FastMAPOL: an efficient multi-angle polarimetric algorithm for simultaneous aerosol and ocean color retrievals powered by deep learning

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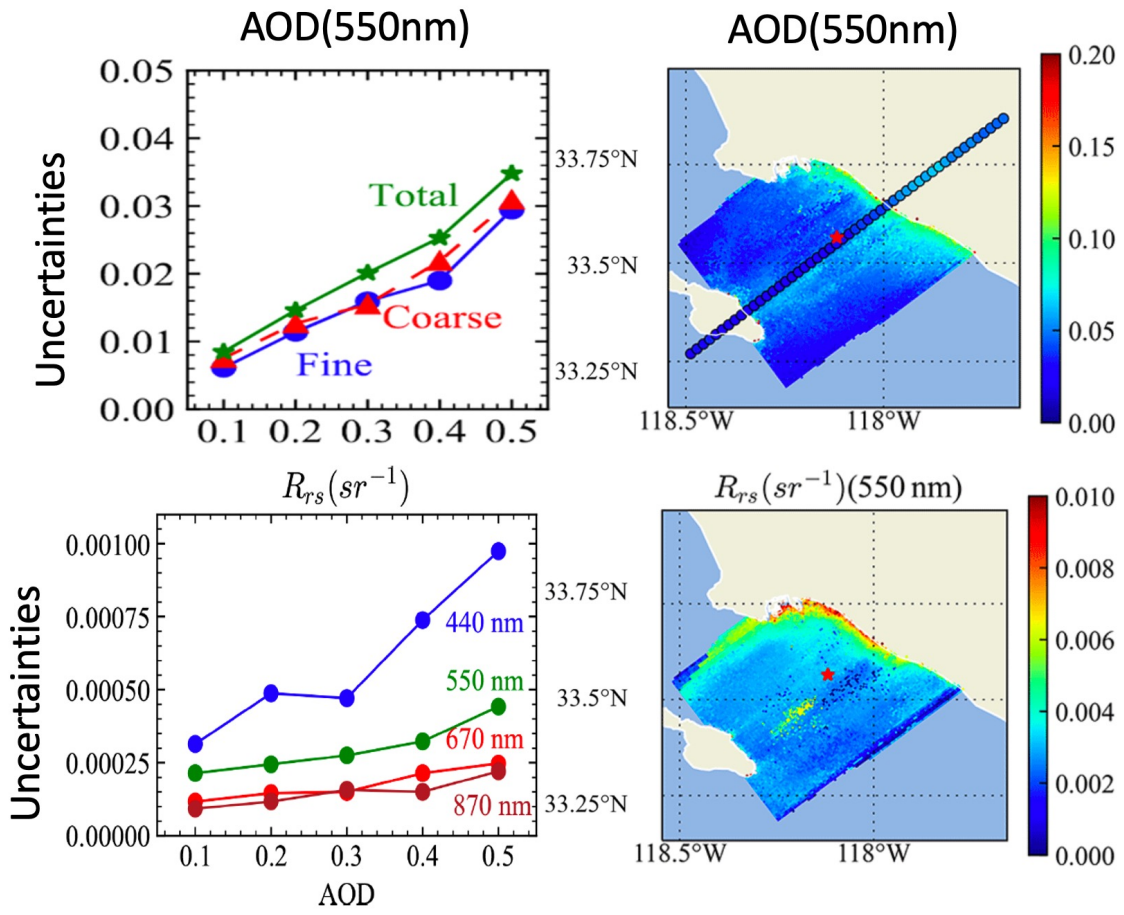
- We developed a practical neural network(NN) training strategy to represent polarized radiative transfer simulations on a coupled atmosphere and ocean system. Fast speed (10^3 to 10^4 speed up), high accuracy (<1%) and minimal model size (~1MB) are achieved.
- Using the NN forward models with analytical Jacobian matrix, an efficient retrieval algorithm based on multi-angle polarimetric measurements is developed and validated with both synthetic and field AirHARP data. Retrieval uncertainties are evaluated.
- Water leaving signals are derived from the multi-angle measurements using NN based atmospheric corrections.
- An AirHARP L2 data product is developed and publicly available from NASA Open Data Portal: https://data.nasa.gov/Earth-Science/FastMAPOL_ACEPOL_AIRHARP_L2/8b9y-7rgh



Synthetic AirHARP data

AirHARP/ACEPOL (2017)

Please find more details in the recorded talk and the FastMAPOL paper: https://doi.org/10.5194/amt-14-4083-2021