Mosquito Landscape Simulation

This suite of codes predicts *Ae. aegypti* abundance in a given location, using time series for temperature, precipitation, and relative humidity as input.

- **Main program:** `MoLS`
- **Arguments:**
  1. `weather_pathname` (string): directory where input file is located
  2. `weatherfile` (string): name of weather data file in csv format, without the `.csv` extension
- **Format of input file (`weatherfile.csv`) :** 9 columns showing (1) year; (2) month; (3) day; (4) maximum temperature; (5) minimum temperature; (6) precipitation in mm; (7) average temperature; (8) precipitation in cm; (9) relative humidity.
  Note: only columns 7-9 are used.
  Template: see example in `Weather` subdirectory
- **Main program calls:**
  - `preprocess_weather_file` calculates water levels, EIP rate, and mosquito life landscape as functions of temperature, precipitation, and relative humidity. Other parameters are species (currently only species 5, *Ae. aegypti*, is considered) and H_on (whether or not relative humidity is taken into account for adult survival). This program calls:
    - `read_local_parameters`
    - `water_levels`
    - `devel_rates_aegypti`
    - `death_rates_aegypti`
    - `EIP_rate`
    - `mosquito_landscape`
  - `abundance_aegypti`, which calculates predicted abundance of gravid females. This program calls:
    - `read_local_parameters`
    - `read_abundance_model_parameters`
    - `sgl_ftr`
    - and internal function called `egg_life`
- **Output:** overwrites weatherfile.csv; it removes the header and includes an additional column with the predicted number of gravid females per day.
- **Test run:**
  - Copy all of the distribution files in your working directory.
  - Start Python and run `Run_Model_v2.py`.
  - This should add a 10th column to `Test_Data_IO.csv` in the `Weather` directory. A plot of the data in the last column of this file should resemble the figure below.
  - For comparison, a file called `Test_Data_for_Comparison.xlsx` is provided in the `Weather` file as well.