at
15:00Z to Oct 01 at 10:30Z
10/01 – Fast (=< 600 km/s) wind stream; No CME toward the Earth;
10/02 – Fast (=< 450 km/s) wind stream; No CME toward the Earth;
10/03 – Fast (=< 450 km/s) wind stream; No CME toward the Earth.
10/04 – No fast wind stream; no CME toward the Earth;
Prev.: No fast wind stream expected; for while low (5% M, 1% X) probability of M / X flares next 2 days; also, occasionally some CME can present a component toward the Earth.

Responsible: Douglas Silva

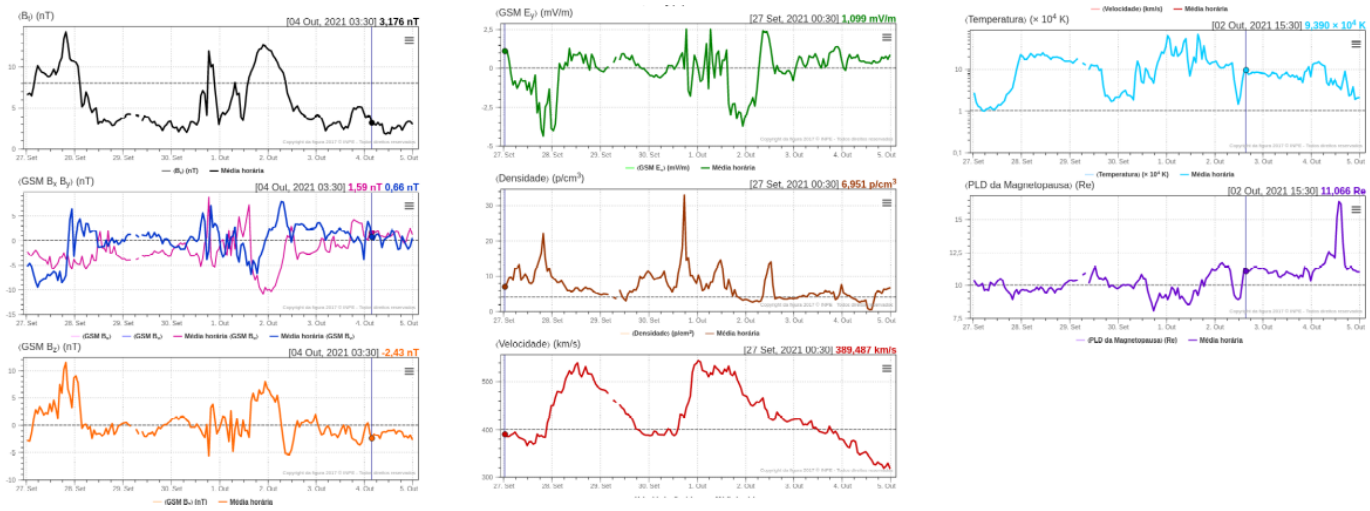
- CME:
  - Type II halo CME was observed at the beginning of September 28, according to LASCO coronagraph images.
- WSA-ENLIL (Prediction for CME 2021-09-26T12:36Z)
  - The simulation indicates that the CME arrival forecast will occur on the following date: 2021-09-30T06:00Z (-7h, +7h)
- WSA-ENLIL (Prediction for CME 2021-09-28T07:00Z)
  - The simulation indicates that the CME arrival forecast will occur on the following date: 2021-10-01T01:29Z (-10h, +7,5h)
- WSA-ENLIL (Prediction for CME 2021-09-26T18:00Z)

- The simulation indicates that the CME arrival forecast will occur on the following date: 2021-09-30T06:00Z (-7.0h, +7.0h)

- Coronal holes:
  - A north polar extension of coronal hole 34544 was observed between 17 and 21 UT on 28 September.

Interplanetary Medium

Responsible: Paulo Jauer



Radiation Belts

Responsible: Ligia Alves da Silva

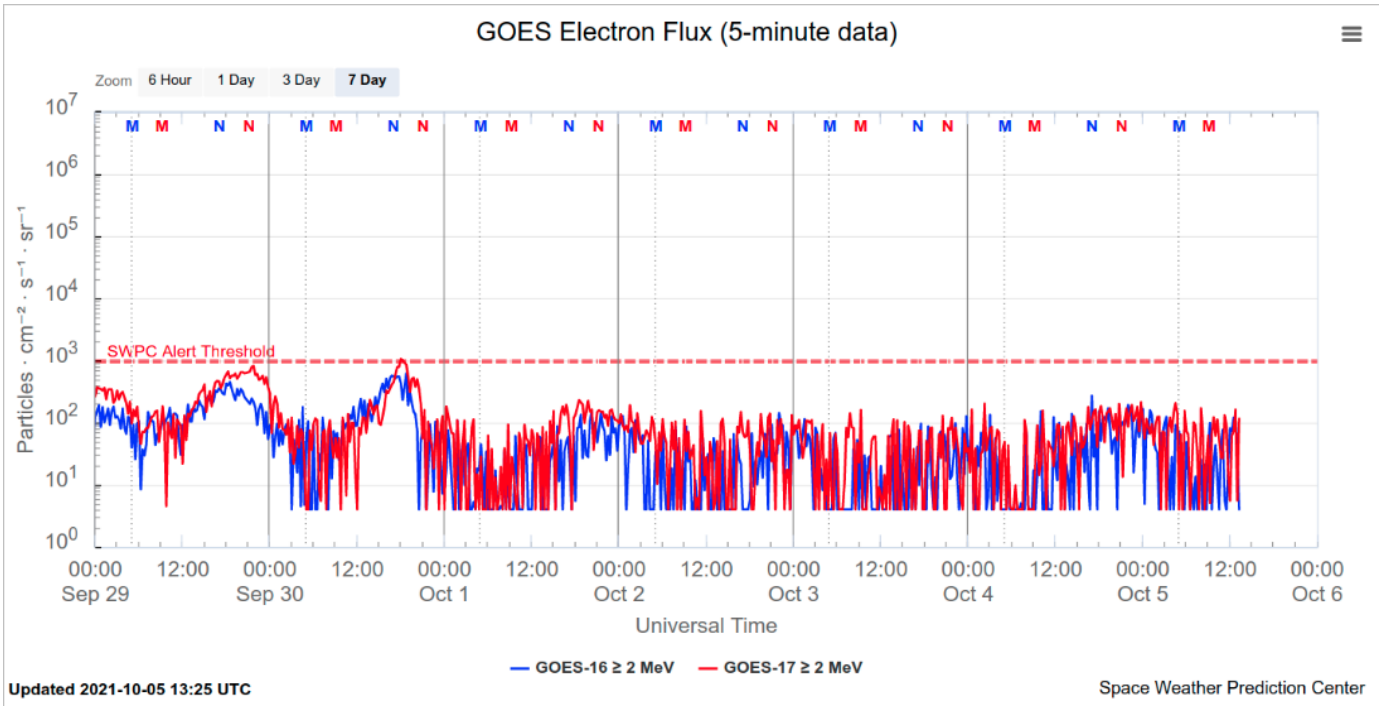


Figure 1: High-energy electron flux (> 2MeV) obtained from GOES satellite. Source: https://www.swpc.noaa.gov/products/goes-electron-flux

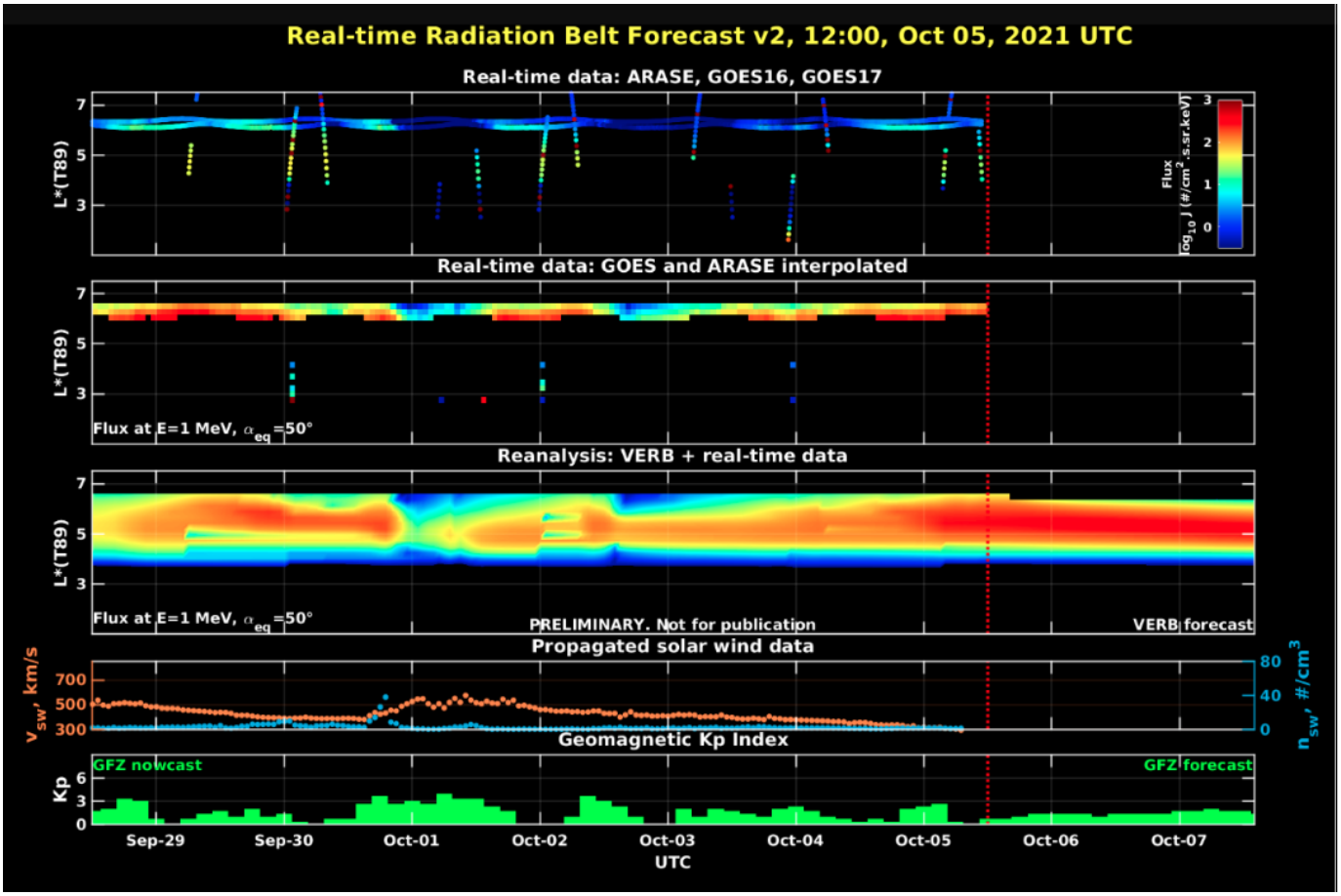


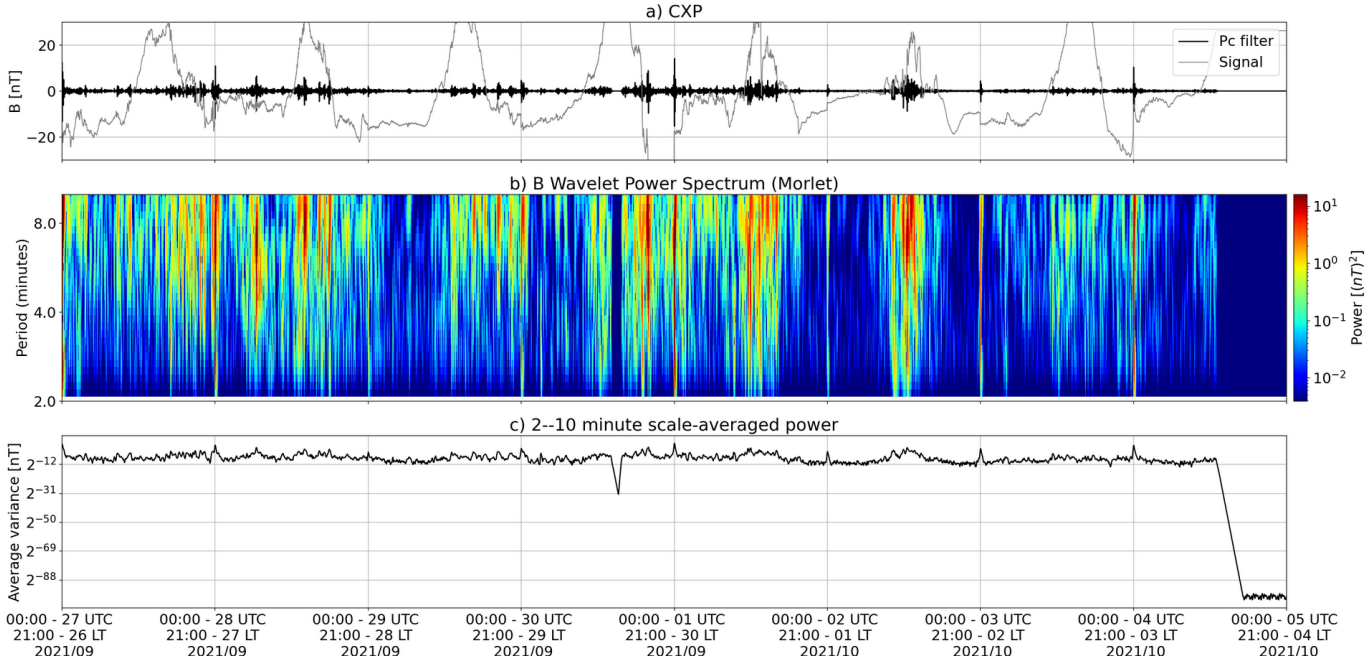
Figure 2: high-energy electron flux data (real-time and interpolated) obtained from ARASE, GOES 16 and 17, POES satellites. Reanalysis's data from VERB code and interpolated electron flux. Solar wind velocity and proton density data from ACE satellite. Source: Fonte: https://rbm.epss.ucla.edu/realtime-forecast/

High-energy electron flux (>2 MeV) in the outer boundary of the outer radiation belt obtained from geostationary satellite data GOES-16 and GOES-17 (Figure 1) is to be close to 103 particles/(cm2 s sr) on September 20-30th, with electron flux decrease at the end of September 30th. A slight electron flux increase is observed at 15:00 UT on October 1st, remaining confined below 102 particles/(cm2 s sr) until today (October 6th). This variability was observed at the outer boundary of the outer radiation belt.

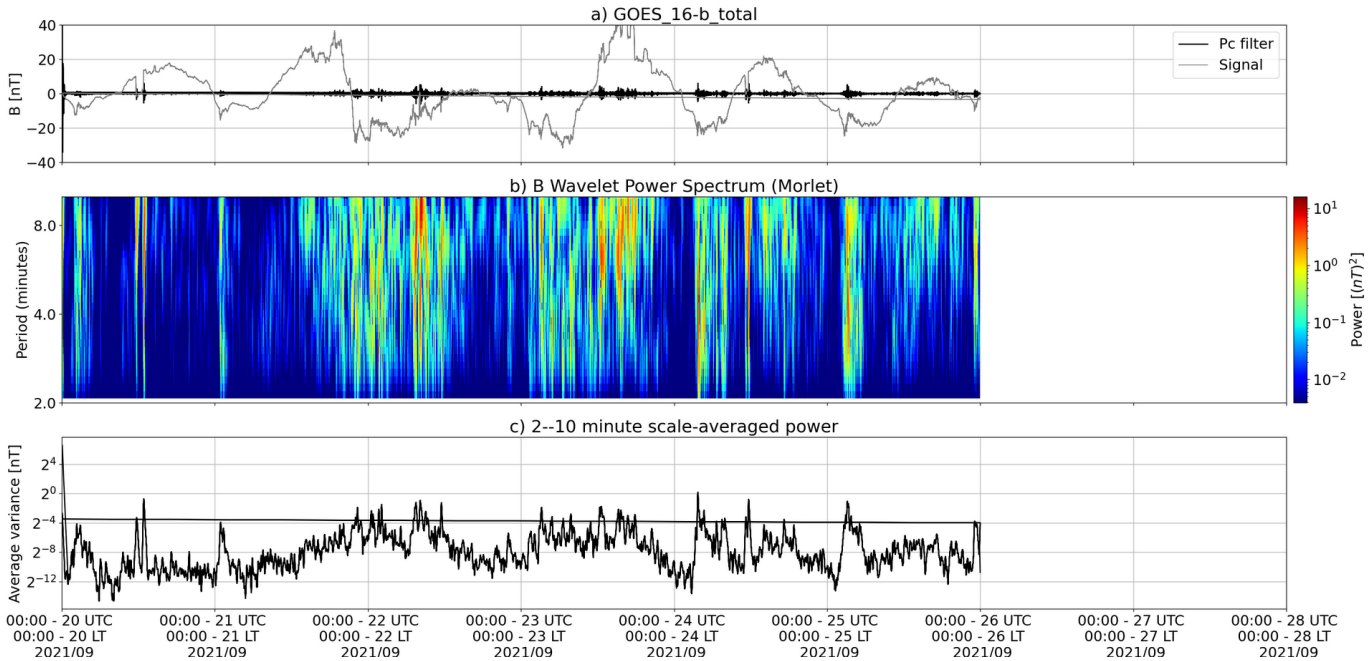
The GOES-16, GOES-17, and Arase satellite data are analyzed and interpolated to observe the high-energy electron flux variability (1 MeV) in the outer radiation belt (Figure 2). Additionally, the VERB code rebuilds this electron considering the Ultra Low Frequency (ULF) waves' radial diffusion. The electron flux decrease observed on September 30th reaches L-shell > 3.5 and concomitantly with ULF wave activities.

ULF waves in the magnetosphere

Responsible: José Paulo Marchezi



a) signal of the total magnetic field measured at the CXP Station of the EMBRACE network in gray, together with the fluctuation in the range of Pc5 in black. b) Wavelet power spectrum of the filtered signal. c) Average spectral power in the ranges from 2 to 10 minutes (ULF waves).



a) signal of the total magnetic field measured at the GOES 16 satellite in gray, together with the fluctuation in the range of Pc5 in black. b) Wavelet power spectrum of the filtered signal. c) Average spectral power in the ranges from 2 to 10 minutes (ULF waves).

- The pulsations followed the negative fluctuations of the interplanetary magnetic field Bz, on 28/09, 01, and 02/10.
    - On the 28th and 29th of October the fluctuations are continuous and with two defined frequency bands (high and low). Following the reduction in solar wind speed in the period.
    - On Days 01 and 02, the fluctuations begin with an increase in the dynamic pressure of the solar wind and a period of polarity shift in Components Bx and By. They are suppressed when the

IMF Bz Component goes north and reappears when the component returns to the south.

- These changes occurred with moderate auroral activity and some variations in electron flux, mainly reduction during impulsive pulses of day 02/10

Geomagnetism

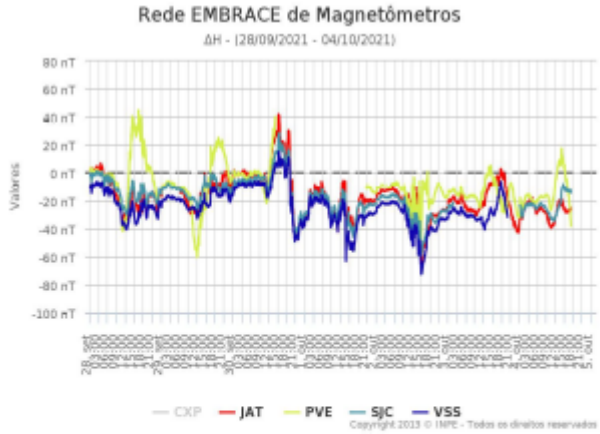
Responsible: Livia Ribeiro Alves

Geomagnetic Report - week of September 29 to October 04.

- Data from the Embrace magnetometer network showed instabilities throughout the period, with some highlighted events:
  30/09 increase in the H component at all stations, followed by a decrease to -40 nT
  01/10 decrease in the H component at all stations down to -60 nT
  02/10decrease in the H component at all stations down to -70 nT
- Geomagnetic activity ranged from quiet to unsettled during the week, with the Dst index reaching its lowest value of -32 nT on October 1st.

The highest Kp of the week was 4o on October 2nd

- The auroral activity remained quiet throughout the period, with an increase on 09/30, 10/01, and 10/02.
- Magnetic field measured in the GOES satellite's orbit showed several disturbances in the period, especially on September 30th.


Rede EMBRACE de Magnetômetros
ΔH - (28/09/2021 - 04/10/2021)
Valores
CXP
JAT
PVE
SJC
VSS
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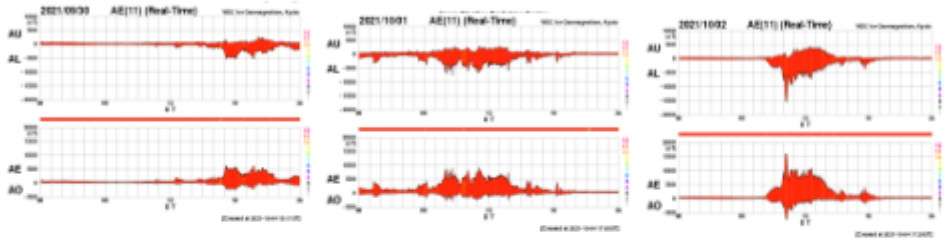
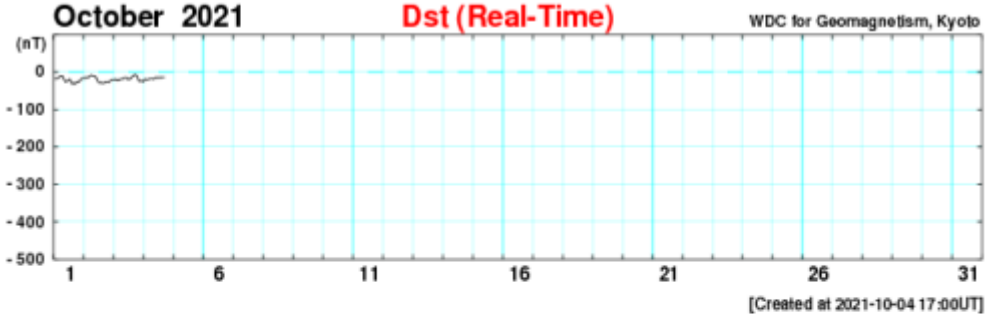
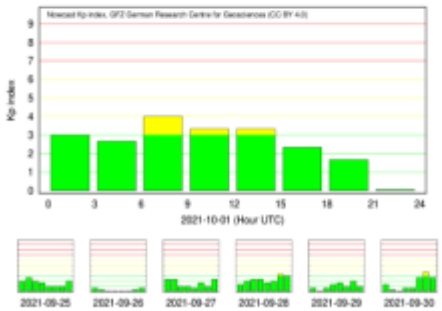
GOES Magnetometers (1-minute data)
Universal Time


2021/09/30 AE(11) (Real-Time)
2021/10/01 AE(11) (Real-Time)
2021/10/02 AE(11) (Real-Time)
AU
AL
AE
AO


September 2021
Dst (Real-Time)
WDC for Geomagnetism, Kyoto
(nT)
[Created at 2021-10-04 15:05UT]


October 2021
Dst (Real-Time)
WDC for Geomagnetism, Kyoto
(nT)
[Created at 2021-10-04 17:00UT]


Kp index
2021-10-01 (Hour UTC)
2021-09-25
2021-09-26
2021-09-27
2021-09-28
2021-09-29
2021-09-30

Ionosphere

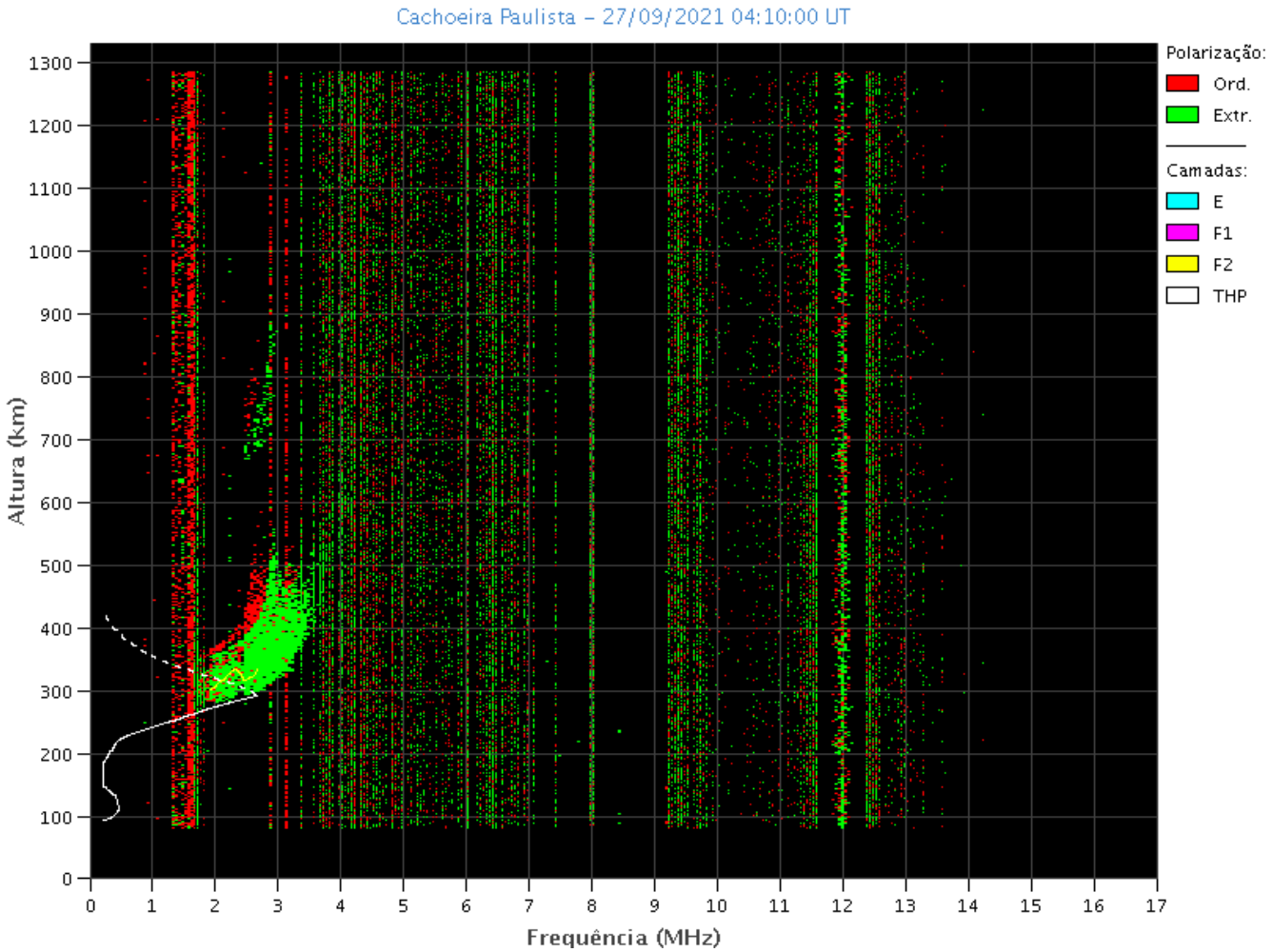
Responsible: Laysa Resende

Boa Vista

(NO DATA)

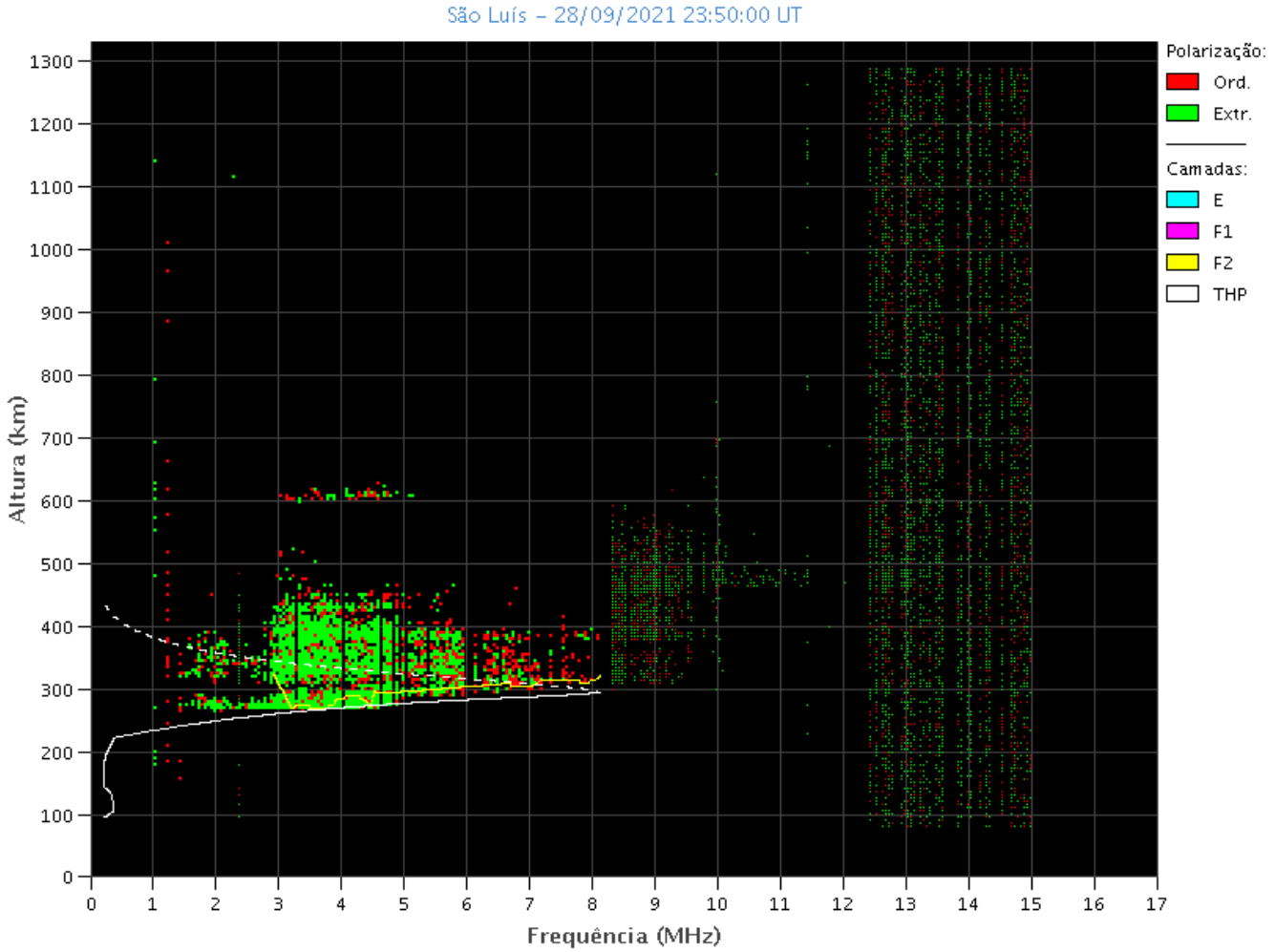
Cachoeira Paulista

- There were spread F during all days in this week.
- The Es layers reached scale 2 during all day in the week.



São Luis

- There were spread F during all days in this week.
- The Es layers reached scale 2 during all day in the week.



Cintilation S4

Responsible: Siomel Savio Odriozola

In this report on the S4 scintillation index, data from the SLMA stations in São Luís / MA, STSN in Sinop /MT, UFBA, in Bahía / BA and SJCE in São José dos Campos / SP were presented. The S4 index tracks the presence of irregularities in the ionosphere having a spatial scale ~ 360 m.

The 4 stations showed moderate and strong values of the S4 index on different days of the analyzed period. In the case of the UFBA and SJCE, on the 28-29/09 and 29-30/09 S4 index values above 1 were recorded (Figure 1 and 2). In the case of SLMA and STSN stations, S4 values above 0.3 were recorded every night of the week except on the night 30-01/10 (Figure 3).

The constant presence of scintillation activity in the stations analyzed in this report, located in different parts of the Brazilian territory, shows that the beginning of the plasma bubble season has been quite intense.

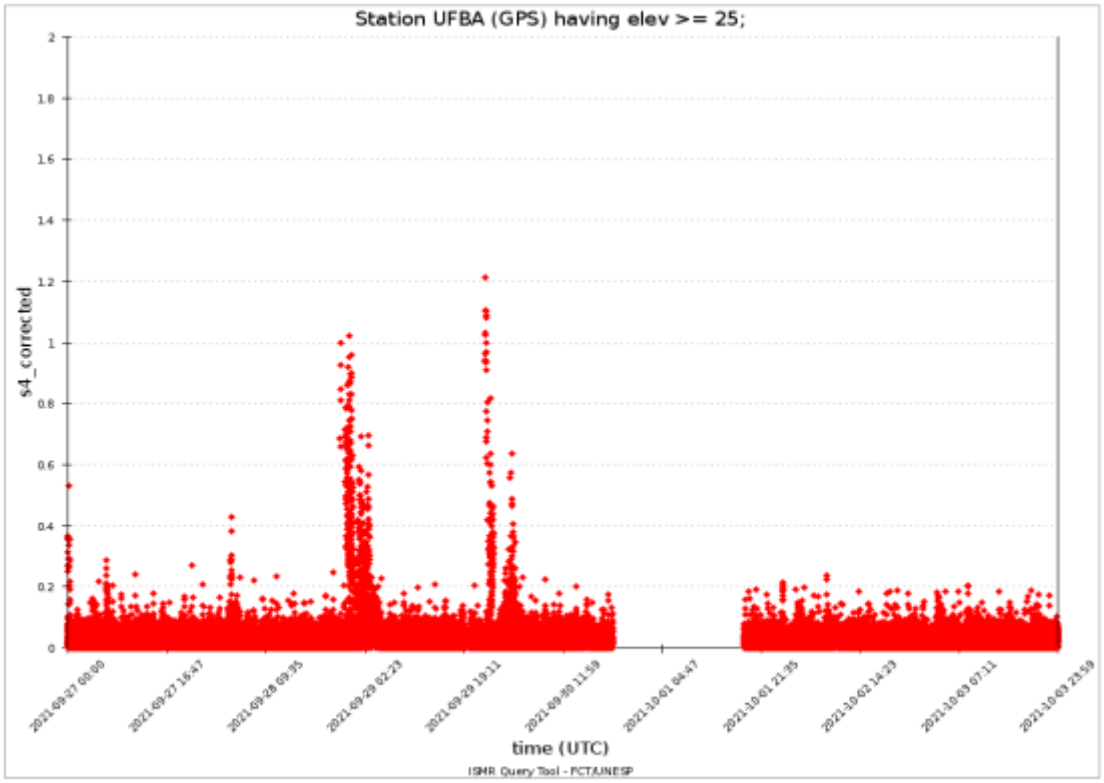


Figure 1: Values of the S4 index for the GPS constellation between September 27th and October 3th for the UFBA station in Salvador\ BA.

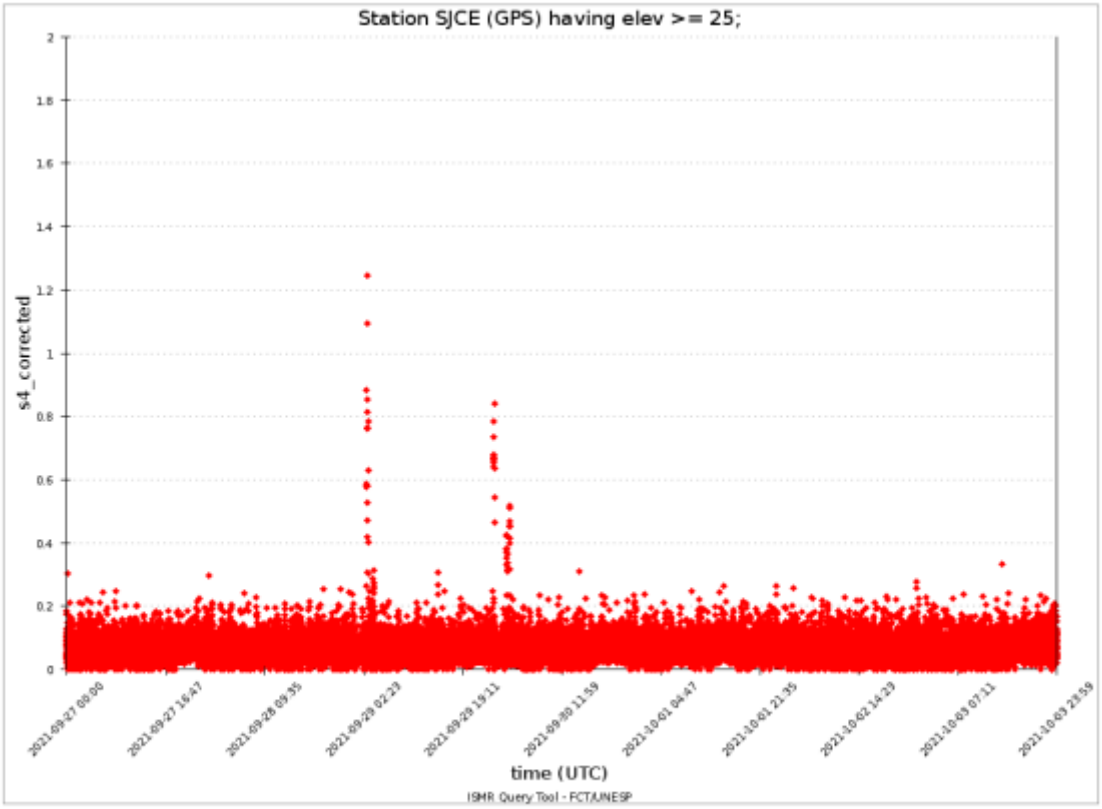


Figure 2: Values of the S4 index for the GPS constellation between September 27th and October 3th for the SJCE station in São José dos Campos\ SP.

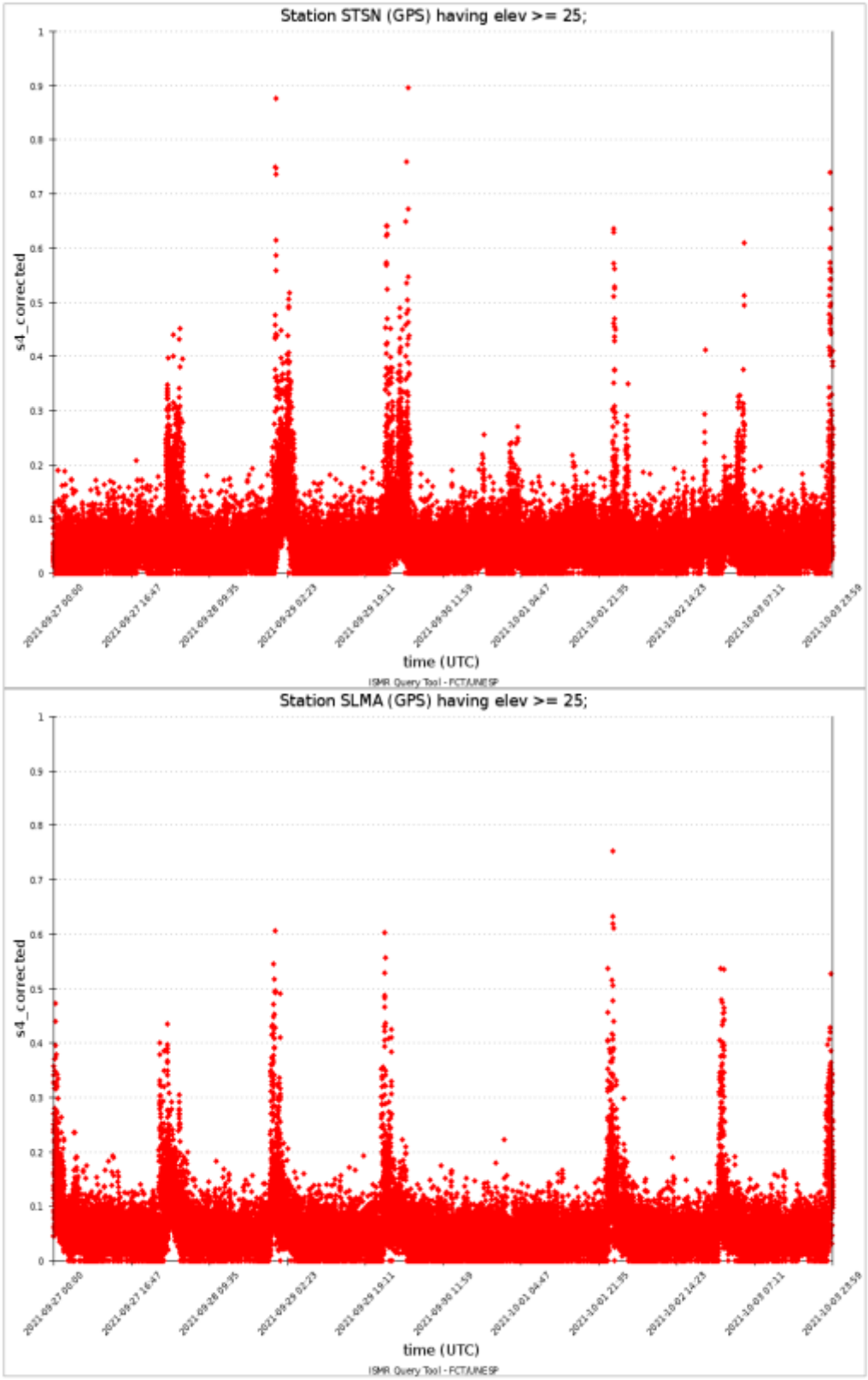


Figure 3: Values of the S4 index for the GPS constellation between September 27th and October 3th for the stations SLMA (upper panel) and STSN (lower panel).