

# **Cumulus cloud entrainment studied using particle tracing**

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The way shallow cumulus clouds interact with their environment is a longstanding issue. Lateral entrainment is for instance assumed by many people to be much smaller than cloud-top mixing, although other studies report features that are best explained by significant lateral mixing. Part of the difficulty of this subject lies in the lack of information on the history and future of a parcel of cloudy air. A possible way to work around this problem is by looking at the evolution of scalar fields, using the classical Paluch diagrams to describe the properties of in-cloud air as a linear combination of cloud-base and environmental air entrained into the cloud.

In this study, an attempt is made to look at the effects of mixing processes by incorporating massless Lagrangian particles in Large Eddy Simulations of the cloud-topped atmospheric boundary layer. Since the individual history and future of each particle is known, questions regarding for instance cloud edge mixing can be addressed directly.