8th International Conference on Fog, Fog Collection and Dew
Taipei, Taiwan, 14–19 July 2019
IFDA2019-125

The importance of in-situ processes and advection impacting radiation fog at orographically contrasting locations.

Daniel Smith (1), Ian Renfrew (1), Jeremy Price (2), and Stephen Dorling (1)

(1) Centre for Ocean and Atmospheric Sciences, School of Environmental Sciences, Norwich, United Kingdom (d.smith5@uea.ac.uk), (2) UK Met Office, Cardington Research Unit, Cardington, UK

The Local and Non-Local Fog (LANFEX) experiment has provided highly detailed observational data over an 18-month period. The LANFEX campaign took place in the UK in two different locations. One, an inhomogeneous complex valley system with valley to hill heights of 100 – 150m and valley widths of around 1 - 4km; the other a more homogenous area with a wide shallow valley of width around 10km and height difference 30-40m. Orography is known to have an important role on the life-cycle of fog events with cold pools and the associated drainage flows also occurring on clear sky nights ideal for fog formation. One key aim of the LANFEX campaign was to elucidate the relative importance of in-situ and advective processes have during the life-cycle of fog events including its formation, vertical development, including the stability of the boundary layer, and dissipation. Combining the LANFEX observations and a sub-kilometre scale version of the UK Met Office's Unified Model, which resolves the orography at both LANFEX sites, two case studies, one at each site, have been used to investigate the relative importance of different processes. Using the sub-kilometre scale model, the temperature and liquid water budgets within the model have been used to quantify the relative magnitude of the processes involved during the events. A comparison of these budgets at different sites within the two LANFEX locations have highlighted the impact of valley geometry and the difference in the relative importance of processes between hill and valley areas at various stages during a fog event.