



A one-dimensional fluctuating plume model for non-Gaussian inhomogeneous turbulence within a plant canopy.

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A fluctuating plume model for the vertical dispersion within the non-Gaussian, inhomogeneous turbulence of a canopy is presented. The model describes the motion of a passive tracer in terms of motions of its barycentre and of the diffusion of the cloud around it. The time evolution of the plume centroid is given by non-stationary stochastic Lagrangian equations with a time dependent filter for the turbulent kinetic energy. The filter removes the contribution of eddies smaller than the instantaneous size of the plume, hence it considers only the portion of the energy spectrum responsible for the meandering of the centroid. The model satisfies the well-mixed condition and is able to evaluate all the moments of the PDF of the passive tracer. Mean concentration and concentration fluctuations are calculated and the results are compared with the laboratory experimental data of Raupach et al (1986).