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Retrieving the Aerosol Asymmetry Parameter from EUSAAR Near-Real-Time Data

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Rationale

- Parameters needed for assessing direct aerosol climate effect: ext. coeff., single scat. alb., asymmetry parameter.
- Model quality assurance focussed so far on extinction.
- Asymmetry parameter needed for improving accuracy.

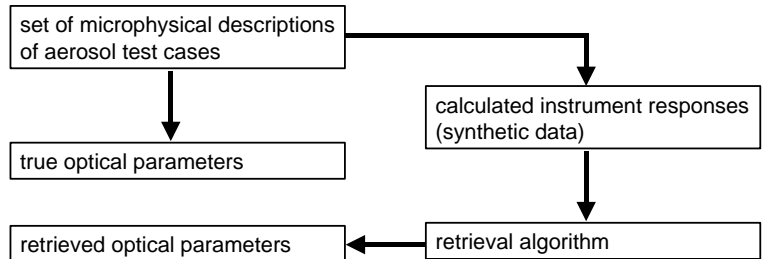
Objectives

- Modify existing algorithm to retrieve asymmetry parameters from EUSAAR dataset.
- Assess accuracy of retrieval result.
- Provide asymmetry parameters data for GEOMON model quality assurance.

Previous Work

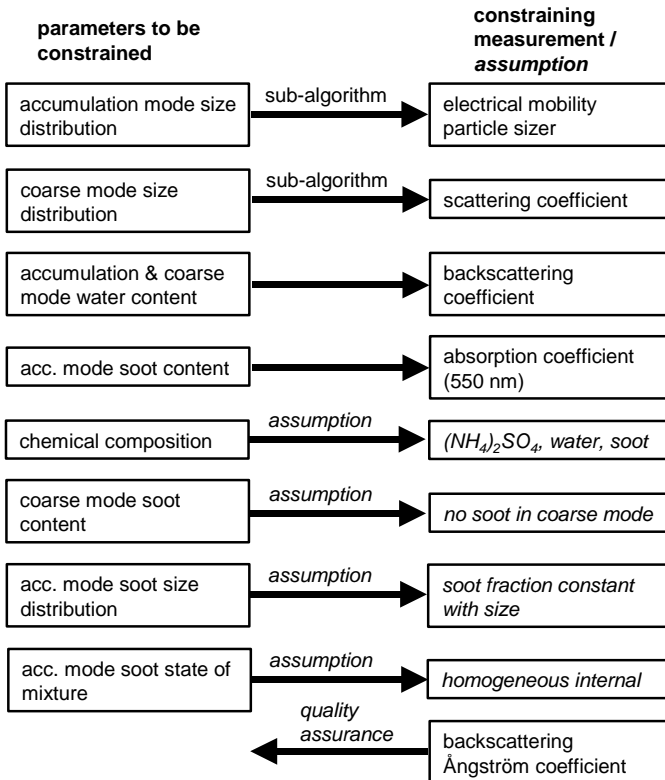
- In the NOAA ground station network, selected aerosol optical parameters (spectral scattering coefficient, spectral backscattering coefficient, spectral absorption coefficient) are measured in two size ranges (PM_{10} , $PM_{2.5}$).
- First version of retrieval algorithm the spectral asymmetry parameter from this data set with approx. 3% systematic uncertainty.

Accuracy Assessment Approach

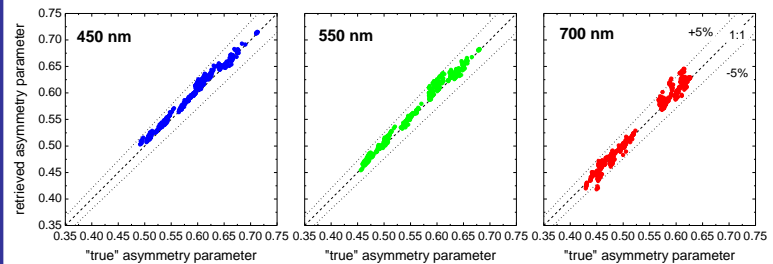


- Test cases consist of 3 log-normal modes (Aitken, accumulation, coarse).
- For each mode, the following parameters are varied (all permutations): particle concentration, median diameter, water content, soot content, soot mixture, soot median diameter.

GEOMON / EUSAAR adapted Algorithm Operation Principle



Retrieval Accuracy



- Accuracy currently better than 5%.

Future Work

- Starting test phase in EUSAAR near-real-time data flow.
- Improve accuracy by including further quality assurance parameter checks.
- Improve accuracy by including more measurements / instruments, thereby removing assumptions.

References

Fiebig et al. (2005): Inversion of data containing information on the aerosol particle size distribution using multiple instruments. *J. Aerosol Sci.*, 36, 11, 1353 - 1372.
 Fiebig and Ogren (2006): Retrieval and Climatology of the Aerosol Asymmetry Parameter in the NOAA Aerosol Monitoring Network. *J. Geophys. Res.*, 111, D21204.