



Measurement of Ocean Surface Turbulence Generated by Rain Using the Controlled Flux Technique

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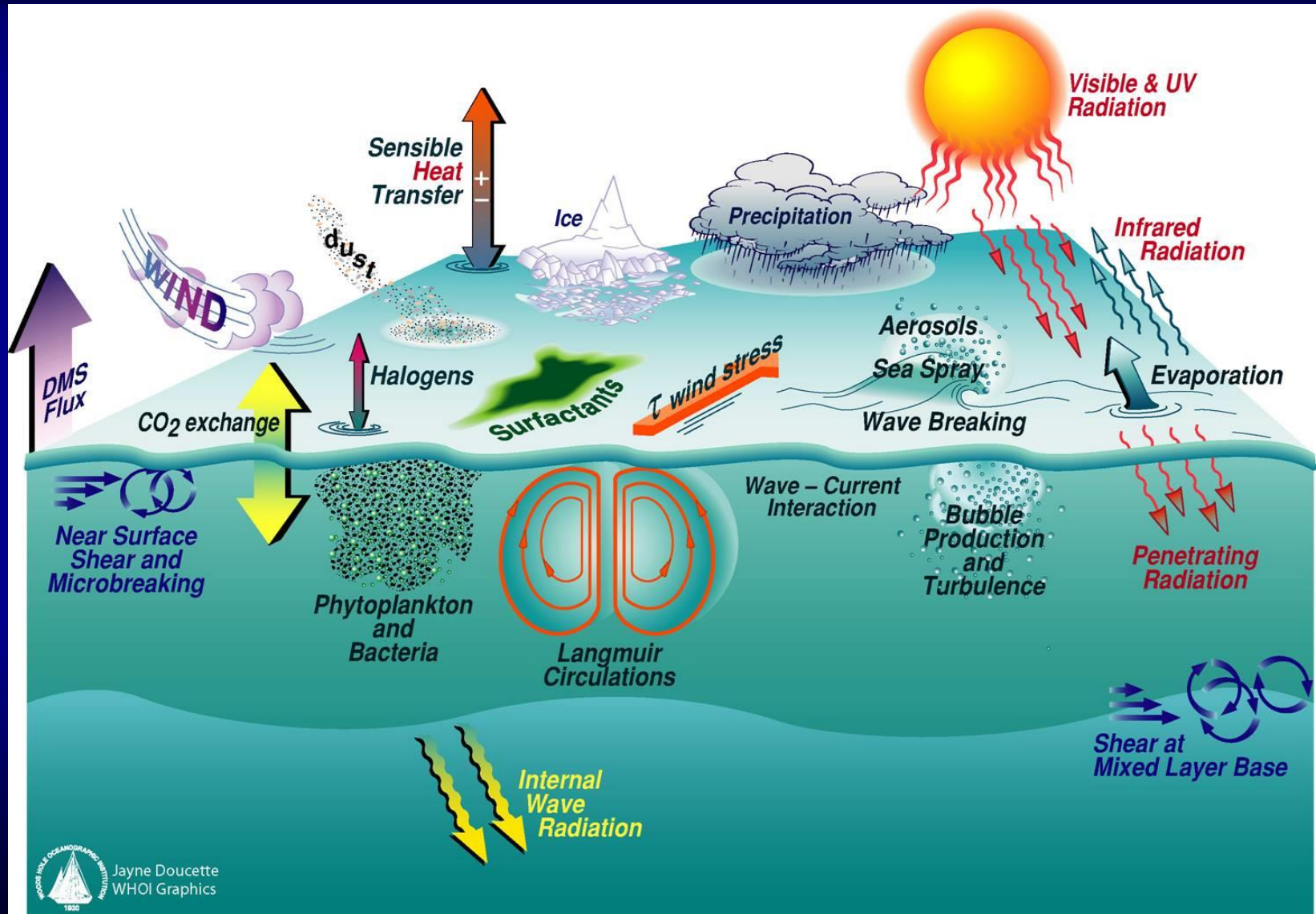
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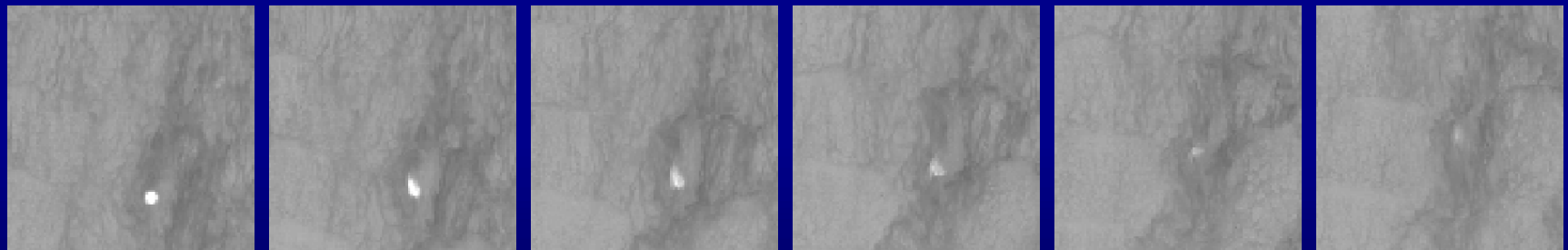
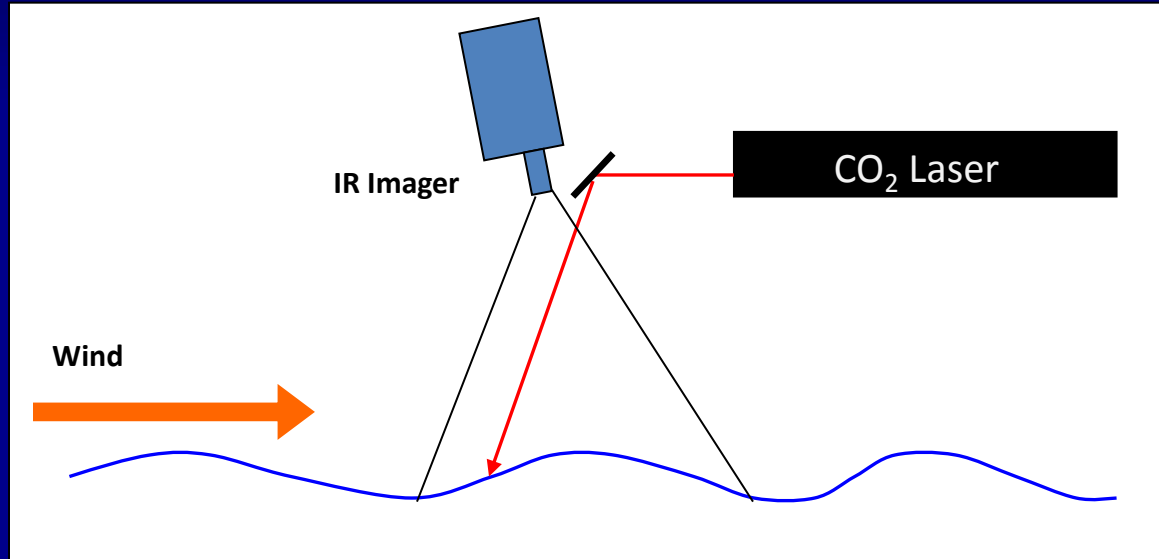


Surface Turbulence, Rain, and Fresh Lenses





The Active Controlled Flux Technique



t = 0 s

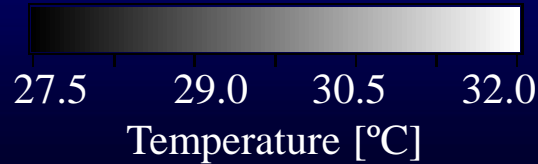
t = 0.1 s

t = 0.2 s

t = 0.3 s

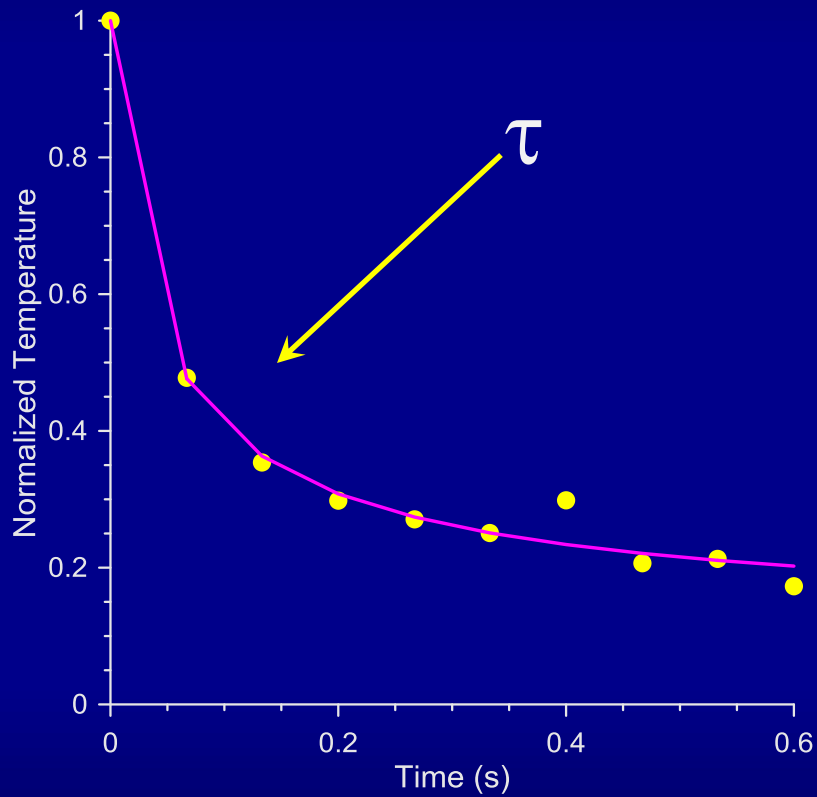
t = 0.4 s

t = 0.5 s





Typical CFT Temperature Decay Curve (and model fit)



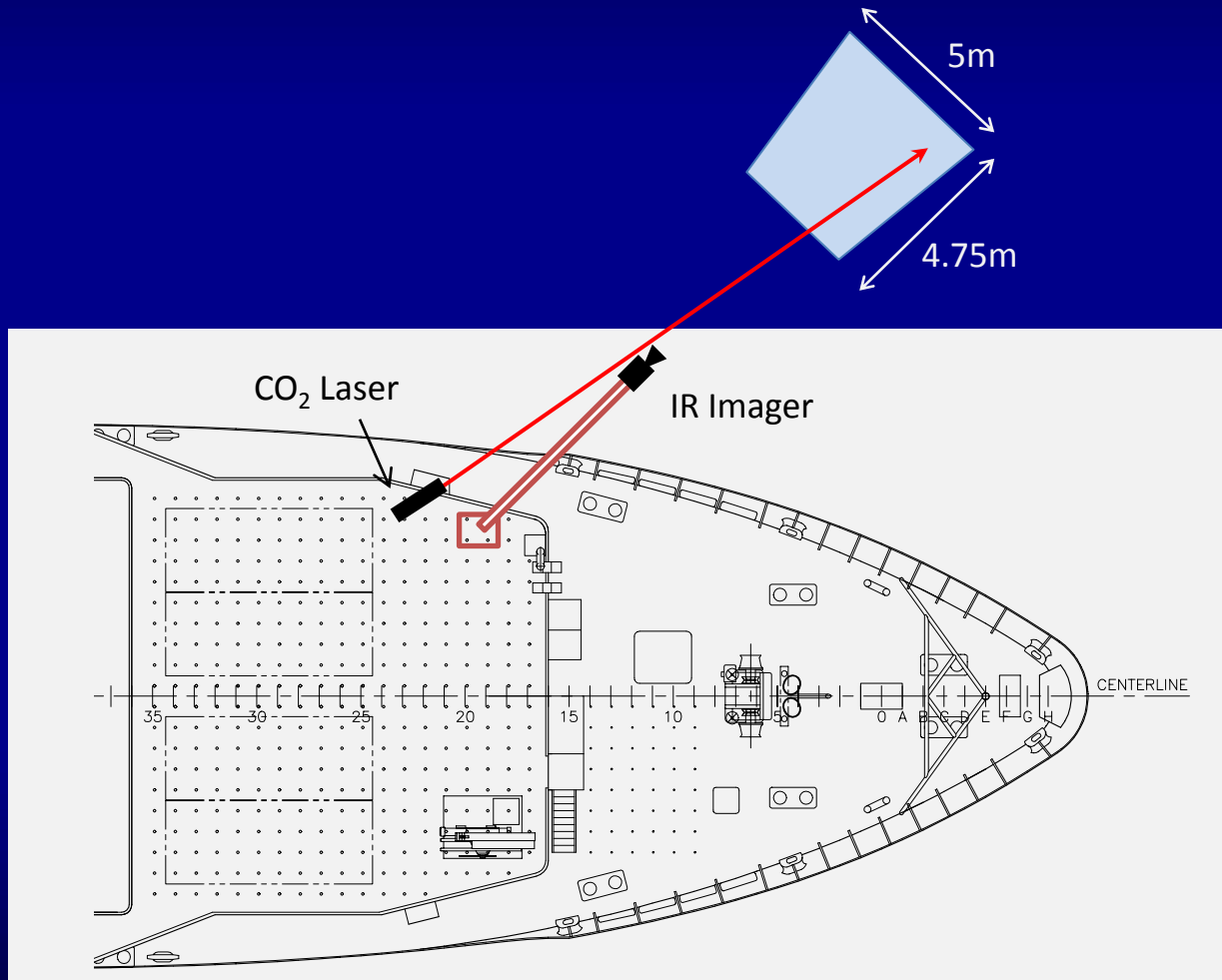
$$F = k_H \Delta T$$

$$k_H = a \sqrt{\frac{D}{\tau}}$$

$$\tau = \sqrt{\frac{\nu}{\varepsilon}}$$

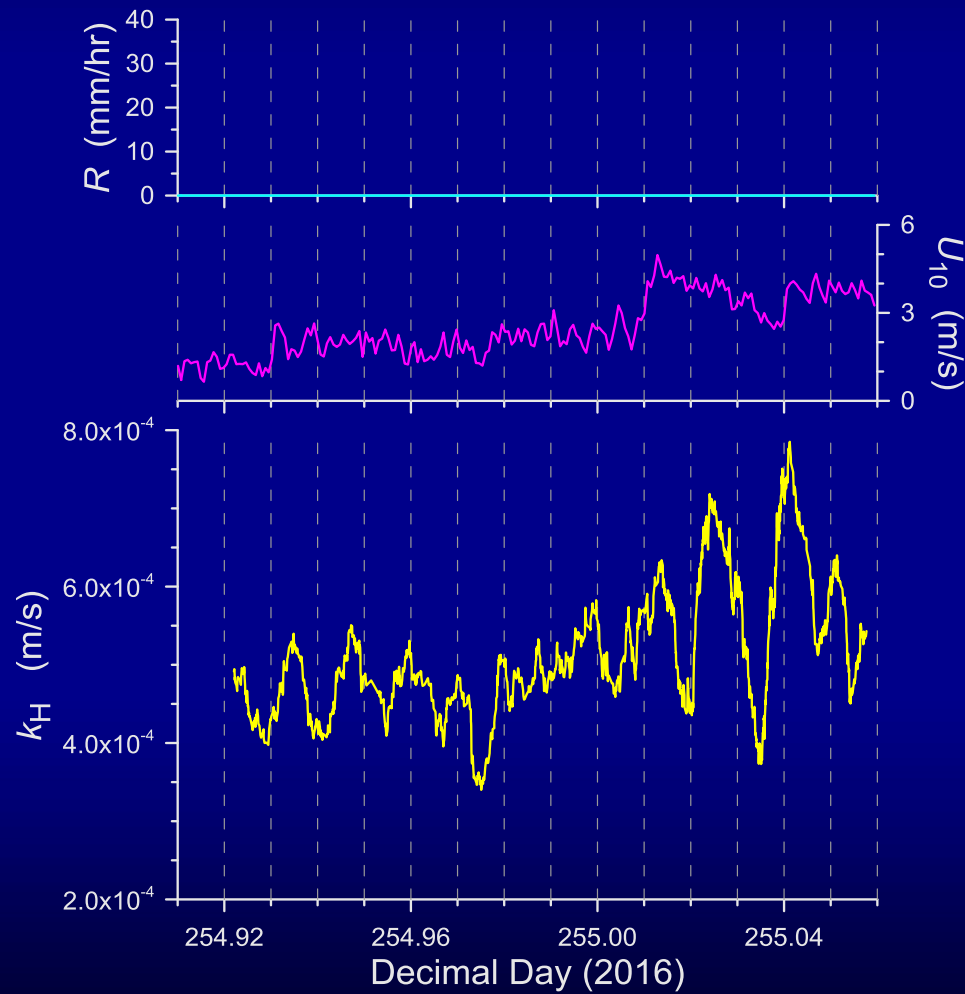


CFT as Implemented During 2016 SPURS-2





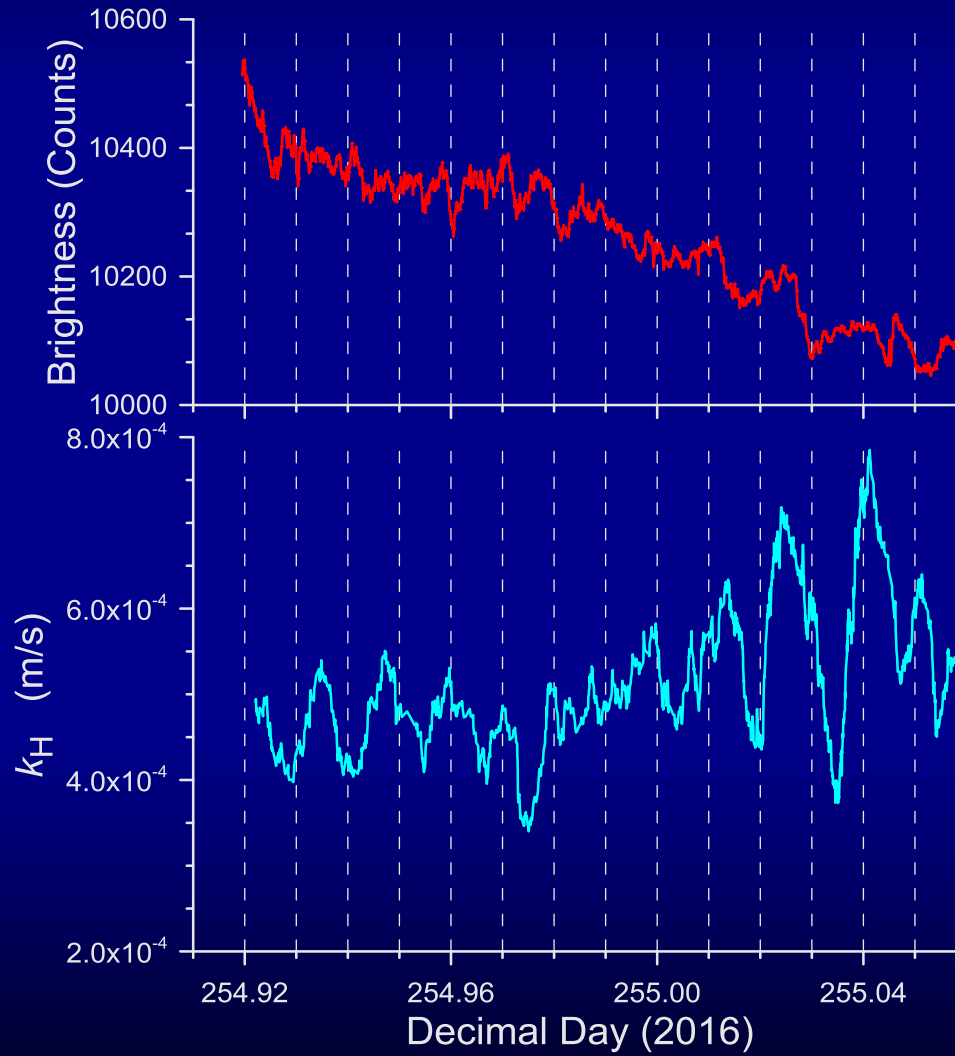
CFT Without Rain



Environmental data provided by Clayson & Edson, SPURS2 1-minute averaged dataset

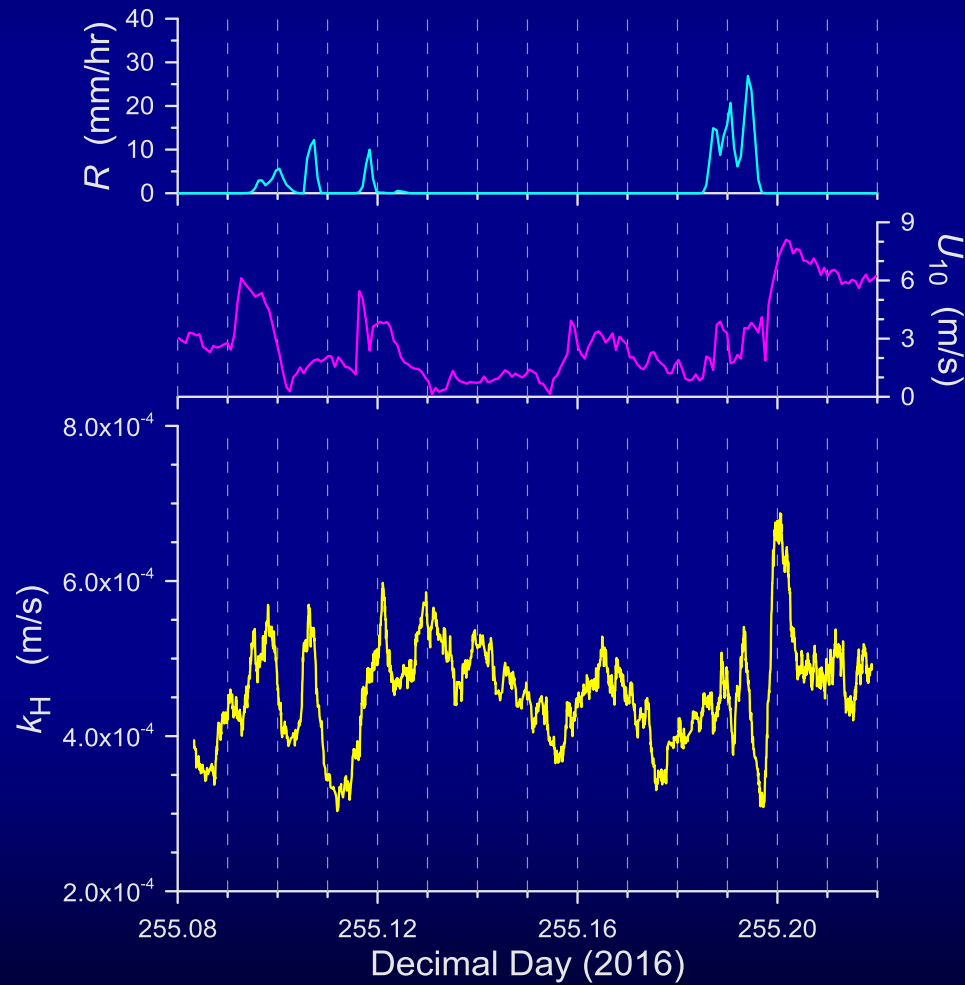


CFT Without Rain





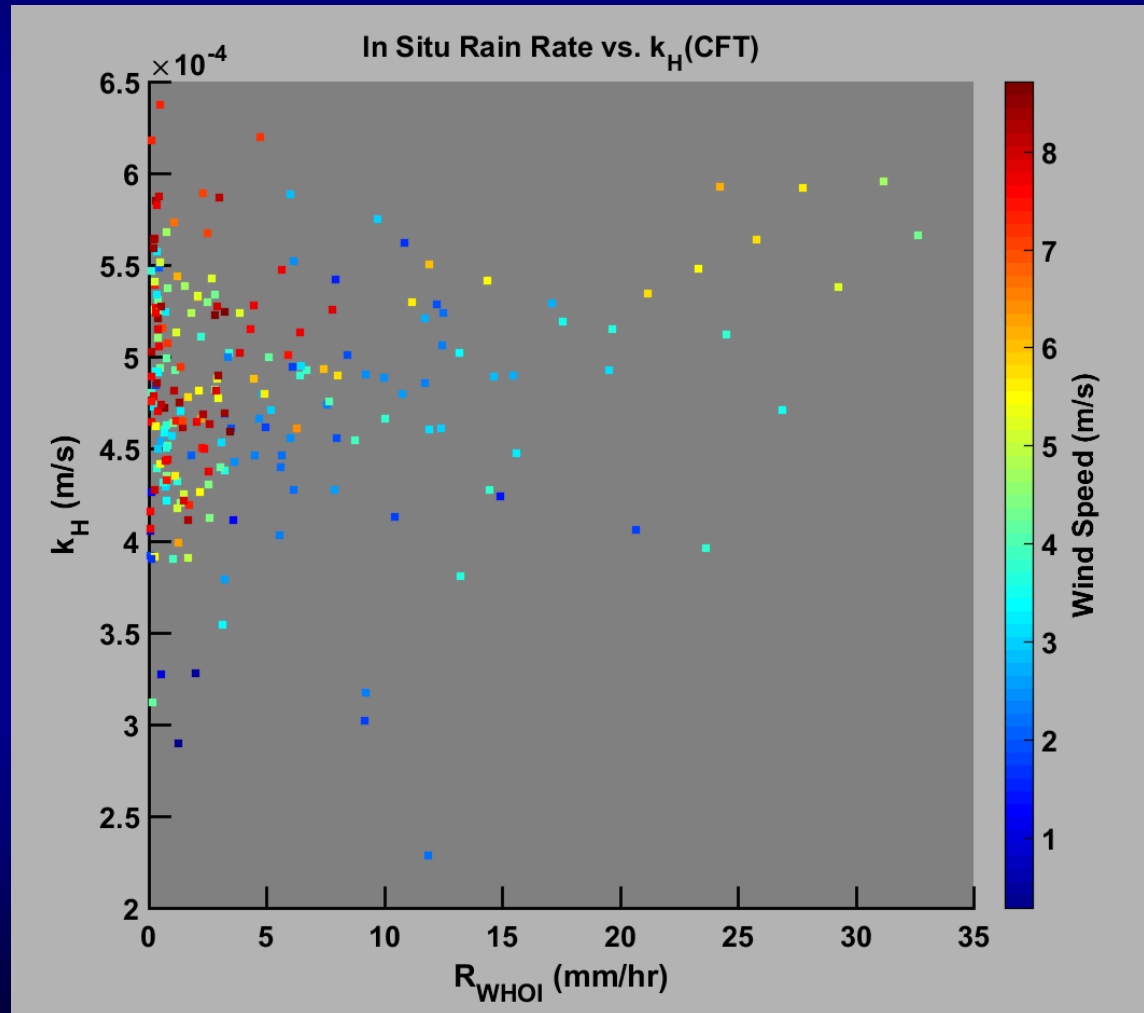
CFT With Rain: Case 1



Environmental data provided by Clayson & Edson, SPURS2 1-minute averaged dataset



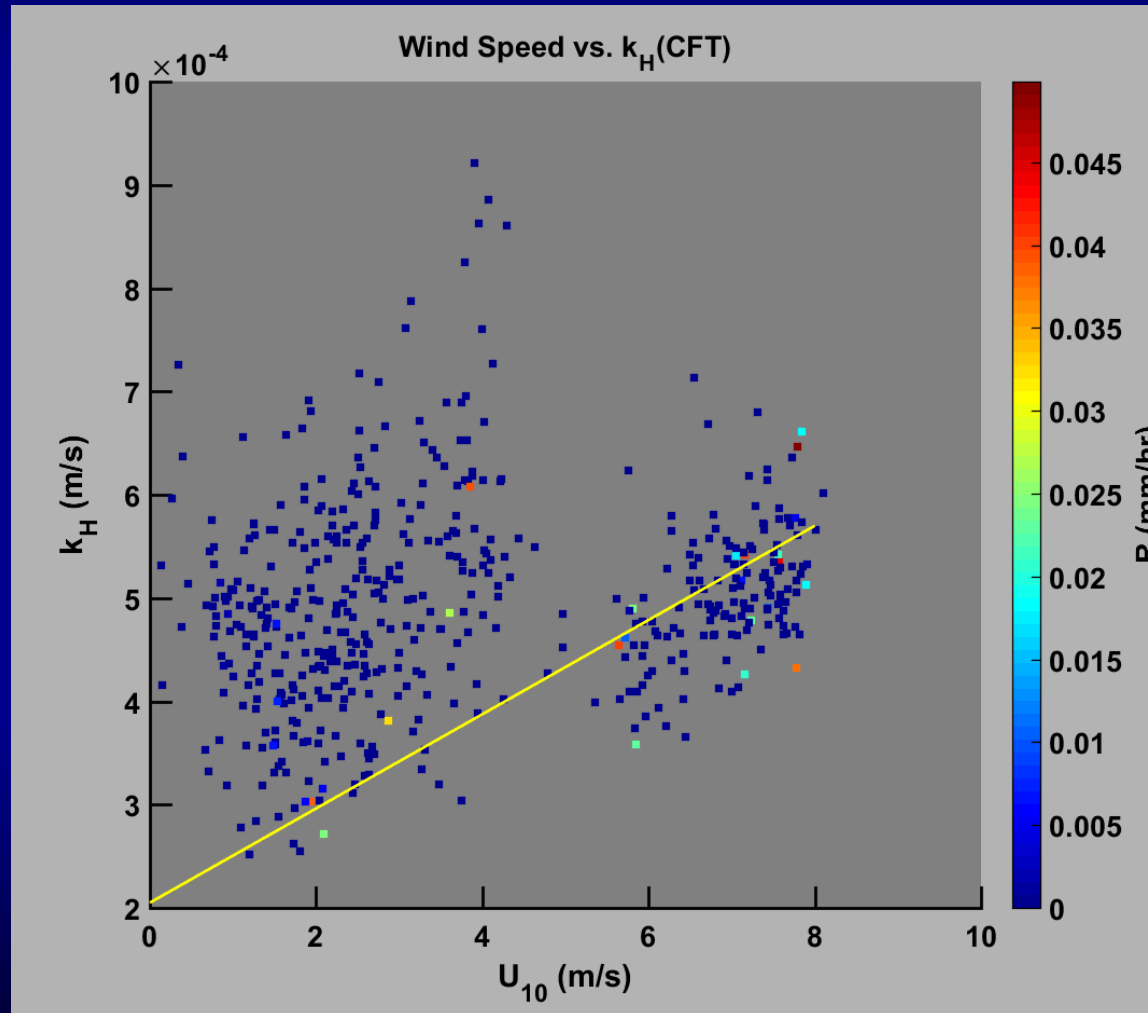
Correlation of k_H with R



Environmental data provided by Clayson & Edson, SPURS2 1-minute averaged dataset



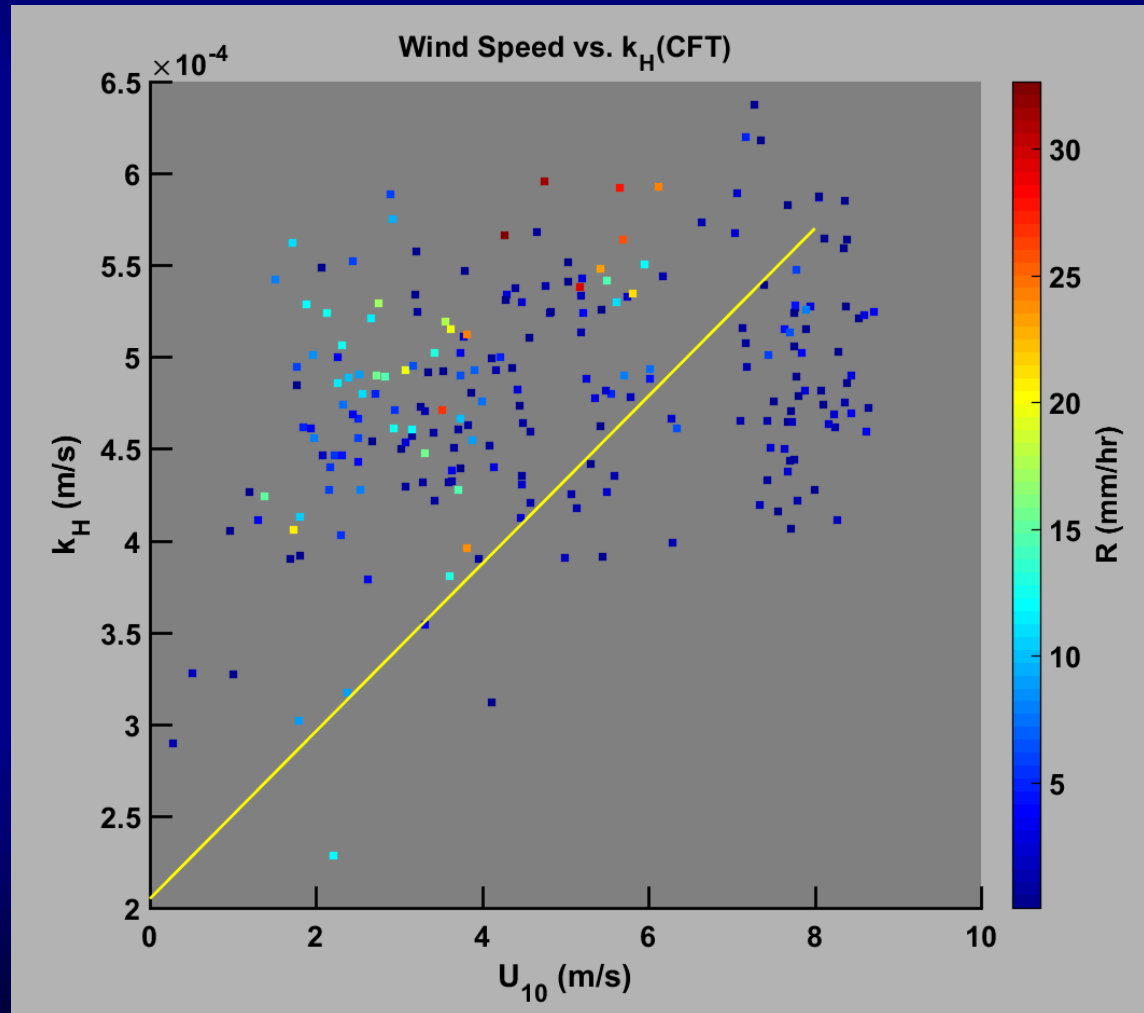
Correlation of k_H with U_{10} : No Rain



Environmental data provided by Clayson & Edson, SPURS2 1-minute averaged dataset



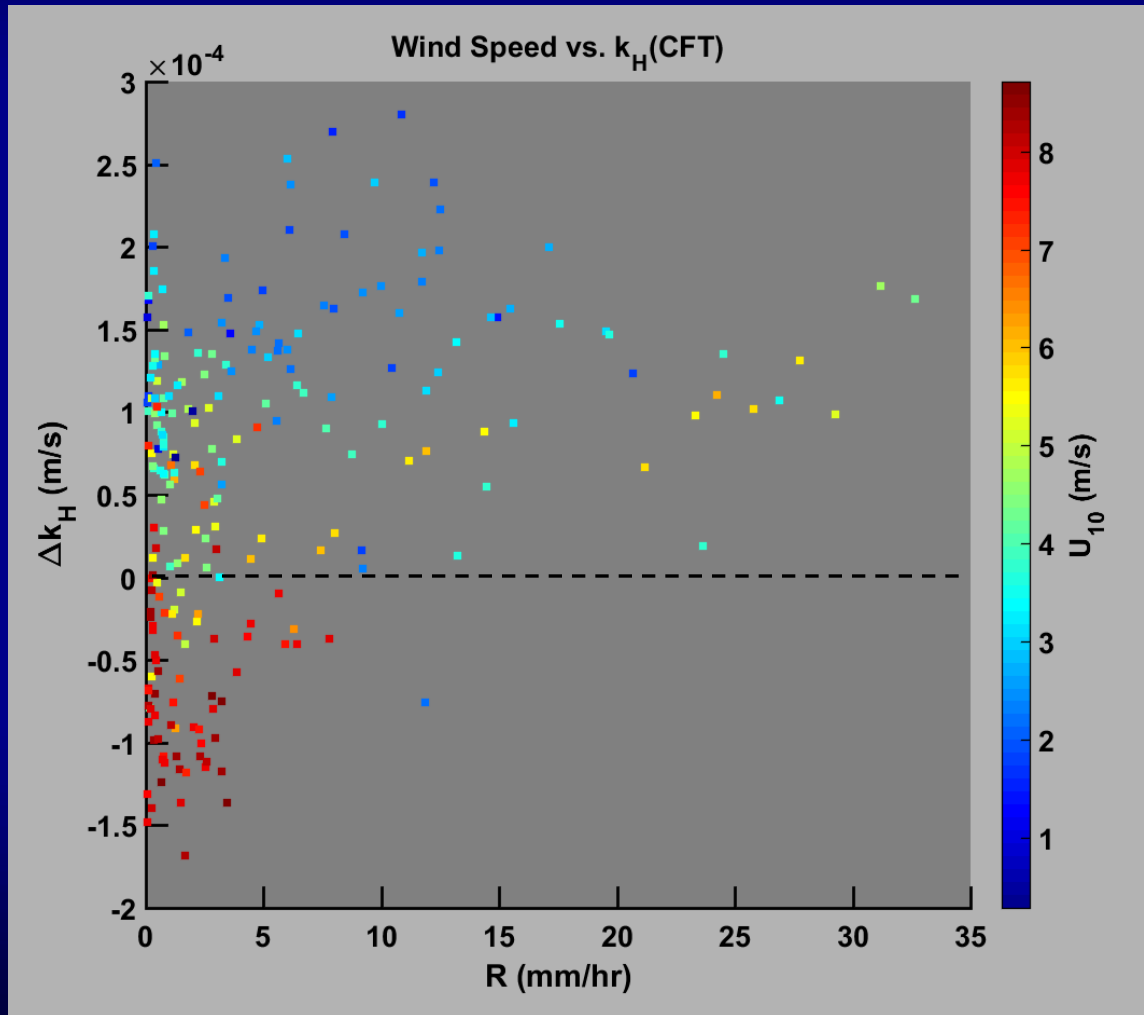
Correlation of k_H with U_{10} : Rain



Environmental data provided by Clayson & Edson, SPURS2 1-minute averaged dataset



k_H Anomaly as a Function of R



$$\Delta k_H = k_H(\text{Rain}) - k_H(\text{Wind})$$

$k_H(\text{Rain})$: CFT, SPURS 2

$k_H(\text{Wind})$: CFT, GASEX-01



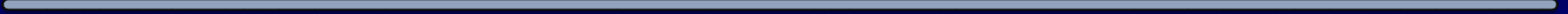
Summary

Result from SPURS2 are consistent with previous field CFT measurements

CFT detects changes in surface turbulence due to rain

Not clear yet how the CFT data can be turned into quantitative estimates of dissipation

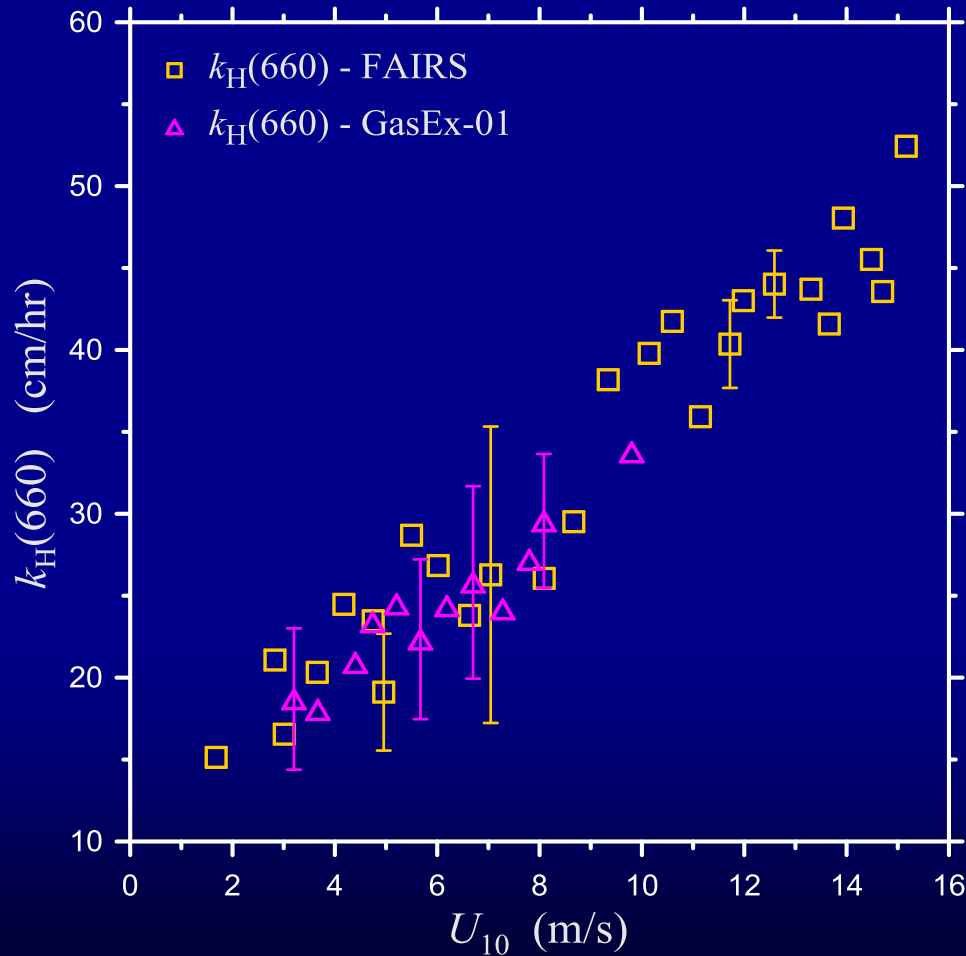
Need to complete data analysis to confirm observed effects of rain on surface turbulence





Previous CFT Field Measurements of k_H

$$F = k_H \Delta T$$



Asher et al. JGR, 2004