

## Introduction

- This research project was focused on **comparing dropsonde and model profiles of temperature and dew point temperature to radio occultation (RO) measurements** during intensification of tropical cyclones.
- We did a **case study on Hurricane Ian (2022)**.
- COSMIC-2 consists of 6 satellites in low Earth orbit that use Radio Occultation (RO) measurements to provide vertical profiles of temperature and water vapor in areas usually sparse in data.
- Radio occultation (RO) consists of capturing GPS signals and the bending angle they experience due to differences in the density of the atmosphere.

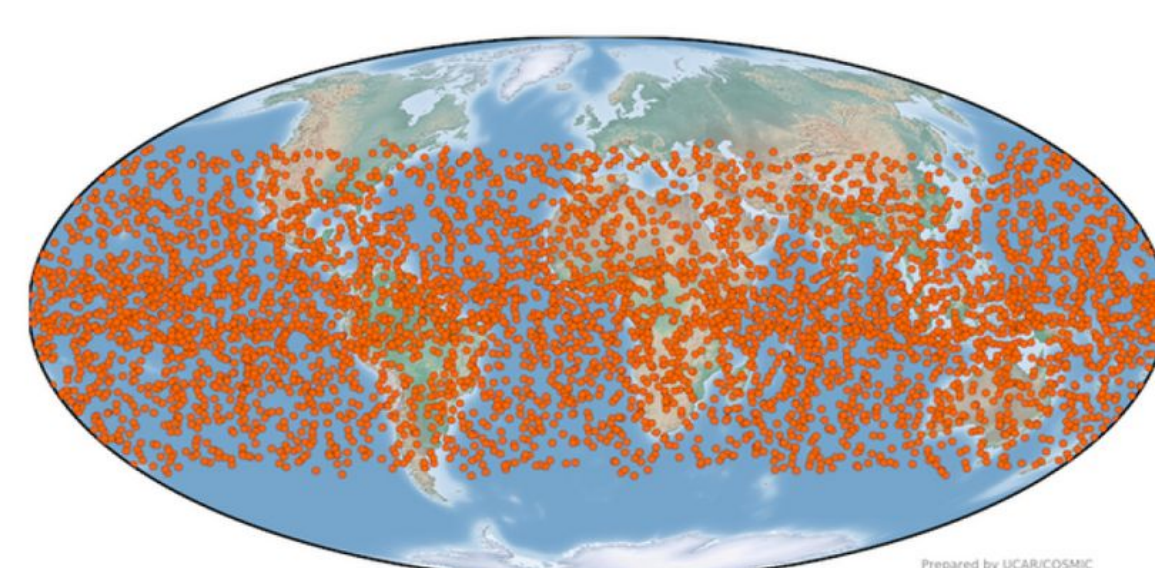
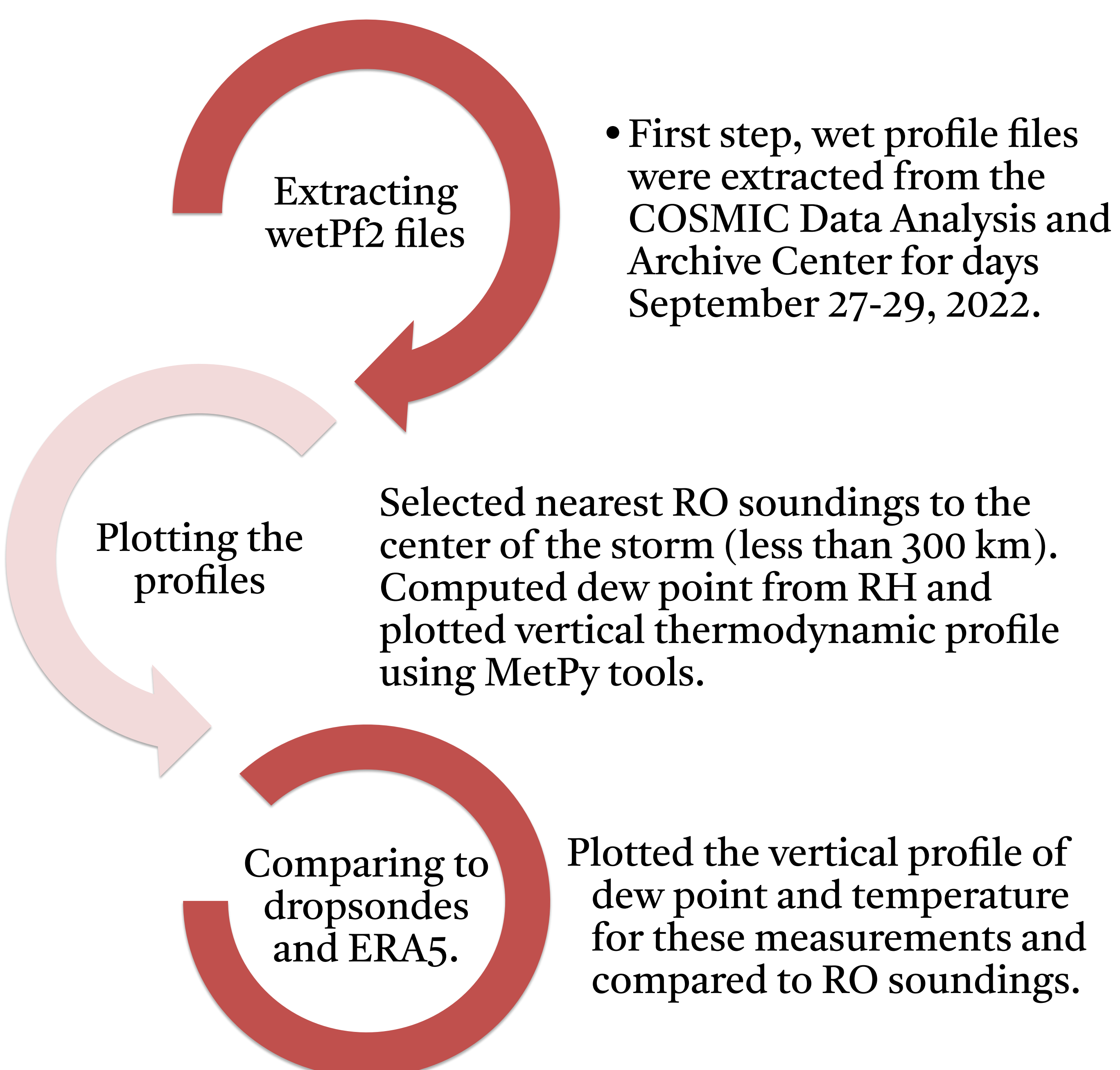


Fig. 1: Coverage of COSMIC-2 RO for October 1, 2019.

## Methodology



## Results

### A. RO observed soundings

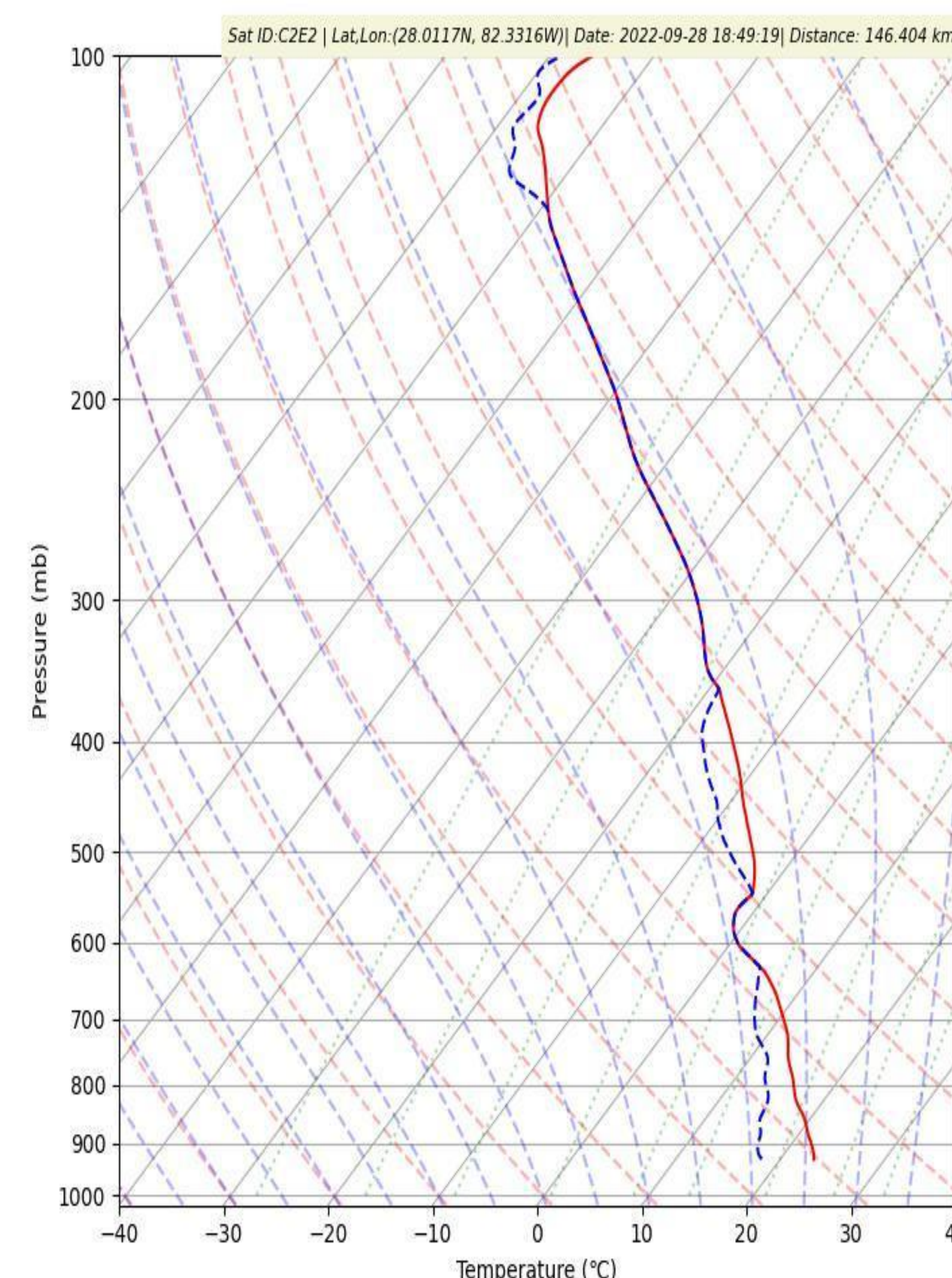


Fig. 2: RO profile on September 28, 2022 at 18:49 UTC. Distance from track: 146 km

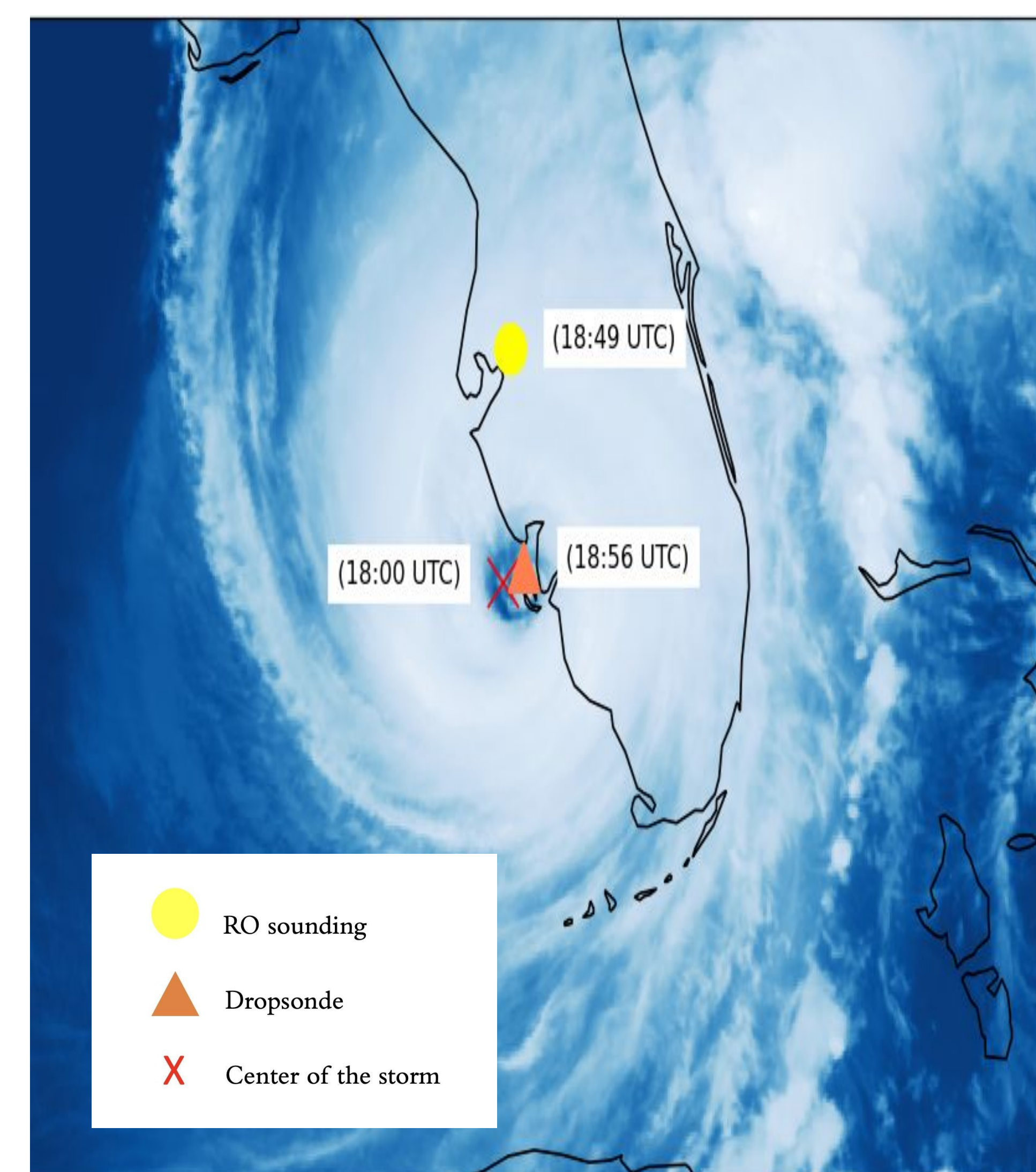


Fig. 3: GOES-16 Satellite image on September 28, 2022 at 18:45 UTC.

### B. Comparison to dropsondes and ERA5 reanalysis model

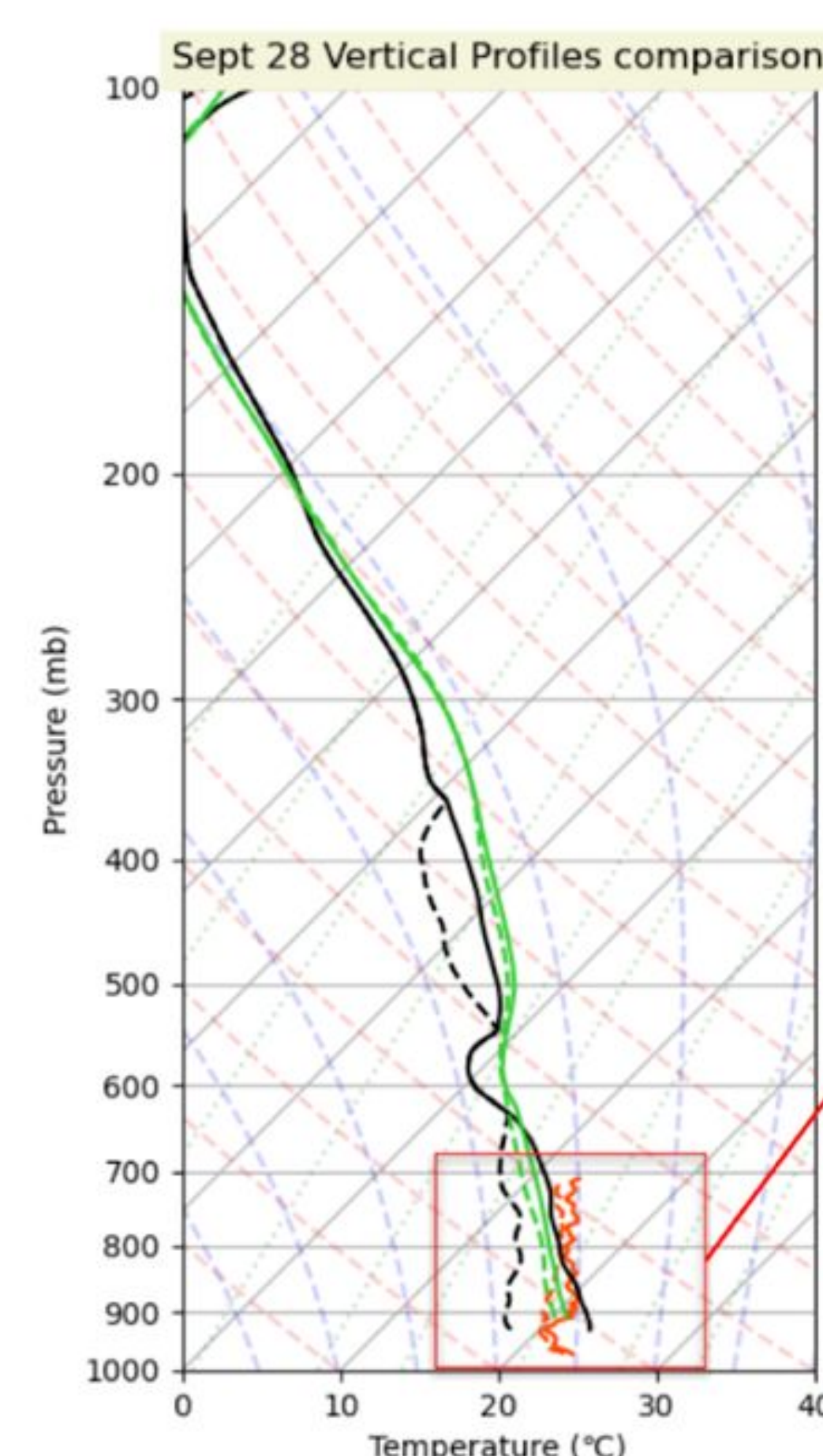
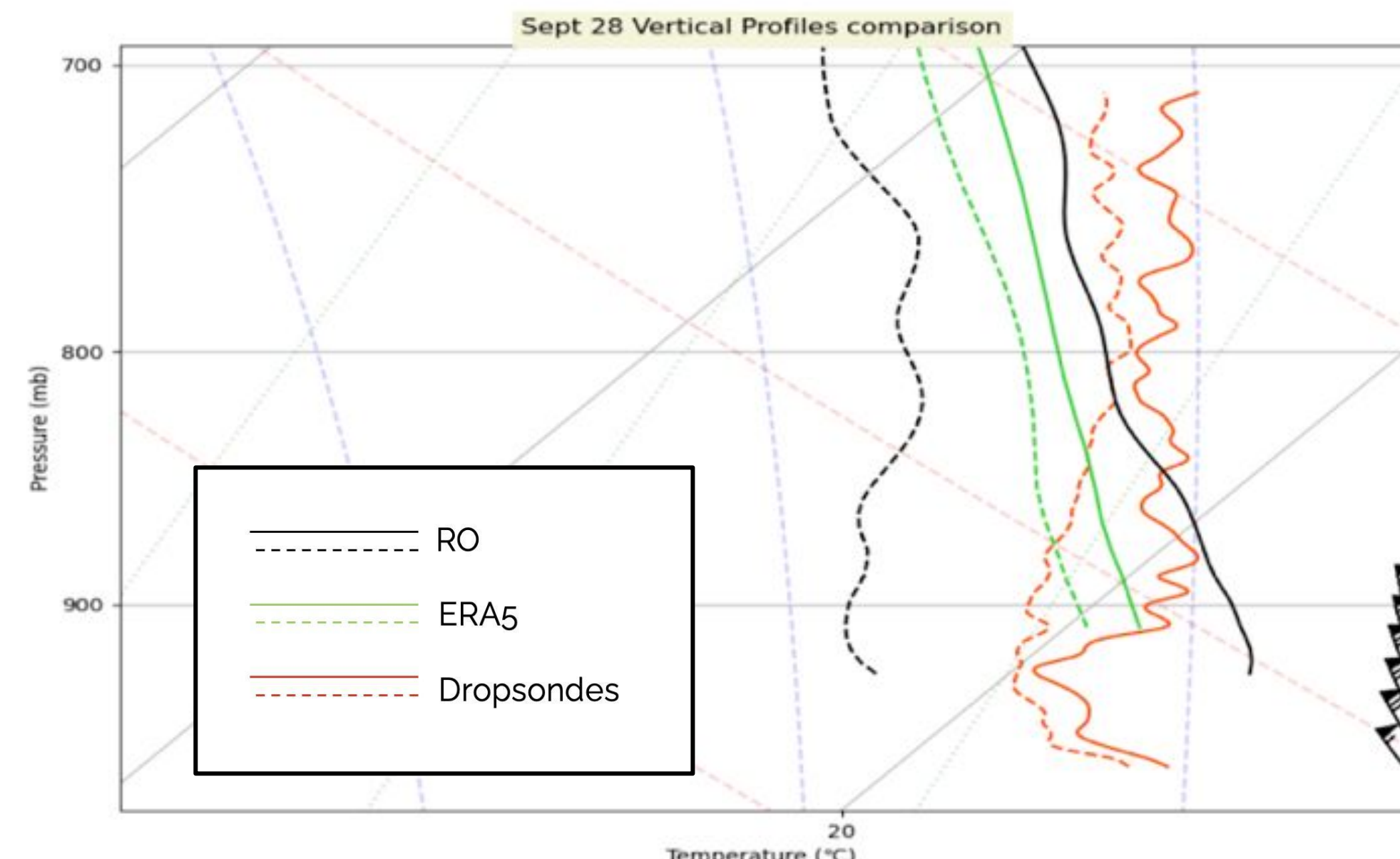


Fig. 4: Comparison of RO sounding for September 28, 2022 at 18:49 UTC, ERA5 reanalysis and dropsonde measurements. Distance and time difference between RO sounding and dropsonde launch: 150 km and 0:12 h.



## Discussion

### A. RO observed soundings

- Soundings from RO on September 28 and September 27 capture saturation from 350 mb. Dense cloud structures can be observed in RO soundings.
- For September 29, the sounding falls outside of the cloud area of the system but are a good reference of how RO capture drier environments

### B. Comparison to dropsondes and ERA5 reanalysis model

- Differences between the measurements types in terms of temperature and dew point temperature are less than 3°C in most profiles.

The employment of RO measurements can complement aircraft, radiosondes, dropsondes and other satellites observations.

## Future work

- As next steps for this research project we would add to the comparison the models MERRA-2, JRA and GFS and work on additional hurricanes case studies.
- Future areas of study could hurricanes upper to lower stratosphere effects.

## Acknowledgements

- This material is based upon work supported by the National Science Foundation under Grant No. AGS-2230301 (SOARS). Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.
- Special thanks to my research mentors: Richard Anthes, Jon Starr, Bill Randel and John Braun, computing mentor Keith Maull, writing mentor Abigail Smith/ Andrea Ray, community mentor Rosimar Rios-Berrios and peer mentor Jennifer Zaragoza.

## References

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