Briefing Space Weather

1 Sun (Douglas Silva)

1.1 Summary

WSA-ENLIL (CME 2023-09-01T23:12 UT)
The simulation results indicate that the flank of CME will reach the DSCOVR mission between 2023-09-05T05:30:00 UT and 2023-09-05T19:30:00 UT.
WSA-ENLIL (CME 2023-09-07T19:24:00 UT)
The simulation results indicate that the flank of CME will reach the DSCOVR mission between 2023-09-10T16:30:00 UT and 2023-09-11T06:30:00 UT.

Solar - Coronal holes Spatial Possibilistic Clustering Algorithm (SPoCA):

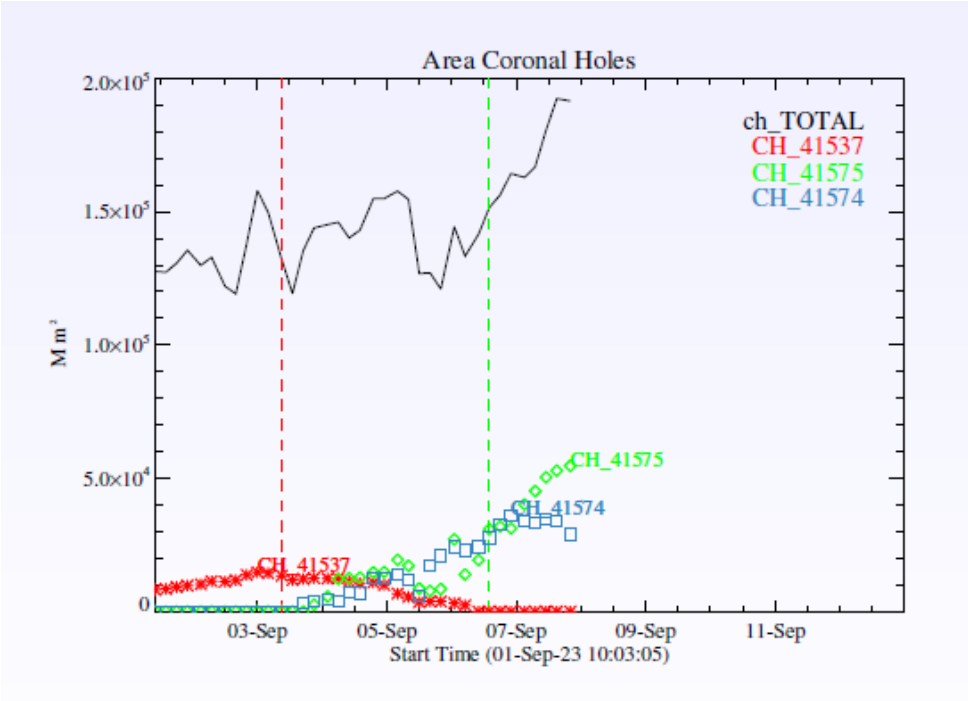


Figura: The solid black line depicts the products of the sum of areas for each detection interval performed by SPOCA between September 01 and 08, 2023.

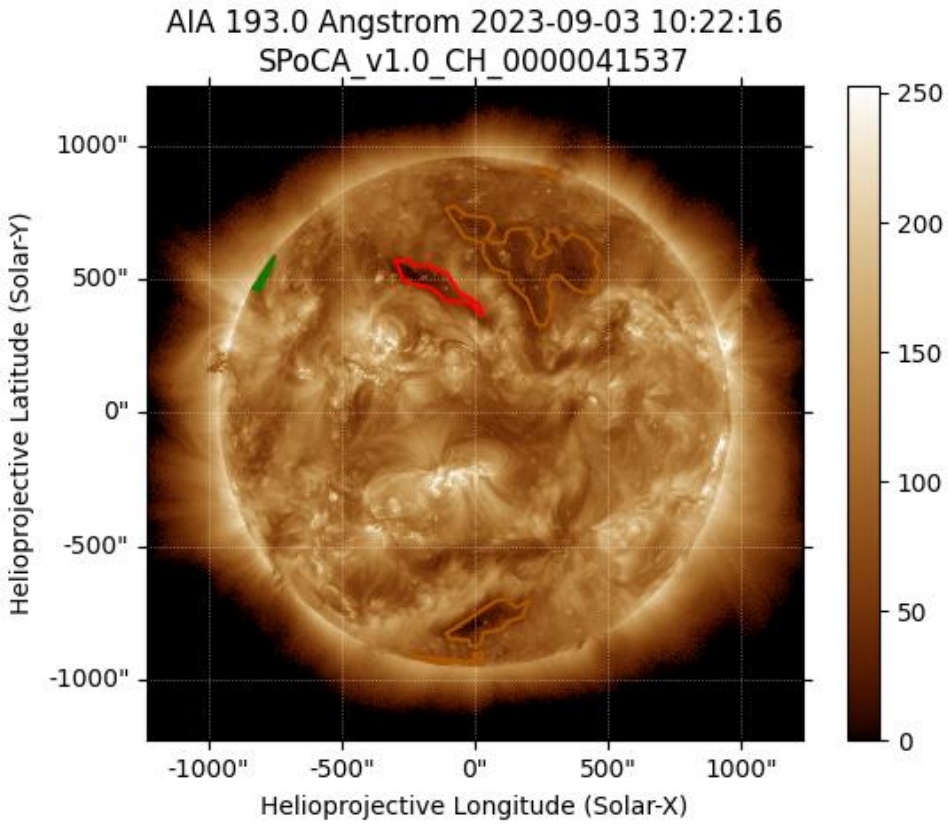


Figura: Above the 193 ˚A image of the Sun are highlighted coronal holes observed by SPOCA around 10:20 UT on September 03, 2023 (red dot line).

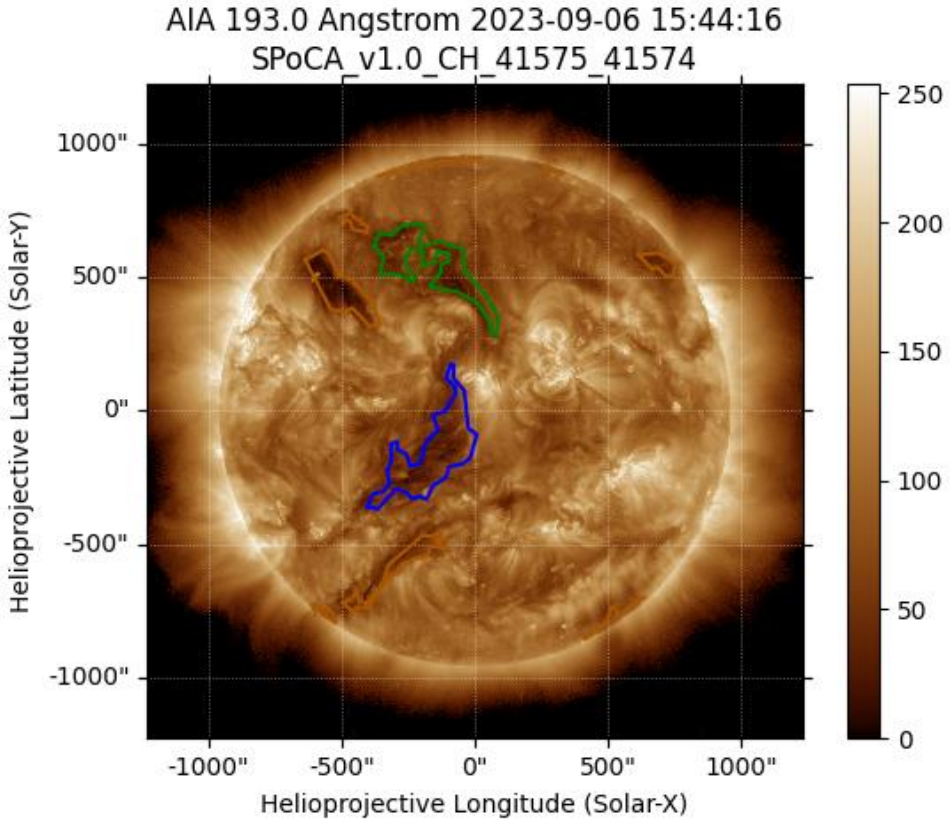
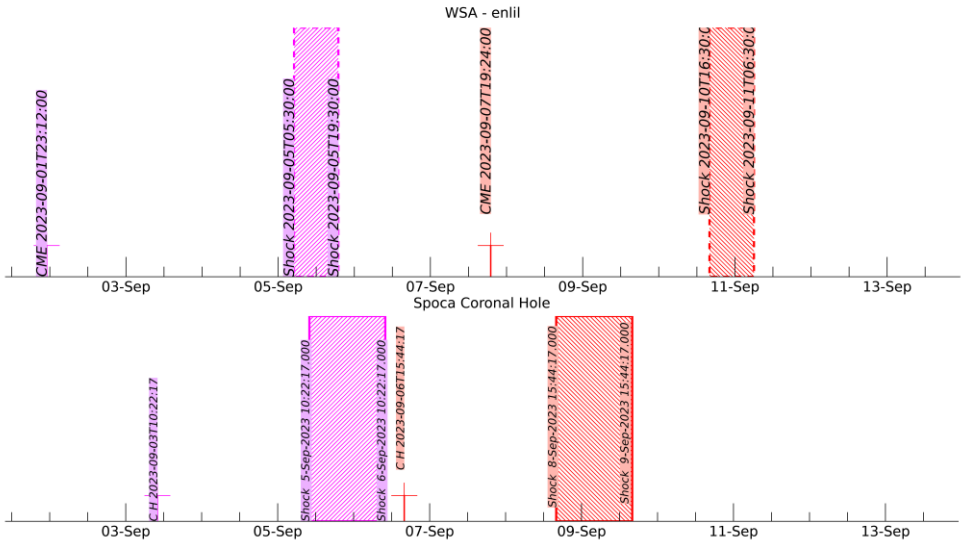


Figura: Above the 193 ˚A image of the Sun are highlighted coronal holes observed by SPOCA around 15:40 UT on September 06, 2023 (green dot line).

Solar - WSA - ENLIL and SPoCA:



2 Interplanetary Medium (Paulo Jauer)

Meio interplanetário – IM – Paulo Ricardo Jauer 04/09 to 11/09 2023

Summary

Summary of IM conditions for the last week. 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 10 nT during the analyzed period.

- The BxBy components presented variations in the analyzed period, keeping both oscillating within the interval [+7, -7] nT, with the presence of sector boundary crossing on 06/Set at 14:30 UT.

- The bz field component showed a minimum value on 05/Set at 15:30 UT of ~ -6.44 nT and on 08/Set at 15:30 UT of - 4.6 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 05/Set at 19:30 of 15 p/cm³. The remainder of the period the density oscillated on average below 10 p/cm³.

- The speed of the solar wind averaged below 400 km/s. Showing a maximum value on 06/Set at 02:30 UT of 433 km/s and a minimum value on 10/Set at 14:30 UT of 313km/s,

- The position of the magnetopause was oscillating on average above the equilibrium position. Minimum registered on 05/Set at 15:30 UT of 8.5 Re.

Figure 1 illustrates a set of parameters observed in the solar wind by the DSCVR satellite. The measured solar wind parameters can be identified in the following order starting in column 1: Interplanetary magnetic field modulus (IMF), the Bx and By components, Bz component, convection electric field Ey, solar wind density, speed, temperature and the last graph represents the position of the subsolar magnetopause. Note that some profiles are repeated in column 2.

Figure 1 – illustrates a set of parameters observed in the solar wind by the DSCVR satellite.

3 Geomagnetismo

3.1 Summary

In the week of Sep 05-11, the following events related to geomagnetic activity stand out:
• 05 and 08/09: the data from the Embrace magnetometer network registered a drop of -30 nT
• The AE index was reached 500 nT on 05 and 08/09. The Dst index ranged around zero. The highest Kp of the week was 4o.

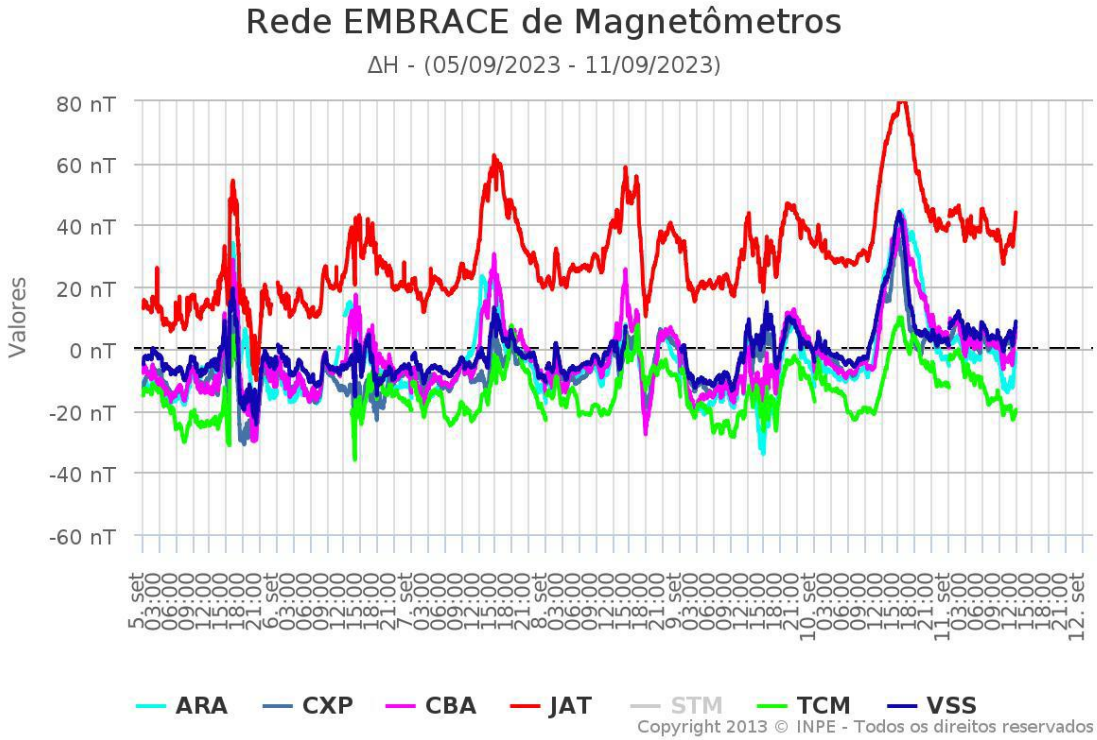


Figure 1.: Daily variation of the geomagnetic field from H (nT) measured at Embrace MagNet from 05 to 11 September 2023.

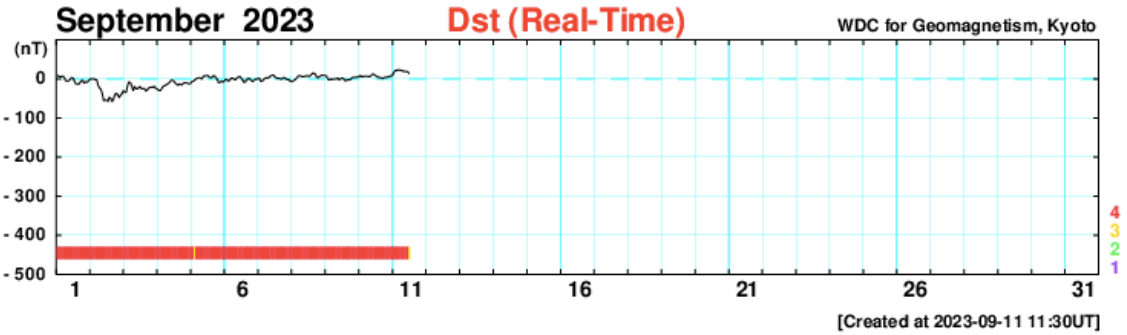


Figure 2: Dst index for September 2023.

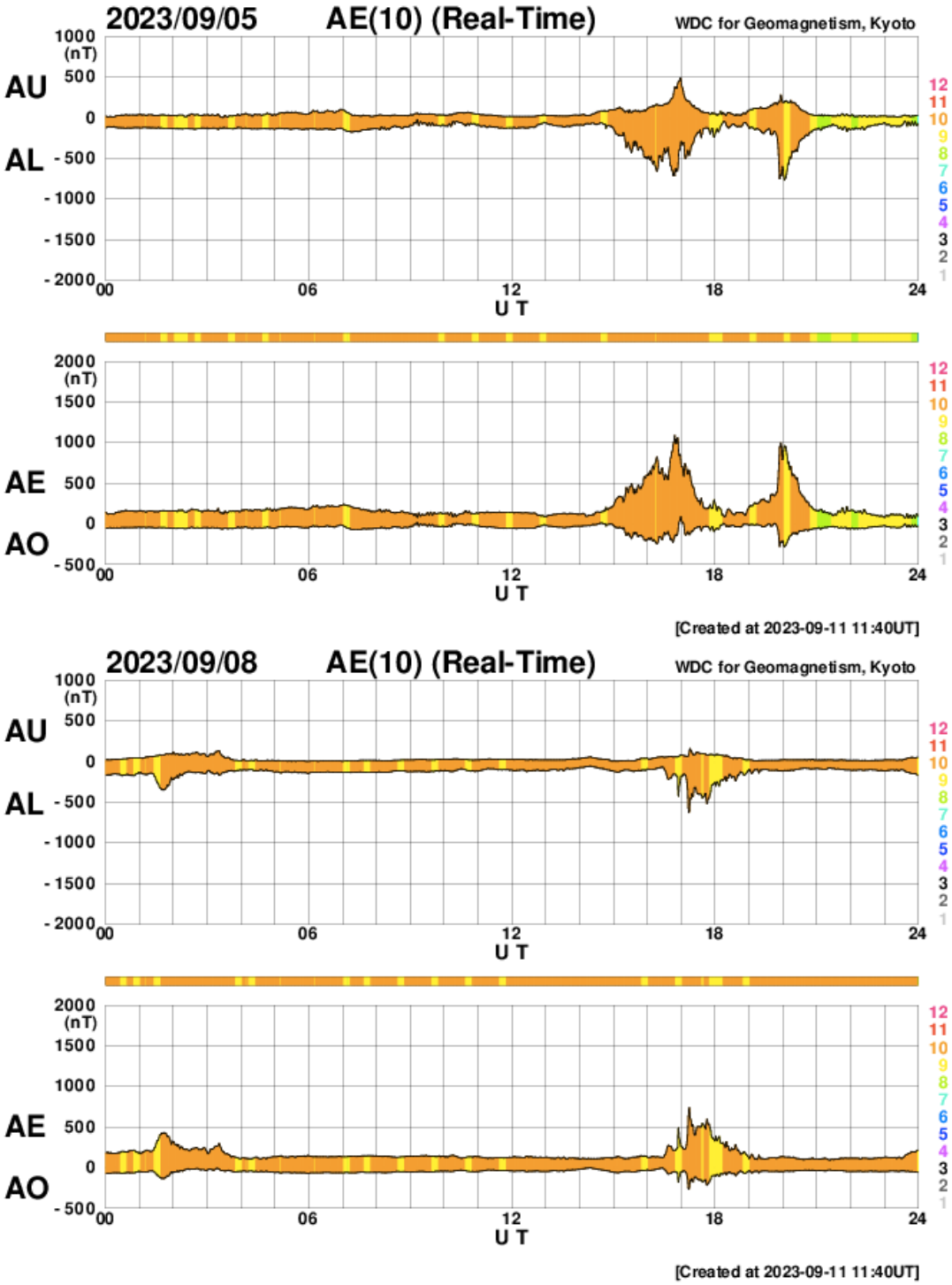


Figure 3.: AE index for the most disturbed days in the current week.

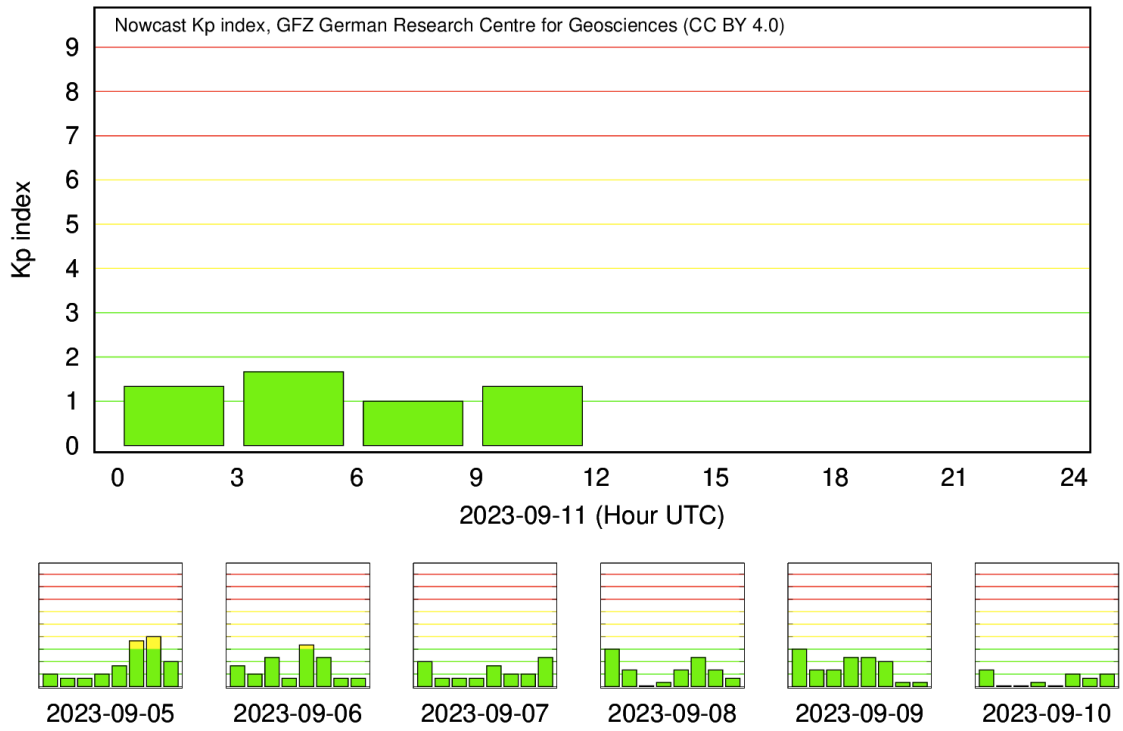


Figure 4: Kp index for the current week (05-11 September 2023).

4 ULF waves (Graziela B. D. Silva)

4.1 Summary

- The GOES 16 satellite in geosynchronous orbit (L ~ 6.6) registered significant activity of Pc5 ULF waves over the week, especially from Sep. 4 to 6.
- 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, and an enhanced activity on Sep. 5.
- The dB/dt rates were below 30 nT/min in magnitude at ISLL (high latitude). The rates were within 6 nT/min at the Embrace stations in lower latitudes.

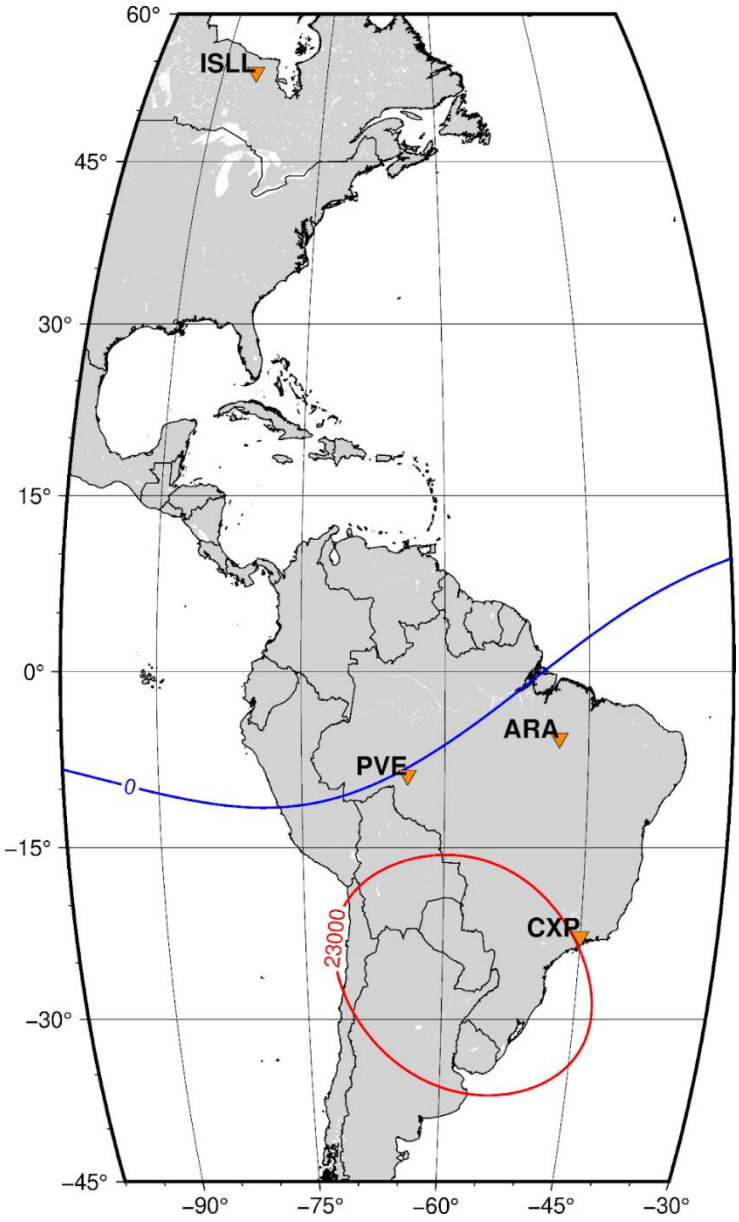


Figure 1: Map describing the geographic location of the stations together with the magnetic isolines to show the magnetic equator (blue) and the SAMA region (red).

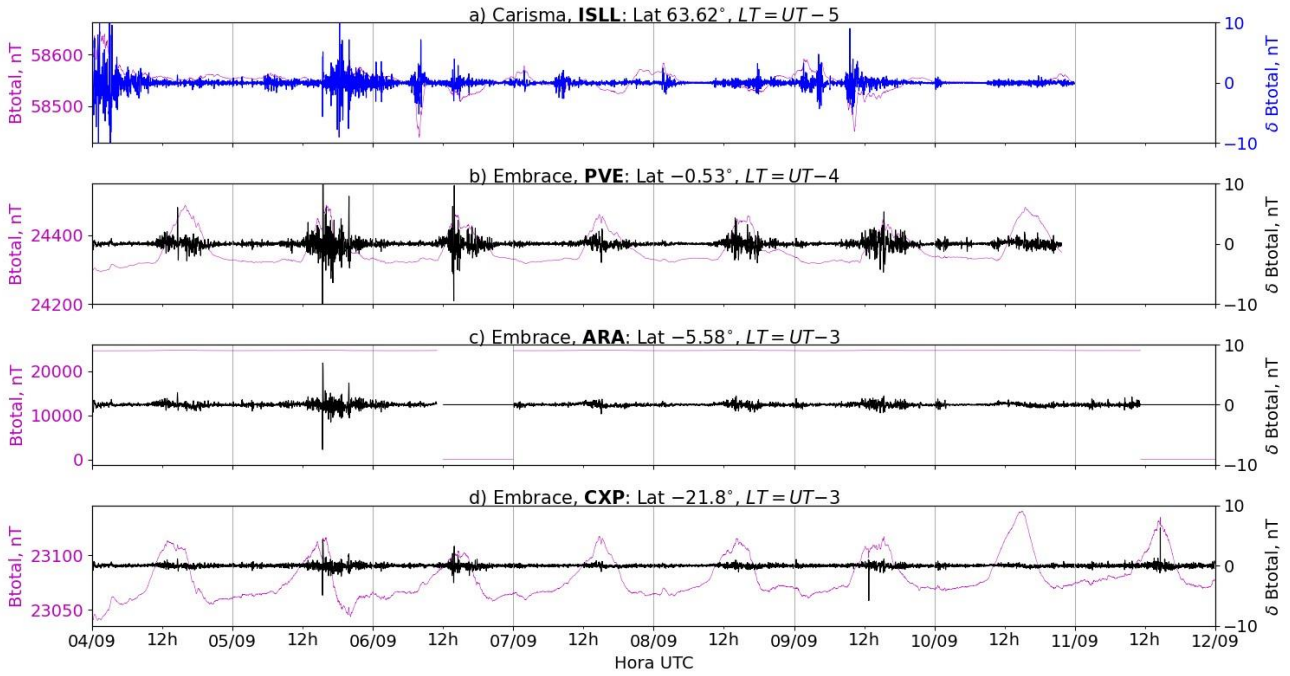


Figure 2: a) Timeseries of the geomagnetic field total component measured at ISLL station (Island Lake) of the CARISMA magnetometer network in magenta, along with the associated perturbation in the Pc5 band shown in blue. b-d) timeseries of the geomagnetic field total component measured at stations PVE (Porto Velho), ARA (Araguatins), and CXP (Cachoeira Paulista) of the EMBRACE network in magenta, along with the Pc5 perturbation in blue.

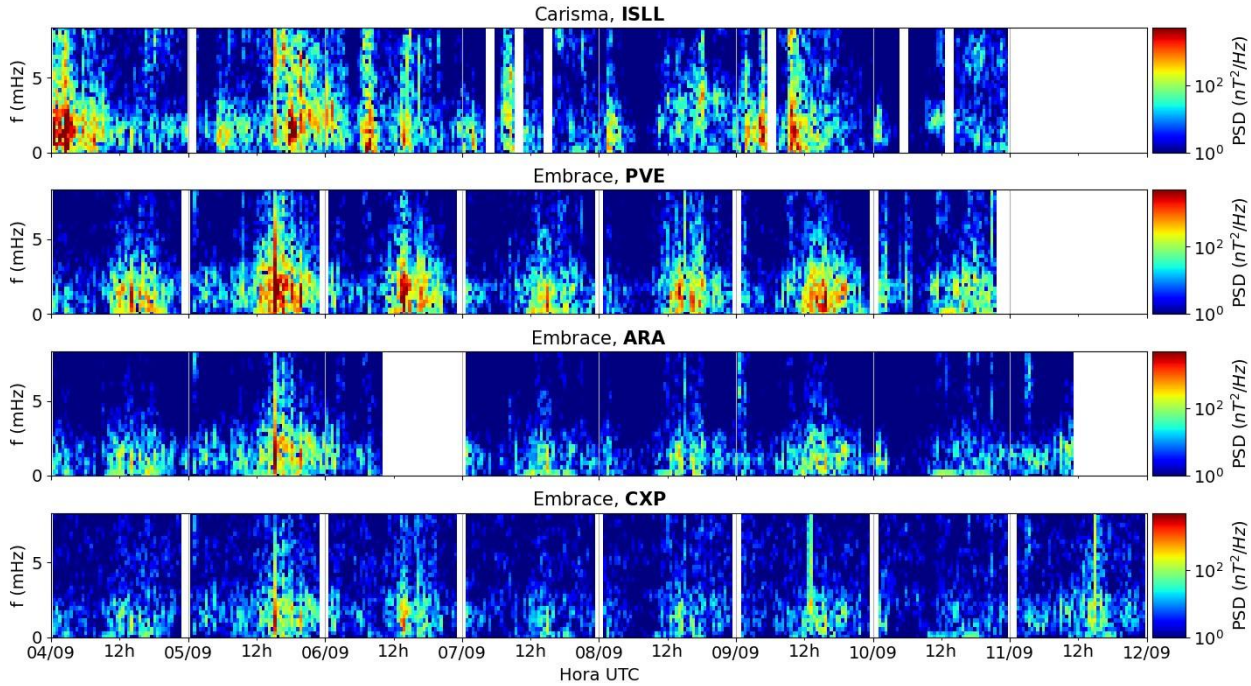


Figure 3: From top to bottom: Time evolution of the power spectral density obtained from the filtered timeseries of the geomagnetic field total component (δBtotal) for a) the high latitude station (ISLL-CARISMA), and b-d) for the low latitude stations of EMBRACE (PVE, ARA, CXP).

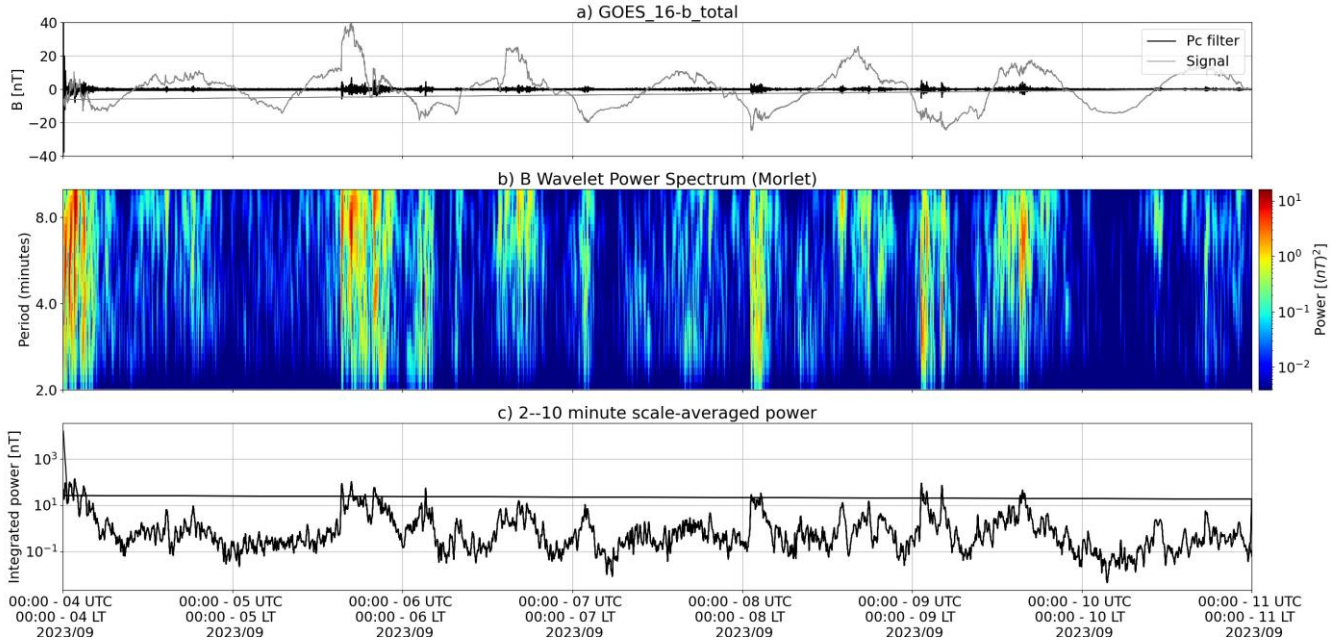


Figure 4: a) Timeseries of the geomagnetic field total component measured by GOES 16, together with the Pc5 fluctuation in black. b) Wavelet power spectrum of the filtered timeseries. c) Average ULF power in the period range from 2 to 10 minutes.

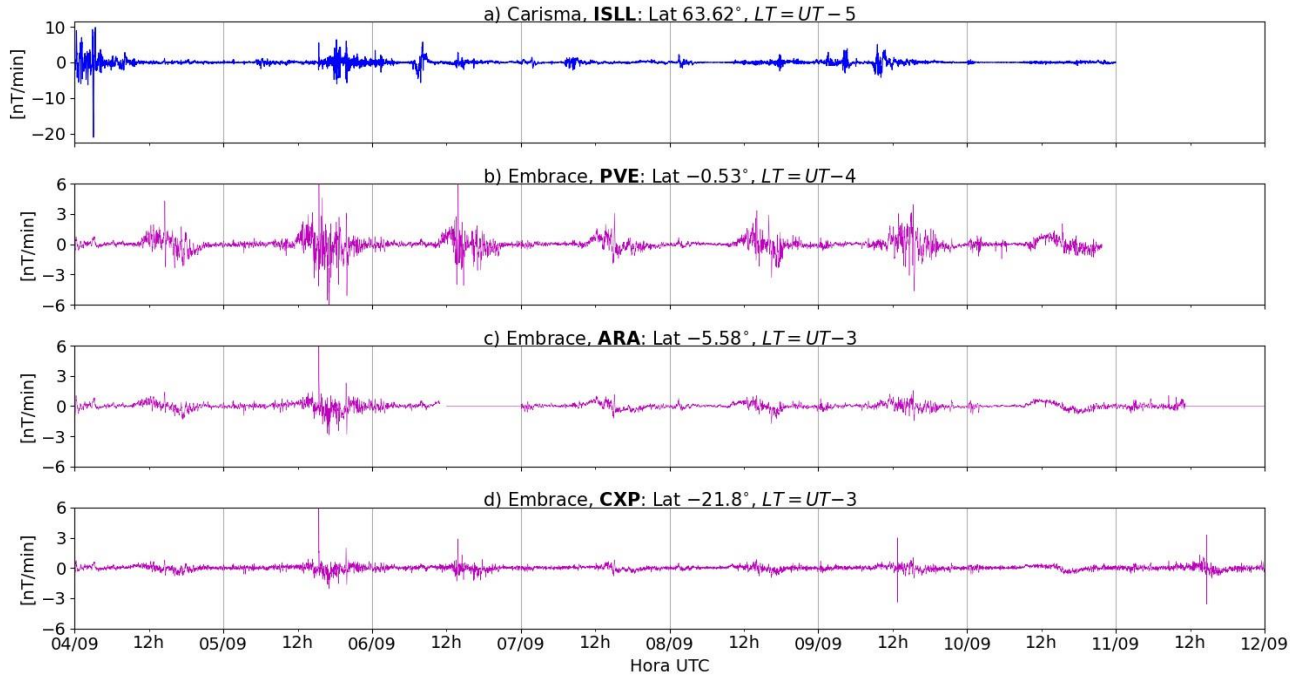


Figure 5: a-d) The rate of change of the geomagnetic field total component (dB/dt) obtained for a) the high latitude station (ISLL-CARISMA), and b-d) for the low latitude stations of EMBRACE (PVE, ARA, CXP).

5 Ionosphere - ROTI (Carolina de Sousa do Carmo)

5.1 Summary

In the week 2278 (September 03 to 09, 2023) there were ionospheric irregularities (plasma bubble) on all nights in the equatorial region (RNNA and MABB), except September 05. Equatorial Plasma Bubble season is returning. 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)).

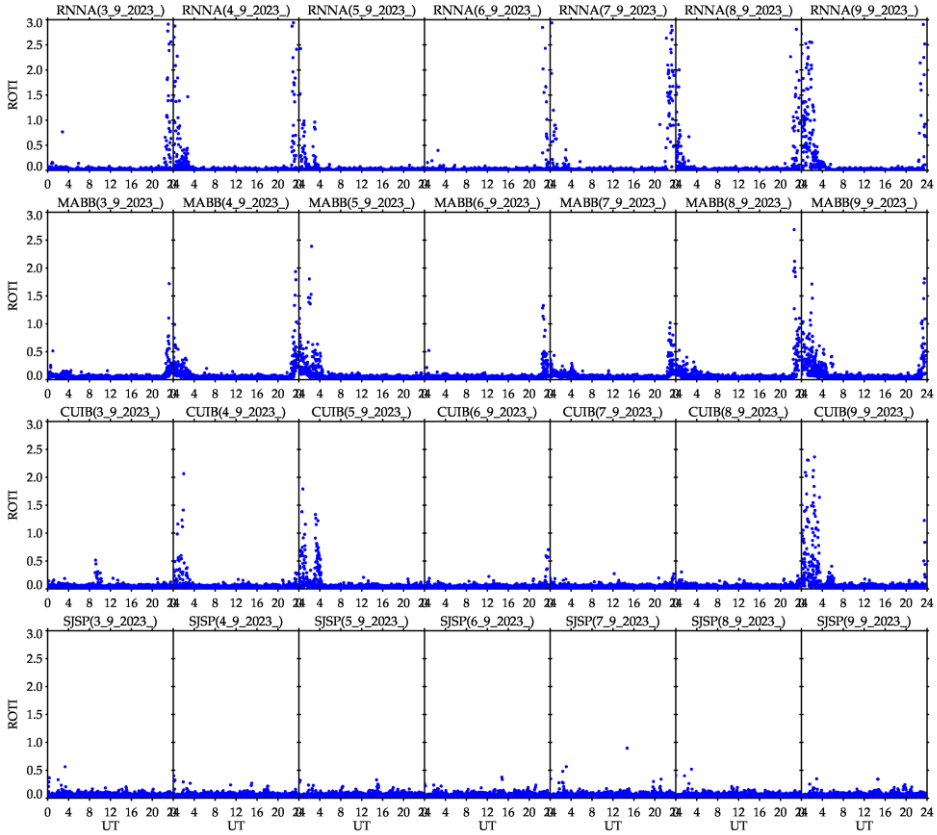


Figure 1 – ROTI time series for four stations in the Brazilian sector (Natal (RNNA), Bacabal (MABB), Cuiabá (CUIB) and São José dos Campos (SJSP)), from September 03 to 09, 2023.