**Metadata Report**

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| **Project:** | Lake Erie Center Sensor Network |
| **Funding Source:** | NSF Field Station and Marine Laboratories |
| **Investigators:** | Jiquan Chen  Michael W. Deal  Carol Stepien |
| **Data Access:** | Public |
| **Data Set Location:** | University of Toledo Landscape Ecology and Ecosystem Science Laboratory Server Toledo, Ohio 43606 419-530-2246 |
| **Data URL:** | <http://research.eeescience.utoledo.edu/lees/LESensorN/index.html> |
| **Site:** | PermS2 (City of Toledo Water Intake Crib) |
| **Location:** | 41.7167 -83.2667  Crib_location.jpg |
| **Other Information:** | Technician notes available on web (READ\_ME\_PERMS2\_NOTES) |

30 Minute Mean Raw Data

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| **Parameter** | **Abbreviation** | **Unit** |
| Sensible heat flux using sonic temperature | Hs | W/m^2 |
| Momentum flux | tau | kg/(m s^2) |
| Friction velocity | u\_star | m/s |
| Standard deviation of sonic temperature | Ts\_stdev | C |
| Covariance of sonic temperature and wind velocity x | Ts\_Ux\_cov | C m/s |
| Covariance of sonic temperature and wind velocity y | Ts\_Uy\_cov | C m/s |
| Covariance of sonic temperature and wind velocity z | Ts\_Uz\_cov | C m/s |
| Standard deviation of wind velocity x | Ux\_stdev | m/s |
| Covariance of wind velocity x and wind velocity y | Ux\_Uy\_cov | (m/s)^2 |
| Covariance of wind velocity x and wind velocity z | Ux\_Uz\_cov | (m/s)^2 |
| Standard deviation of wind velocity y | Uy\_stdev | m/s |
| Covariance of wind velocity y and wind velocity z | Uy\_Uz\_cov | (m/s)^2 |
| Standard deviation of wind velocity z | Uz\_stdev | m/s |
| Wind speed | wnd\_spd | m/s |
|  | rslt\_wnd\_spd | m/s |
| Sonic wind direction | wnd\_dir\_sonic | degrees |
| Standard deviation sonic wind direction | std\_wnd\_dir | degrees |
| Compass (set) wind direction | wnd\_dir\_compass | degrees |
| Average wind velocity x | Ux\_Avg | m/s |
| Average wind velocity y | Uy\_Avg | m/s |
| Average wind velocity z | Uz\_Avg | m/s |
| Average sonic temperature | Ts\_Avg | C |
| Orientation of sonic | sonic\_azimuth | degrees |
| Number of sonic samples | sonic\_samples\_Tot | samples |
|  | no\_new\_sonic\_data\_Tot | samples |
| Number of signal errors | sig\_error\_Tot | samples |
|  | amp\_l\_f\_Tot | samples |
|  | amp\_h\_f\_Tot | samples |
|  | sig\_lck\_f\_Tot | samples |
|  | del\_T\_f\_Tot | samples |
| CO2 flux (LI-7500) with Webb et al. term | Fc\_li\_wpl | mg/(m^2 s) |
| Latent heat flux (LI-7500) with Webb et al. term | LE\_li\_wpl | W/m^2 |
| Sensible heat flux using sonic temperature corrected for water vapor measured by the LI-7500 | Hc\_li | W/m^2 |
| Standard deviation of CO2 concentration (LI-7500) | CO2\_li\_stdev | mg/m^3 |
| Covariance of CO2 concentration and wind velocity x | CO2\_li\_Ux\_cov | mg/(m^2 s) |
| Covariance of CO2 concentration and wind velocity y | CO2\_li\_Uy\_cov | mg/(m^2 s) |
| Covariance of CO2 concentration and wind velocity x | CO2\_li\_Uz\_cov | mg/(m^2 s) |
| Standard deviation of H2O concentration (LI-7500) | H2O\_li\_stdev | g/m^3 |
| Covariance of H2Oconcentration and wind velocity x | H2O\_li\_Ux\_cov | g/(m^2 s) |
| Covariance of H2O concentration and wind velocity y | H2O\_li\_Uy\_cov | g/(m^2 s) |
| Covariance of H2Oconcentration and wind velocity x | H2O\_li\_Uz\_cov | g/(m^2 s) |
| Standard deviation of LI-7500 temperature | Tc\_li\_stdev | C |
| Covariance of sonic temperature corrected for humidity and wind velocity x | Tc\_li\_Ux\_cov | C m/s |
| Covariance of sonic temperature corrected for humidity and wind velocity y | Tc\_li\_Uy\_cov | C m/s |
| Covariance of sonic temperature corrected for humidity and wind velocity x | Tc\_li\_Uz\_cov | C m/s |
| Mean CO2 concentration LI-7500 | CO2\_li\_mean | mg/m^3 |
| Mean H2Oconcentration LI-7500 | H2O\_li\_mean | g/m^3 |
| Mean ambient pressure LI-7500 | amb\_press\_li\_mean | kPa |
| Mean sonic temperature corrected for humidity | Tc\_li\_mean | C |
|  | rho\_a\_li\_mean | kg/m^3 |
| CO2 flux (LI-7500) without Webb et al. term | Fc\_li\_irga | mg/(m^2 s) |
| Latent heat flux (LI-7500) without Webb et al. term | LE\_li\_irga | W/m^2 |
| CO2 flux (LI-7500), Webb et al. term due to latent heat flux | CO2\_wpl\_LE\_li | mg/(m^2 s) |
| CO2 flux (LI-7500), Webb et al. term due to sensible heat flux | CO2\_wpl\_H\_li | mg/(m^2 s) |
| Latent heat flux (LI-7500), Webb et al. term due to latent heat flux | H2O\_wpl\_LE\_li | W/m^2 |
| Latent heat flux (LI-7500), Webb et al. term due to sensible heat flux | H2O\_wpl\_H\_li | W/m^2 |
|  | no\_new\_data\_li\_Tot | samples |
| Number of signal errors | sig\_error\_li\_Tot | samples |
| Average signal quality (AGC) | agc\_li\_Avg |  |
| Number of times exceeding AGC threshold | agc\_thrshld\_excded\_Tot | samples |
| Mean temperature from HMP-45C | T\_hmp\_mean | C |
| Mean vapor pressure from HMP-45C | e\_hmp\_mean | kPa |
| Mean saturation vapor pressure from HMP-45C | e\_sat\_hmp\_mean | kPa |
| Mean vapor density from HMP-45C | H2O\_hmp\_mean | g/m^3 |
| Mean relative humidity from HMP-45C | RH\_hmp\_mean | % |
| Mean relative air density from HMP-45C | rho\_a\_mean\_hmp | kg/m^3 |
| Average net radiation from CNR4 | Rn\_Avg | W/m^2 |
| Average albedo from CNR4 | albedo\_Avg | arb |
| Average shortwave downwelling radiation from CNR4 | Rs\_downwell\_Avg | W/m^2 |
| Average shortwave upwelling radiation from CNR4 | Rs\_upwell\_Avg | W/m^2 |
| Average longwave downwelling radiation from CNR4 | Rl\_downwell\_Avg | W/m^2 |
| Average longwave upwelling radiation from CNR4 | Rl\_upwell\_Avg | W/m^2 |
|  | T\_nr\_Avg | K |
| Average longwave downwelling radiation from CNR4 | Rl\_downwell\_meas\_Avg | W/m^2 |
| Average longwave upwelling radiation from CNR4 | Rl\_upwell\_meas\_Avg | W/m^2 |
| Average photosynthetically active radiation | par\_Avg | umol/s/m^2 |
| Average infrared radiation target surface temperature 1 | irr\_target\_tmpr\_Avg(1) | C |
| Average infrared radiation target surface temperature 2 | irr\_target\_tmpr\_Avg(2) | C |
| Average infrared radiation body temperature #1 | irr\_body\_tmpr\_Avg(1) | C |
| Average infrared radiation body temperature #2 | irr\_body\_tmpr\_Avg(2) | C |
| Average water temperature #1 | tmpr\_107\_Avg(1) | C |
| Average water temperature #2 | tmpr\_107\_Avg(2) | C |
| Average water temperature #3 | tmpr\_107\_Avg(3) | C |
| Average horizontal wind speed | hor\_wnd\_spd\_AVG |  |
|  | hor\_wnd\_spd\_rlt\_AVG |  |
| Average horizontal wind direction | hor\_wnd\_dir\_rlt\_AVG | Deg |
| Standard deviation of horizontal wind direction | std\_hor\_wnd\_dir\_STD | Deg |
| Total precipitation | precip\_Tot | mm |
| Average turbidity | turbidity\_Avg | mV |
| Average panel temperature | panel\_tmpr\_Avg | C |
| Average battery voltage | batt\_volt\_Avg | V |
| Total slow-sequence records | slowsequence\_Tot | samples |