MONTHLY WORK REPORT

(To be filled by the Candidate)

Candidates Name: Mr. Moses Charlie Yalla	**Designation:** WBL Trainee
Period: 14 June 2025 – 14 July 2025	**WBL Level:** I
Department: Industrial Material and Systems division	**Employee Code:** 210
Name of the Supervisor: Mr. Abhishek Jha	**Name of the HoD:** Smt. Poornima Srivastava
Name of the Project: Development of Retrieval algorithm for Liquid water Path and Integrated Water Vapor from ground-based Microwave radiometer	
Technology Area: Atmospheric Science	

Details of the work done

Objective: To explore and implement basic retrieval concepts for LWP and IWV from radiometric data using Python, and to support ongoing algorithm development through literature review, dataset analysis, and code prototyping.

Tools & Technologies Used:

1) Python (libraries: matplotlib, pandas, numpy, scipy)
2) MATLAB (basic plotting functions)
3) Jupyter Notebook (new_env)
4) Anaconda Navigator (Anaconda3)

Key Tasks Performed:

1. **Literature Review**
   - Reviewed papers on retrieval methods (linear regression, optimal estimation).
   - Studied radiative transfer principles related to microwave frequencies.
2. **Algorithm Understanding**
   - Understood forward model concepts using brightness temperature data.
   - Explored relationships between brightness temperature and water vapor content.
3. **Data Preparation**
   - Cleaned and formatted multichannel radiometer data.
   - Matched satellite/reanalysis profiles with ground-based data for validation.
   - Exported plots in PNG format for reports.
4. **Prototype Retrieval Logic**
   - Implemented basic linear regression to estimate IWV.
   - Visualized retrieval outputs vs. reference data (e.g., radiosonde).
5. **Documentation**
   - Maintained a Jupyter Notebook documenting the steps and plots.
   - Added markdown comments to explain code and results.

Learning Outcomes

- Understood the physics behind microwave radiometry and atmospheric retrieval.
- Developed a prototype regression model for IWV estimation.
- Strengthened skills in scientific Python coding and statistical analysis.
- Improved ability to read and apply research literature to practical work.

Appendix: Visualizations and Results

Figure 1: Temperature Profile with Height

Displays the vertical temperature structure of the atmosphere up to ~10 km. This is useful for understanding lapse rate and thermal layering.

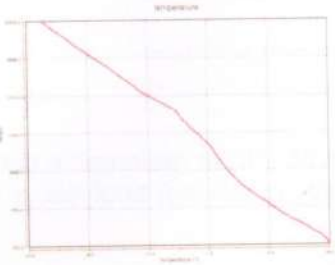


Figure 2: Brightness Temperature Variation Over Time

Compares brightness temperature variation between two channels over time, which helps assess atmospheric fluctuations.

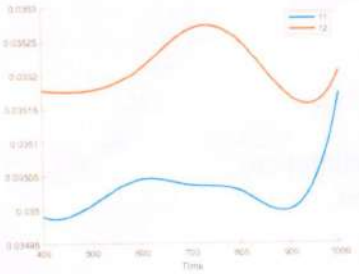
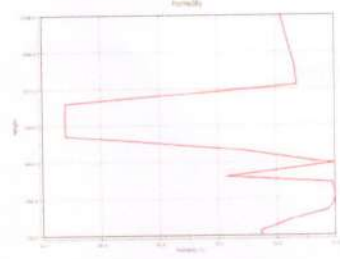


Figure 3: Humidity Profile with Height

Illustrates relative humidity distribution with altitude, useful for retrieval algorithm analysis.



Signature of the Candidate	Signature of Supervisor	Signature of HoD
Moses Charlie	08/08/2025	8.8.25
Date: 07-08-2025	Date: 07-08-2025	Date: 07-08-2025

CANDIDATE FEEDBACK

(To be filled and signed by the Supervisor/HoD)

Candidates Name: Mr. Moses Charlie Yalla	**Designation:** WBL Trainee
Month & Year: July 2025	**WBL Level:** I
Department: Industrial Material and Systems Division	**Employee Code:** 210
Name of the Supervisor: Mr. Abhishek Jha	**Name of the HoD:** Smt. Poornima Srivastava

Name of the Project: Development of Retrieval algorithm for Liquid water Path and Integrated Water Vapor from ground-based Microwave radiometer

Sr. No.	Criterion	Marks in the Scale of 1-10 (1-Poor, 10-Excellent)
1	Initiative (personal drive, enthusiasm)	7.5
2	Acceptance of responsibility	8
3	Technical knowledge, problem solving skills and expertise	8
4	Work quality and output	8
5	Communication (Oral/Written) skills	7
6	Behavior, tact and courtesy	9
7	Attitude/willingness to work	8
8	Time management	8
9	Punctuality and regularly	8
10	Self-improvement	7.5
	Overall Score (1-10)	7.9/10

Signature of Supervisor	Signature of HoD
08/08/2025	8.8.25
Date: 07-08-2025	**Date: 07-08-2025**

Evaluation Guidelines:

1. Candidate will submit monthly work report to the supervisor.
2. Supervisor will submit his feedback on the work report to concerned Head of the Division.
3. Supervisor will forward the monthly report along with supervisor's feedback to center coordinator Shri. Vijay Sarode, WBL Coordinator (Email: vijay@sameer.gov.in)
4. Supervisor feedback should be in the format given above.
5. The Mid-term and End of term review of WBL candidates by TECH-MEC would be carried out based on evaluation of survey/Study, Design aspects, technology understanding, Initial Prototyping etc.