Microphysical
aerosol
parameters via
regularized
inversion of
LIDAR data

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Part I:
Microphysical
retrieval from
measurement
data of
National
Institute of
R&D for Op-
toelectronics,
Bucharest

Part II:
Synthetic
microphysical
retrievals with
a spheroidal
particle model

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Microphysical retrieval from measurement data of Nat. Inst. of R&D for Optoelectronics (INOE)

[S. Samaras et al, 2015] *This study's goal:*

- *Methodology for semi-automated retrievals for spherical particles*
- *Evaluation of a hybrid regularization algorithm using LIDAR, Aerosol Mass Spectrometer (AMS), and Sun Photometer (AERONET) data.*
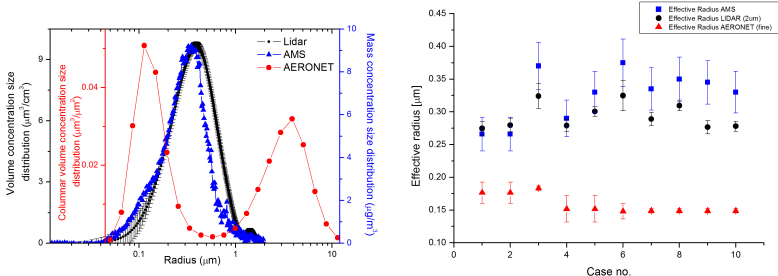

Figure: LIDAR- and AERONET- inversion data vs AMS measurement data. Left: size distributions for 1 smoke case. Right: effective radius of the fine mode for 10 smoke cases.

Synthetic microphysical retrievals with a spheroidal particle model

Simulations with different regularization methods:

- *Truncated Singular Value Decomposition (TSVD)*
- *Tikhonov with L-curve method (TLC)*
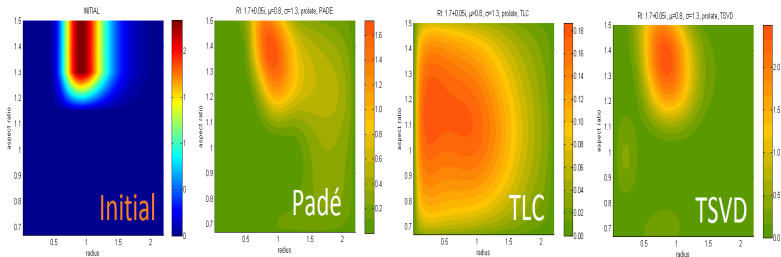- *Padé Iteration with the Discrepancy Principle*

Figure: Comparison between the synthetic (leftmost) and the retrieved size distributions (2nd left to right). Atmospheric scenario: coarse & absorbing prolate particles.