

Briefing Space Weather - 2022/01/17

Sun

Responsible: Douglas Silva

CME:

- Two coronal mass ejections type II halo (2021-11-09T17:00 UT, 2021-11-10T15:16 UT, 2021-11-11T09:24 UT) and one type IV halo were observed on the LASCO coronal images.

WSA-ENLIL (CME 2022-01-12T04:36:00 UT)

- According to the simulation no or little impact on Earth.

WSA-ENLIL (Prediction for CME 2022-01-14T13:38 UT)

- The simulation indicates that the CME arrival forecast will occur on the following date:

2022-01-16T14:39Z (-7.0h, +7.0h).

WSA-ENLIL (Prediction for CME 2022-01-15T06:00 UT)

- According to the simulation no or little impact on Earth.

WSA-ENLIL (Prediction for CME 2022-01-15T16:12 UT)

- The simulation indicates that the CME arrival forecast will occur on the following date:

2022-01-19T06:00Z (-7.0h, +7.0h).

Coronal holes (SPOCA):

- Coronal holes 34909 (disk center) and 34857 (south polar extension) were observed between January 10 and 13.

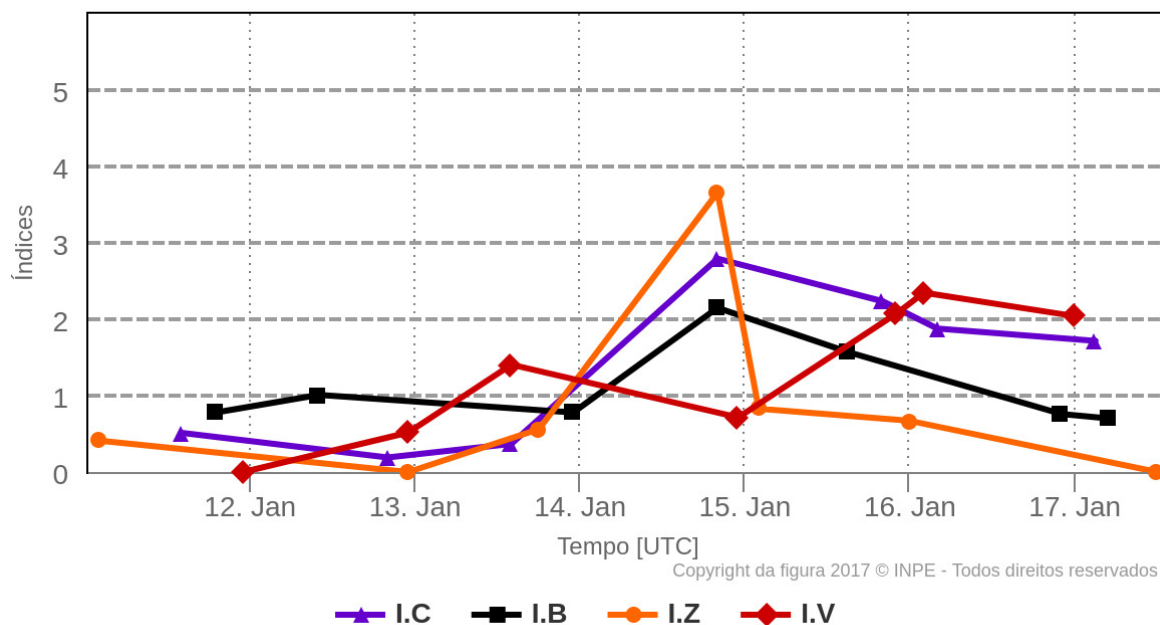
- Coronal hole 34651 was identified by SPOCA between the 8th and 9th of November.

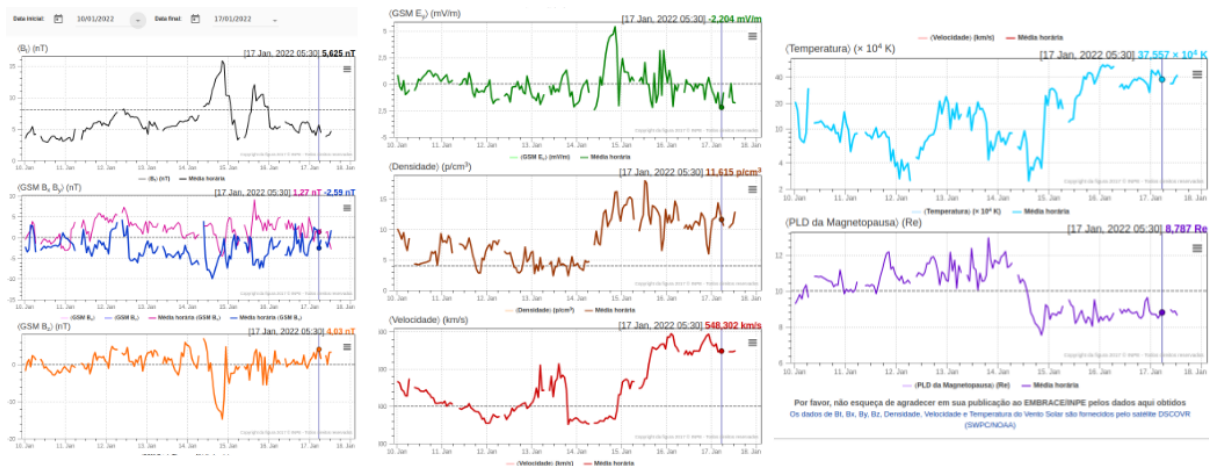
Interplanetary Medium

Responsible: Paulo Ricardo Jauer

Resumo dos índices do meio interplanetário

Máximos diários - mais recentes entre 11 Jan, 2022 e 17 Jan, 2022





- 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 modulus of the interplanetary magnetic field component showed 2 peaks: 14/Jan at 20:30 at ~ 15.7 nT and another 15/Jan at 15:30 ~ 12nT.
- The bxbx components show a sector switch on Jan 11 at 01:30, being within the range of ~[+10, -10]nT.
- The component of the south bz field showed a significant peak of ~ -14.79 nT, during ~ 7 hours on 14/Jan at 19:30.
- The solar wind density remained below 10 p/cm³ between January 10-14. The density also showed a peak of 15/Jan 12:30 UT of 18 p/cm³.
- The solar wind speed was mostly above 400km/s during the analyzed period, with a peak around ~595km/s on 16/Jan at 02:30 UT.
- The magnetopause position was above the typical position between January 10-14 with maximum compression of 7.5 Re on January 14 at 20:30.

Radiation Belts

Responsible: Ligia Alves Da Silva

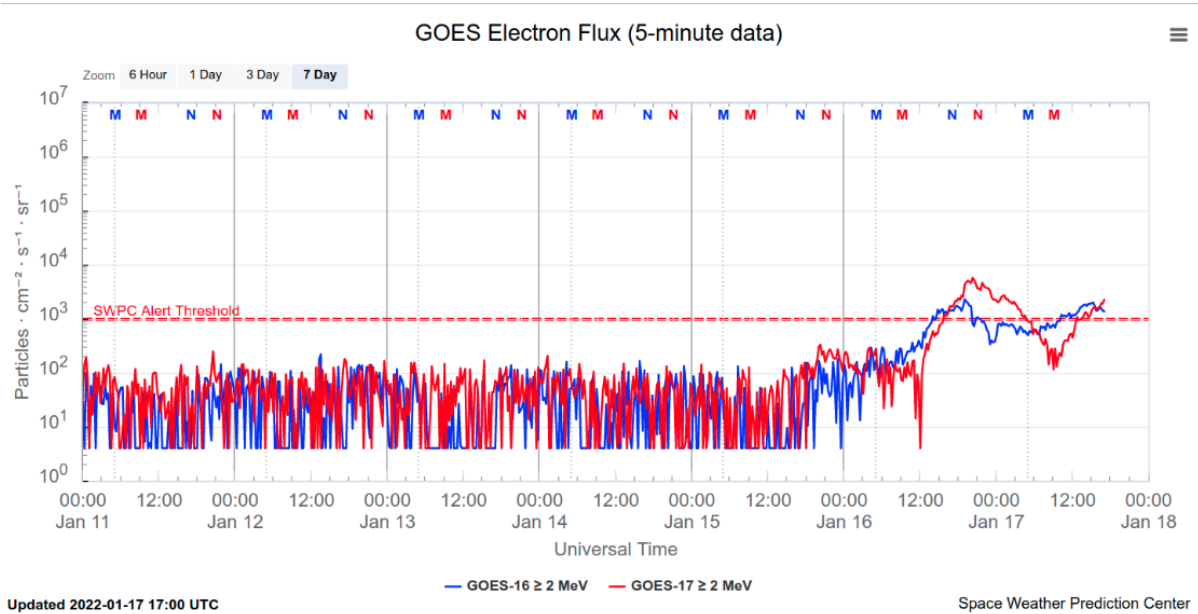


Figure 1: High-energy electron flux (> 2MeV) obtained from GOES-16 and GOES-17 satellite. Source: <https://www.swpc.noaa.gov/products/goes-electron-flux>

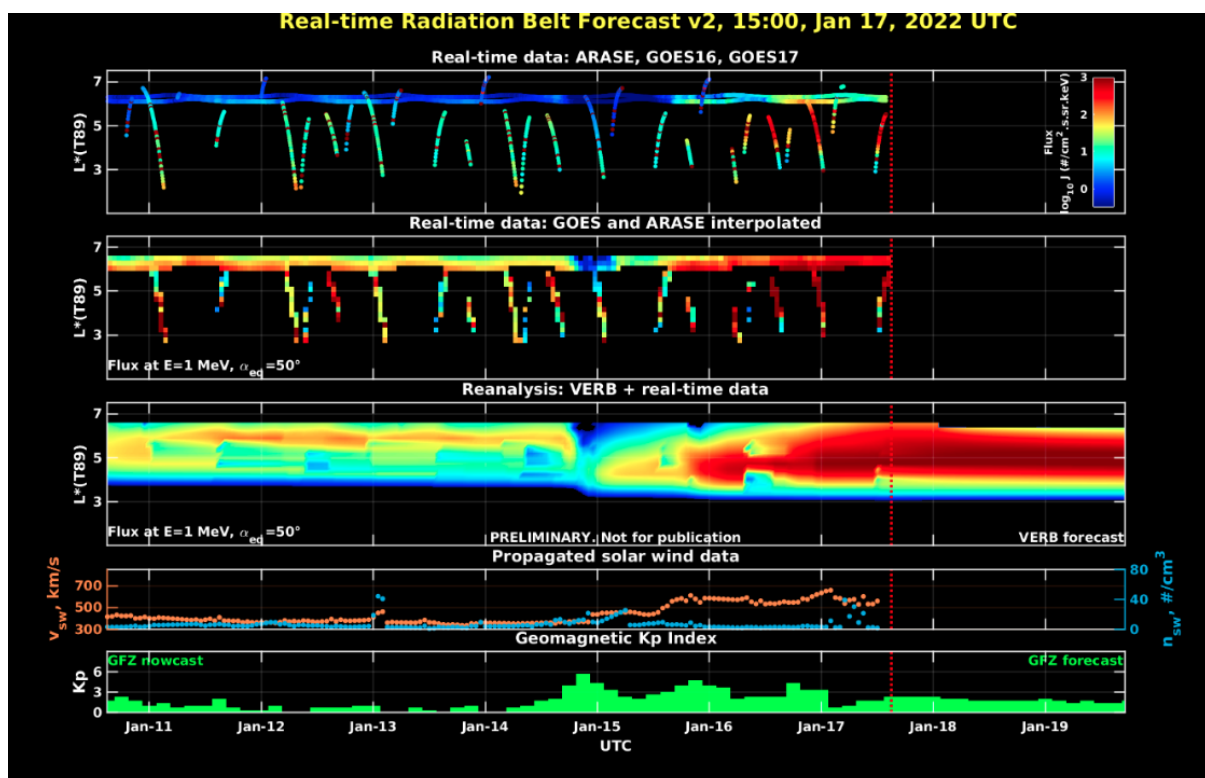


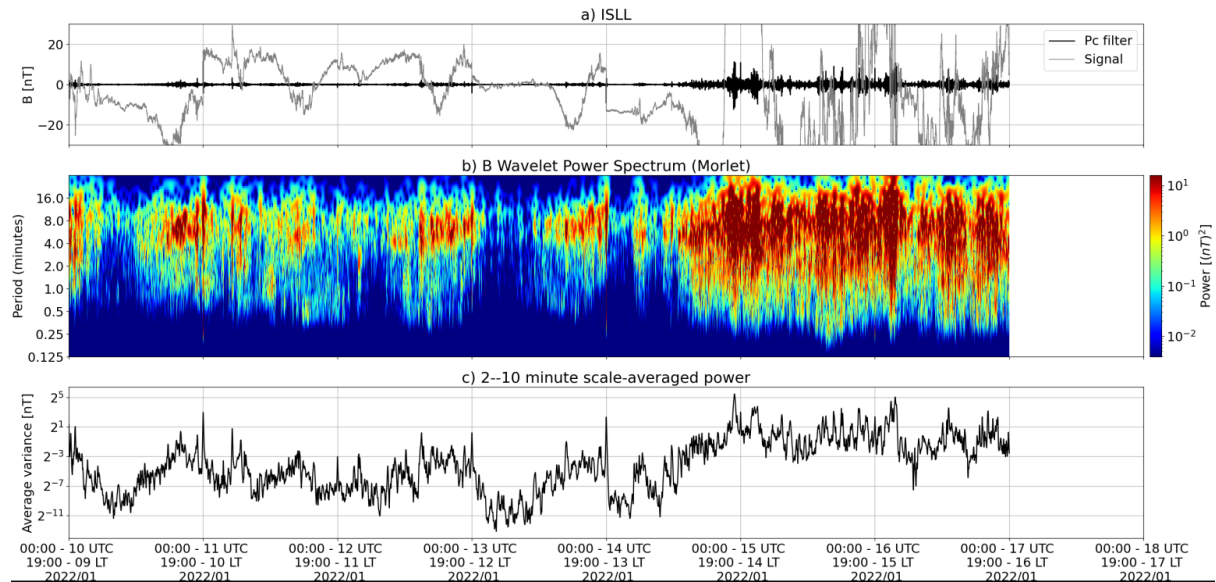
Figure 2: high-energy electron flux data (real-time and interpolated) obtained from ARASE, GOES-16, GOES-17 satellites. Reanalysis's data from VERB code and interpolated electron flux. Solar wind velocity and proton density data from ACE satellite. Source: <https://rbm.epss.ucla.edu/realtime-forecast/>

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 shown below 102 particles/(cm² s sr) up to the 15th/January. An increase in electron flux was observed on January 15th, where the electron flux remained confined above 103 particles/(cm² s sr) until January 17th.

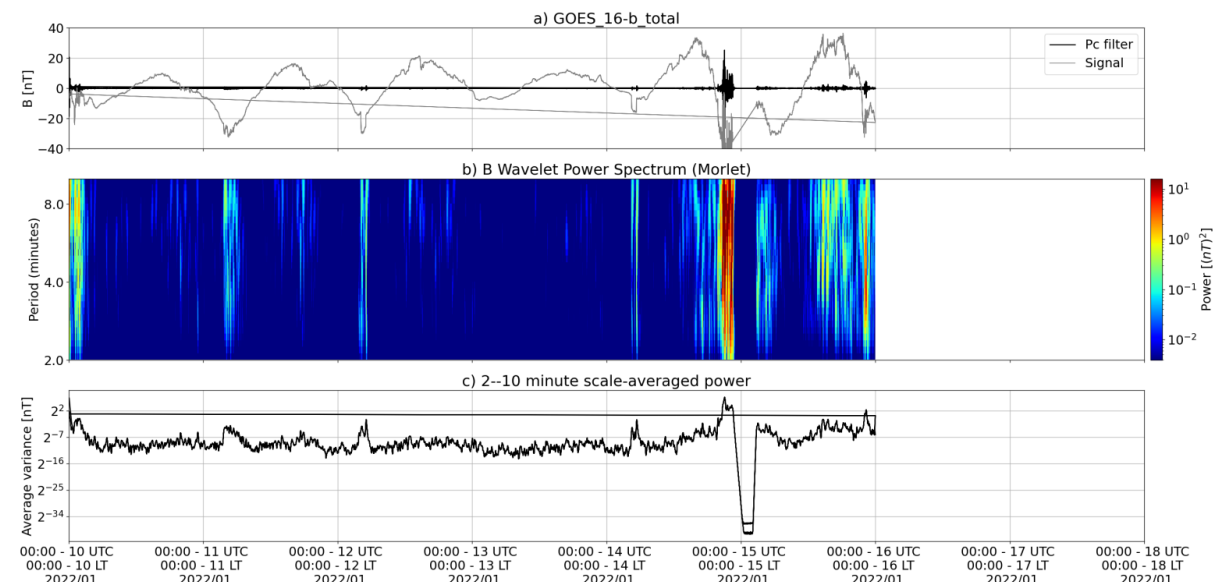
The GOES-16, GOES-17, and Arase satellite data are analyzed and interpolated to observe the high-energy electron flux variability (1 MeV) in the outer radiation belt (Figure 2). Additionally, the VERB code rebuilds this electron considering the Ultra Low Frequency (ULF) waves' radial diffusion. The electron flux increase observed from January 15th reached L-shell > 3.5 concomitantly with the arrival of a complex solar wind structure and the ULF wave activity.

ULF waves in the Magnetosphere

Responsible: José Paulo Marchezi



a) signal of the total magnetic field measured in 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).



a) signal of the total magnetic field measured by the GOES 16 satellite, 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 low activity of geomagnetic pulsations. From the end of 14/Jan we started to observe an increase in wave activity, mainly at high latitudes. Probable auroral activity during the period, possibly generated by the interaction of a coronal mass ejection.

Geomagnetism

Responsible: Livia Ribeiro Alves

Geomagnetic Report - January 11-17

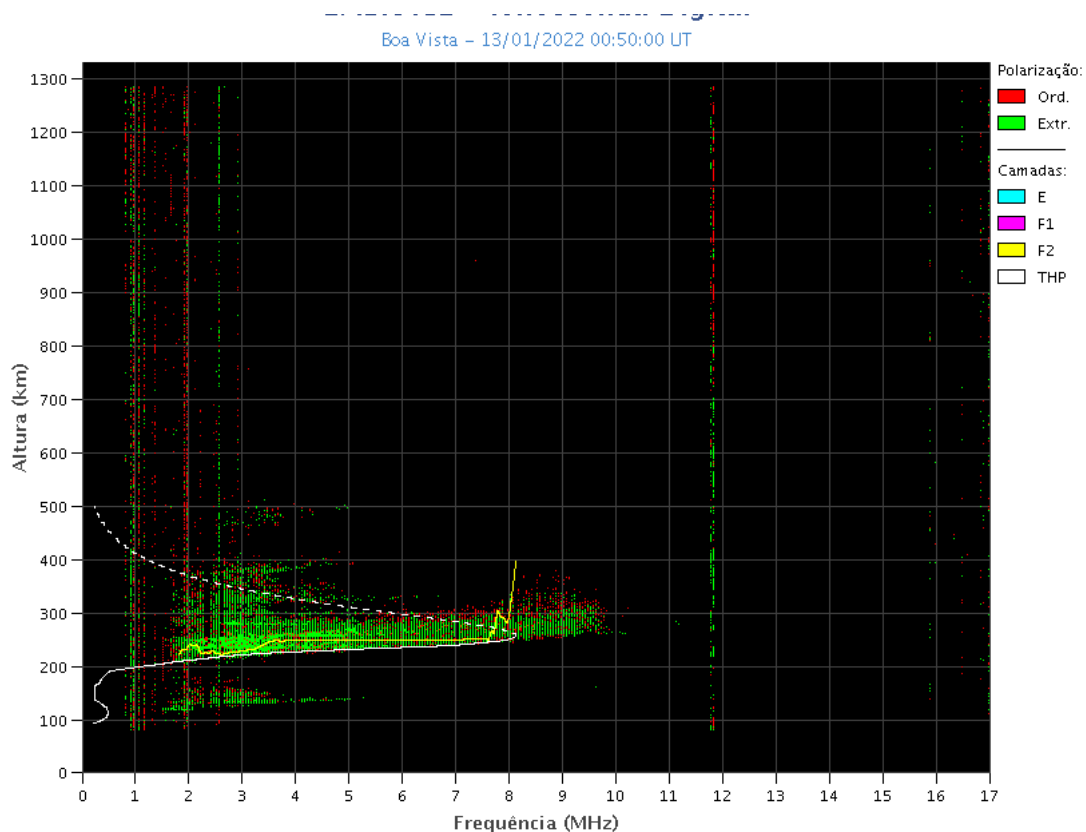
- Data from the Embrace magnetometer network similarities instabilities throughout the period, with a few highlighted: 14th, sh -160 nT 15th, 16th and 17th, show the geomagnetic storm recovery phase
- Geomagnetic activity reached the G1 level on the 14th and 15th, with the Dst index reaching its minimum value of -95 nT on 01/15. The Highest Kp of the week was 5+ recorded on the 14th
- Auroral activity was intensified on the 14th, 15th, 16th, and 17th.
- Average magnetic field in the orbit of the GOES satellite showed disturbances on the 14th and 15th of January.

Ionosphere

Responsible: Laysa Resende

Boa Vista:

- There were spread F during all days in this week.
- The Es layers reached scale 3 from day 15.

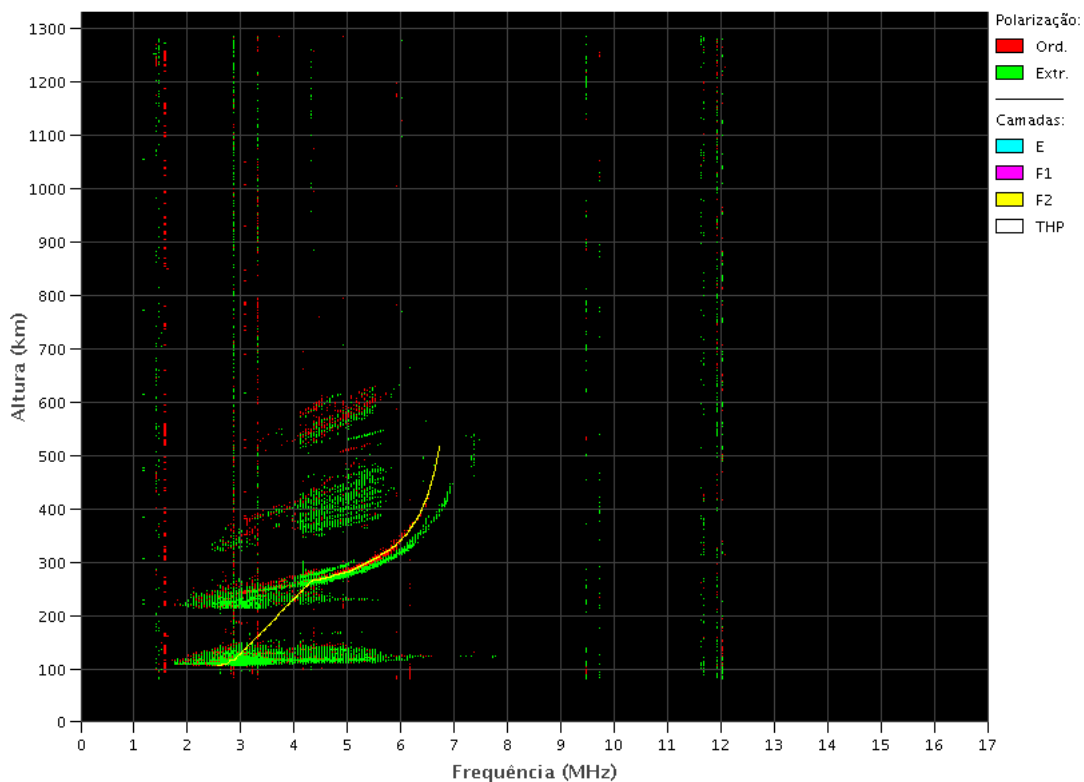


Cachoeira Paulista:

- There were spread F between 12 and 14.
- The Es layers reached scale 3 on days 11, and 14.

EMBRACE - Ionosonda Digital

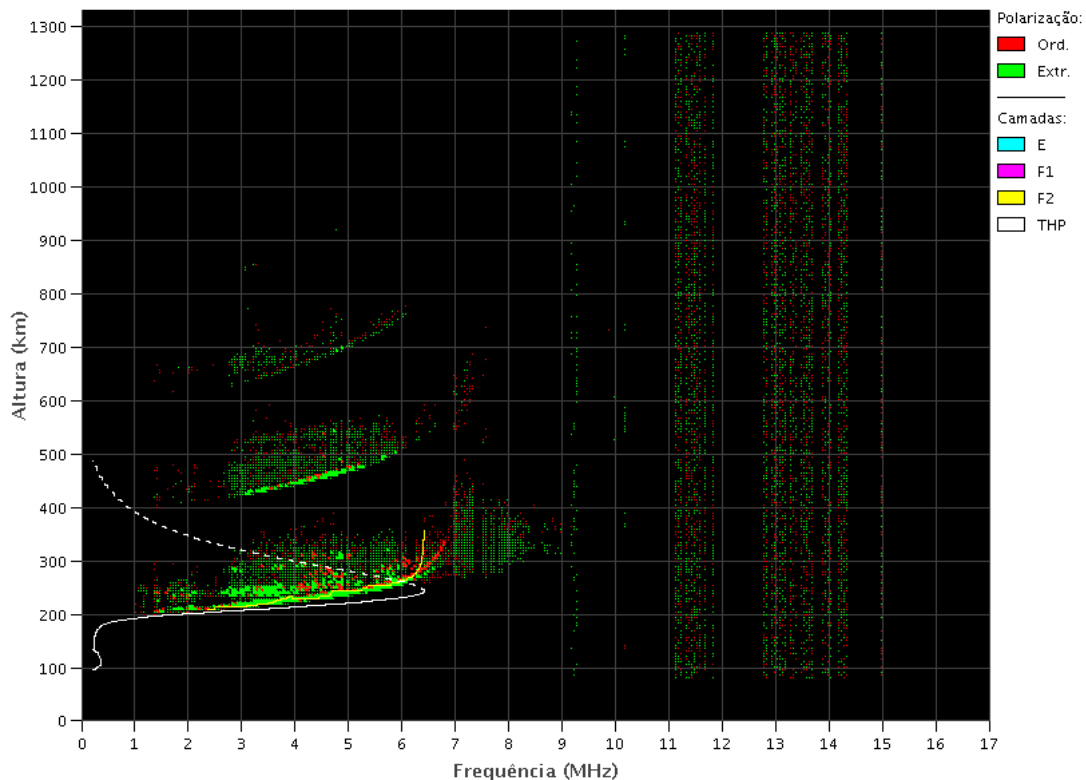
Cachoeira Paulista - 11/01/2022 01:20:00 UT



São Luís:

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

São Luís - 12/01/2022 02:30:00 UT



Scintillation 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.

This week, no data were acquired at the UFBA station. The S4 index values for the SLMA station show scintillation effects every day, while for STSN, except on 01/15-16, the rest of the week showed S4 values greater than 0.4. For SJCE station, scintillation events were frequent in this analyzed period, with emphasis on the early hours of the 17/01 (Figure 1). Figure 2 shows the satellites that contributed to the highest S4 values for the three stations analyzed in this summary during the days 01/16- 01/17/2022

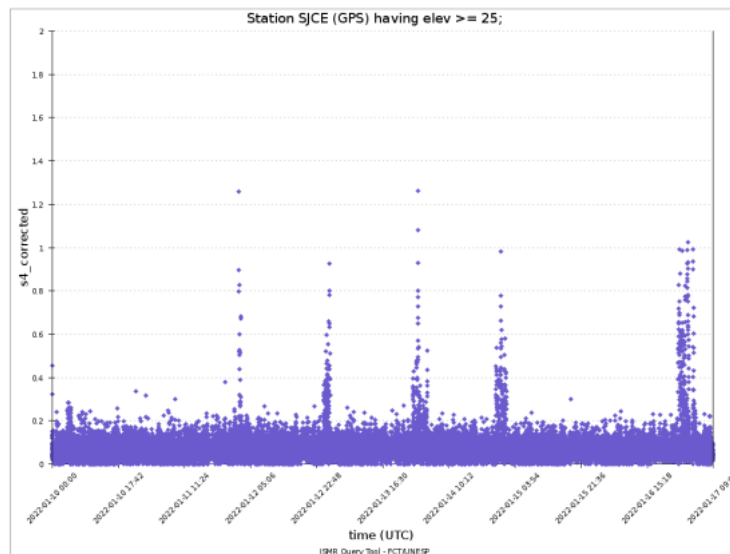


Figure 1: Values of the S4 index for the GPS constellation for SJCE station measured during the week 10/01—17/01/2022.

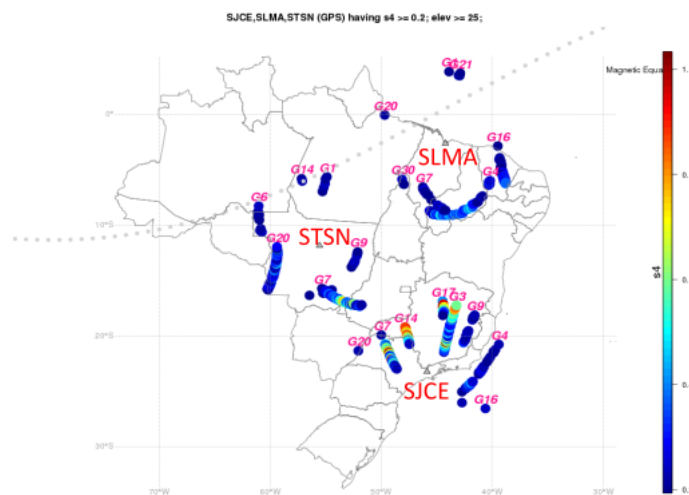


Figure 2: Map of S4 values > 0.2 for the GPS satellites with elevation > 25° in the receiver's field of view of SLMA, STSN and SJCE stations between 2200 UT on 01/16 until 0500 UT on 01/17/2022.