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 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)
What is needed?

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

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

Questions?

Long-term perspectives (WG2)
Validation (WG3)
Improved accuracy (WG4)
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
Information content is largely dependent on retrieval conditions

Harmonize on nomenclature, but not on approaches

Nomenclature:
- components/particles (unchanged input), mixtures (output)

Overall qualitative categorization
- by size, absorption (spectral dependence?) 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 unnecessarily 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 proxies