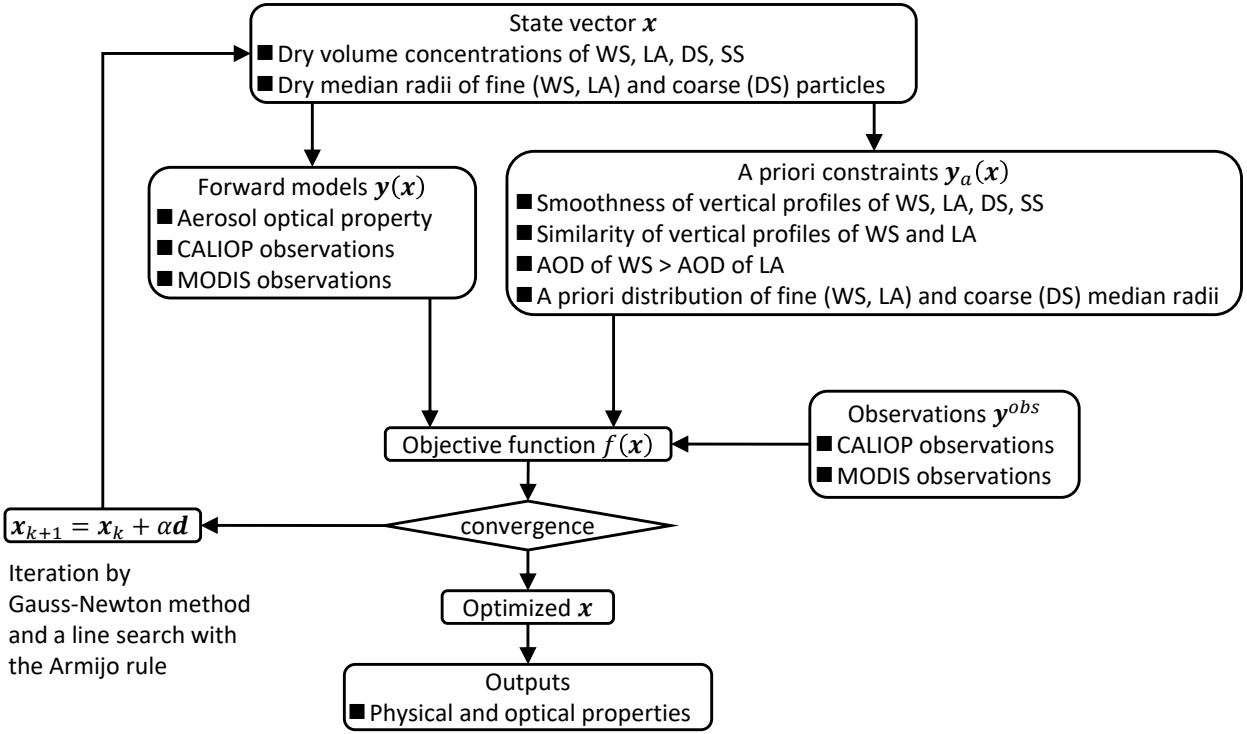
State vector $\boldsymbol{x}$
■ Dry volume concentrations of WS, LA, DS, SS
■ Dry median radii of fine (WS, LA) and coarse (DS) particles
Forward models $\boldsymbol{y}(\boldsymbol{x})$
■ Aerosol optical property
■ CALIOP observations
■ MODIS observations
A priori constraints $\boldsymbol{y}_a(\boldsymbol{x})$
■ Smoothness of vertical profiles of WS, LA, DS, SS
■ Similarity of vertical profiles of WS and LA
■ AOD of WS > AOD of LA
■ A priori distribution of fine (WS, LA) and coarse (DS) median radii
Observations $\boldsymbol{y}^{obs}$
■ CALIOP observations
■ MODIS observations
Objective function $f(\boldsymbol{x})$
convergence
$\boldsymbol{x}_{k+1} = \boldsymbol{x}_k + \alpha \boldsymbol{d}$
Iteration by
Gauss-Newton method
and a line search with
the Armijo rule
Optimized $\boldsymbol{x}$
Outputs
■ Physical and optical properties