Geophysical Research Abstracts,
Vol. 11, EGU2009-9131, 2009
EGU General Assembly 2009
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The impact of Humidity Fluctuations on Sensible Heat Fluxes Measured with Scintillometers

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In scintillometery the temperature structure function is estimated with the structure function of the index of refraction. Atmospheric scintillations depend on both temperature and humidity fluctuations. When the sensible heat flux is estimated from the measured fluctuations in the index of refraction, the effect of the humidity is modeled, however, there is no verification of the humidity model from spatial field measurements. 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.