Briefing Space Weather

2023/08/04

1 Sun

1.1 Responsible: Douglas Silva

- WSA-ENLIL (CME 2023-07-23T15:05:00 UT)
  - The simulation results indicate that the flank of CME will reach the DSCOVR mission between 2023-07-25T18:08:00 UT and 2023-07-26T08:08:00 UT.
- WSA-ENLIL (CME 2023-07-28T22:36:00 UT)
  - The simulation results indicate that the CME will reach the DSCOVR mission between 2023-07-31T21:41:00 UT and 2023-08-01T06:41:00 UT.

Coronal holes (SPOCA):

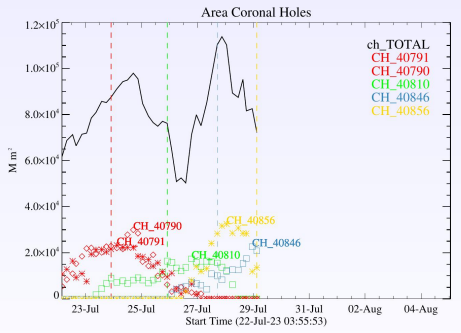


Figura: The solid black line depicts the products of the sum of areas for each detection interval performed by SPOCA between July 22 and 29, 2023.

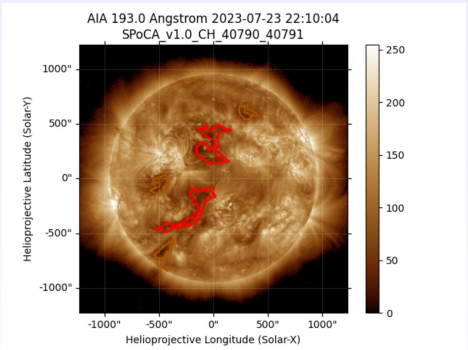
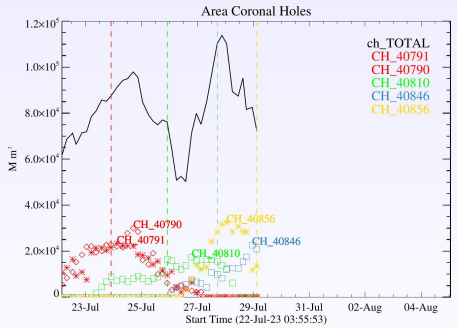


Figura: Above the 193 Å image of the Sun are highlighted coronal holes observed by SPOCA around 22:10 UT on July 23, 2023 (red dot line).

Coronal holes (SPOCA):



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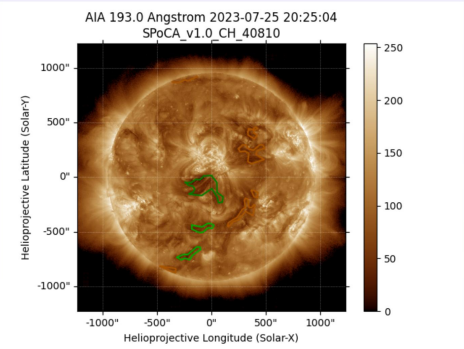
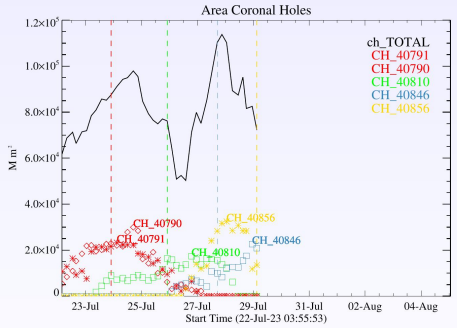


Figura: Above the 193 Å image of the Sun are highlighted coronal holes observed by SPOCA around 20:20 UT on July 25, 2023 (green dot line).

Coronal holes (SPOCA):



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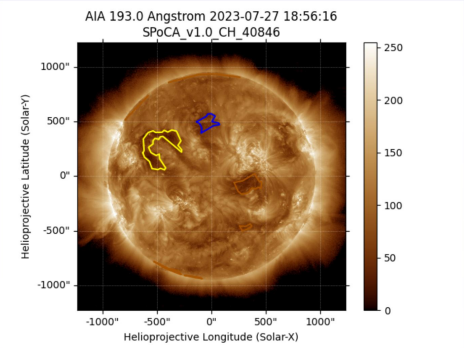
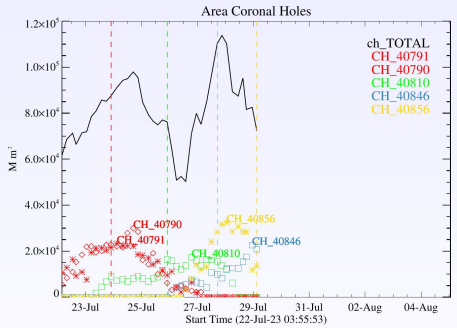


Figura: Above the 193 Å image of the Sun are highlighted coronal holes observed by SPOCA around 18:50 UT on July 27, 2023 (magenta dot line).

Coronal holes (SPOCA):



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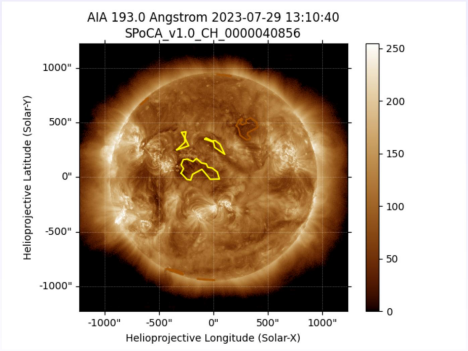
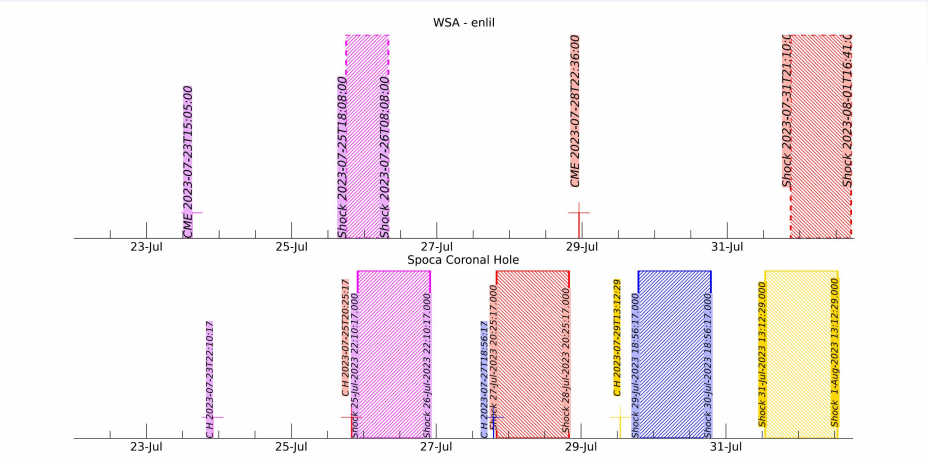


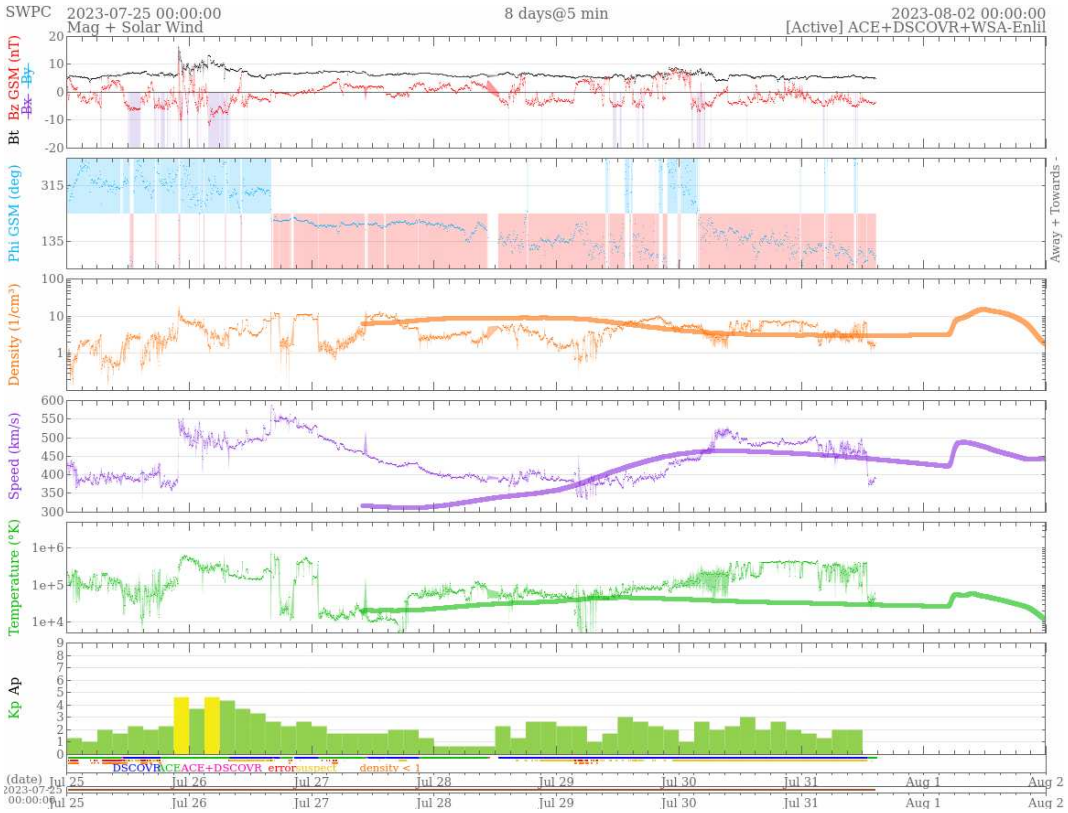
Figura: Above the 193 Å image of the Sun are highlighted coronal holes observed by SPOCA around 13:10 UT on July 29, 2023 (yellow dot line).

WSA - ENLIL and SPOCA



2 Interplanetary Medium

2.1 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 DSCOVR satellite in the interplanetary medium.
- The modulus of the interplanetary magnetic field component showed a peak 12 nT on 26/July at 04:30 during the analyzed period.
- The BxBy components presented variations in the analyzed period, keeping both oscillating within the interval [+10, -10] nT, with the presence of sector Boundary crossing on July 26 at 16:30 UT.
- The bz field component showed a minimum value on 26/July at 04:30 UT of $\sim$ -8.0nT . In the remainder of the period, the bz component fluctuated in the interval [+5, -5] nT. The solar wind density presented oscillations however below 12 p/cm^3.
- The solar wind speed remained on average above 400 km/s with a peak on 26/July at 16:30 UT of 564 km/s.
- The position of the magnetopause was oscillating with a minimum value recorded on 25/July at 22:30 UT of 8.6 Re. On average the position of the magnetopause oscillating above the equilibrium position

3 Radiation Belts

3.1 Responsible: Ligia Alves da Silva

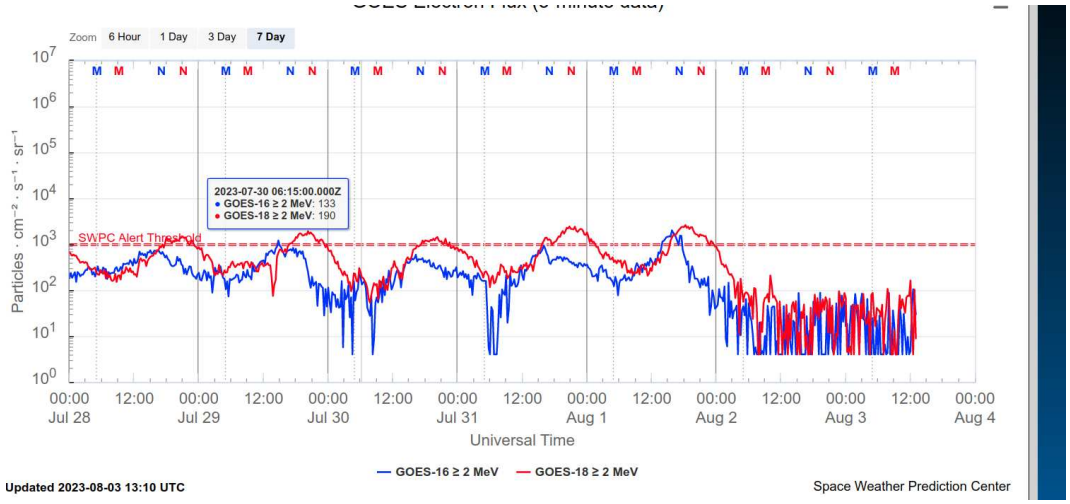


Figura 1: High-energy electron flux (> 2MeV) obtained from GOES-16 and GOES-18 satellite. Source: `:https://www.swpc.noaa.gov/products/goes-electron-flux`

High-energy electron flux (> 2 MeV) in the outer boundary of the outer radiation belt obtained from geostationary satellite data GOES-16 and GOES-18 (Figure above) oscillates around 10^3 particles/$(cm^2 sr)$ between July 28th and August 1st. A dropout is observed from August 2nd with more than two orders of magnitude, persisting below 10^2 particles/$(cm^2 sr)$ more than 24 hours.

4 ULF waves

4.1 Responsible: Graziela B. D. Silva

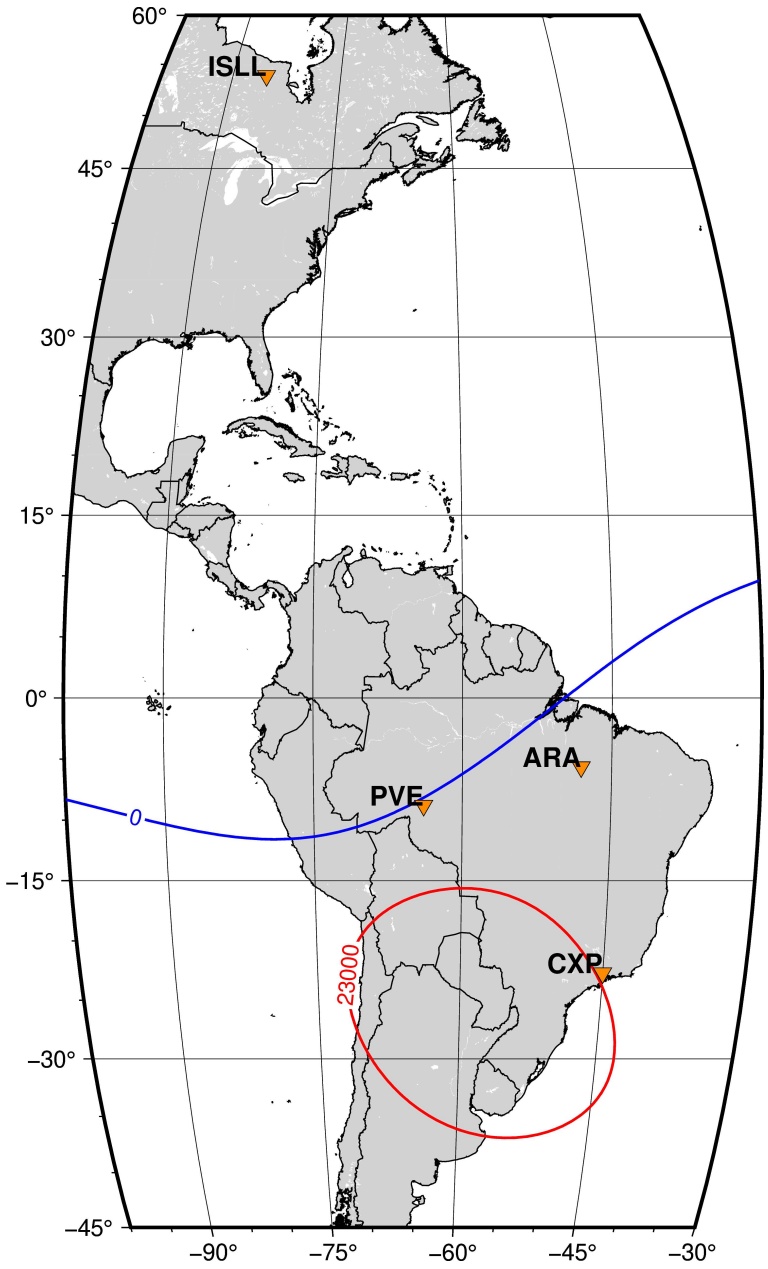


Figura 2: a) Map describing the geographic location of the stations together with the magnetic isolines to show that magnetic equator (blue) and the SAMA region (red). Cortesy: Karen Sarmiento.

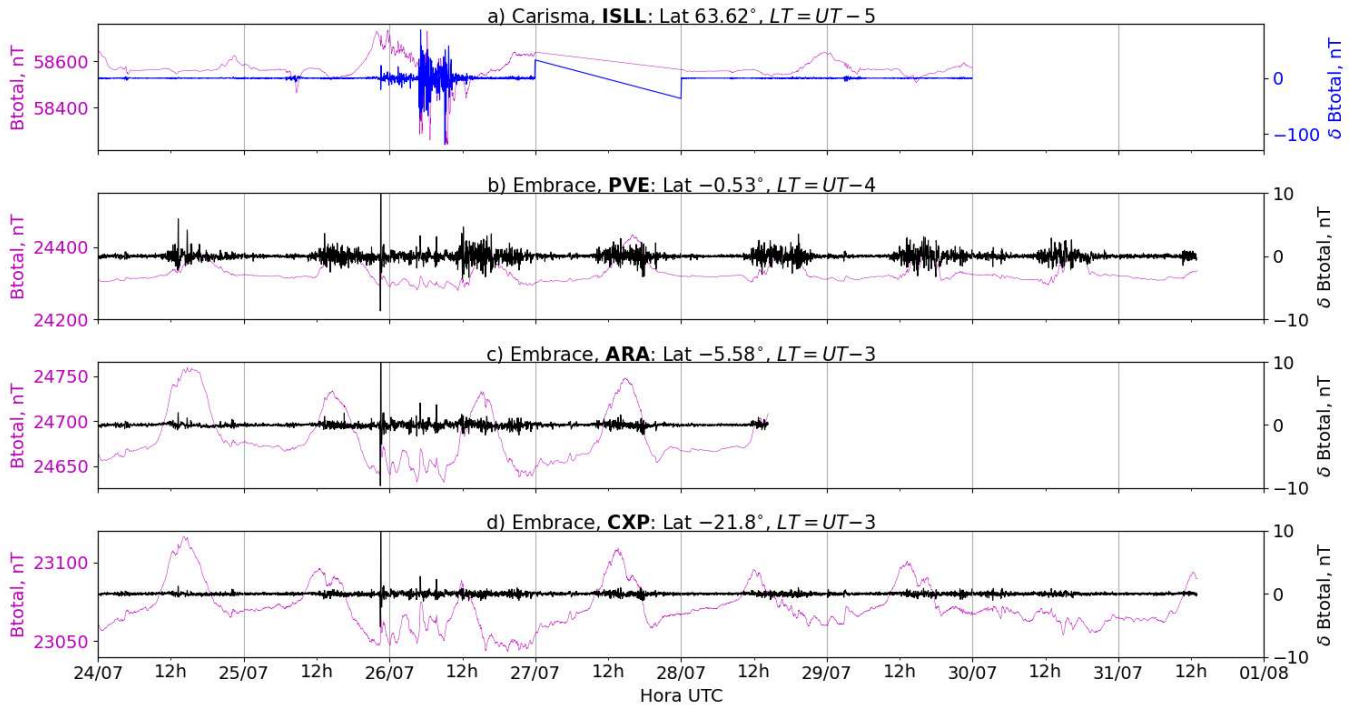


Figura 3: a) Timeseries of the geomagnetic field total component measured at ISLL station (Island Lake) of the CARISMA magnetometer network in magenta, along with the associated perturbation in the Pc5 band shown in blue. b-d) timeseries of the geomagnetic field total component measured at stations PVE (Porto Velho), ARA (Araguatins), and CXP (Cachoeira Paulista) of the EMBRACE network in magenta, along with the Pc5 perturbation in blue.

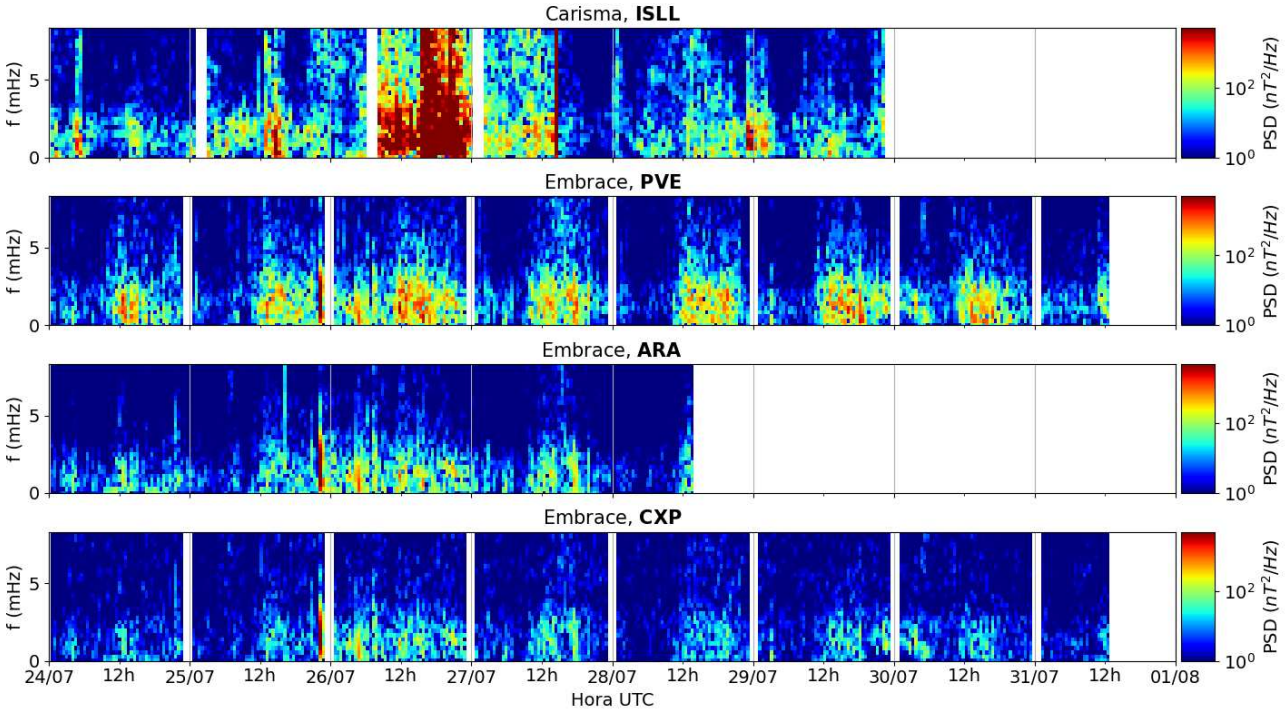


Figura 4: a-d) Time evolution of the power spectral density obtained from the filtered timeseries of the geomagnetic field total component (δ Btotal) for a) the high latitude station (ISLL-CARISMA), and b-d) for the low latitude stations of EMBRACE (PVE, ARA, CXP).

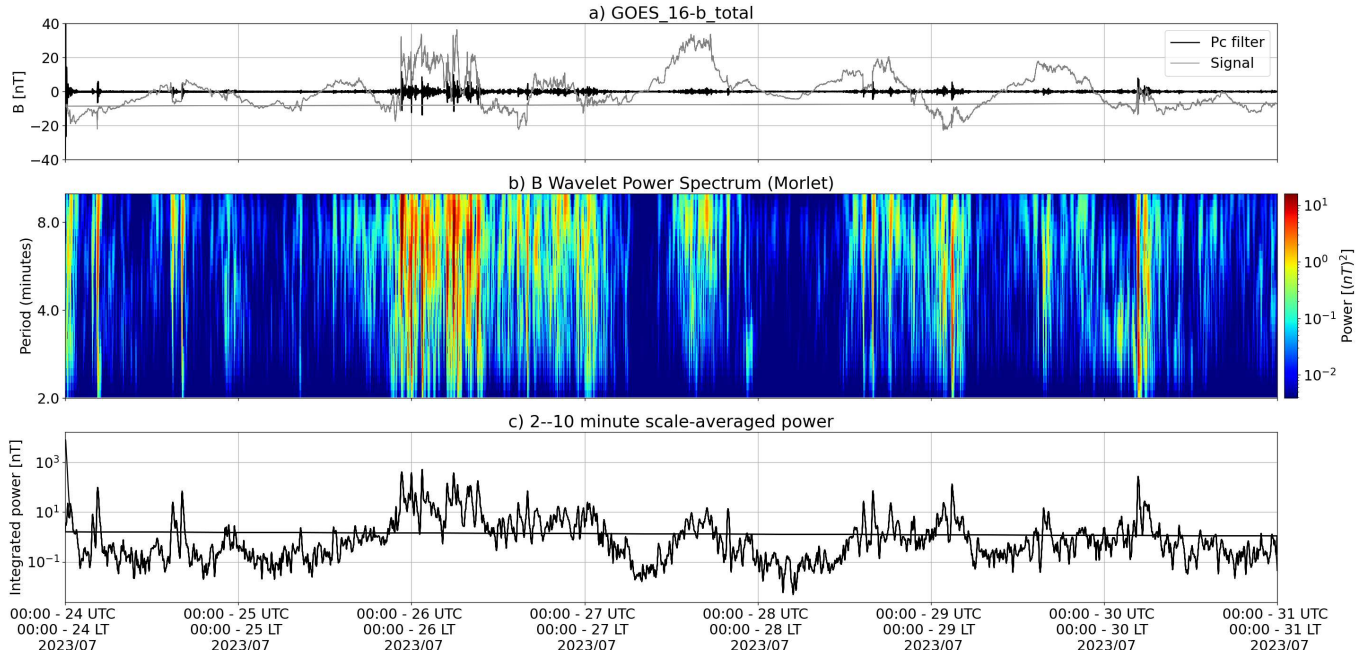


Figura 5: a) Timeseries of the geomagnetic field total component measured by GOES 16, together with the Pc5 fluctuation in black. b) Wavelet power spectrum of the filtered timeseries. c) Average ULF power in the period range from 2 to 10 minutes.

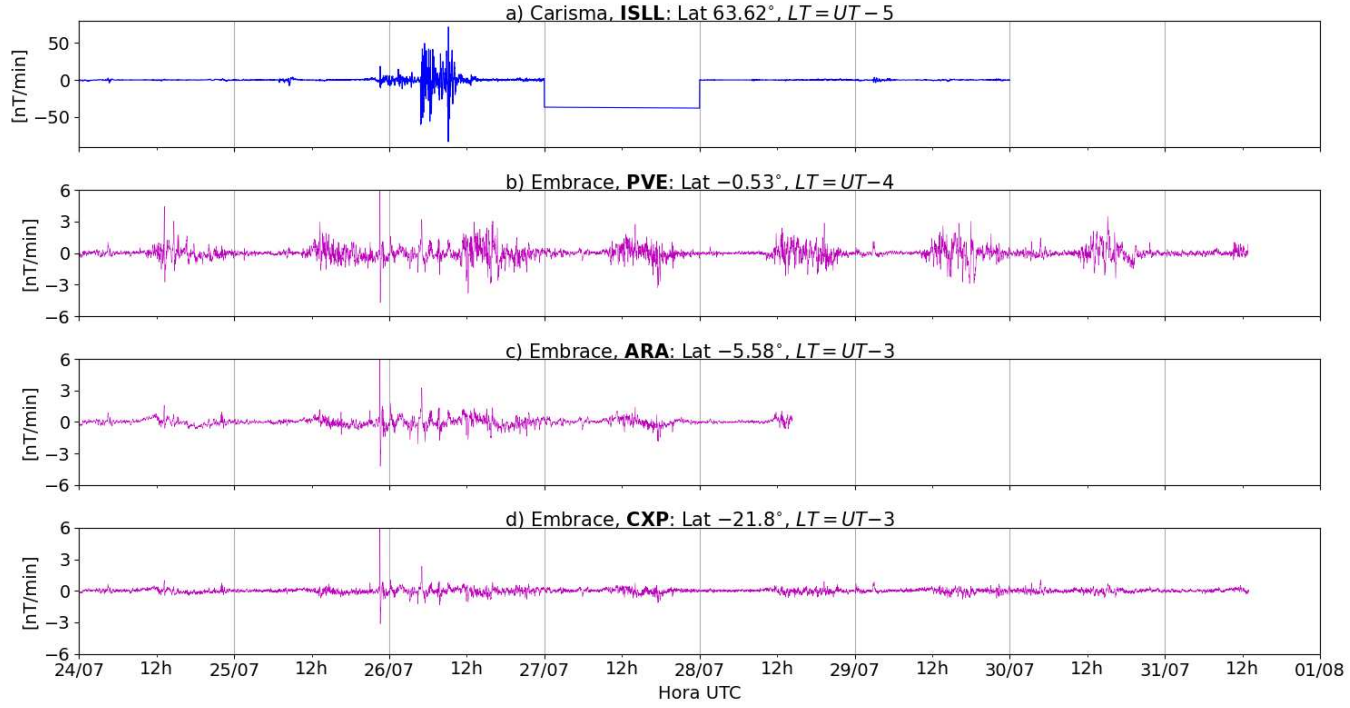


Figura 6: a-d) The rate of change of the geomagnetic field total component (dB/dt) obtained for a) the high latitude station (ISLL-CARISMA), and b-d) for the low latitude stations of EMBRACE (PVE, ARA, CXP).

- The GOES 16 satellite in geosynchronous orbit (L $\sim$ 6.6) registered significant activity of Pc5 ULF waves over the week, that is, especially on July 25 (as of 19 UT), and July 26.
- As observed on the ground, the ISLL station at high latitude registered intense ULF wave activity

over July 26.

- The PVE station from Embrace MagNet, located under the dip equator, registered significant activity of the waves during the week, which was most sustained on July 26.
- The ARA and CXP stations at low latitude of Brazil registered low to moderate activity of the waves (mostly on July 26).
- The dB/dt rates were below 100 nT/min in magnitude at ISLL (high latitude), reached on July 26. The rates were below 6 nT/min at the Embrace stations in lower latitudes.
- There was detection of a significant event of SI (sudden impulses or SCs with dB/dt > 5nT/min) on July 25.

5 Geomagnetic activity

5.1 Responsible: Lívia Alves

From 25-31 July, the geomagnetic field was unsettled, the following occurences are highlighted

- jul/25: Embrace MagNet registered a shock enhancement of +20 nT Embrace MagNet registered instabilities and a drop of -80 nT at 15:15 UT, Dst = -56nT
- jul/29: AE index reached 500 nT and Kp was 5o

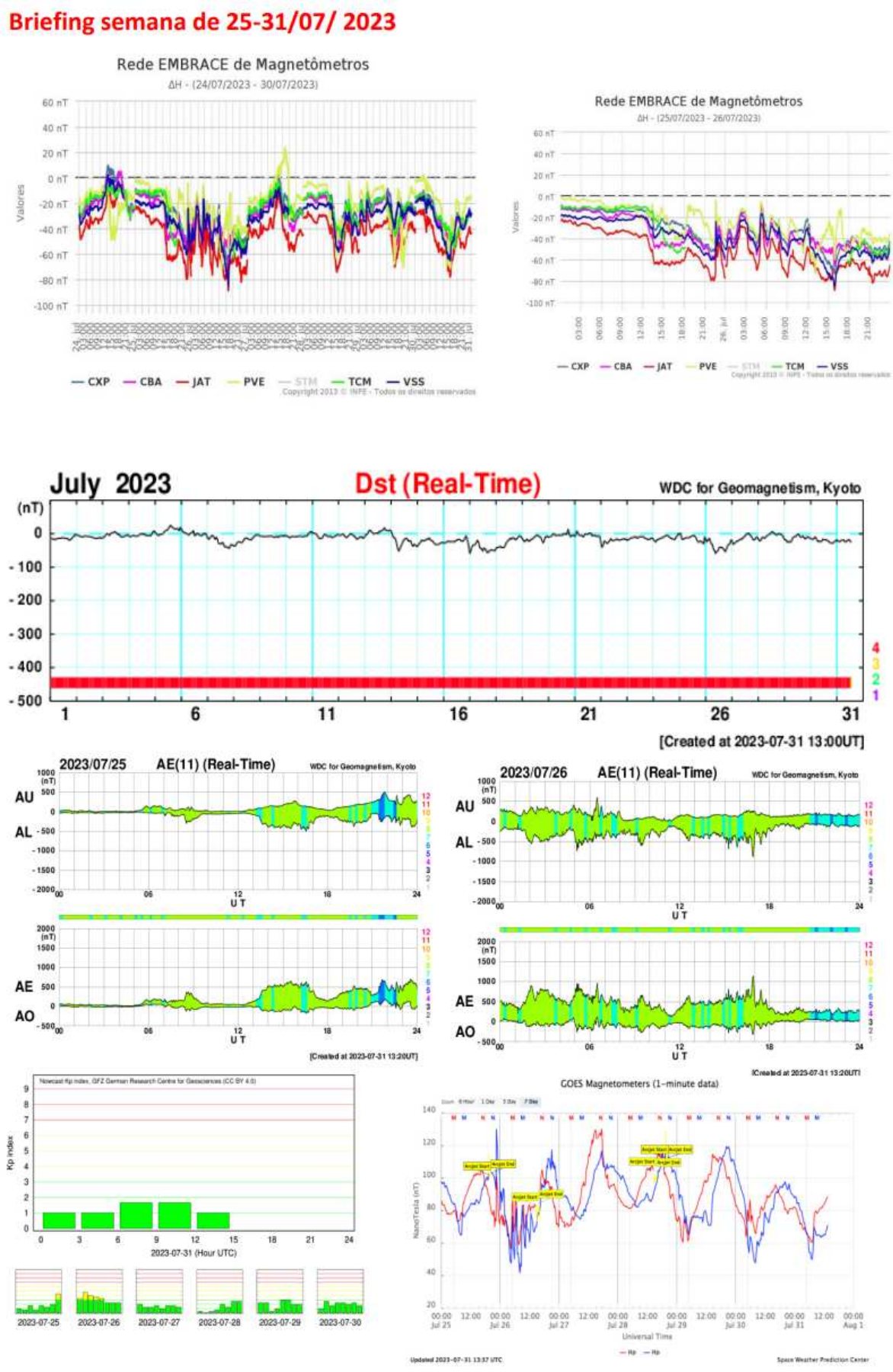


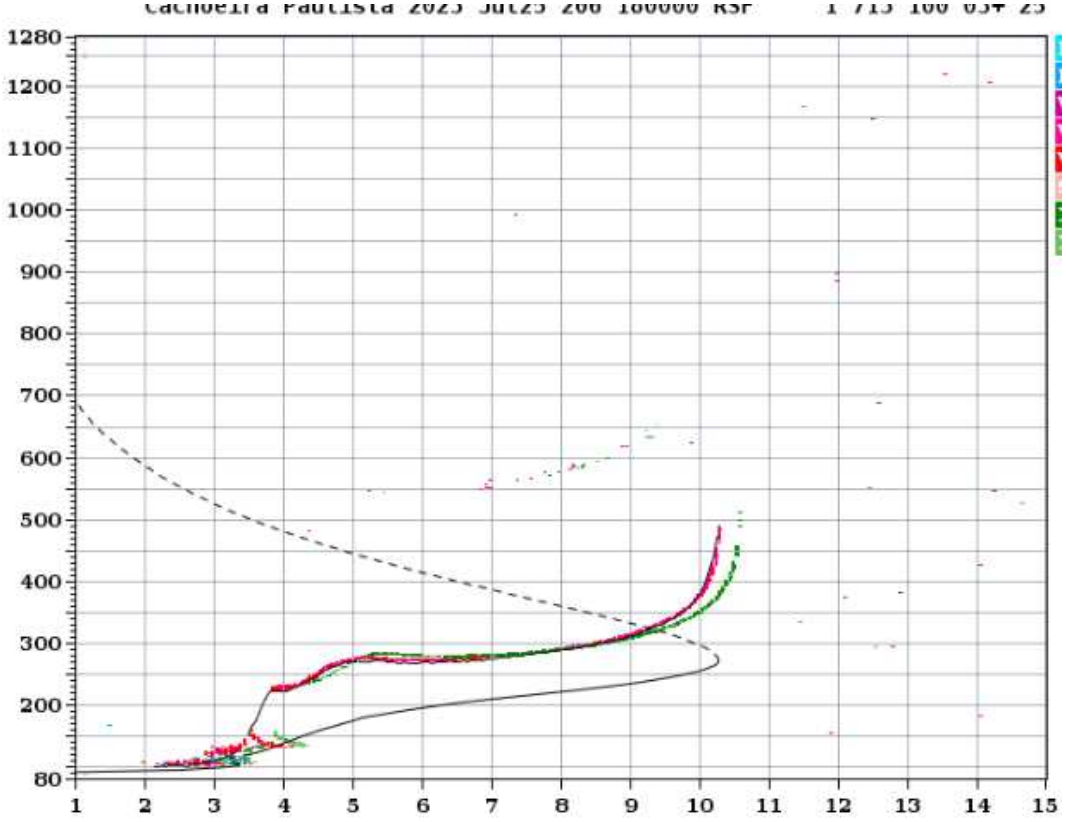
Figura 7: Time evolution of the geomagnetic field data and indices during the reported week.

6 Ionosphere

6.1 Responsible: Laysa Resende

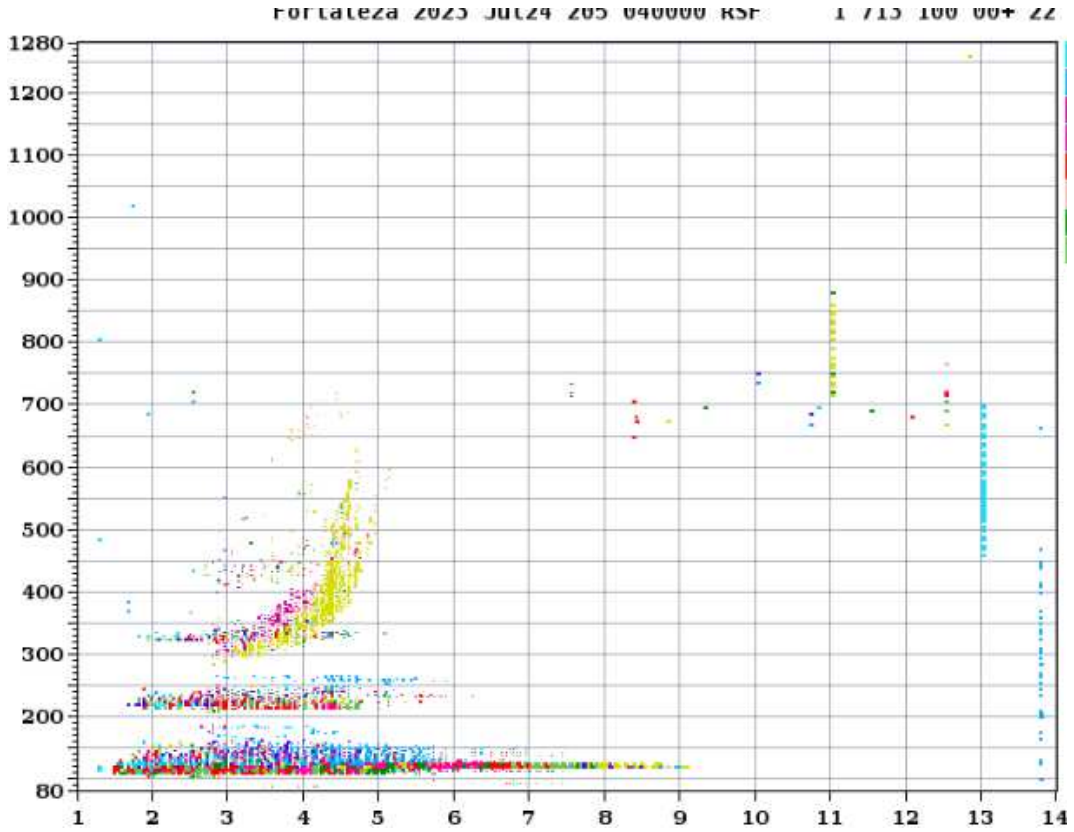
Cachoeira Paulista:

- There were not spread F during this week.
- The Es layers reached scale 2 during this week.
-



Fortaleza

- There were not spread F during this week.
- The Es layers reached scale 5 during this week.



7 ROTI

7.1 Responsible: Name

In the week 2272 (July 23-29, 2023) there were no ionospheric irregularities (plasma bubble). Figure 1 shows the ROTI time series for four stations in the Brazilian sector (Natal (RNNA), Bacabal (MABB), Cuiabá (CUIB) and São José dos Campos (SJSP)).

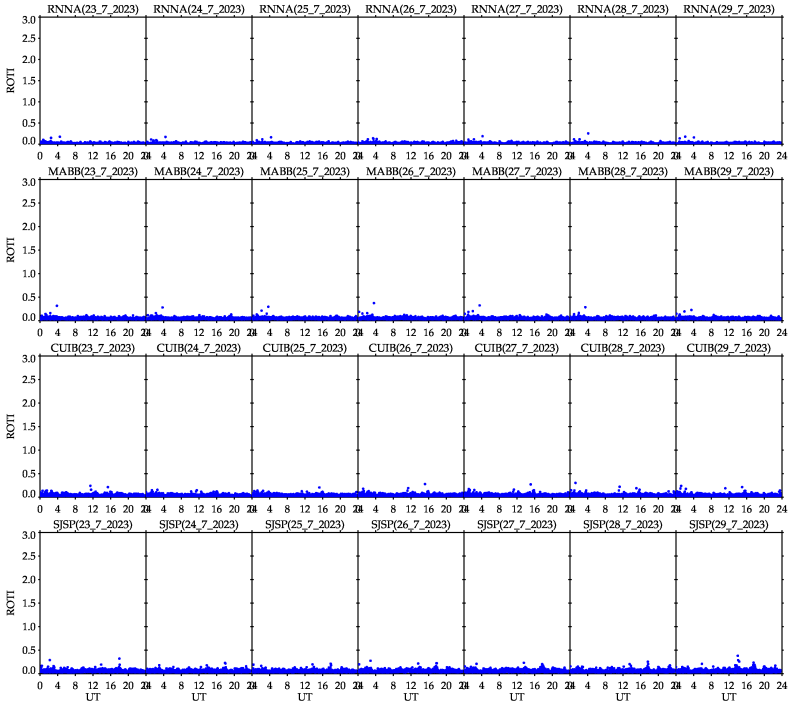


Figura 8: ROTI time series for four stations in the Brazilian sector (Natal (RNNA), Bacabal (MABB), Cuiabá (CUIB) and São José dos Campos (SJSP)), from July 23 - 29, 2023.