LOONE Data Description

* Stage data

Water Level data download R Script: download stage data at different gauges in Lake Okeechobee and merge them in one csv file. In addition, water levels at the different WCAs locations are downloaded.

Then using the LOONE\_DATA\_PREP Python Script, it uses the Stg\_Sto\_Ar Python script to calculate the surface area and storage associated with the water depth.

LOONE\_DATA\_PREP Script put the WCA water level data in format for LOONE.

* Flows

Using Inflow Flow data download R Script: We download flow data at all inlet locations (S191\_S, S65E\_S, S65EX1\_S, S84\_S, S154\_C, S71\_S, S72\_S, FISHP, S308.DS, L8.441, S133\_P, S127\_C, S127\_P, S129\_C, S135\_C, S2\_P, S3\_P, S4\_P, S351\_S, S352\_S, S354\_S, S129 PMP\_P, S135 PMP\_P).

Using Outflows Flow data download R Script: we download flow data at all distributaries of Lake Okeechobee (S308.DS, S77\_S, L8.441, S127\_C, S129\_C, S135\_C, S351\_S, S352\_S, S354\_S, INDUST, S79, S80, S2\_NNR, S3, S48\_S, S49\_S).

Using the LOONE\_DATA\_PREP Python Script, we calculate Inflows, Outflows, and Netflows.

LO\_Inflows\_BK\_LORS20082023, INDUST\_Outflow\_20082023, Netflows\_acft\_LORS20082023, Outflows\_consd\_20082023, C43RO\_LORS20082023, C43RO\_Monthly\_LORS20082023, C44RO\_LORS20082023, C44RO\_Monthly\_LORS20082023, SLTRIB\_Monthly\_LORS20082023, TotalQWCA\_Obs\_LORS20082023, EAA\_MIA\_RUNOFF\_Inputs\_LORS20082023 Are outputs of LOONE\_DATA\_PREP Script using flow data downloads from DBHYDRO.

* Weather Data

Lake Weather data download R Script is used to download all meteorological data (RF, ET, Wind, RADT, RADP, Water Temp, Air Temp) at different stations in the lake.

Rainfall data were downloaded and merged into one file and average daily rainfall over the lake was determined using the R Script.

ET data were downloaded and merged into one file and average daily rainfall over the lake was determined using the R Script.

Using the LOSMB\_Updated Python Script: The Storage deviation is calculated using Rainfall, ET, Netflows, Outflows, S77\_In, and S308\_In data calculated using the LOONE\_DATA\_PREP Script.

For **Water Temperature**, I **manually** merge the data at all stations into one file and **calculate the average** of all values each day.

We used regression relations developed by our team to predict water temperature function of air temperature because water temperature measurements stopped around 2012 at most stations and around 2020 at one station only (LZ40).

Then, I used Python functions to fill all the gaps in the Water Temperature data with predicted water temperature (i.e., function of air temperature).

The Water Temperature data were used to calculate kinematic viscosity (nu) using the Kinematic\_Visc Python Script.

Wind Speed data were averaged using the LOONE\_DATA\_PREP Script.

Then, using the Wind\_Induced\_Waves Python Script, the shear stress is calculated.

The output of this Script is File (WindShearStress\_LORS20082023)

* Water Quality Data

Using Inflow Water Quality data download R Script: We download PHOSPHATE, TOTAL AS P, AMMONIA-N, NITRATE+NITRITE-N, CHLOROPHYLL-A, CORRECTED, CHLOROPHYLL-A(LC) for main inflow stations (S191', 'S65E', 'S84', 'S154', 'S71', 'S72', 'S4', 'FECSR78', 'S308C', 'CULV10A', 'S133', 'S127', 'S135').

**Data Interpolation**

Using Data\_Interpolation Python Script, we interpolate all the water quality in the previous step to daily values. **Note:** Needs to run all stations at the same time and interpolate all simultaneously.

I did interpolate NITRATE+NITRITE-N, AMMONIA-N, PHOSPHATE, TOTAL AS P, PHOSPHATE, ORTHO AS P, CHLOROPHYLL-A, CORRECTED, CHLOROPHYLL-A(LC) for all stations inside the lake and for all inflow stations.

Using LOONE\_DATA\_PREP Python Script average daily of TP, OP, NO, NH4, Chla are calculated in Lake Okeechobee including all available stations.

Using LOONE\_DATA\_PREP Python Script, we calculate TP loads at all inflow stations, Then Total External Loads and Total External Loads 3MLag are calculated.

**NOTES**

Files CE\_SLE\_turns\_inputs\_LORS20082023, Estuary\_needs\_water\_Input\_LORS20082023, Water\_dmd\_LORS20082023, as well as columns LOSAdmd and LOSAsup in the SFWMM\_Daily\_Outputs\_LORS20082023 were filled using replicated data from the past!

PhotoPeriod Python Script is used to determine daily photoperiod for one year in Lake Okeechobee and then this one year data is replicated to fill in all years of simulation.

Seasonal\_LONINO\_LORS20082023 and Multi\_Seasonal\_LONINO\_LORS20082023 were developed manually by downloading monthly USACE Reports and fill missing data.