



## **Turbulent structure of scalars in the eddy surface layer over land and sea**

Ann-Sofi Smedman and Erik Sahlee

Uppsala University, Department of Earth Sciences, Uppsala, Sweden (ann-sofi.smedman@met.uu.se)

Turbulent structure of scalars in the 'eddy surface layer' over land and sea.

In a study of the kinematic structure of the near neutral atmospheric surface layer, Högström, Hunt and Smedman, 2002, it was demonstrated that a model with detached eddies from above the surface layer impinging on to the surface (Hunt and Morrison, 2000) could explain some of the observed features in the neutral atmospheric boundary layer. Thus the detached eddy model proved successful in explaining the dynamic structure of the near neutral atmospheric surface layer (eddy surface layer), especially the shape of the spectra of the wind components and corresponding fluxes.

However, the structure of temperature and humidity fluctuations in the eddy surface layer shows quite different behaviour. In particular the efficiency of turbulent exchange of sensible and latent heat is observed to be more strongly enhanced than is consistent with standard similarity theory. Also the profiles of dissipation of turbulent kinetic energy and temperature fluctuation variance are found to depend on the height of the eddy surface layer and not the height above the surface. All these features are found to be similar in measurements at a marine site, a flat land site and during hurricane conditions (hurricane Fabian and Isabel).

Hunt, J.C.R and Morrison, J.F., 2000: Eddy structure in turbulent boundary layers, Euro. J. Mech. B-Fluids, 19, 673-694..

Högström, U., Hunt, J.C.R., and Smedman, A., 2002: Theory and measurements for turbulence spectra and variances in the atmospheric neutral surface layer, Bound.-Layer Meteorol., 103,101-124.