



Estimation of the influence of pollution on clouds using satellite and chemical transport model data from ICARTT

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Recent studies have applied satellite data to the problem of assessing the magnitude and nature of the effects of pollution aerosols on cloud properties. One ambiguity associated with these efforts is that, out of necessity, satellite measurements of pollution levels must be done in clear air adjacent to clouds, rather than within clouds themselves. While cloud properties depend foremost on meteorology, almost by definition clouds and aerosols sampled lie in different meteorological regimes. A more direct comparison employs AQUA and TERRA MODIS cloud property retrievals with collocated output from the high temporal and spatial resolution FLEXPART chemical transport model. FLEXPART advects particulate and gaseous tracers within ECMWF wind fields. Comparisons focus on clouds over ocean downwind of the North Eastern US during the timeframe of the summer 2004 ICARTT mission. Anthropogenic CO is used as a pollution tracer because its concentrations are tied primarily to mixing rather than precipitation or oxidation. The data are separated into three $4^\circ \times 4^\circ$ boxes along the line of prevailing winds downwind of the US Northeast urban corridor. Preliminary results in low-level clouds show negative correlations between cloud droplet effective radius r_e and CO. With distance downwind of the coast, dr_e/dCO in each box ranges from -0.037 to -0.042 $\mu\text{ m ng}^{-1}\text{ m}^3$.