Briefing Space Weather

2023/08/25

1 Sun

1.1 Responsible: José Cecatto

08/14 – No M/X flare; No fast wind stream; 9 CME can have component toward the Earth;
08/15 – No M/X flare; No fast wind stream; 6 CME can have component toward the Earth;
08/16 – No M/X flare; No fast wind stream; 1 CME can have component toward the Earth;
08/17 – No M/X flare; No fast wind stream; 7 CME can have component toward the Earth;
08/18 – No M/X flare; Fast (< 500 km/s) wind stream; 5 CME can have component toward the Earth;
08/19 – No M/X flare; Fast (< 500 km/s) wind stream; 2 CME can have component toward the Earth;
08/20 – No M/X flare; Fast (< 650 km/s) wind stream; 3 CME can have component toward the Earth;
08/21 – No M/X flare; Fast (< 650 km/s) wind stream; No CME toward the Earth;
Prev.: Fast (< 650 km/s) wind stream for next 01-02 days; for while low (15% M, 1% 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 2023-08-18T19:48:00 UT and 2023-08-18T22:00:00 UT)
  - The simulation results indicate that the Combined Coronal Mass Ejections flanks reached the DSCOVR mission between 2023-08-22T05:00:00 UT and 2023-08-22T19:00:00 UT.

Coronal holes (SPOCA):

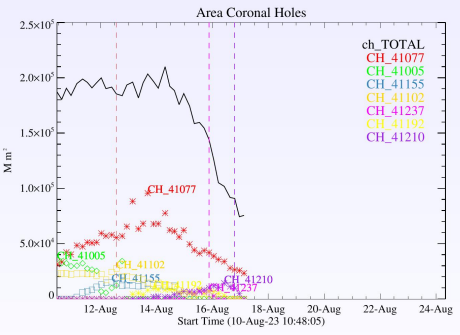


Figura: The solid black line depicts the products of the sum of areas for each detection interval performed by SPOCA between August 10 and 18, 2023.

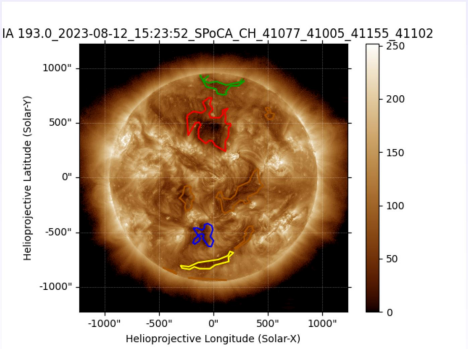
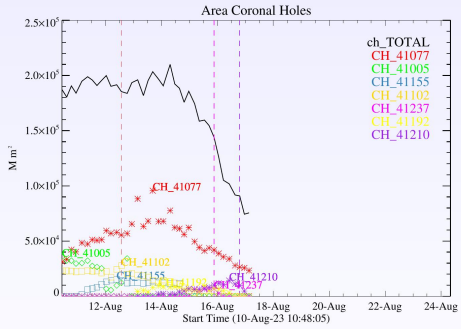


Figura: Above the 193 Å image of the Sun are highlighted coronal holes observed by SPOCA around 15:20 UT on August 12, 2023 (red dot line).

Coronal holes (SPOCA):



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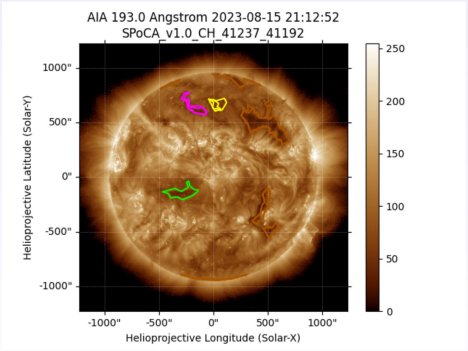


Figura: Above the 193 Å image of the Sun are highlighted coronal holes observed by SPOCA around 19:10 UT on August 08, 2023 (magenta dot line).

Coronal holes (SPOCA):

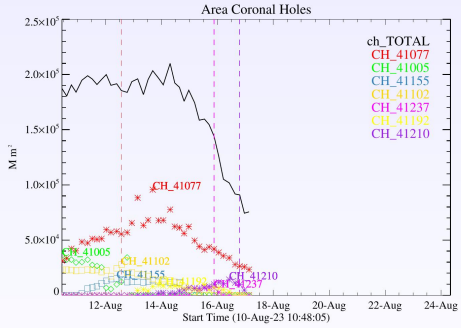


Figura: The solid black line depicts the products of the sum of areas for each detection interval performed by SPOCA between August 10 and 18, 2023.

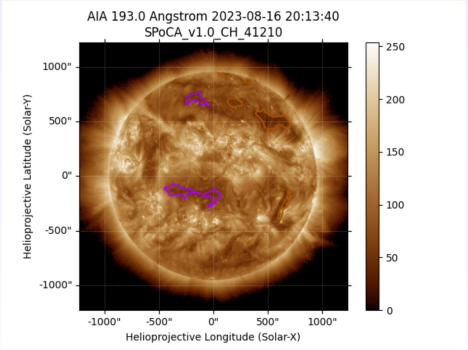
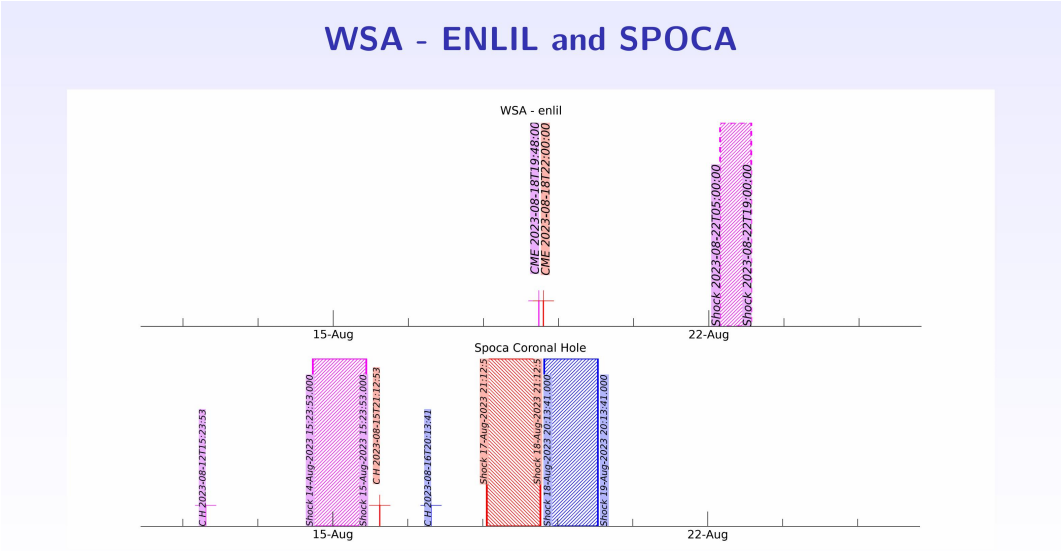


Figura: Above the 193 Å image of the Sun are highlighted coronal holes observed by SPOCA around 20:10 UT on August 16, 2023 (purple dot line).



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 and HSS type structures identified by the DSCOVR satellite in the interplanetary medium.
- The modulus of the interplanetary magnetic field component showed a maximum peak $\sim$ 13 nT on 18/Aug at 02:30 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 change on 17/Aug at 18:30 UT.
- The bz field component showed a minimum value on 16/Aug at 14:30 UT of $\sim$ -7.0nT and also on 15th and 18th of August at 17:30 UT and 07:30 UT of -4 and -5 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 17/Aug at 19:30 UT of 16 p/cm^3.
- The solar wind speed averaged below 400 km/s until Aug/18 at 01:30 UT. Afterwards, it showed a variation with a maximum peak on 20/Aug at 22:30 UT of 640 km/s.
- The position of the magnetopause was oscillating with a minimum value recorded on 10/Aug at 18:30 UT of 9.0 Re. On average the position of the magnetopause oscillates above the equilibrium position.

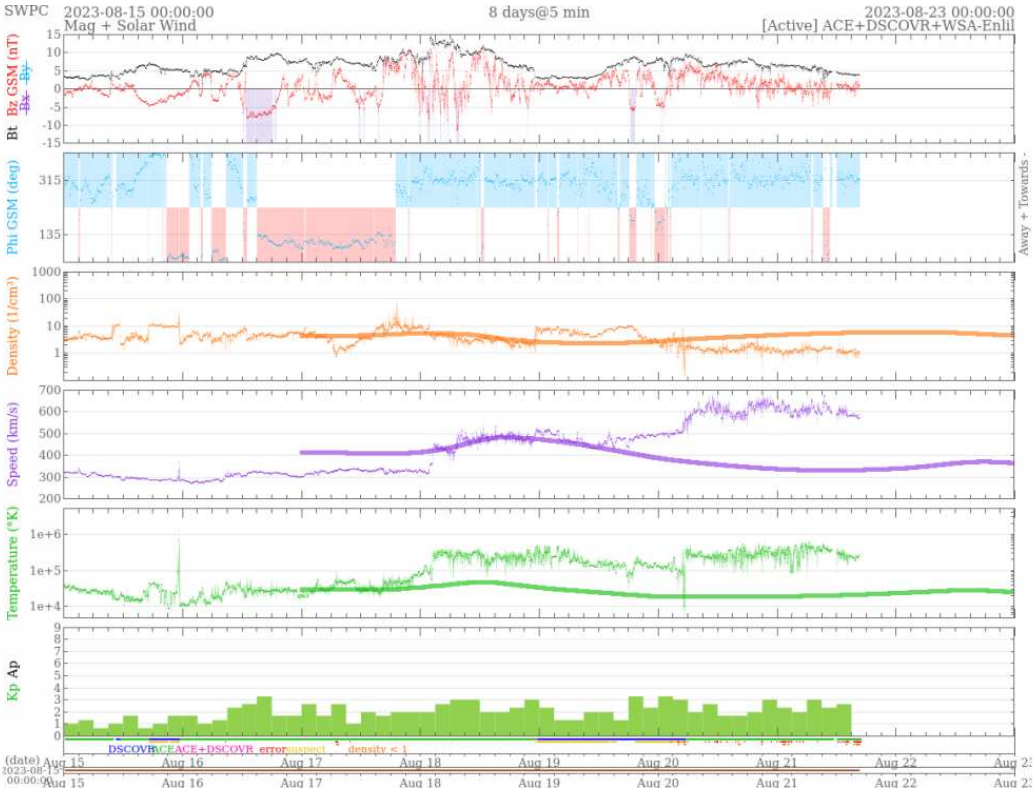


Figura 1: Solar wind measurements propagated to the Earth's bow shock.

4 ULF waves

4.1 Responsible: Graziela B. D. Silva

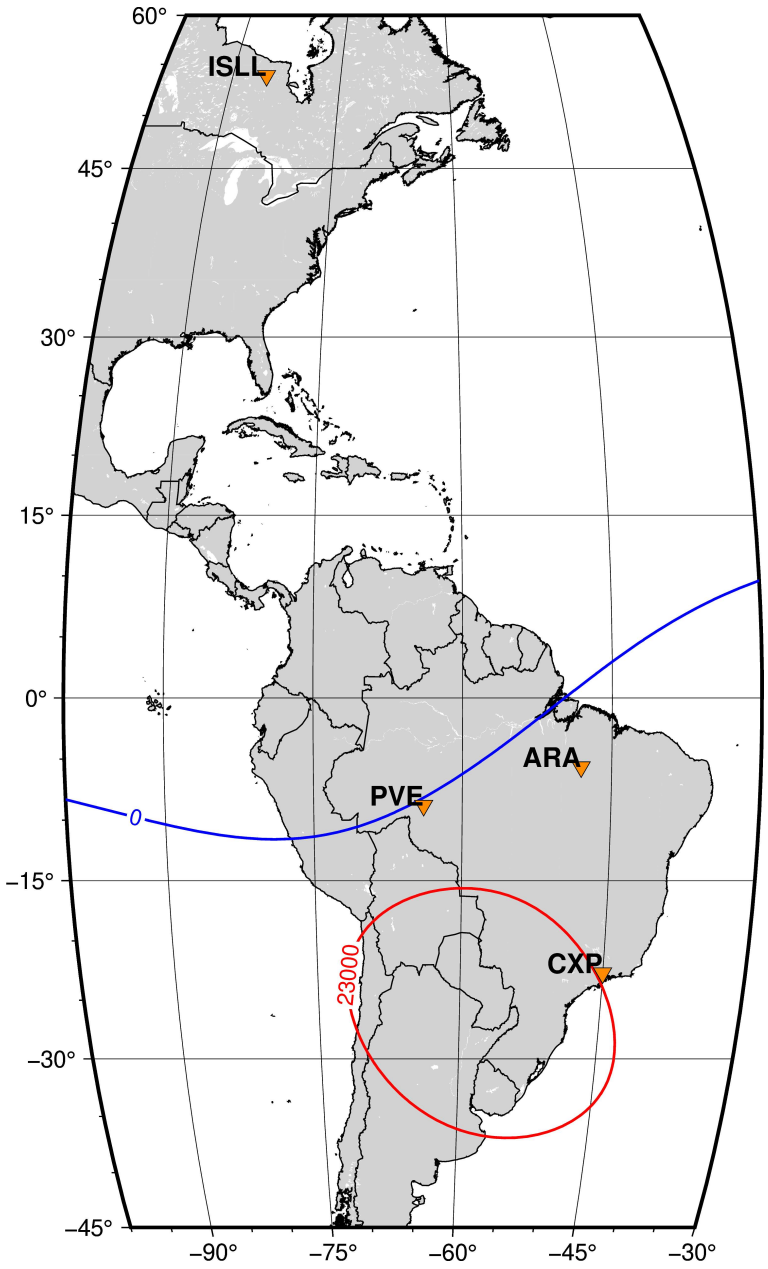


Figura 2: a) Map describing the geographic location of the stations together with the magnetic isolines to show that magnetic equator (blue) and the SAMA region (red). Cortesy: Karen Sarmiento.

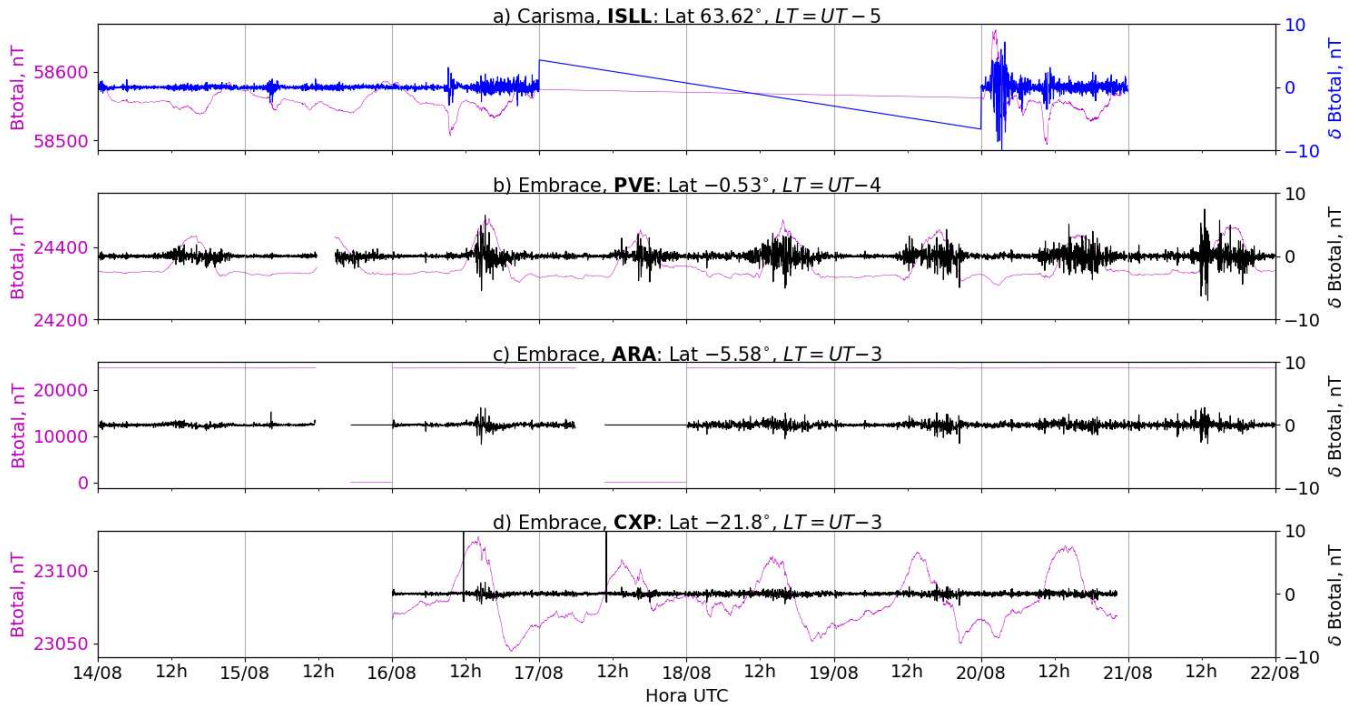


Figura 3: a) Timeseries of the geomagnetic field total component measured at ISLL station (Island Lake) of the CARISMA magnetometer network in magenta, along with the associated perturbation in the Pc5 band shown in blue. b-d) timeseries of the geomagnetic field total component measured at stations PVE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

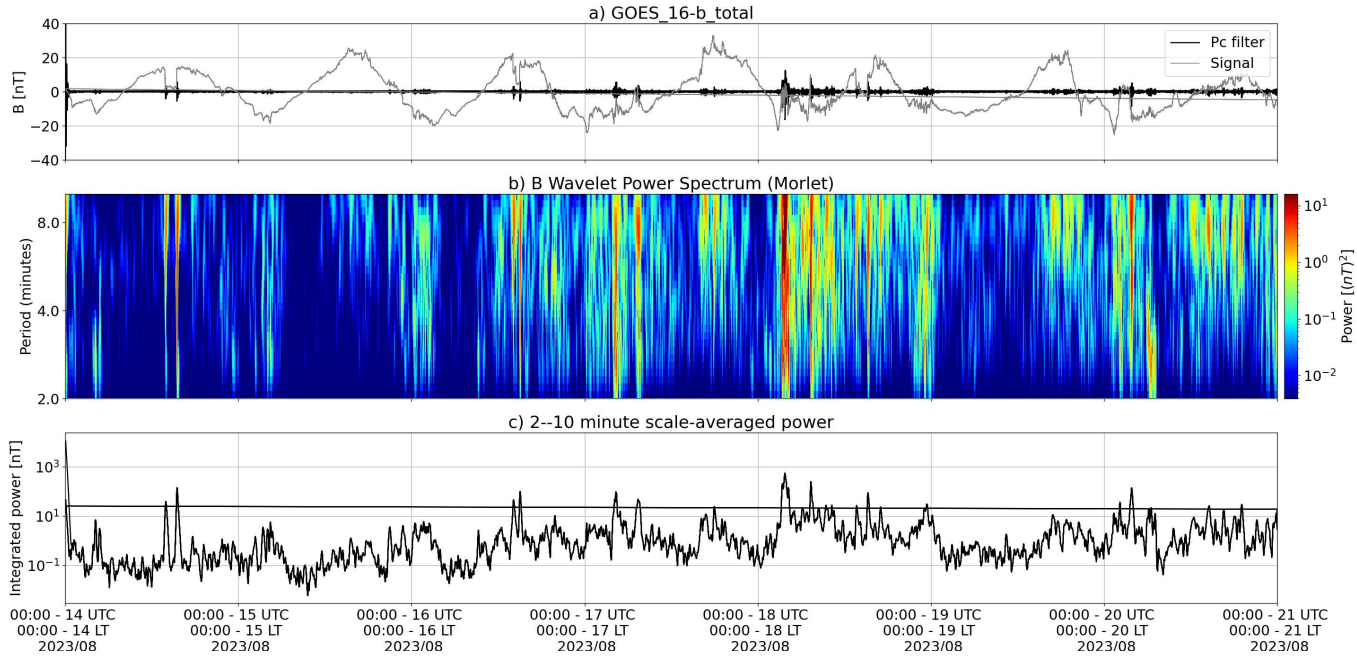


Figura 4: a) Timeseries of the geomagnetic field total component measured by GOES 16, together with the Pc5 fluctuation in black. b) Wavelet power spectrum of the filtered timeseries. c) Average ULF power in the period range from 2 to 10 minutes.

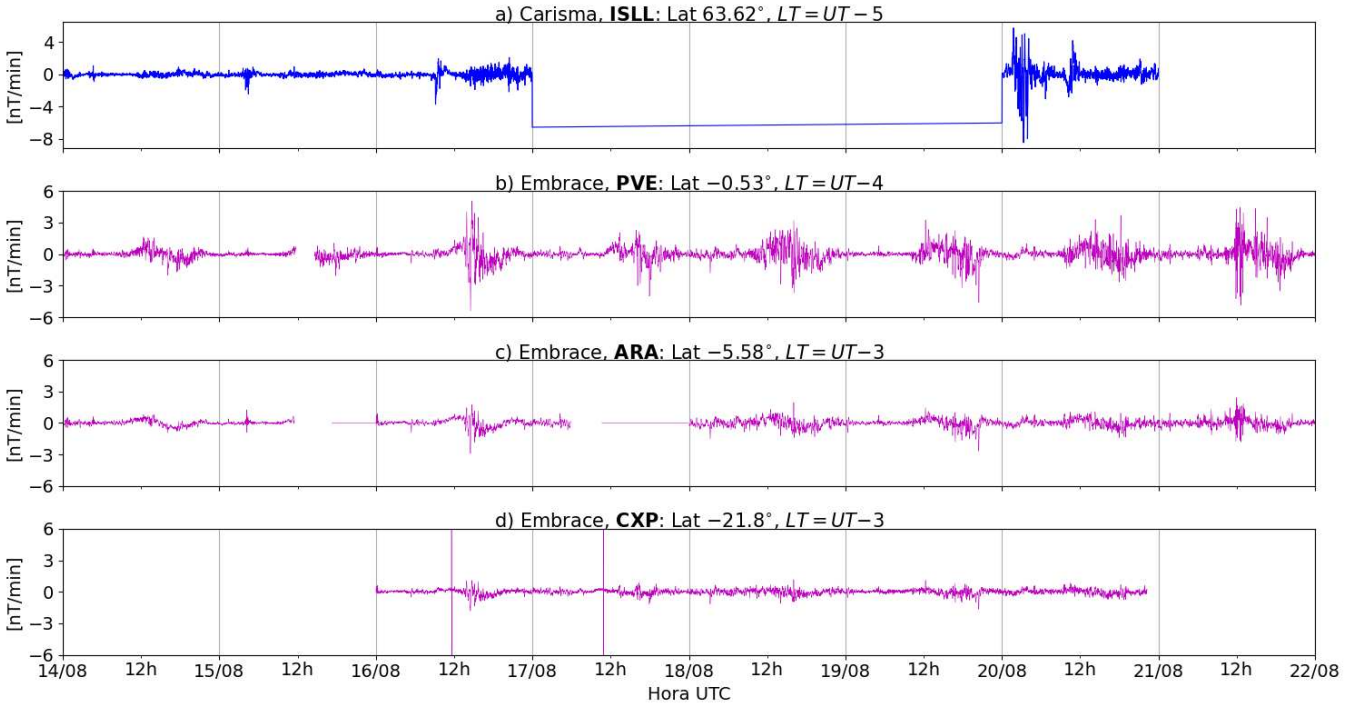


Figura 5: a-d) The rate of change of the geomagnetic field total component (dB/dt) obtained for a) the high latitude station (ISLL-CARISMA), and b-d) for the low latitude stations of EMBRACE (PVE, ARA, CXP).

- 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.

5 Geomagnetic activity

5.1 Responsible: Lívia Alves

From 16-21 August, the geomagnetic field was unsettled, the following occurences are highlighted

- 16, 18, 21: Embrace MagNet registered enhancement in the H-component at PVE due to increase of Equatorial electrojet current; the Embrace MagNet does not registered a significative drop of the H-component.
- 16: AE index reached 500 nT and Kp was 3+

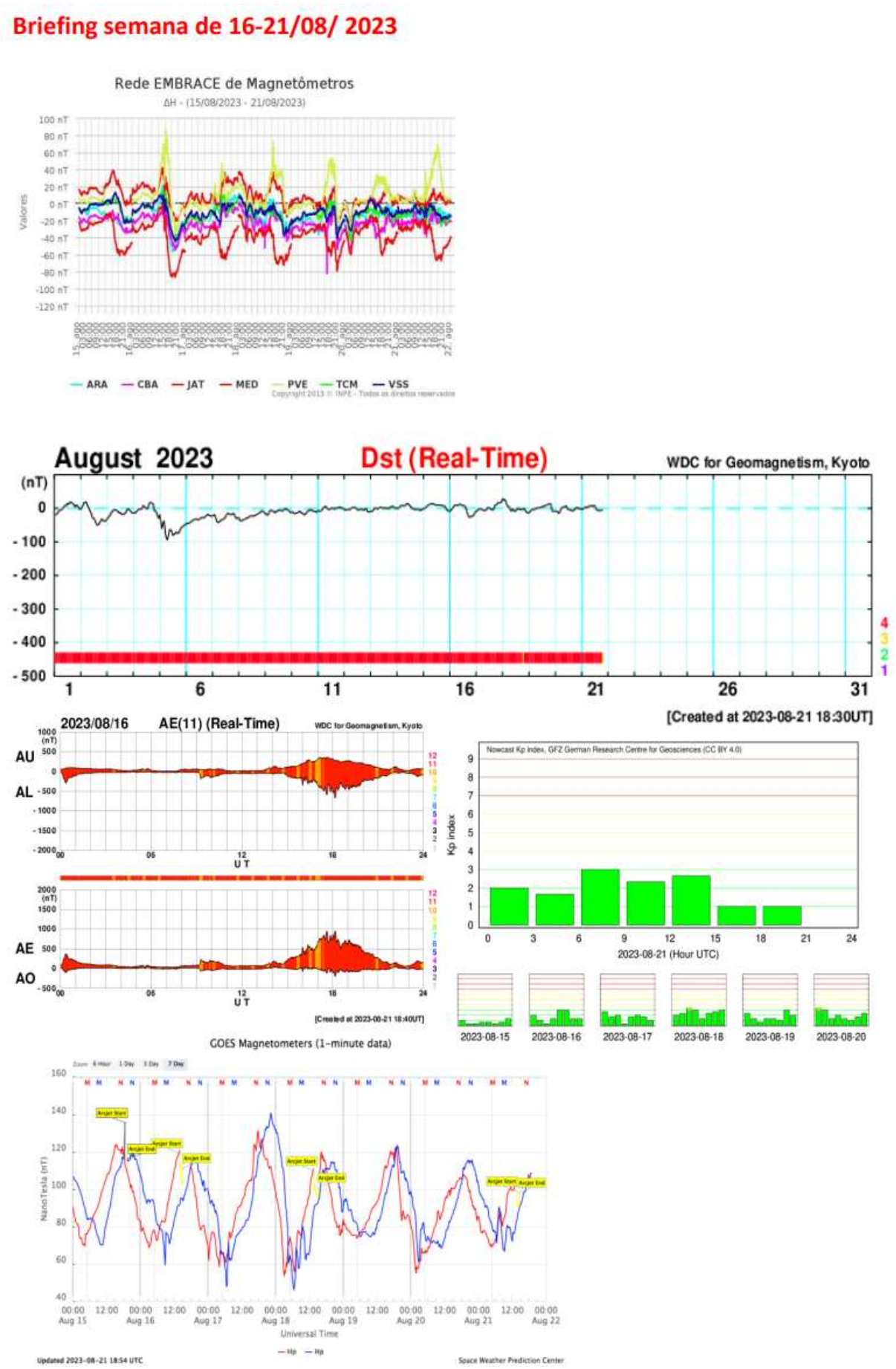


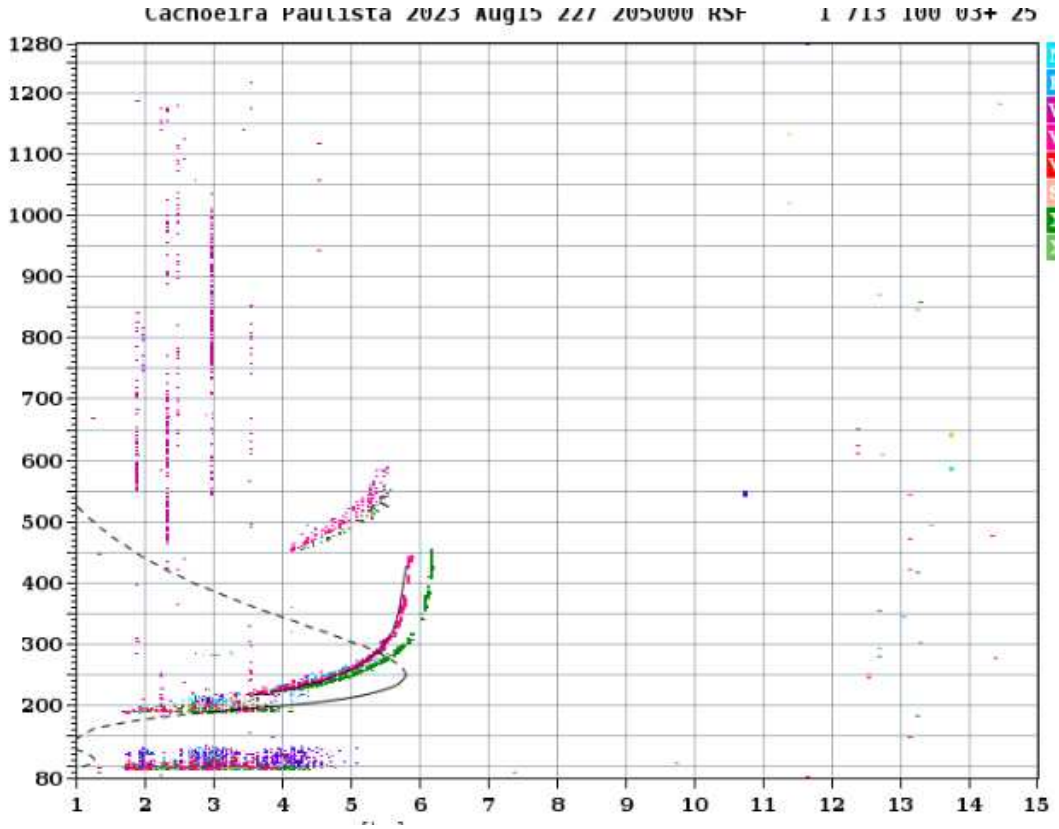
Figura 6: Time evolution of the geomagnetic field data and indices during the reported week.

6 Ionosphere

6.1 Responsible: Laysa Resende

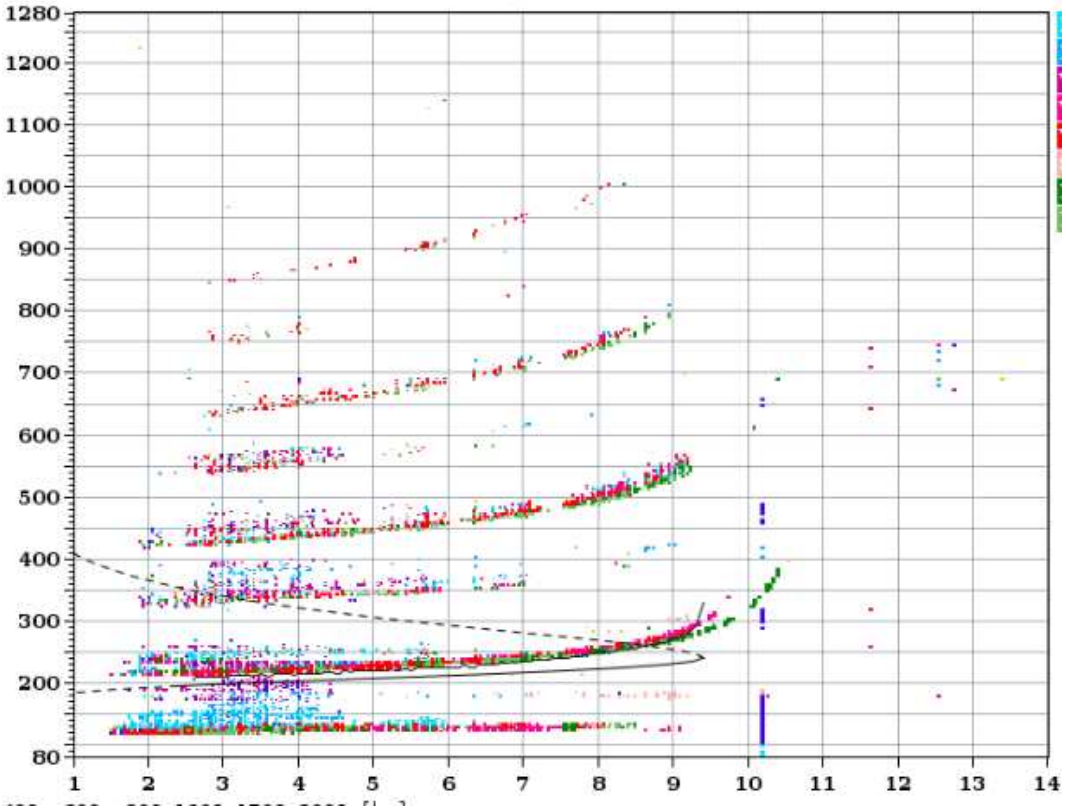
Cachoeira Paulista:

- There were not spread F during this week.
- The Es layers reached scale 2 and 3 during this week.



Fortaleza

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



7 Scintilation

7.1 Responsible: Siomel Savio Odriozola

In this report on the S4 scintillation index, data from SLMA in São Luiz/MA, UFBA in Salvador/BA, STCB in Cuiabá/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 $\sim$ 400 m. During the week, values above 0.3 were not consistently recorded for the S4 index at all stations. Absence of data on the 15th, 16th, 19th and 20th of August compromised the continuity of S4 monitoring at all stations (Figure 1).

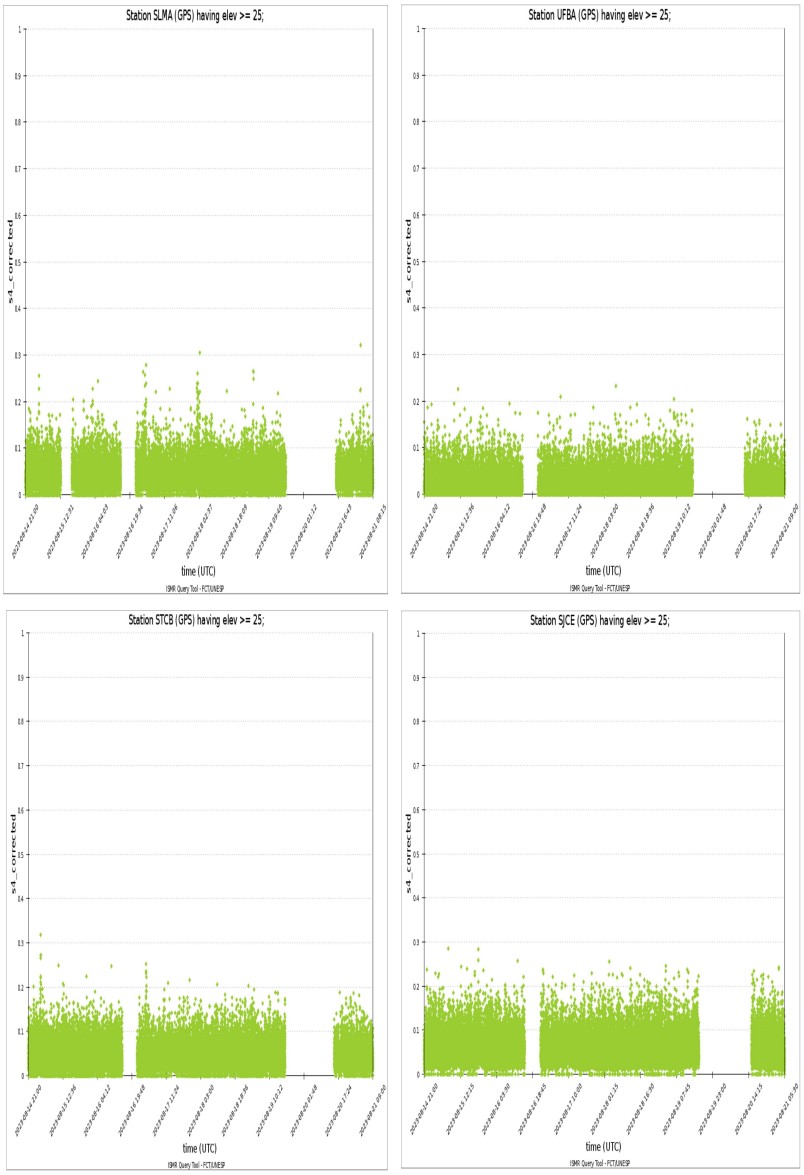


Figure 1: S4 index values for the GPS constellation measured at SLMA (upper left panel), UFBA (upper rigth panel), STCB (lower left panel) and SJCE (lower rigth panel) during the week 08/14—21.

8 ROTI

8.1 Responsible: Carolina de Sousa

In the week 2275 (August 13-19, 2023) there were ionospheric irregularities (plasma bubble) on August 13 over CUIB and on August 14 over RNNA. 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)).

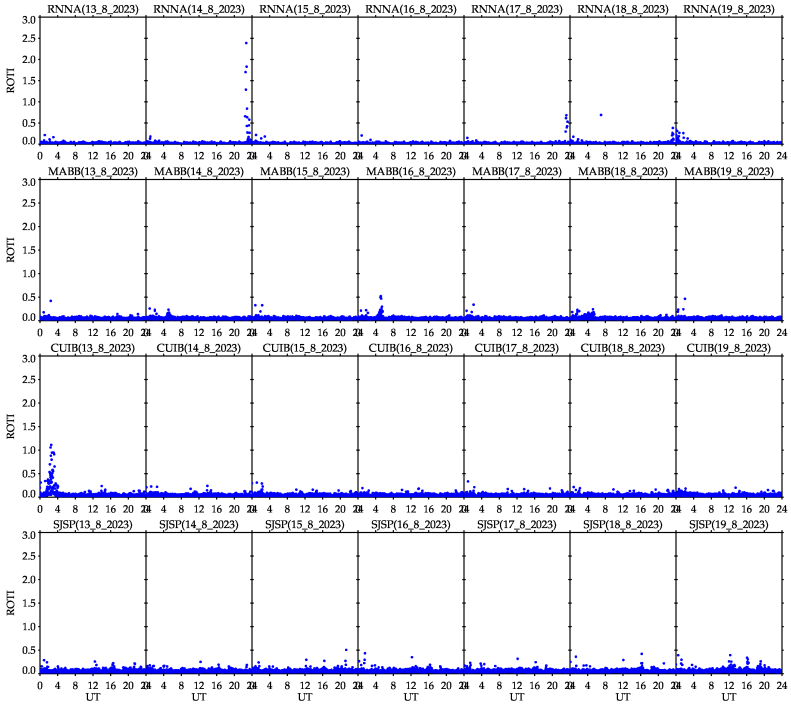


Figura 7: ROTI time series for four stations in the Brazilian sector (Natal (RNNA), Bacabal (MABB), Cuiabá (CUIB) and São José dos Campos (SJSP)), from August 13 - 19, 2023.