During the day, coastal wetlands act as a net sink of carbon dioxide. Researchers from West Virginia University were able to measure the net ecosystem exchange (NEE) of several salt marshes in the Waquoit Bay in Massachusetts in 2013 using 4 sites. Their data, along with publicly available data from NOAA has been attached; assume collection was evenly spaced throughout the listed date between 8 am and 4:30 pm. Your task is to develop a model of NEE(measured in μmol/m2/s) using :

- PAR (the photosynthetically active radiation), measured in μmol/m^2/s
- ST (the soil temperature) measured in degrees centigrade
- SS (porewater salinity) measured in parts per thousand
- Pa, atmospheric pressure measured in millibars
- and cp, the specific heat of wet soil, set to 1.48 kJ/kg/K
- and time, measured in seconds

Your model should not be statistically or probabilistically derived; statistical tools can only be used to compute parameters in the model afterwards. You should then use the attached data to discuss the quality of this model. (After submitting the project, I'll provide the source if you're interested in more about this topic.)

You may consult standard references for any relevant unit conversions you need but you may not consult any other sources outside of our class materials without first discussing things with me.

After finding a model, you will have to use the data in the file to judge the quality of this model, meaning you'll need to perform some basic data-fitting. If you are unsure of how to proceed with this, I am more than happy to help with that. You are free to use any software language you want for this part of the project; the data easily lends itself to use in Excel, Python, or R (I can help mainly with the second).

Your report should include the derivation of your model with appropriate justification; the predictions of your model using the data given; and a discussion of the strengths/weaknesses of the model. As usual, you must also include the contributions of each group member.

The project is due by email to me by 11:59pm November 20.