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# Modeling of precipitation in cloud boundary layer stratocumulus clouds and parameterization for general circulation models

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At present, the parameterizations of precipitation formation in GCM are derived from CRM *bulk* parameterizations while the onset of precipitation is a non-linear process with spatial and temporal scales smaller than the ones of a GCM. Parameterizations of the average precipitation rate of an ensemble of cloud cells may be more relevant to study in particular the $2^{nd}$ indirect effect of aerosols..

At the scale of a cloud system, the physical parameters that drive the mean precipitation rate are the liquid water path LWP and the droplet concentration N, as it results from aerosol activation. Palowska and Brenguier (2002), by analyzing 8 cases of the ACE2 data set, have shown that the mean precipitation rate R scales as $LWP^2/N$. This result has been corroborated by Van Zanten et al. (2004), using data from DYCOMS-II.

These experimental results are well reproduced with large eddies simulations (LES) of boundary layer clouds, with varying values of the liquid water path and droplet concentration.