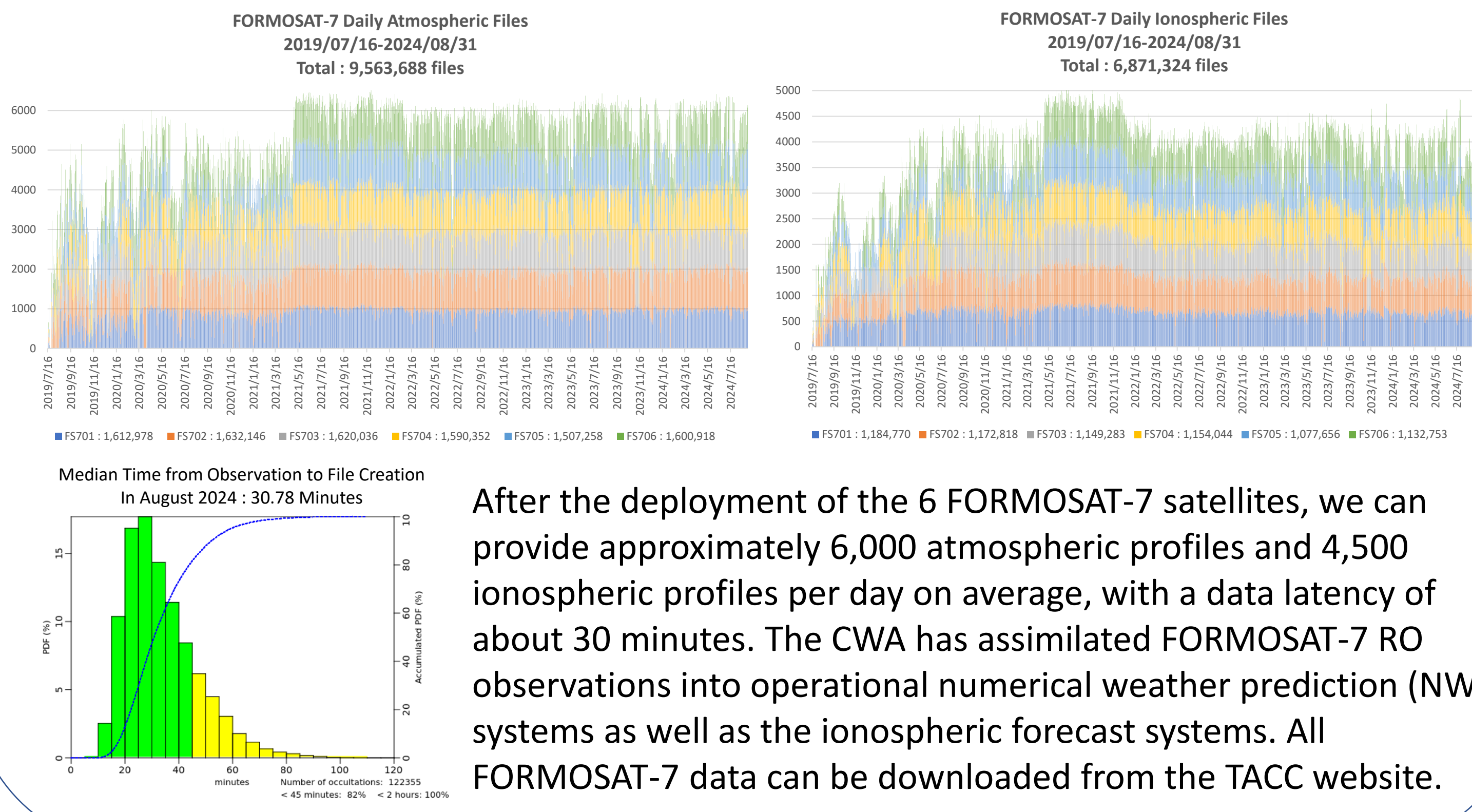


Abstract

The Taiwan Analysis Center for COSMIC (TACC) was established as part of the cooperation project for the FORMOSAT program between Central Weather Administration (CWA) and Taiwan Space Agency (TASA). We process and publish more than 16 million atmospheric FORMOSAT-3/FORMOSAT-7 RO profiles and 11 million ionospheric FORMOSAT-3/FORMOSAT-7 RO profiles. Starting in 2024, we have also begun processing and providing the TRITON Reflectometry data. Our summary includes the current status of available products, product latency and data quality, and recent developments.

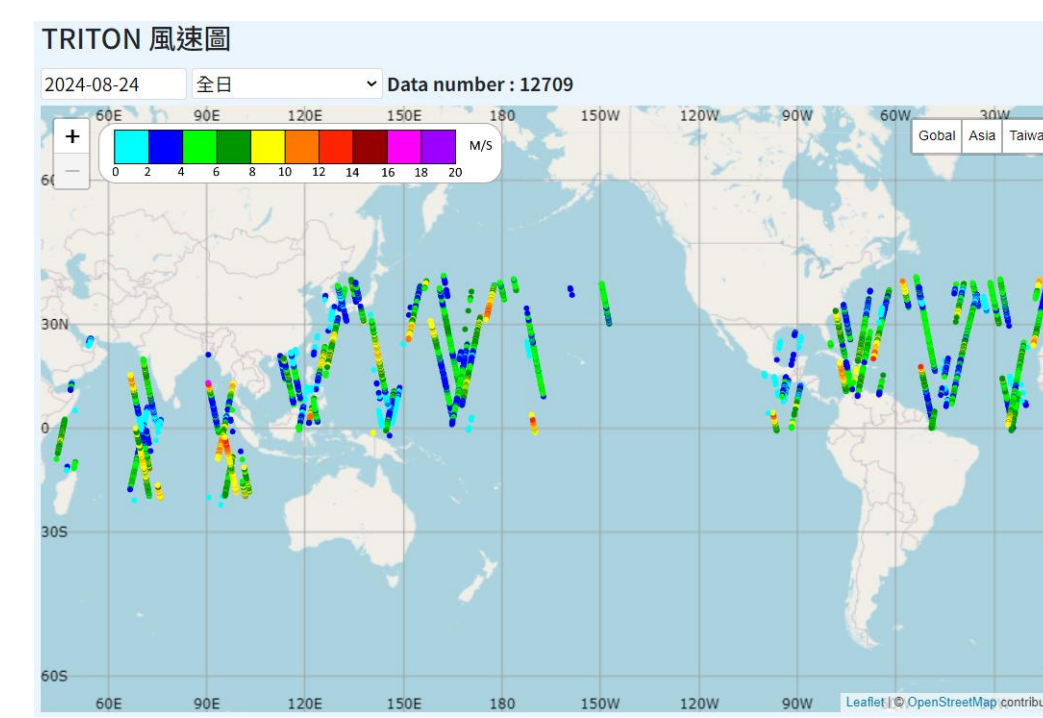
FORMOSAT-7/COSMIC-2 Radio Occultation Data



After the deployment of the 6 FORMOSAT-7 satellites, we can provide approximately 6,000 atmospheric profiles and 4,500 ionospheric profiles per day on average, with a data latency of about 30 minutes. The CWA has assimilated FORMOSAT-7 RO observations into operational numerical weather prediction (NWP) systems as well as the ionospheric forecast systems. All FORMOSAT-7 data can be downloaded from the TACC website.

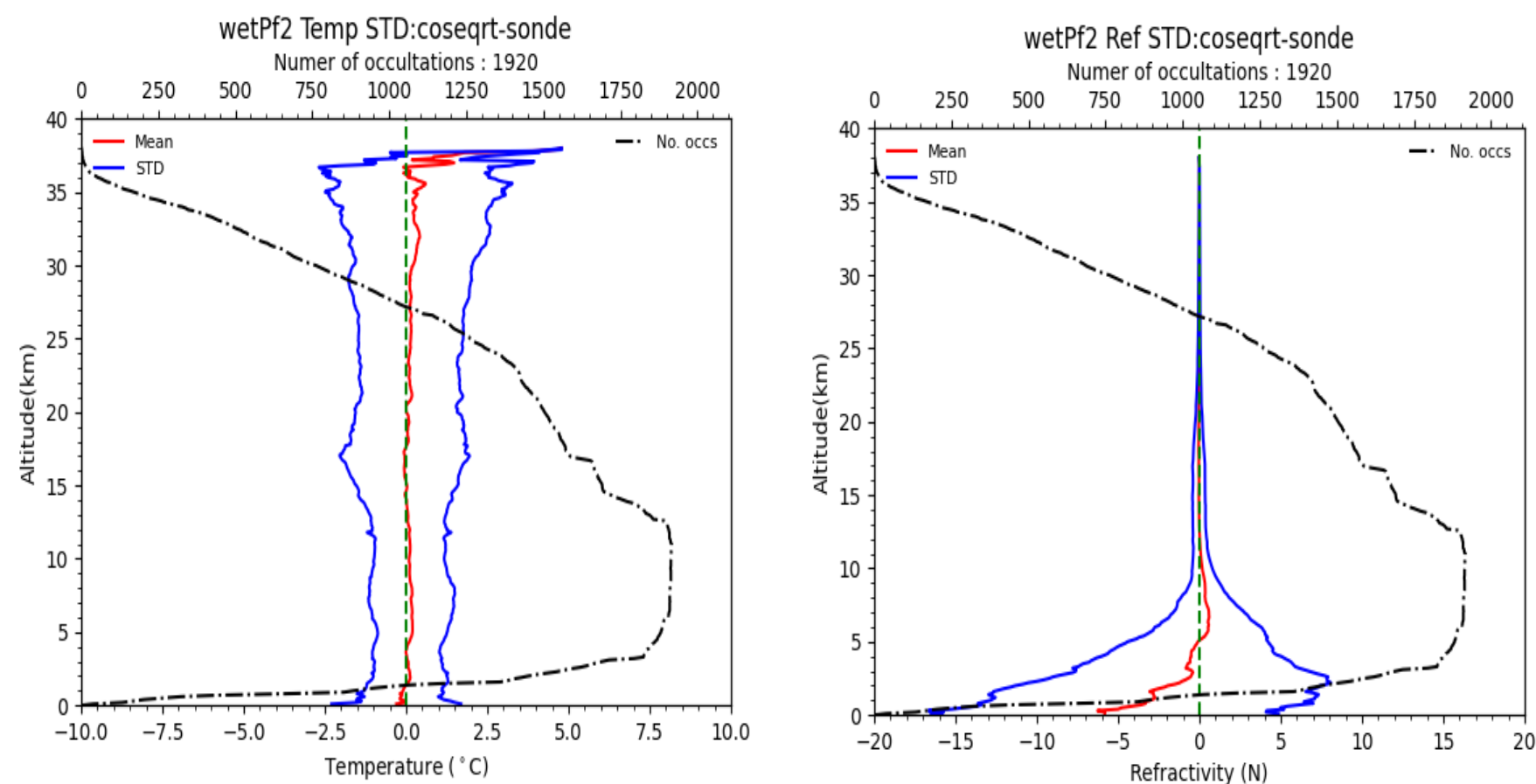
TRITON GNSS-Reflectometry Data Release

levels	Description
Level1a	Raw Data Downlink from Satellite Recorded in netCDF Format.
Level1b	Calibrated Delay-Doppler Map(DDM) Removes the Effect from the Antenna and Receiver.
	Metadata Included the Code Phase and Doppler Frequency of Specular Point(SP), Effective Scattering Area and Normalized Bistatic Radar Cross Section(NBRCS) etc.
Level2	The Retrieved Ocean Surface Wind Speed (U10 < 20m/s) and Roughness (Mean Square Slope and Significant Height).



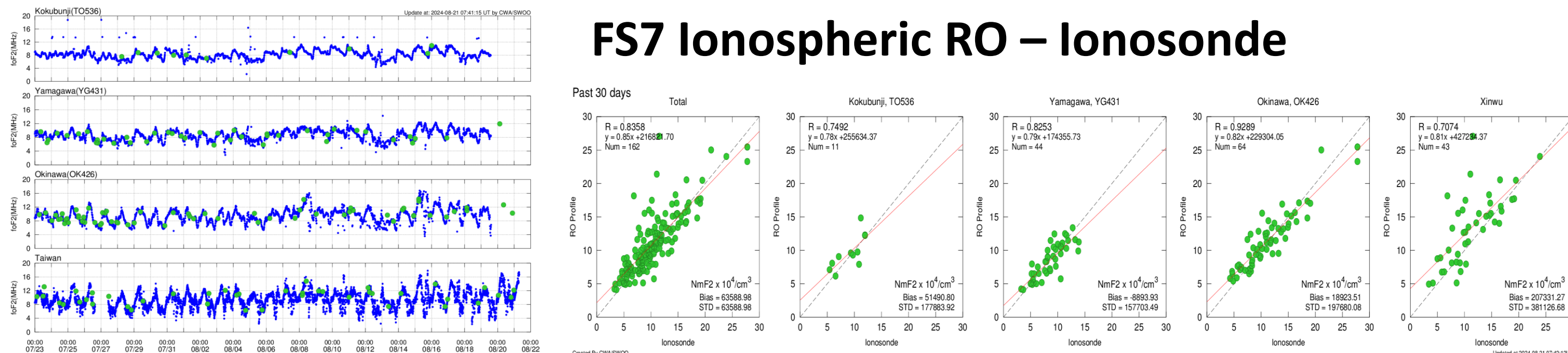
The TRITON satellite was successfully launched in October 2023. This year, we also began releasing data on the TACC website, including raw data, DDM and sea surface wind speed. Currently, only specific regions' sea surface observations are available, providing approximately 8,000 sea surface wind speed data points per day.

Comparison to Other Observations FS7 Atmospheric RO – Radiosonde



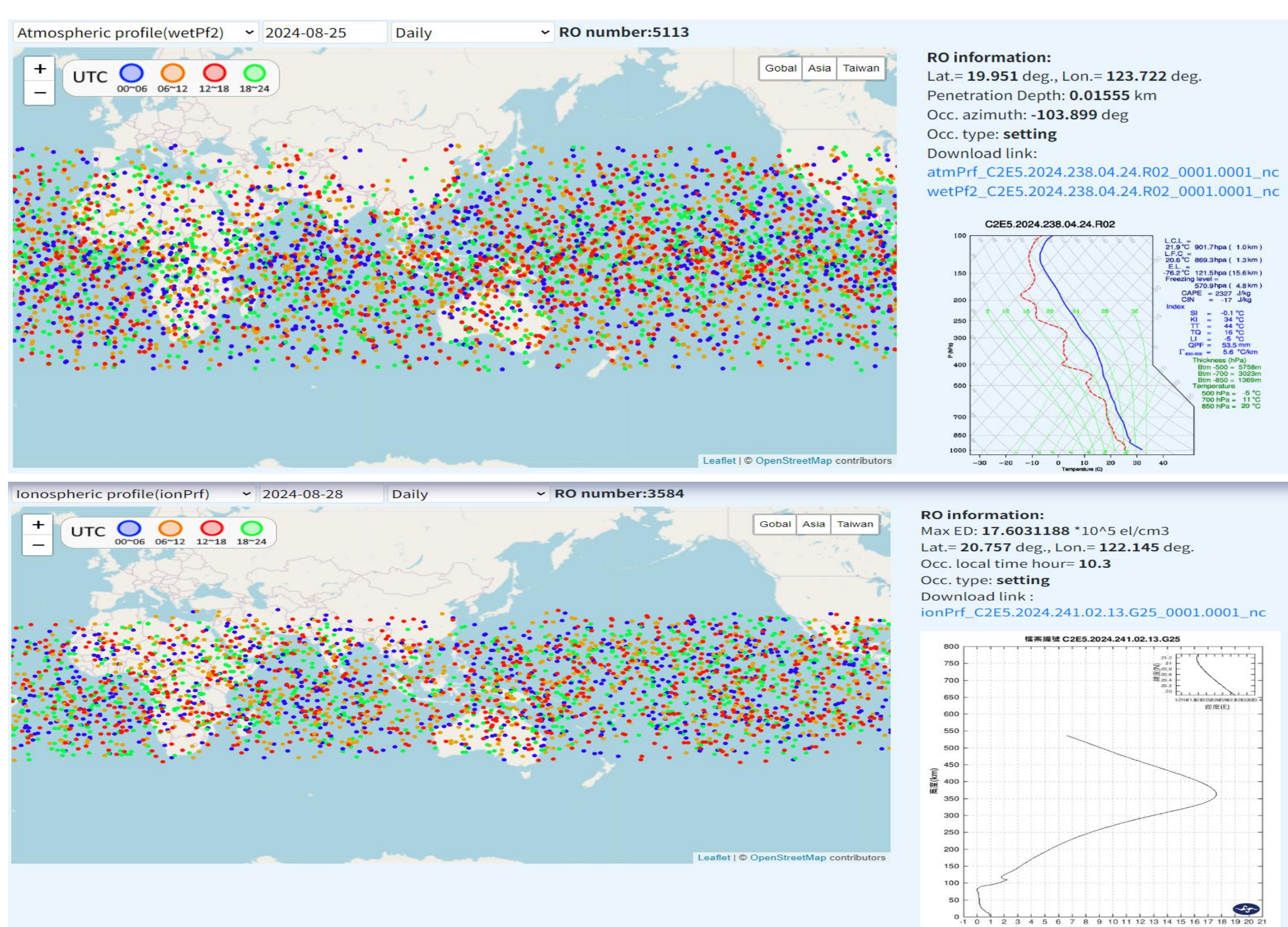
A comparison of FS7 temperature and refractivity with radiosonde data within a 3-hour window and a 100 km radius indicates that FS7 observations closely align with those of the radiosonde. Notably, the temperature difference is significantly less than 0.5 degrees below an altitude of 35 km.

FS7 Ionospheric RO – Ionosonde



The left image shows a 30-day comparison of the NICT and CWA ionosonde critical frequency of the F2 layer (foF2) (blue line) with FS7 observations (green dots). The right image is a scatter plot for the peak density of the F2-region (NmF2), with a correlation coefficient of approximately 0.85.

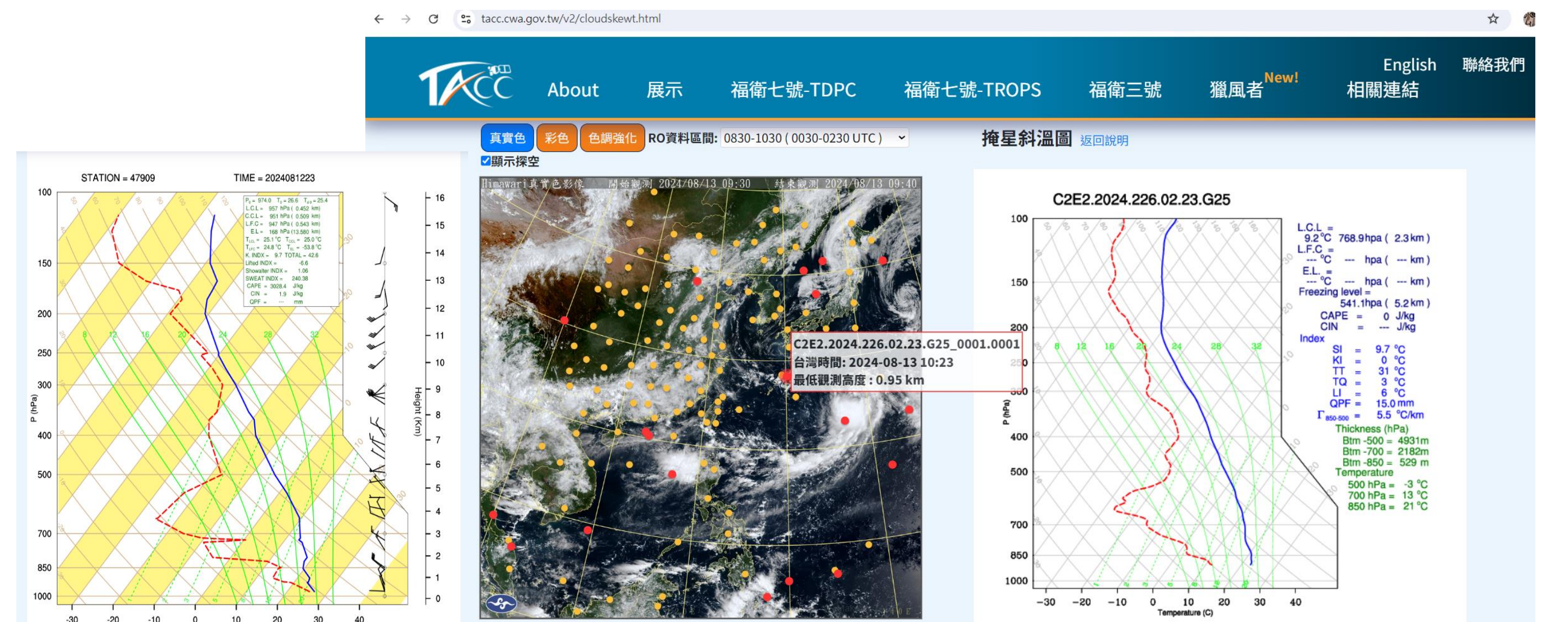
Distribution of FORMOSAT-7 ATM/ION RO Profiles



The upper and lower images show the atmospheric and ionospheric occultation distributions for one day, with different colors representing four time periods. Moving the cursor over any point displays its time and location. Clicking on an atmospheric point shows a skew-T diagram and provides download links for atmPrf and wetPF2 files. Clicking on an ionospheric point displays an electron density profile and offers a download link for the ionPrf file.

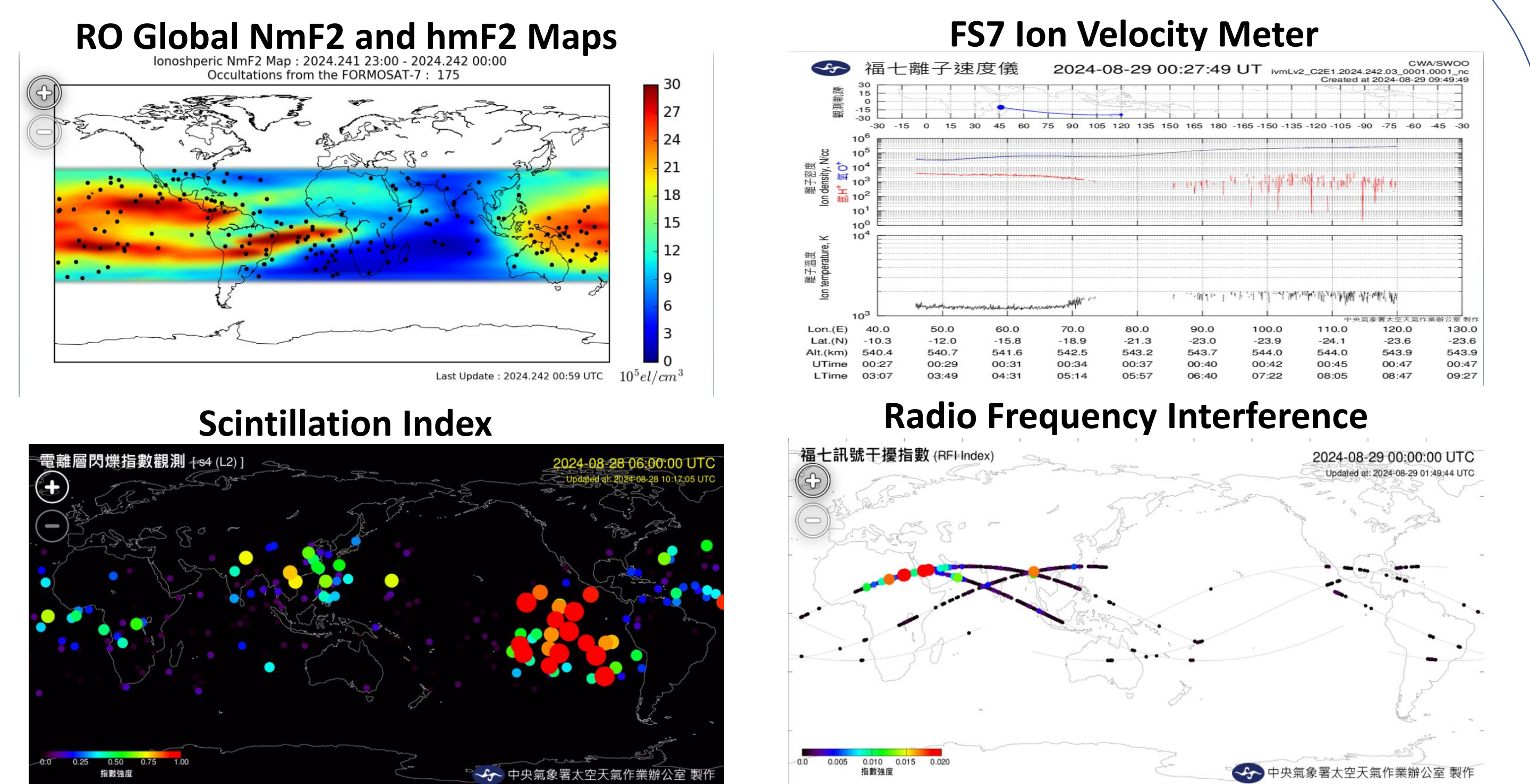


Near Real-time Display FORMOSAT-7 Radio Occultation Profiles

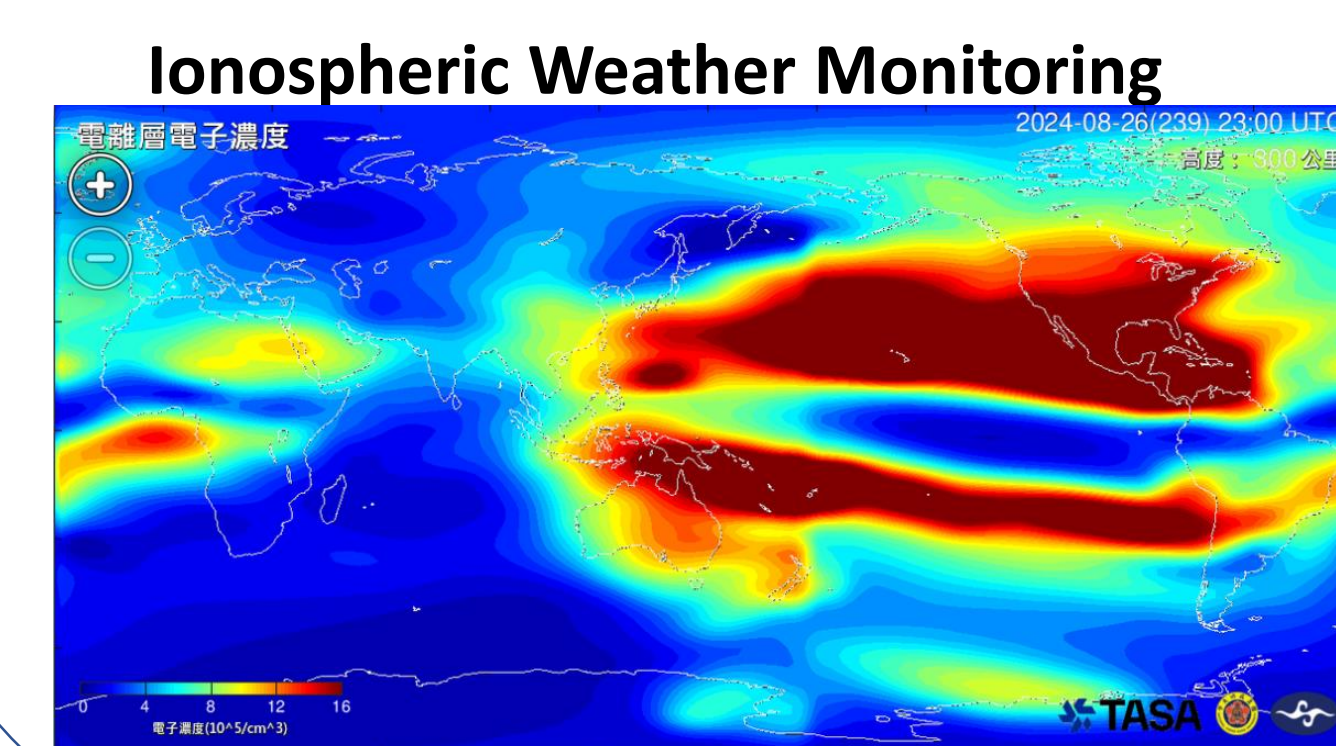


The TACC website provides near real-time satellite cloud images, occultation data points (red dots), and radiosonde data points (yellow dots). Clicking on a data point displays the skew-T log-P diagram and related data for that region.

FORMOSAT-7 Data in Space Weather



The Space Weather Operational Office (SWOO) website displays near real-time FORMOSAT-7 observations for monitoring space weather.



Combined observations from FORMOSAT-7 data and global GNSS ground receivers are used to reconstruct the global three-dimensional electron density distribution.



Conclusion

- TRITON GNSS-Reflectometry data are available on the TACC website starting in 2024.
- We continue to provide high-quality and low-latency FORMOSAT-7 data for operational, research and application purposes.
- The TACC and SWOO websites offer user-friendly and interactive tools for data visualization and real-time monitoring.