

# Briefing Space Weather - 2021/08/23

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### Sun

#### Responsible: José Roberto Cecatto

08/16 – Fast (< 500 km/s) wind stream; 1 CME can have component toward the Earth;

08/17 – Fast (< 500 km/s) wind stream; 3 CME can have component toward the Earth;

08/18 – Fast (< 500 km/s) wind stream; 2 CME can have component toward the Earth;

08/19 – No fast wind stream; 3 CME can have component toward the Earth;

08/20 – No fast wind stream; 4 CME can have component toward the Earth;

08/21 – No fast wind stream; 1 CME can have component toward the Earth;

08/22 – No fast wind stream; 8 CME can have component toward the Earth;

08/23 – No fast wind stream; No CME toward the Earth;

Prev.: Fast wind stream expected for August 24 and 25; for while low (5% M, 1% X) probability of M / X flares next 2

days; also, occasionally some other CME can present a component toward the Earth.

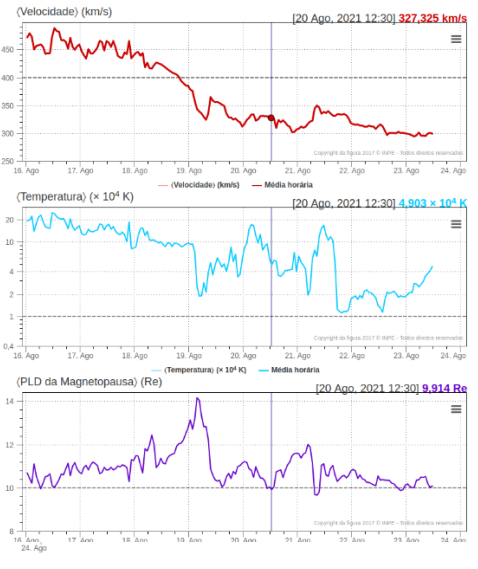
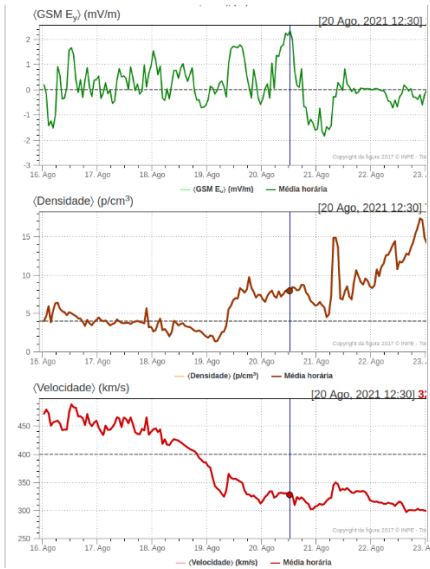
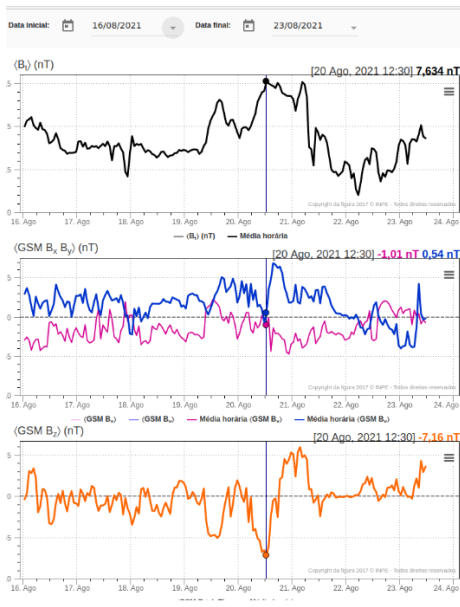
#### Responsible: Douglas Silva

- EMC:
  - Nenhuma EMC direciona à Terra foi observada segundo imagens disponível no LASCO.
- WSA-ENLIL (Vento solar)
  - Segundo a simulação entre os dias 27 e 28 de agosto ocorrerá um aumento no vento solar alcançando o valor de 400km/s.
- Buracos coronais (SPOCA):
  - Uma pequena extensão do buraco coronal polar norte foi observado no dia 16 de agosto.

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### 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 DSCOVR satellite in the interplanetary region along with sector boundary crossing.
- The total Bt magnetic field showed oscillations, however, it remained below 8 nT during the analyzed period.
- The IMF Bz component oscillated mostly negative. We observed two peaks in bz on August 19 at 11:30 am  $\sim$ -4.85nT and on August 20 at 12:30 am at -7.16nT. The occurrence of the change of sector in the BxBY components took place on August 22 at 05:30. In the rest of the interval there is no clear change of sector in the BxBY components.
- The Vsw density showed peaks on days 19, 21 and 22 at 03:30, 07:30 and 22:30, of 1.33, 14, 8, and 17.44 p/cm<sup>3</sup> respectively. The solar wind speed Vsw peaked on August 16 at 12:30 at 488km/s. Remaining below 400 km/s on the 18 at 19:30, and reaching a minimum value on the 23 of August at 03:30 at 293 km/s.
- Subsolar Mp showed maximum expansion on August 19 at 4:30 am of 14Re and minimum compression on August 21st at 8:30 am of 9.65 Re

## Radiation Belts

Responsible: Ligia Alves da Silva

### GOES Electron Flux (5-minute data)

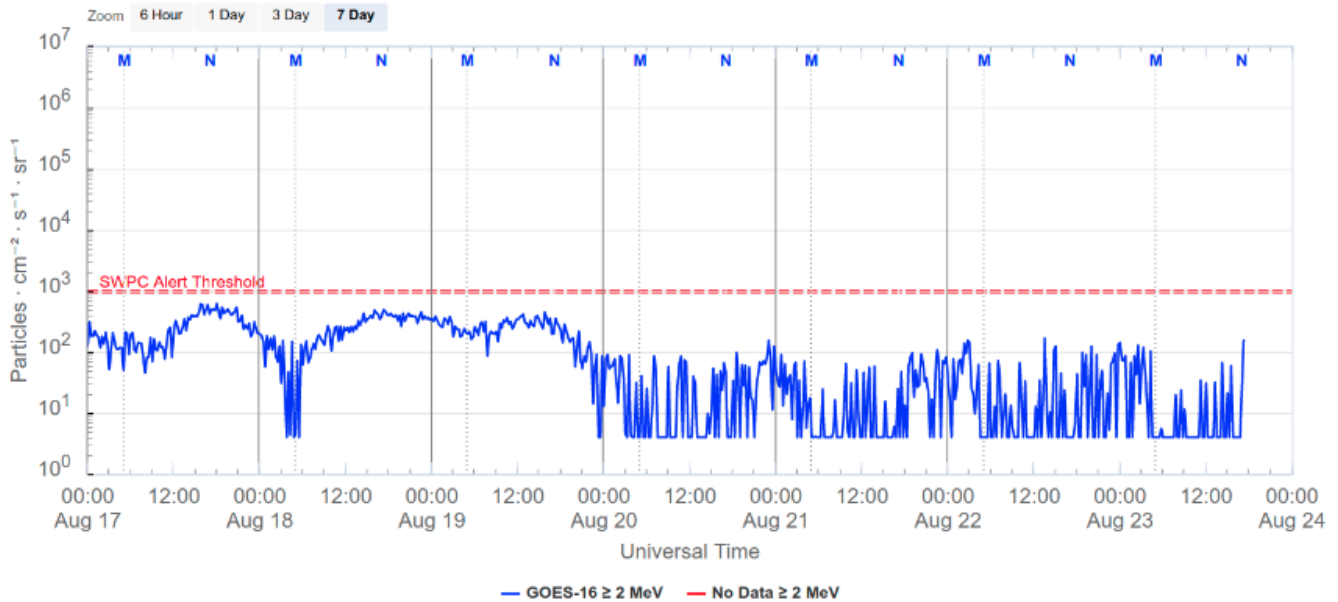


Figure 1: High-energy electron flux (> 2MeV) obtained from GOES satellite. Source: <https://www.swpc.noaa.gov/products/goes-electron-flux>

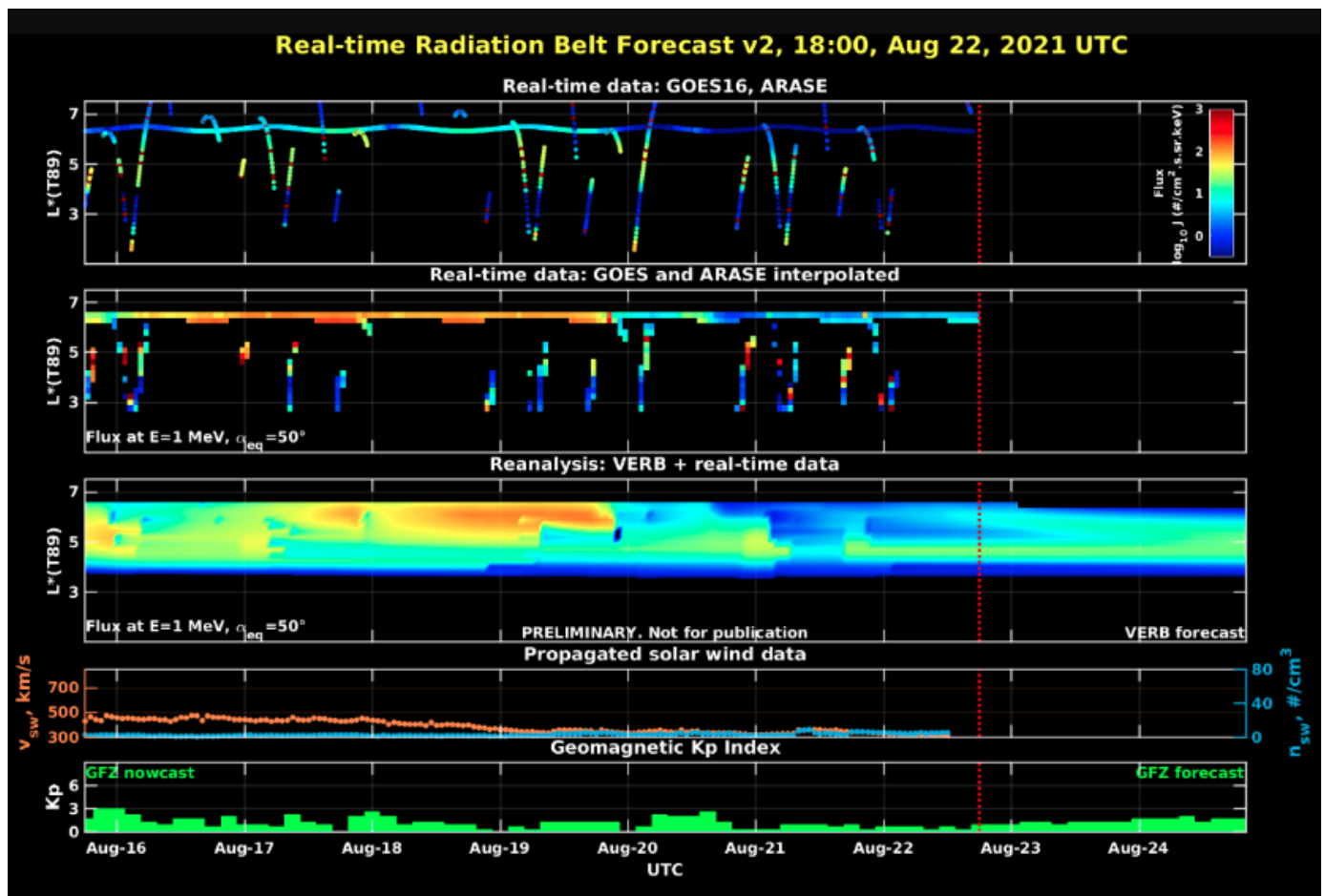


Figure 2: high-energy electron flux data (real-time and interpolated) obtained from ARASE, GOES 16, POES satellites. Reanalysis's data from VERB code and interpolated electron flux. Solar wind velocity and proton density data from ACE satellite. Source: Fonte: <https://rbm.epss.ucla.edu/realtime-forecast/>

High-energy electron flux (>2 MeV) in the outer boundary of the outer radiation belt obtained from geostationary satellite data - GOES 16 (Figure 1) is shown to be close to 103 particles/(cm<sup>2</sup> s sr) at the

beginning of August 17th. A electron flux decrease is observed from 03:00 UT on August 18th, reaching below 102 particles/(cm<sup>2</sup> s sr). On August 21st an electron flux decrease is again observed, this time concomitant with the magnetopause compression.

The GOES-16 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 ULF waves' radial diffusion. On August 21st, an electron flux decrease is observed, reaching L-shell > 4. The electron flux decrease always occurred concomitantly with Ultra Low Frequency (ULF) wave activities.

## ULF waves in the magnetosphere

Responsible: José Paulo Marchezi

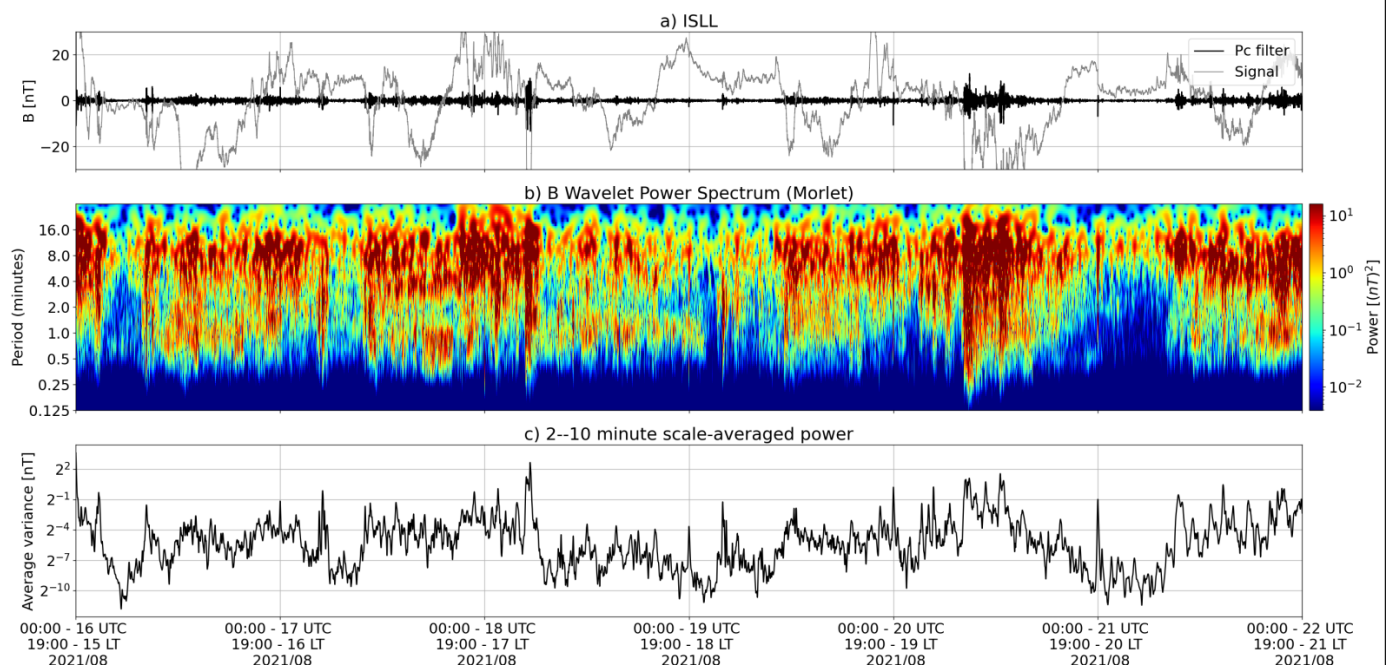


Figure 1: a) signal of the total magnetic field measured at the ISLL Station of the Carisma network in gray, together with the fluctuation in the range of Pc5 in black. b) Wavelet power spectrum of the filtered signal. c) Average spectral power in the ranges from 2 to 10 minutes (ULF waves)..

- Four periods with greater ULF activity: days 16, 18, 20 and 21
  - Are associated with a negative incursion of the B<sub>z</sub> component of the IMF.
  - Abrupt variations in this period follow increases in the dynamic pressure of the solar wind.
- Possible current activity in the auroral region between days 16 and 18, and after day 20
  - Between days 16 and 18, there is a signal with continuous characteristics and with higher frequencies (Pc3), which may be associated with processes internal to the magnetosphere at high latitudes.
- By component registered by the GOES satellite shows an increase in the signal following the variations in the B<sub>y</sub> component of the IMF, on the 17th, 18th and 20th

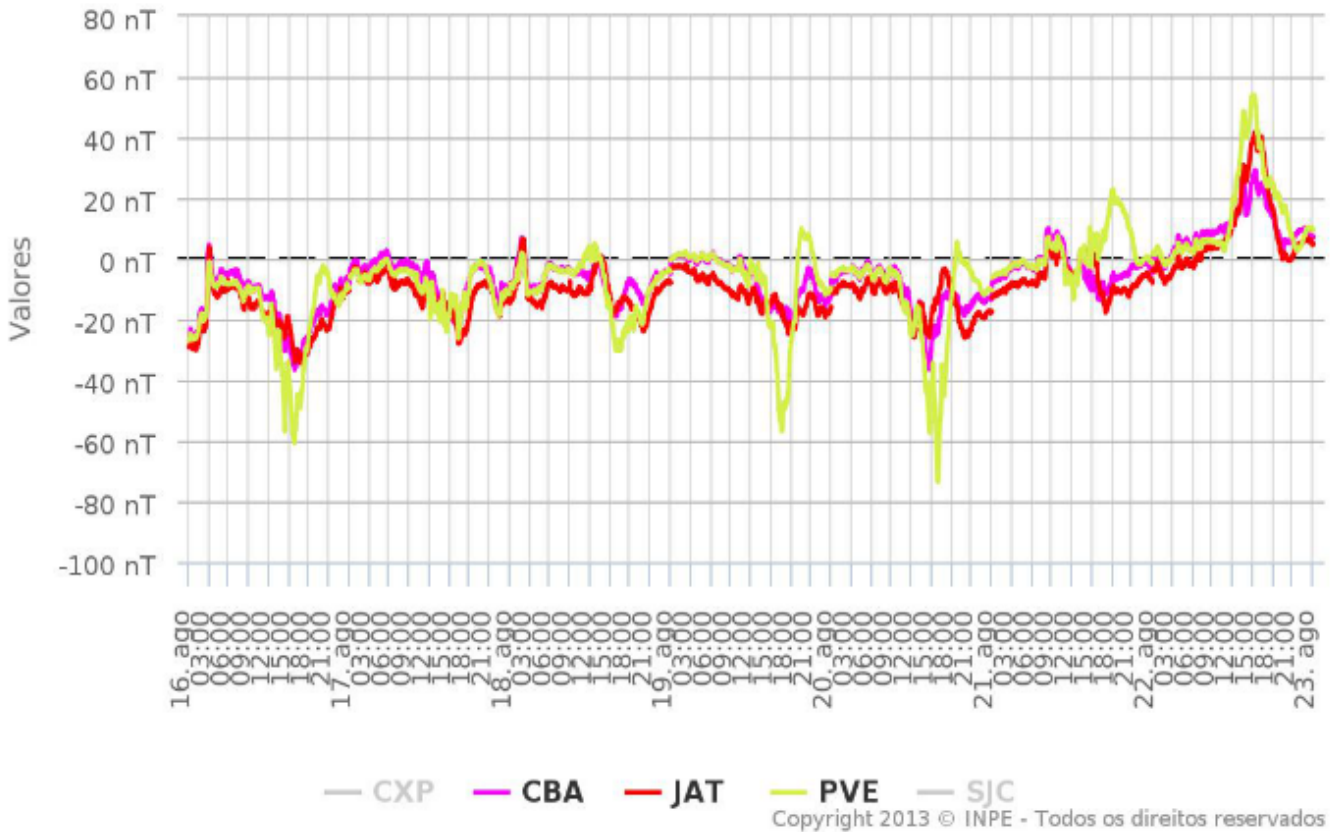
# Geomagnetism

Responsible: Livia Ribeiro Alves

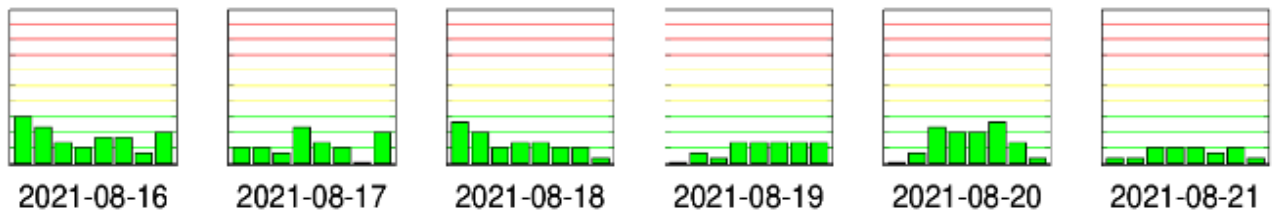
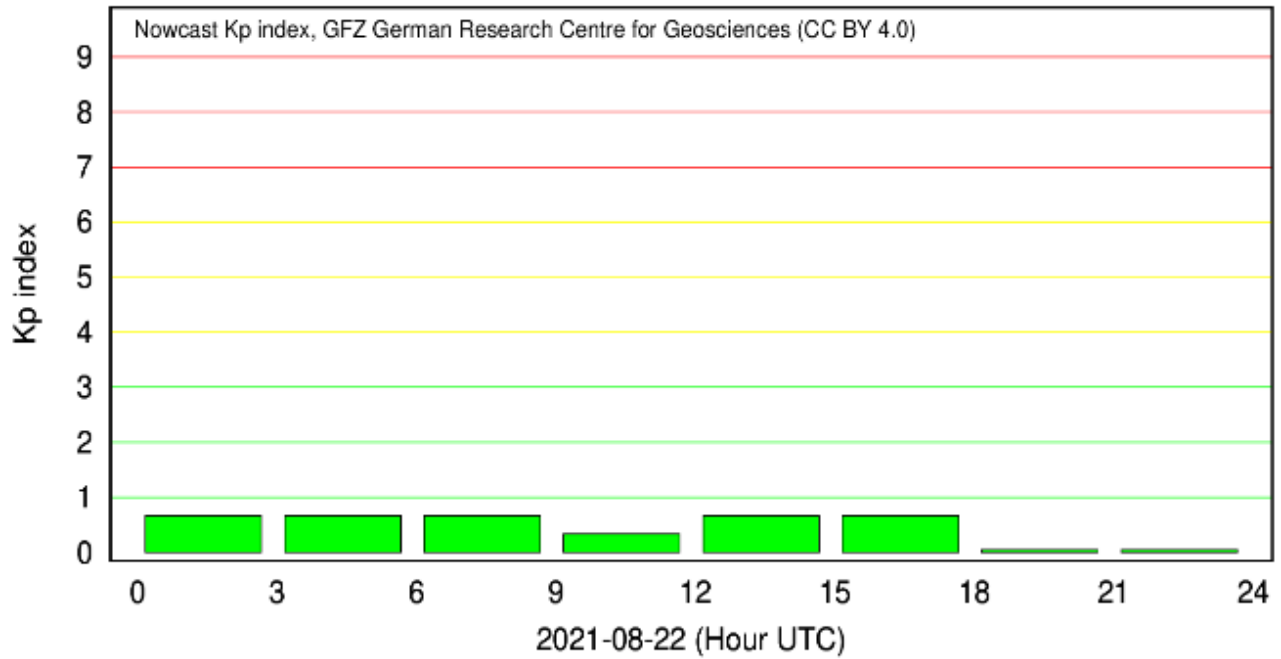
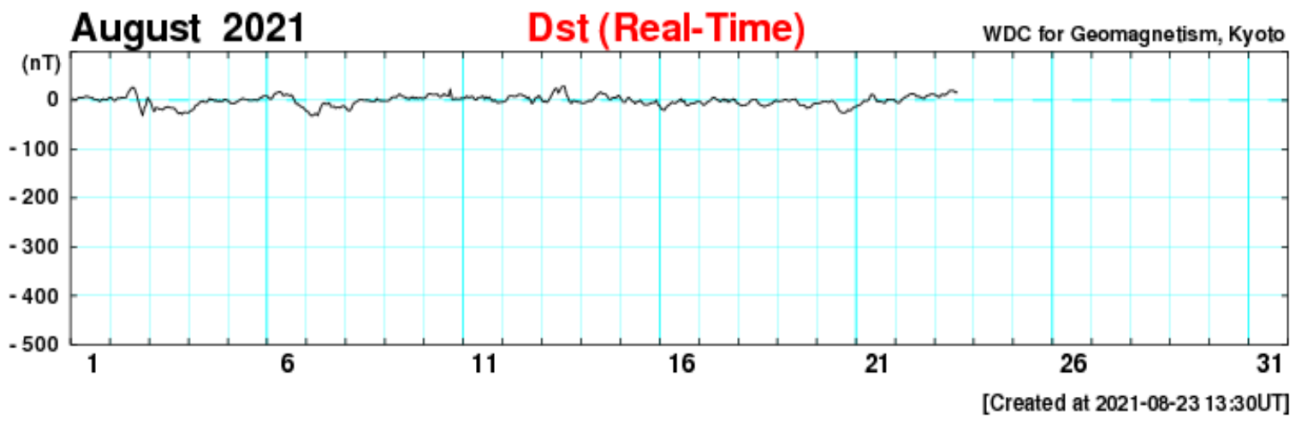
The geomagnetic events that are representative of this period are listed below:

## Rede EMBRACE de Magnetômetros

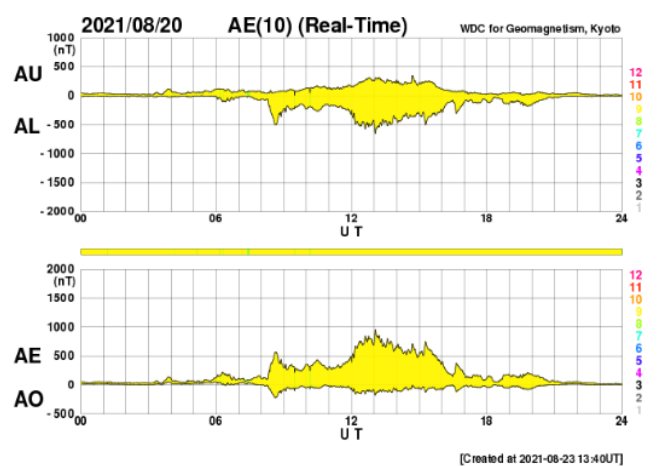
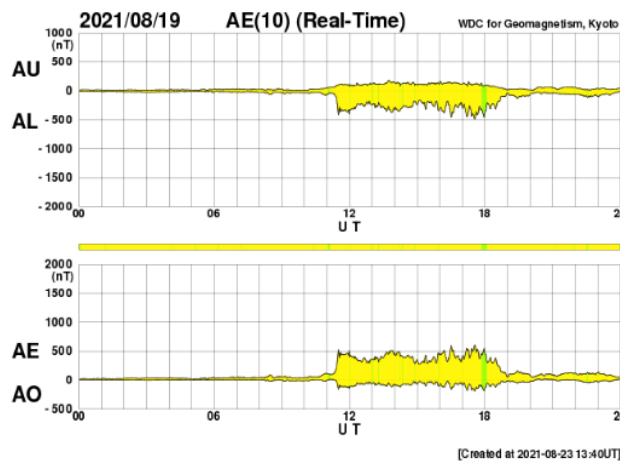
$\Delta H$  - (16/08/2021 - 22/08/2021)



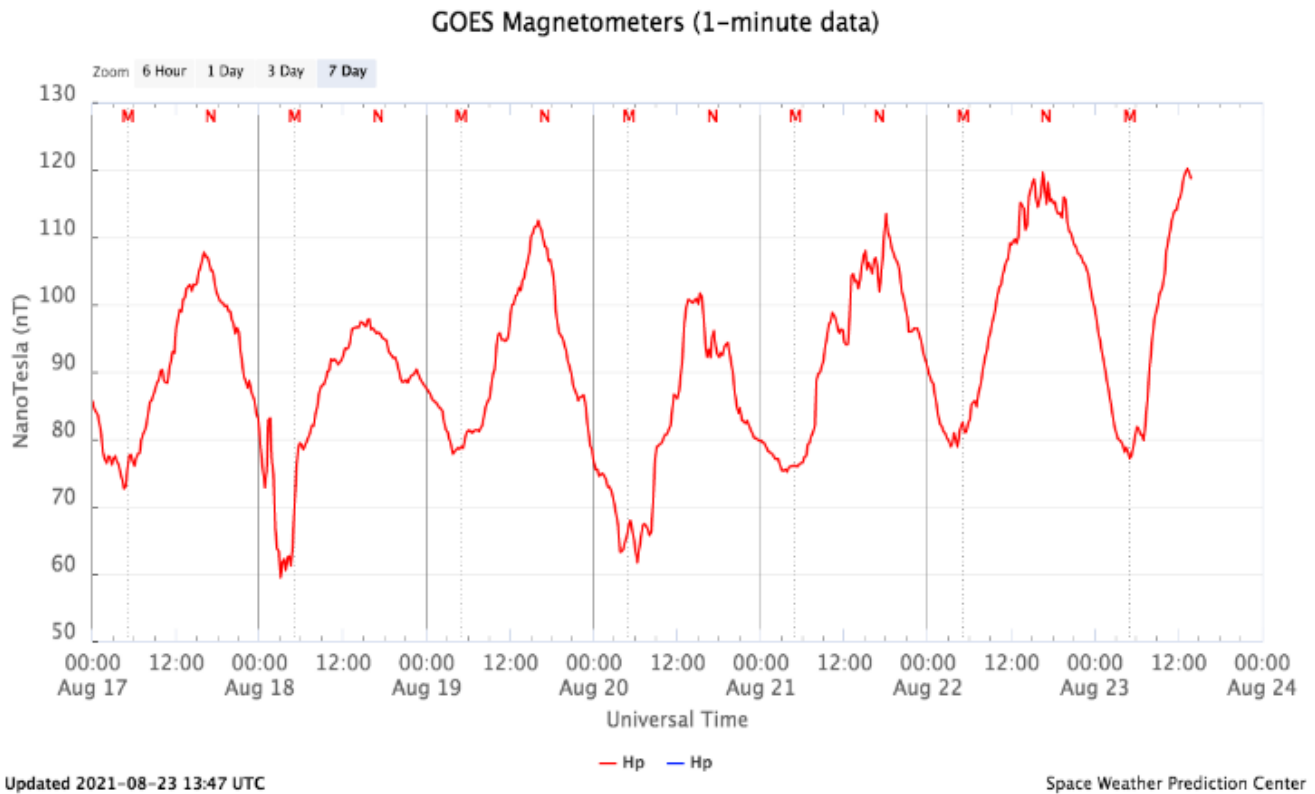
- Data from the Embrace magnetometer network showed instabilities throughout the period, with some highlighted events:
- 08/21 H component increase from 09:00 UT on all stations
- 08/21 increase of the H component of the PVE station only, around 20 nT @ 18:00 UT
- 08/22 increase of component H of all stations, from 15 UT
- 21/08 - The PVE station registered characteristic activity of local ionospheric current @ 15 UT, shifting from the behavior of the other stations.



- Geomagnetic activity was reportedly unstable during the week, with the Dst index reaching its lowest value of -25 nT on 8/20. The highest Kp of the week was 3- recorded on 17, 18 and 20/08



- The auroral activity remained stable throughout the period, with a slight increase on August 19 and 20.



- Magnetic field measured in the GOES satellite orbit showed a decrease in the H component on the night side on the 18/08 and 20/08.

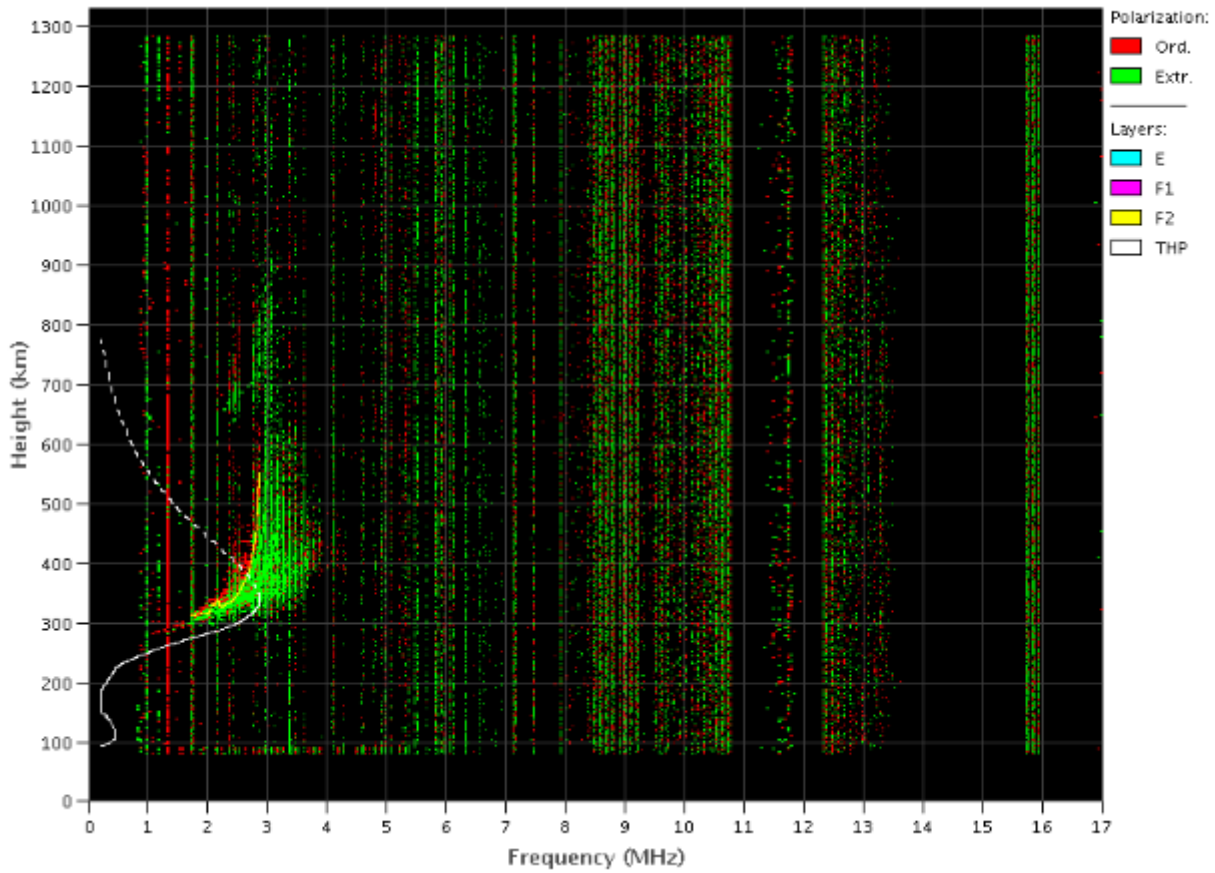
## Ionosphere

**Responsible: Laysa Resende**

**Boa Vista**

- There were spread F on day August 17.
- The Es layers reached scale 4 on days August 16, and 17.

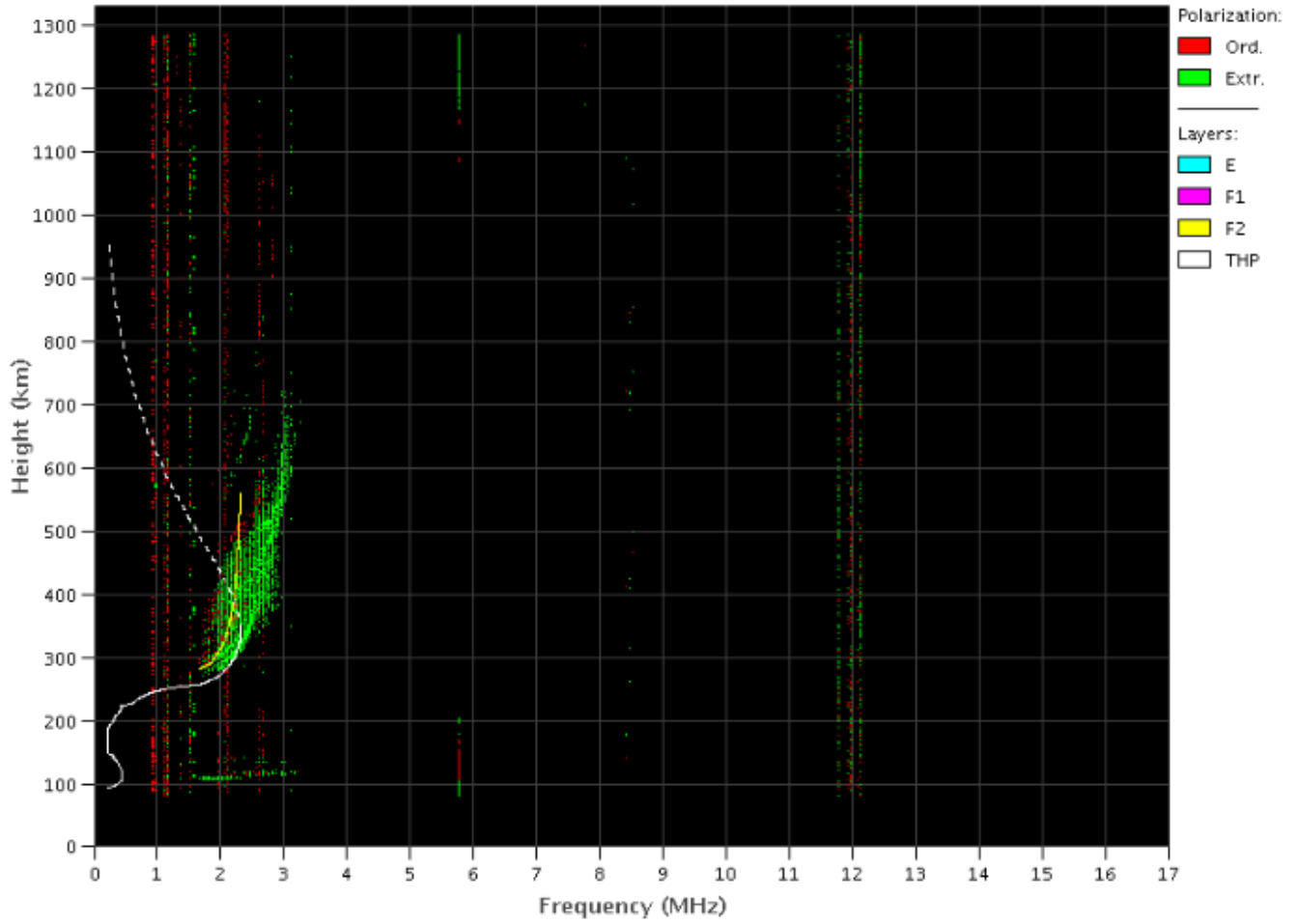
Boa Vista - 08/19/2021 05:20:00 UT



### Cachoeira Paulista

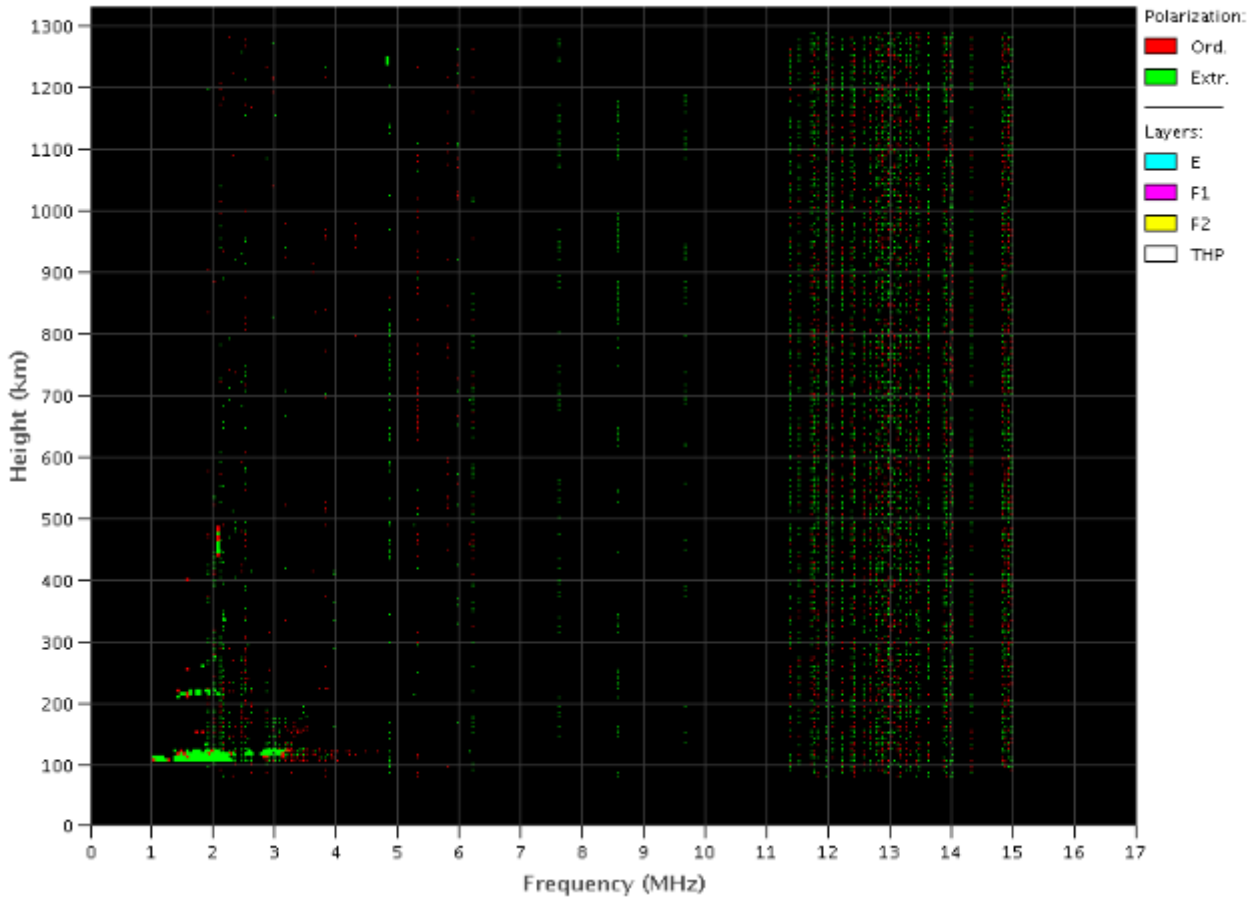
- There were spread F on days August 18, and 19.
- The Es layers reached scale 2 during all day in the week.





### São Luis

- There was not spread F in this week.
- The Es layers reached scale 3 on day August 20.



## Cintillation 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 Bahia / 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 four stations analyzed did not show appreciable values above the noise value in the period between 08/16 and 08/22. The Sinop/MT station showed slight changes on different days and at the same time over the analyzed period. The fact that it is periodic, as can be seen in Figure 1, discards a geophysical origin of the phenomenon.

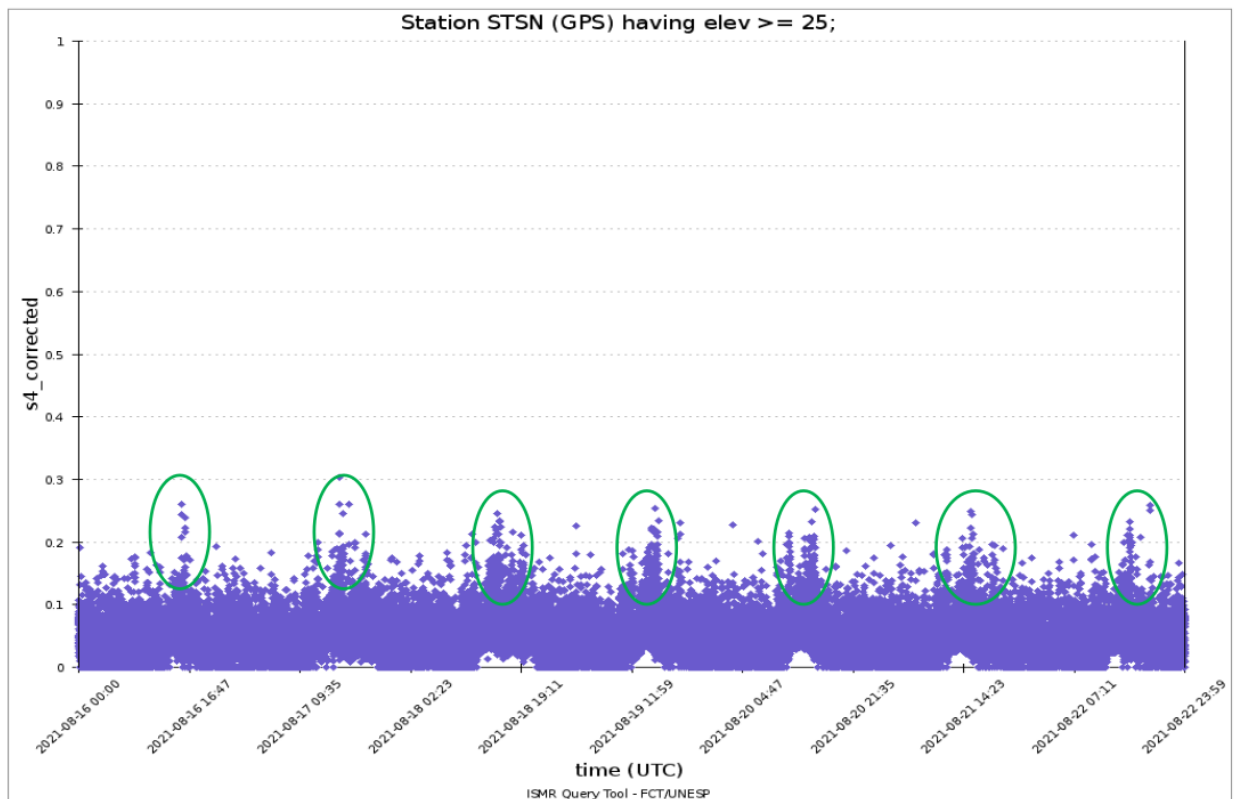


Figure 1: S4 index values for the GPS constellation in the period between 08/16 and 08/22. Point groupings are visible around 15:30 hours (UT) every day over the period.