



Estuary Data Mystery

Title: What caused a dark day for the National Estuarine Research Reserve System (NERRS)?

Reserve, State: All

SWMP Stations: All meterological stations

Parameter: Photosynthetic active radiation (PAR)

Start and End Dates: August 21, 2017

Data: Available and easy to graph at nerrsdata.org

Investigate This: Photosynthetic active radiation (PAR) sensors measure the amount of sunlight available for photosynthesis, which is around 400-700 nanometers (nm). Each reserve within the National Estuarine Research Reserve System (NERRS) takes readings of this parameter every 15 minutes, along with other water and weather data, via the System-Wide Monitoring Program (SWMP).

PAR readings will fluctuate through out the day and year depending on weather, the season, and other factors. For example, see **Figure 1** and **Figure 1a** comparing cloudy versus sunny days at the Jacques Cousteau Research Reserve in New Jersey. Can you tell which is which?

Figure 1: Sunny day vs cloudy at the Jacques Cousteau Research Reserve

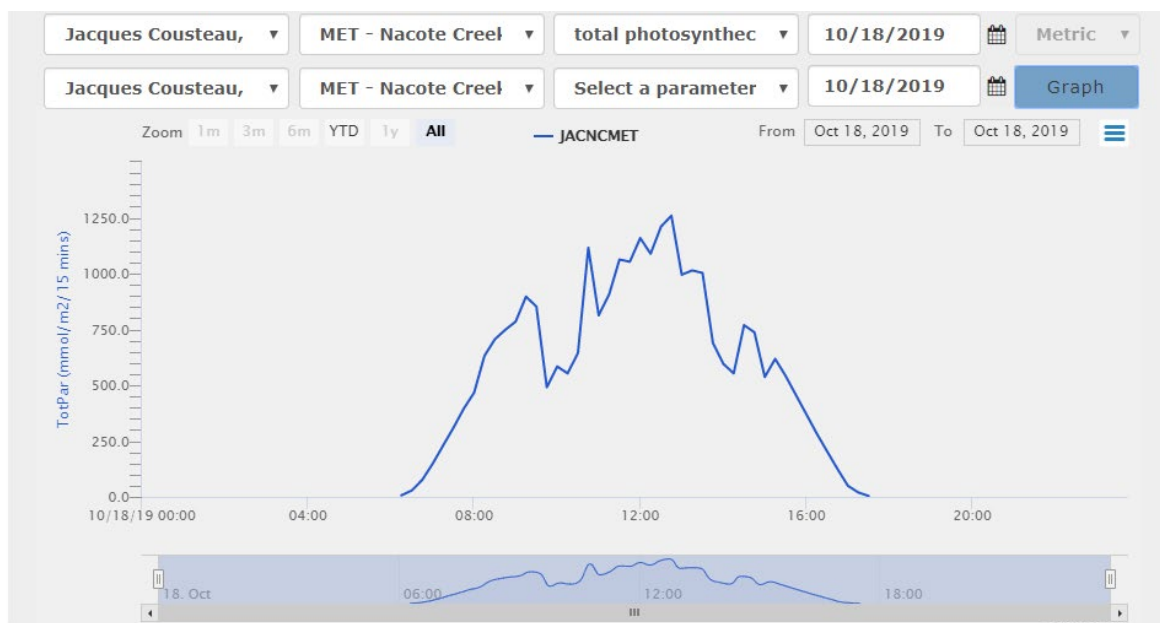
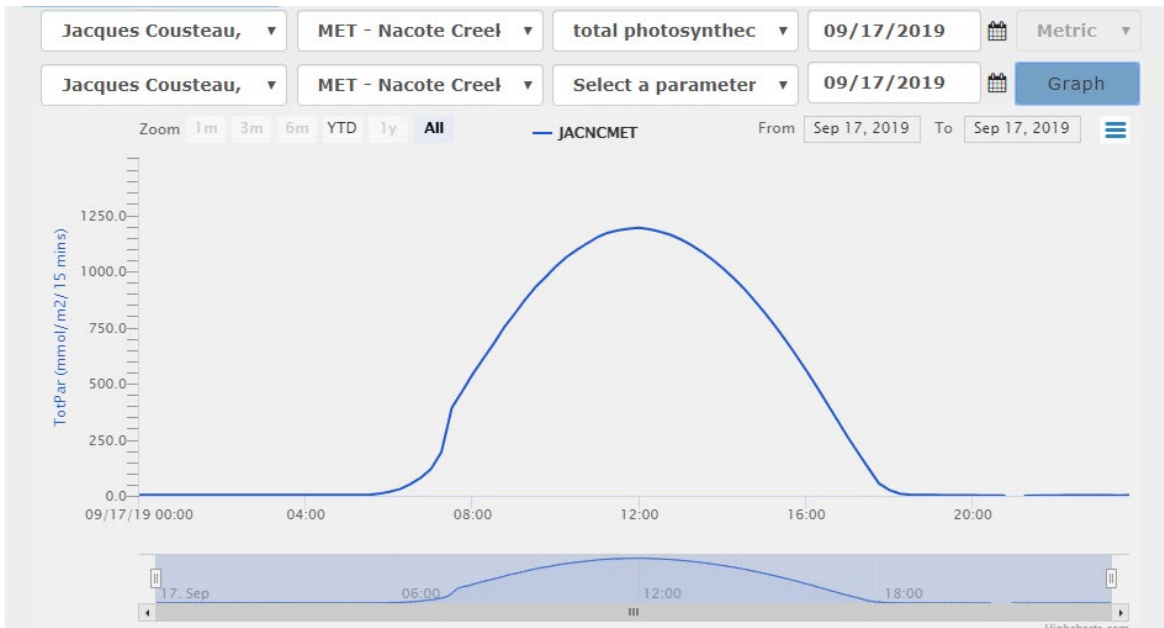
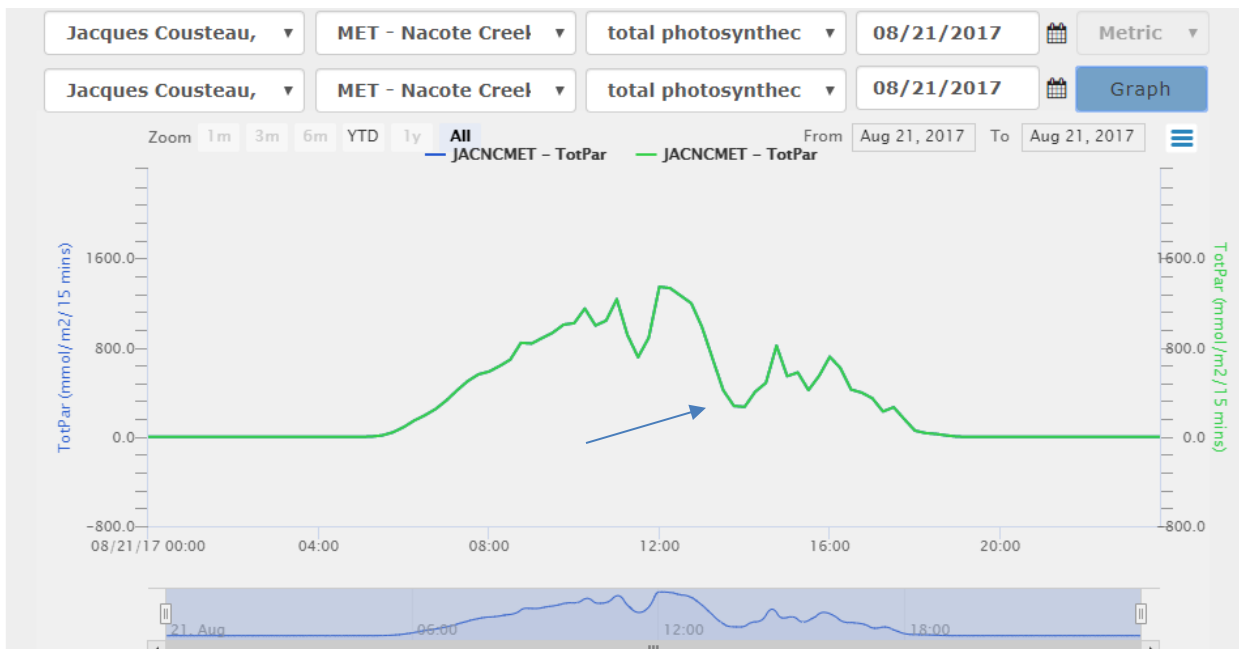


Figure 1a: Sunny day vs cloudy at the Jacques Cousteau Research Reserve



On one afternoon in particular, at the Jacques Cousteau Research Reserve, PAR readings dropped suddenly (see **Figure 2**). Not only did the Jacques Cousteau Research Reserve experience a drop in PAR readings, but so did other reserves. See **Figures 3a-c** for other reserve PAR data. What observations can you make from the graphs in **Figure 2** and **Figures 3a-c**? What do you think happened to cause this phenomenon? Why would it happen at multiple reserves on the same day?

Figure 2: Peculiar PAR reading from the Jacques Cousteau Research Reserve



Figures 3a: Same day: peculiar PAR readings from San Francisco Bay Research Reserve

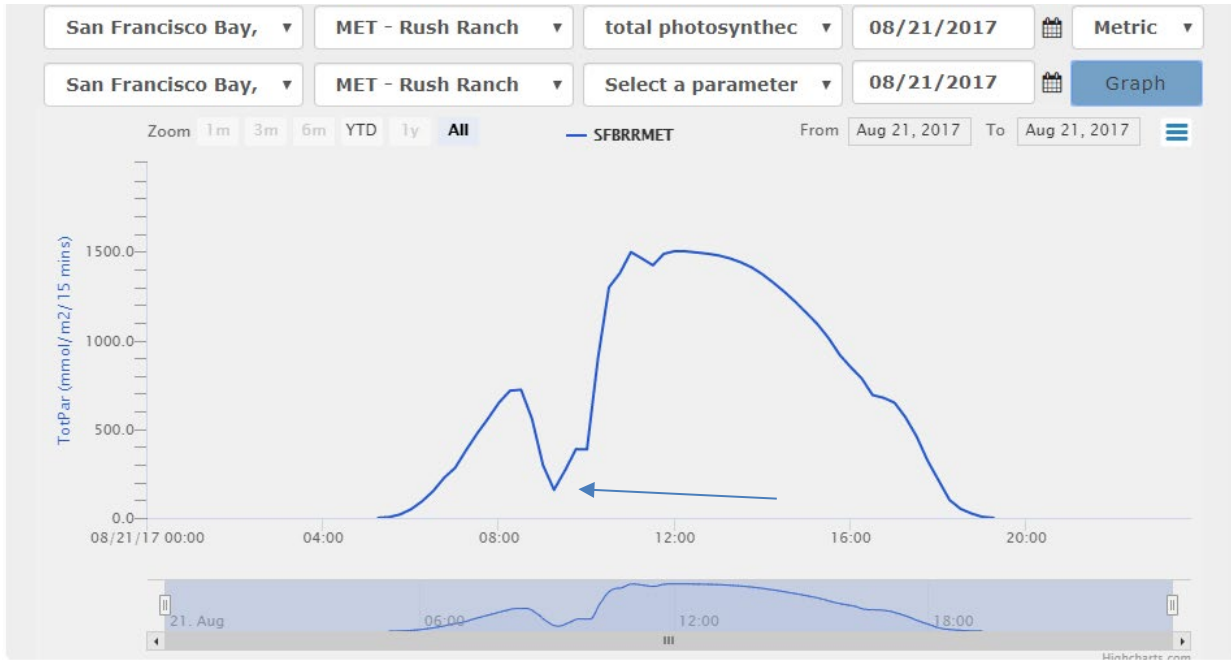


Figure 3b: Same day: peculiar PAR readings from Lake Superior Research Reserve, Wisconsin

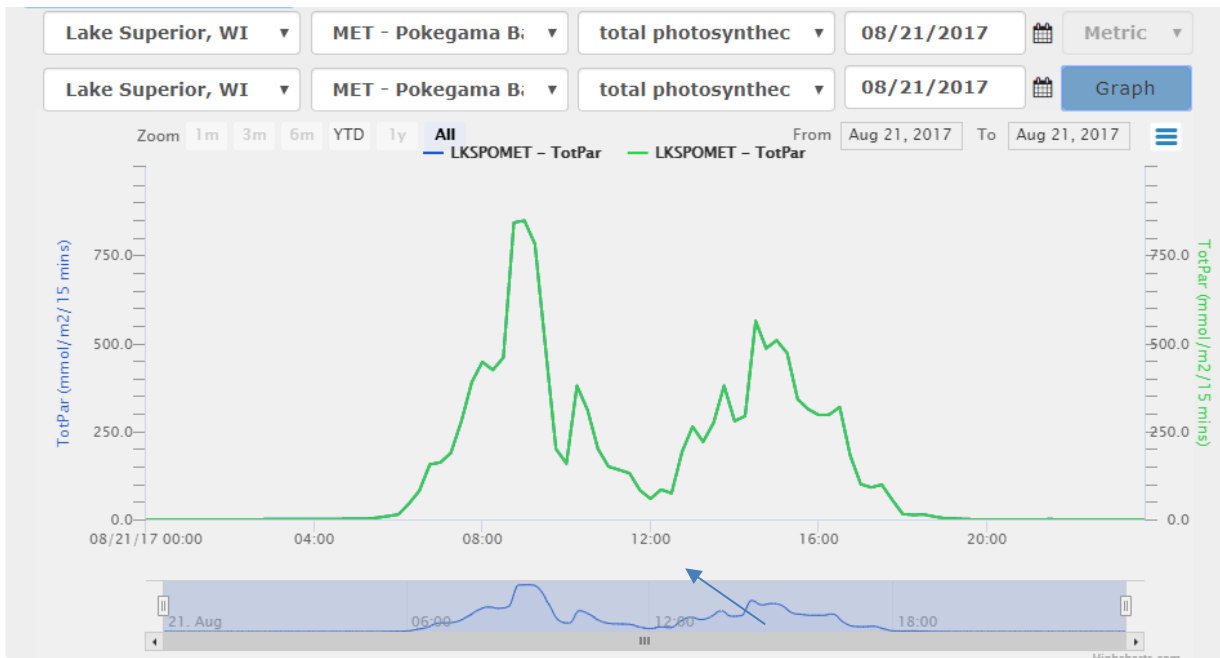
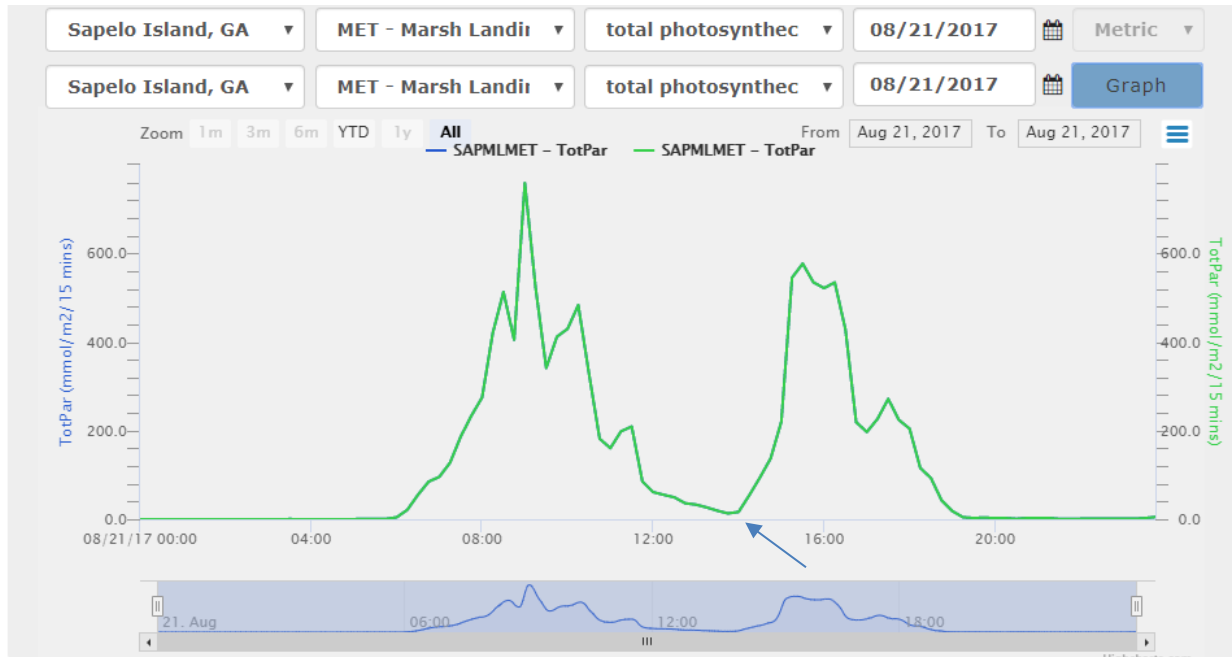


Figure 3c: Same day: peculiar PAR readings from Sapelo Island Research Reserve, Georgia



Explanation: An eclipse was experienced on August 21, 2017. This celestial event was captured throughout the research reserves by PAR sensors at different times during the day because of the different time zones. Notice how it happened in the morning at the San Francisco Research Reserve and in the afternoon at the Jacques Cousteau and Sapelo Island Research Reserves.

Extension Idea: Continue to explore other reserve PAR readings from that day. Check out Kim Cressman's blog below to see all reserve PAR data in a side-by-side comparison!

Additional resources: Blog by Kimberly Cressman. SWMP coordinator for the Grand Bay National Estuarine Research Reserve: <https://nerrdsonthewater.com/2017/08/25/eclipsing-the-sensor>