Briefing Space Weather

2022/07/04

1 Sun

1.1 Responsible: José Cecatto

06/27 – No flare (M/X); Fast wind stream (=< 650 km/s); 3 CME c.h.c. toward the Earth;
06/28 – No flare (M/X); Fast wind stream (=< 550 km/s); 4 CME c.h.c. toward the Earth;
06/29 – No flare (M/X); Fast wind stream (=< 550 km/s); 5 CME c.h.c. toward the Earth;
06/30 – No flare (M/X); Fast wind stream (=< 450 km/s); 3 CME c.h.c. toward the Earth;
07/01 – No flare (M/X); No fast wind stream; 2 CME c.h.c. toward the Earth;
07/02 – No flare (M/X); No fast wind stream; 4 CME c.h.c. toward the Earth;
07/03 – No flare (M/X); No fast wind stream; 2 CME c.h.c. toward the Earth;
07/04 – No flare (M/X); No fast wind stream; No CME toward the Earth;
Prev.: Fast wind stream from July 04 to July 07; for the next 2 days very low (1% M, 1% X) probability of M / X flares;
also, occasionally other CME can present component toward the Earth.
c.h.c. – can have a component; * partial halo; ** halo

2 Sun

2.1 Responsible: Douglas Silva

- WSA-ENLIL (Prediction for CME 2022-06-26T18:23Z)
  - The simulation results indicate that the flank of CME will reach the DSCOVR mission between 05:00 and 18:00 UT on 1st July 2022.
- WSA-ENLIL (CME 2022-06-21T00:48Z)
  - The simulation results indicate that the flank of CME will reach the DSCOVR mission between 2022-07-02T22:00 and 2022-07-03T12:00 UT.

Coronal holes (SPOCA):

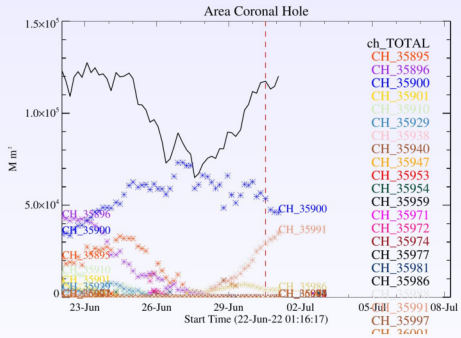


Figura: The solid line in black shows the products of the sum of areas for each detection interval performed by SPOCA between June 22 and July 02, 2022.

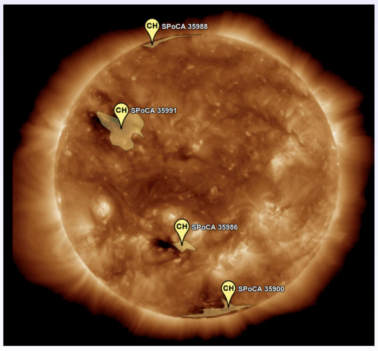
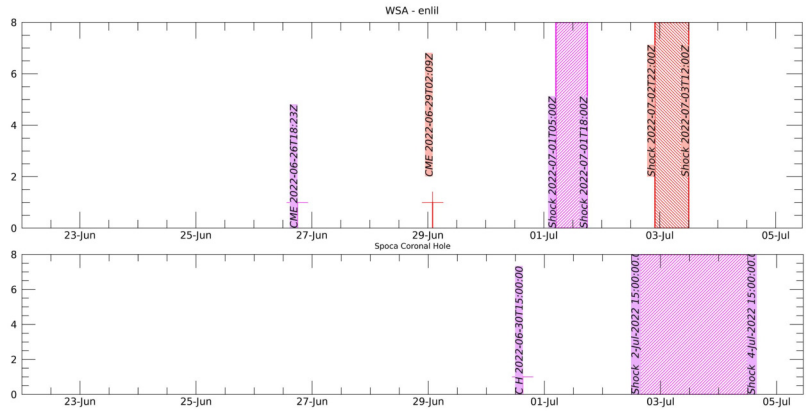


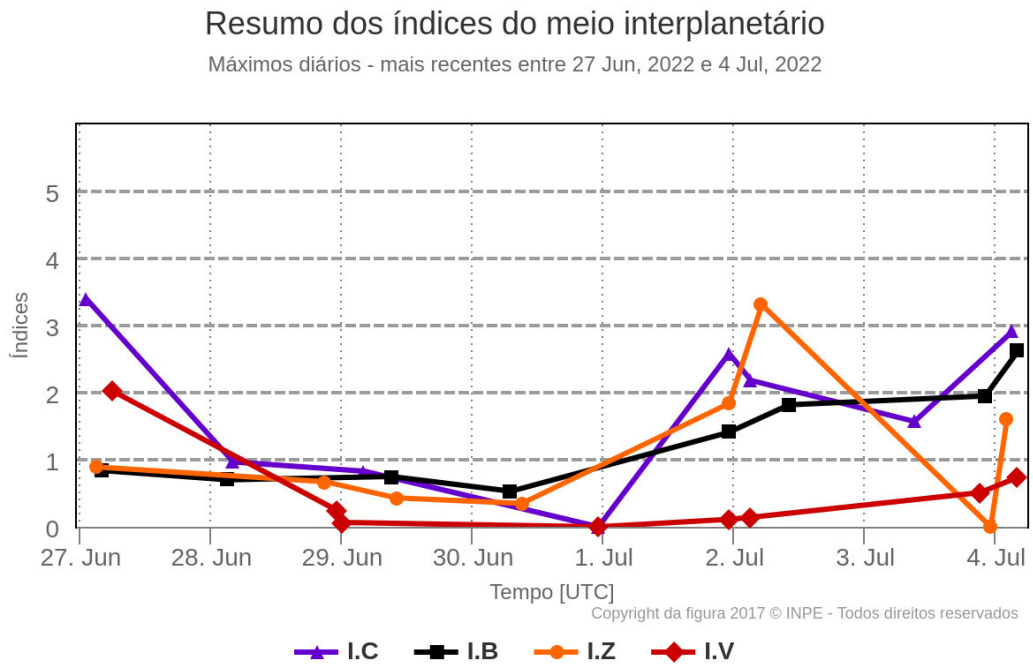
Figura: Above the 193 Å image of the Sun are highlighted coronal holes observed by SPOCA around 15:00 UT on July 01, 2022.

WSA - ENLIL SPOCA



3 Interplanetary Medium

3.1 Responsible: Paulo Jauer



- The interplanetary medium region in the last week showed a low/moderate level of plasma perturbations due to the possible interaction of CME and HSS-like structures identified by the DISCOVERY satellite in the interplanetary medium.
- The modulus of the interplanetary magnetic field component showed 2 peak on 02-04/July at 09:30-04:30 of $\sim$ 13-18 nT respectively.
- The BxBy components showed variations in the analyzed period, both remaining oscillating within the [+13, -13] nT interval, without the presence of sector switching.
- The component of the bz field showed fluctuations oscillating mostly in the interval [+14,-12.3] nT. The bz component showed a negative value of -12 nT on July 2nd at 04:30 UT and positive value on July 4th at 08:30 of 14 nT.
- The solar wind density showed 3 peaks of 29, 42 and 50 p/cm^3 on July 1st, 3rd and 4th at 22:30, 07:30 and 05:30 UT respectively.
- The solar wind speed fluctuated with maximum peak on July 27 at 07:30 UT of 607 km/s and minimum value recorded on July 03 at 04:30 of 303 km/s.
- The magnetopause position was oscillating on average below the equilibrium position. On June 27 at 01:30, it presented a maximum compression of 6.9 Re. He presented another 3 compressions on June 01, 02 and 04 at 23:30, 03:30 and 03:30 UT of 7.7, 8.06 and 7.6 Re respectively.

4 ULF waves

4.1 Responsible: Graziela B. D. Silva

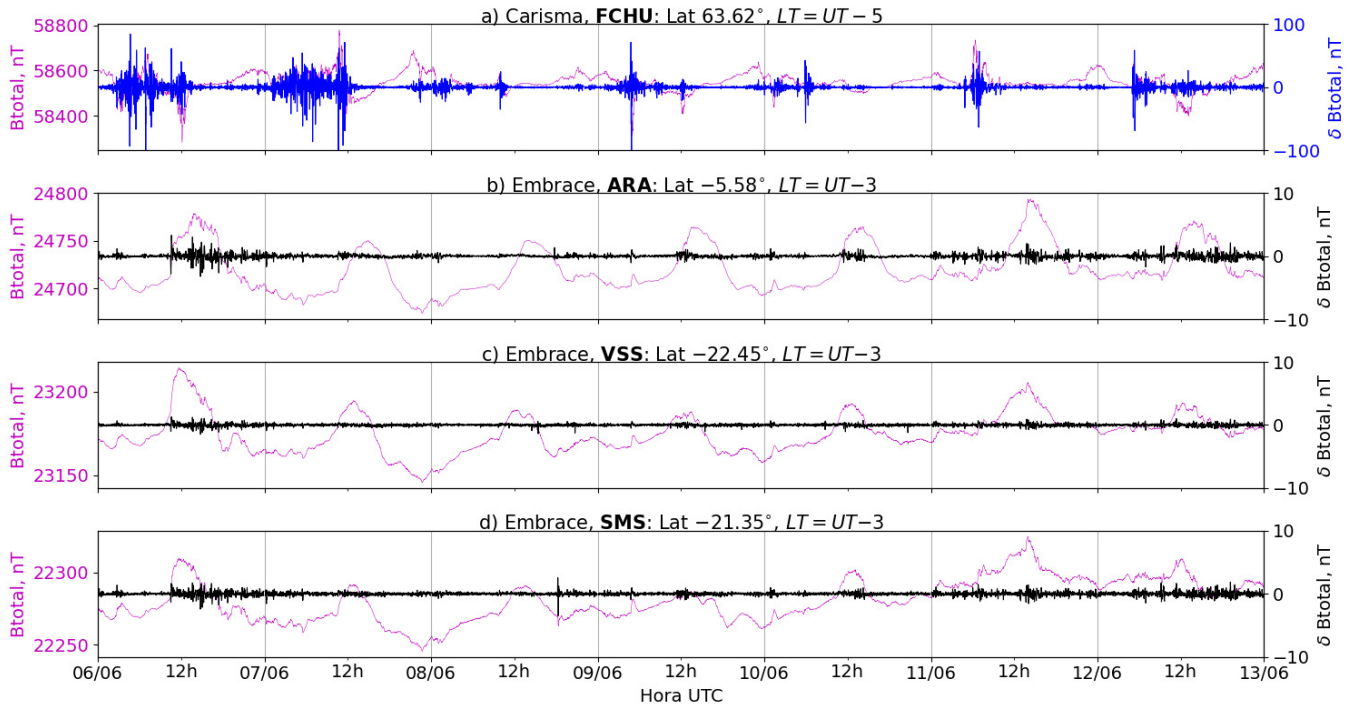


Figure 1: a) Timeseries of the geomagnetic field total component measured at FCHU station (Fort Churchill) of the CARISMA magnetometer network in magenta, along with the associated perturbation in the Pc5 band shown in blue. b-d) timeseries of the geomagnetic field total component measured at stations ARA (Araguatins), VSS (Vassouras) and SMS (São Martinho da Serra) of the EMBRACE network in magenta, along with the Pc5 perturbation in blue.

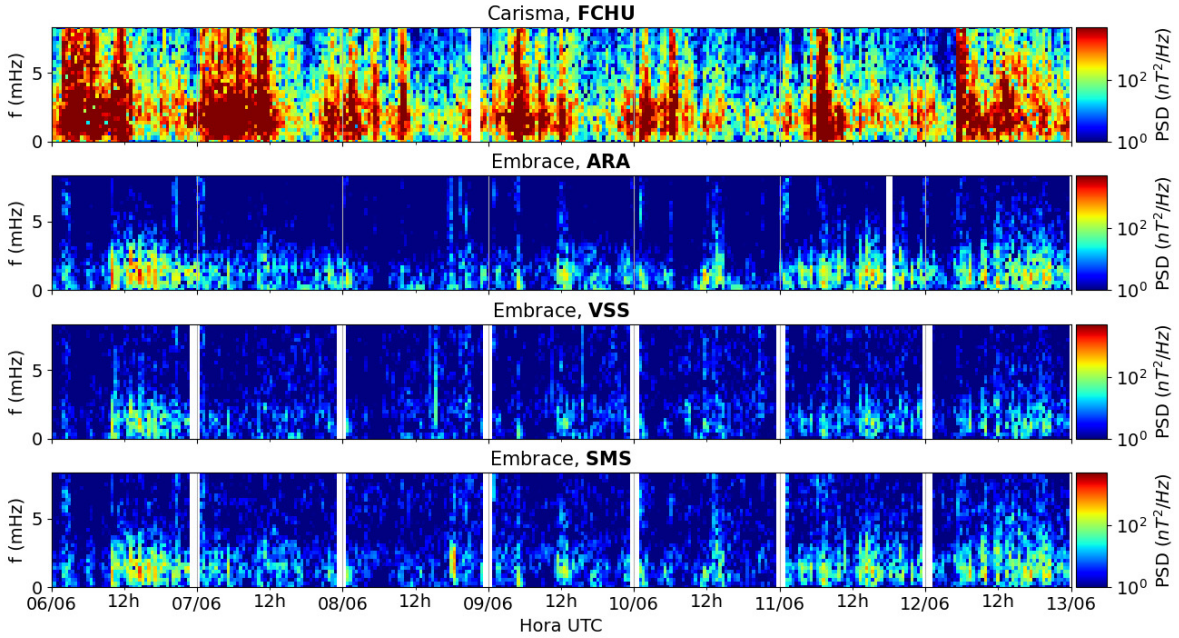


Figure 2: a-d) Time evolution of the power spectral density obtained from the filtered timeseries of the geomagnetic field total component (δ Btotal) for a) the high latitude station (FCHU-CARISMA), and b-d) for the low latitude stations of EMBRACE (ARA, VSS, SMS).

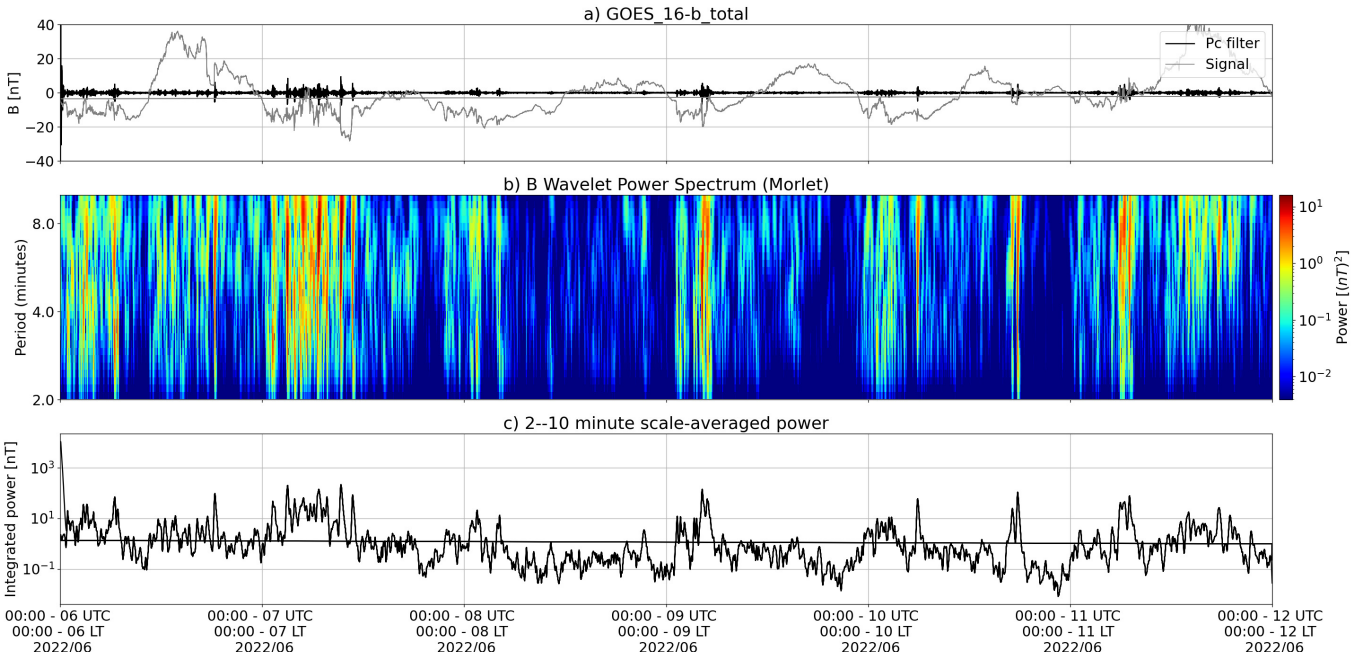


Figure 3: a) Timeseries of the geomagnetic field total component measured by GOES 16, together with the Pc5 fluctuation in black. b) Wavelet power spectrum of the filtered timeseries. c) Average ULF power in the period range from 2 to 10 minutes.

- There was significant activity of Pc5 ULF waves between 27/june and 28/june, as measured by GOES 16 at geosynchronous orbit (L $\sim$ 6.6). From $\sim$ 15 UT on 01/july, an intense acitivity of the waves was probed by the satellite, in response to global perturbation in the magnetosphere.

- The solar wind structures associated to the reported ULF wave activity throughout the week were mainly a CIR (corotating interaction region) on 26/june, and two shock-related ICMEs (interplanetary coronal mass ejections) on 01/july and 03/july.
- For the ground-based stations, an intense activity of ULF waves was registered in Fort Churchill (FCHU/high latitude) on days 27/july, and on 02 to 03/july. The wave activity on the other weekdays was considered small to moderate.
- The Embrace stations over the low latitude region of Brazil registered moderate level of activity of Pc5 ULF waves in the first hours of 27/june, and weak activity up to 12 UT on 01/july.
- Through 02-03/july, there was continuous/intense activity of ULF waves at these stations, accompanied by a storm-time decrease of total magnetic field component at the three stations.

5 Geomagnetic activity

5.1 Responsible: Lívia Alves

In the week of 27 June until 04 July, the following events related to geomagnetic activity stand out:

- The data from the Embrace magnetometer network showed instabilities throughout the period, with emphasis on Jul 01-04 - The magnetometers of the Embrace network recorded a drop followed by an enhancement in the H component.
- The geomagnetic activity was unstable throughout the period, the AE index was unsettled in the period, AE index persisted in 500 nT for several haours. The Dst index reached -51 nT. The highest Kp of the week was 5-.
- The gemagnetic field measured at the GOES orbit shows instabilities on 01-04 July.

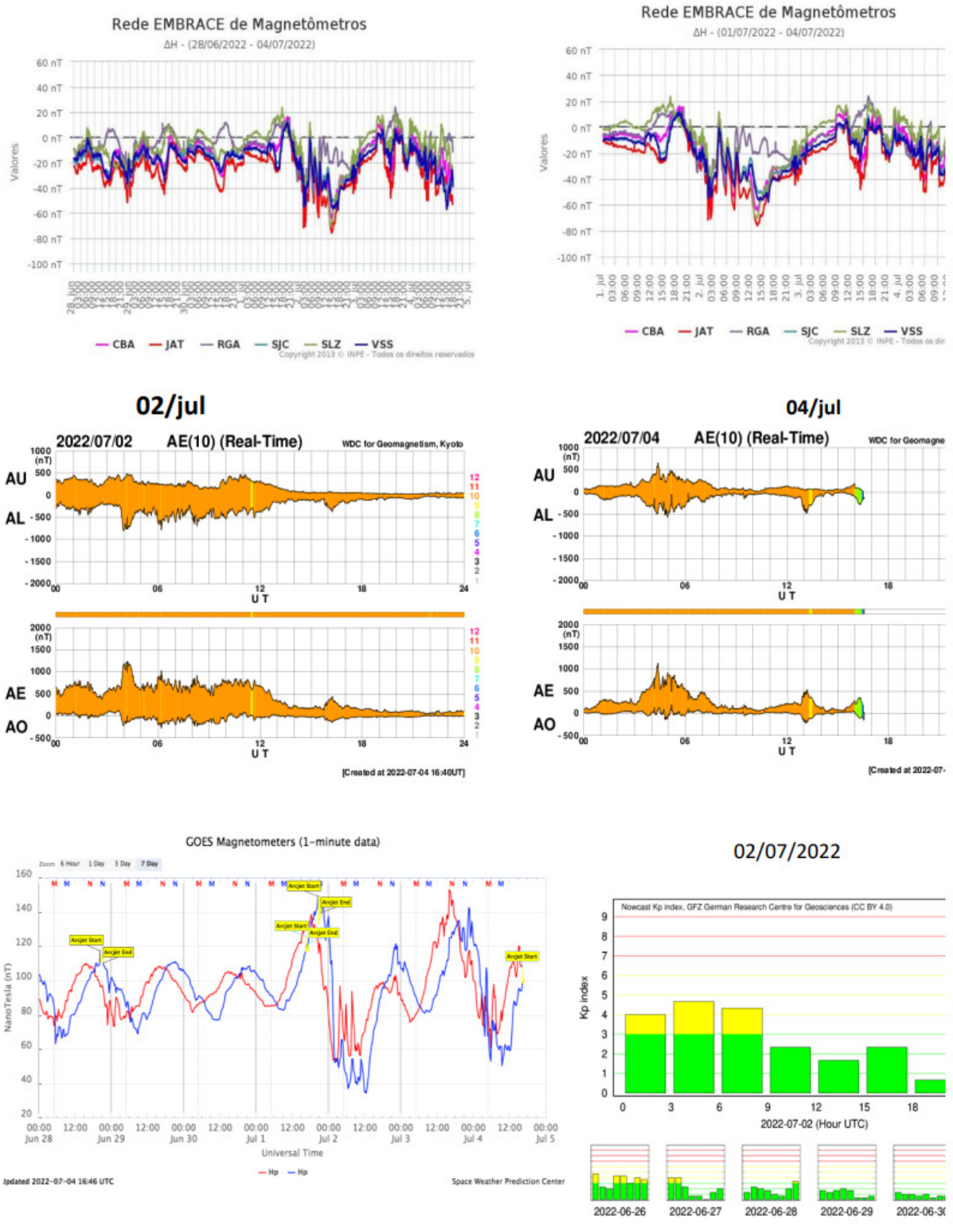


Figure 4: The figures from top to bottom show the weekly evolution of the H magnetic field component measured by the Embrace network, of the auroral AE index, of the geomagnetic field measured by the GOES satellites at $L \sim 6.6$ on the left, along with the Kp index on the right hand side.

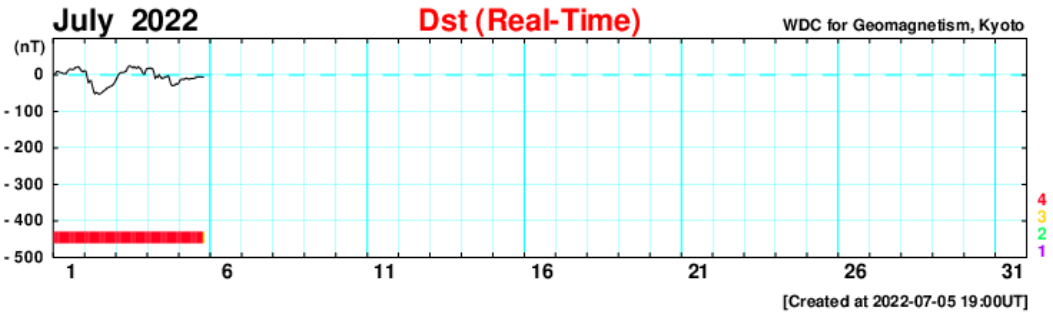


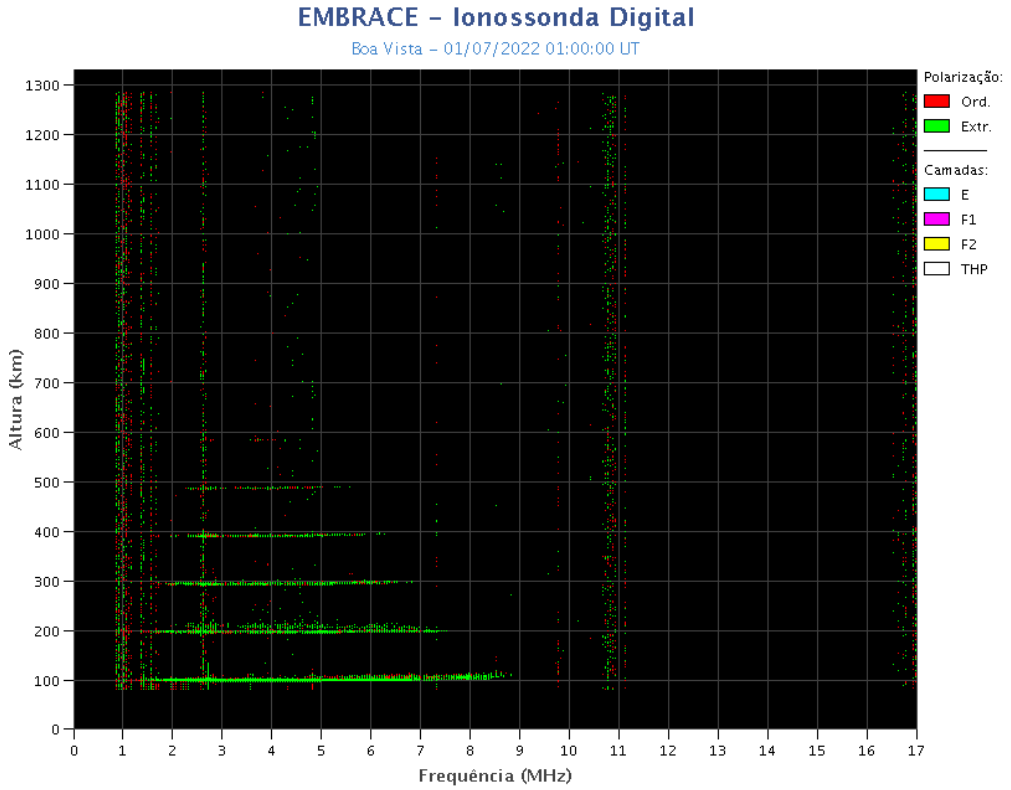
Figure 5: Time evolution of the geomagnetic Dst index.

6 Ionosphere

6.1 Responsible: Laysa Resende

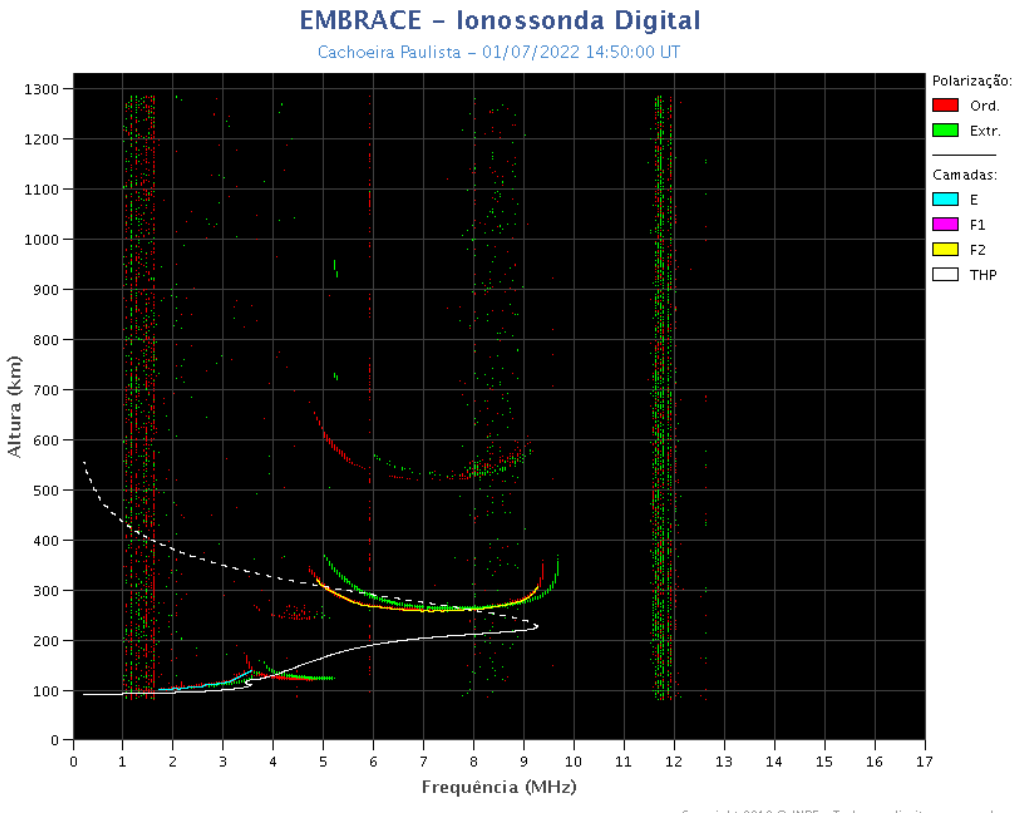
Boa Vista:

- The spread F does not occur on June 29 and July 02.
- The Es layers reached scale 5 on July 02.



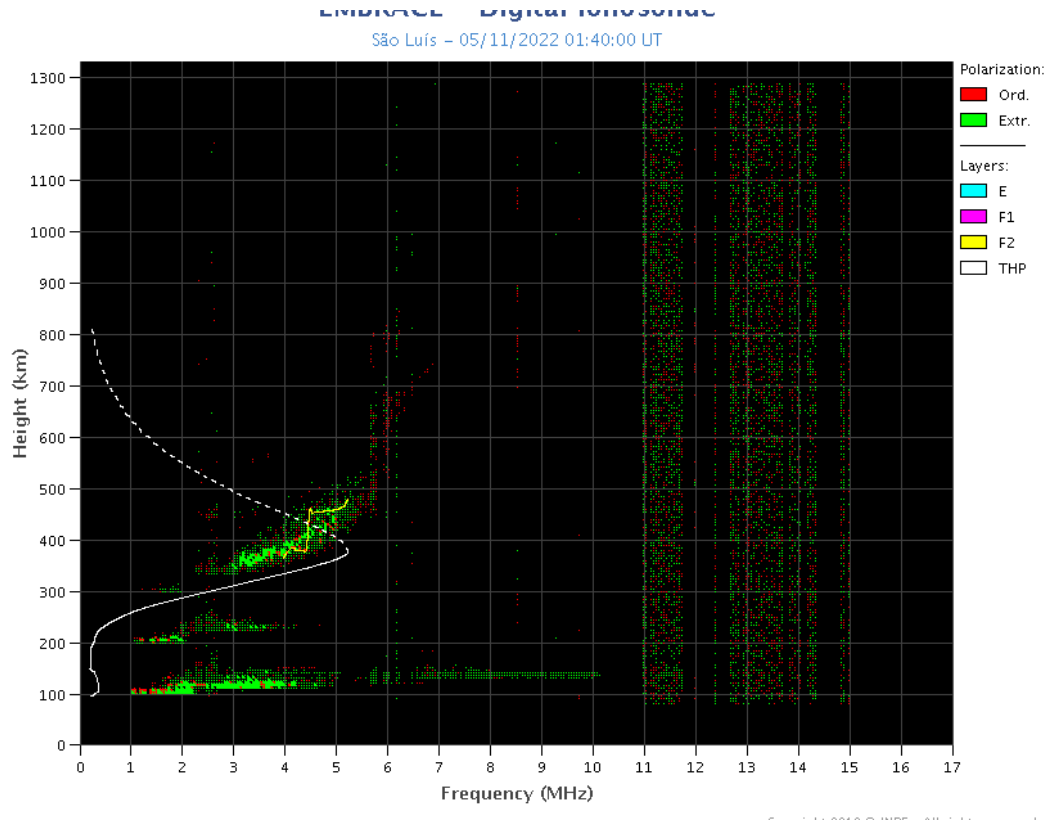
Cachoeira Paulista:

- The spread F did not occur during this week.
- The Es layers reached scale 3 July 01.



São Luís:

- There were a spread F during all days in this week.
- The Es layers reached scale 5 on July 01.



7 Scintilation

7.1 Responsible: Siomel Savio Odriozola

In this report on the S4 scintillation index, data from SLMA in São Luiz/MA, STNT in Natal/RN, STSN in Sinop/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 $\sim$ 360 m. During this week the SLMA and STSN and SJCE stations showed S4 values below 0.3. STSN was the only station to report light and moderate scintillation values during the morning of 07/03 (Figure 1). Satellites mainly located west of the STSN station were the ones that contributed most to S4 values above 0.3 (Figure 2).

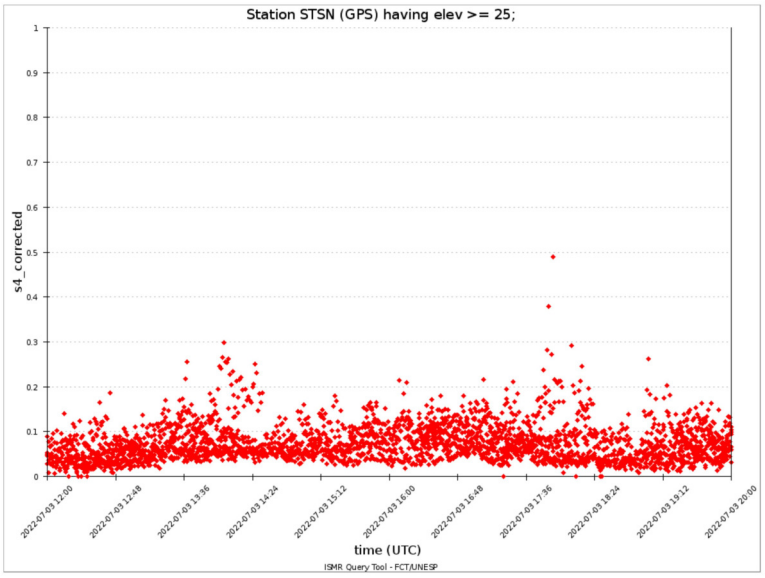


Figure 1: S4 index values for the GPS constellation measured at STSN during the morning hours of 07/03.

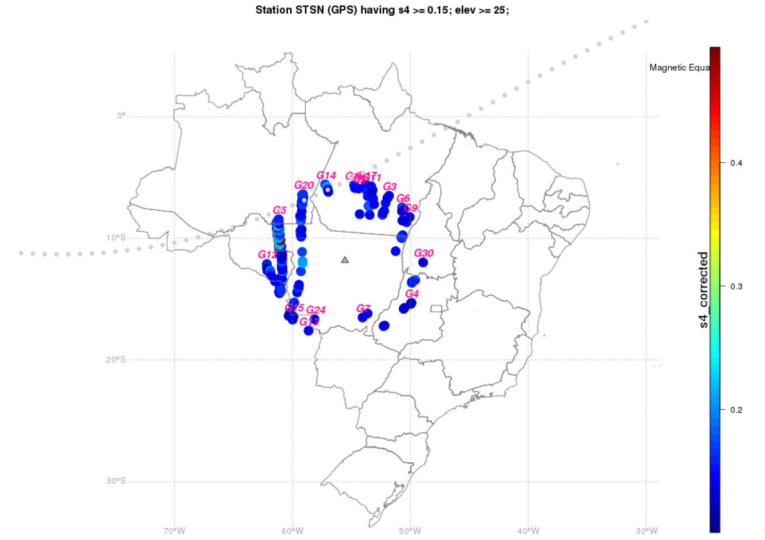


Figura 2: Map of S4 values > 0.15 for GPS satellites with elevation > 25° at STSN receiver field of view in between 1300-2000 UT on 07/03.