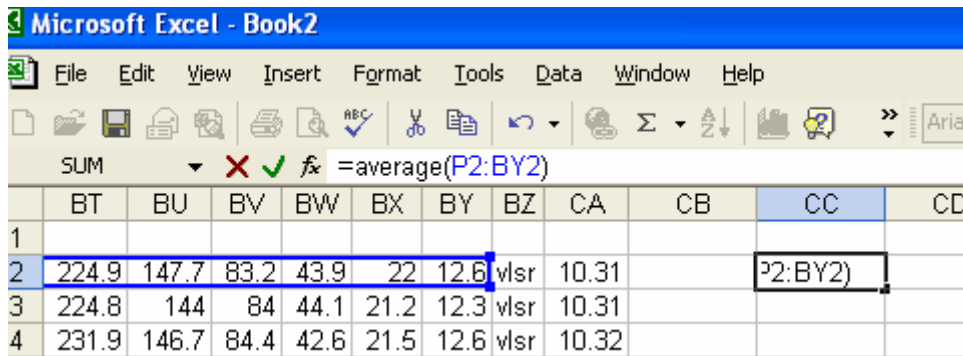


## LESSON #7 PLOTTING YOUR DATA IN EXCEL

1. Open the Excel file which you saved in lesson #6.
2. Remember from lesson #5 that the first 15 columns contain no data (it jumped from 11 to 15 when we expanded the time figure). Similarly, the last 2 columns contain no data. My data was recorded in columns P through BY.
3. We'll want to average the data in every row. This will give us values for the sun's total power output. To average a row, pick a cell to the right of the data and type in `"=average("`. You will now be able to draw a box around the data you want to average. After you've done that, close the parentheses and press enter.



|   | BT    | BU    | BV   | BW   | BX   | BY   | BZ   | CA    | CB | CC | CD |
|---|-------|-------|------|------|------|------|------|-------|----|----|----|
| 1 |       |       |      |      |      |      |      |       |    |    |    |
| 2 | 224.9 | 147.7 | 83.2 | 43.9 | 22   | 12.6 | vlsr | 10.31 |    |    |    |
| 3 | 224.8 | 144   | 84   | 44.1 | 21.2 | 12.3 | vlsr | 10.31 |    |    |    |
| 4 | 231.9 | 146.7 | 84.4 | 42.6 | 21.5 | 12.6 | vlsr | 10.32 |    |    |    |

4. We'll want to average all the rows this way. Click on the cell where you just found your first average. Drag a box down to the last row. Press `"ctrl-d"` (fill down) to fill the column with averages.

Microsoft Excel - Book2

File Edit View Insert Format Tools Data Window Help

CC2 =AVERAGE(P2:BY2)

|    | BT    | BU    | BV   | BW   | BX   | BY   | BZ   | CA    | CB | CC       | CD |
|----|-------|-------|------|------|------|------|------|-------|----|----------|----|
| 1  |       |       |      |      |      |      |      |       |    |          |    |
| 2  | 224.9 | 147.7 | 83.2 | 43.9 | 22   | 12.6 | vlsr | 10.31 |    | 391.5274 |    |
| 3  | 224.8 | 144   | 84   | 44.1 | 21.2 | 12.3 | vlsr | 10.31 |    | 392.0855 |    |
| 4  | 231.9 | 146.7 | 84.4 | 42.6 | 21.5 | 12.6 | vlsr | 10.32 |    | 391.5484 |    |
| 5  | 225.9 | 153.8 | 84.7 | 43.8 | 22   | 12.4 | vlsr | 10.32 |    | 397.4532 |    |
| 6  | 230.4 | 151   | 84.7 | 44.4 | 21.5 | 12.6 | vlsr | 10.32 |    | 399.7855 |    |
| 7  | 230.4 | 151   | 84.7 | 44.4 | 21.5 | 12.3 | vlsr | 10.33 |    | 399.9645 |    |
| 8  | 230.4 | 151   | 84.7 | 44.4 | 21.5 | 12.6 | vlsr | 10.33 |    | 400.5194 |    |
| 9  | 237   | 146.5 | 86.7 | 43.9 | 22.2 | 12.4 | vlsr | 10.34 |    | 393.7242 |    |
| 10 | 223.6 | 146.4 | 85.5 | 43.6 | 21.7 | 12.1 | vlsr | 10.34 |    | 392.2306 |    |
| 11 | 222   | 142.2 | 83.5 | 43.8 | 21.1 | 12.1 | vlsr | 10.34 |    | 387.8855 |    |
| 12 | 223.6 | 150   | 84.4 | 43.1 | 22   | 12.6 | vlsr | 10.35 |    | 393.1758 |    |
| 13 | 227.3 | 147.2 | 84.5 | 42.8 | 21.5 | 12.6 | vlsr | 10.35 |    | 393.9242 |    |
| 14 | 222.9 | 144.5 | 82.2 | 43.3 | 21.9 | 12.6 | vlsr | 10.36 |    | 396.4855 |    |
| 15 | 229.9 | 145.9 | 84   | 43.3 | 21.1 | 12.1 | vlsr | 10.36 |    | 396.9661 |    |
| 16 | 245   | 162.1 | 82.2 | 48.2 | 22.7 | 12.6 | vlsr | 10.45 |    | 422.0774 |    |

External Data

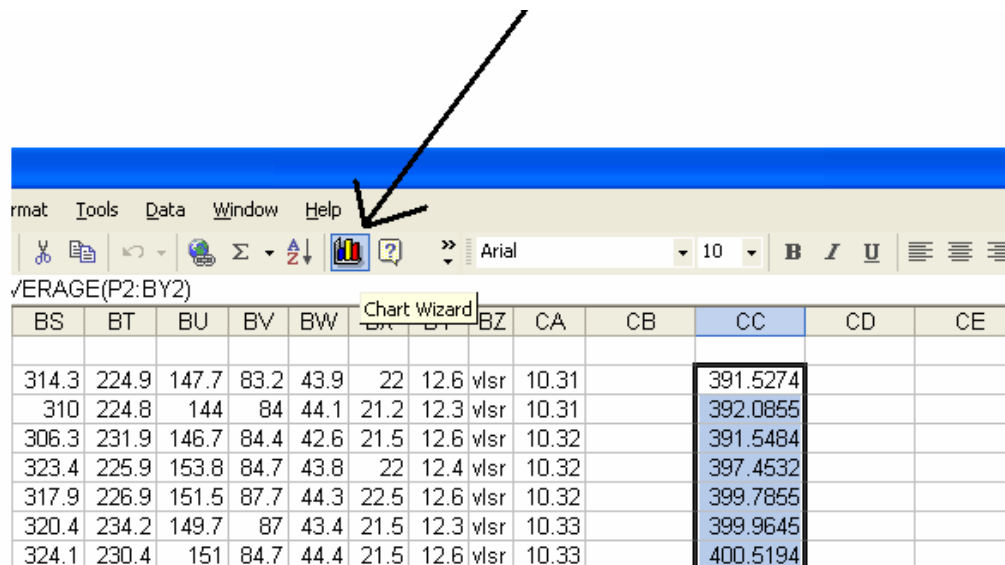
5. Average the columns in a similar way (you'll have to use "ctrl-r" for fill right).

This would produce a row of averages just as averaging the rows gave a column of averages.

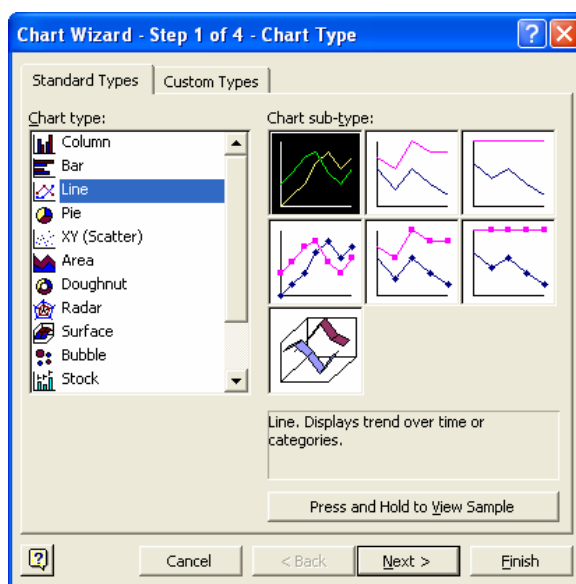
6. Graphing the averaged rows would give us a graph of the change in energy emitted by the sun as a function of time. Graphing the averaged columns would give us a graph of the energy emitted by the sun as a function of frequency.

7. Let's graph the average of the rows.

8. With the averages highlighted, click on the Chart icon.



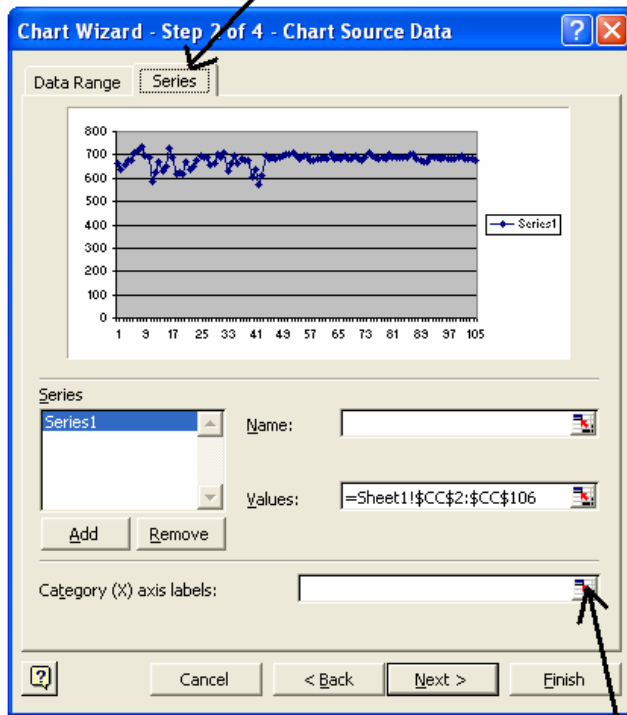
9. This will bring up the following window. Choose a Line graph without data-dots.



click Next

10. Make sure you're in the series part of this window. We will change the values of our x-axis. Remember that our graph is of the energy emitted by the sun as a function of time. As of now, the x-axis simply runs from 1 upward. We want it to represent time instead. I took the data for my graph over a few minutes, so I'll express the x-axis in minutes.

go to the series tab, not the data range tab



click on this icon to choose your x-axis values

To do this, click on the icon the right of the text field.

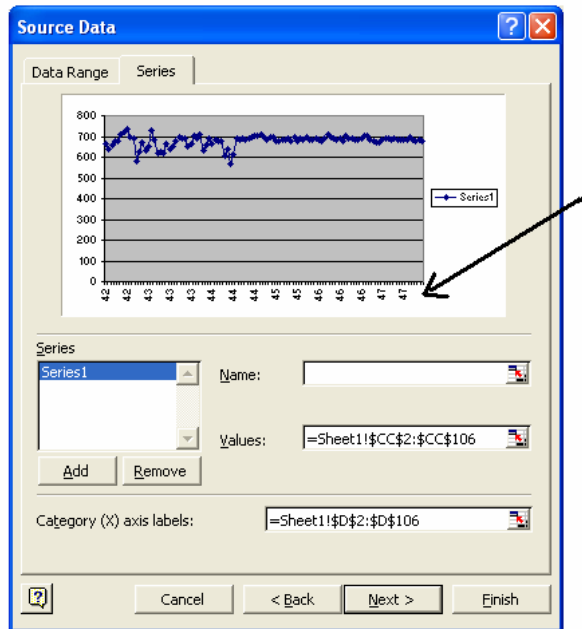
11. Now we're back in the spreadsheet. Here's what to do:

Draw this box around your minutes column

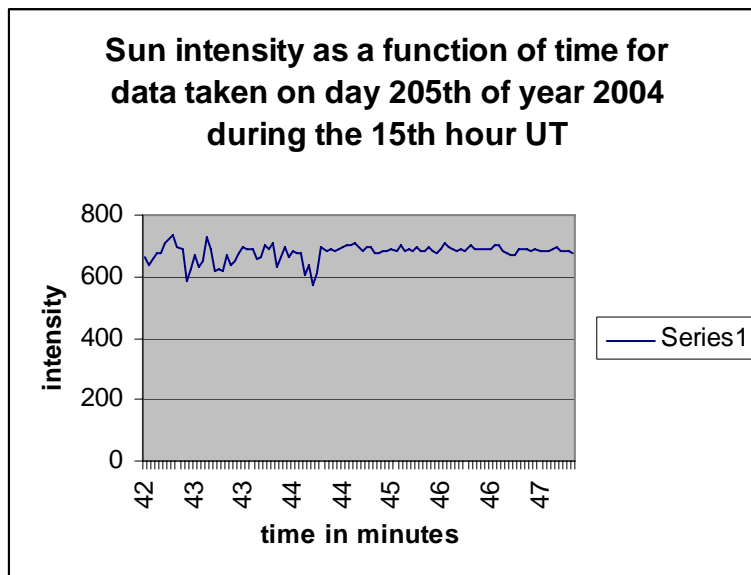
|        | B     | C   | D    | E      | F      | G     | H    | I   | J | K       | L          | M    |
|--------|-------|-----|------|--------|--------|-------|------|-----|---|---------|------------|------|
| LONGW= | 71.50 | day | hour | minute | second |       |      |     |   |         |            |      |
|        | 2004  | 205 | 15   | 42     | 25     | 141.9 | 65.8 | 0.9 | 3 | 1414.88 | 0.00390625 | 2 64 |
|        | 2004  | 205 | 15   | 42     | 28     | 141.9 | 65.8 | 0.9 | 3 | 1414.88 | 0.00390625 | 2 64 |
|        | 2004  | 205 | 15   | 42     | 31     | 141.9 | 65.8 | 0.9 | 3 | 1414.88 | 0.00390625 | 2 64 |
|        | 2004  | 205 | 15   | 42     | 34     | 141.9 | 65.8 | 0.9 | 3 | 1414.88 | 0.00390625 | 2 64 |
|        | 2004  | 205 | 15   | 42     | 38     | 142.3 | 65.8 | 0.9 | 3 | 1414.88 | 0.00390625 | 2 64 |
|        | 2004  | 205 | 15   | 42     | 50     | 142.3 | 65.8 | 0.9 | 3 | 1414.88 | 0.00390625 | 2 64 |
|        | 2004  | 205 | 15   | 42     | 53     | 142.3 | 65.8 | 0.9 | 3 | 1414.88 | 0.00390625 | 2 64 |
|        | 2004  | 205 | 15   | 42     | 56     | 142.3 | 65.8 | 0.9 | 3 | 1414.88 | 0.00390625 | 2 64 |
|        | 2004  | 205 | 15   | 42     | 59     | 142.3 | 65.8 | 0.9 | 3 | 1414.88 | 0.00390625 | 2 64 |
|        | 2004  | 205 | 15   | 43     | 3      | 142.3 | 65.8 | 0.9 | 3 | 1414.88 | 0.00390625 | 2 64 |
|        | 2004  | 205 | 15   | 43     | 6      | 142.3 | 65.8 | 0.9 | 3 | 1414.88 | 0.00390625 | 2 64 |
|        | 2004  | 205 | 15   | 43     | 9      | 142.3 | 65.8 | 0.9 | 3 | 1414.88 | 0.00390625 | 2 64 |

then click here to get back to the graph wizard

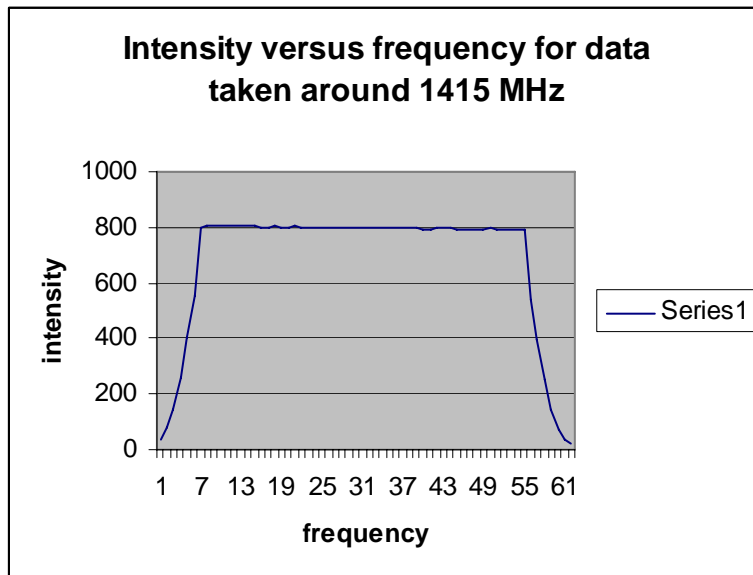
12. Now our x-axis reads as follows:



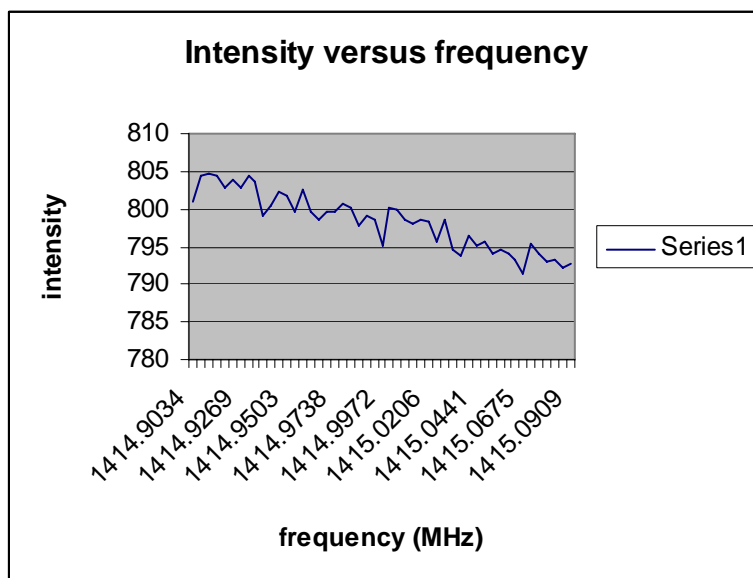
13. Click next and then name your graph and your axes. Your graph should look something like this:



14. Just for kicks, graph the averages of the columns. This will make a graph of intensity versus frequency. My graph ended up looking like this:



15. I decided to take a closer look at the top of the plateau and used a clever technique to change the values on the x-axis. My final graph looked like this:



16. Close the program; you're done.