

## Development and Application of a physical model-based active sensor retrieval scheme

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We have developed a physical model to provide fast estimates of the time-dependent backscattered signal from space-borne active sensors for application to global datasets (Sato et al., 2018). The physical model was evaluated by Monte Carlo simulation, and further intensive error analyses were performed to characterize the accuracy of the model. For space-borne lidar configuration, it was found that the accuracy of the developed approach based on physical approximations do not strongly depend on the cloud microphysical properties or on the instrument settings, and significantly reduces the mean error and standard deviation compared to a more statistical approach. The physical model was used to analyze the cloud data obtained by the Multiple-Field-of-view-Multiple-Scattering Polarization Lidar (MFMSPL: Okamoto et al., 2016). Evaluation of the developed retrieval algorithms for EarthCARE (Jaxa-ESA) with these datasets are also planned.

Keywords: space-borne lidar/radar, cloud