

## CDAWEB instructions for LAB-WORK-1

### To plot magnetic field and plasma data.

1. <http://cdaweb.nasa.gsfc.gov>
2. On the page that comes to screen, Select the spacecraft name from the boxes on the left, and then Select the following instruments from the boxes on the right:
  - a. Magnetic Feilds (space)
  - b. Plasma and Solar Wind

Then click on the Submit button at the very end of the page.

3. Step (2) will bring a screen which shows you the instruments on your spacecraft.
4. First click on the blue statement that say “- [Click here to CLEAR All checkboxes, OR](#) “ to clean all selected boxes by default. This will clear all the default check marks from the boxes you see on the screen. Then you can proceed to select your own box.

#### For WIND spacecraft, mark the boxes below:

- WI\_HO\_MFI:** Wind Magnetic Fields Investigation: 3 sec, 1 min, and hourly Definitive Data. - A. Koval (UMBC, NASA/GSFC) [Available Time Range: 1994/11/12 00:00:30 - 2020/11/01 23:59:30]
- WI\_KO\_SWE:** Wind SWE (Solar Wind Experiment), Key Parameters - K. Ogilvie (NASA GSFC) [Available Time Range: 1994/01/01 00:00:00 - 2020/11/03 23:58:08]

The first one is for [Magnetic field data](#) and the second one is for [the plasma data \(density, velocity, temperature\)](#).

Then again click SUBMIT button at the very end of the page.

5. Next, on the screen, there will **DATE option** on the middle top and the names of the data will appear on your screen.

**First: Enter the date and time within the time interval given on your LabWork-document.** Any date that covers 24 hours interval is fine. This is arbitrary. Just pick a one day and enter it.

As an example let's use today's date:

Enter, for Start date: 2020/11/05 00:00:00.000 and then

for the END date as: 2020/11/05 23:59:00.000

Be careful about the format while entering the dates. Use the format shown on the left side of the date. Otherwise it will not work.

Then to plot the data, Select **PLOT option** (Click on the box that says plot). By default, the **“PLOT Data” option** has already been checked up. But check it anyway if it was not.

Then you should move to the next section on the same page where you will select the data names you will plot.

6. On same page, **For WIND:**

Under **WI\_HO\_MFI** select the following boxes:

- Magnetic field magnitude (1 min)
- Magnetic field vector in GSM cartesian coordinates (1 min)

Under **WI\_KO\_SWE**, select the following boxes:

- Solar Wind Velocity in GSM coord., 3 comp.
- Solar Wind Most Probable Thermal Speed =  $\sqrt{2kT/M}$ , scalar
- Solar Wind Proton Number Density, scalar (linear)
- Solar Wind Proton Number Density, scalar (log)

**When you hit the submit button you will see the plots of the quantities you checked the boxes.**

Here, for wind, the second column is the thermal speed data measured by Wind. The equation is given and you will use this equation to obtain Temperature data from thermal speed measured by WIND. In this equation,  $k$  is Boltzmann constant ( $k=1.38 \times 10^{-23}$  Joule/Kelvin),  $M$  is the proton's mass ( $1.68 \times 10^{-27}$  kg),  $T$  is the temperature in Kelvin.

**You should get accustomed and play with other several utilities on this page to plot your data. It is up to you to explore what this page provides you to plot your data on the screen.**

7. Then copy-and paste the plots that comes on your screen. (This is what is asked in item-3)
8. Be careful while placing those panels on your page. Both plots, namely both magnetic field and plazma plots should be placed on the same page in order for an easy comparison between different variables. DO not let the plots to be drooped over to the next page. Organize them to fit on one page.
9. To download data you selected, instead of "PLOT data" option highlighted in Yellow in Step-5 above, select "**List data**" option.

**List Data (ASCII/CSV):** List data option will bring the data on your screen which then you can copy-and-paste to a Microsoft document or Microsoft excel document if your want. If you want to download the data on your computer desktop, follow the other options in the same location.

**Download original files:** press submit button to retrieve list of files. (Max. 200 days - use [HTTPS site](https://) for larger requests)