Entrainment Interface Layer (EIL) Analysis

Steve Krueger
University of Utah

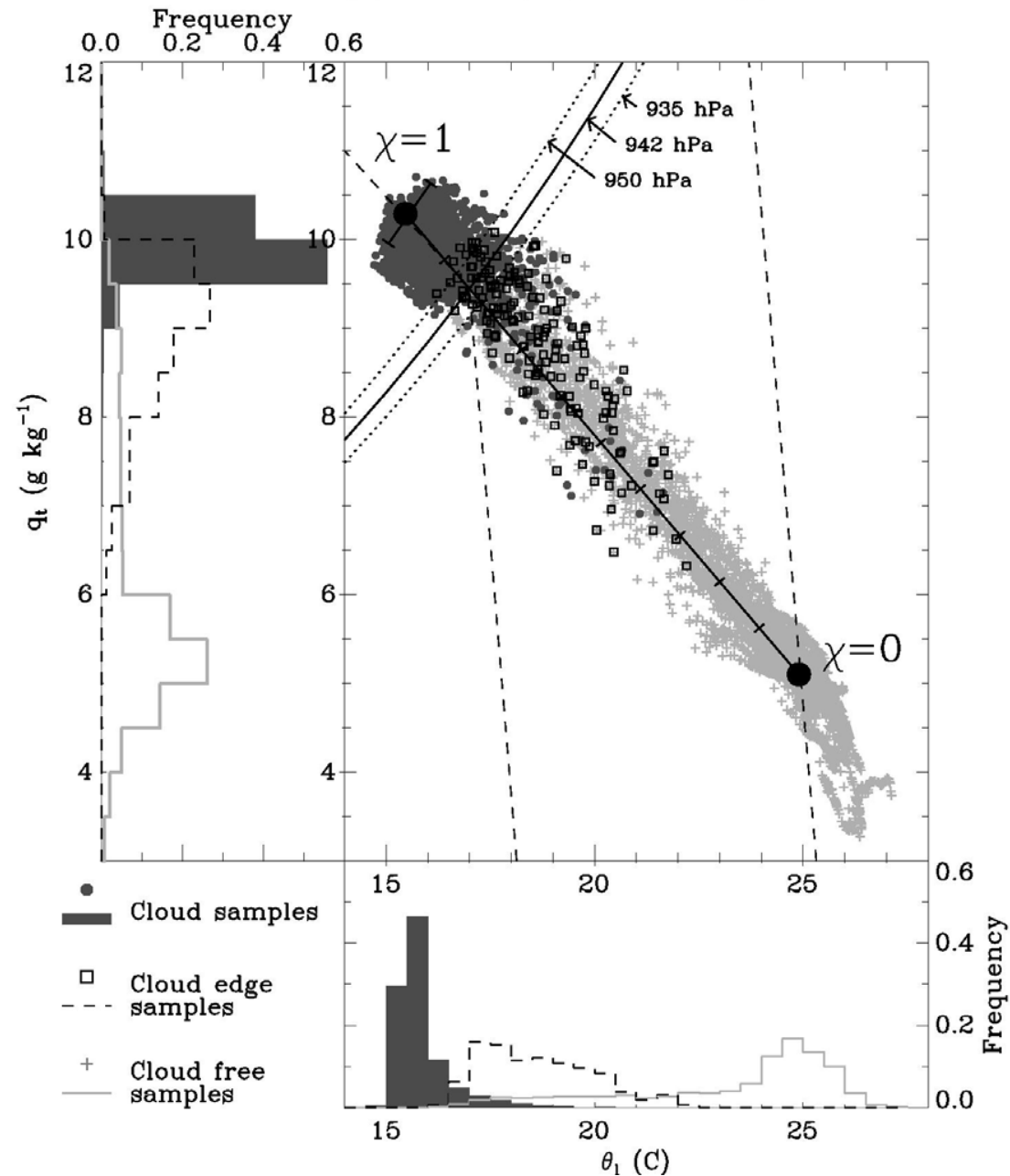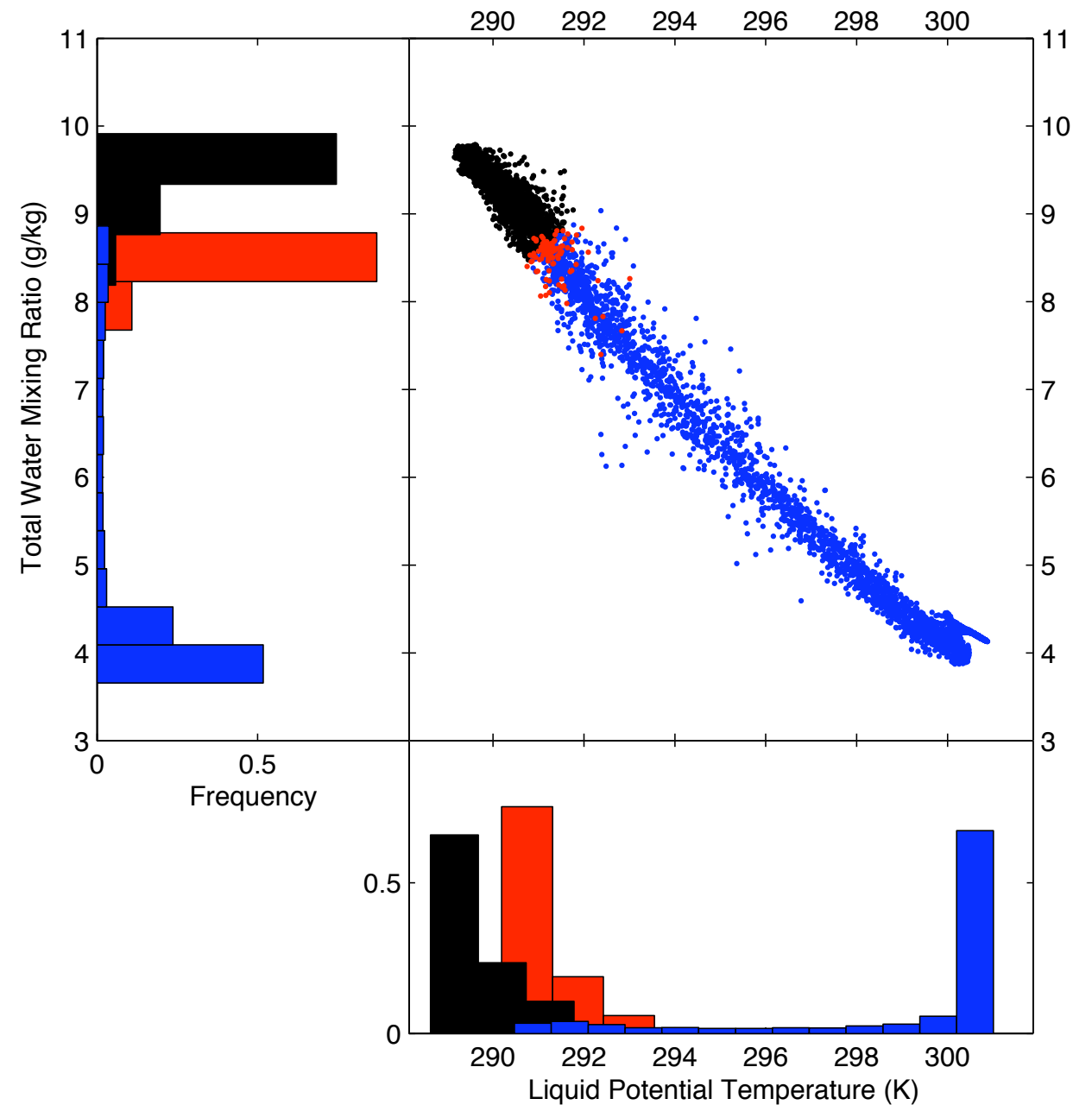## Aircraft obs (10-m avg)

LES (dx=6 m)

Figure 3a : Scatterplot of q_t vs. θ_l for the DYCOMS-II case (same data set as in Fig. 1). Different symbols are used for cloud, clear air and clear air samples adjacent to cloudy samples (edge samples), as indicated in the legend. Three saturation curves are drawn for 935, 942 and 950 hPa, as indicated by the labels. Isobaric mixing at 942 hPa between air from the free troposphere ($\chi=0$, $\theta_{le}=24.9$ C, $q_{ve}=5.1$ g kg^{-1}) and from adiabatic cloudy air ($\chi=1$, $\theta_{li}=15.5$ C, $q_{ti}=10.3$ g kg^{-1}) is represented by the solid straight line. This mixing line is graduated from 0 to 1 every 0.1. The error bar of the adiabatic cloud reference corresponds to an error of ± 0.5 C on the estimation of the cloud base temperature. The two dashed lines are the constant virtual temperature lines corresponding to the free troposphere and to the adiabatic cloudy air. Frequency distributions of θ_l and q_t are shown along the two axis for cloud, clear air and cloud edge samples separately.
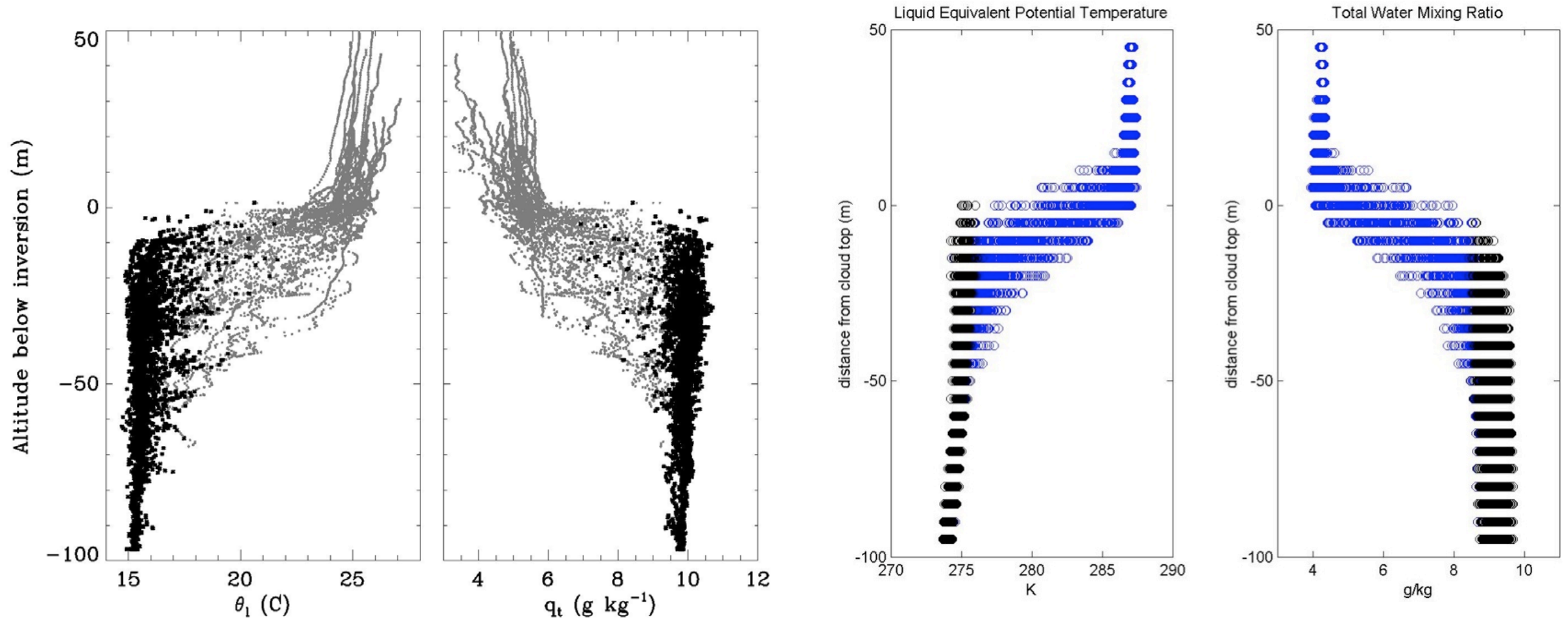
Burnet and Brenguier (2006)

Aircraft obs (10-m avg)

LES (dx=6 m)

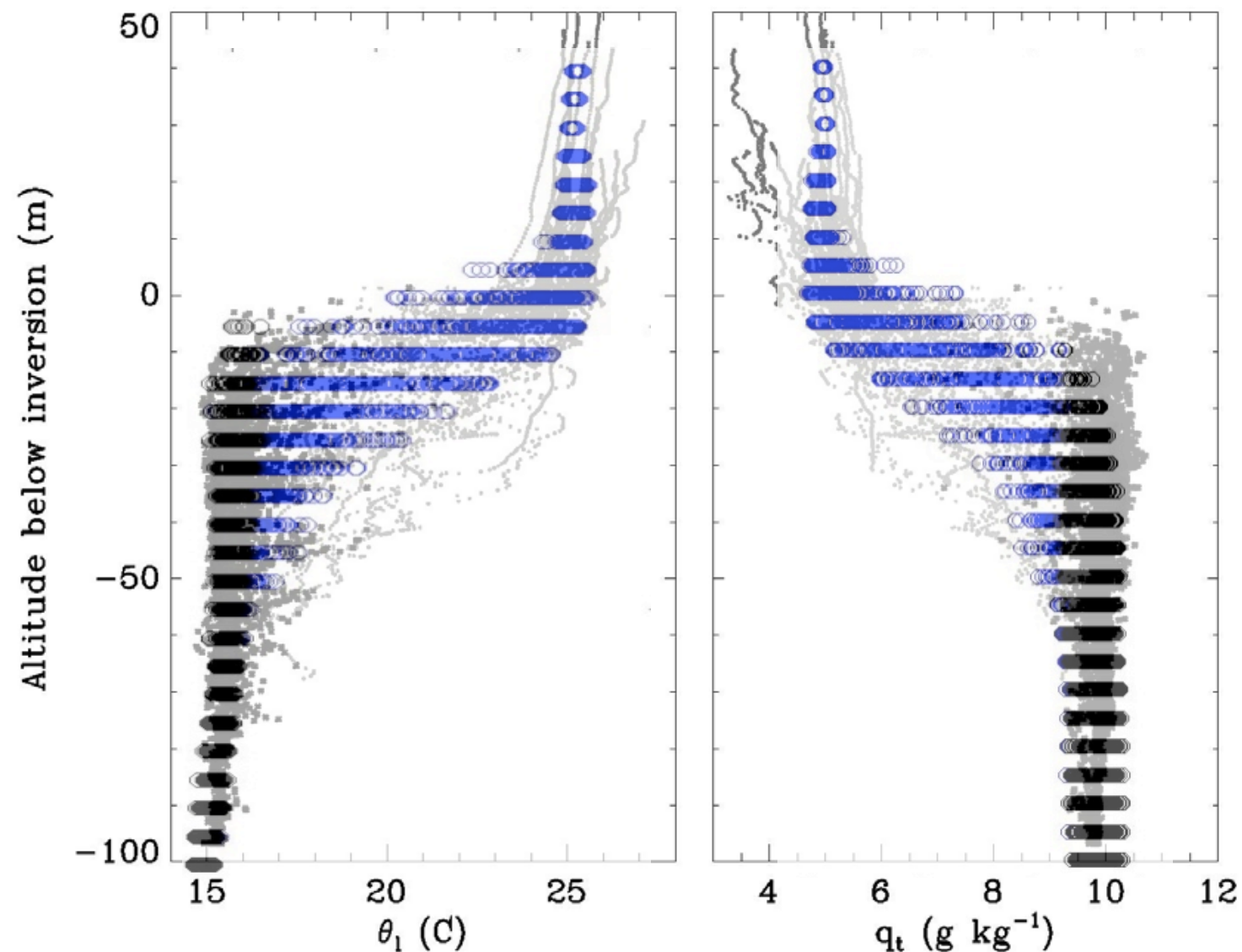Liquid Equivalent Potential Temperature

Total Water Mixing Ratio

from Burnet and Brenguier (2006)

Figure 1 : Vertical profiles of θ_l (left) and q_t (right) for the 14 traverses of the cloud top profiling circle of the DYCOMS-II RF03 flight between 11:45 and 12:17 UTC. Cloudy samples ($N>3$ cm^{-3}) are in black and clear air samples are in grey. The altitude is relative to the height of the inversion determined for each profile separately.

Aircraft obs (10-m avg)

## LES (dx=6 m)

from Burnet and Brenguier (2006)

Figure 1 : Vertical profiles of θ_l (left) and q_t (right) for the 14 traverses of the cloud top profiling circle of the DYCOMS-II RF03 flight between 11:45 and 12:17 UTC. Cloudy samples ($N>3$ cm^{-3}) are in black and clear air samples are in grey. The altitude is relative to the height of the inversion determined for each profile separately.

LES profiles shifted downwards by 10 m. LES values scaled to match aircraft obs at +50 m and -100 m.
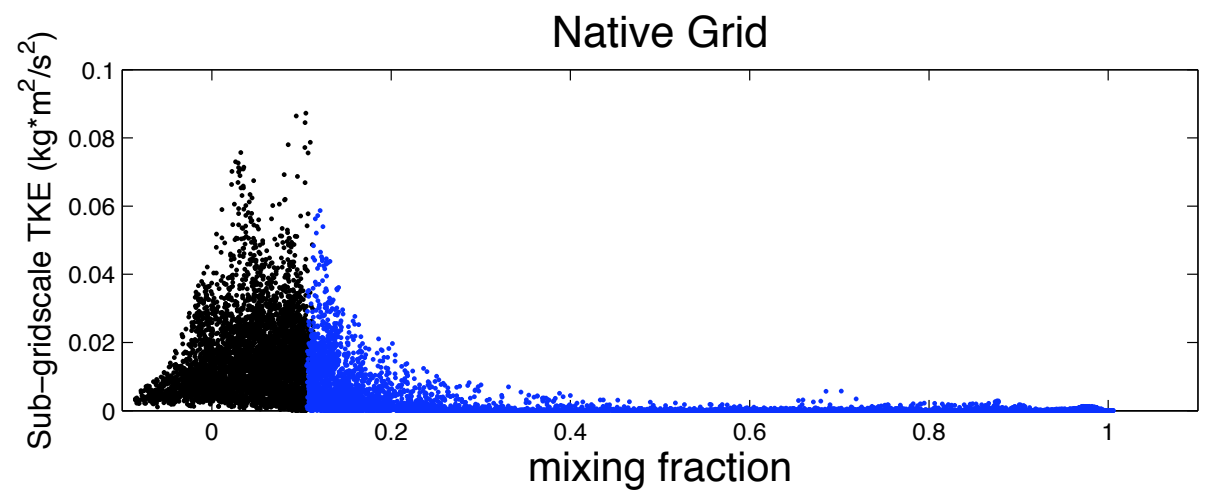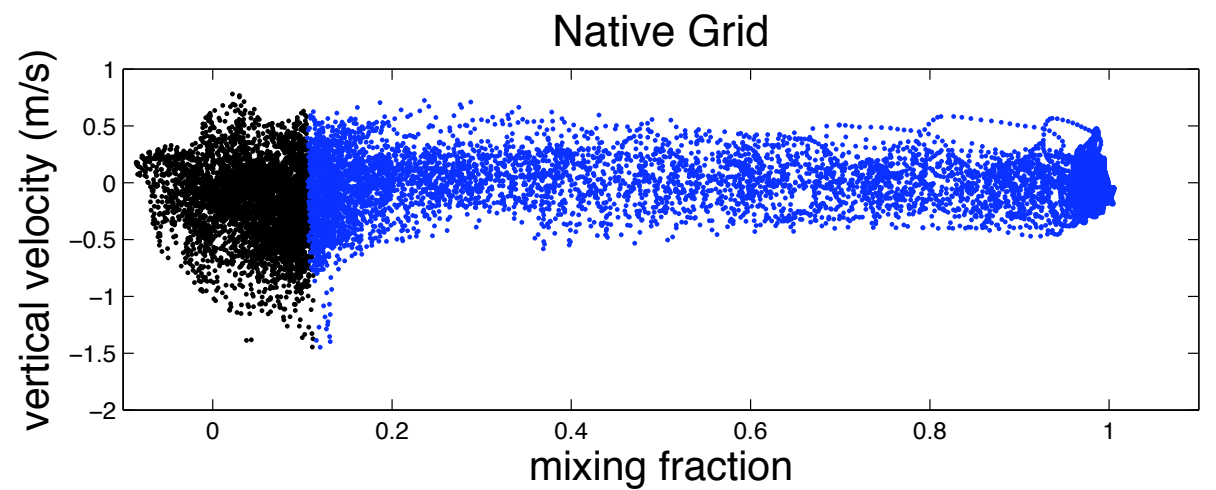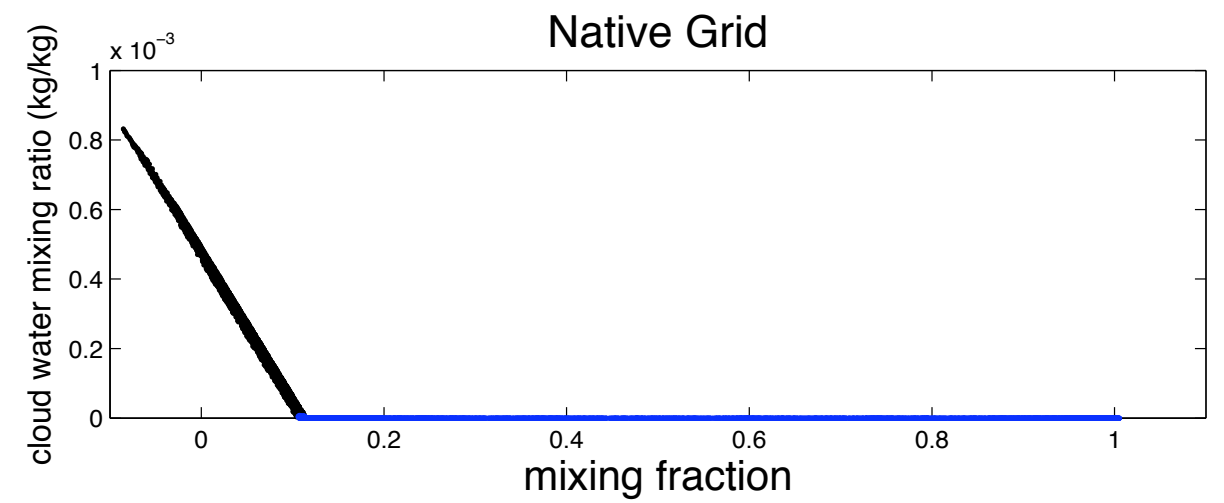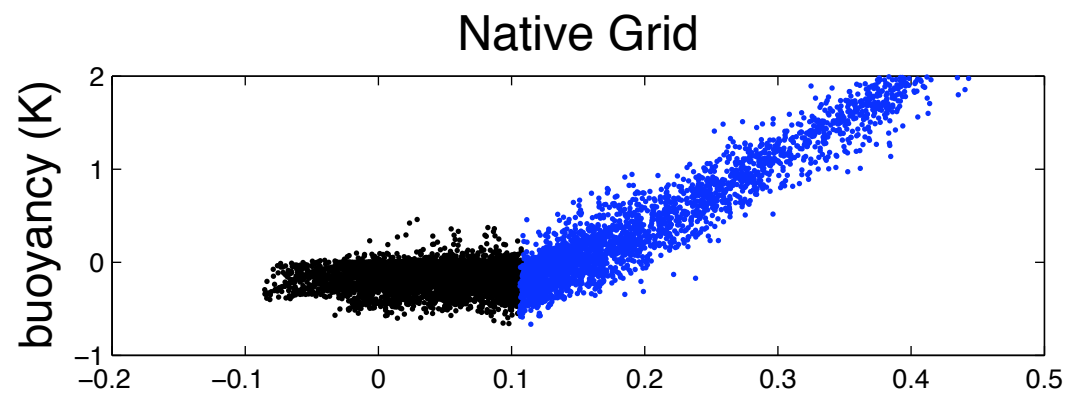
Mixing Fraction
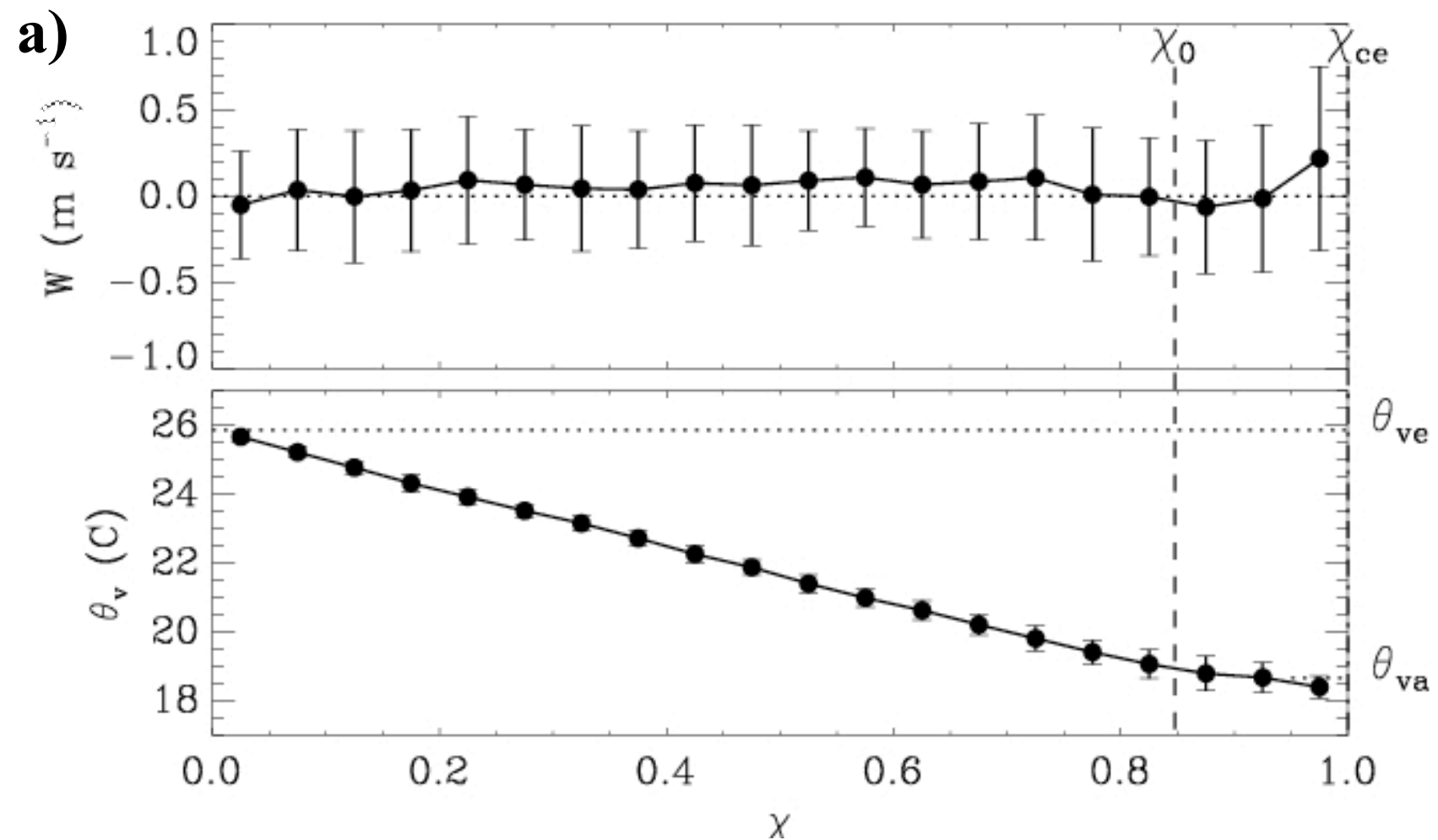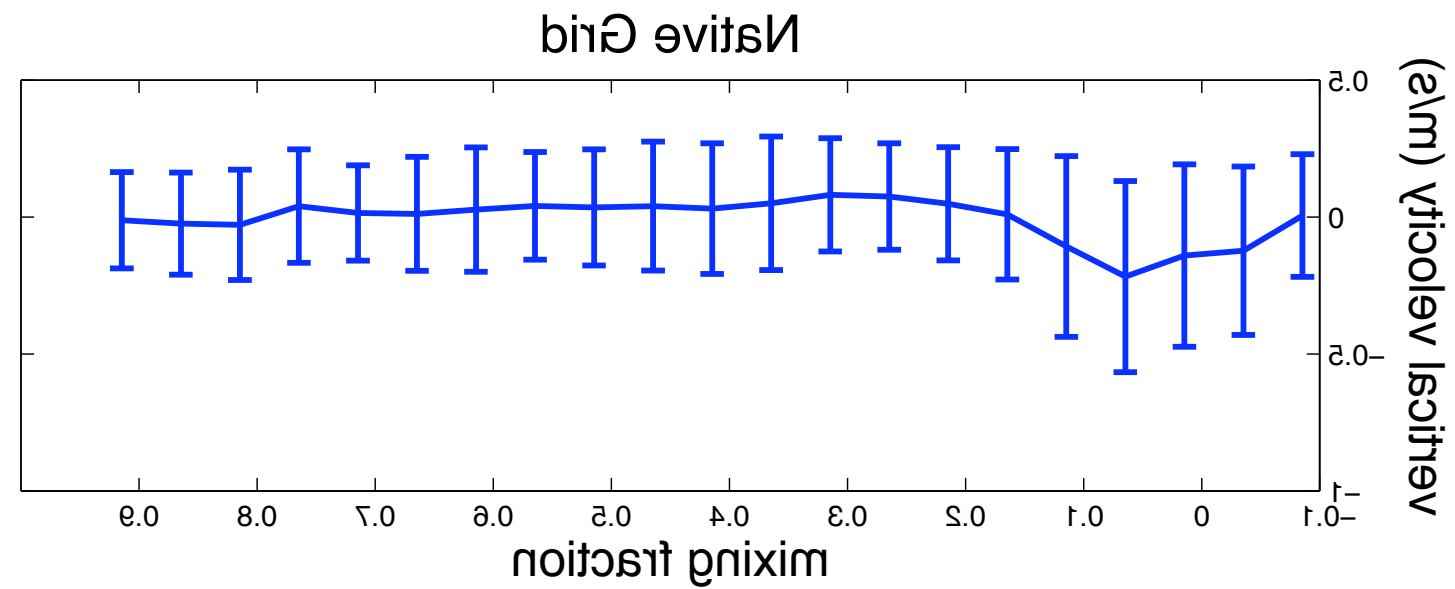of free atmosphere air
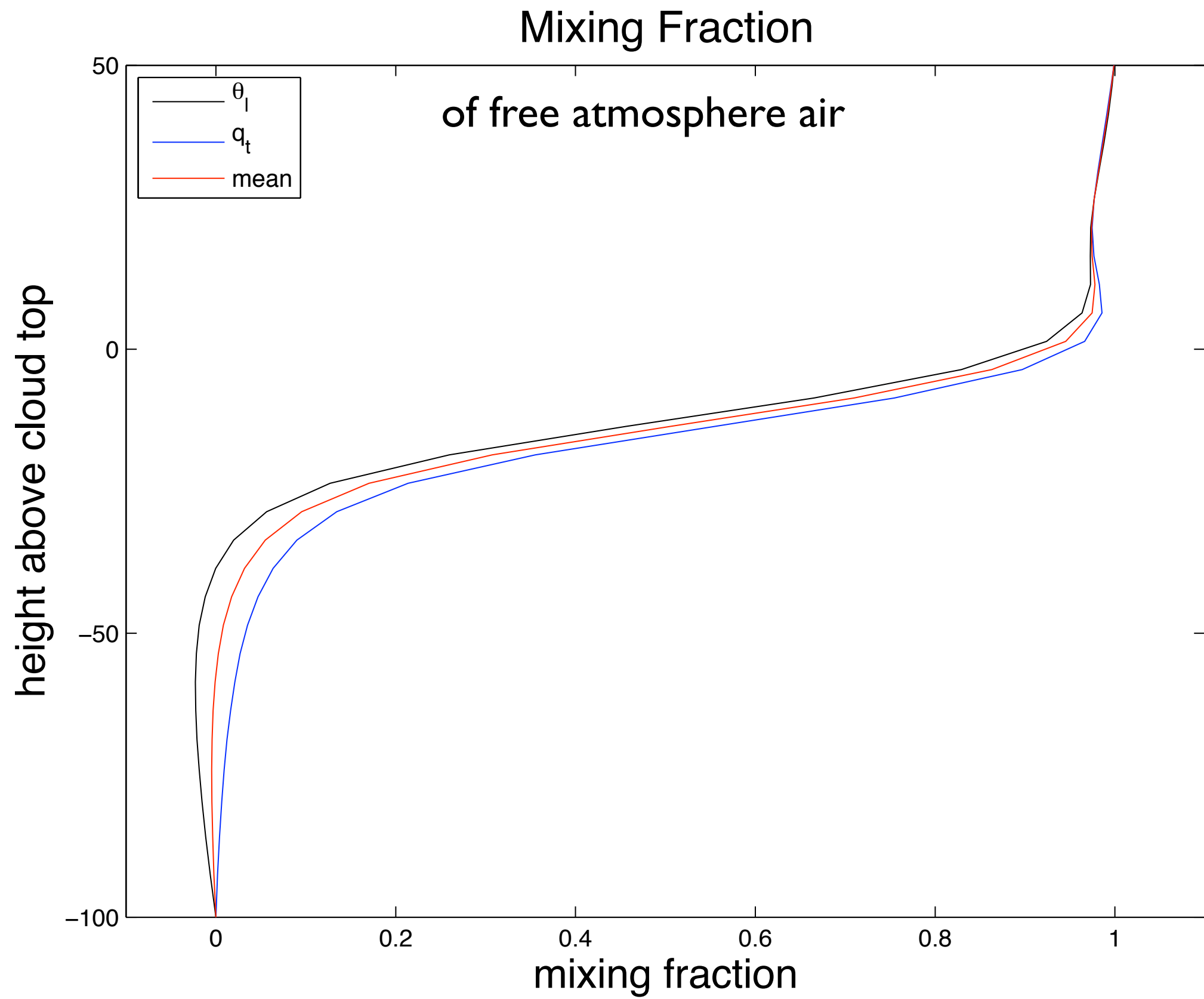
Interface heights
- mixing top
- maximum gradient level
- cloud top
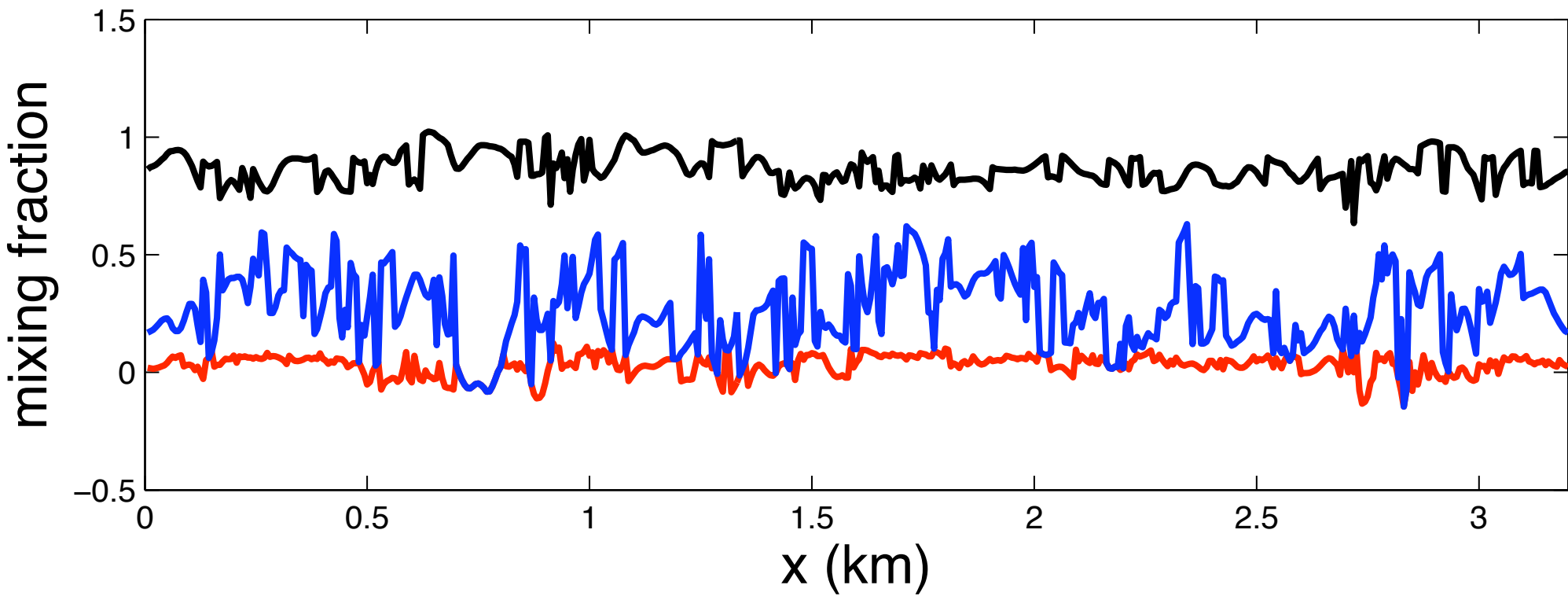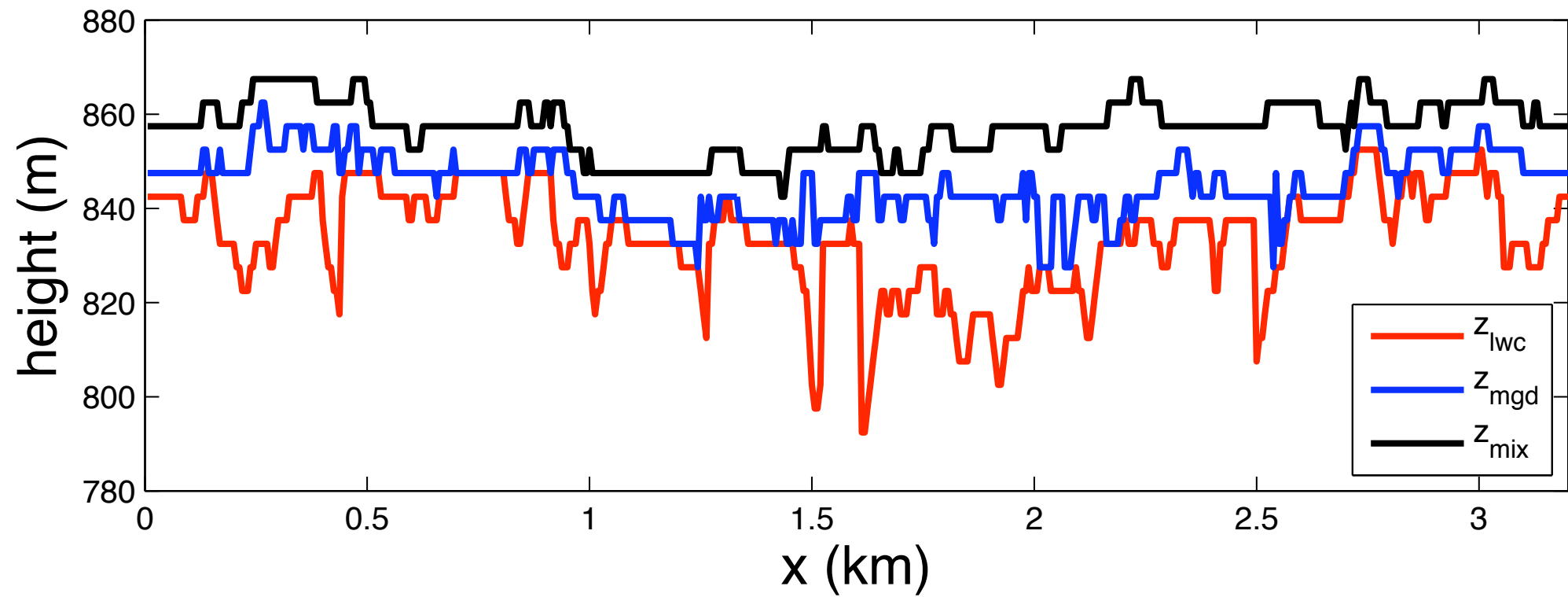
EIL properties vs mixing fraction

Vertical velocity vs mixture fraction

Burnet & Brenguier 2006