EMS7/ECAM8 Abstracts,
Vol. 4, EMS2007-A-00269, 2007
7th EMS Annual Meeting / 8th ECAM

Estimation of length scales from mesoscale networks

D. Belusic (1), L. Mahrt (2)

(1) Department of Geophysics, Faculty of Science, University of Zagreb, Croatia, (2) COAS, Oregon State University, USA (dbelusic@irb.hr)

Boundary-layer theory is primarily posed in terms of homogeneous stationary conditions. However the weak-wind stable boundary layer is almost always heterogeneous and nonstationary due to mesoscale motions. Except for certain well-defined phenomena, the understanding of this mesoscale variability is still minimal.

This study examines the spatio-temporal statistics from three recent mesoscale networks of atmospheric data. The spatial properties of mesoscale motions vary significantly between cases and, to this point, common behavior has not been identified. Therefore, this analysis incorporates a large number of cases to determine the spatial coherence of the mesoscale motions.

The same dominant spatial scale for horizontal coherence for a given network is obtained from several independent methods. The spatial scales differ between different networks, presumably due to different topography and surface conditions. The dominant spatial scales also depend on the range of time scales included in the analysis. The increase of spatial scale with time scale is linear for meso scales, but does not seem to be predictable, again partly due to site-specific conditions. The dominant spatial scales are of the order of few kilometers for time scales less than an hour, but may reach tens of kilometers for time scales of several hours.