



UMBC

Retrieval of aerosol properties and water leaving radiance over open and coastal oceans using multi-angle spectral polarimetric measurements

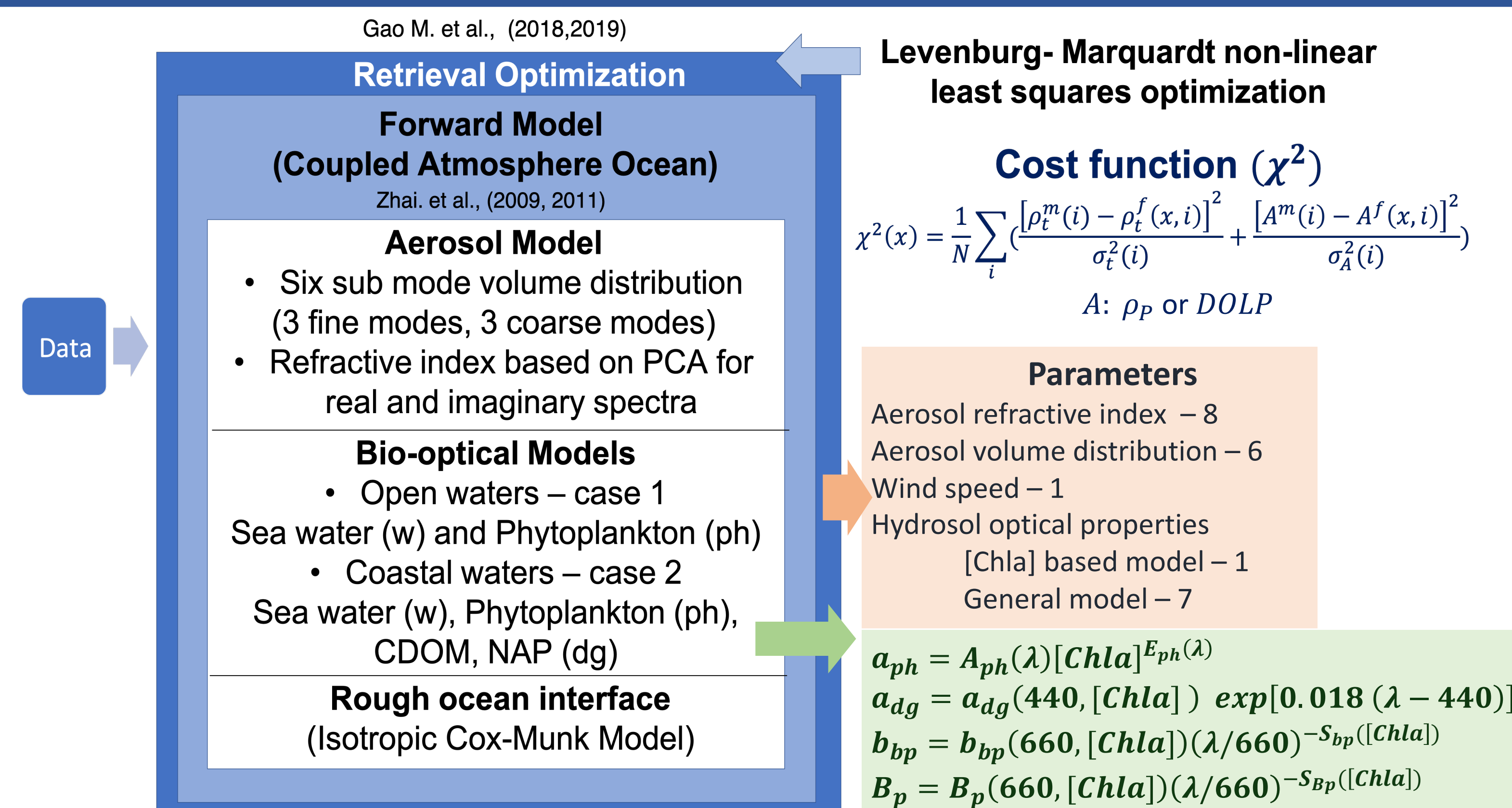
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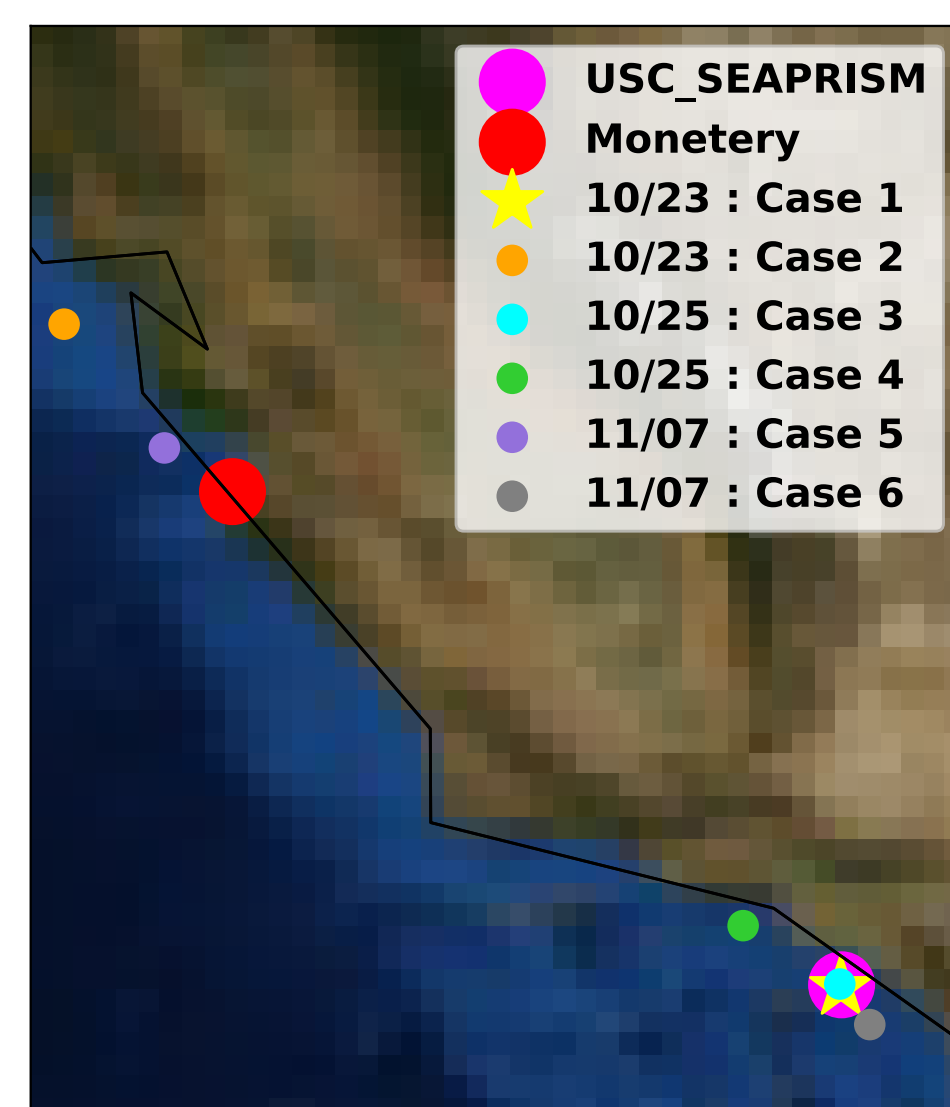
Background

- Ocean color remote sensing is important to study climate change, phytoplankton functional types global carbon cycle, and ocean ecosystems.
- Uncertainty in atmospheric correction and aerosol retrievals increase the uncertainty in climate models
- Atmospheric correction for coastal waters is challenging due to
 - Complex optical properties of aerosols and coastal waters at NIR wavelengths
 - Noisy measurements (smaller SNR) in SWIR wavelengths
 - Insufficient information content in measurements (Ex: MODIS, VIIRS)
- Joint Retrieval algorithms can retrieve both aerosol and ocean color properties simultaneously using multi-angle polarimetric measurements which results in an accurate atmospheric correction
- We report a joint retrieval algorithm which is capable of handling both Research Scanning Polarimeter (RSP) and Spectro-polarimeter for Planetary Exploration (SPEX) Airborne measurements

MAPOL - Joint Retrieval Algorithm



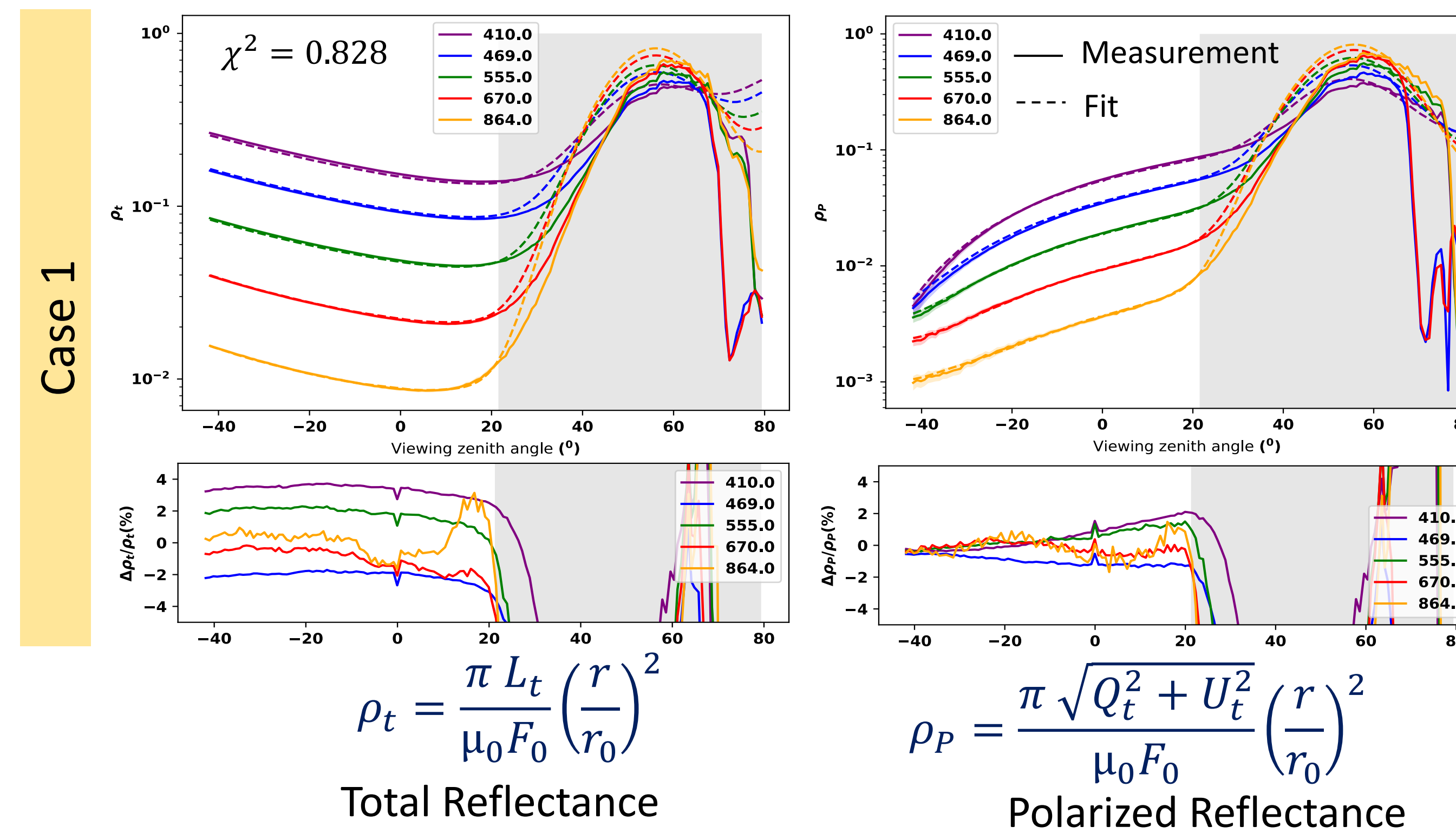
ACEPOL Campaign



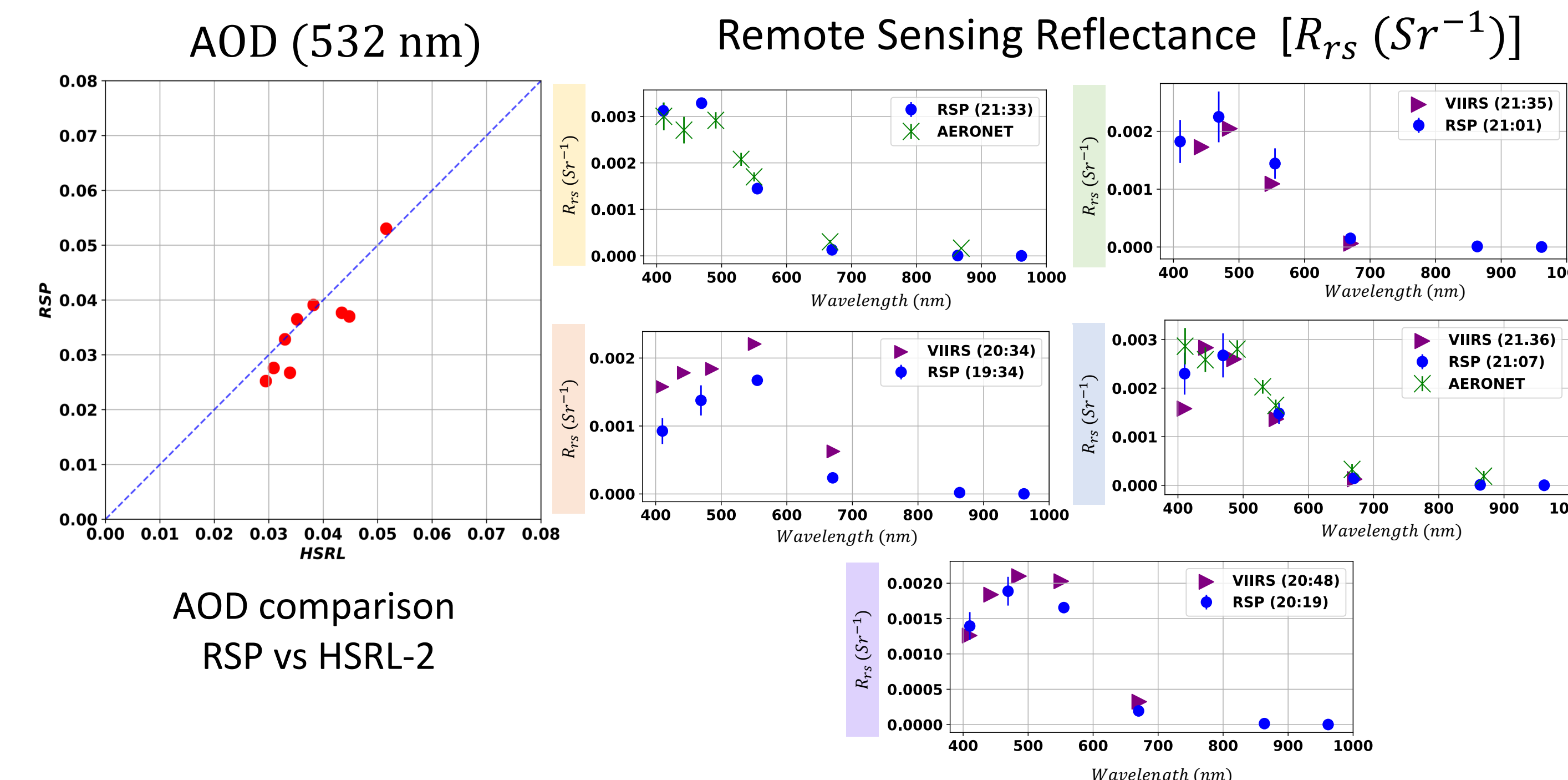
Case	1	2	3	4	5
Date	23/10	23/10	25/10	25/10	07/11
Time (UTC)	21:33	19:34	21:02	21:07	20:19
Aircraft altitude (km)	20.05	20.08	19.70	19.70	20.07
Solar Zenith (°)	53.34	49.50	50.87	50.40	53.71
Scattering Angle (°)	48-167	90-131	100-130	101-130	105-130

* All the locations are coastal locations

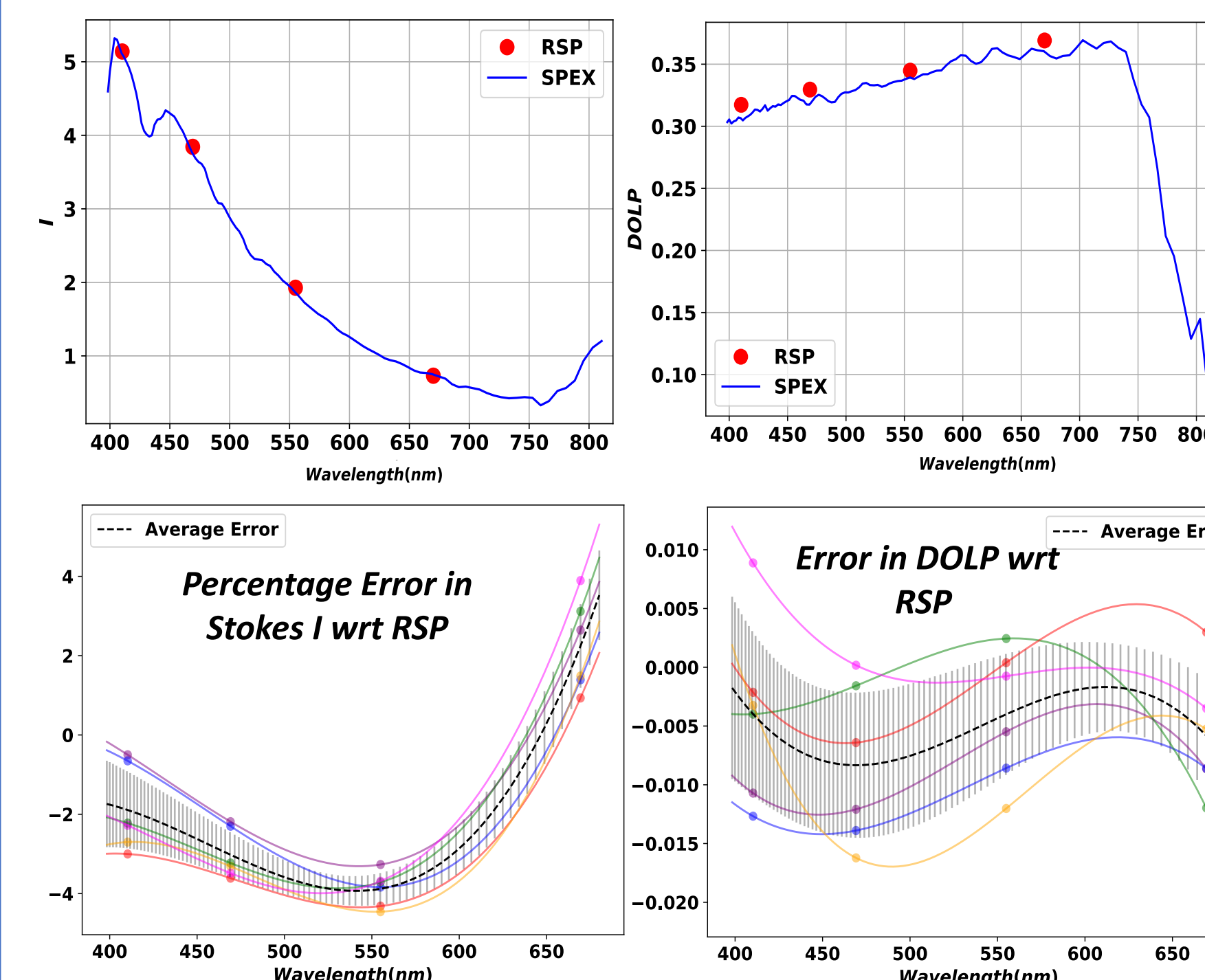
Retrieval Results – RSP



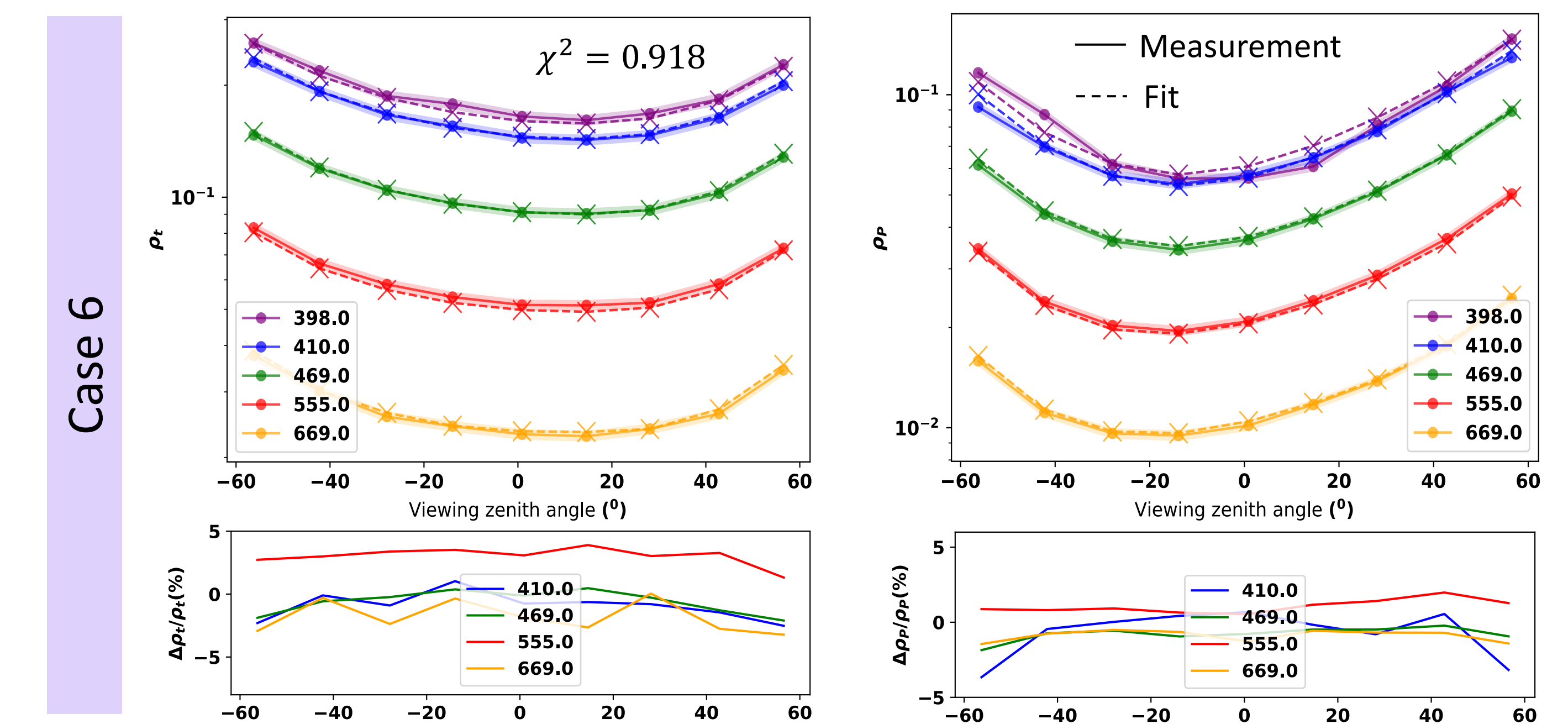
Aerosol Optical Depth and Remote Sensing Reflectance Retrieval - RSP



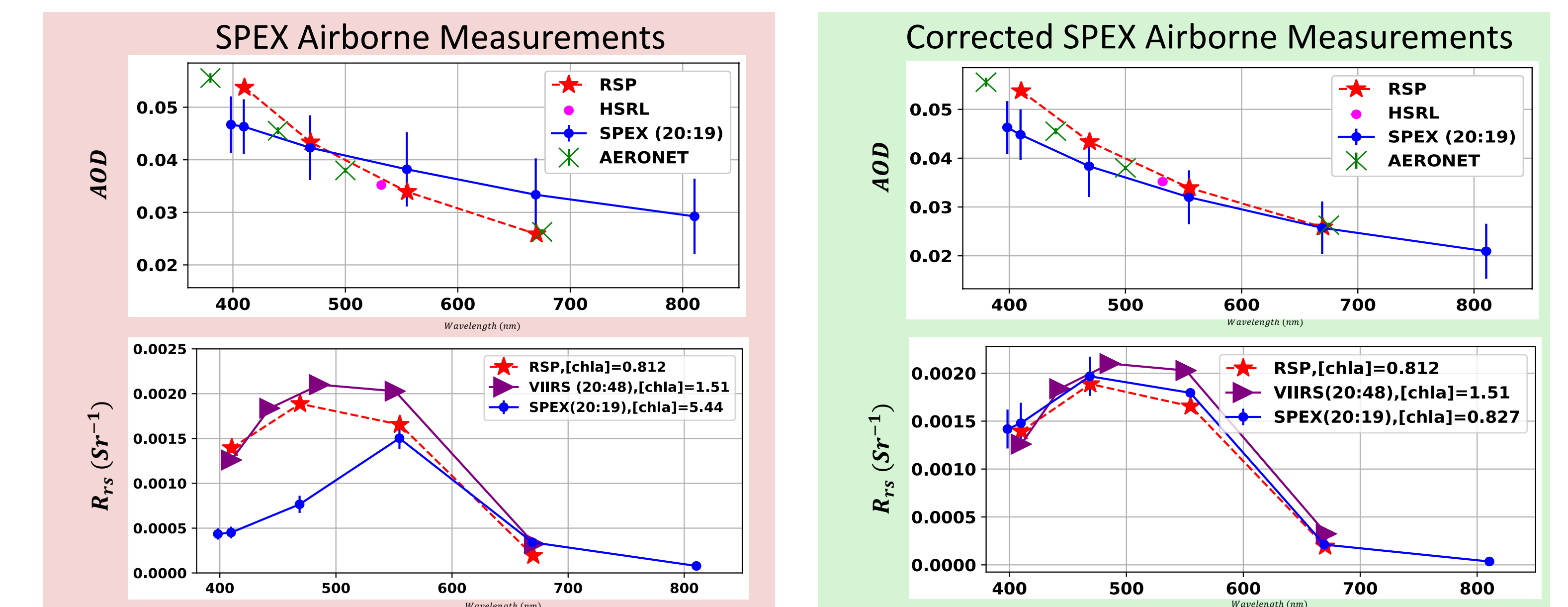
RSP vs SPEX Airborne



Retrieval Results – SPEX Airborne



* Using corrected measurements with respect to RSP



Conclusions

- MAPOL algorithm retrieves AOD and R_{rs} from RSP, which are in good agreement with collocated HSRL and/or AERONET results.
- SPEX Airborne measurements require error corrections for a better retrieval, due to the spectrally dependent systematic error in I and random error in DOLP
- The retrieved aerosol properties might be used for the atmospheric correction on hyperspectral ocean color instruments.

References

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