Briefing Space Weather

2023/05/25

1 Sun

1.1 Responsible: José Cecatto

05/15 – No flare; Fast wind stream (=< 500 km/s); 4 CME c.h.c. toward the Earth;
05/16 – M9.6 flare; Fast wind stream (=< 500 km/s); 10 CME c.h.c. toward the Earth **;
05/17 – No flare; Fast wind stream (=< 450 km/s); 8 CME c.h.c. toward the Earth *;
05/18 – M1.0, M1.2, M2.2, M1.6, M1.1, M3.6, M4.5 flares; Fast wind stream (=< 500 km/s); 5 CME c.h.c. toward the
Earth;
05/19 – M5.3, M1.6, M2.5, M2.3, M2.7 flares; Fast wind stream (?); 3 CME c.h.c. toward the Earth;
05/20 – M1.0, M6.4, M1.1, M1.6, M8.9, M5.6, M1.1, M5.1 flares; Fast wind stream (=< 600 km/s); 5 CME c.h.c. toward
the Earth;
05/21 – M1.4, M2.6 flares; Fast wind stream (=< 550 km/s); 6 CME c.h.c. toward the Earth;
05/22 – M1.9 flare; Fast wind stream (=< 600 km/s); 9 CME c.h.c. toward the Earth *;
Prev.: Fast wind stream for the next 01-02 days; for the next 2 days (75% M, 30% 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.

Coronal holes (SPOCA):

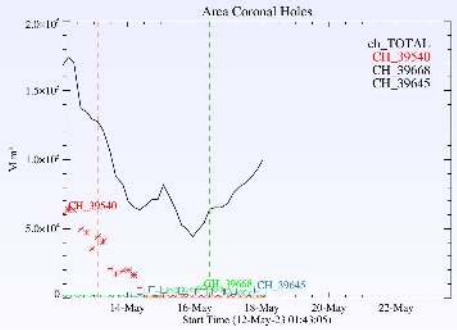


Figura: The solid black line depicts the products of the sum of areas for each detection interval performed by SPOCA between May 13 and 18, 2023.

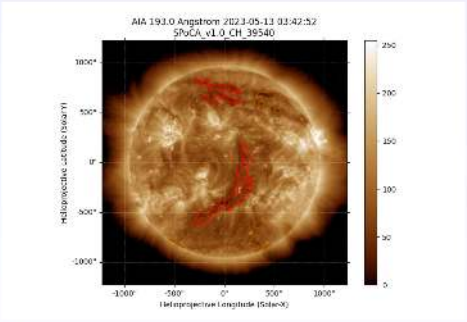
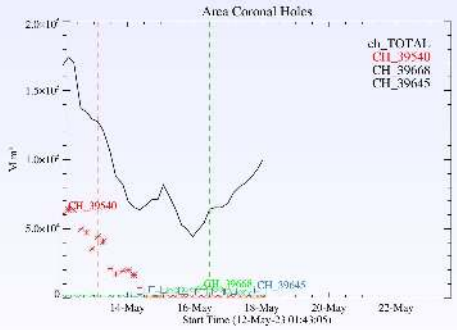


Figura: Above the 193 Å image of the Sun are highlighted coronal holes observed by SPOCA around 03:47 UT on May 13, 2023 (red dot line).

Coronal holes (SPOCA):



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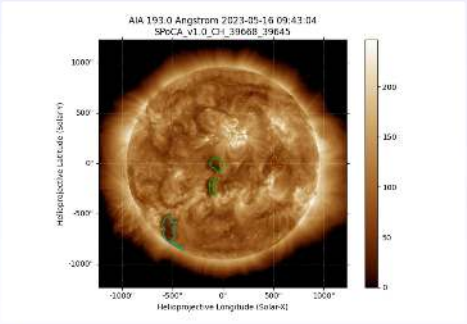
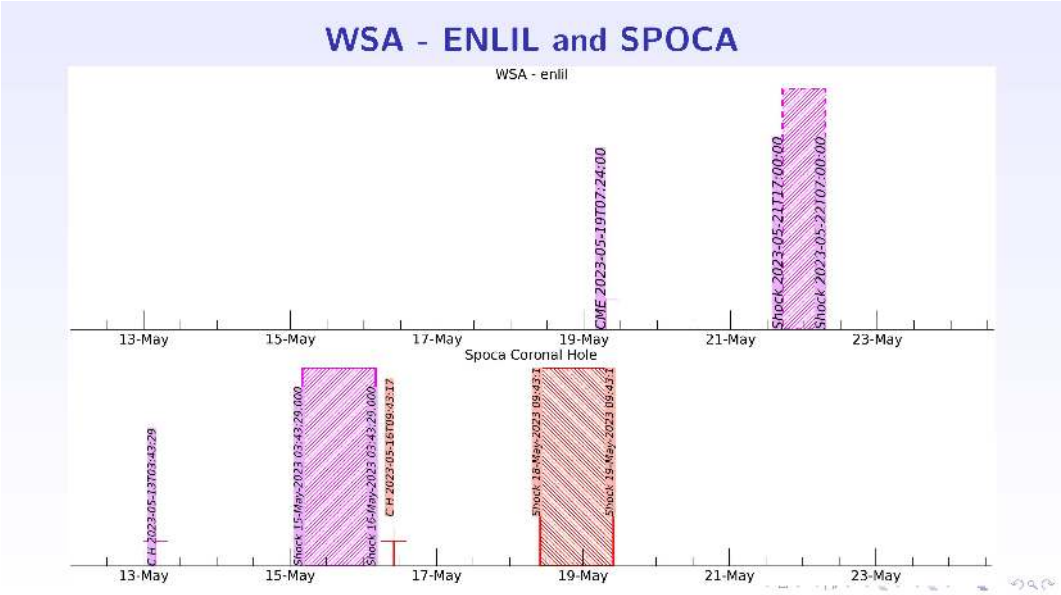


Figura: Above the 193 Å image of the Sun are highlighted coronal holes observed by SPOCA around 09:40 UT on May 16, 2023 (green dot line).



3 ULF waves

3.1 Responsible: Graziela B. D. Silva

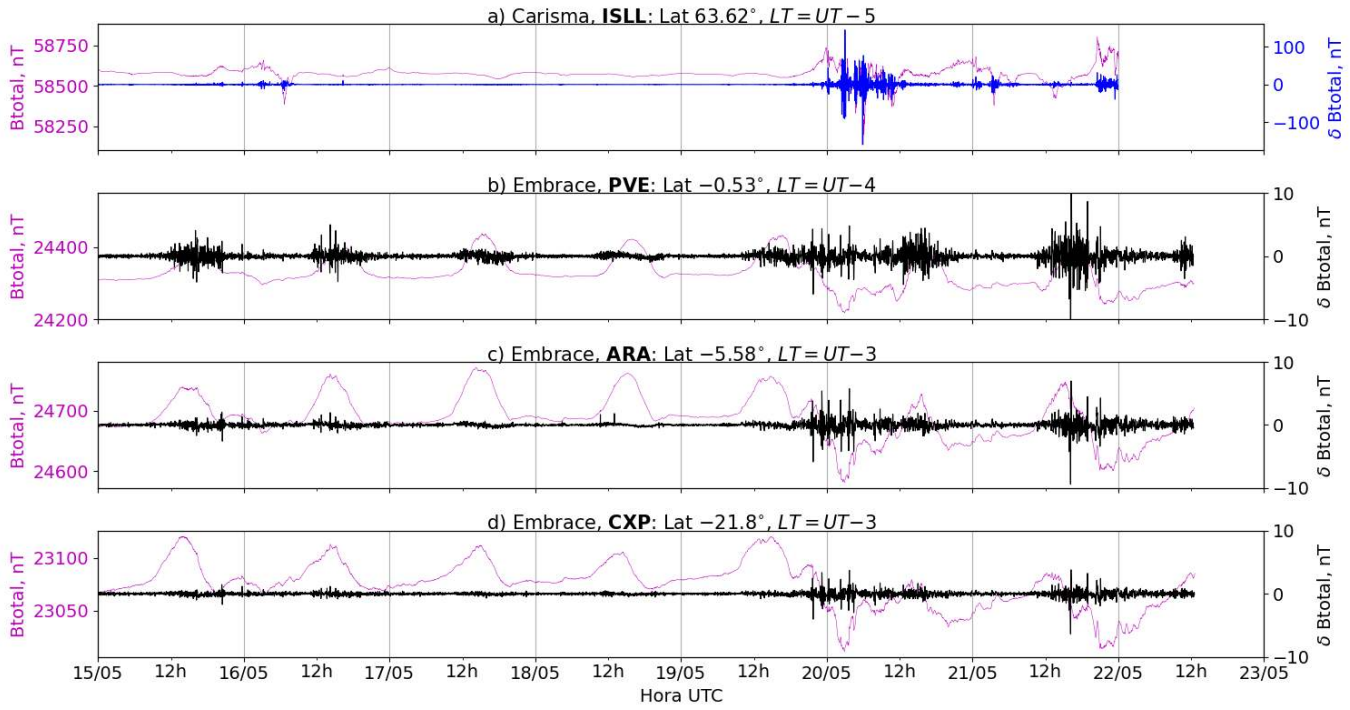


Figura 1: a) Timeseries of the geomagnetic field total component measured at ISLL station (Island Lake) of the CARISMA magnetometer network in magenta, along with the associated perturbation in the Pc5 band shown in blue. b-d) timeseries of the geomagnetic field total component measured at stations PVE (Porto Velho), ARA (Araguatins), and CXP (Cachoeira Paulista) of the EMBRACE network in magenta, along with the Pc5 perturbation in blue.

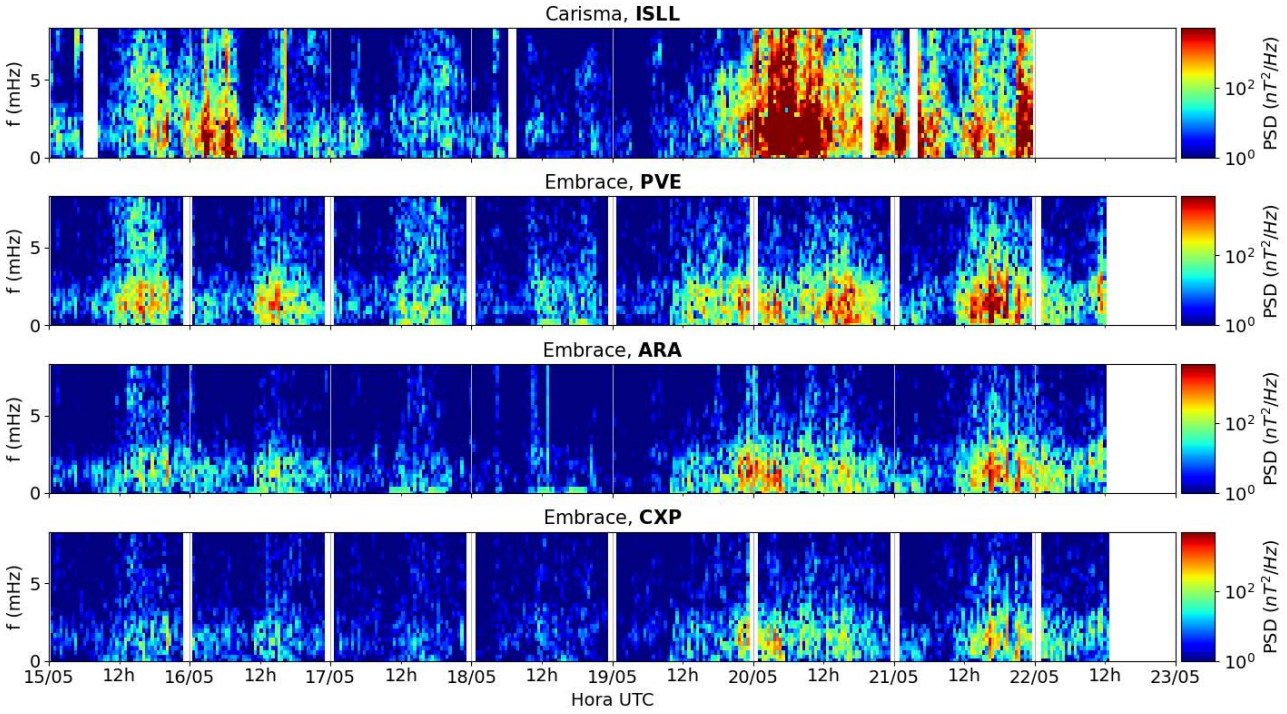


Figura 2: a-d) Time evolution of the power spectral density obtained from the filtered timeseries of the geomagnetic field total component (δ Btotal) for a) the high latitude station (ISLL-CARISMA), and b-d) for the low latitude stations of EMBRACE (PVE, ARA, CXP).

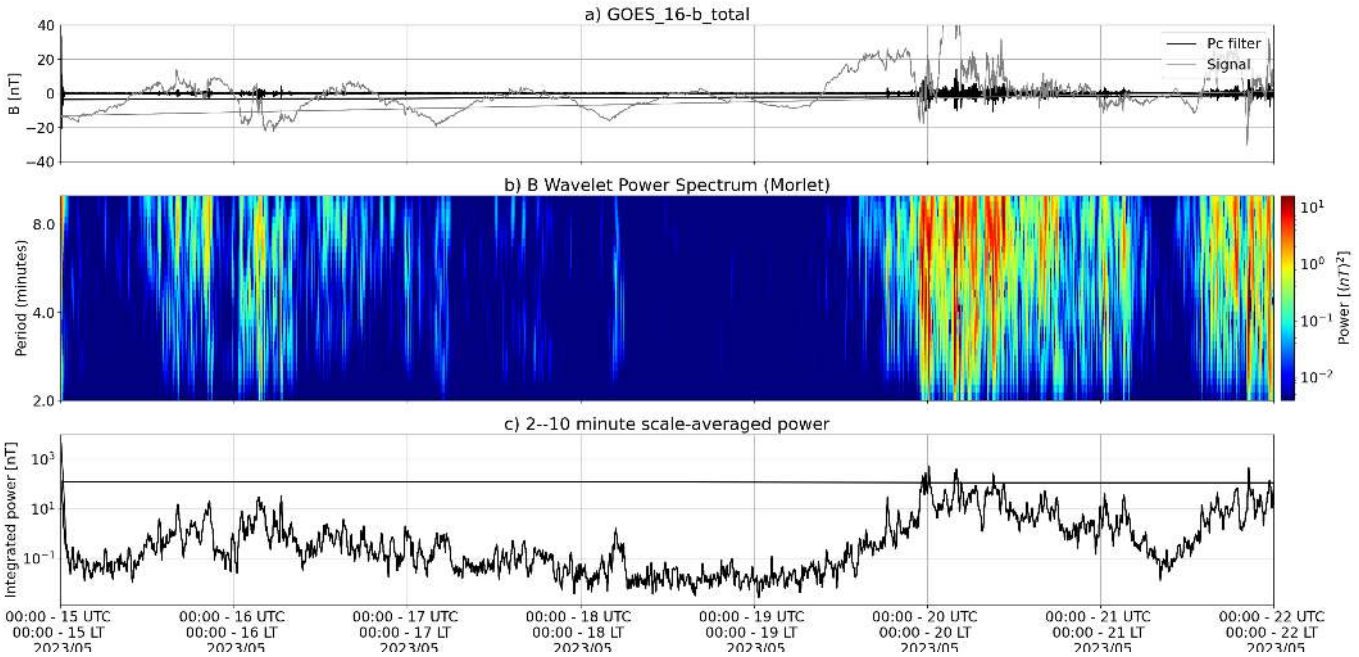


Figura 3: a) Timeseries of the geomagnetic field total component measured by GOES 16, together with the Pc5 fluctuation in black. b) Wavelet power spectrum of the filtered timeseries. c) Average ULF power in the period range from 2 to 10 minutes.

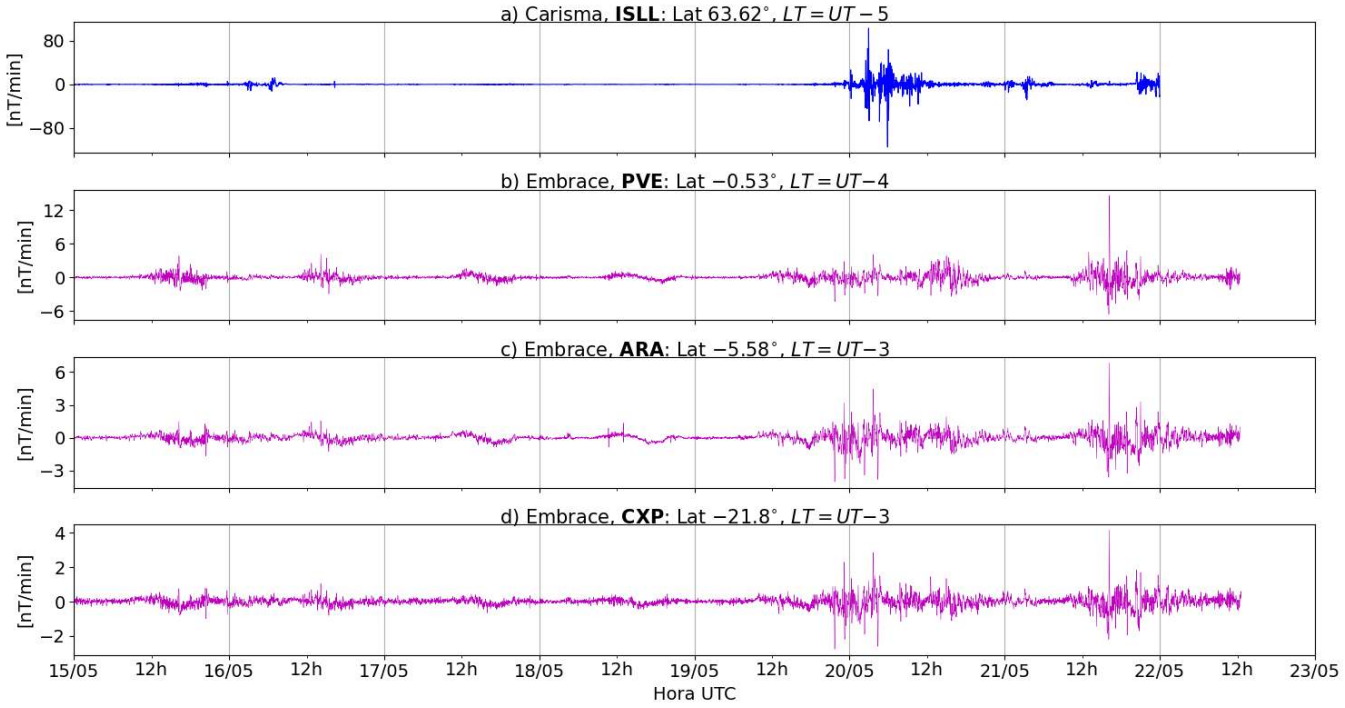


Figura 4: a-d) The rate of change of the geomagnetic field total component (dB/dt) obtained for a) the high latitude station (ISLL-CARISMA), and b-d) for the low latitude stations of EMBRACE (PVE, ARA, CXP).

- The GOES 16 satellite in geosynchronous orbit (L $\sim$ 6.6) registered significant activity of Pc5 ULF waves on May 20 and 21.
- As observed on the ground, the ISLL station at high latitude registered weak to 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, but May 17-18.
- The CXP and ARA stations at low latitudes of Brazil rather registered low activity of the waves over the week. However, the ULF wave activity highly increased on May 19.
- The dB/dt rates were enhanced on May 20 up to amplitude values ¿ 80 nT/min in ISLL (high latitude), while they were below $\sim$ 12 nT/min in magnitude at the low latitudes of Brazil. There was occurrence of sudden impulses on May 8, 9, and 12.

4 Geomagnetic activity

4.1 Responsible: Lívia Alves

From May 16 to 22, the following events related to geomagnetic activity stand out:

- May 20 to 22: H- component reached -120 nT on May 20, the other two days the H-component was negative.
- The AE index surpassed 1000 nT in May 20 to 22. The Dst index reached -60 nT (May 20) . The highest Kp of the week was 6o

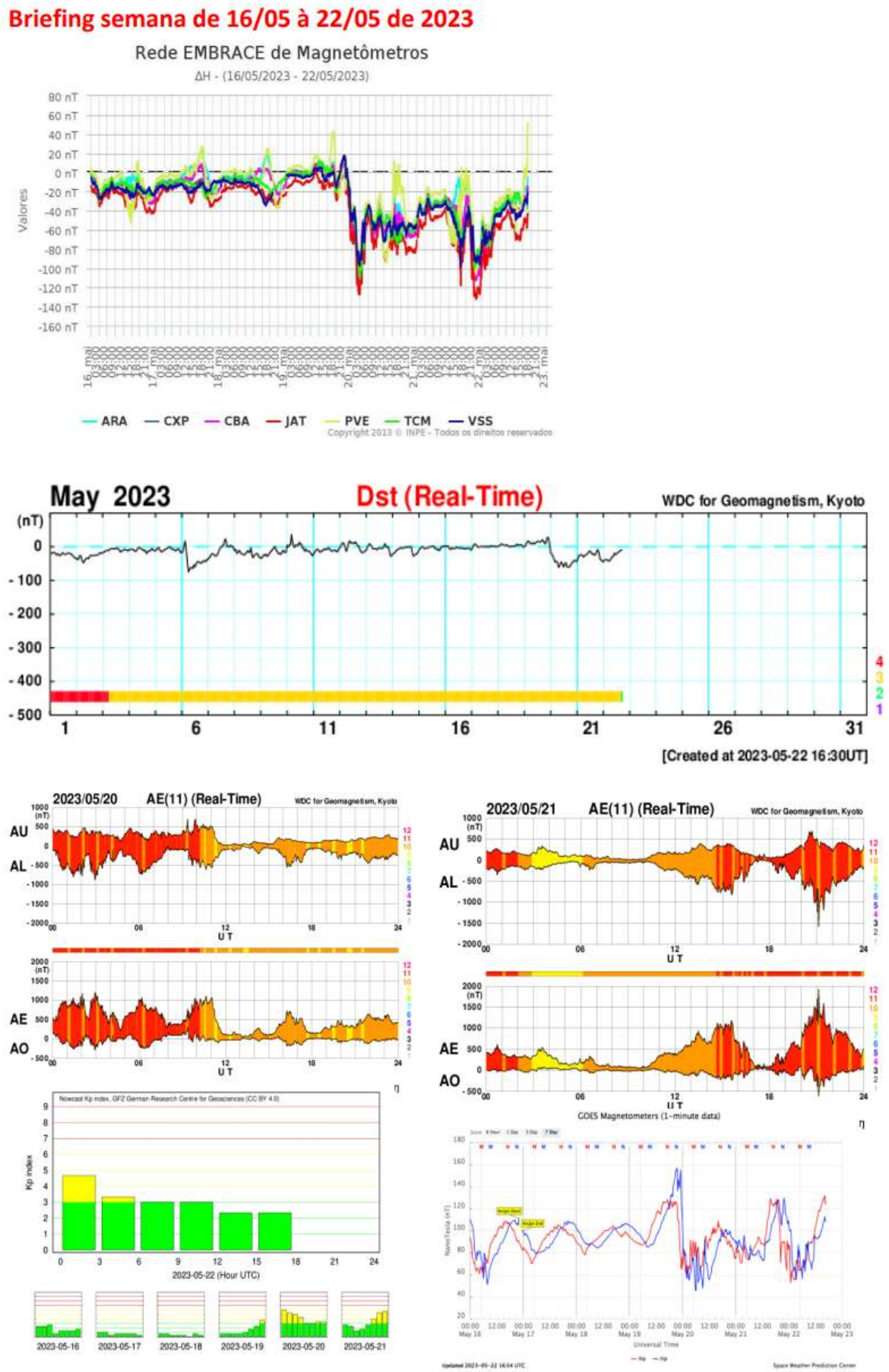


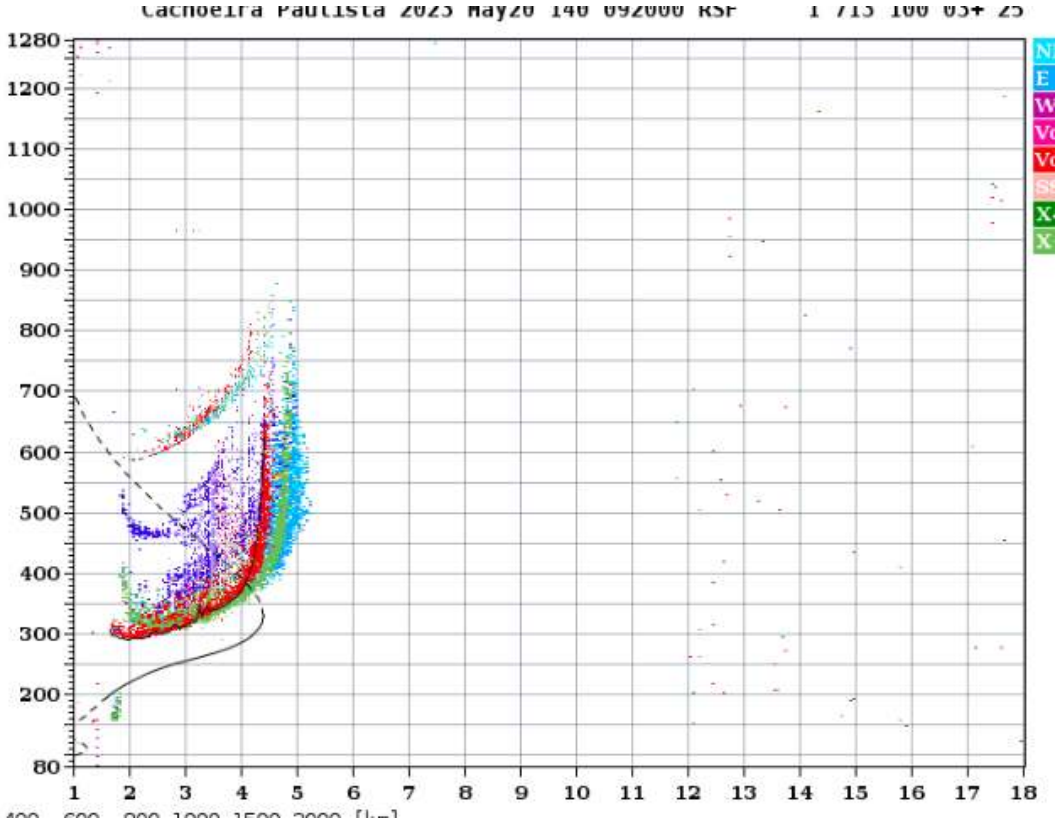
Figura 5: Time evolution of the geomagnetic field data and indices during the reported week.

5 Ionosphere

5.1 Responsible: Laysa Resende

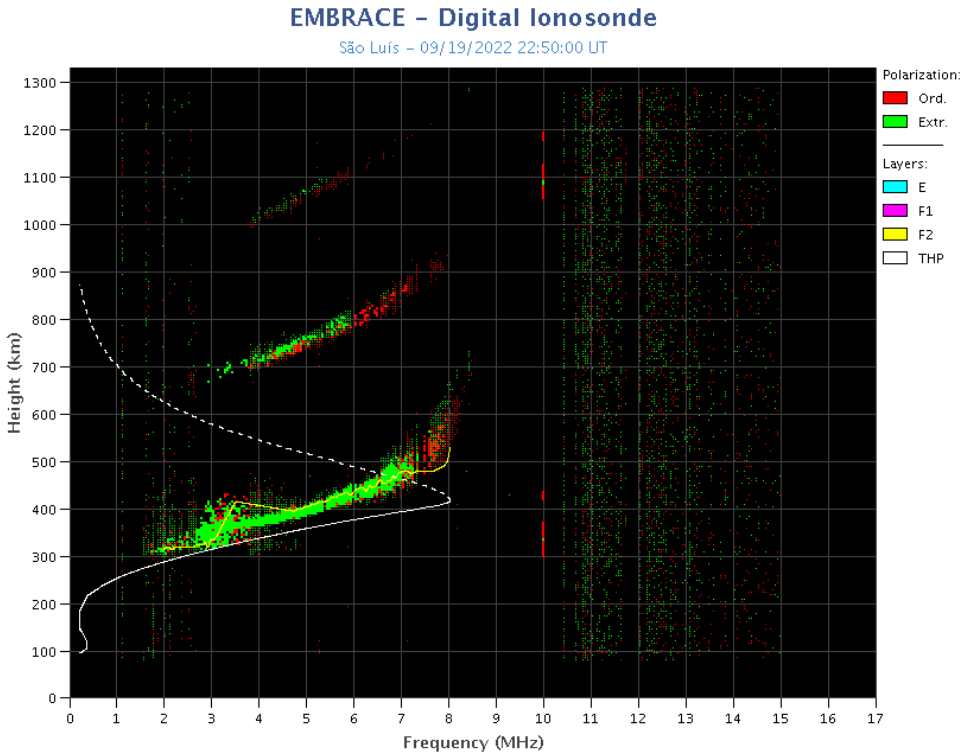
Cachoeira Paulista:

- There were spread F on May,20.
- The Es layers reached scale 2 during the week.



São Luís

- There were spread F between 18 and 21.
- The Es layers reached scale 5 on May, 15.



6 ROTI

6.1 Responsible: Carolina de Sousa do Carmo

In the week 2262 (May 14 to 20, 2023) there were no ionospheric irregularities (plasma bubble), on all analyzed days, with the exception on May 20 in CUIB and SJSP. Figure 6 shows the ROTI time series for four stations in the Brazilian sector (Natal (RNNA), Bacabal (MABB), Cuiabá (CUIB) and São José dos Campos (SJSP)).

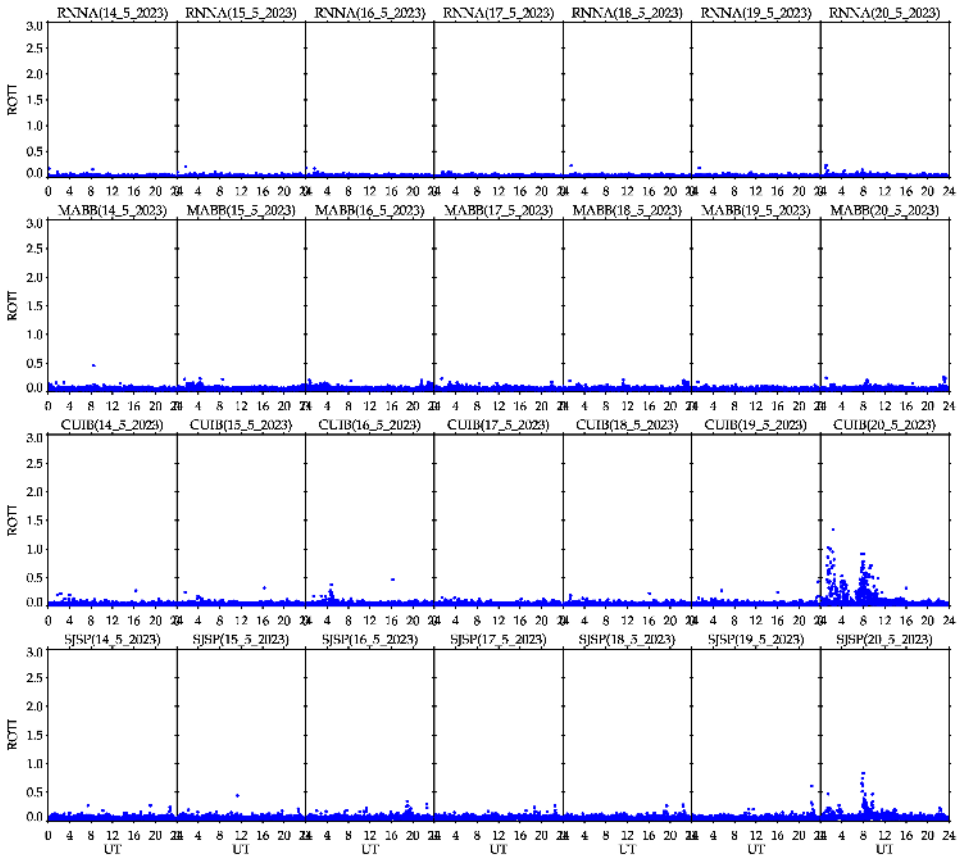


Figura 6: ROTI time series for four stations in the Brazilian sector (Natal (RNNA), Bacabal (MABB), Cuiabá (CUIB) and São José dos Campos (SJSP)), from May 14 to 20, 2023.