Aerosol type

- … is a categorial / qualitative variable
- … is input needed for (ill-posed) retrievals / affects accuracy (AOD …)
- … is output from retrievals to some extent (AERONET, satellite)
- … is estimated from ground-based data (sampling!) and model climatologies
- Different instruments
  - … need different definitions
  - … have different / limited information content for aerosol type

Aerosol typing

Aerosol typing procedures differ in many aspects:

- approach
- nomenclature (e.g. same name for different definitions)
- assumed number of components (e.g. TOMS: 3 – MISR: 74)

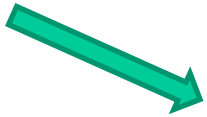
- parameters used for the classification
  - Particle size / shape / absorbing properties
  - Aerosol load
  - Location
  - Seasonal behavior

- approach
  - by source (e.g. dust, sulfates)
  - by optical properties (e.g. aspherical, absorbing)

Questions?

What is needed?

- review of aerosol typing assumptions
- harmonization of the nomenclatures
- harmonization of the procedures



Long-term perspectives (WG2)
Validation (WG3)
Improved accuracy(WG4)

Can / we find one overarching nomenclature?
Do we see a need / benefit in it?

Different concept examples

- Aerosol_cci
  - 4 basic components; 3 external mixing mixing fractions
  - Reflecting limited dual view information content
- MISR
  - 8 components
  - 74 mixtures grouped by size, absorption, sphericity
- CALIOP
  - Originally driven by need to define lidar ratio for extinction
  - Combination of depolarisation and geolocation criteria

Discussion points (1)

- Information content is largely dependant on retrieval conditions
- Harmonize on nomenclature, but not on approaches
- Nomenclature:
  - components/particles (unchanged input), mixtures (output)
- Overall qualitative categorization
  - by size, absorption (spectral dependance?) and shape
- Unknown / partly unknown should be valid output
- Mixture pdfs can be provided instead of best mix
- Review table of aerosol typing schemes will be made
- Idea: multi-sensor level4 aerosol typing?

Discussion points (2)

- Clearly communicate
  - limitations of retrievals/derivation/interpretation for aerosol types
  - Quantitative definition of components
  - Avoid unnessasarily confusing nomenclature
  - Satellites „see“ optical properties
- Different users need different aerosol types (climate / AQ)
- User needs mentioned – direct/derived
  - Fine mode, absorption, dust
  - Smoke, dust, pollution
  - Plume origin, height, ...
  - Anthropogenic, dust/salt, submicron dust
  - Aerosol-cloud interaction proxys