Briefing Space Weather

2023/04/12

1 Sun

1.1 Responsible: José Cecatto

04/03 – No flare; Fast wind stream (=< 550 km/s); 7 CME c.h.c. toward the Earth *;
04/04 – No flare; Fast wind stream (=< 550 km/s); 2 CME c.h.c. toward the Earth;
04/05 – No flare; Fast wind stream (=< 500 km/s); 2 CME c.h.c. toward the Earth;
04/06 – M3.0 flare; Fast wind stream (=< 450 km/s); 7 CME c.h.c. toward the Earth;
04/07 – No flare; Fast wind stream (=< 450 km/s); 5 CME c.h.c. toward the Earth *;
04/08 – M2.9 flare; No fast wind stream; 4 CME c.h.c. toward the Earth;
04/09 – No flare; Fast wind stream (=< 450 km/s); 11 CME c.h.c. toward the Earth *,*;
04/10 – M2.8 flare; Fast wind stream (=< 550 km/s); No CME toward the Earth;
Prev.: Fast wind stream for the next 01-02 days; for the next 2 days (25% M, 01% 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

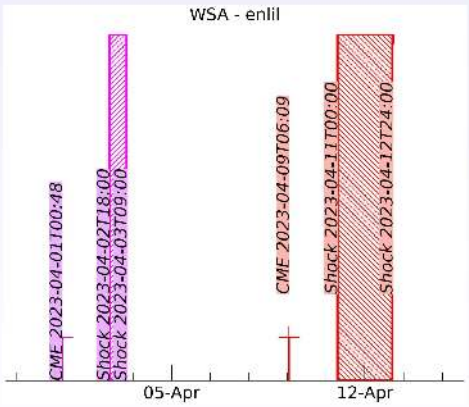
2 Sun

2.1 Responsible: Douglas Silva

- WSA-ENLIL (Prediction for CME: 2023-04-01T00:48 UT)
  - The simulation results indicate that the flank of CME will reach the DSCOVR mission between 2023-04-02T18:00 UT and 2023-04-03T09:00 UT
- WSA-ENLIL (CME 2023-04-09T06:09 UT)
  - The simulation results indicate that the flank of Coronal Mass Ejection will reach the DSCOVR mission between 2023-04-11T00:00 UT and 2023-04-12T24:00 UT.

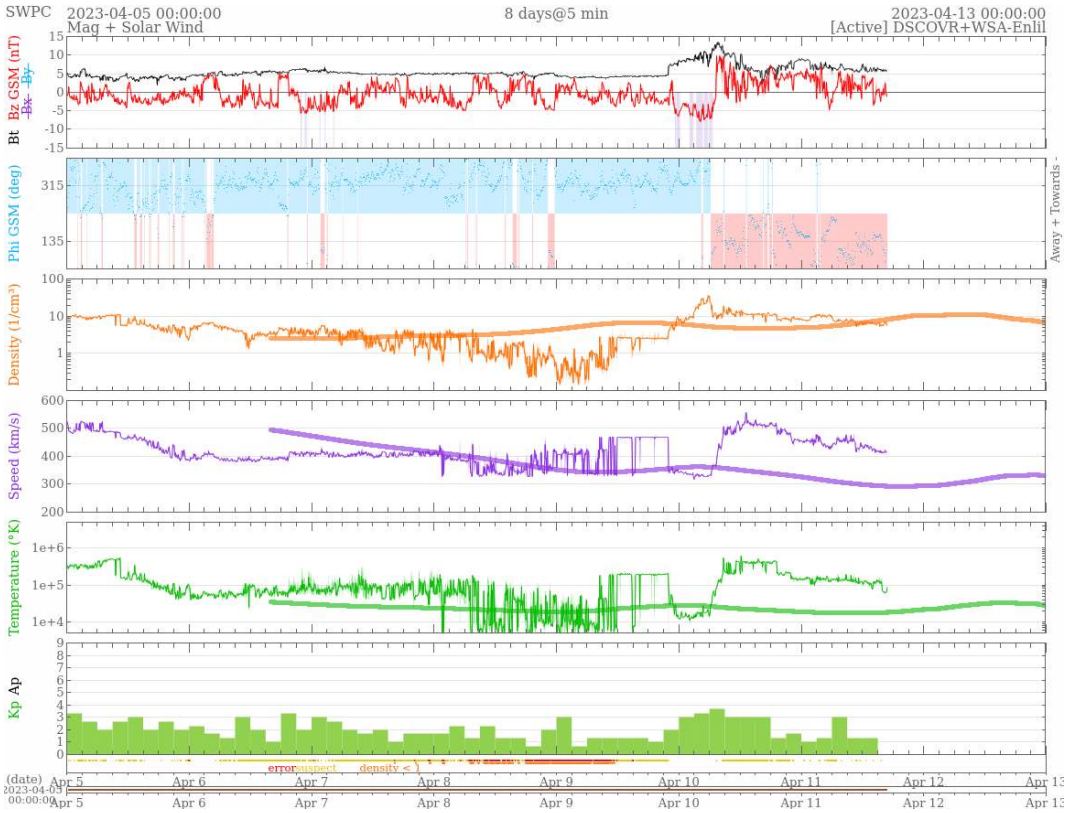
Coronal holes (SPOCA):
Don't have data.

WSA - ENLIL and SPOCA



3 Interplanetary Medium

3.1 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 of 12.8 nT on Apr/10 at 7:30 am 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 crossing sector boundary on 10/Apr at 06:30 UT.
- The bz field component showed a minimum value of -6.02nT on Apr/10 at 05:30 UT and a maximum positive value of 7.92 nT on Apr/10 at 08:30 UT. In the remainder of the period, the bz component fluctuated in the interval [+10, -10] nT.
- The solar wind density showed a maximum peak on 10/Apr at 05:30 of 26 p/cm^3, however the density remained on average below 14 p/cm^3 for the remainder of the period.
- The solar wind speed remained on average above 400 km/s with a maximum peak on Apr/10 at 13:30 UT of 529 km/s, and a minimum value on Apr/10 at 05:30 UT of 327 km/s.
- The position of the magnetopause was oscillating with a minimum value recorded on 10/Apr at 05:30 UT of 8.4 Re. On average, the position of the magnetopause was below the equilibrium position during April 03-05.

4 ULF waves

4.1 Responsible: Graziela B. D. Silva

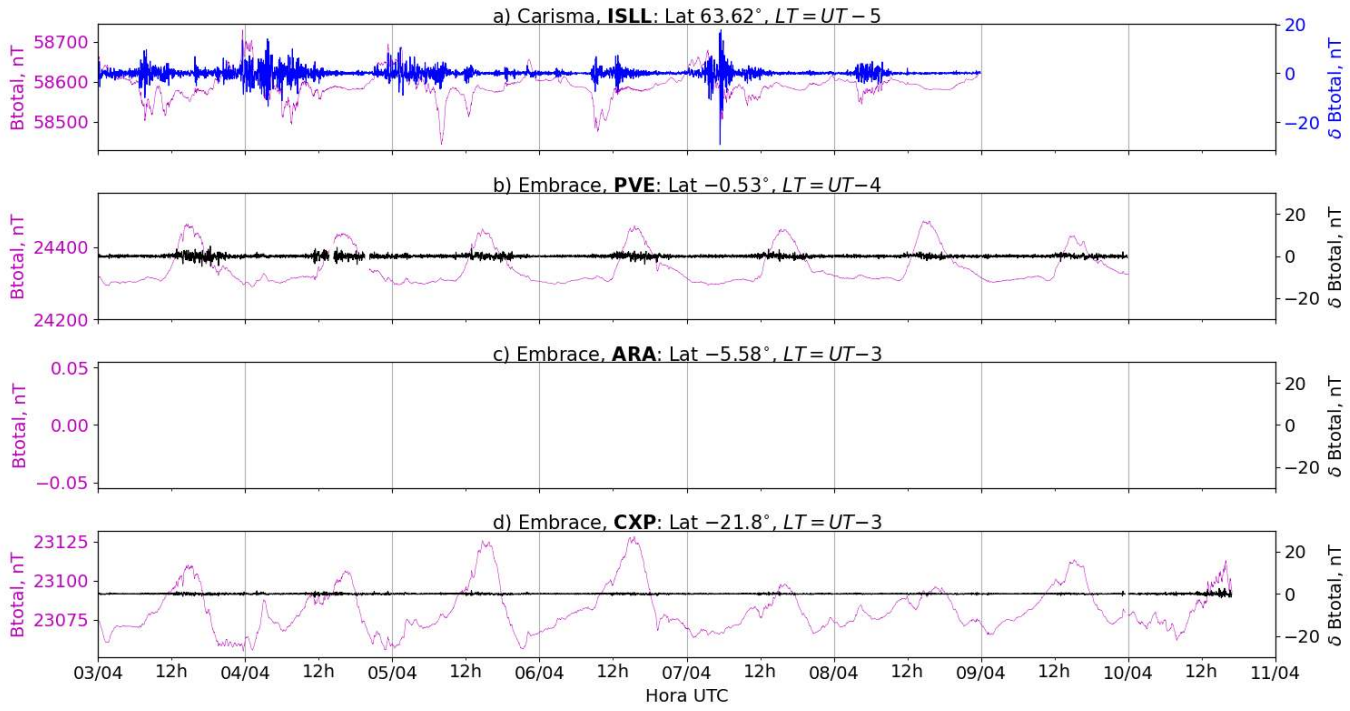


Figura 1: a) Timeseries of the geomagnetic field total component measured at ISLL station (Island Lake) of the CARISMA magnetometer network in magenta, along with the associated perturbation in the Pc5 band shown in blue. b-d) timeseries of the geomagnetic field total component measured at stations PVE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

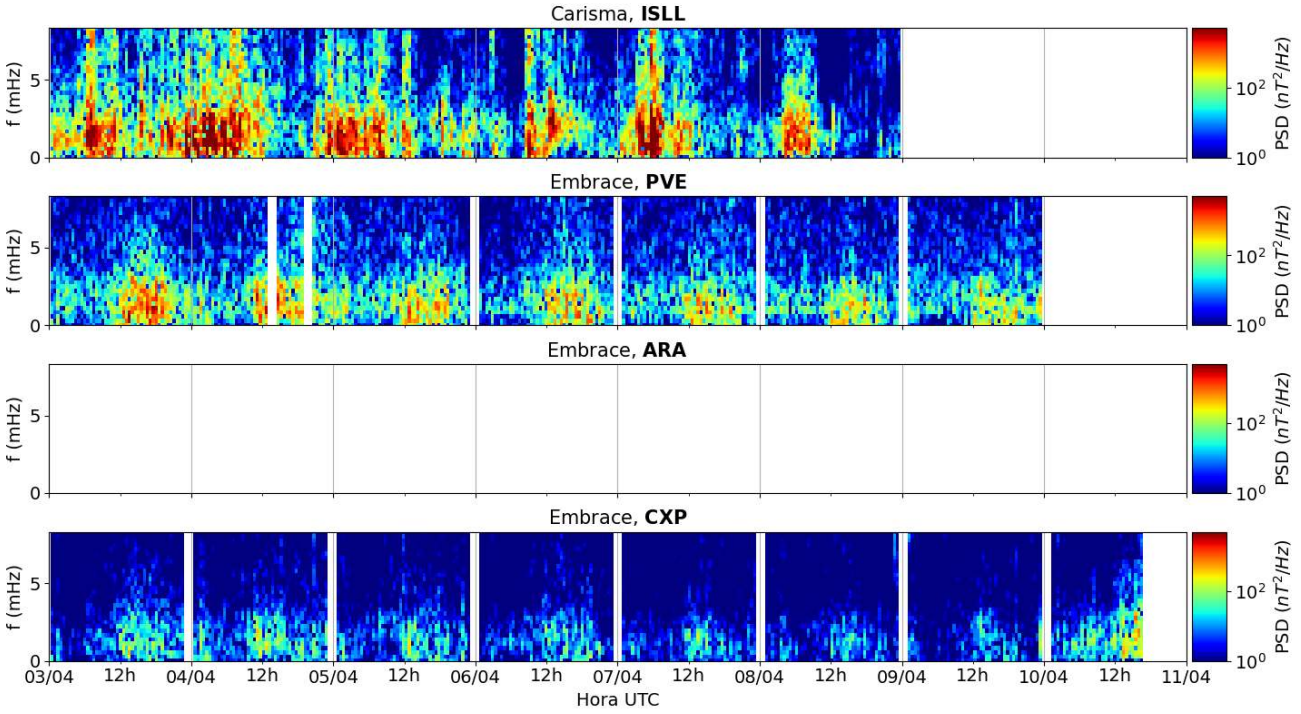


Figura 2: a-d) Time evolution of the power spectral density obtained from the filtered timeseries of the geomagnetic field total component (δ Btotal) for a) the high latitude station (ISLL-CARISMA), and b-d) for the low latitude stations of EMBRACE (PVE, ARA, CXP).

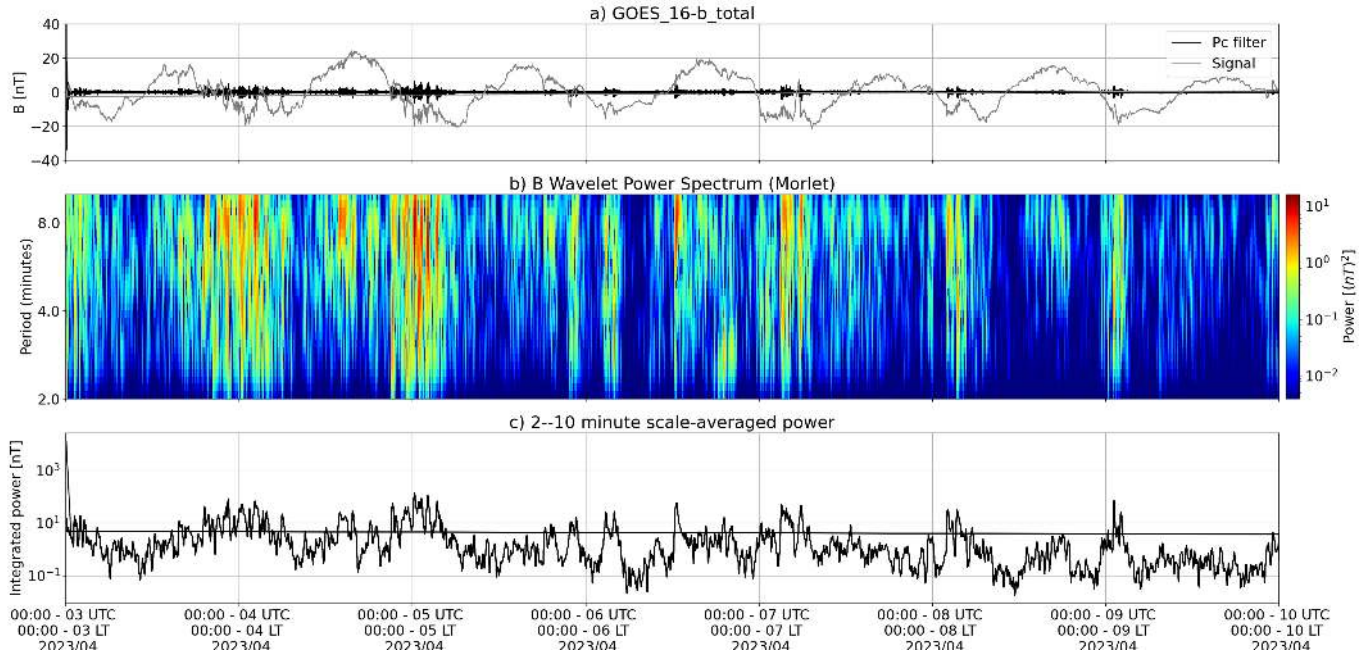


Figura 3: a) Timeseries of the geomagnetic field total component measured by GOES 16, together with the Pc5 fluctuation in black. b) Wavelet power spectrum of the filtered timeseries. c) Average ULF power in the period range from 2 to 10 minutes.

- The GOES 16 satellite in geosynchronous orbit (L $\sim$ 6.6) registered significant activity of Pc5 ULF waves especially through April 3-7.
- As observed on the ground, the ISLL station at high latitude registered significant levels of ULF

wave activity over the week.

- The PVE station from Embrace MagNet, located under the dip equator, registered significant levels of ULF wave activity over these days, however, with a strong diurnal influence by the equatorial electrojet.
- The ARA station at low latitudes of Brazil did not register significant activity of the waves until April 9. Later on the 10th, the station observed enhanced activity of the waves in response to the arrival of the solar wind HSS and CIR structures.

5 Geomagnetic activity

5.1 Responsible: Lívia Alves

The figures below show that the week of April 3-10 registered very low auroral activity (the AE index never reached 1000 nT in the period). The weekly time series of the Dst index shows quite geomagnetic conditions until April 10.

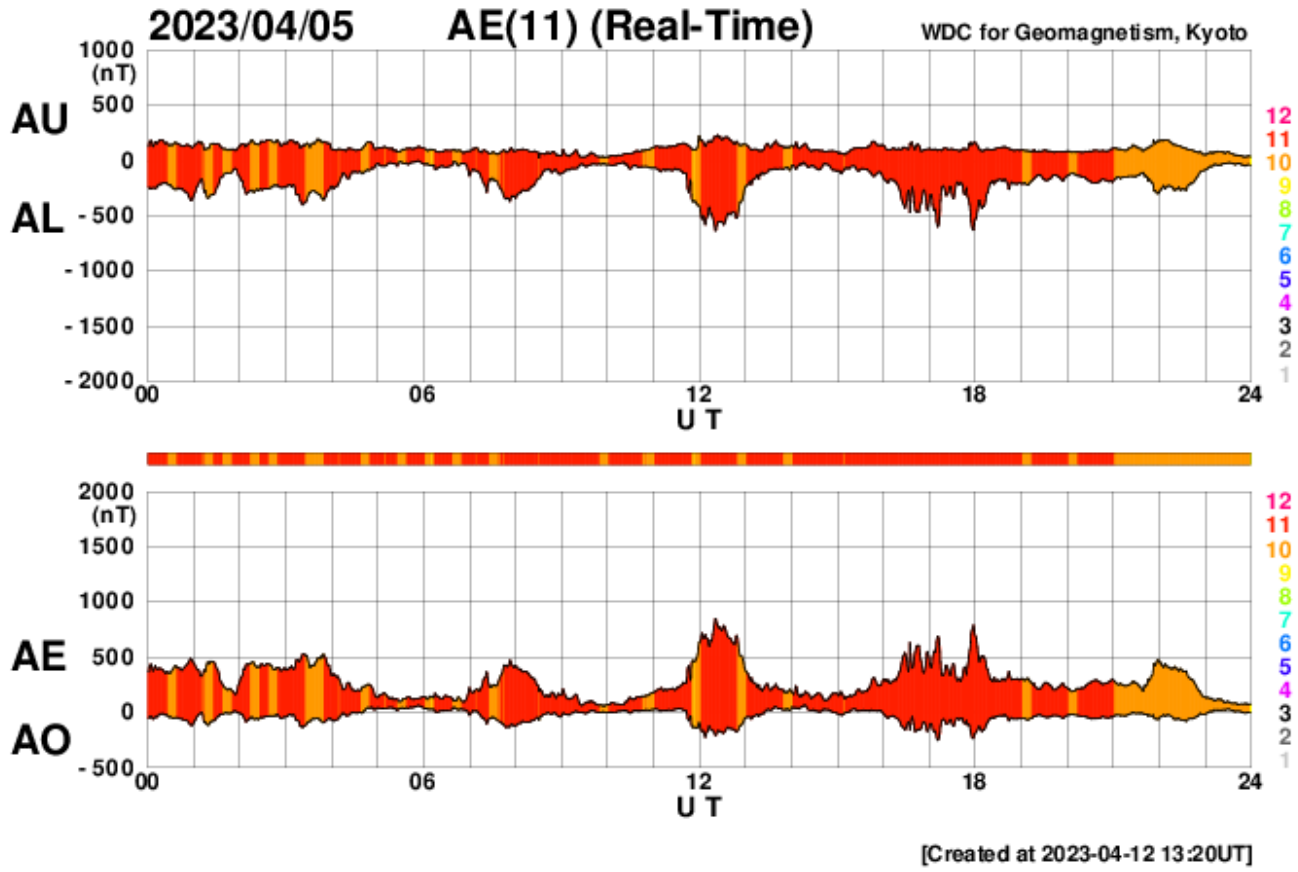


Figura 4: Geomagnetic index AE on April 5.

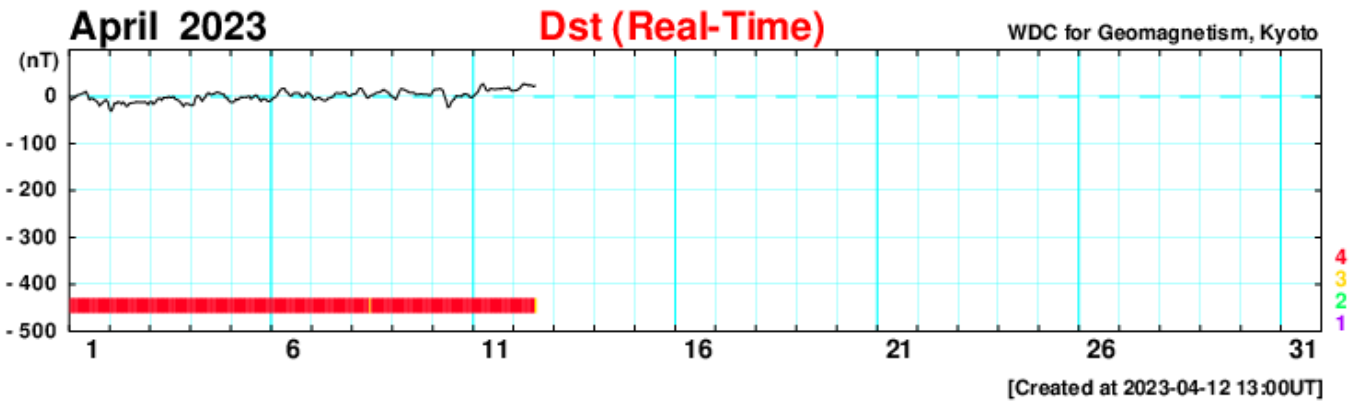


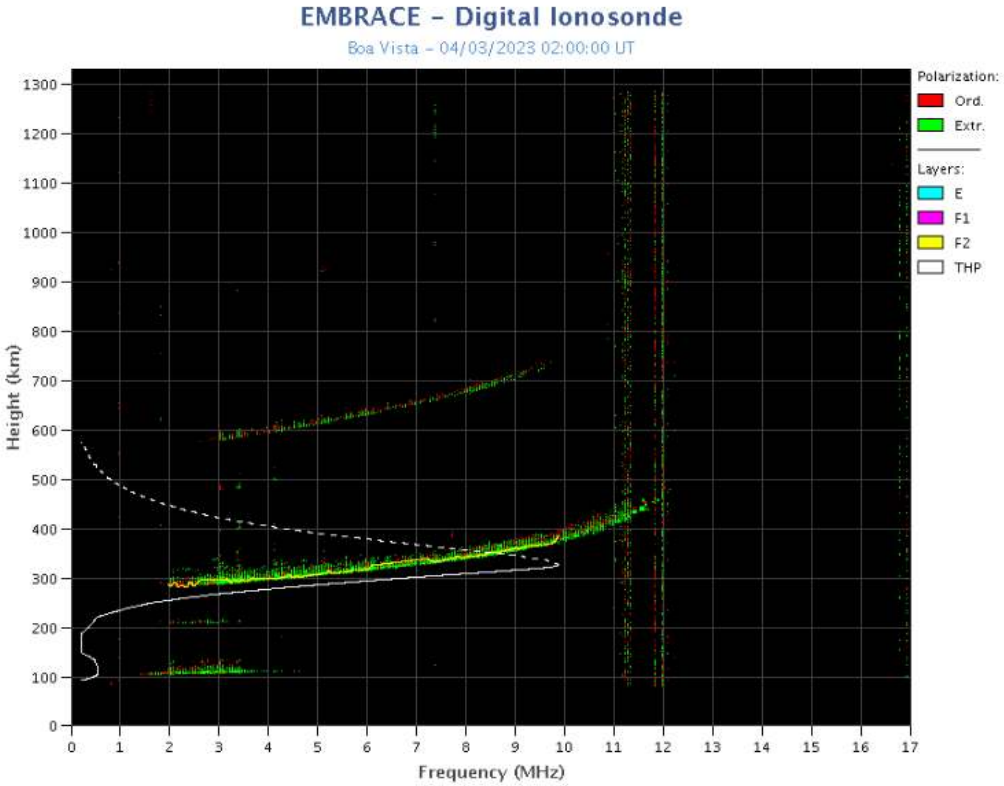
Figura 5: Geomagnetic index Dst during the reported week.

6 Ionosphere

6.1 Responsible: Laysa Resende

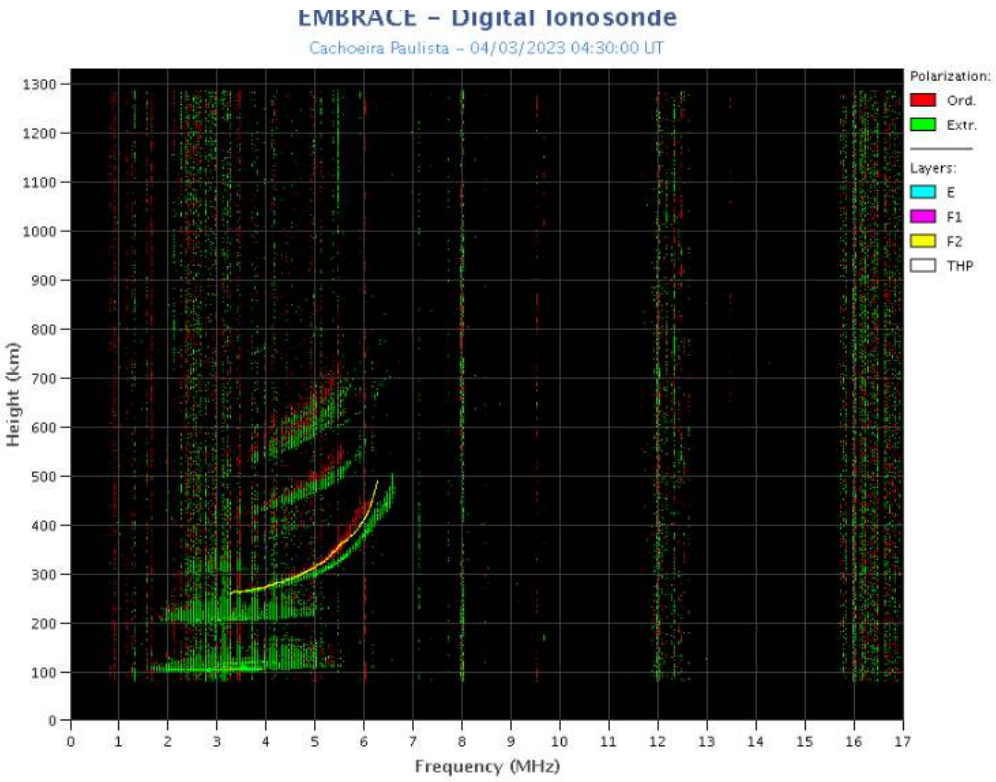
Boa Vista:

- There was no spread F on April 03, 2023.
- The Es layers reached scale 3 on April 03, 2023.



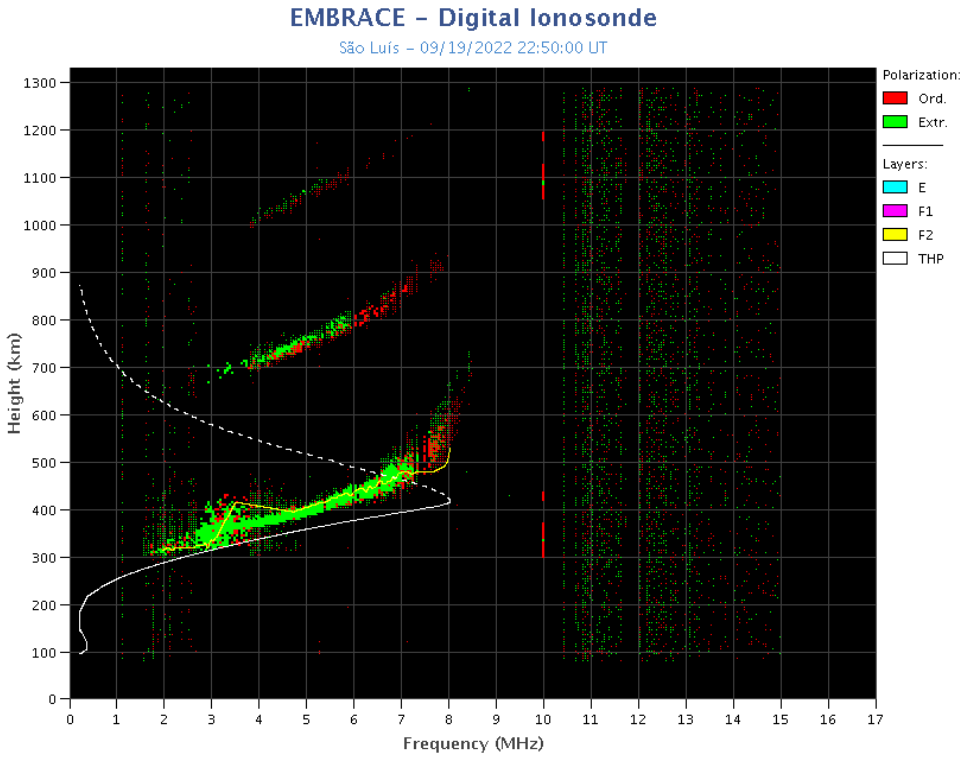
Cachoeira Paulista:

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



São Luís:

- There were spread F during all days in this week.
- The Es layers reached scale 2 during all days in this week.



7 ROTI

7.1 Responsible: Carolina de Sousa do Carmo

In the week 2256 (April 02 to 08, 2023) there were ionospheric irregularities (plasma bubble), on all analyzed days. The Figure below shows the ROTI time series for four stations in the Brazilian sector (Natal (RNNA), Bacabal (MABB), Cuiabá (CUIB) and São José dos Campos (SJSP)).

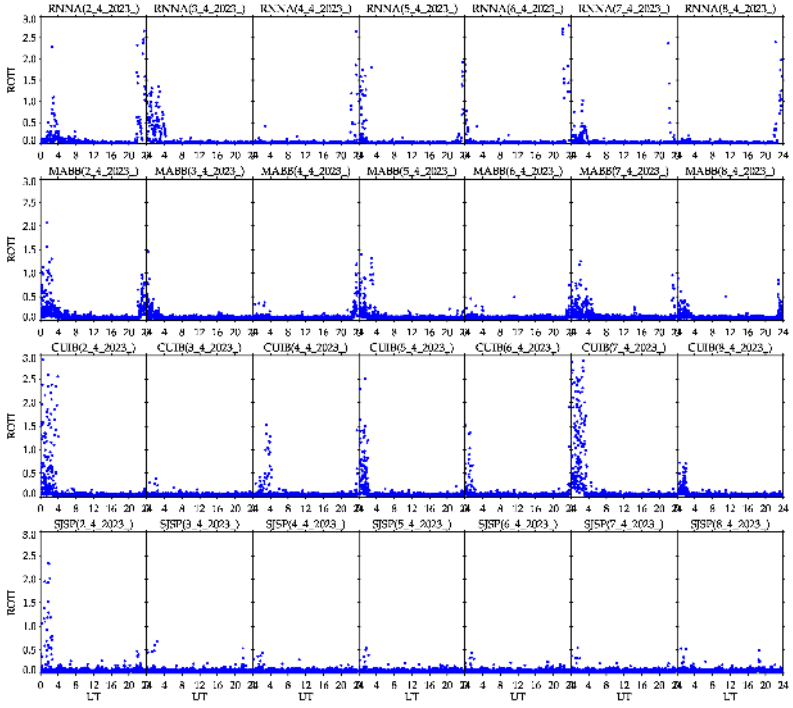


Figura 6: ROTI time series for four stations in the Brazilian sector (Natal (RNNA), Bacabal (MABB), Cuiabá (CUIB) and São José dos Campos (SJSP)), from April 02 to 08, 2023.