

SWPC_CAT CME analysis Procedure

- * [Identify the CME](#) and the [start time](#) (first appearance), [look at coronagraph images](#) in motion.
- * [Look at EUV images](#) in motion near the CME start time and identify the source location and any lower coronal signatures (post eruption arcade, dimming, rising loops, filament eruption).
- * Figure out what "right click" is on your computer. You'll need it!
- * Start `sswidl` (at the command prompt)
- * Load images by typing the following commands at the IDL prompt:

```
IDL> swpc_cat_getdata ; loads the past 24 hours of images
```

-or choose a date range-

```
IDL> swpc_cat_getdata, '2014-06-24 01:00', '2014-06-24 18:00'
```
- * Start SWPC_CAT by typing "swpc_cat" at the IDL prompt

```
IDL> swpc_cat
```
- * [Load the images](#): enter the start and end times in the lower left corner, and press "Load Images" button. Pick a start time that is ~ 1 hour before the CME start.
- * The first thing you should do is [survey the images](#): use the scroll bars below the image windows, or use the "Animation Controls" section to run the movies. You want to be sure they loaded properly and cover the entire range of images (from before LASCO C2 out to the edge of LASCO C3).
- * [Adjust the images](#) so you can see them well! Use "L/C/R" panels (Left/Center/Right) to play with image scales.
- * Another option is to [adjust](#) the way the images are displayed. Right click in one of the image panes, and then click on "Image Differencing." Your three options are "None" (display raw images; not recommended), "Running Difference" (probably the best) and "Set Current Image as Background" (i.e. pick an image time as your background that is before the time of your CME – this is useful if the Running Difference images are very busy)
- * You can [switch](#) between the LASCO C2 and C3 images by right clicking in the middle image frame (SOHO) and selecting "Show LASCO C2" or "Show LASCO C3".
- * [Choose a time where you can see the CME well](#), but also be sure that the CME's width & location isn't varying too rapidly. You're trying to determine the values corresponding to 21.5 R_{Sun} (but keep in mind that the earlier images may correspond better with the EUV images).
- * [Experiment with the parameters and do your best to fit all three viewpoints](#). Once you think you've got good parameters, go into an image pane and click "CME Matches Image."
- * *Note: Once you've chosen Latitude/Longitude/Angular Width, you can't change them! Choose wisely. :)*
- * For each image time, [adjust the Radial Distance slider](#) until you think it matches closely. Note that image times do not have to match! Adjust the distance for each image time and select "[Match Image](#)."
- * Every time you click "CME Matches Image" you should see a small box outline appear in the "CME LEADING EDGE vs TIME" plot. Clicking "[Calculate Velocity](#)" will draw a line fit to the data points and then update the values in the "ENLIL PARAMETERS" box.
- * Finally, examine your values – if the speed looks roughly constant, you can use the derived values. If it looks like it is decelerating or accelerating, you may want to "[Unmatch](#)" some earlier images to make sure the velocity fit is only using later images (closer to 21.5 R_{Sun}).
- * To finish up: Pick a single image to serve as a "[Representative Image](#)" and select "[Export Analysis](#)." The final step is doing a [screenshot](#) of the whole thing (don't forget!) to send to your supervisor.

