



Models, In situ, and Remote sensing of Aerosols (MIRA) An International Working Group

250+ members in 30 countries and growing!

MIRA Steering Committee

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What is MIRA?

MIRA is forum that fosters international collaborations amongst the aerosol Modeling, In situ, and Remote sensing specialties. This is accomplished with:

- Focused Interdisciplinary Topics
- Monthly webinars
- Quarterly newsletters
- MIRA Sessions at major conferences (e.g., AGU)
- MIRA Workshops (starting in 2025)

Why?

The purpose of MIRA is to contextualize both observations and model results through the encouragement of holistic projects and collaborations.

How does MIRA differ from other projects?

MIRA focuses on interdisciplinarity to improve measurements and their utility, and MIRA complements the activities of other groups. For example, the ensemble model runs of AeroCom could be used in MIRA projects with greater effect than an interdisciplinary effort that uses single-model analyses.

MIRA Currently has 5 Topics (described here)

- HAMR: Harmonization of aerosol Assimilation Models and Retrievals
- MAC: Mapping Aerosol lidar ratios for CALIPSO
- TAO: Tables of Aerosol Optics
- TaCO: Tables of Cloud Optics
- SAPM: Satellite-Assisted Particulate Matter

Harmonization of aerosol Assimilation Models and Retrievals (HAMR)

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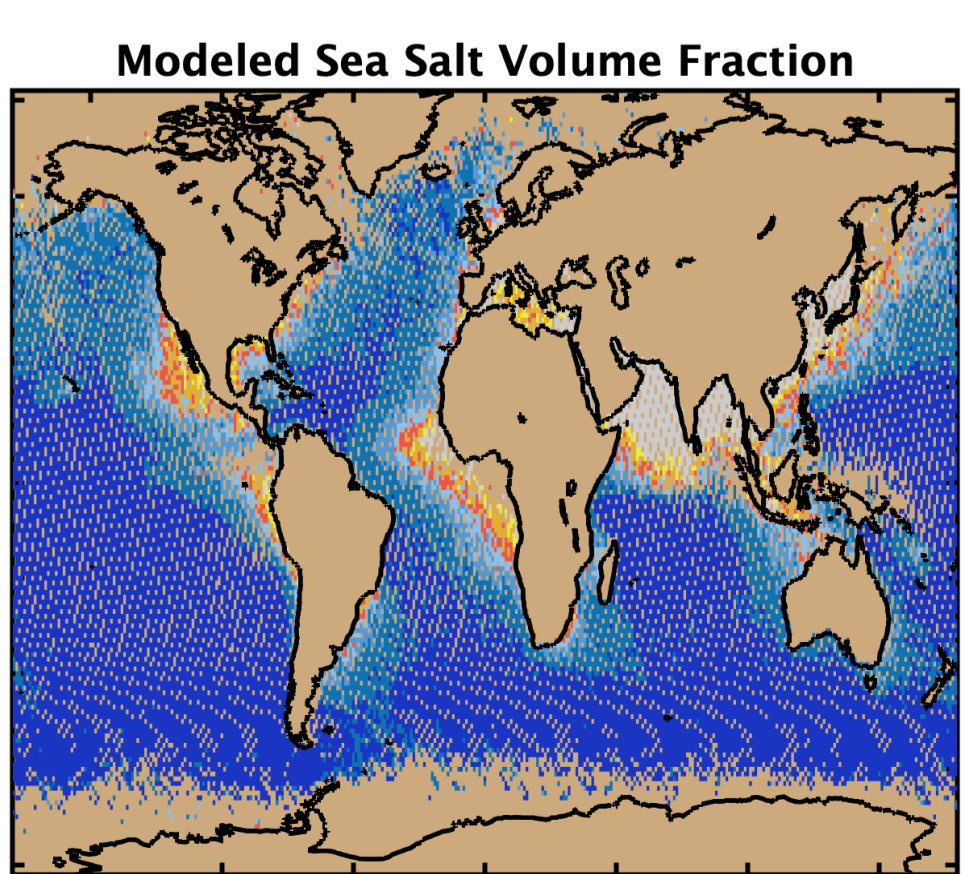
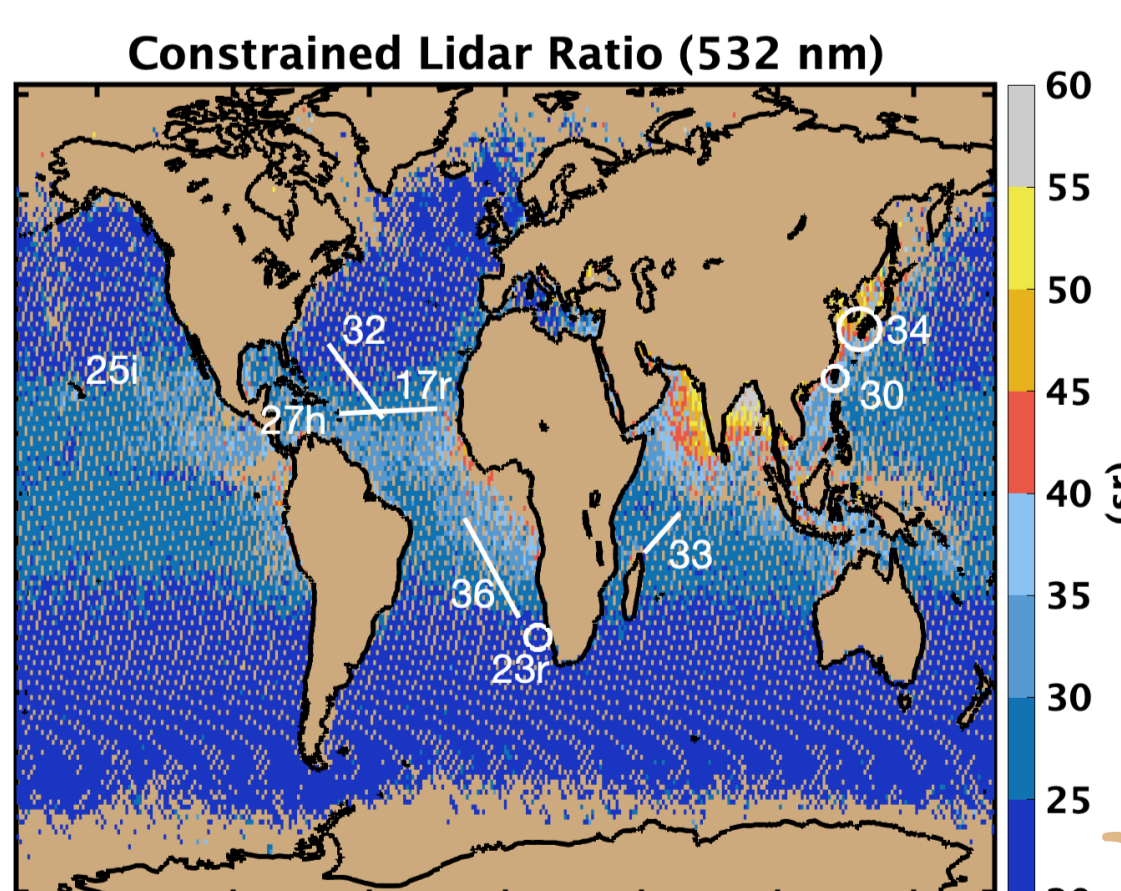
The objective of HAMR is to harmonize aerosol representations connecting climate models and remote sensing by

- Applying remote sensing techniques to the optics modules in climate models will improve the accuracy of the CM optics modules.
- An improved CM/RS interface will improve the efficiency of aerosol assimilation models.
- Improved efficiency of Remote Sensing approaches that use Climate Model data as a priori constraints.

Mapping Aerosol Lidar Ratios for CALIPSO (MAC)

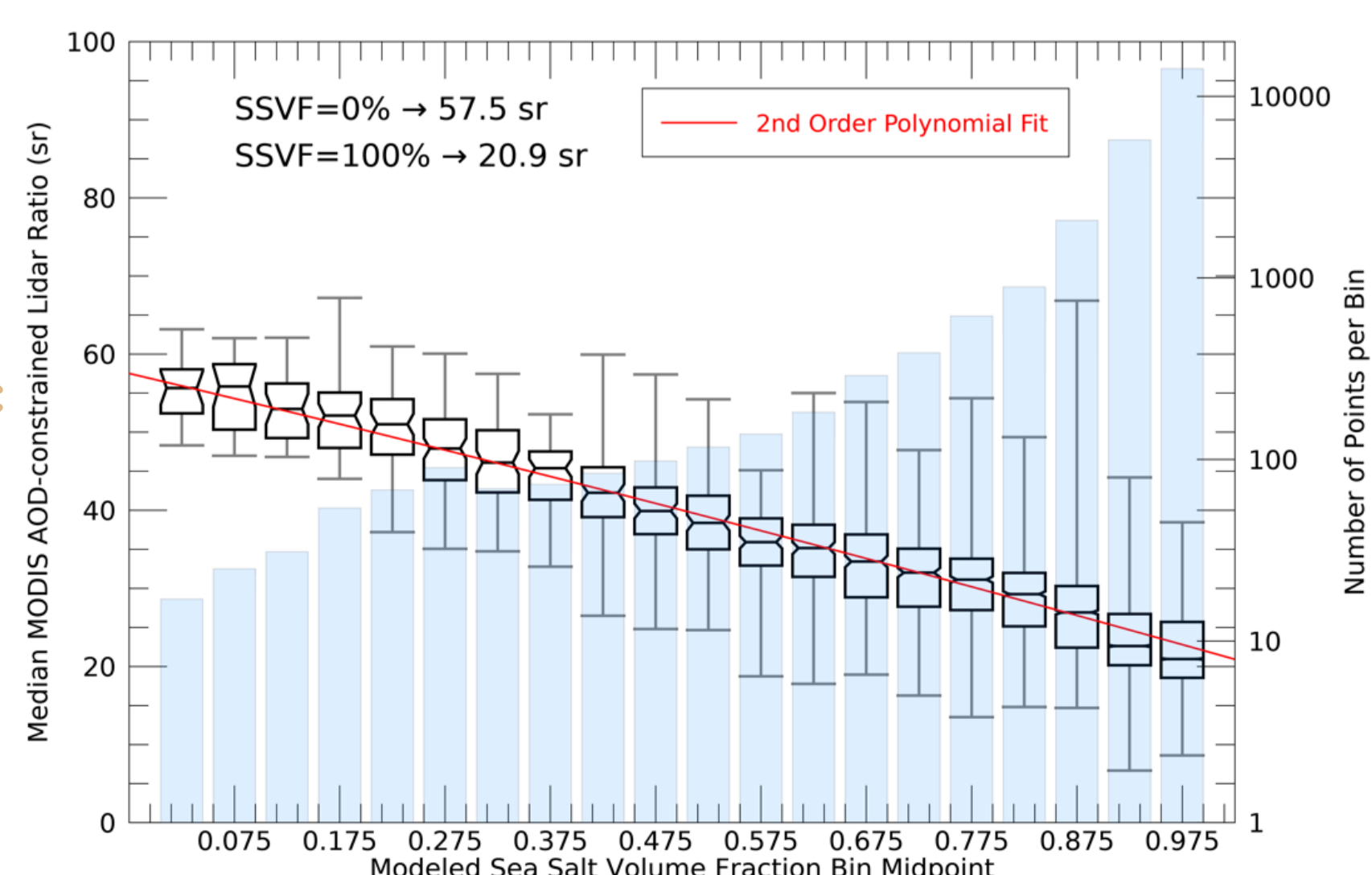
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Elastic-backscatter lidars depend upon a priori knowledge of aerosol microphysical and optical properties to convert lidar backscatter measurements into aerosol extinction profiles. Presently, CALIPSO Version 4 aerosol retrievals use a single lidar ratio for each CALIPSO aerosol type.



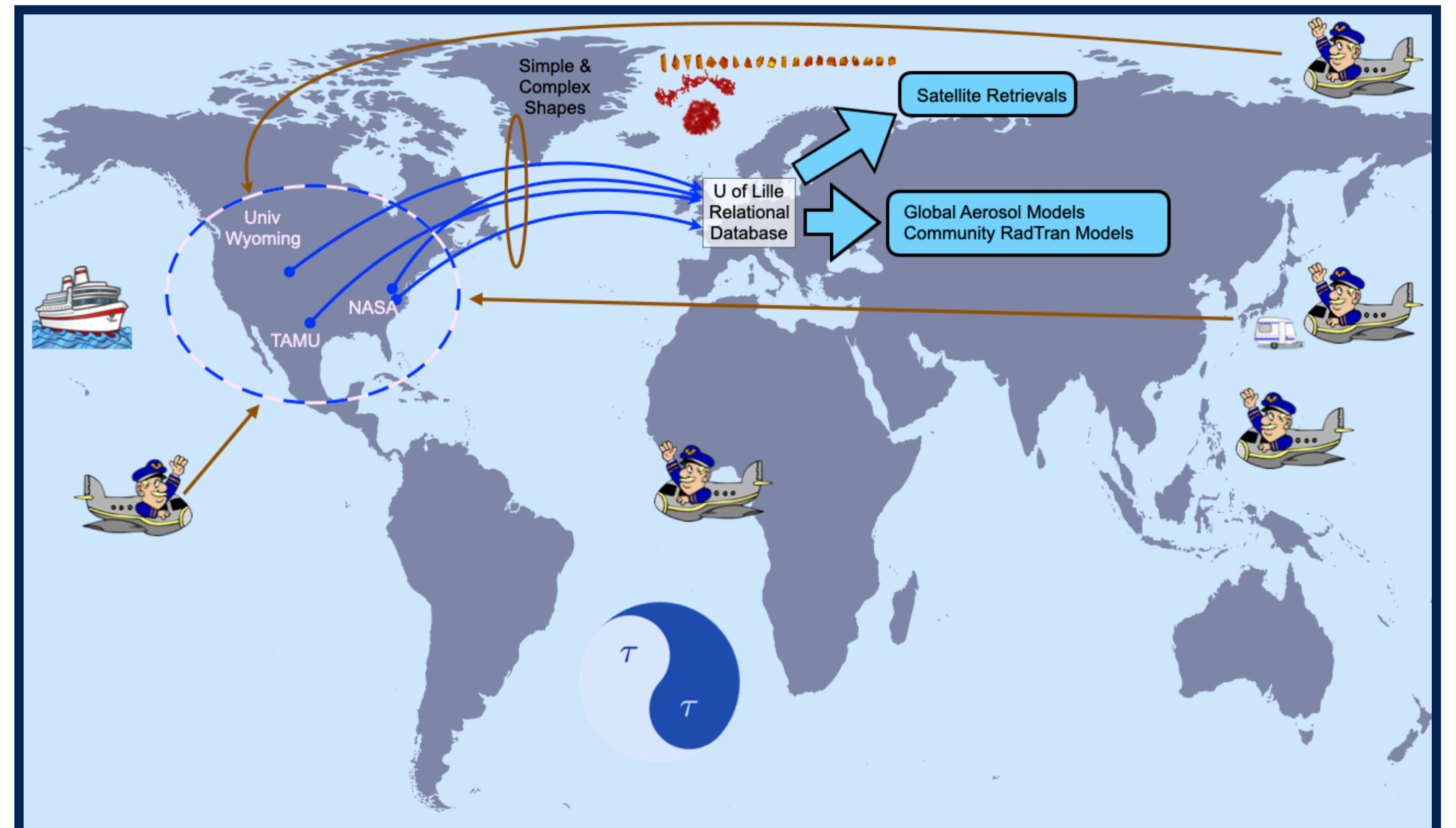
Objectives:

- Develop methods to quantify the mixing of aerosol species and types, including model assistance.
- Characterize the seasonal and regional variability of the CALIPSO aerosol types.



Tables of Aerosol Optics (TAO)

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- The objective of the Table of Aerosol Optics is to build a dynamic community repository of optics computations that are useful for models and remote sensing (mass extinction coeffs, mass absorption coeffs, SSA, Lidar Ratio, etc). It updates historical efforts (Shettle and Fenn, d'Almeida, GADS, OPAC, etc) with recent measurements and new computational techniques for non-spherical particles.
- Presently, TAO is highly fluid and located on a NASA google drive. This is not permanent. TAO will establish a new home (e.g., GitHub) within about 1 year. Contact gregory.l.schuster@nasa.gov for access and join our newlist below for updates.

Table of Cloud Optics (TaCO)

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The objective of the Table of Cloud Optics (TaCO) is to develop a community-accessible cloud optics tables. TaCO will include a suite of the bulk optical properties of liquid clouds, ice clouds, and other hydrometeors across the entire spectral domain, which is to be developed based on state-of-the-art ice crystal models and light-scattering computational capabilities. Similar to TAO, TaCO will be useful for regional/global climate models, remote sensing applications, and other radiative transfer applications.

Satellite-Assisted Particulate Matter (SAPM)

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The objective of SAPM is to facilitate interaction between the modeling and measurement groups with the purpose of improving PM2.5 characterization and forecasting. The benefit of merging satellite measurements with ground-based measurements and modeling techniques for estimating PM2.5 include:

- Improved PM2.5 concentrations for areas lacking *in situ* ground station coverage,
- Satellites provide frequent constraints for data assimilation systems, and
- Improved spatial and temporal characterization of PM2.5 on both regional and global scales.

MIRA Workshop!

We are in the early planning stage of a MIRA workshop for the Summer of 2025. The workshop will likely be in Nafplio, Greece, and it will likely take place June 16-20, 2025. Join our newlist below to receive updates.



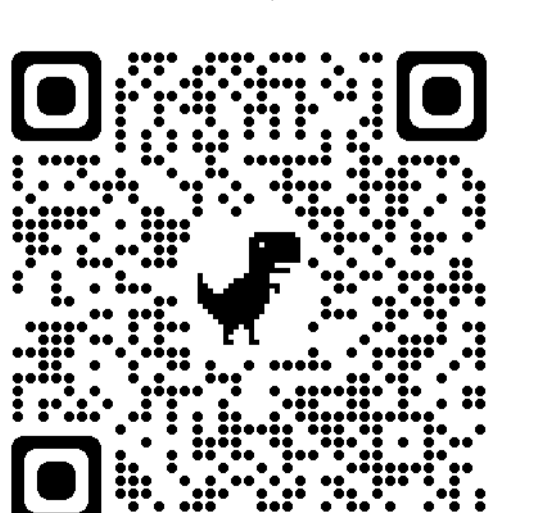
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Webpage



Newlist



Join us with these links!

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