Briefing Space Weather - 2021/10/25

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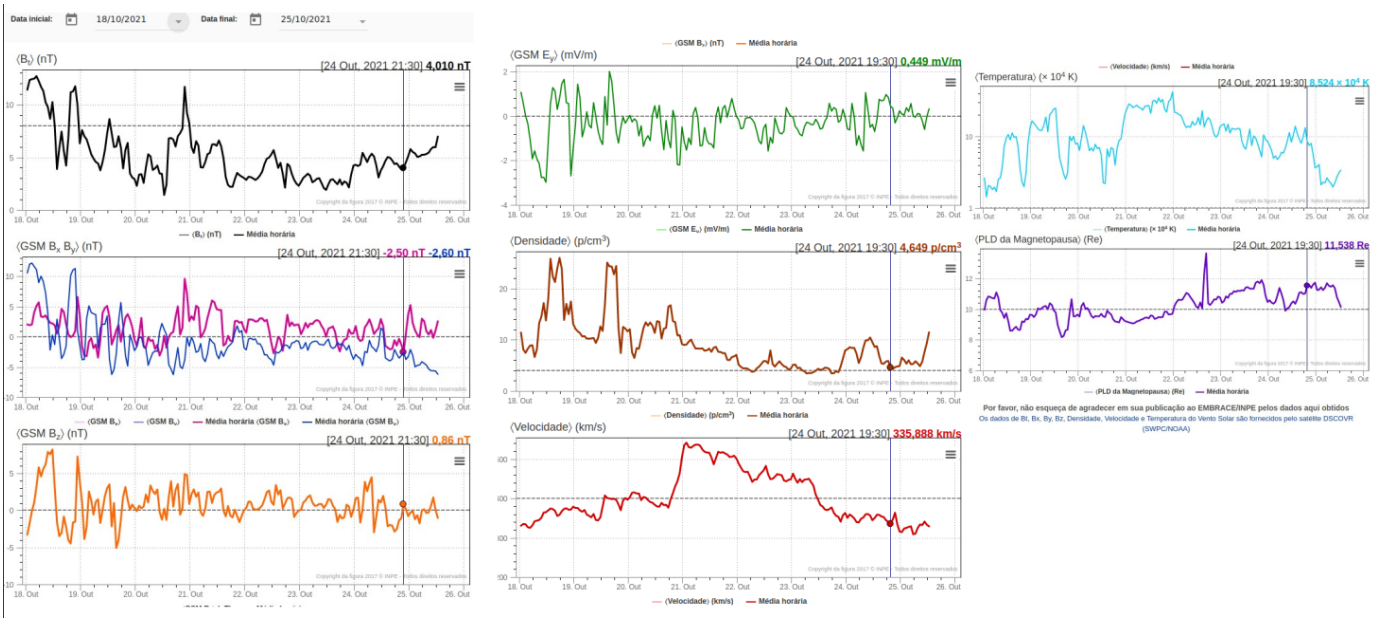
Sun

Responsible: Douglas Silva

- CME:
  - Partial halo coronal mass ejection was observed around 10:48 UT on October 23 in LASCO imagery.
- WSA-ENLIL (Prediction for CME 2021-10-17T09:36Z)
  - The simulation indicates that the CME arrival forecast will occur on the following date: 2021-10-20T04:17Z (-7.0h, +7.0h)
- Coronal holes (SPOCA):
  - Coronal hole 34590 observed in the southern hemisphere between October 18th and 23rd presented an initial area of 60100.

Interplanetary Medium

Responsible: Paulo Jauer



- The interplanetary region in the last week showed a moderate/low level of plasma perturbations due to the passage of the CME and HSS structures identified by the DISCOVERY satellite in the interplanetary region along with sector boundary crossing.
- The total Bt magnetic field showed oscillations, remaining below 13nT, with peaks on the folowing days: Oct 18, Oct 18, Oct 12 and Oct 20 at 4:30, 9:30 pm, 7:30 am and at 9:30 pm UT.
- The IMF Bz component oscillated with 2 positive peaks on Oct 18 at 11:30 am UT 8.22 nT and 7.27nT at 22:30. showed a change in orientation with a minimum recorded value of - 5.06 nT.
- There was a clear occurrence of sector switching in the BxBy components, on Oct 20 at 13:30 and a significant peak on Oct 20 at 21:30 UT.
- The density of Vsw, presented oscillations with 2 peaks on October 18th at 13:30 UT and at 17:30 UT of 25.8 and 26.01 p/cm³. It also showed a peak on October 19 at 2:30 pm of 25.08 p/cm³ and on October 20 at 6:30 pm of 16.7 p/cm³.
- The solar wind speed Vsw, showed an increase above 400km/s on Oct/20 at 18:30 UT, 397.5 km/s. It presented a maximum peak on October 21 at 01:30 at 541.68 km/s.
- The subsolar Mp showed maximum compression on Oct 19 at 15:30 of 8.17 Re. It remains below 10 Re until Oct 22 at 00:30 UT, where it starts to oscillate with values greater than the typical 10 Re position.

Radiation Belts

Responsible: Ligia Alves da Silva

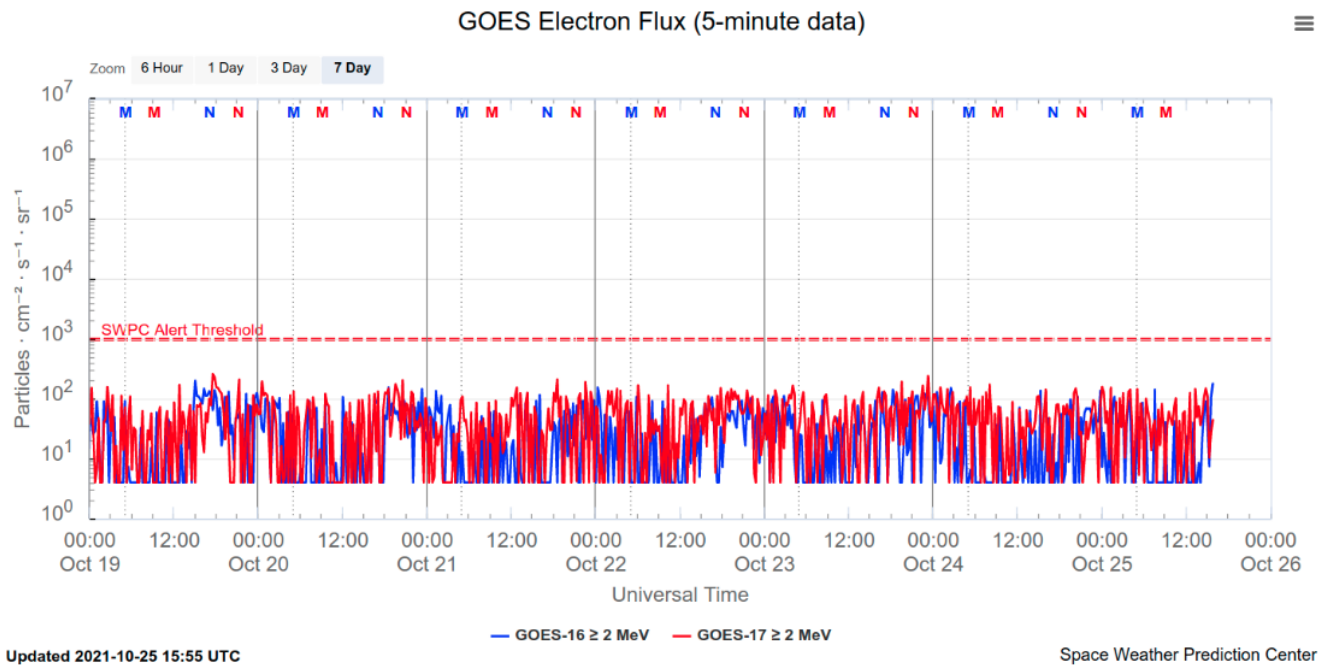


Figure 1: High-energy electron flux (> 2MeV) obtained from GOES satellite. Source: https://www.swpc.noaa.gov/products/goes-electron-flux

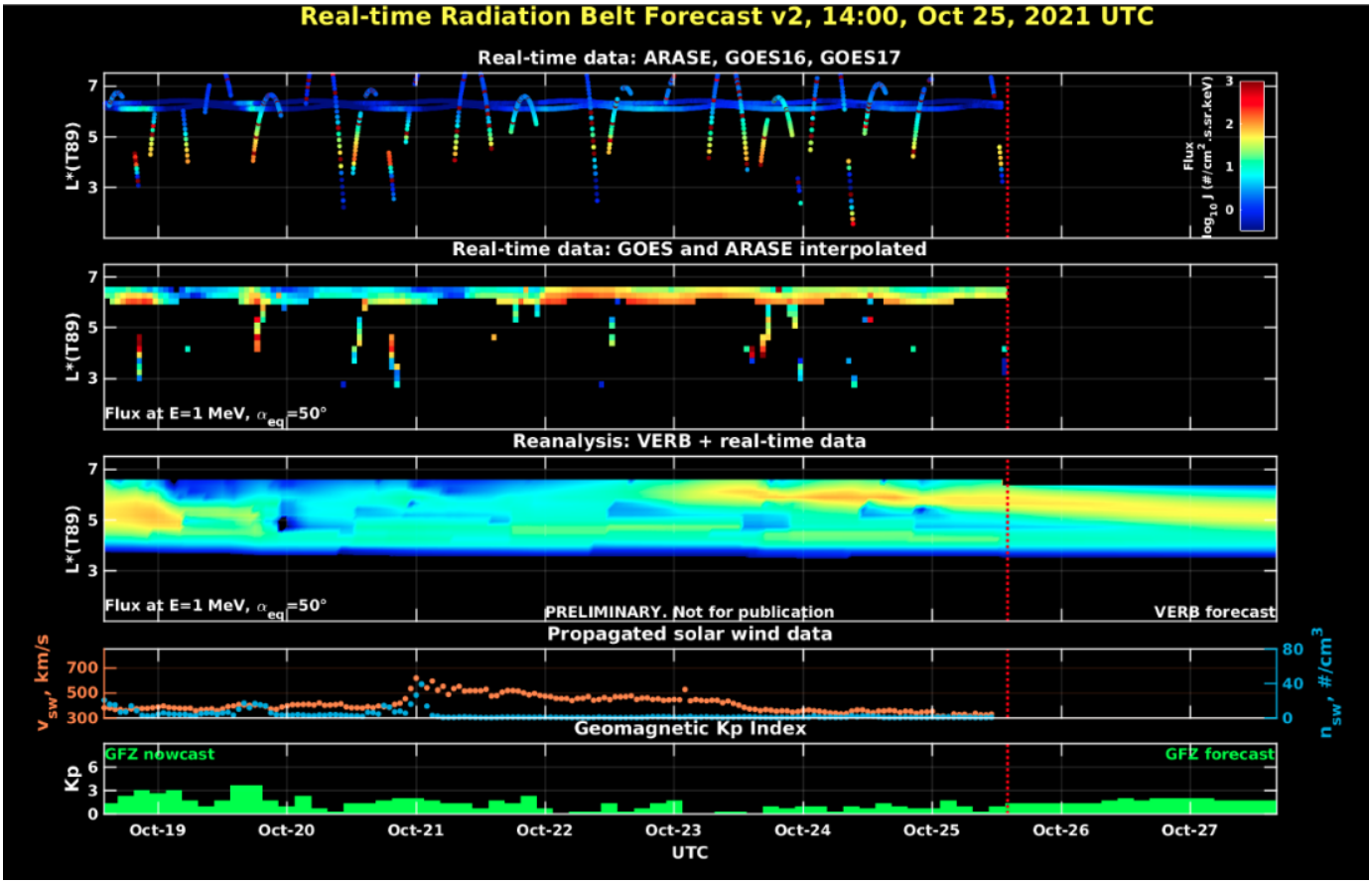


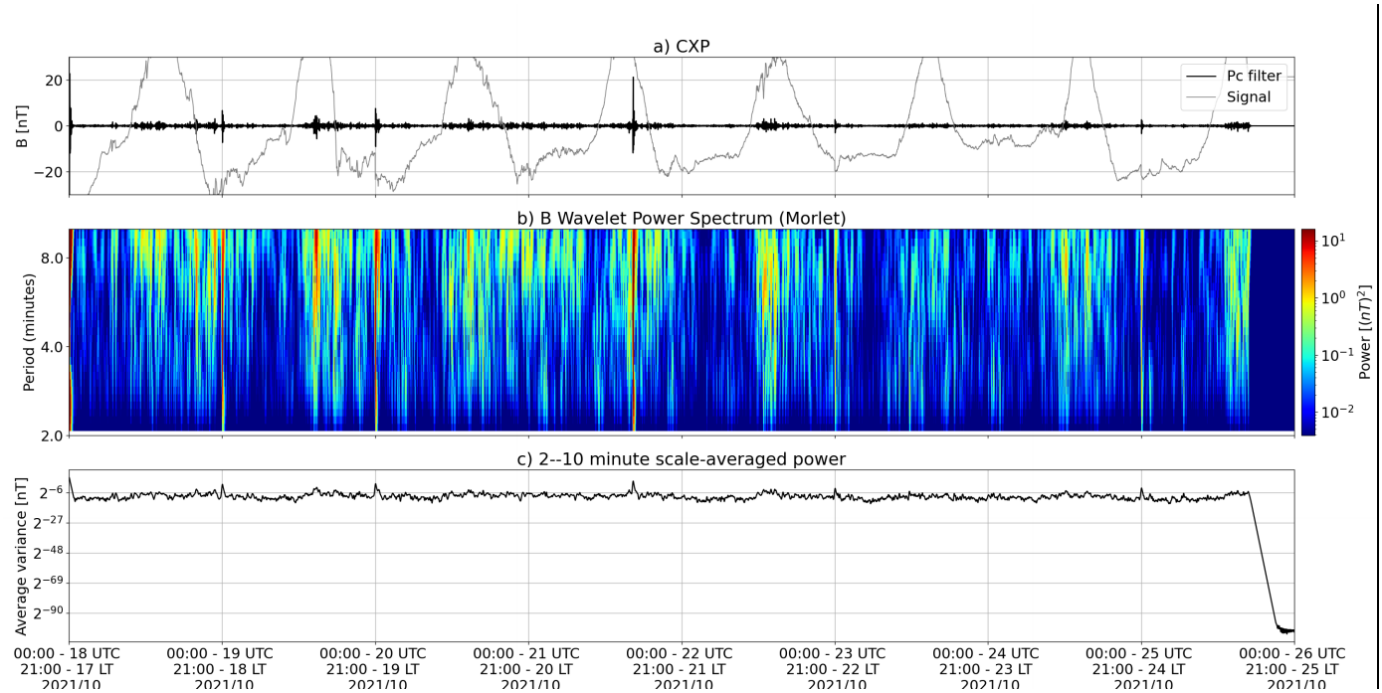
Figure 2: high-energy electron flux data (real-time and interpolated) obtained from ARASE, GOES 16 and 17, POES satellites. Reanalysis's data from VERB code and interpolated electron flux. Solar wind velocity and proton density data from ACE satellite. Source: Fonte: https://rbm.epss.ucla.edu/realtime-forecast/

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 102 particles/(cm2 s sr) all the days analyzed, showing slight electron flux increase on October 19th, 20th and 22nd. These electron flux increase did not exceed the threshold of 102 particles/(cm2 s sr).

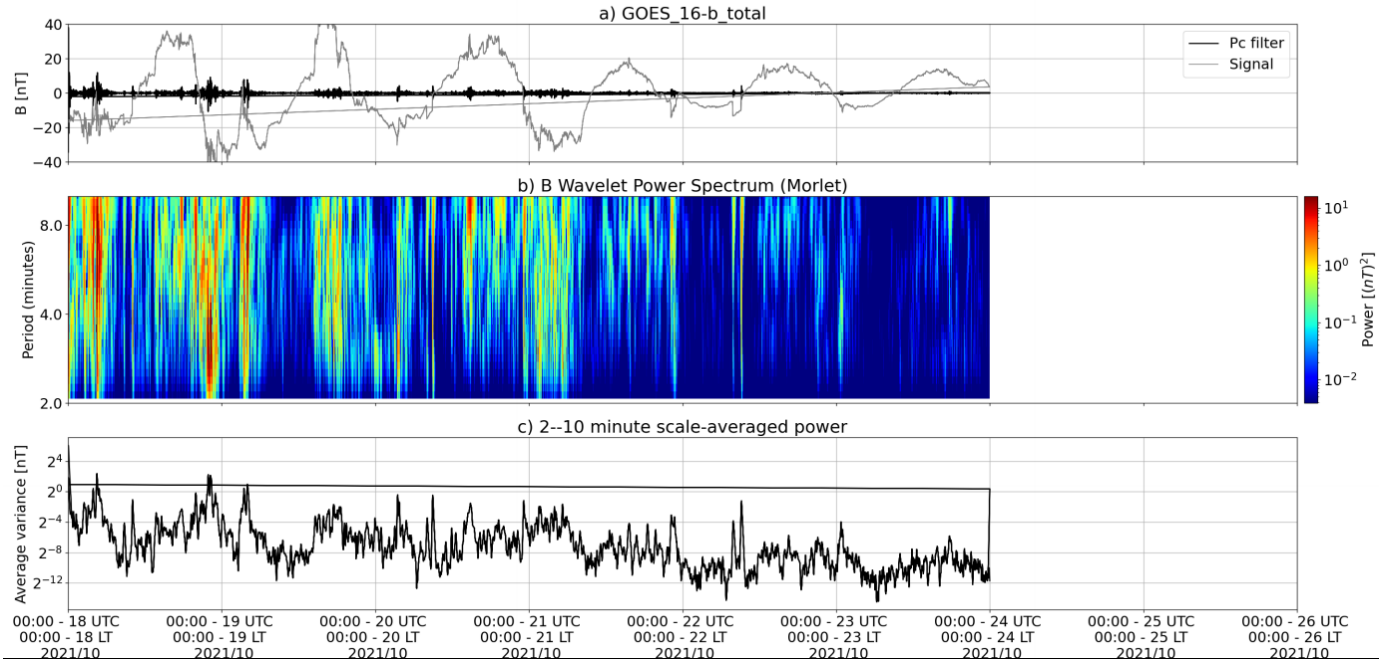
The GOES-16, GOES-17, and Arase satellite data are analyzed and interpolated to observe the high-energy electron flux variability (1 MeV) in the outer radiation belt (Figure 2). Additionally, the VERB code rebuilds this electron considering the Ultra Low Frequency (ULF) waves' radial diffusion. The slight electron flux increases observed on October 19th, 20th and 22nd reach L-shell > 5.0 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 week starts with a high activity in auroral latitudes (ISLL Station).
    - The activity may be related to an increase in the dynamic pressure of the solar wind on October 18th and 19th.
- Between the 20th and 21st there is an increase in the speed of the solar wind, which can be related to an HSS. It also generates continuous oscillations from high to low latitudes.

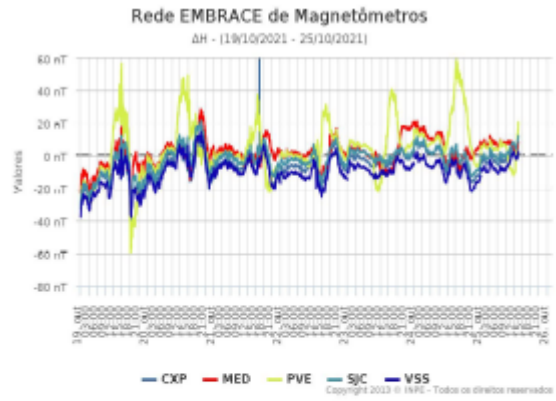
- The PVE season has high fluctuations throughout the week, especially during the local midday.
- The GOES 16 satellite shows fluctuations mainly on the 18th and 19th of October and on the 21st, with some oscillations concentrated in higher frequencies

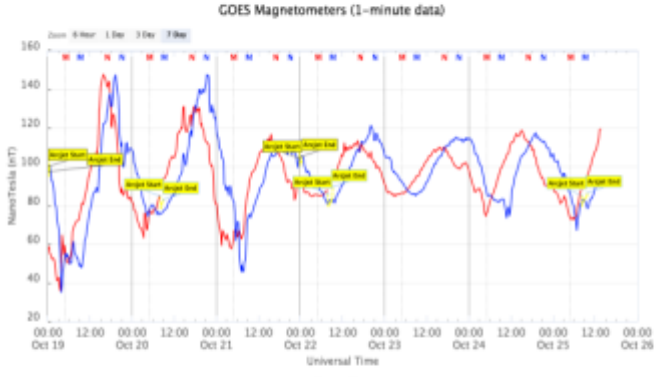
Geomagnetism

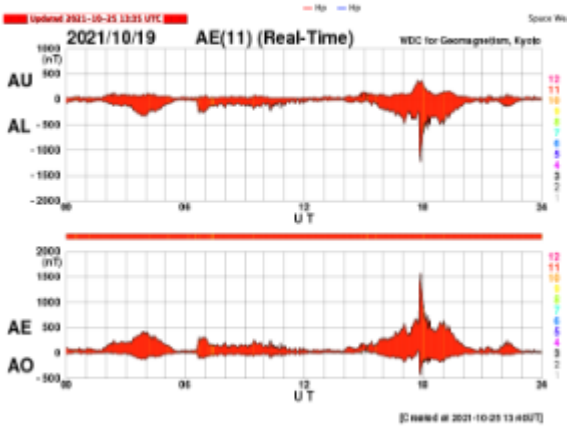
Responsible: Livia Ribeiro Alves

Geomagnetic Report - October 19-25.

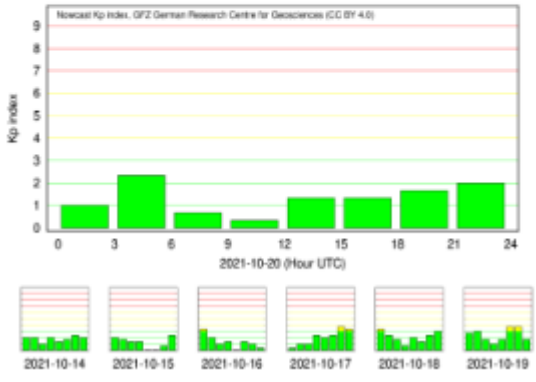
- Data from the Embrace magnetometer network showed instabilities throughout the period, with emphasis on:
- 19/10 increase followed by a drop in the H component in all stations, up to -60 nT
- Geomagnetic activity ranged from quiet to active during the week, with the Dst index reaching its minimum value of -24 nT on 19/10. The highest Kp of the week was 4- recorded on 19/10
- The auroral activity remained calm throughout the period, increasing on 19/10.
- Magnetic field measured in the GOES satellite orbit showed disturbances on days 19 and 20.


Rede EMBRACE de Magnetômetros
ΔH - (19/10/2021 - 25/10/2021)
Valores
CXP
MED
PVE
SJC
VSS


GOES Magnetometers (1-minute data)
NanoTesla (nT)
Universal Time


2021/10/19
AE(11) (Real-Time)
WDC for Geomagnetism, Kyoto
AU
AL
AE
AO
U T


October 2021
Dst (Real-Time)
WDC for Geomagnetism, Kyoto
(nT)
[Created at 2021-10-25 13:30UT]


Kp index
2021-10-20 (Hour UTC)
2021-10-14
2021-10-15
2021-10-16
2021-10-17
2021-10-18
2021-10-19

Ionosphere

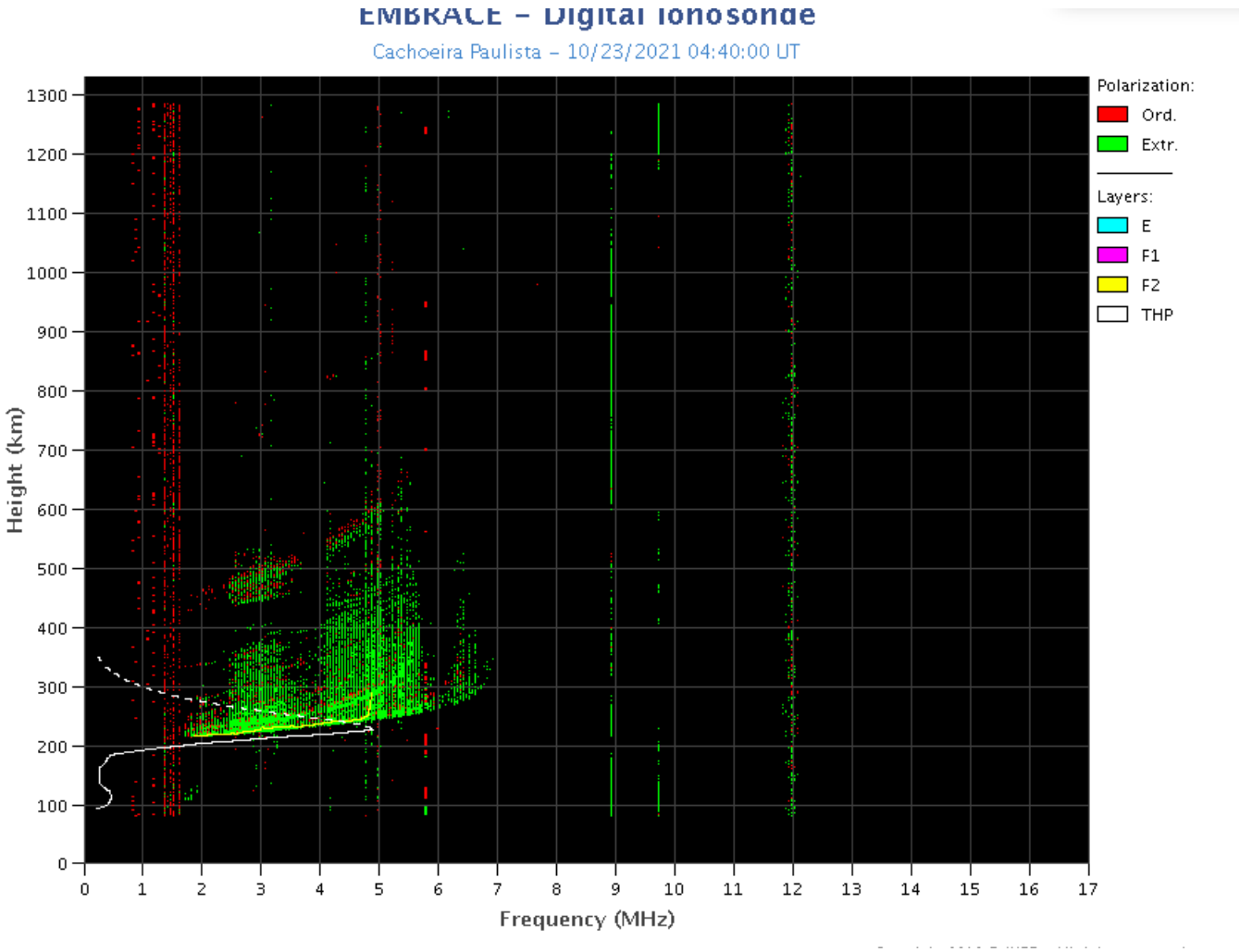
Responsible: Laysa Resende

Boa Vista

(NO DATA)

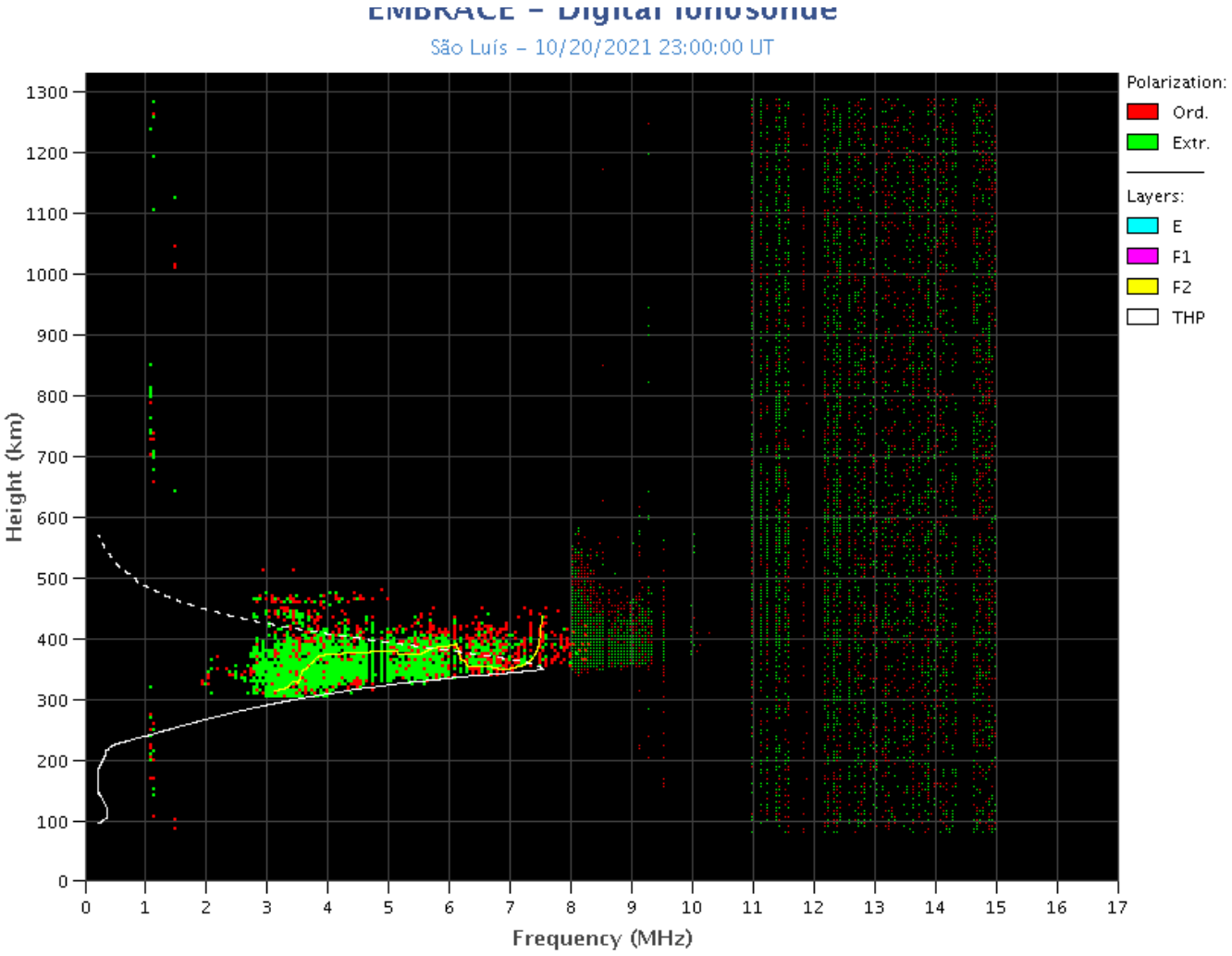
Cachoeira Paulista

- There were spread F on days: 23 and 24.
- 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.



Santa Maria

- There were not spread F during all days in this week.
- The Es layers reached scale 4 for one day 19.
- The auroral type, indicating particle precipitation, occurred on days 18, 19 and 24.

Santa Maria – 10/18/2021 00:54:04 UT