Briefing Space Weather

2023/09/01

1 Sun

1.1 Responsible: José Cecatto

08/21 – No M/X flare; Fast (< 650 km/s) wind stream; No CME toward the Earth;
08/22 – M1.1 flare; Fast (< 550 km/s) wind stream; 8 CME can have component toward the Earth *;
08/23 – No M/X flare; Fast (< 450 km/s) wind stream; 8 CME can have component toward the Earth;
08/24 – No M/X flare; Fast (< 500 km/s) wind stream; 2 CME can have component toward the Earth;
08/25 – M1.5 flare; Fast (< 500 km/s) wind stream; 6 CME can have component toward the Earth;
08/26 – M1.1 flare; Fast (< 450 km/s) wind stream; 8 CME can have component toward the Earth *;
08/27 – No M/X flare; No fast wind stream; 5 CME can have component toward the Earth *;
08/28 – No M/X flare; No fast wind stream; No CME toward the Earth;
Prev.: No fast wind stream for next 01-02 days; for while low (20% M, 05% X) probability of M / X flares next 2 days;
also, occasionally some other CME can present a component toward the Earth.

2 Sun

2.1 Responsible: Douglas Silva

- WSA-ENLIL (CME 2023-08-22T23:29 UT)
  - The simulation results indicate that the flank of CME will reach the DSCOVR mission between 2023-08-25T17:00 UT and 2023-08-26T07:00 UT

Coronal holes (SPOCA):

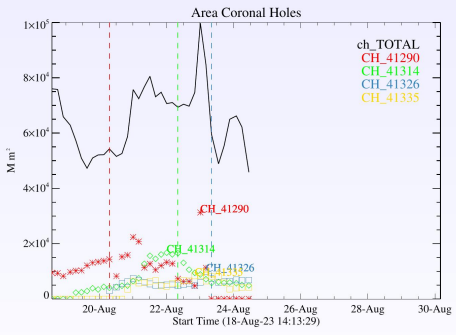


Figura: The solid black line depicts the products of the sum of areas for each detection interval performed by SPOCA between August 18 and 25, 2023.

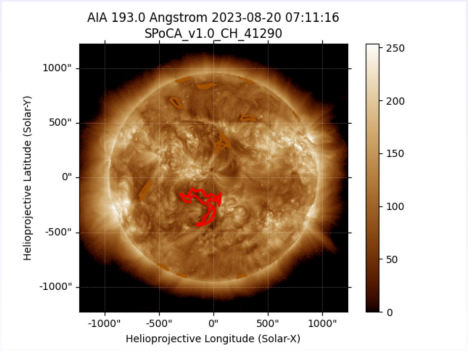


Figura: Above the 193 Å image of the Sun are highlighted coronal holes observed by SPOCA around 07:10 UT on August 20, 2023 (red dot line).

Coronal holes (SPOCA):

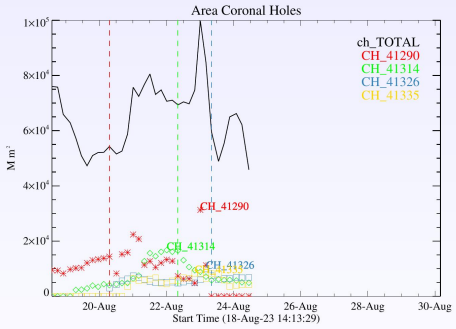


Figura: The solid black line depicts the products of the sum of areas for each detection interval performed by SPOCA between August 18 and 25, 2023.

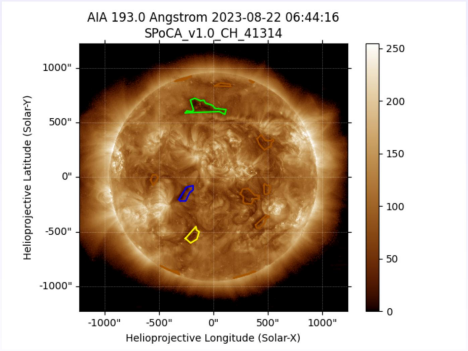


Figura: Above the 193 Å image of the Sun are highlighted coronal holes observed by SPOCA around 06:40 UT on August 22, 2023 (green dot line).

Coronal holes (SPOCA):

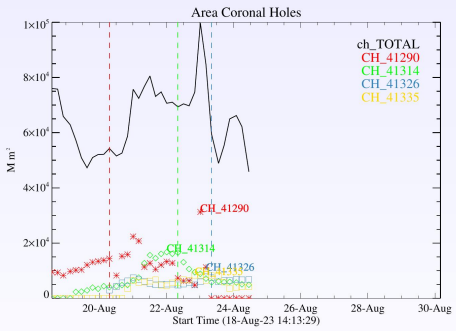


Figura: The solid black line depicts the products of the sum of areas for each detection interval performed by SPOCA between August 18 and 24, 2023.

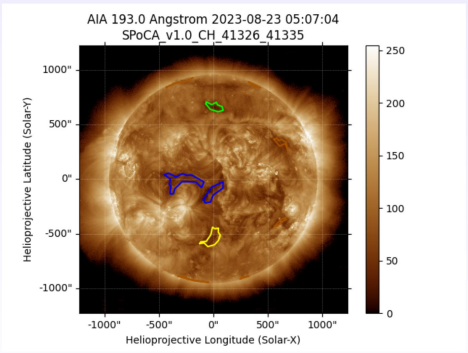
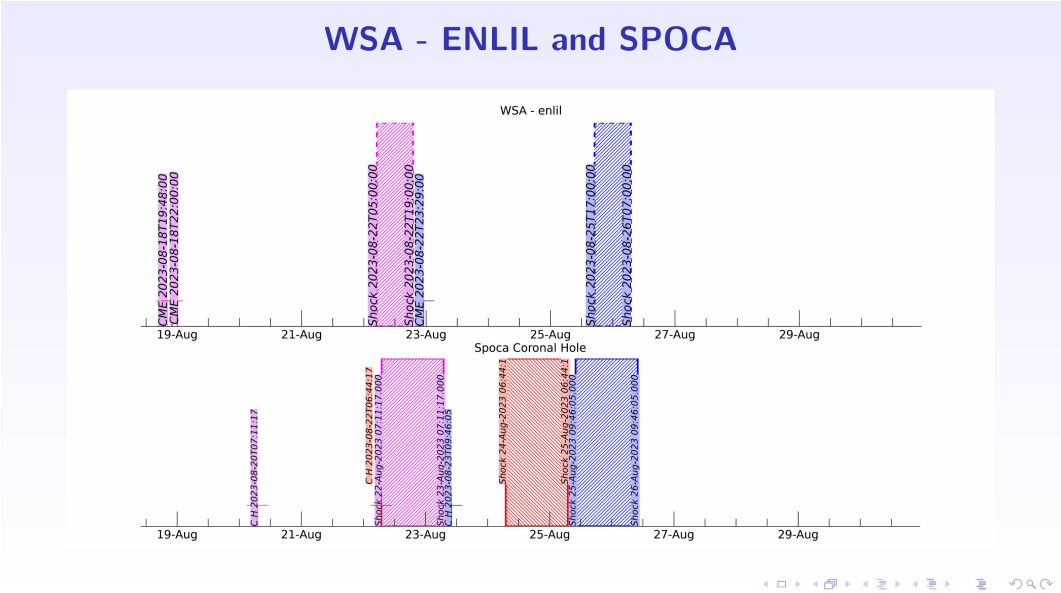


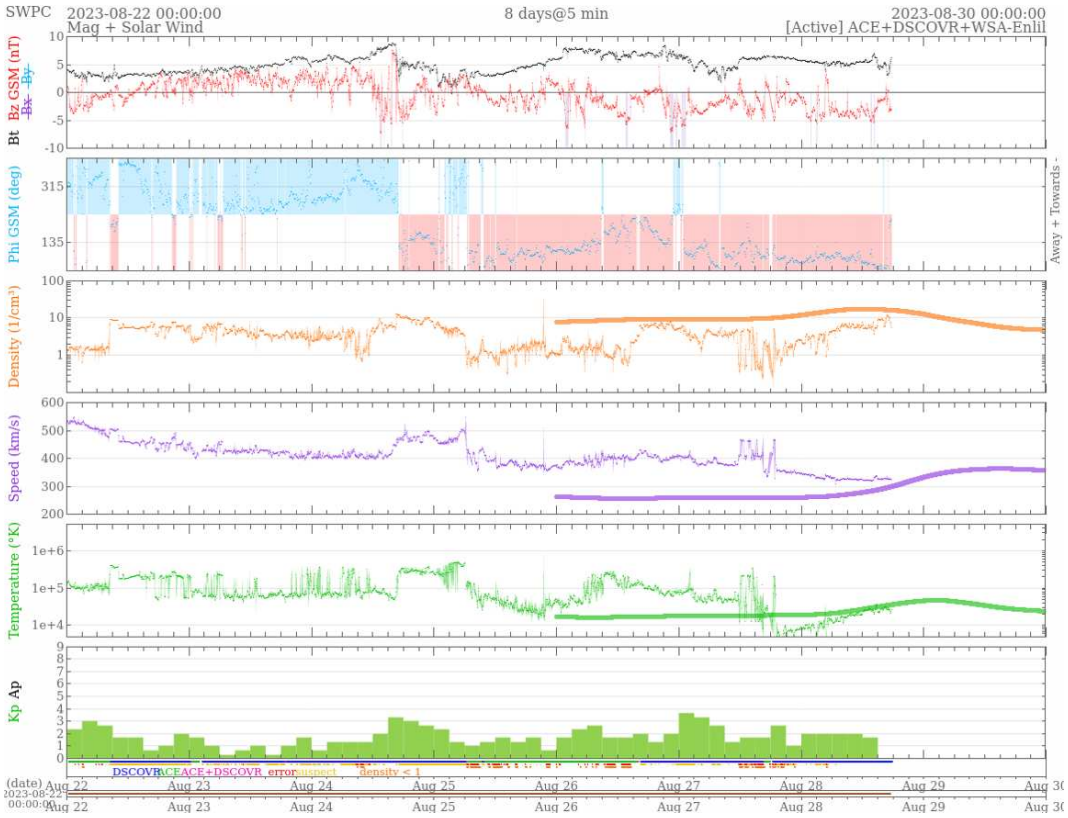
Figura: Above the 193 Å image of the Sun are highlighted coronal holes observed by SPOCA around 05:00 UT on August 23, 2023 (blue dot line).



3 interplanetary medium

3.1 Responsible: Paulo Jauer

- The interplanetary medium region in the last week showed a low to moderate level of plasma disturbances due to the possible interaction of CME-like structures identified by the DSCOVR satellite in the interplanetary medium.
- The magnitude of the interplanetary magnetic field component remained below 8 nT during the analyzed period.
- The BxBy components presented variations in the analyzed period, keeping both oscillating within the interval [+8, -8] nT, with the presence of sector boundary crossing on 25/Aug at 06:30 UT.
- The bz field component showed a minimum value on 26/Aug at 13:30 and 22:30 UT of $\sim$ - 4.55 and - 4.9 nT respectively. In the remainder of the period, the bz component fluctuated in the interval [+5, -5] nT.
- The solar wind density showed oscillations with a maximum peak recorded on 22; 24; 26 /Aug at 09:30, 17:30, 22:30, 15:30 UT of 8 p/cm^3, 10 p/cm^3, 06 p /cm^3, 09 p/cm^3 respectively.
- The speed of the solar wind averaged above 400 km/s. Showing a maximum value on 21/Aug at 09:30 UT of 633 km/s and a minimum value on 28/Aug at 12:30 UT of 322km/s
- The position of the magnetopause was oscillating on average above the equilibrium position. Minimum amount registered on 24/Aug at 17:30 UT of 8.9 Re.



4 Radiation Belts

4.1 Responsible: Ligia Alves da Silva

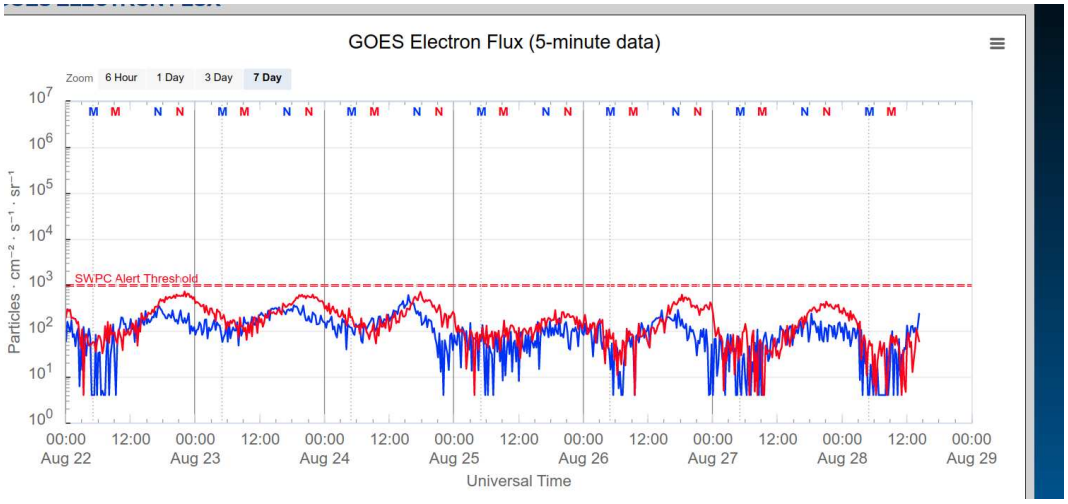


Figura 1: High-energy electron flux (¿ 2MeV) obtained from GOES-16 and GOES-18 satellite. Source: `https://www.swpc.noaa.gov/products/goes-electron-flux`

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 below) oscillates below 10^3 particles/$(cm^2 sr)$ during the entire analyzed time. A first dropout was observed at the end of August 24th, remaining around 10^2 particles/$(cm^2 sr)$ until 12:00 UT on August 26th. A second dropout was observed at the beginning of August 27th, followed by a quick recovery. A third dropout was observed at the end of August 28th, followed again by a quick recovery.

5 ULF waves

5.1 Responsible: Graziela B. D. Silva

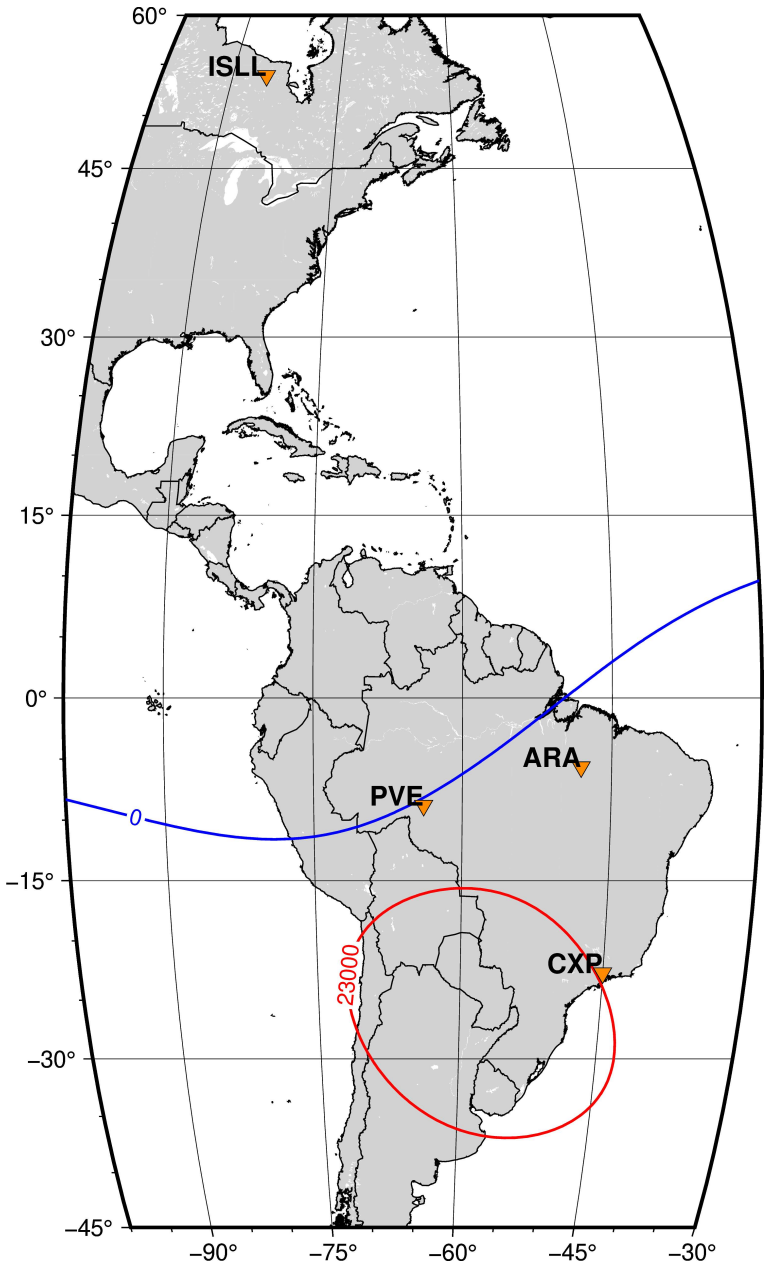


Figura 2: a) Map describing the geographic location of the stations together with the magnetic isolines to show that magnetic equator (blue) and the SAMA region (red). Cortesy: Karen Sarmiento.

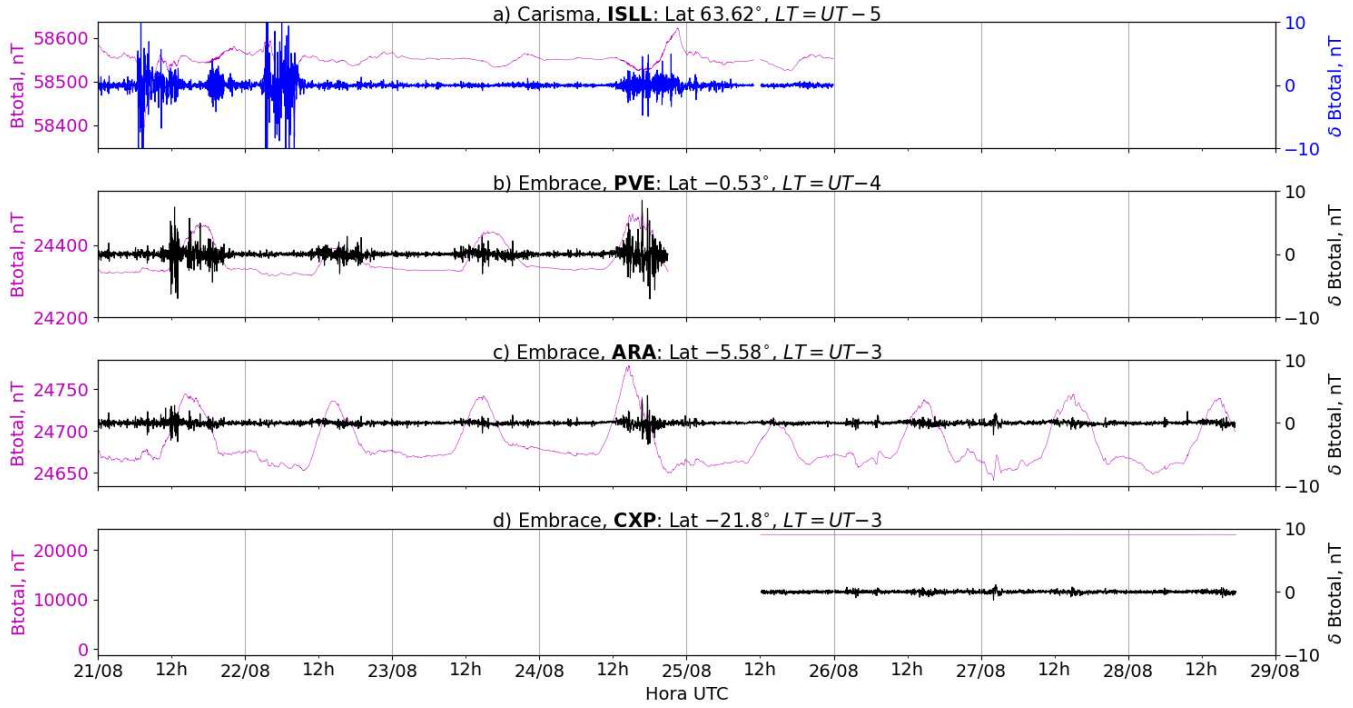


Figura 3: a) Timeseries of the geomagnetic field total component measured at ISLL station (Island Lake) of the CARISMA magnetometer network in magenta, along with the associated perturbation in the Pc5 band shown in blue. b-d) timeseries of the geomagnetic field total component measured at stations PVE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

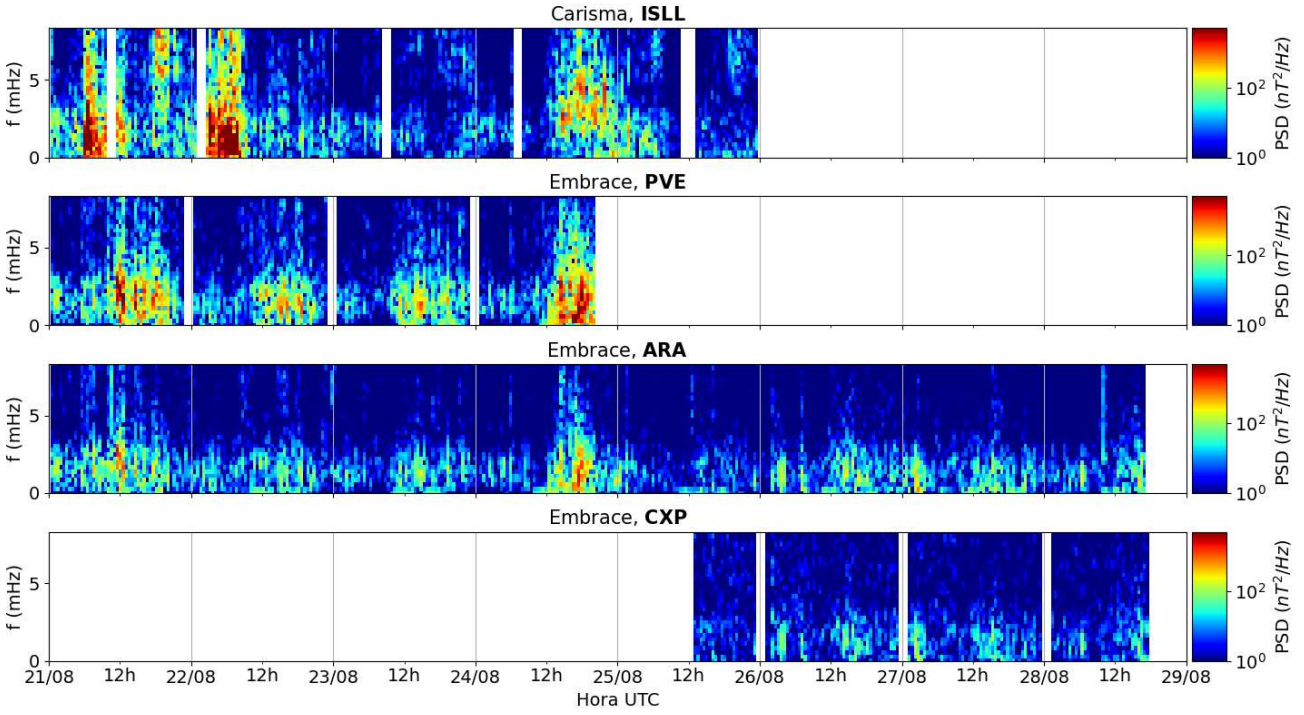


Figura 4: a-d) Time evolution of the power spectral density obtained from the filtered timeseries of the geomagnetic field total component (δ Btotal) for a) the high latitude station (ISLL-CARISMA), and b-d) for the low latitude stations of EMBRACE (PVE, ARA, CXP).

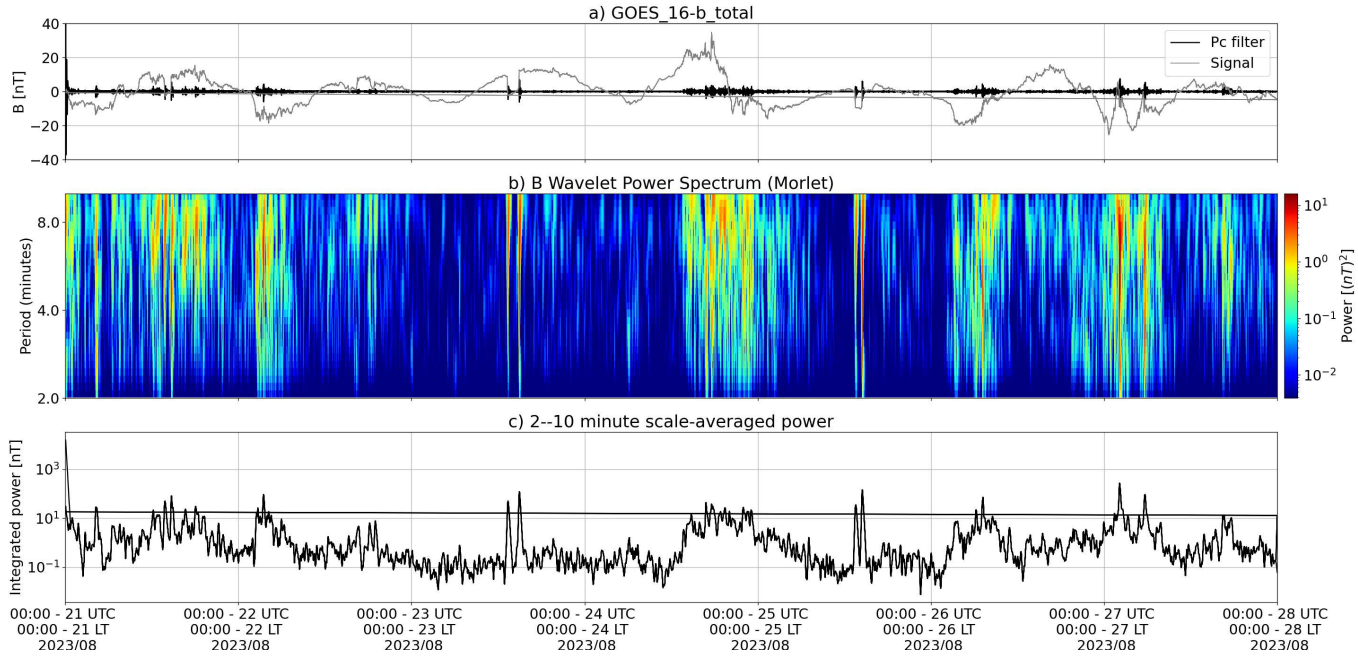


Figura 5: a) Timeseries of the geomagnetic field total component measured by GOES 16, together with the Pc5 fluctuation in black. b) Wavelet power spectrum of the filtered timeseries. c) Average ULF power in the period range from 2 to 10 minutes.

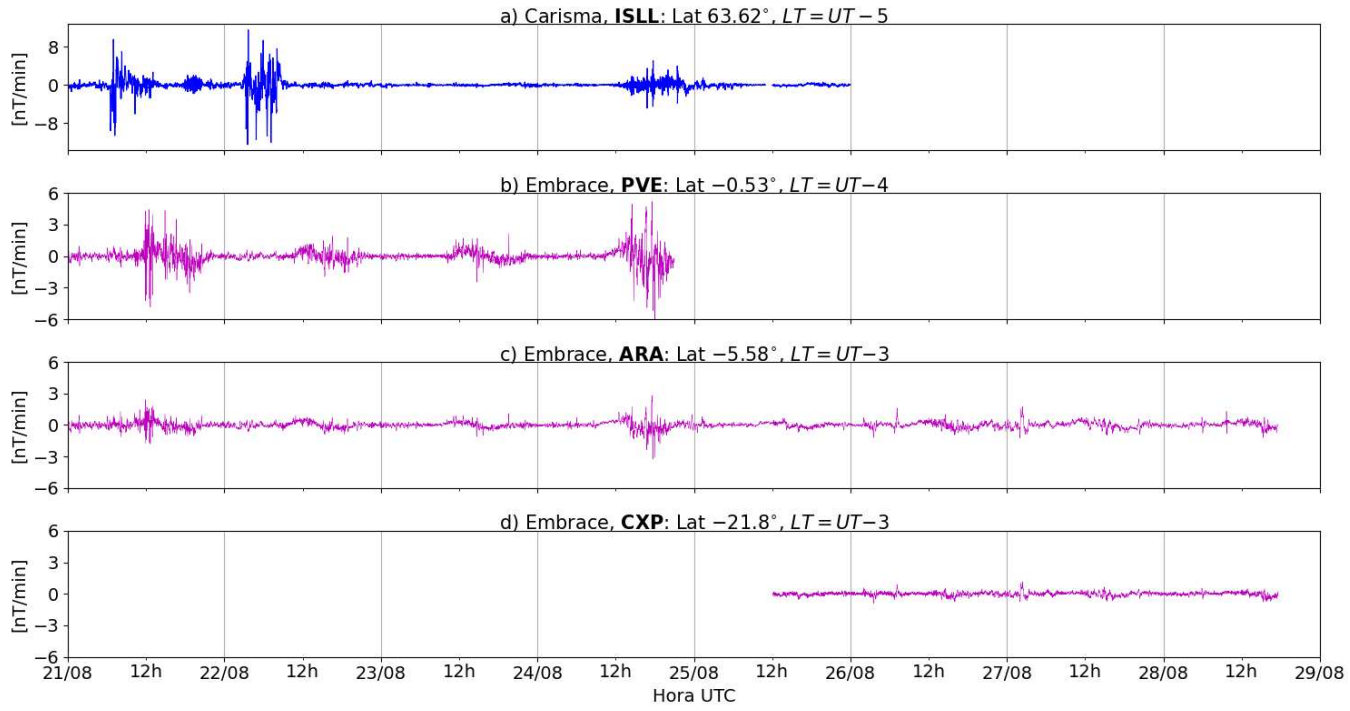


Figura 6: a-d) The rate of change of the geomagnetic field total component (dB/dt) obtained for a) the high latitude station (ISLL-CARISMA), and b-d) for the low latitude stations of EMBRACE (PVE, ARA, CXP).

- The GOES 16 satellite in geosynchronous orbit (L $\sim$ 6.6) registered significant activity of Pc5 ULF waves over the week.
- As observed on the ground, the ISLL station at high latitude registered weak ULF wave activity

over the week.

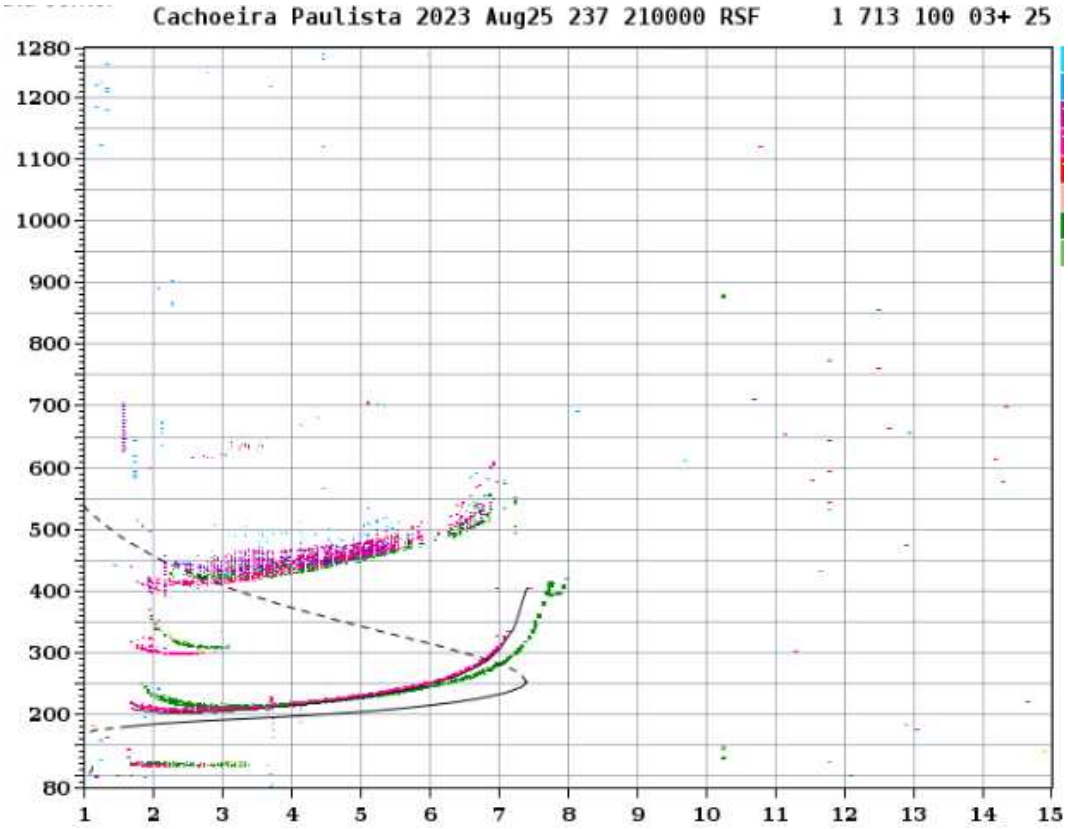
- The PVE station from Embrace MagNet, located under the dip equator, registered regular activity of the waves during the week.
- The ARA and CXP stations at low latitude of Brazil registered low to moderate activity of the waves.
- The dB/dt rates were below 10 nT/min in magnitude at ISLL (high latitude). The rates were below 6 nT/min at the Embrace stations in lower latitudes.

6 Ionosphere

6.1 Responsible: Laysa Resende

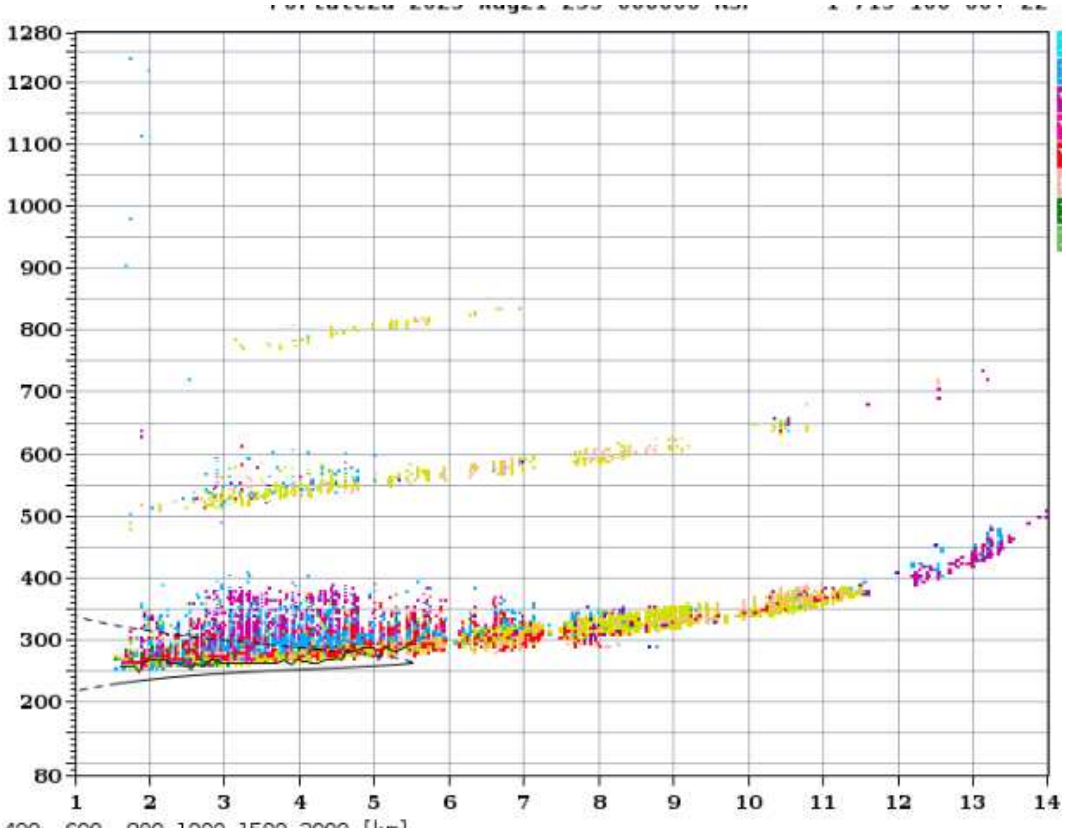
Cachoeira Paulista:

- There were no spread F during this week.
- The Es layers reached scale 2 and 3 during this week.



Fortaleza

- There were spread F during this week.
- The Es layers reached scale 4during this week.



7 ROTI

7.1 Responsible: Carolina de Sousa

In the week 2276 (August 20-26, 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)).

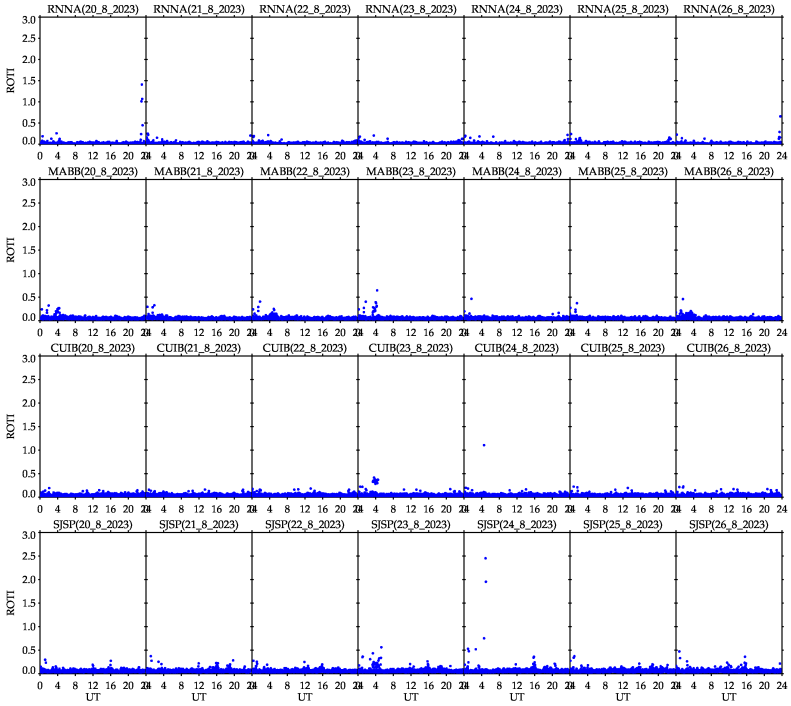


Figura 7: ROTI time series for four stations in the Brazilian sector (Natal (RNNA), Bacabal (MABB), Cuiabá (CUIB) and São José dos Campos (SJSP)), from August 20 - 26, 2023.