

# 1 Introduction

We have observed fog in weak-wind stratified flow moving through bushes with little displacement of the mean flow, although generation of very fine scale turbulence can be detected. Apparently the form drag in this regime is minimal. The interaction of the boundary-layer flow with porous roughness elements is much different in very stable conditions compared to traditional thinking.

## 2 The lattice experiment

Fog was released in the later afternoon of 26 January 2010 before sunset. Conditions were partly sunny with weak winds and widely scattered showers. Some stratification appear to form, at least intermittently. Machine released fog was advected through the lattice. Remarkably, the initial fog show very sharp edges and filaments, suggesting lack of significant fine scale diffusion and lack of a fully developed inertial subrange. This is a surprise because the stratification was not strong. The lattice induces fine scale structure and immediate development of significant fine scale diffusion. The larger eddies upstream from the lattice are presumably filtered out when they flow through the lattice.

The time scale to generate a new inertial subrange downwind from the lattice with fine scale diffusion,  $\tau$ , would be the length scale of the generated vortices,  $L_v$ , divided by their velocity scale,  $u$ . Using the mean wind speed,  $u$ , a distance scale can be defined for generation of the new inertial subrange,  $U L_v/u$ , which might an order of magnitude greater than the lattice openings. However, the photographs suggest instantaneous development of fine scale diffusion. Better photography and inferences of  $u$  are required.

## 3 Natural Vegetation

I have not done a search of the archives yet, but include one example of fog drifting westward into an orchard just west of FUC. Contrast the striated fog over grass (Figure 7) with the nearby diffuse fog flowing through an adjacent vineyard (Figure 8)



Figure 1: Flow from left to right.



Figure 2: Flow from right to left.



Figure 3: Flow from left to right. Notice that upwind turbulence near the surface seems fully developed but not near the top of the fog plume.



Figure 4: Flow from right to left.



Figure 5: Flow from left to right



Figure 6: Residual fog collects as a nearly stagnant skin flow.



Figure 7: Layered fog over grass showing minimal mixing.





Figure 8: Fog is diffused by fine scale turbulence generated by flow through a vineyard.