

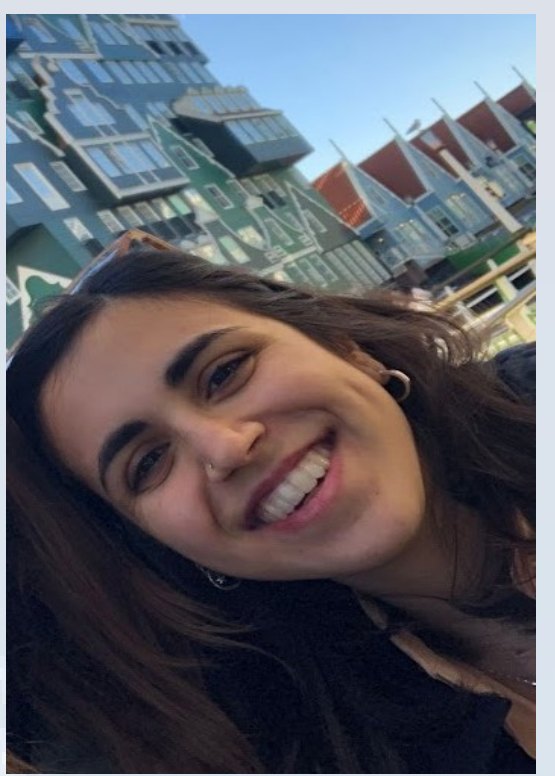
Improvements in the TROPOMI ozone profile retrieval to enhance tropospheric ozone detection sensitivity

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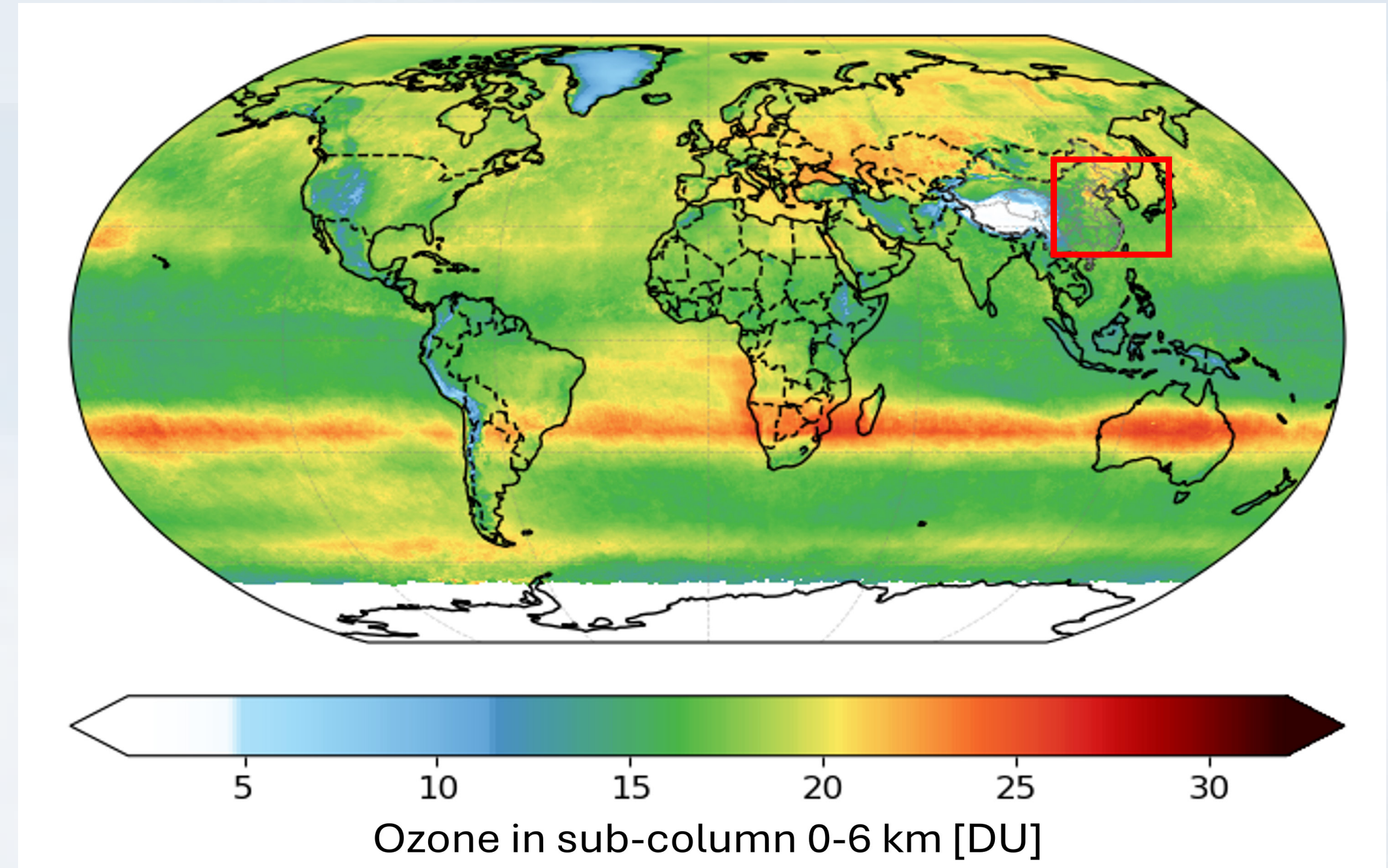
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INTRODUCTION

In recent years, tropospheric ozone pollution has noticeably increased and it is one of the primary pollutants affecting summer air quality in major economically developed regions, such as the Beijing-Taianijn-Hebei region and the Yangtze River Delta in China. Therefore, it is crucial to monitor daily global tropospheric ozone to understand its distribution but also its transport, at a local to global scale.



OBJECTIVE

- Improving the TROPOMI ozone algorithm for tropospheric ozone detection
- Developing a method to use the improved data for air quality studies in highly polluted regions
- Validate the results with available ground-based and other satellite measurements
- Investigate the impact of the observations on air quality models

METHODS

1. Radiometric calibration
2. Optimization/fine tuning of OE parameters
3. Trends and seasonal variation of TROPOMI ozone precursors: NO_x, CO, HCHO

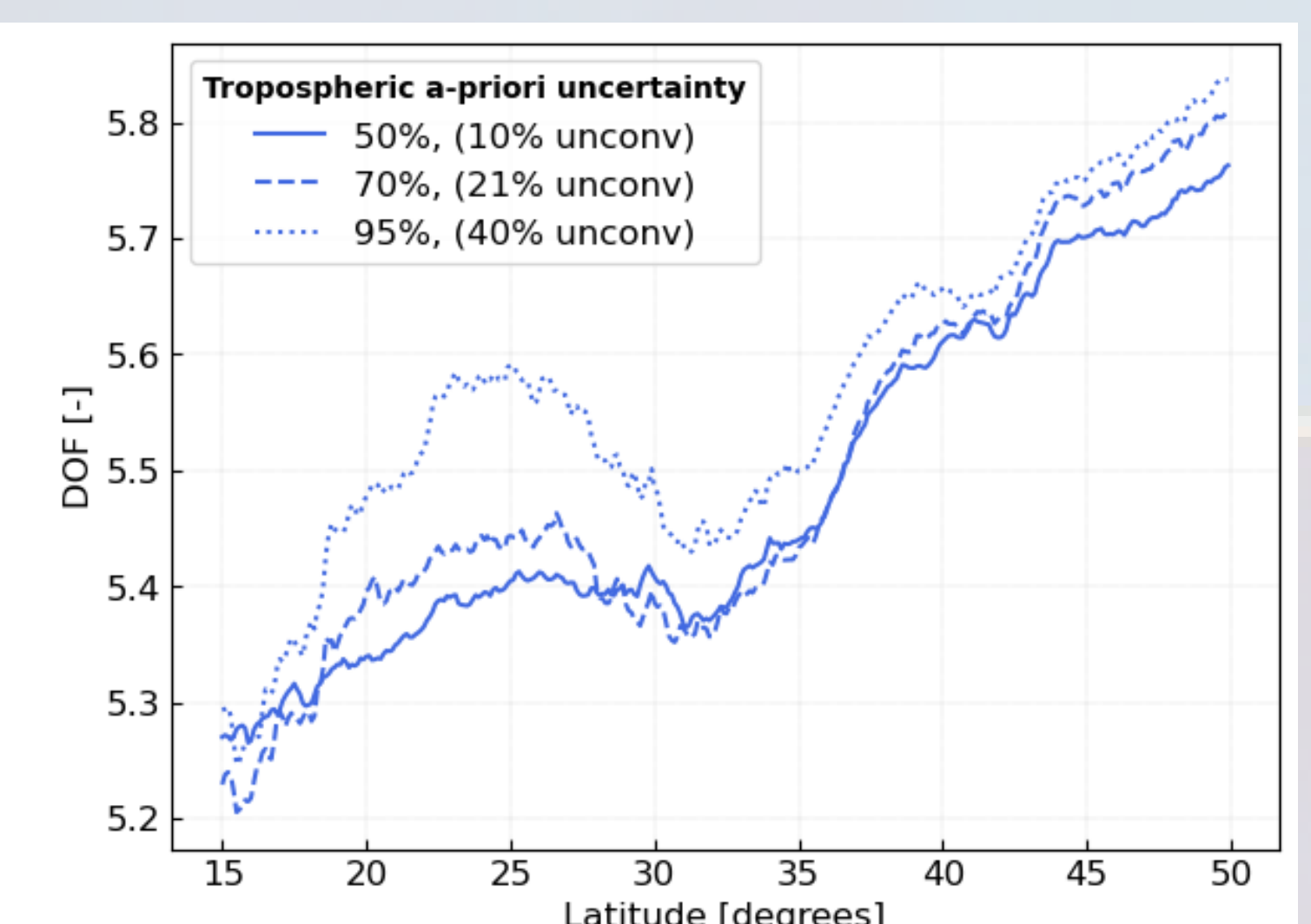
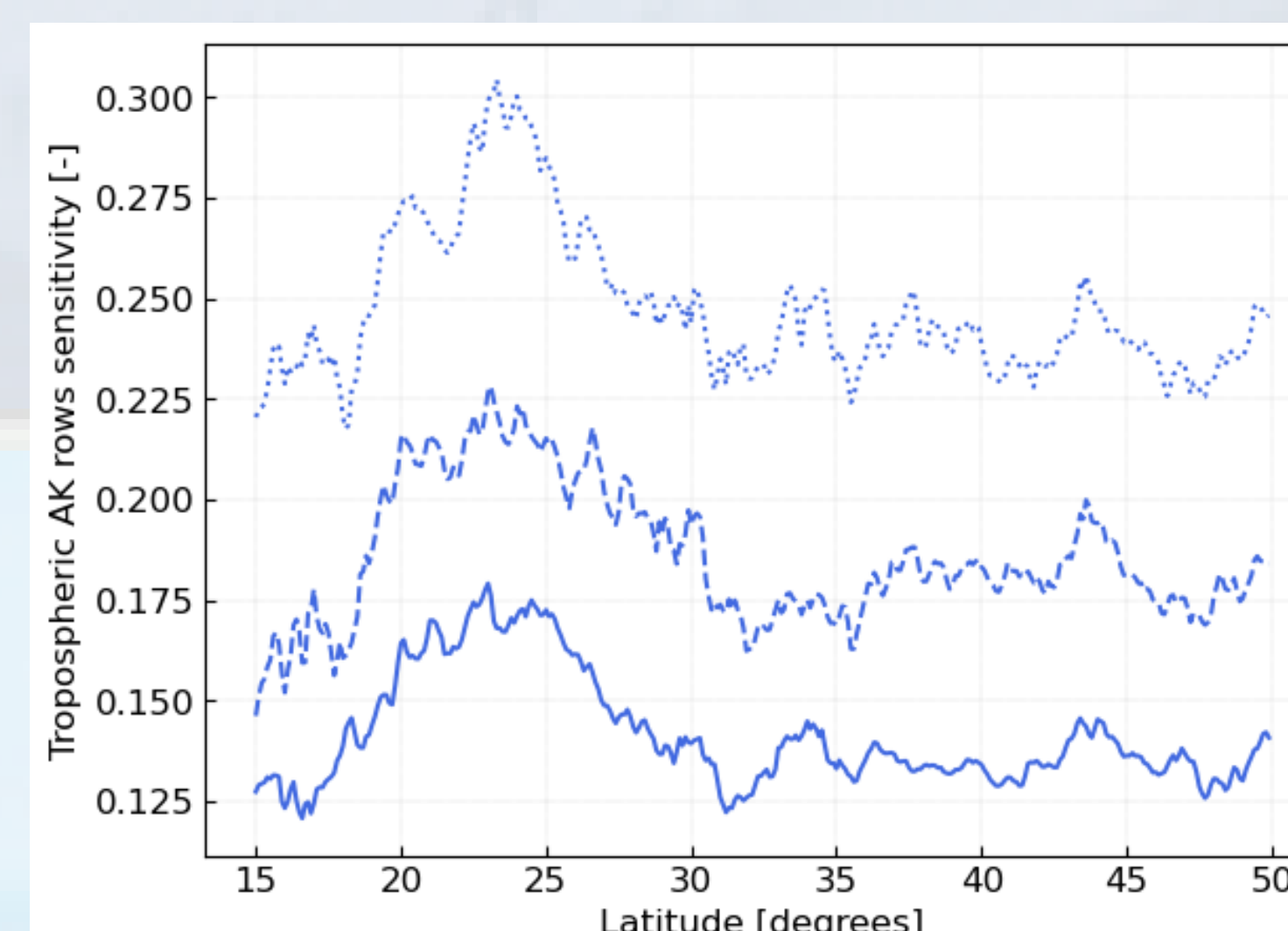
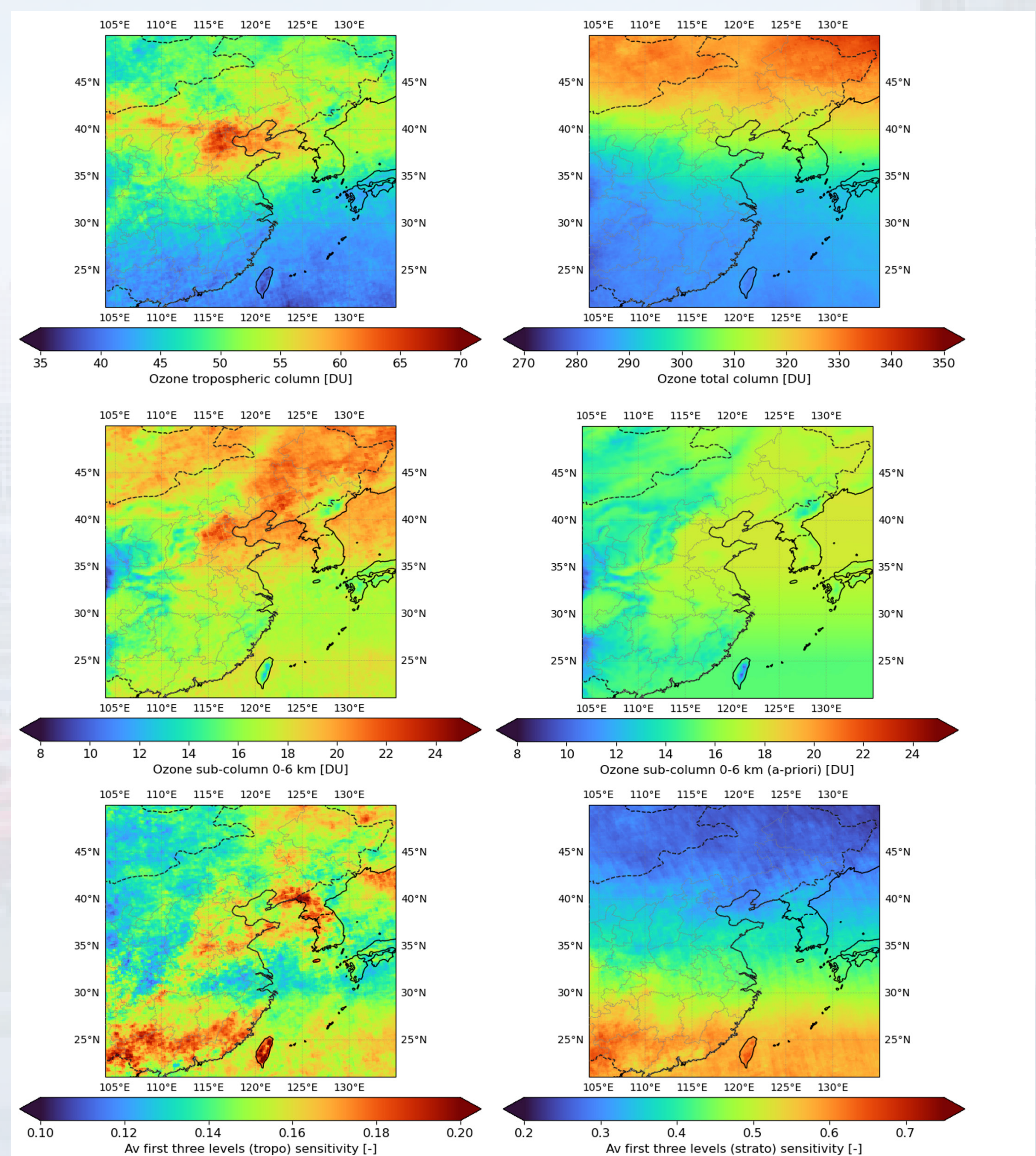
DISCUSSION

The retrieval sensitivity is an insightful method for the interpretation and quantification of the measurement contribution to the retrieval solution compared to the a-priori. Fine-tuning of the a-priori uncertainty and the measurement error constraints are crucial in the context of enhancing the tropospheric ozone detection for ozone profile retrievals from nadir instruments, while ensuring high retrieval convergence.

NEXT STEPS

After the implementation of the new improved radiometric calibration in the operational stream, planned in fall 2025, we aim to finalize the fine-tuning of the retrieval constraints (a-priori uncertainty and signal-to-noise ratio constraint).

RESULTS



REFERENCES

- Keppens et al., 5 years of Sentinel-5P TROPOMI operational ozone profiling and geophysical validation using ozonesonde and lidar ground-based networks, Atmos. Meas. Tech., 17, 3969–3993, 2024, <https://doi.org/10.5194/amt-17-3969-2024>
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