



Cluster analysis for description and characterization of boundary-layer eddies

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Boundary-layer eddies play an important role in atmosphere and land-surface interactions. It is already known that near the surface many small eddies exist, which merge to form large eddies in the upper layers of the atmospheric boundary layer. However, it is not yet fully understood how these eddies organize themselves and how the organization can be best described. In this study, we present a new cluster analysis for description and characterization of boundary-layer eddies. Using this method, we group physical parameters in each air layer according to certain rules to connected clusters, each of which represents an eddy. The method is applied to the simulations of a coupled large-eddy atmosphere and land-surface model (LES-ALM). We present how the eddies are determined based on the different physical parameters for different air layers, the size distribution of the eddies within an air layer and how the results depend on the chosen physical parameter such as temperature, vertical temperature flux, moisture, vertical moisture flux and vertical wind. This analysis will help to better understand how information is transported through the different air layers and thus the role eddies play in the land-surface atmosphere interactions.