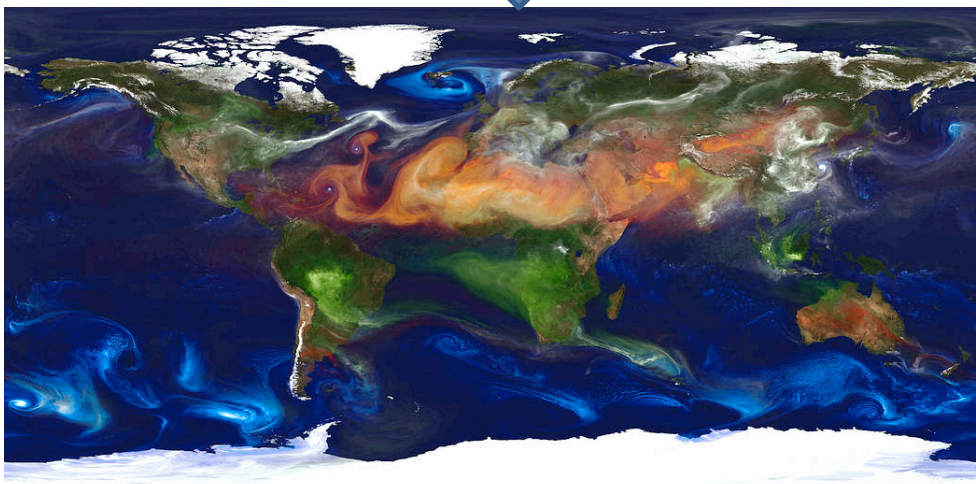
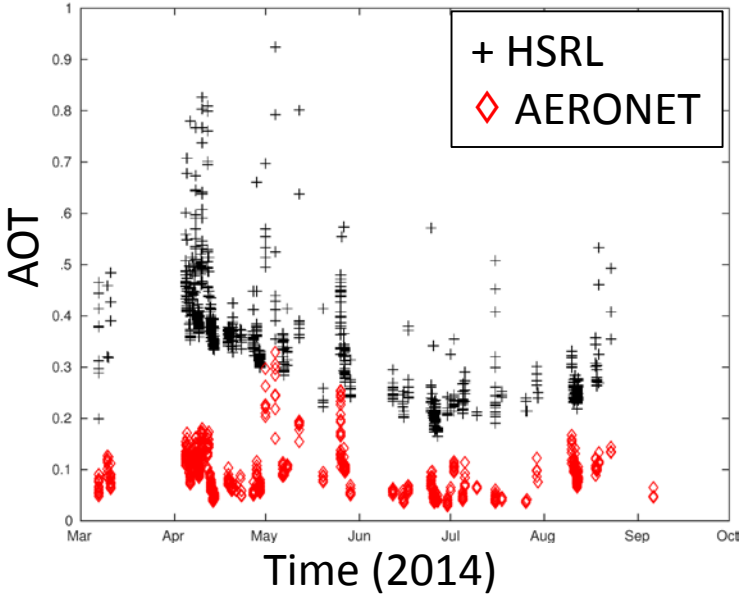
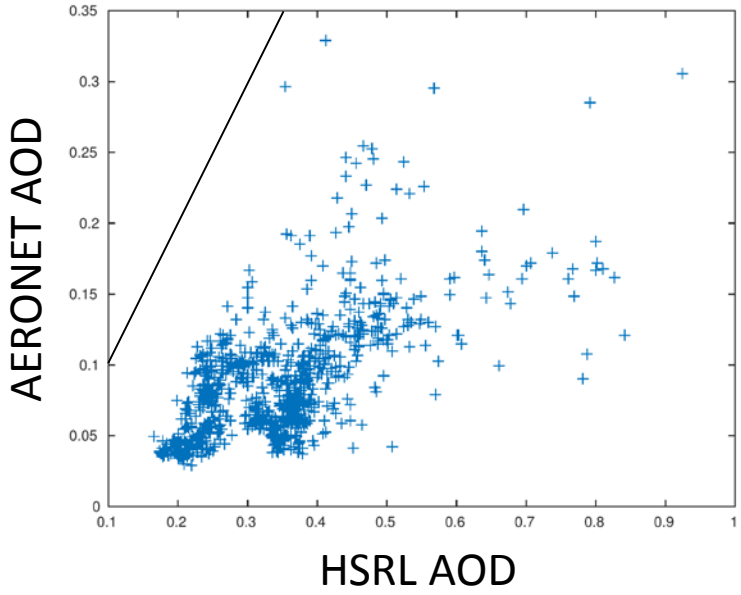
How can ARM measurements be made more useful to the global aerosol modeling community?



Experience with HSRL data

- Innovative measurements that apply cutting edge technology!
- Objective: Use HSRL measurements from Barrow to evaluate simulated vertical distributions of aerosols
- Results:
  - Column integrated AOD from HSRL differed too substantially from AERONET for it to be considered trustworthy
  - Email discussions and analysis revealed overlap correction issues, data below 1km being ‘quite uncertain’, large noise above 5km, …



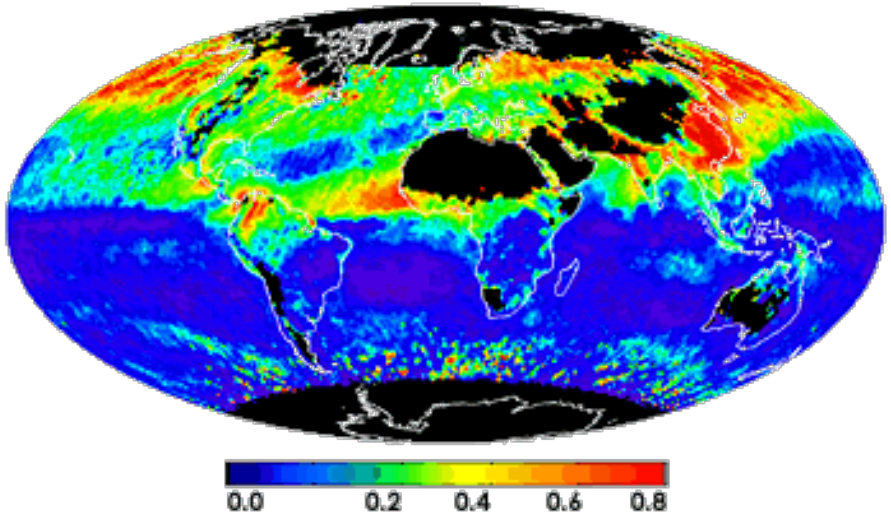


Suggestions

- *Quality labeling* (QL): Implement improved QC **and** QL
  - Clear delineations of limitations of data and/or processing steps that can be undertaken to improve the data
- *Products*: Aim to produce data *products* instead of data streams
  - Invest in efforts to re-process data as improved retrieval algorithms and bias correction techniques are developed
- *Packaging*: Modelers are more likely to use nicely-packaged, clearly-described, and easy-to-use data (e.g., familiar grids, data formats, coordinate systems, etc)
  - If it can be used *off the shelf* (for better or worse) it will
- *Modeler's perspective*: Aim to constrain **parameters**

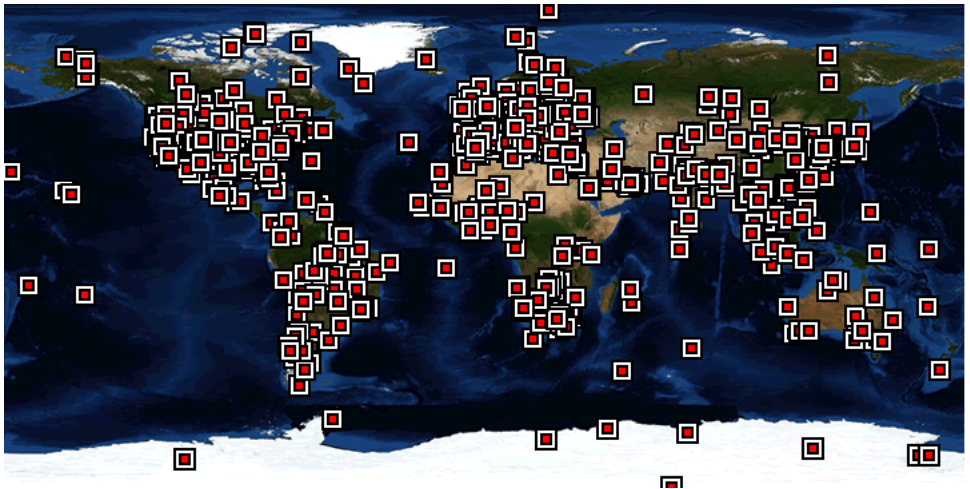
Example of data widely used by global aerosol modelers: MODIS

- Attractive features:
  - New “collections” are occasionally produced that apply improved retrieval algorithms
  - Data are provided on “climate modeling grids”
  - Higher level products are **gap-filled**



Example of data widely used by global aerosol modelers: AERONET

- Attractive features:
  - Identical (nearly) instruments deployed at all sites
    - Consistent calibration of all instruments on a regular basis
  - Clear identification of **levels** of data, each of which require progressively more assumptions
  - Data are formatted consistently (if not conveniently)



Think like a modeler

- Aim to constrain **parametric relationships**
  - This requires more focus and definition than exploring *processes* (which may itself have high scientific value)
  - Example of meltwater scavenging of black carbon in snow: Although I am generally interested in the process, I want a justifiable value of *k* that I can incorporate into my model:

$$\frac{\mathrm{d}m_i}{\mathrm{d}t} = k(q_{i+1}c_{i+1} - q_i c_i) + D$$