



Large Eddy Simulation investigation of evaporation from open water bodies

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In regional hydrological systems, open water bodies such as lakes or wetlands are important components of the landscape. Atmospheric flows above such systems can rarely be approximated as stationary and homogeneous. Thus, the quantification of their evaporation is a challenge. In this work we use Large Eddy Simulations to explore the turbulence statistics of temperature and water vapor that are relevant to evaporation. Specifically, we investigate the effect of dry air entrainment above a water body on the transport characteristics of temperature and water vapor. The vertical transport efficiencies of the two scalars are compared for a simulation of an infinite lake, the transition between a wet and a dry surface with varying temperatures. The spectral similarity of the scalars is analyzed in the different examples. The analysis focuses on how the relative transport efficiencies R_{wT}/R_{wq} are perturbed from unity with increased advection or the atmospheric stability. Results are compared with an experimental study performed over three water bodies of different sizes and climates by (Assouline, Tyler et al. 2008).

Assouline, S., S. W. Tyler, et al. (2008). "Evaporation from three water bodies of different sizes and climates: Measurements and scaling analysis." *Advances in Water Resources* 31(1): 160-172.