Below is a template for the peer review. You may copy this into a new document and delete the blue text to edit.

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The peer review will be returned to original authors. Be polite and professional but be thorough. You will be graded on how thoughtfully you assess their work.

Overview

This group chose a flare that appeared on August 9th, 2015, with the peak flare happening at approximately 8:00am. The class assigned to this flare was C4 and its maximum peak being 4.26 *10^-6 W/m^2 The group chose a well isolated flare with little to no solar activity in the 2 days following the flare. They began their analysis by importing and displaying the data acquired from the Space Weather Data Portal website. The next step was to convert the data from W/m^2 to Ergs/s. To change the units of time, the group used the **dt.datetime.strptime** function as well as the **data.iloc** function. After changing the units of time, they clearly labeled the new column with the correct units: “time(seconds)”. To be consistent with the change in units, the y axis of the data was changed from power per area to energy per second. The name of the column in which the data was displayed was also changed to reflect the new units: “longwave (ergs/s)”. To plot this solar flare data, the group imported the **matplotlib.pyplot** library and plotted their flare.

The next task was finding the baseline of the curve to eventually make an accurate integration of the entire flare. The chosen method for the baseline was to take an average from t=0 to t=35 minutes using the **data.iloc[0:35,1].mean()** function. After establishing the baseline, they plotted the graph with the new baseline to demonstrate the necessary removal of the pre-flare background. The group then removed that preflare backgorund by using the **[data['longwave (ergs/s)'].subtract(avg_baseline)** to subtract the baseline from the total curve. To integrate their final curve, the group imported the necessary library **(scipy.integrate)** and used the **integrate.trapz** function. Their total energy was reported as 3.848369635763776e+28 ergs.

Merits

This group analysis of the flare was very well written. The code was clear and concise with some helpful commenting for the reader as they followed along the code. The flare was well described in the beginning, highlighting the peak its value in W/m^2. The chosen flare was easy to identify from their graph as they selected the correct range to view the flare. Each section of code was provided along a graph to show what was being done and why. The zoomed in graph of the pre-flare background made it easy for the audience to identify not only the baseline line that was chosen, but also how that baseline measured against the real data. This baseline correction is reasonable because taking an average of that entire pre-flare from

t=0 to t=35 is somewhat equal in the number of smaller peaks that appear. Therefore, the average of that beginning avoids adding unnecessary data to the total flare integration and avoids cutting out an entire piece of the pre-flare background. The final integration step was clear with the total energy in the correct units being displayed at the bottom. The integration method used was trapezoidal integration which is reasonable when looking at the shape of the flare. There were not any discrepancies at the end of the flare that needed to be adjusted with a polynomial fit, for example. A trapezoidal integration seems sufficient with correct limits of integration.

Critiques

I recommend that the group add more comments to their code to clear outline what is being done with each section. When changing the units of power per area, for example, it was not clear what the lines of code were doing. Another area that was a bit confusing was the renaming of the data set to be the “adjusted flare data”. To demonstrate the accuracy of the baseline correction, it might also be a good idea to overlap the original flare to the baseline corrected one. Although I agree with the baseline correction method, annotating why you chose that method compared to a polynomial fit, or local minima, or some other method will solidify the readers understanding of your analysis. Again, commenting on the lines of code will help the reader follow easier without confusion. Final note: the pre-flare data and the subsequent graphs are all graphed in time units of minutes. This needs to be corrected so that all the graphs and the data are displayed in units of seconds. If there needs to be a graph displayed in minutes for clarity, then explain why, and explain the adjustment back to seconds for the final flare with baseline removed.

Overall Recommendation

☐	No revisions are needed
■	Needs minor revisions
☐	Needs major revisions

Conclusions

Overall, I think this was an excellent analysis of a C4 class solar flare. The total energy reported was reasonable and consistent with the method chosen to find that total energy. The graphs were clear, and the code was concise and effective. I suggest going back and commenting more lines of your code to make it easier for the reader to follow. There are also some inconsistencies with the units of time for the pre-flare background graphs as well as the graphs following that one. The correction will perhaps change your total energy reported; however, it will only make it more accurate.