



A Backscatter-Lidar Forward-Operator

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We have developed a forward-operator which is capable of calculating virtual lidar profiles from atmospheric state simulations. The operator allows us to compare lidar measurements and model simulations based on the same measurement parameter: the lidar backscatter profile. This method simplifies qualitative comparisons and also makes quantitative comparisons possible, including statistical error quantification. Implemented into an aerosol-capable model system, the operator will act as a component to assimilate backscatter-lidar measurements. As many weather services maintain already networks of backscatter-lidars, such data are acquired already in an operational manner.

To estimate and quantify errors due to missing or uncertain aerosol information, we started sensitivity studies about several scattering parameters such as the aerosol size and both the real and imaginary part of the complex index of refraction.

Furthermore, quantitative and statistical comparisons between measurements and virtual measurements are shown in this study, i.e. applying the backscatter-lidar forward-operator on model output.