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The impact of Humidity Fluctuations on Sensible Heat Fluxes Measured with Scintillometers

C. Higgins, M. Froidveaux, and M.B. Parlange

EEPFL, School Of Archetecture, Civil and Environmental Engineering, Lausanne, Switzerland (chad.higgins@epfl.ch)

In scintillometery the temperature structure function is estimated with the structure function of the index of refraction, but atmospheric scintillations depend on both temperature and humidity fluctuations. To isolate the dependence of the index of refraction on temperature, a set of assumptions are made to eliminate the effects of water vapor; however, there is no verification of the validity of these assumptions or the resulting prognostic equation from spatially derived field data. In the summer of 2008 a field campaign was conducted to measure the index of refraction structure function, temperature structure function, and humidity structure function independently, with scintillometers and a temperature/humidity LIDAR. These data are used to ascertain the validity of the assumptions used to determine sensible heat fluxes with scintillometers, and the impact of water vapor on the flux estimates.