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Global statistics of liquid water content and effective number concentration of water clouds over ocean derived from combined CALIPSO and MODIS measurements

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Abstract. This study presents an empirical relation that links the volume extinction coefficients of water clouds, the layer integrated depolarization ratios measured by lidar, and the effective radii of water clouds derived from collocated passive sensor observations. Based on Monte Carlo simulations of CALIPSO lidar observations, this method combines the cloud effective radius reported by MODIS with the lidar depolarization ratios measured by CALIPSO to estimate both the liquid water content and the effective number concentration of water clouds. The method is applied to collocated CALIPSO and MODIS measurements obtained during July and October of 2006, and January 2007. Global statistics of the cloud liquid water content and effective number concentration are presented.

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