Regional and global estimates of droplet number concentration of boundary layer clouds from visible/near-infrared observations

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This presentation will summarize our efforts to develop and improve retrievals of boundary layer cloud droplet number concentration (CDNC) in support of climate research. We provide an overview on how cloud droplet number concentration is derived and assess and quantify potential systematic error sources including effects of broken clouds, and remaining artefacts caused by the retrieval process or related to observation geometry. Retrievals and evaluations are performed at the scale of initial MODIS observations (in contrast to some earlier climatologies, which were created based on already gridded data). This allows us to implement additional screening criteria, so that observations inconsistent with key assumptions made in the CDNC retrieval could be rejected. Application of these additional screening criteria led to significant changes in the annual cycle of CDNC both in terms of its phase and magnitude. After an optimal screening was established a final CDNC climatology was generated. Resulting CDNC uncertainties for the climatology are in the order of 30% in the stratocumulus regions and 60% to 80% elsewhere.