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SCALES OF MOMENTUM TRANSPORT IN CLOUDY ATMOSPHERES

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Lien visio : https://bluejeans.com/975092671/2072

Résumé :

The transport of horizontal momentum is a key process in the atmosphere from small-scale turbulence to cloud- and meso-scale circulations. The interplay between momentum transport and shallow convection is a particularly unexplored mechanism which can play an important role in setting the momentum budget and the organization of a cloud field. In this study we use the Dutch Atmospheric Large Eddy Simulation (DALES) and a mesoscale weather model (HARMONIE-AROME) to elucidate on the scales at which shallow convection influences the transport of momentum.

Are the various scales always contributing equally to the total momentum flux?
Answering this question, we aim at contributing to a better scale adaptive parameterization of momentum flux. We focus on the Atlantic trade-wind region, specifically on a nine-day period within the EUREC4A campaign, where different cloud regimes and cloud patterns were observed. We repetitively apply a filter to the momentum-flux fields to partition the total flux into a sub-filter and an up-filter contributors. We find that the amount of flux carried at the meso-scales increases significantly with the degree of organization, where scales larger than 2.5 km carry up to 50% of the total flux in organized fields. We also find differences in the vertical profiles of momentum flux, which challenge the classical concept of cumulus friction.

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