ReadMe File for Datasets and Descriptive Plots
"Long-Range Dependence and Extreme Values of Precipitation, Phosphorus Load and Cyanobacteria"

DCRA_precip_1940-2021.Rdata contains daily precipitation at Dane County Regional Airport for 1940-2021 (Anderson, Robertson, & Service, 2022). Data were downloaded as .csv file and converted to .Rdata.

Discharge_PB+YW_1990-2021.Rdata contains daily discharge data for Pheasant Branch (PB), the Yahara Watershed (YW), and their sum for 1990-2021. The file was constructed by the R script **Merge_Discharge_PB+YW_ca1990-2021.R** from the downloaded file **Disch_PB+YP_1976-2021_gaps.Rdata**. Downloading from the USGS website was conducted by the R script **RetrieveUSGSdata.R**.

Annloads_PB+YP_1995-2021.Rdata contains daily total phosphorus load data for Pheasant Branch (PB) and the Yahara Watershed (YW; the YP in the file name is a typo) downloaded from the USGS website was accomplished by the R script **RetrieveUSGSdata.R**.

Me_1min_2021.Rdata is the observations of water temperature, pigment concentrations, and meteorologic variates made every minute from the buoy in Lake Mendota generated by **Read_Mendota_2021_1min.R** from the file **DavidBuoy2021.csv** posted by Magnuson et al. (2022).

NOTE: *Similar R files were constructed from the same source for each year from 2008-2021. Due to storage limitations of GitHub these files are not copied here.*

BGA+Chl_dark_centered_Z_2008-2021.Rdata was built from annual files '**Me_1min_yyyy.Rdata**' where yyyy stands for a four-digit year using the R script **Make_Dark_Pigments_CenterLogs+Z_AllYears_2022-02-04.R** . Data from each year are trimmed to days 152-258, 1 June – 15 September the primary bloom season. Means are saved for the full 24 hour cycle and for the 'dark hours' of 2200-0400 each day to minimize quenching. 24 hour and dark-hour means are saved for both phycocyanin and chlorophyll in data frames BGAdark and Chldark, respectively. Columns in each data frame are year, day of year, daily mean dark-hour pigment, daily mean dark-hour log pigment, centered dark-hour log pigment (mean for the year subtracted), and Z-scored dark-hour log pigment (subtract the annual mean and divide by the annual standard deviation).

PPT_Disch_Pload_BGAdark_2008-2021.Rdata was built from daily .Rdata files for precipitation, discharge, phosphorus load, and phycocyanin defined above using the R script **Merge_Precip_Dischg_Pload_BGA_for_Plots_2022-04-24.R** The same script was modified to make the version without discharge used for cross correlations **PPT_Pload_BGAdark_2008-2021.Rdata**

Time series Figures S1, S2, S3, and S4 are plotted by
TimeSeries4Panels_PPT+Disch+Pload+BGA_2022-04-24.R

Cross-correlations panels in Fig. 1 computed and plotted by
CCFs_byYear+Sums_2022-02-24.R The leading or driver variate x is selected on lines 42-45. The following, response, or dependent variate y is selected on lines 46-48.

The panel of correlation exponents (gamma) in Fig. 1 plots the values from Table 1.

References

Anderson, L., Robertson, D. M., & Service, N. W. (2022). *Madison Wisconsin Daily Meteorological Data 1869 - current*. Retrieved from: https://doi.org/10.6073/pasta/f716e89717c2fb017451678aab688a0e

Magnuson, J. J., Carpenter, S. R., & Stanley, E. H. (2022). *North Temperate Lakes LTER: High Frequency Data: Meteorological, Dissolved Oxygen, Chlorophyll, Phycocyanin - Lake Mendota Buoy 2006 - current*. Retrieved from: https://doi.org/10.6073/pasta/fc8bd96677405945024ad708003be1fc