*Abstract to* ***Turbulence and Scalar Transport in Roughness Sub-layers***

## SPATIAL HOMOGENEITY IN THE FOREST ROUGHNESS SUBLAYER?

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For forested surfaces, the roughness sublayer is defined as a layer with enhanced eddy diffusivity compared to inertial sublayer scaling (e.g. Cellier and Brunet, 1992). In urban areas, the roughness sublayer has a slightly different definition: again it is the layer where the inertial sublayer theory does not hold, but instead of the enhanced eddy diffusivity, it is defined as the region where the friction velocity starts decreasing from its inertial sublayer value (Rotach, 1999). The urban roughness sublayer is spatially heterogeneous and characterised by influence of the individual roughness elements, whereas the forest roughness sublayer is often assumed to be more homogeneous.

For the summer and autumn of 2006, a roughness sublayer experiment is planned above a stand of 25m high European beech. We will use a LIDAR to determine horizontal inhomogeneity and how it disappears with increasing height. The LIDAR, which is developed by QinetiQ, will point horizontally and measure velocities along a line over the canopy.

Simultaneously, a detailed wind profile will be taken with sonic anemometers at a 57m tall mast in the forest. The wind profile has previously been analysed over this forest (Dellwik and Jensen, 2005). By using sonic anemometers rather than – as previously – cup anemometers we hope to improve the quality of the data and also take good measurements closer to the canopy.

For the workshop, we would like to discuss the differences in the urban and forest roughness sub-layer definitions. We would further like to present the setup for the forest experiment and possibly get feed-back on improvement and analysis.

References:

Cellier P. and Brunet Y., 1992: Flux-gradient relationships above tall plant canopies, Agr. For. Meteorol., 58, 93-117.
Dellwik E. and Jensen N.O., 2005: Flux-profile relationships of a fetch-limited beech forest, Boundary Layer Met., 115, 179-204.
Rotach M., 1999: On the influence of the urban roughness sublayer on turbulence and dispersion, Atmospheric Environment, 33, 4001-4008.