Modeling fog in complex topography with aLMo-tBM

O. Liechti

Analysen&Konzepte, 8404 Winterthur, Switzerland
(OlivierLiechtiAuK@compuserve.com.OlivierLiechtiAuK@compuserve.com / phone: +41 52 242 57 60)

The formation and dissipation of fog over flat topography is controlled by radiation and wind. In complex terrain local topographical effects come into play: firstly, the volume effect leads to faster changes of temperature under given radiative conditions, and secondly, anabatic and katabatic winds lead to vertical mixing even in the absence of wind. Nocturnal cooling in complex topography leads to thicker inversion layers than over flat terrain. For nocturnal cooling terrain is complex if its highest surface elevations reach up to the depth of the near-ground inversion which can be quite thin in calm conditions. The 2-d topographical boundary layer model tBM takes the area-elevation distribution of the forecast area into account. As a result of the COST 722 model intercomparison for 1-d models carried out for Paris CDG the vertical resolution of tBM was refined to 10 m and a turbulence scheme was added in order to reduce the formation of fog in windy conditions. This refined version of tBM was applied to Zurich airport for a winter season with aLMo model profiles as external forcings for the vertical profiles of wind, temperature, and humidity. Forced by the aLMo model, the tBM re-calculated the boundary layer processes for night and day. The near ground visibilities obtained from the aLMo-tBM calculations were compared to observations at Zurich airport. Results will be presented at the conference.