Briefing Space Weather

2023/05/31

1 Sun

1.1 Responsible: José Cecatto

05/22 – M1.9 flare; Fast wind stream (=< 600 km/s); 11 CME c.h.c. toward the Earth;
05/23 – M3.0 flare; Fast wind stream (=< 600 km/s); 8 CME c.h.c. toward the Earth **;
05/24 – M1.0, M1.8, M1.0 flares; Fast wind stream (=< 600 km/s); 9 CME c.h.c. toward the Earth *;
05/25 – M1.1 flare; Fast wind stream (=< 650 km/s); 8 CME c.h.c. toward the Earth;
05/26 – No (M/X) flare; Fast wind stream (=< 550 km/s); 5 CME c.h.c. toward the Earth;
05/27 – No (M/X) flare; Fast wind stream (=< 500 km/s); 7 CME c.h.c. toward the Earth;
05/28 – M1.0 flare; Fast wind stream (=< 500 km/s); 5 CME c.h.c. toward the Earth;
05/29 – No (M/X) flare; Fast wind stream (=< 450 km/s); 1 CME c.h.c. toward the Earth *;
Prev.: Fast wind stream since the next 02-04 days; for the next 2 days (55% M, 10% 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 (CME 2023-05-07T23:12 UT)
  - The simulation results indicate that the flank of CME will reach the DSCOVR mission between 2023-05-21T17:00 UT and 2023-05-22T07:00 UT.
- WSA-ENLIL (CME 2023-05-25T15:36 UT)
  - The simulation results indicate that the flank of CME will reach the DSCOVR mission between 2023-05-29T17:00 UT and 2023-05-30T07:00 UT.

Coronal holes (SPOCA):

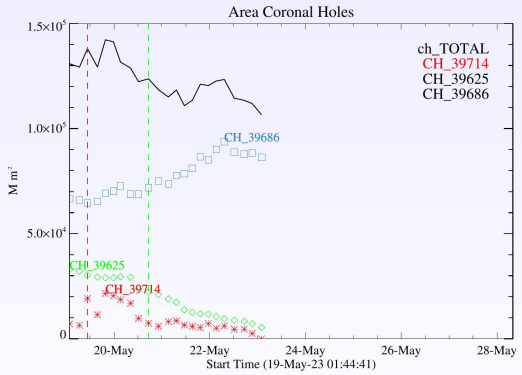


Figura: The solid black line depicts the products of the sum of areas for each detection interval performed by SPOCA between May 19 and 23, 2023.

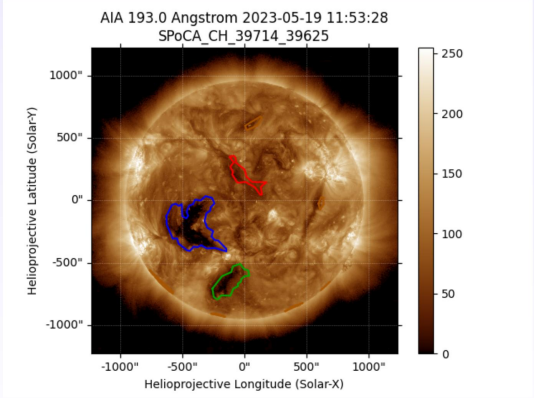
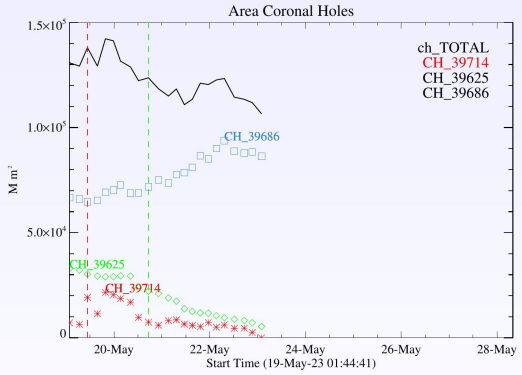


Figura: Above the 193 Å image of the Sun are highlighted coronal holes observed by SPOCA around 11:50 UT on May 19, 2023 (red dot line).

Coronal holes (SPOCA):



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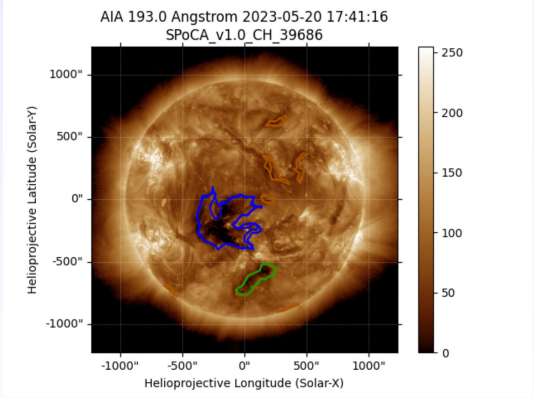
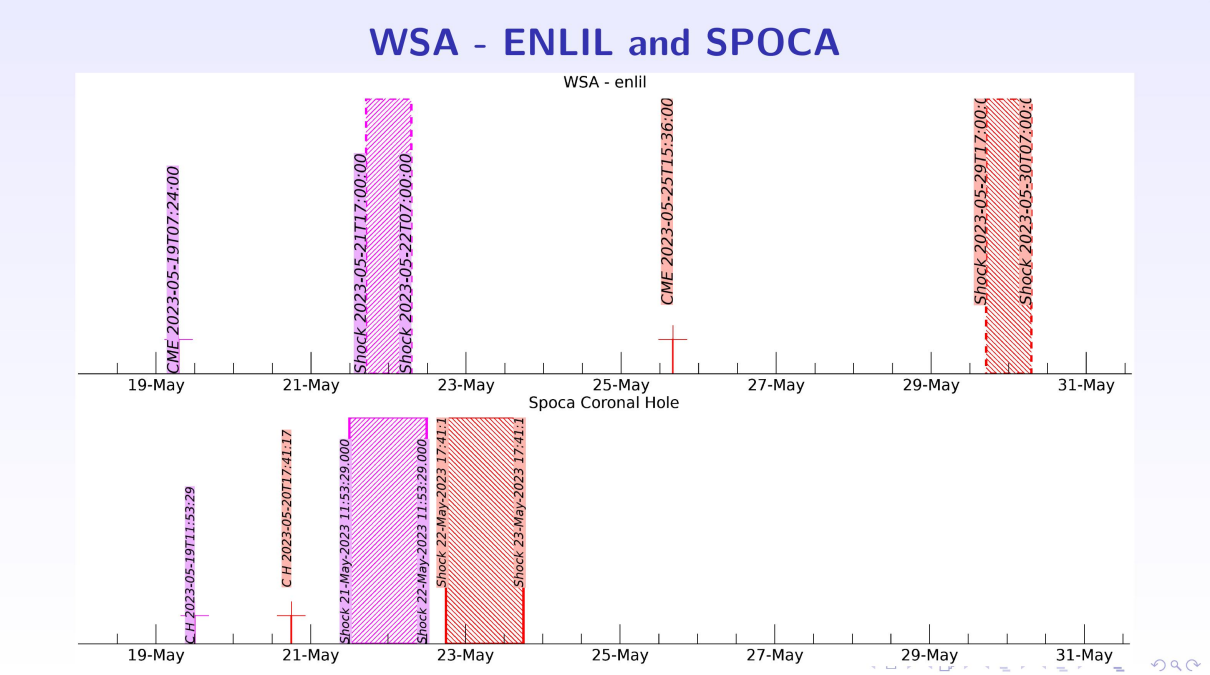


Figura: Above the 193 Å image of the Sun are highlighted coronal holes observed by SPOCA around 17:40 UT on May 20, 2023 (green dot line).



3 Radiation Belts

3.1 Responsible: Ligia Alves da Silva

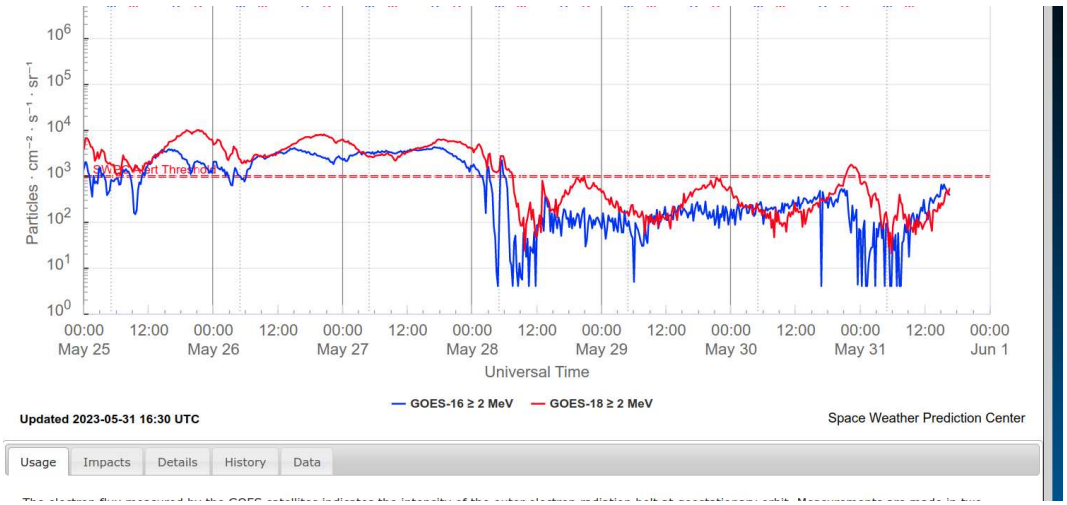


Figura 1: High-energy electron flux (> 2MeV) obtained from GOES-16 and GOES-18 satellite. Source: `https://www.swpc.noaa.gov/products/goes-electron-flux`

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 (following Figure) is between 10^3 particles/$(cm^2 ssr)$ during the first three days of the analyzed period. A "dropout" of approximately three orders of magnitude was observed on May 28. After this decrease, the electron flux was below 10^3 particles/$(cm^2 sr)$ throughout the remainder of the period.

4 ULF waves

4.1 Responsible: Graziela B. D. Silva

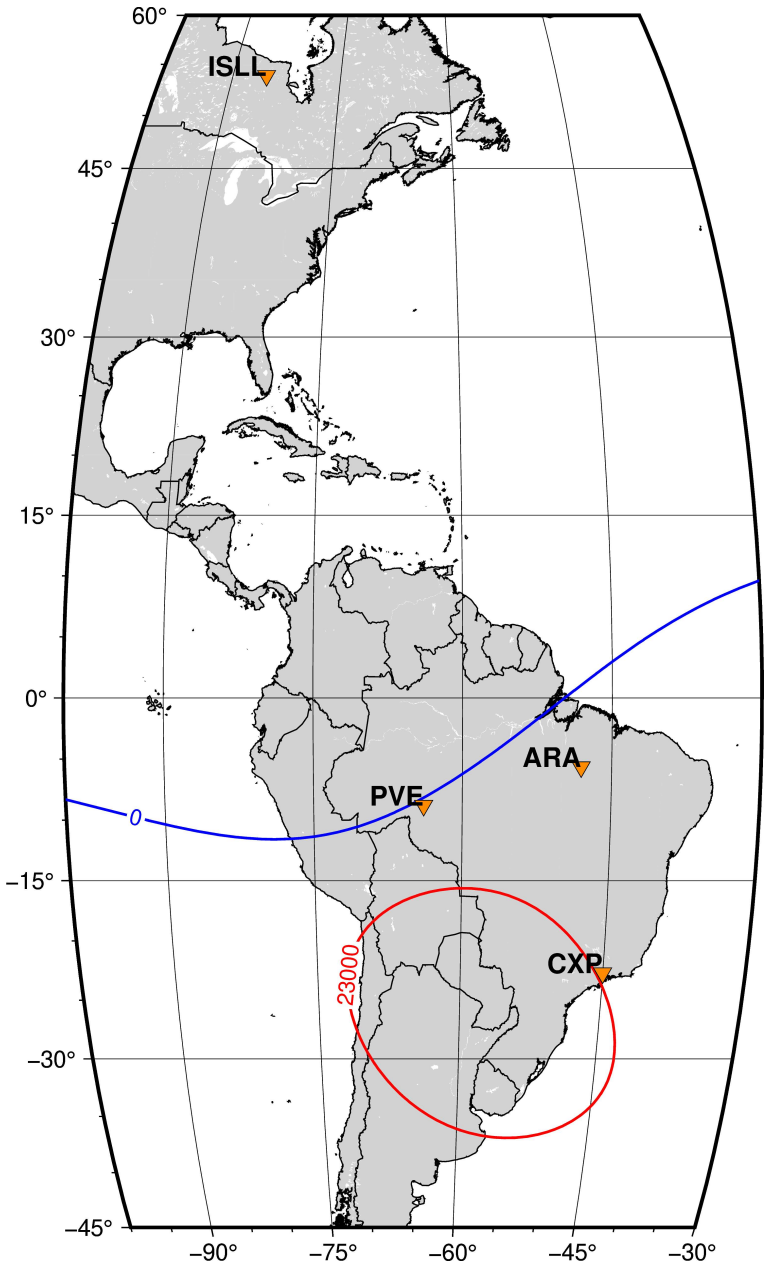


Figura 2: a) Map describing the geographic location of the stations together with the magnetic isolines to show that magnetic equator (blue) and the SAMA region (red). Cortesy: Karen Sarmiento.

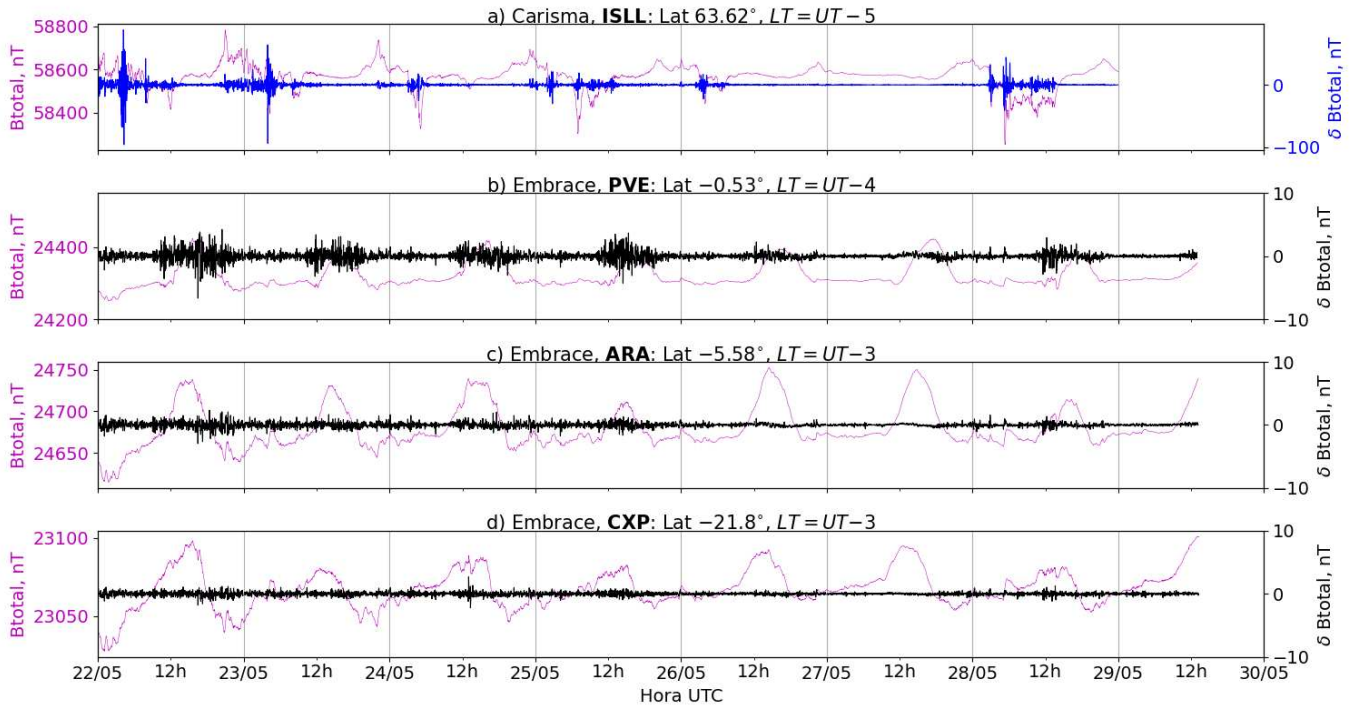


Figura 3: a) Timeseries of the geomagnetic field total component measured at ISLL station (Island Lake) of the CARISMA magnetometer network in magenta, along with the associated perturbation in the Pc5 band shown in blue. b-d) timeseries of the geomagnetic field total component measured at stations PVE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

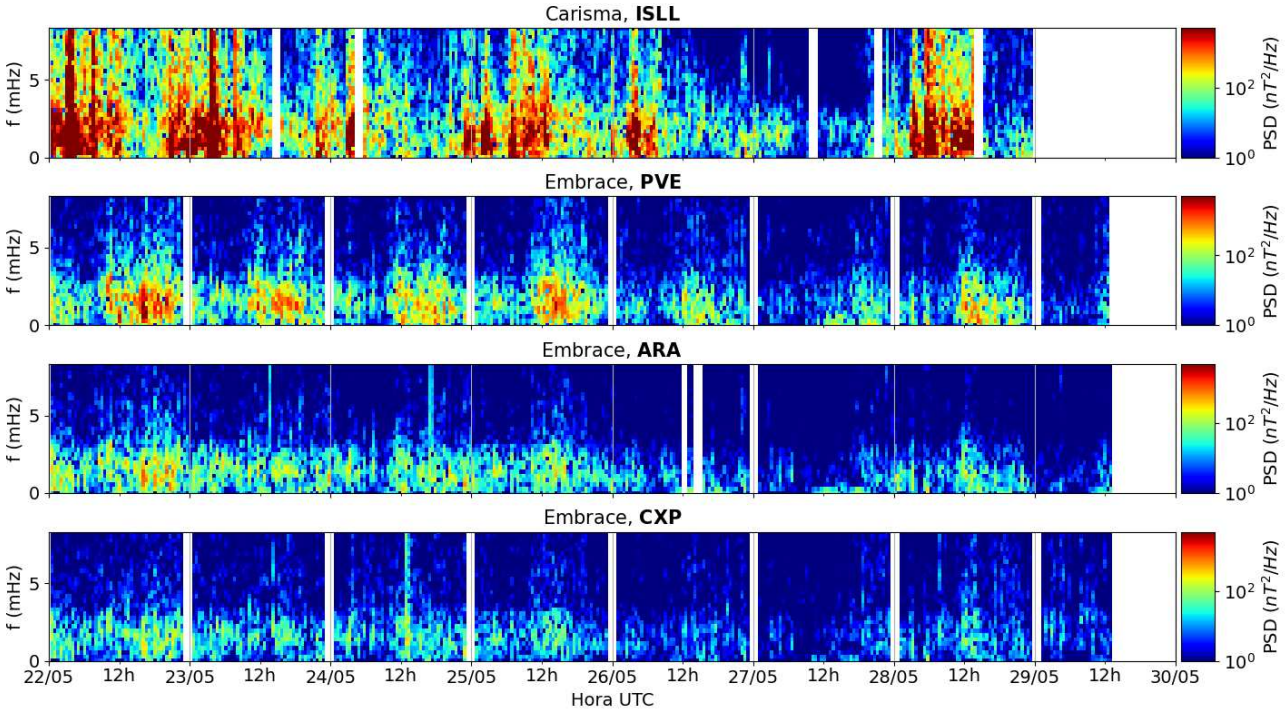


Figura 4: a-d) Time evolution of the power spectral density obtained from the filtered timeseries of the geomagnetic field total component (δ Btotal) for a) the high latitude station (ISLL-CARISMA), and b-d) for the low latitude stations of EMBRACE (PVE, ARA, CXP).

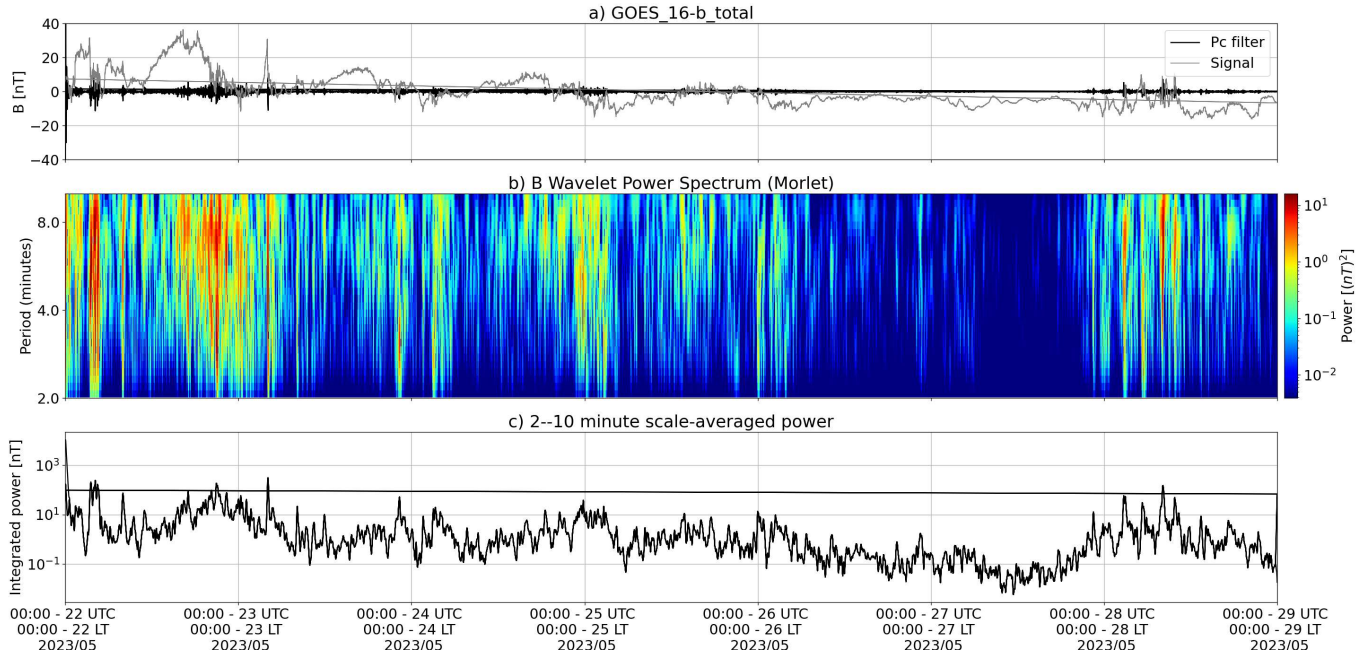


Figura 5: a) Timeseries of the geomagnetic field total component measured by GOES 16, together with the Pc5 fluctuation in black. b) Wavelet power spectrum of the filtered timeseries. c) Average ULF power in the period range from 2 to 10 minutes.

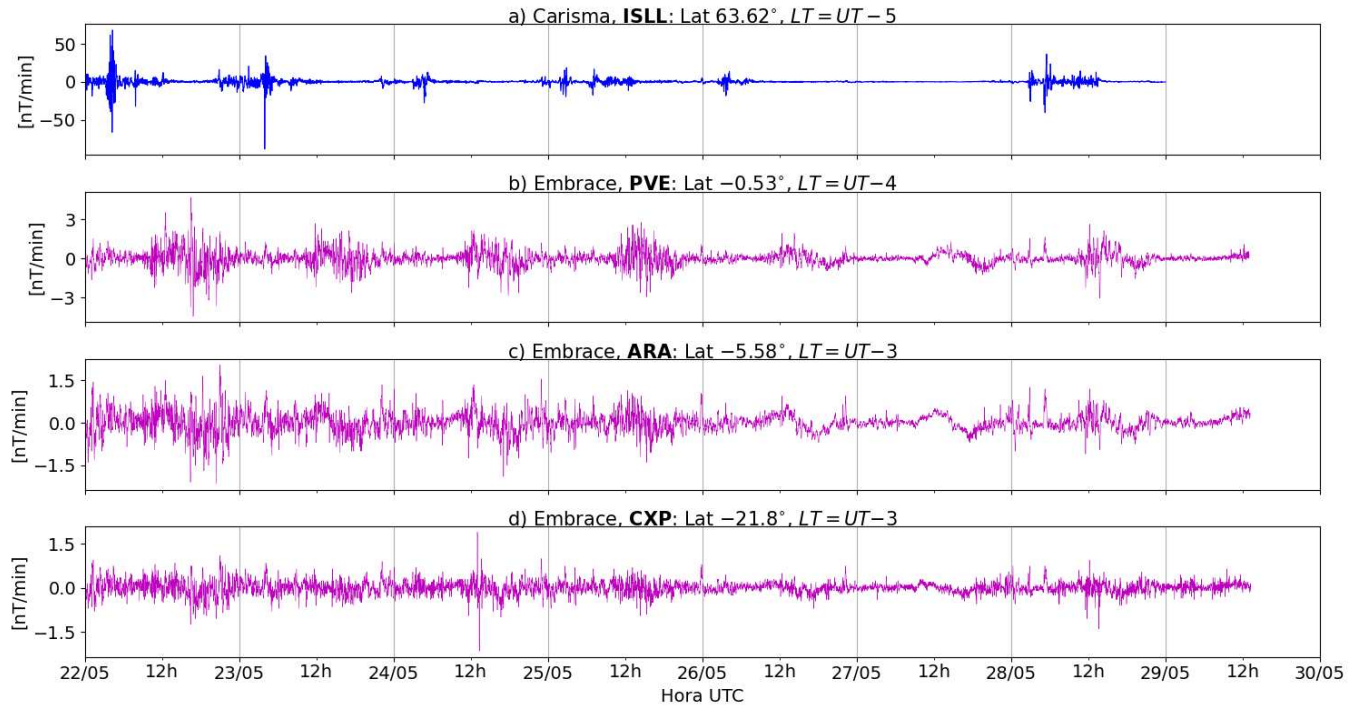


Figura 6: a-d) The rate of change of the geomagnetic field total component (dB/dt) obtained for a) the high latitude station (ISLL-CARISMA), and b-d) for the low latitude stations of EMBRACE (PVE, ARA, CXP).

- The GOES 16 satellite in geosynchronous orbit (L $\sim$ 6.6) registered significant activity of Pc5 ULF waves throughout the week, but May 26-27.
- As observed on the ground, the ISLL station at high latitude registered intense levels of ULF wave

activity over the week.

- The PVE station from Embrace MagNet, located under the dip equator, registered an intense activity of the waves activity during the week.
- The CXP and ARA stations at low latitudes of Brazil rather registered low activity of the waves over the week.
- The dB/dt rates were enhanced between May 22 and 26 up to amplitude values ¿ 50 nT/min in ISLL (high latitude), while they were below $\sim$ 4 nT/min in magnitude at the low latitudes of Brazil.
- There was no detection of significant events of SI (sudden impulses or SCs) over the week.

5 Geomagnetic activity

5.1 Responsible: Lívia Alves

From May 23 to 29, the following events related to geomagnetic activity stand out:

- May 26 to 28: two sudden impulse was detected but the storm did not evolve.
- May 28: The H-component reached a minimum at 15UT in PVE.
- The AE index surpassed 500 nT in May 28. The Dst index reached -38 nT (May 28) . The highest Kp of the week was 3o.

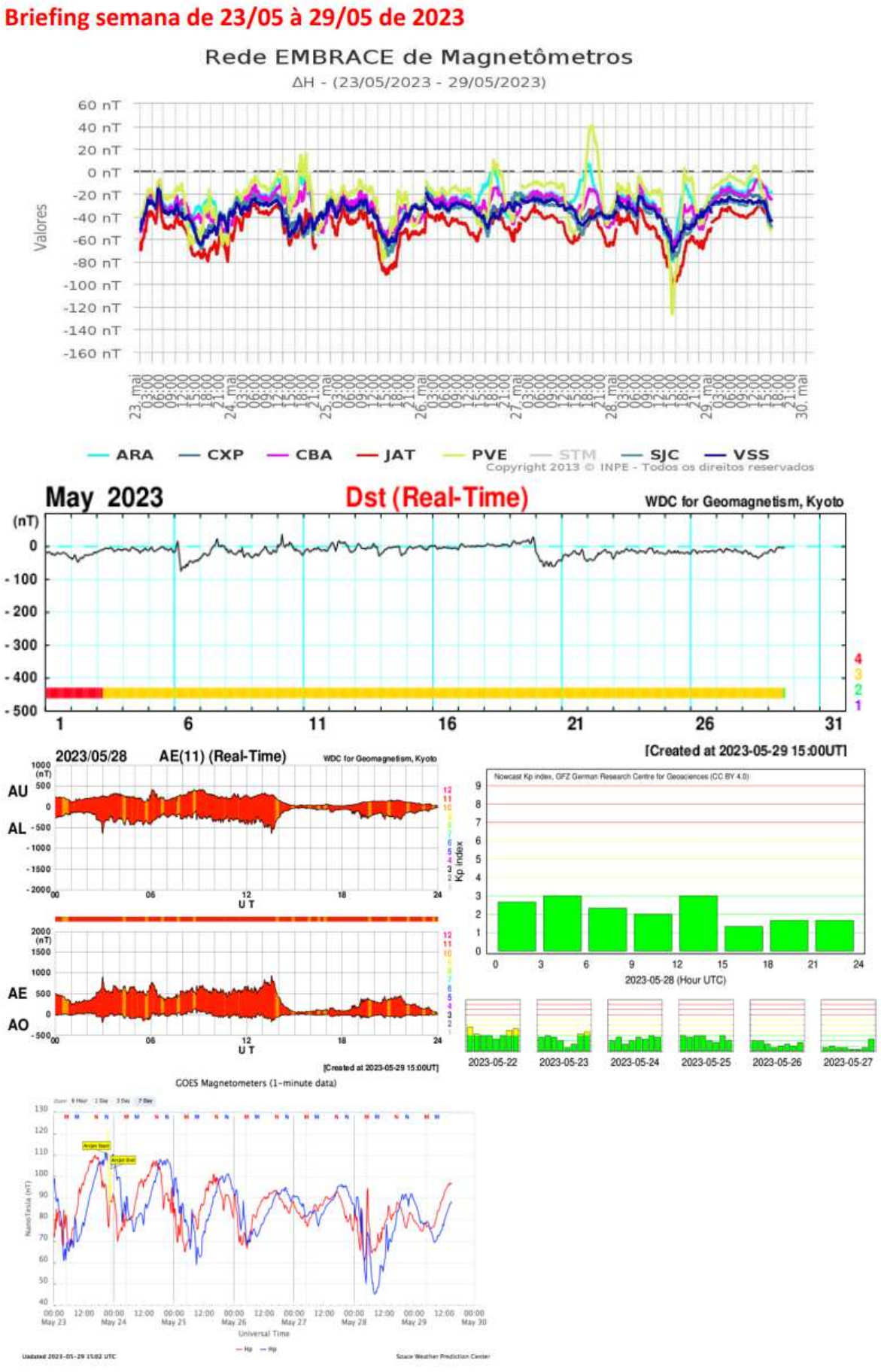


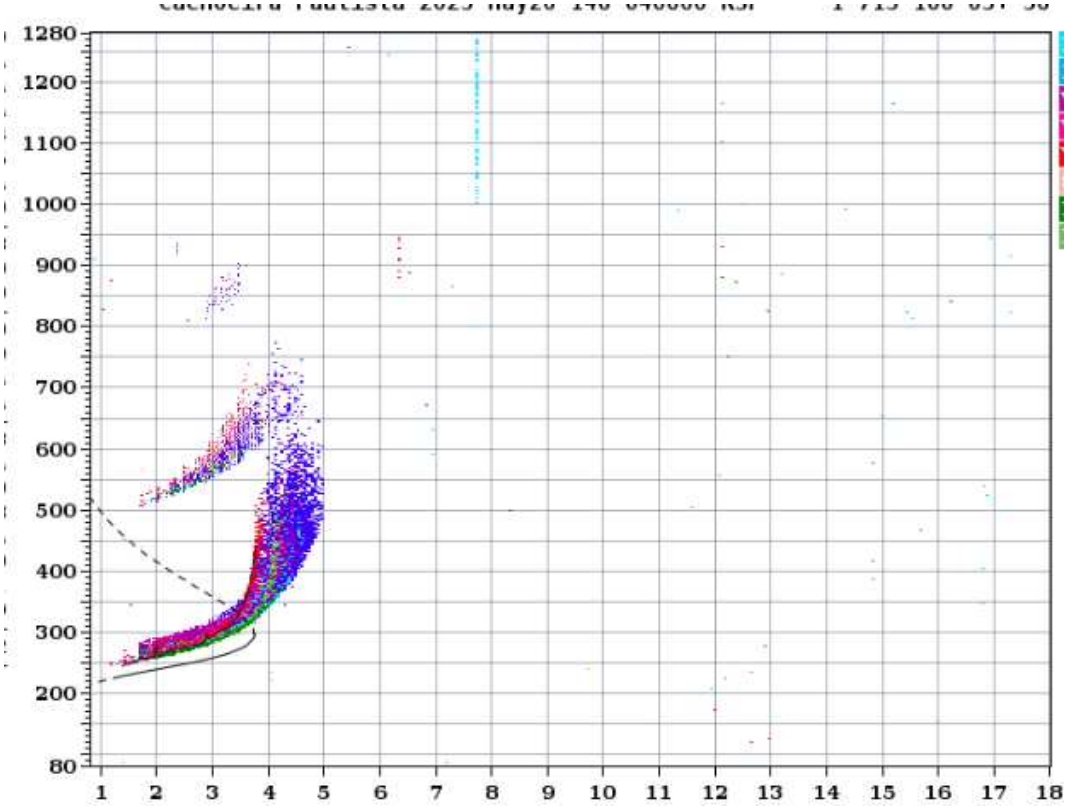
Figura 7: Time evolution of the geomagnetic field data and indices during the reported week.

6 Ionosphere

6.1 Responsible: Laysa Resende

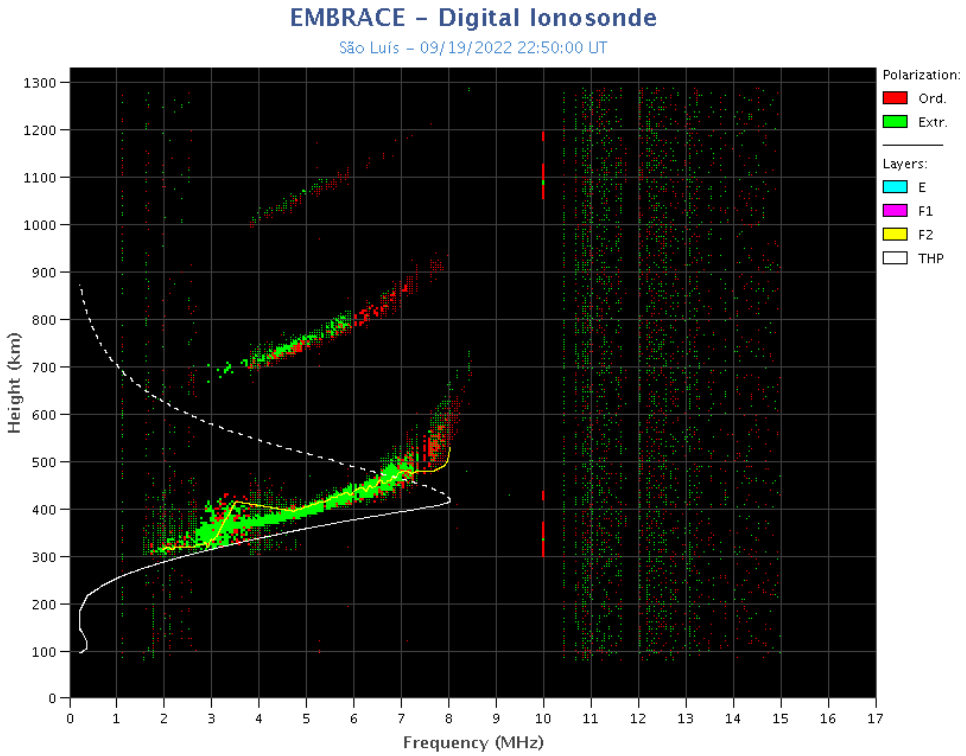
Cachoeira Paulista:

- There were spread F on May,26.
- The Es layers reached scale 2 and 3 during the week.



São Luís

- There were spread F between 24 and 28.
- The Es layers reached scale 5 on days in May 26 and 27.


EMBRACE – Digital Ionosonde
São Luís – 09/19/2022 22:50:00 UT
Height (km)
Frequency (MHz)
Polarization:
Ord.
Extr.
Layers:
E
F1
F2
THP