

Interactive comment on “Momentum and scalar transport within a vegetation canopy following atmospheric stability and seasonal canopy changes: the CHATS experiment” by S. Dupont and E. G. Patton

S. Dupont and E. G. Patton

sdupont@bordeaux.inra.fr

Received and published: 12 April 2012

Thank you for your comment and your interest in our paper. Your concern about the possible impact of local heterogeneity of the canopy on measurements is effectively always a problem that could arise from single point measurements.

In the CHATS experiment, all possible measures have been taken to limit the influence of any local or site heterogeneities. More specifically, these measures include locating the tower: 1) centered within a tree row with booms holding the instruments into

C1490

the row-middle minimizing any direct influence of nearby branches or trunks (i.e. minimizing any potential contribution from dispersive stresses following Poggi and Katul, 2008, Exp. Fluids), and 2) approximately 150 canopy heights downwind from the orchard's southern edge in order to avoid any edge effects on the measurements. The sub-canopy at CHATS was also not sparse enough to observe the long distance edge effects observed by Dupont et al. (2011, AFM).

In addition, the statistics presented in this manuscript include averages over a large number of 30-min (unstable and neutral conditions) and 5-min (stable conditions) periods that include a range of wind direction variations, wind speed magnitude, and solar radiation or zenith angle. This averaging should attenuate possible local effects related to the tower position. We also note that during the experiment, the primary wind direction was not generally aligned with the orchard rows (see Figure 3 in Dupont and Patton 2012 AFM), such that micrometeorological effects introduced specifically by the orchard's row structure is not expected; especially since the tree crown was nearly closed in the sampling row. Furthermore, wind spectra presented in Dupont and Patton (2012, AFM) for each stability condition did not show high frequency peaks related to specific small-scale structures induced by local heterogeneities of the canopy.

For these reasons, it is our opinion that the results presented in this paper are representative of the general orchard turbulence. It is also important to emphasize that our analysis largely focuses on the statistical trends induced by canopy-state and atmospheric stability as opposed to their absolute magnitude. These points will be brought forth more clearly in the revised version of our paper.

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 6363, 2012.

C1491