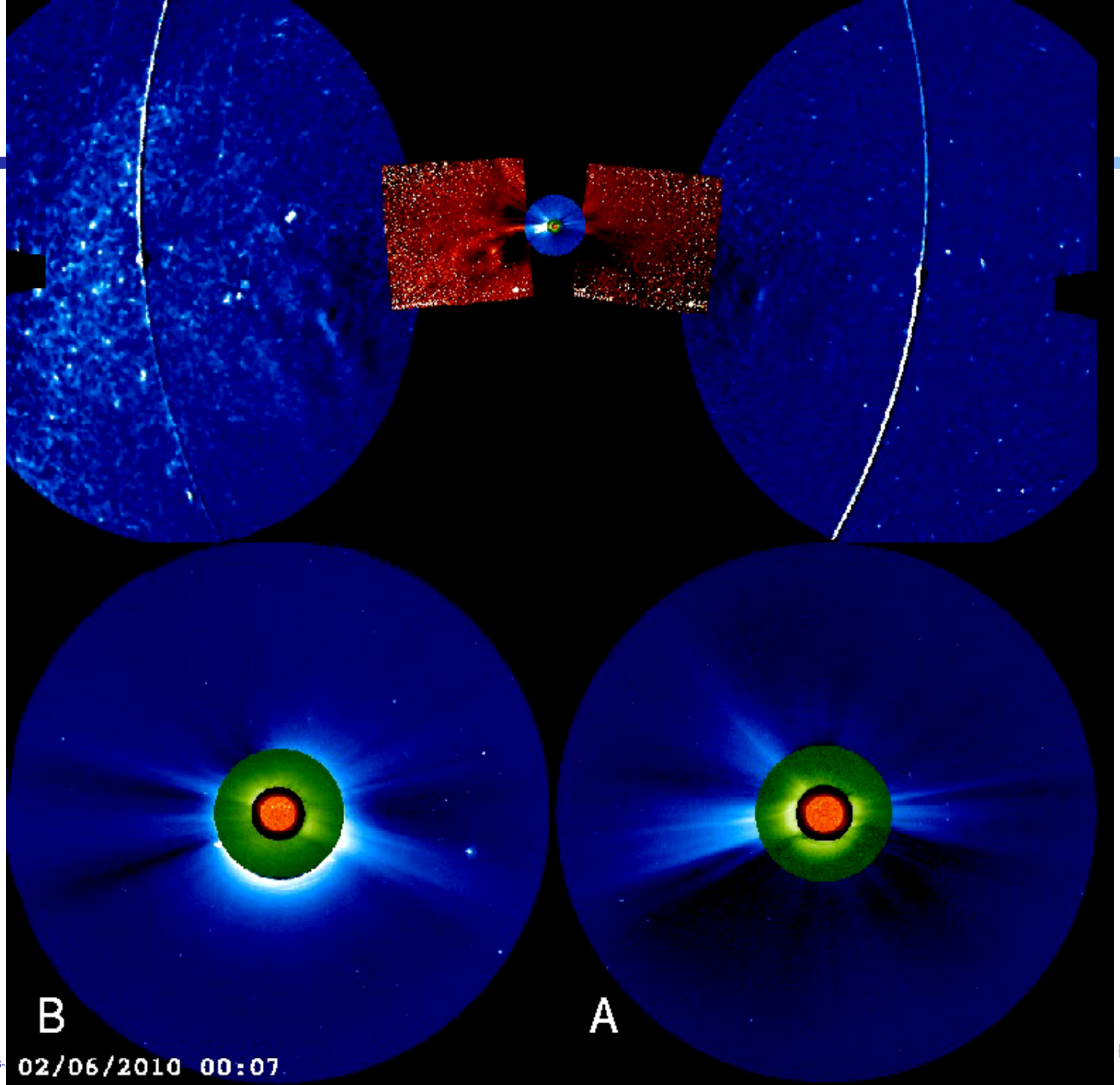

B
A
02/06/2010 00:07

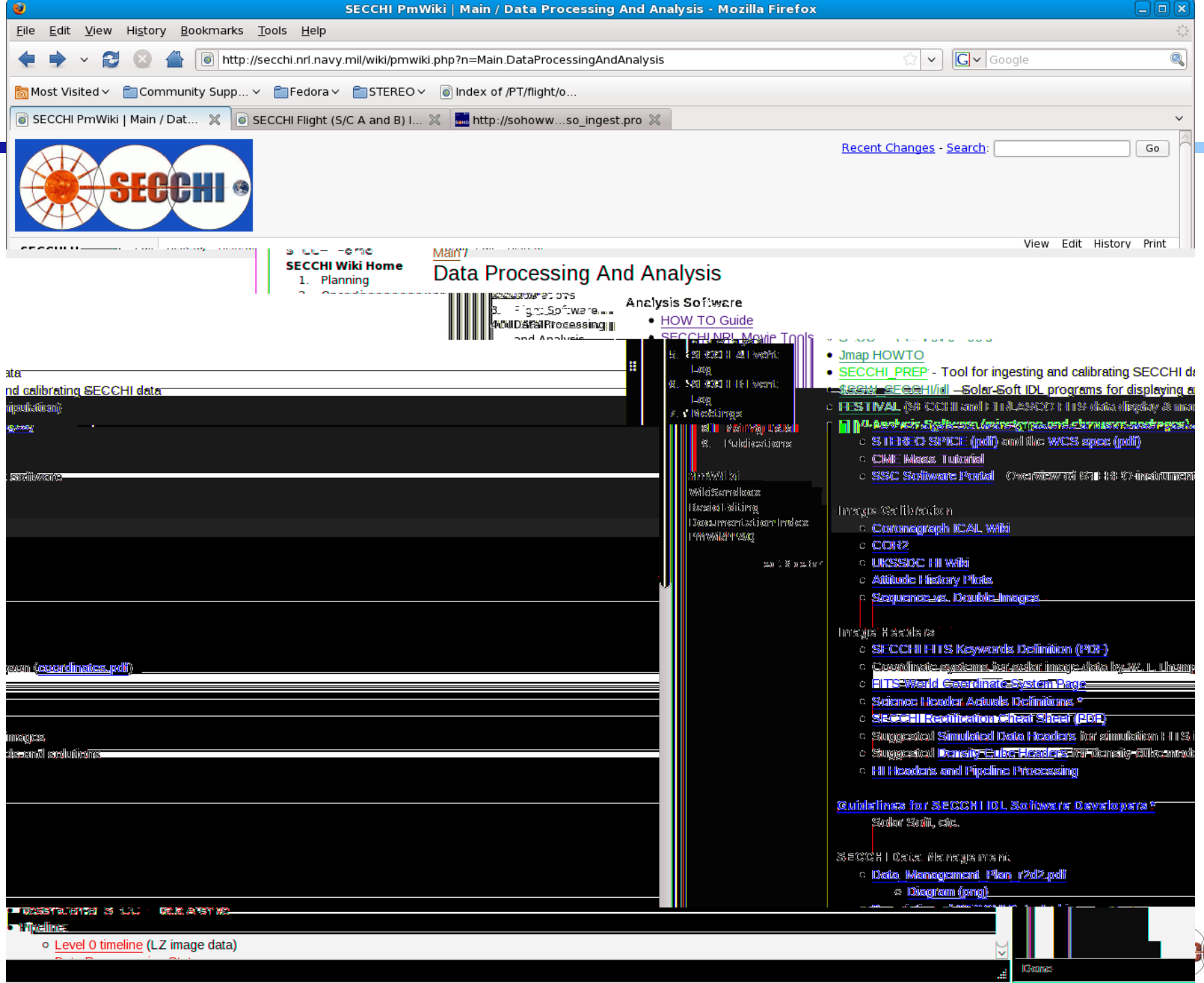
NRL IDL Movie Tools

SECCHI Meeting
March 22-23 2010
Dublin,Ireland

Lynn Simpson (202-404-1412)
Nathan Rich (202-404-1408)
NRL/Interferometrics Inc.

NRL IDL Movie Tools

- **Introduction**
  - **These are IDL tools in Solarsoft written specifically for LASCO/EIT/SECCHI images**
  - **Instructions for accessing and using SECCHI data may be found via http://secchi.nrl.navy.mil/wiki under Data Processing And Analysis**
  - **Details about each of the tools in this presentation are also available through the wiki or in $SSW/stereo/secchi/doc/secchimvi.htm**


SECCHI PmWiki | Main / Data Processing And Analysis - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://secchi.nrl.navy.mil/wiki/pmwiki.php?n=Main.DataProcessingAndAnalysis
Most Visited Community Supp... Fedora STEREO Index of /PT/flight/o...
SECCHI PmWiki | Main / Dat...
SECCHI Flight (S/C A and B) I...
http://sohoww...so_ingest.pro
SECCHI
Recent Changes - Search: Go
View Edit History Print
SECCHI Wiki Home
1. Planning
Main /
Data Processing And Analysis
Analysis Software
HOW TO Guide
Jmap HOWTO
SECCHI_PREP - Tool for ingesting and calibrating SECCHI
STEREO SPICE (pdf) and the WCS spec (pdf)
CME Mass Tutorial
SSC Software Portal
Image Calibration
Coronagraph ICAL Wiki
COR2
UKSSDC HI Wiki
Attitude History Plots
Sequence vs. Double Images
Image Headers
SECCHI HIS Keywords Definition (PDF)
FITS World Coordinate System Page
Science Header Actuals Definitions
SECCHI Rectification Cheat Sheet (PDF)
HI Headers and Pipeline Processing
Guidelines for SECCHI IDL Software Developers
Solar Soft, etc.
SECCHI Data Management
Data_Management_Plan_r2d2.pdf
Diagram (png)
Level 0 timeline (LZ image data)

SECCHI HOW-TO Quick-guide to Using SECCHI Data - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://sohowww.nascom.nasa.gov/solarsoft/stereo/secchi/doc/sccuserguide.html

Most Visited Community Supp... Fedora STEREO Index of /PT/flight/o...

SECCHI HOW-TO Quick-guid... SECCHI Flight (S/C A and B) I... http://sohoww...so_ingest.pro

Information about SECCHI movie tools may be found here.

If you want CALIBRATED images, see the SECCHI PREP User Guide.

RETRIEVING SECCHI DATA

If you do not have the SECCHI FITS archive available to you locally, there are two ways to retrieve the data:

1. **Web query** is available at http://secchi.nrl.navy.mil. This method offers the most options for query search.
2. **Using Solarsoft/IDL** you may use xsecchi_vso_ingest.pro to retrieve data from the STEREO Science Center over a socket. Note that this tends to

retrieve lists of FITS files:

ary.pro which returns an array of

scclister.pro. This returns a structure of

nented, this takes a long time.)

ks at NRL.)

his routine, you just supply it with a

net!):

If you do have the SECCHI FITS archive available to you locally in $secchi or $SECCHI_LZ, there are two ways to

1. The fastest way to query for large intervals of SECCHI data is using the summary files and scc_read_summ
2. If you are doing a more targeted search and/or want to refine your search using more parameters, there is
3. Finally, it is possible to do an image database query from IDL using sqdb.pro. (Note: This method only wor

SECCHI PRETTY PICTURES ONLINE

Go to http://secchi.nrl.navy.mil/images and browse the categories that appear in the left-hand sidebar.

SECCHI PRETTY PICTURE MAKING

Scc_mk_image.pro will turn (almost) any SECCHI FITS file into a pretty picture using default settings. To use th
SECCHI FITS file name, and it will return to you a beautiful, byte-scaled, "pretty" data array. Example (incl. cor

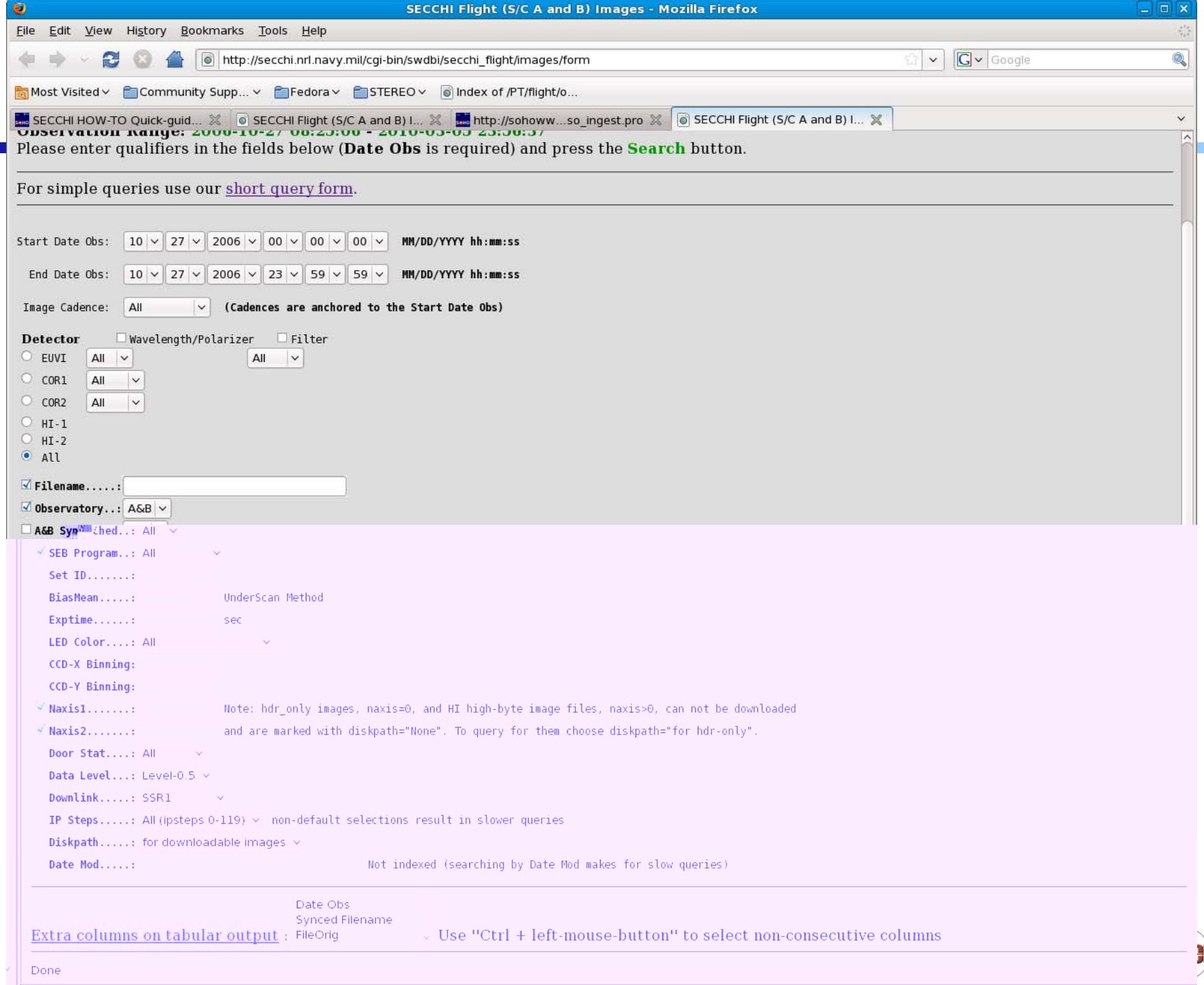
Using SECCHI_PREP for pretty pictures

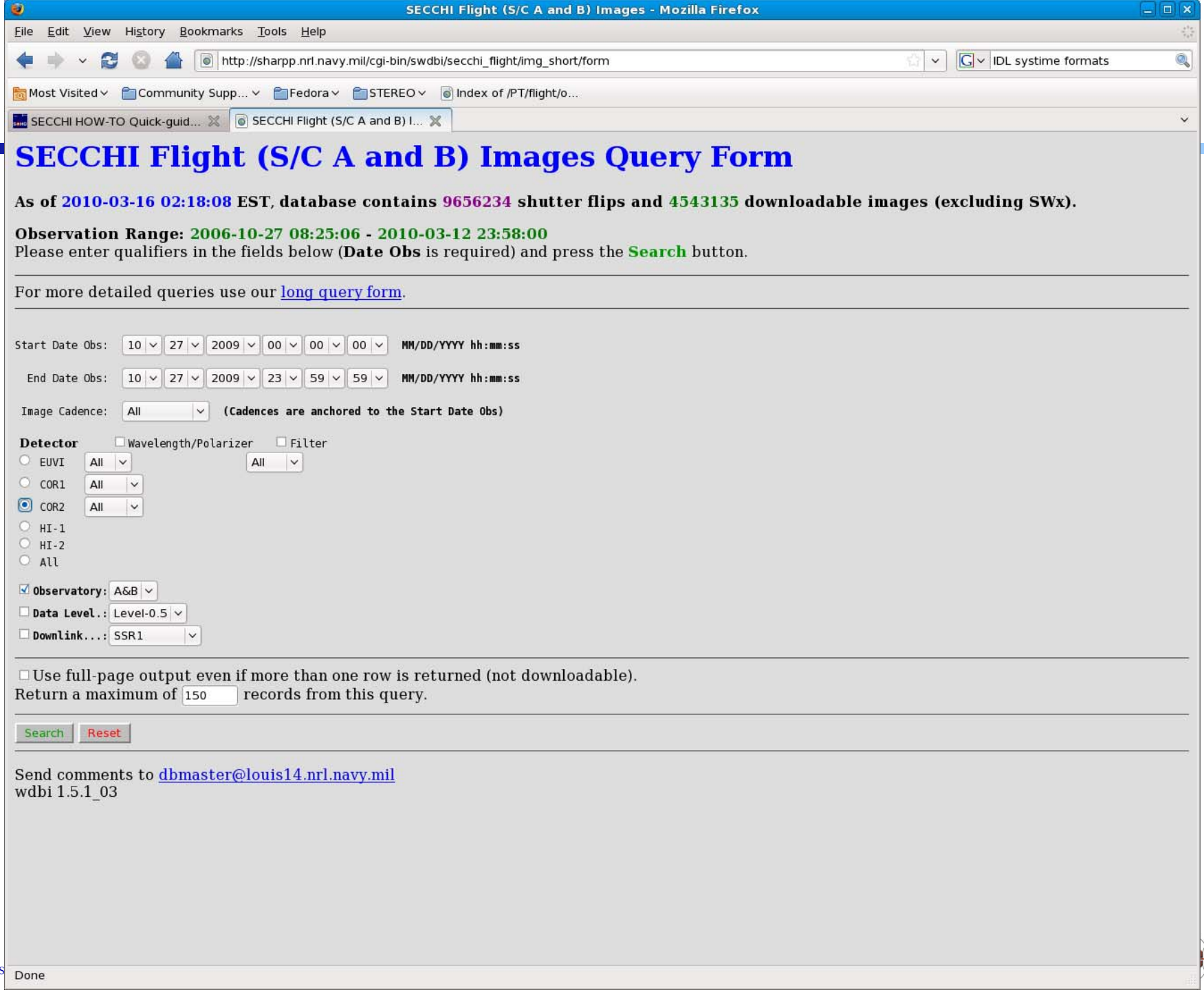
IDL> SECCHI_PREP, filenames, headers, images, OUTSIZE=512, /NOCALFAC, /CALIMG_OFF, /UPDATE_HDR_OFF, /EXPTIME_OFF

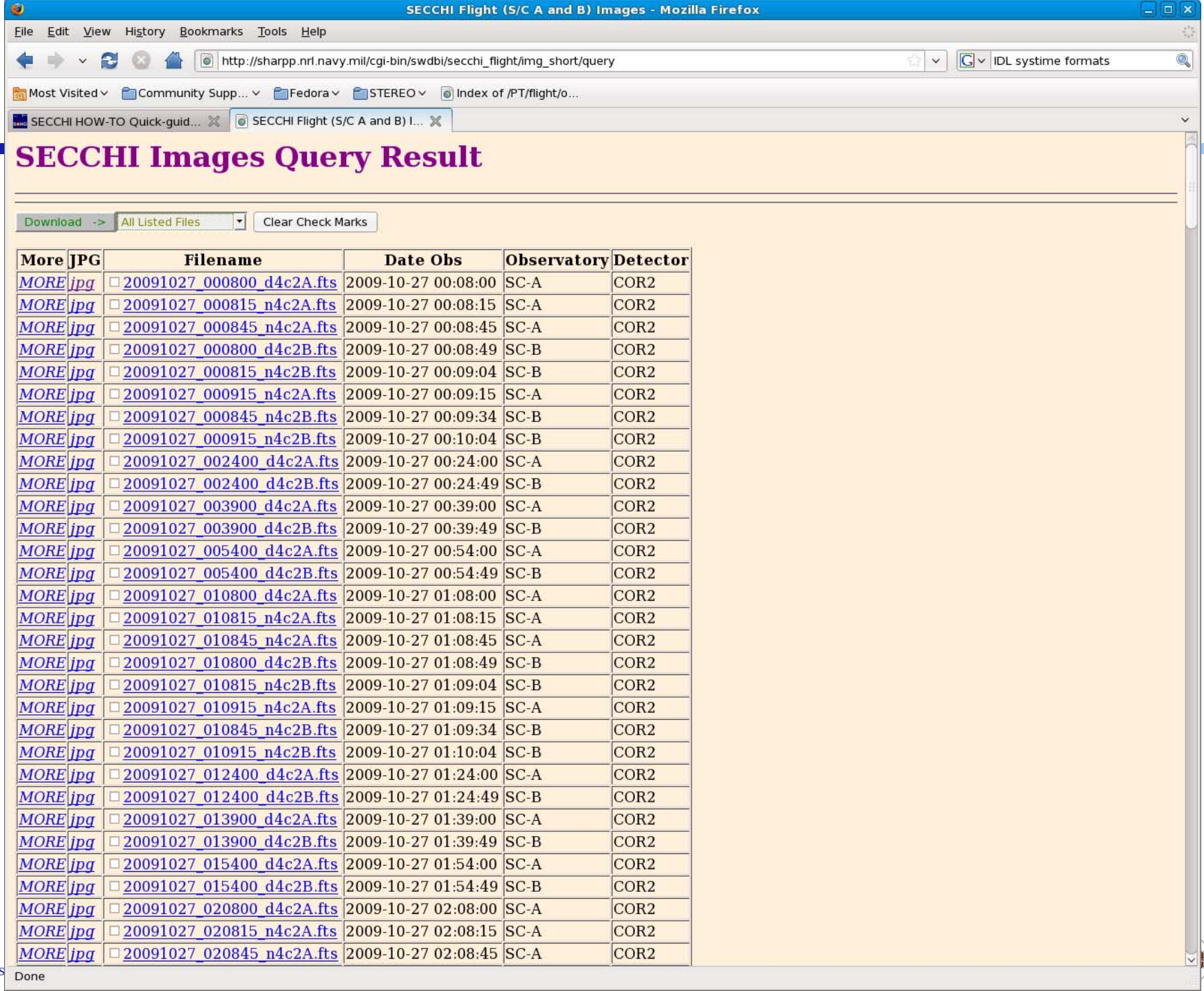
SECCHI BACKGROUND IMAGES

Retrieve background images for a SECCHI image with scc_getbkgimg.pro:

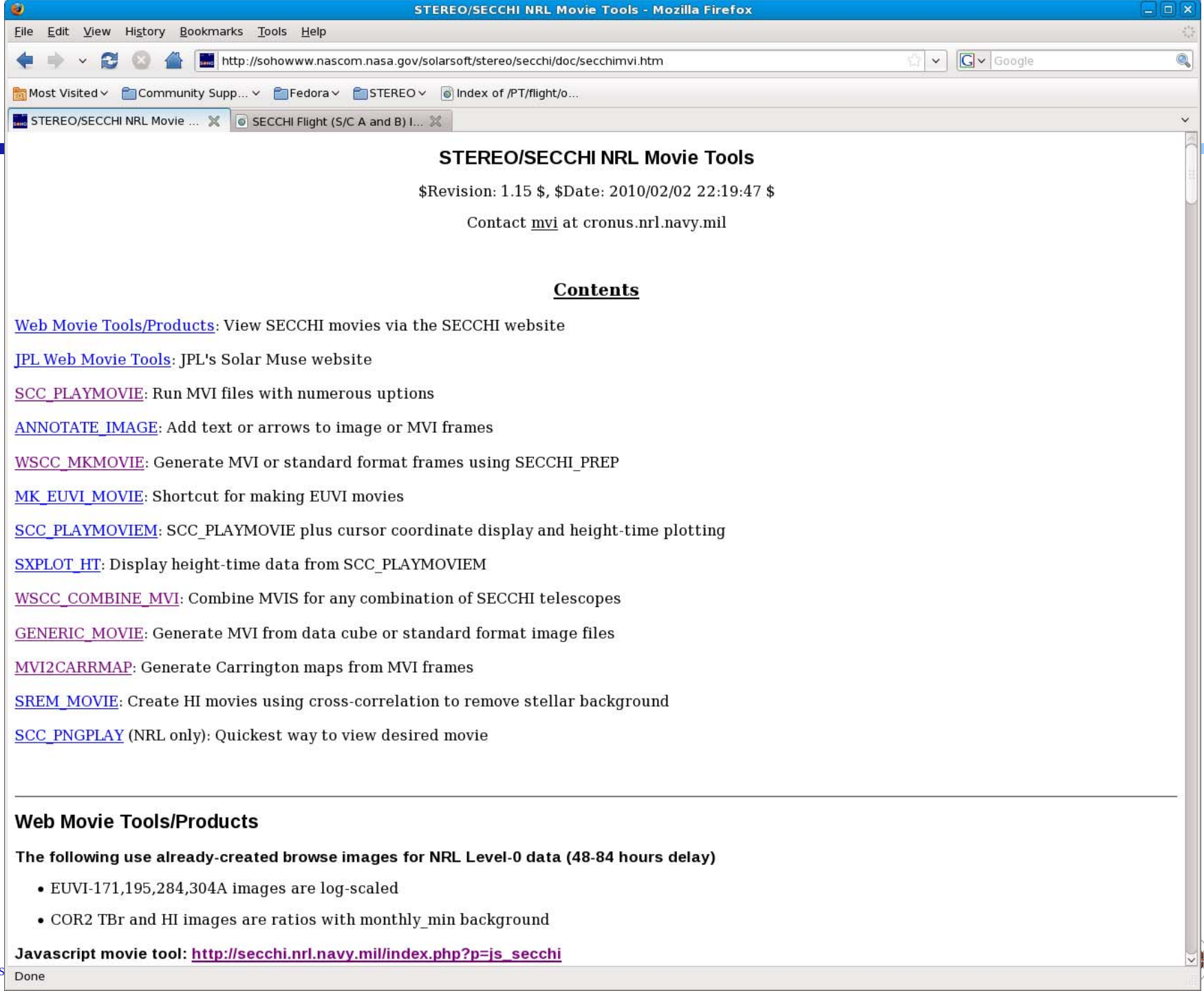
```
IDL> bkg = scc_getbkgimg(secchi_fits_hdr)

; Options    : /SILENT = Don't print out informational messages
Done
```


SECCHI Flight (S/C A and B) Images - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://secchi.nrl.navy.mil/cgi-bin/swdbi/secchi_flight/images/form
Most Visited Community Supp... Fedora STEREO Index of /PT/flight/o...
SECCHI HOW-TO Quick-guid...
SECCHI Flight (S/C A and B) I...
http://sohoww...so_ingest.pro
SECCHI Flight (S/C A and B) I...
Please enter qualifiers in the fields below (Date Obs is required) and press the Search button.
For simple queries use our short query form.
Start Date Obs: 10 27 2006 00 00 00 MM/DD/YYYY hh:mm:ss
End Date Obs: 10 27 2006 23 59 59 MM/DD/YYYY hh:mm:ss
Image Cadence: All (Cadences are anchored to the Start Date Obs)
Detector Wavelength/Polarizer Filter
EUVI All All
COR1 All
COR2 All
HI-1
HI-2
All
Filename.....:
Observatory..: A&B
A&B Synched..: All
SEB Program..: All
Set ID.....:
BiasMean.....: UnderScan Method
Exptime.....: sec
LED Color....: All
CCD-X Binning:
CCD-Y Binning:
Naxis1.....: Note: hdr_only images, naxis=0, and HI high-byte image files, naxis>0, can not be downloaded
Naxis2.....: and are marked with diskpath="None". To query for them choose diskpath="for hdr-only".
Door Stat....: All
Data Level...: Level-0.5
Downlink.....: SSR1
IP Steps.....: All (ipsteps 0-119) non-default selections result in slower queries
Diskpath.....: for downloadable images
Date Mod.....: Not indexed (searching by Date Mod makes for slow queries)
Extra columns on tabular output : Date Obs
Synced Filename
FileOrig
Use "Ctrl + left-mouse-button" to select non-consecutive columns
Done


SECCHI Flight (S/C A and B) Images - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://sharpp.nrl.navy.mil/cgi-bin/swdbi/secchi_flight/img_short/form
IDL systime formats
Most Visited Community Supp... Fedora STEREO Index of /PT/flight/o...
SECCHI HOW-TO Quick-guid...
SECCHI Flight (S/C A and B) I...
SECCHI Flight (S/C A and B) Images Query Form
As of 2010-03-16 02:18:08 EST, database contains 9656234 shutter flips and 4543135 downloadable images (excluding SWx).
Observation Range: 2006-10-27 08:25:06 - 2010-03-12 23:58:00
Please enter qualifiers in the fields below (Date Obs is required) and press the Search button.
For more detailed queries use our long query form.
Start Date Obs: 10 27 2009 00 00 00 MM/DD/YYYY hh:mm:ss
End Date Obs: 10 27 2009 23 59 59 MM/DD/YYYY hh:mm:ss
Image Cadence: All (Cadences are anchored to the Start Date Obs)
Detector Wavelength/Polarizer Filter
EUVI All All
COR1 All
COR2 All
HI-1
HI-2
All
Observatory: A&B
Data Level.: Level-0.5
Downlink...: SSR1
Use full-page output even if more than one row is returned (not downloadable).
Return a maximum of 150 records from this query.
Search Reset
Send comments to dbmaster@louis14.nrl.navy.mil
wdbi 1.5.1_03
Done

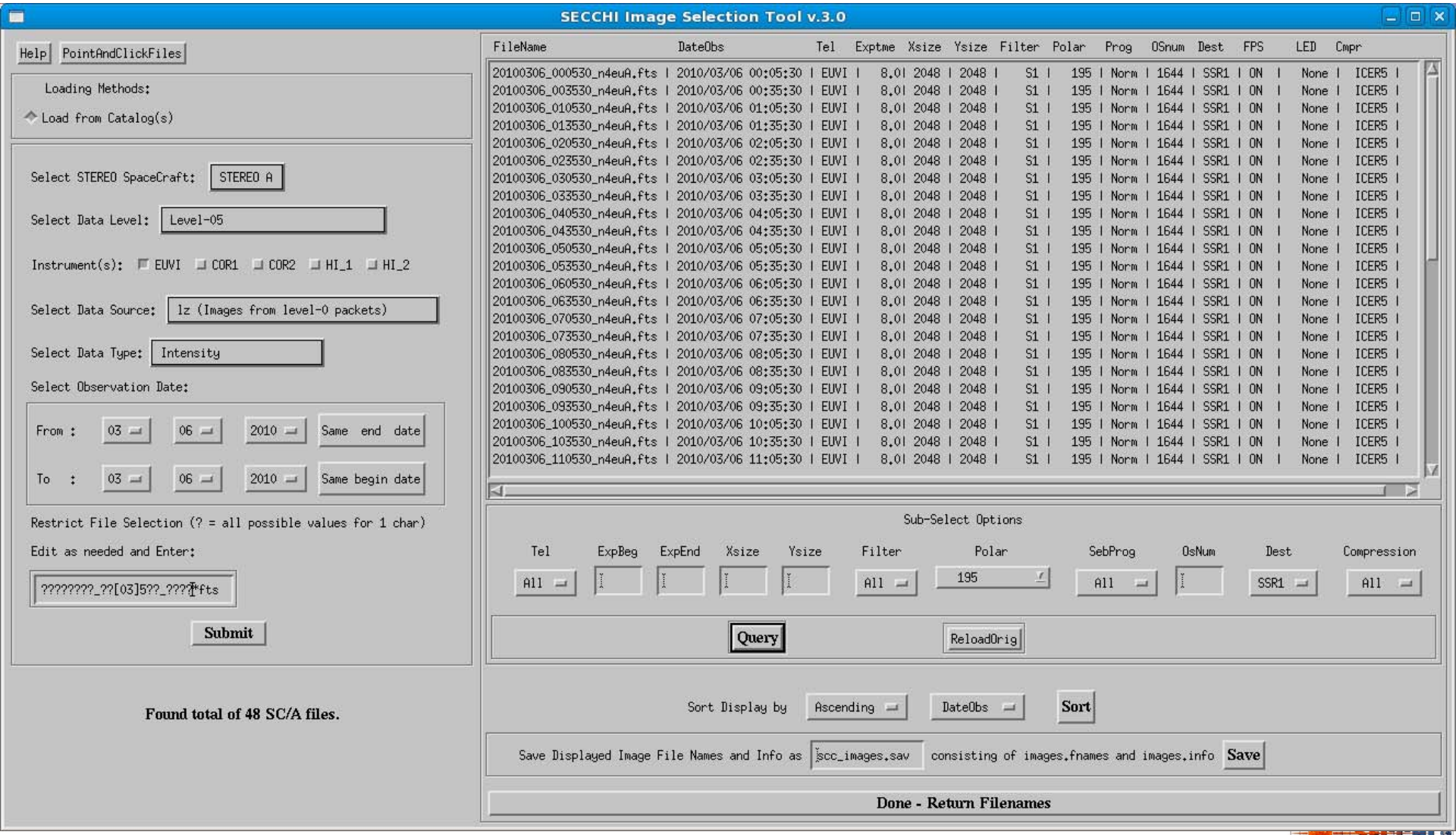


More	JPG	Filename	Date Obs	Observatory	Detector
MORE	jpg	20091027_000800_d4c2A.fts	2009-10-27 00:08:00	SC-A	COR2
MORE	jpg	20091027_000815_n4c2A.fts	2009-10-27 00:08:15	SC-A	COR2
MORE	jpg	20091027_000845_n4c2A.fts	2009-10-27 00:08:45	SC-A	COR2
MORE	jpg	20091027_000800_d4c2B.fts	2009-10-27 00:08:49	SC-B	COR2
MORE	jpg	20091027_000815_n4c2B.fts	2009-10-27 00:09:04	SC-B	COR2
MORE	jpg	20091027_000915_n4c2A.fts	2009-10-27 00:09:15	SC-A	COR2
MORE	jpg	20091027_000845_n4c2B.fts	2009-10-27 00:09:34	SC-B	COR2
MORE	jpg	20091027_000915_n4c2B.fts	2009-10-27 00:10:04	SC-B	COR2
MORE	jpg	20091027_002400_d4c2A.fts	2009-10-27 00:24:00	SC-A	COR2
MORE	jpg	20091027_002400_d4c2B.fts	2009-10-27 00:24:49	SC-B	COR2
MORE	jpg	20091027_003900_d4c2A.fts	2009-10-27 00:39:00	SC-A	COR2
MORE	jpg	20091027_003900_d4c2B.fts	2009-10-27 00:39:49	SC-B	COR2
MORE	jpg	20091027_005400_d4c2A.fts	2009-10-27 00:54:00	SC-A	COR2
MORE	jpg	20091027_005400_d4c2B.fts	2009-10-27 00:54:49	SC-B	COR2
MORE	jpg	20091027_010800_d4c2A.fts	2009-10-27 01:08:00	SC-A	COR2
MORE	jpg	20091027_010815_n4c2A.fts	2009-10-27 01:08:15	SC-A	COR2
MORE	jpg	20091027_010845_n4c2A.fts	2009-10-27 01:08:45	SC-A	COR2
MORE	jpg	20091027_010800_d4c2B.fts	2009-10-27 01:08:49	SC-B	COR2
MORE	jpg	20091027_010815_n4c2B.fts	2009-10-27 01:09:04	SC-B	COR2
MORE	jpg	20091027_010915_n4c2A.fts	2009-10-27 01:09:15	SC-A	COR2
MORE	jpg	20091027_010845_n4c2B.fts	2009-10-27 01:09:34	SC-B	COR2
MORE	jpg	20091027_010915_n4c2B.fts	2009-10-27 01:10:04	SC-B	COR2
MORE	jpg	20091027_012400_d4c2A.fts	2009-10-27 01:24:00	SC-A	COR2
MORE	jpg	20091027_012400_d4c2B.fts	2009-10-27 01:24:49	SC-B	COR2
MORE	jpg	20091027_013900_d4c2A.fts	2009-10-27 01:39:00	SC-A	COR2
MORE	jpg	20091027_013900_d4c2B.fts	2009-10-27 01:39:49	SC-B	COR2
MORE	jpg	20091027_015400_d4c2A.fts	2009-10-27 01:54:00	SC-A	COR2
MORE	jpg	20091027_015400_d4c2B.fts	2009-10-27 01:54:49	SC-B	COR2
MORE	jpg	20091027_020800_d4c2A.fts	2009-10-27 02:08:00	SC-A	COR2
MORE	jpg	20091027_020815_n4c2A.fts	2009-10-27 02:08:15	SC-A	COR2
MORE	jpg	20091027_020845_n4c2A.fts	2009-10-27 02:08:45	SC-A	COR2


STEREO/SECCHI NRL Movie Tools - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://sohowww.nascom.nasa.gov/solarsoft/stereo/secchi/doc/secchimvi.htm
Google
Most Visited
Community Supp...
Fedora
STEREO
Index of /PT/flight/o...
STEREO/SECCHI NRL Movie ...
SECCHI Flight (S/C A and B) I...
STEREO/SECCHI NRL Movie Tools
$Revision: 1.15 $, $Date: 2010/02/02 22:19:47 $
Contact mvi at cronus.nrl.navy.mil
Contents
Web Movie Tools/Products: View SECCHI movies via the SECCHI website
JPL Web Movie Tools: JPL's Solar Muse website
SCC_PLAYMOVIE: Run MVI files with numerous uptions
ANNOTATE_IMAGE: Add text or arrows to image or MVI frames
WSCC_MKMOVIE: Generate MVI or standard format frames using SECCHI_PREP
MK_EUVI_MOVIE: Shortcut for making EUVI movies
SCC_PLAYMOVIEM: SCC_PLAYMOVIE plus cursor coordinate display and height-time plotting
SXPLOT_HT: Display height-time data from SCC_PLAYMOVIEM
WSCC_COMBINE_MVI: Combine MVIS for any combination of SECCHI telescopes
GENERIC_MOVIE: Generate MVI from data cube or standard format image files
MVI2CARRMAP: Generate Carrington maps from MVI frames
SREM_MOVIE: Create HI movies using cross-correlation to remove stellar background
SCC_PNGPLAY (NRL only): Quickest way to view desired movie
Web Movie Tools/Products
The following use already-created browse images for NRL Level-0 data (48-84 hours delay)
EUVI-171,195,284,304A images are log-scaled
COR2 TBr and HI images are ratios with monthly_min background
Javascript movie tool: http://secchi.nrl.navy.mil/index.php?p=js_secchi
Done

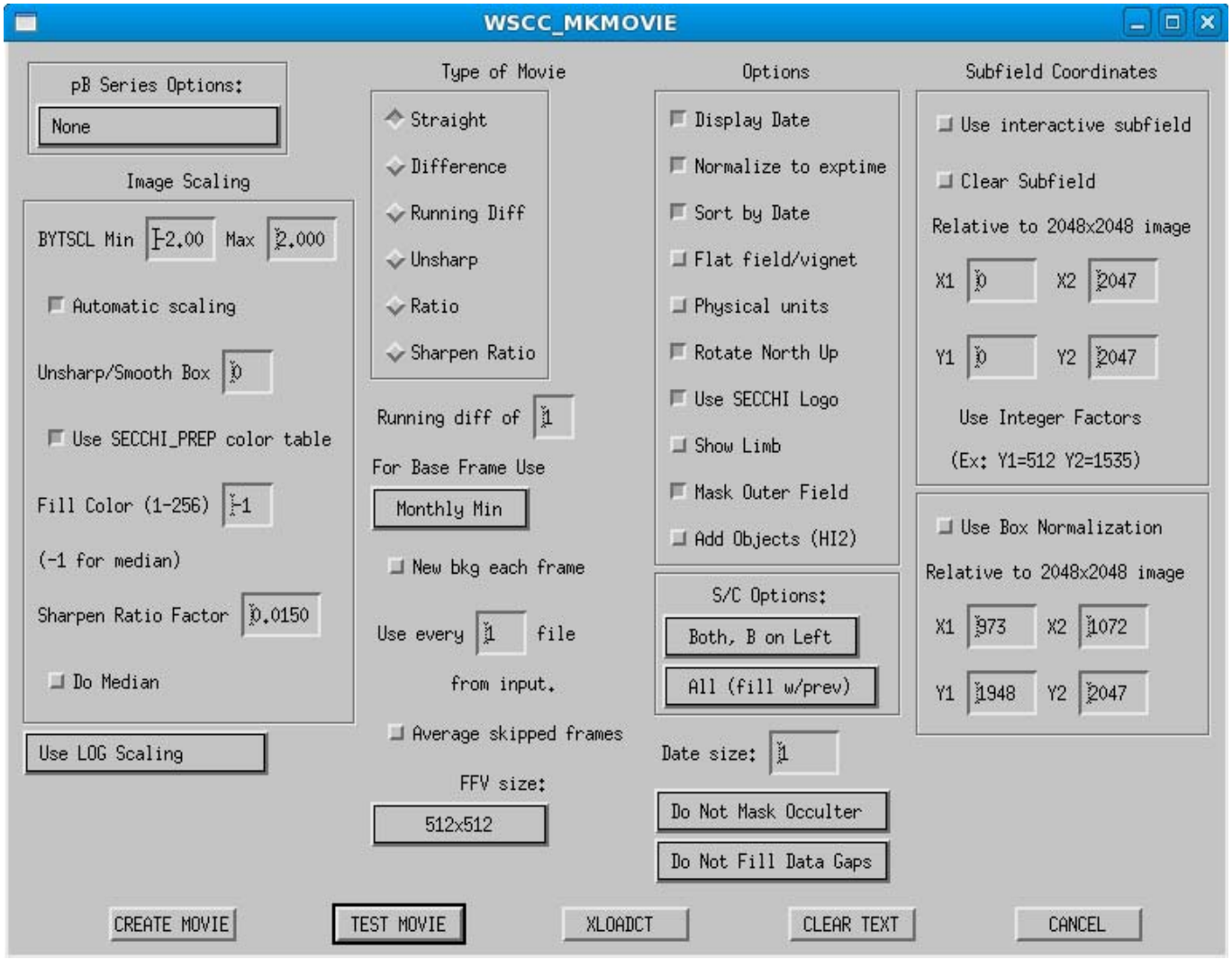
SCCLISTER

IDL> files=SCCLISTER()



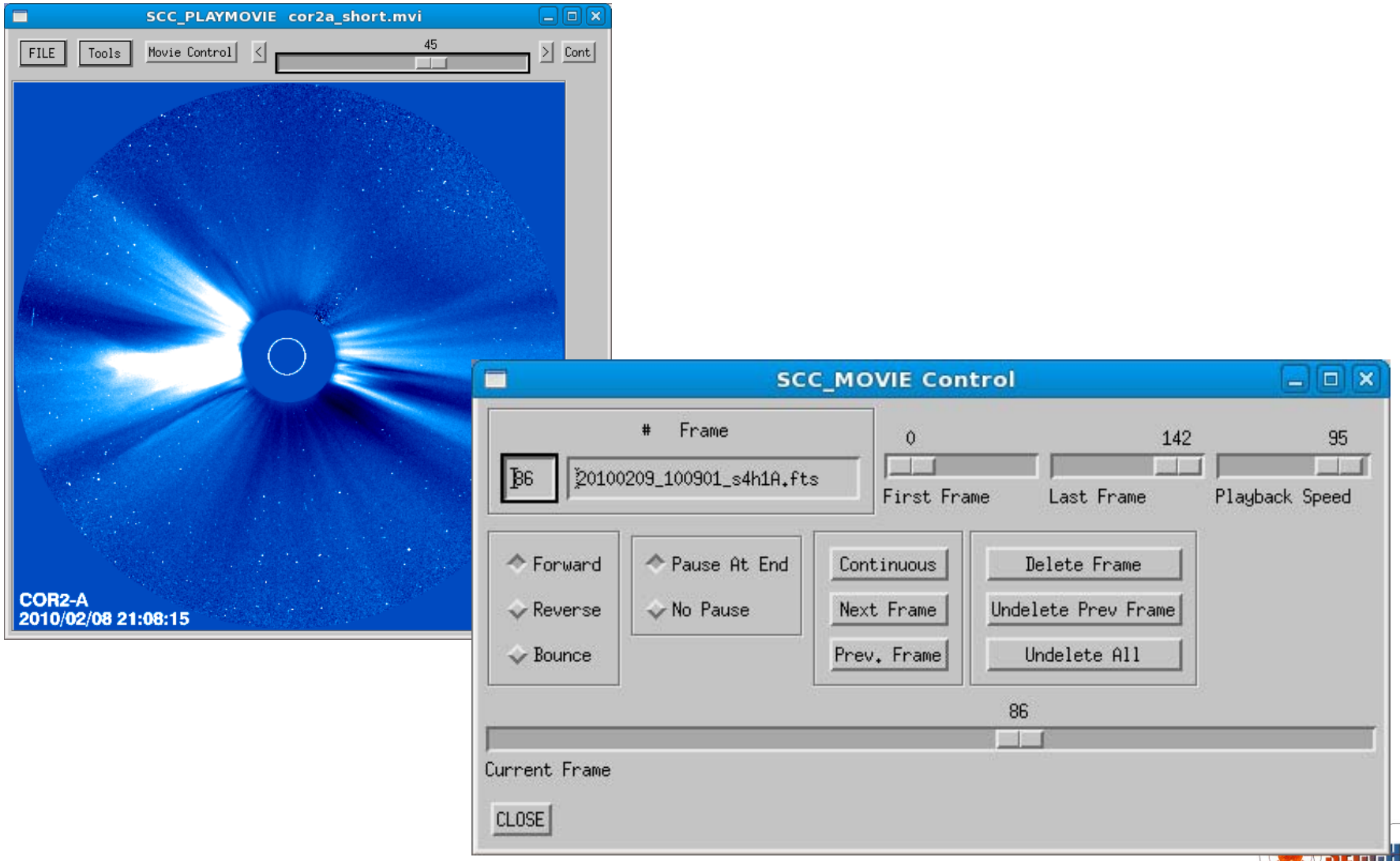
WSCC_MKMOVIE

IDL> wscc_mkmovie, files.sc_a or **IDL> wscc_mkimage ,one_file**

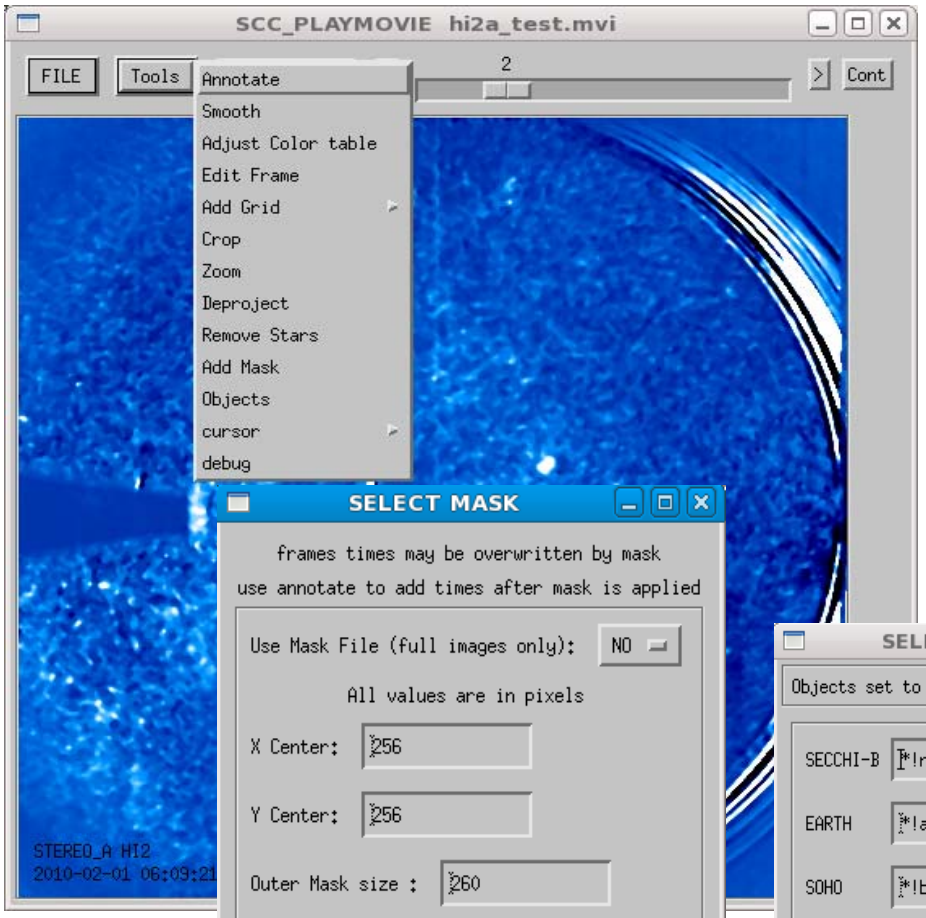


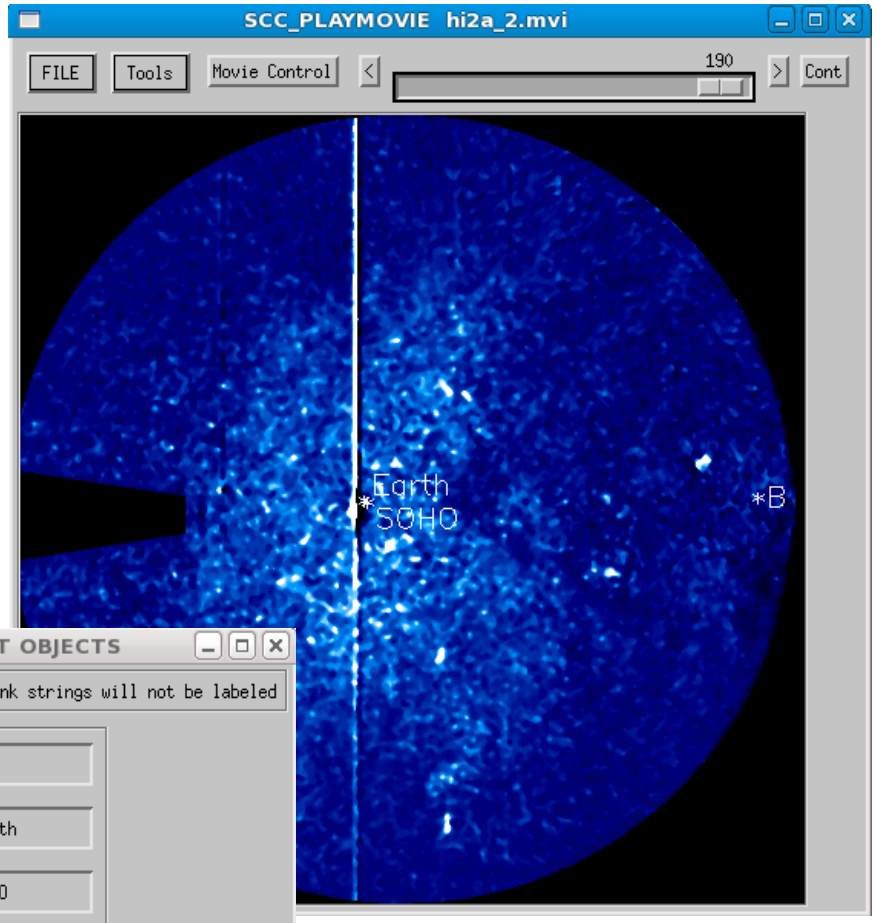
SCC_PLAYMOVIE

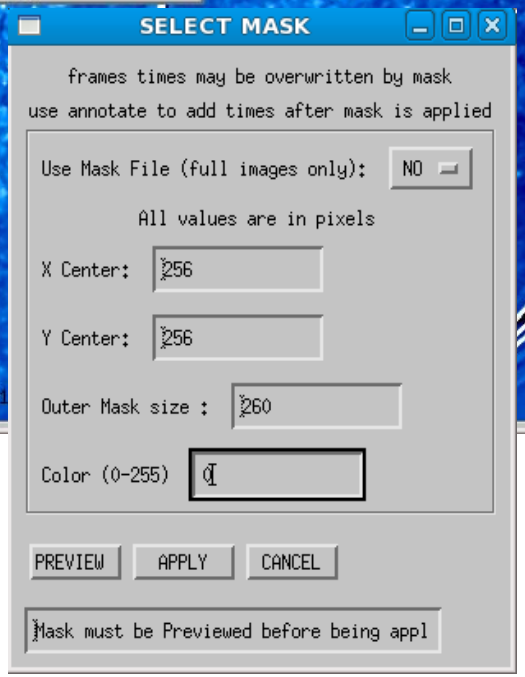
IDL> scc_playmovie ,['cor2a_short.mvi']

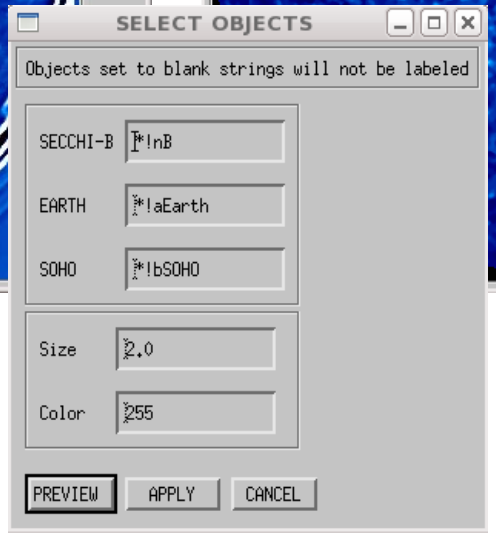


SCC_PLAYMOVIE: HI2

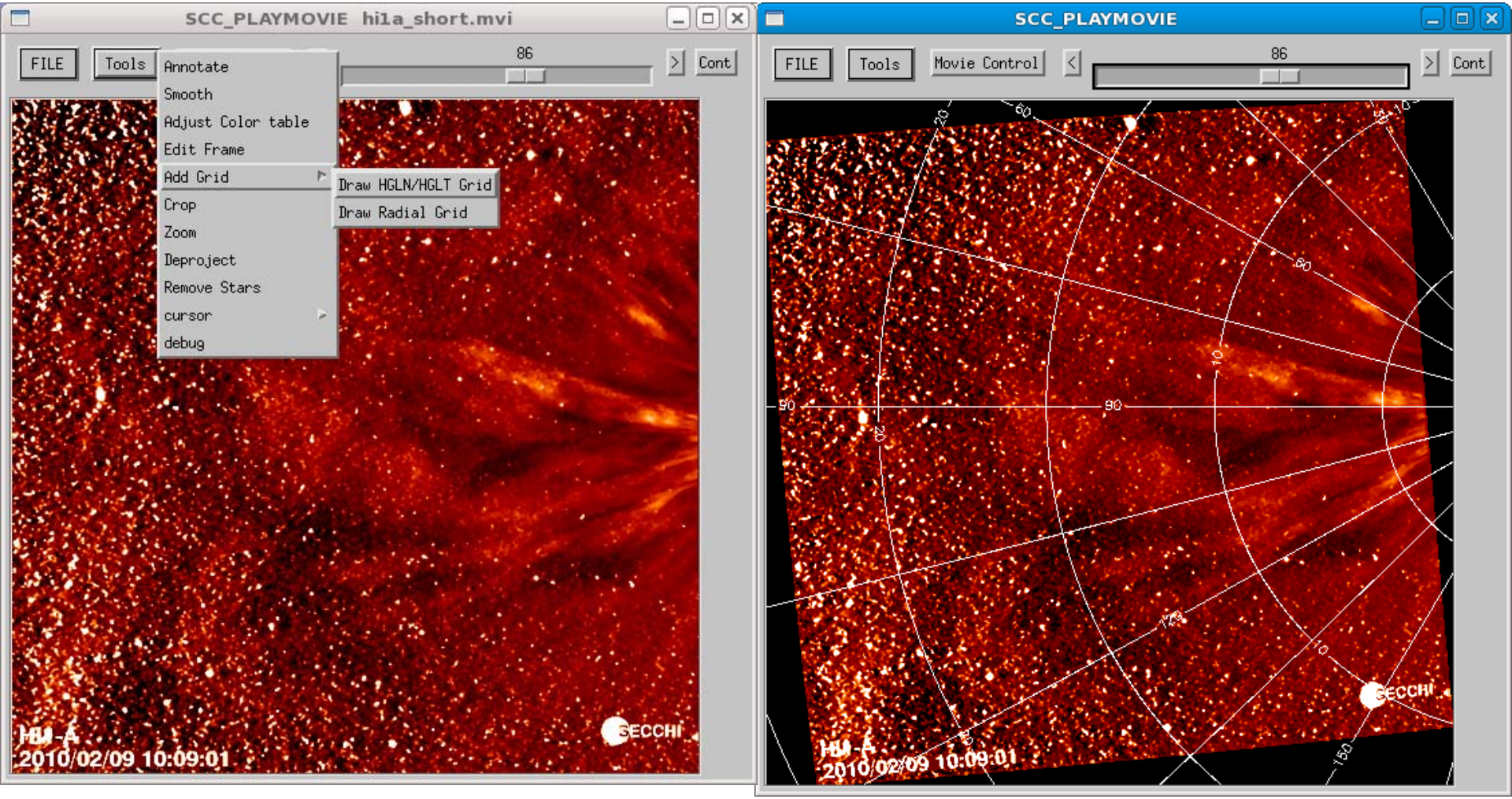




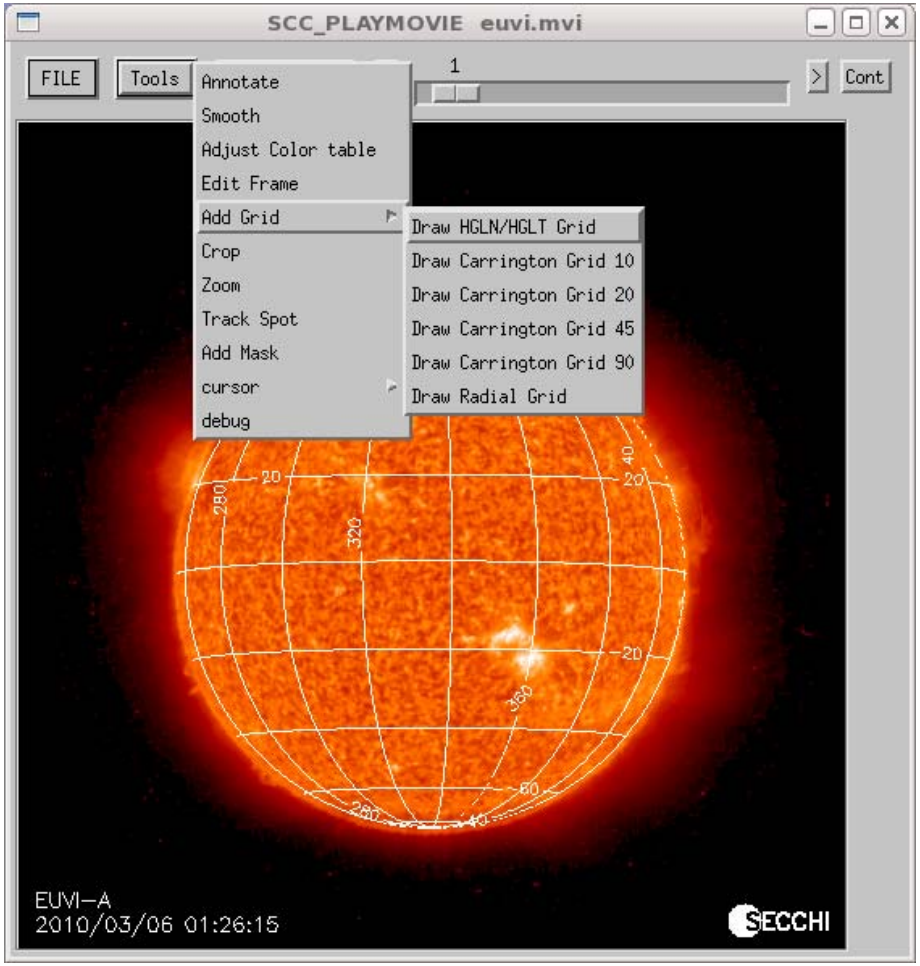


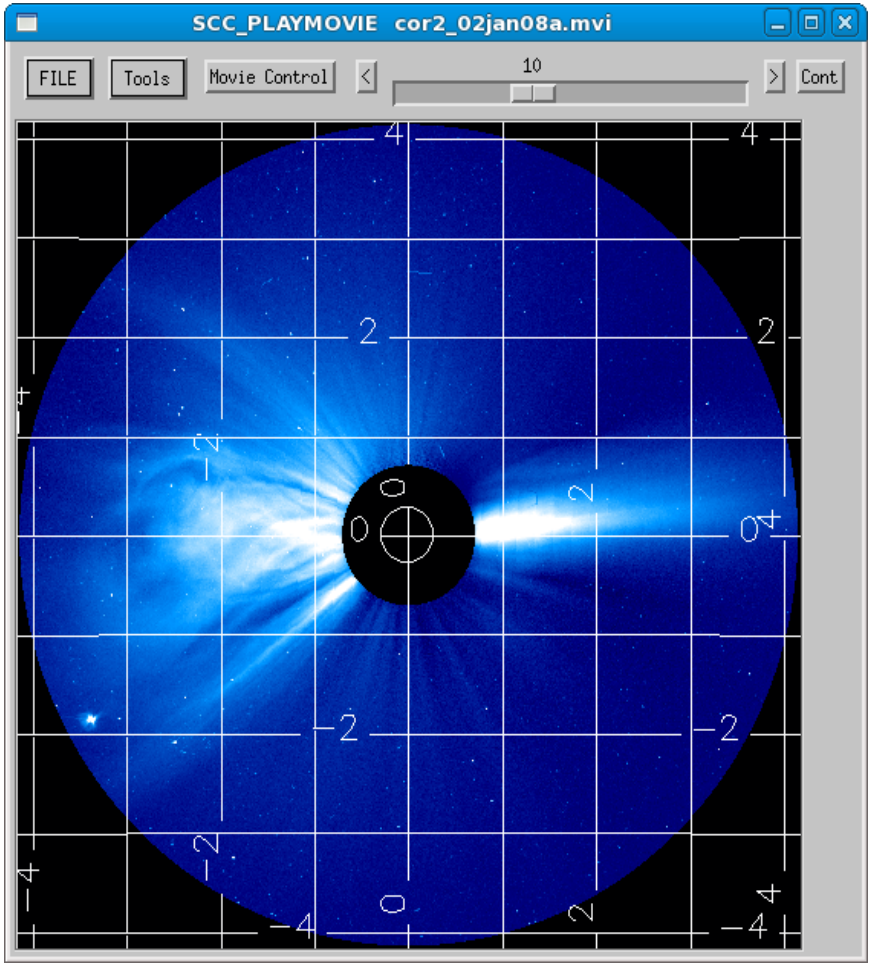


SCC_PLAYMOVIE: HI1

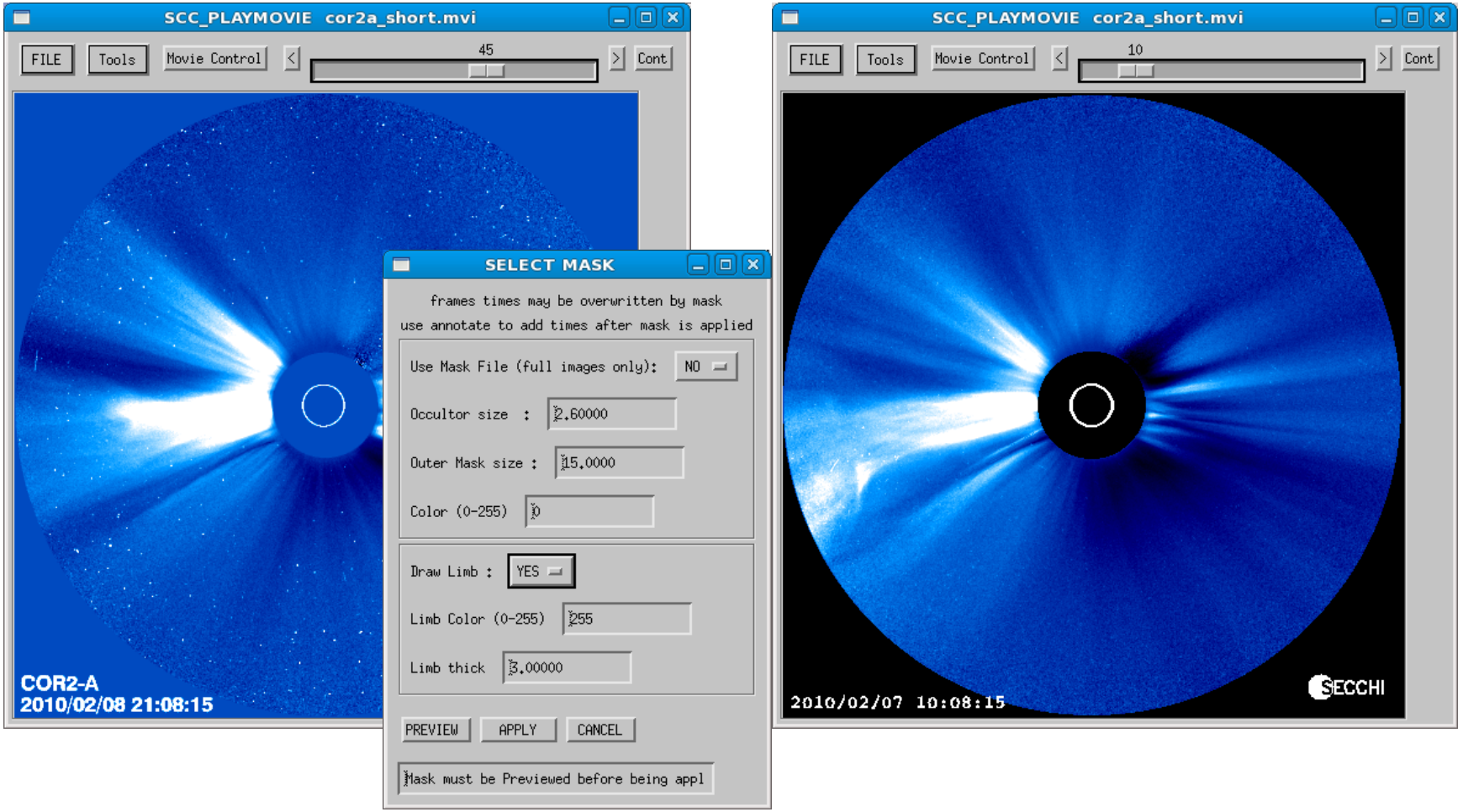


SCC_PLAYMOVIE Grids

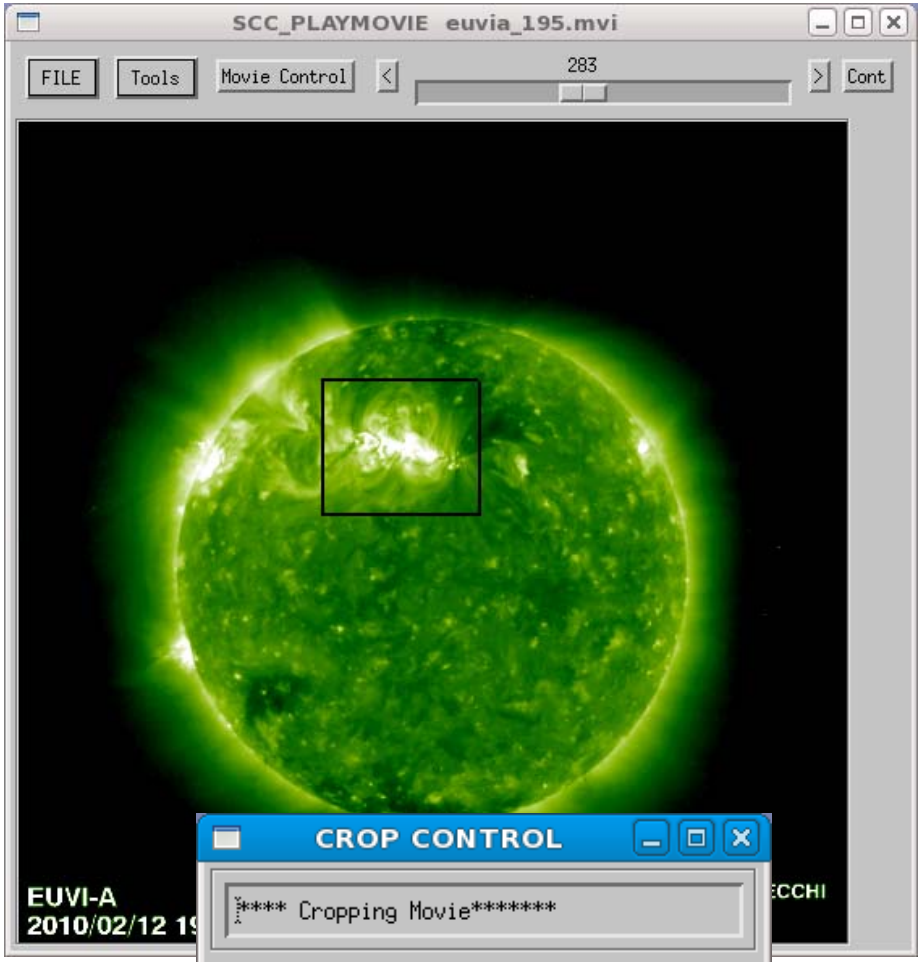


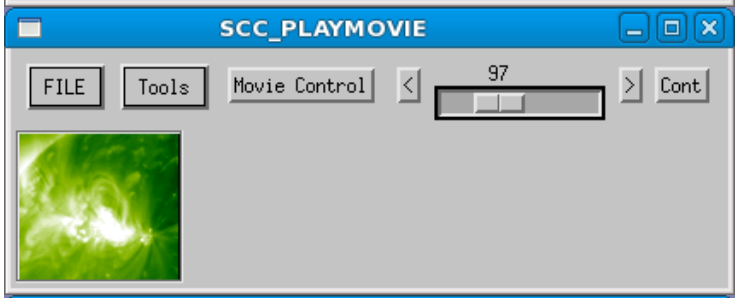


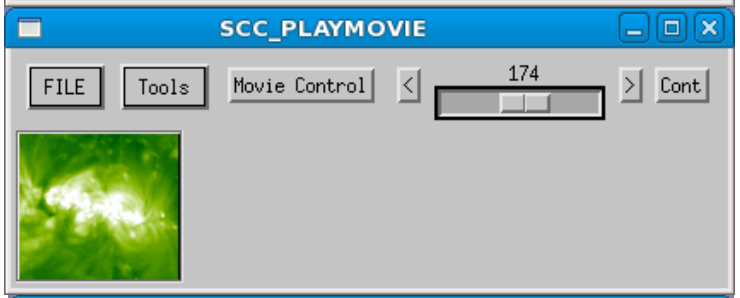
SCC_PLAYMOVIE: COR2 Mask

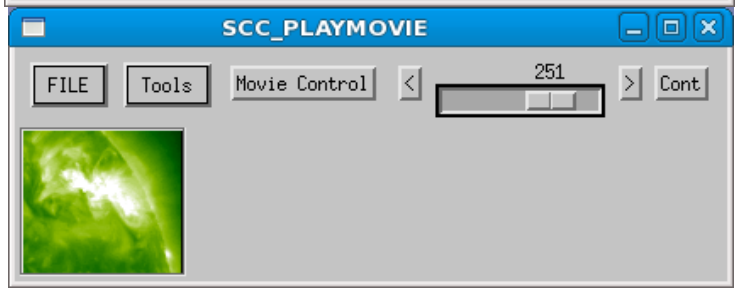


SCC_PLAYMOVIE: EUVI CROP

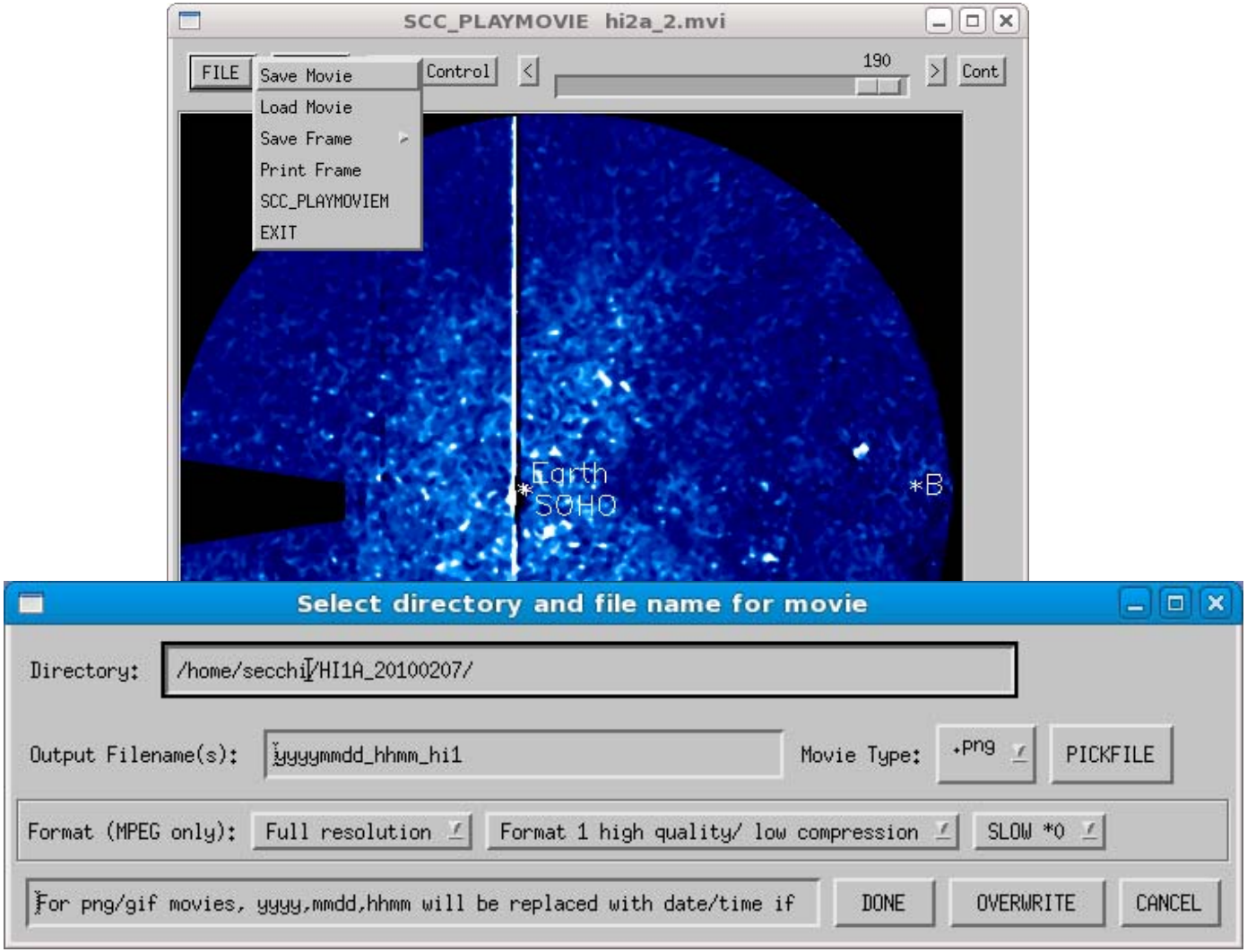








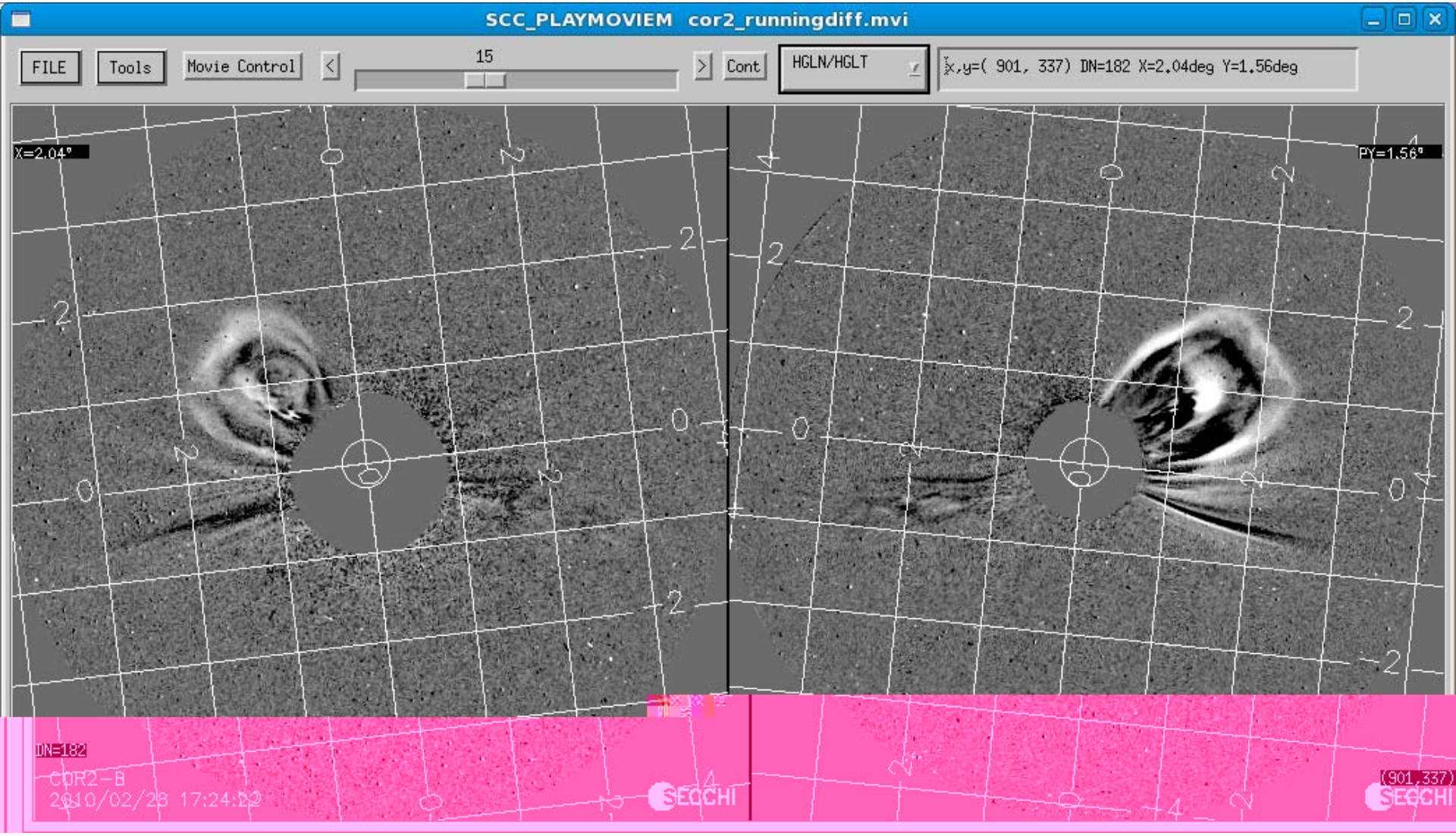
SCC_PLAYMOVIE: Save



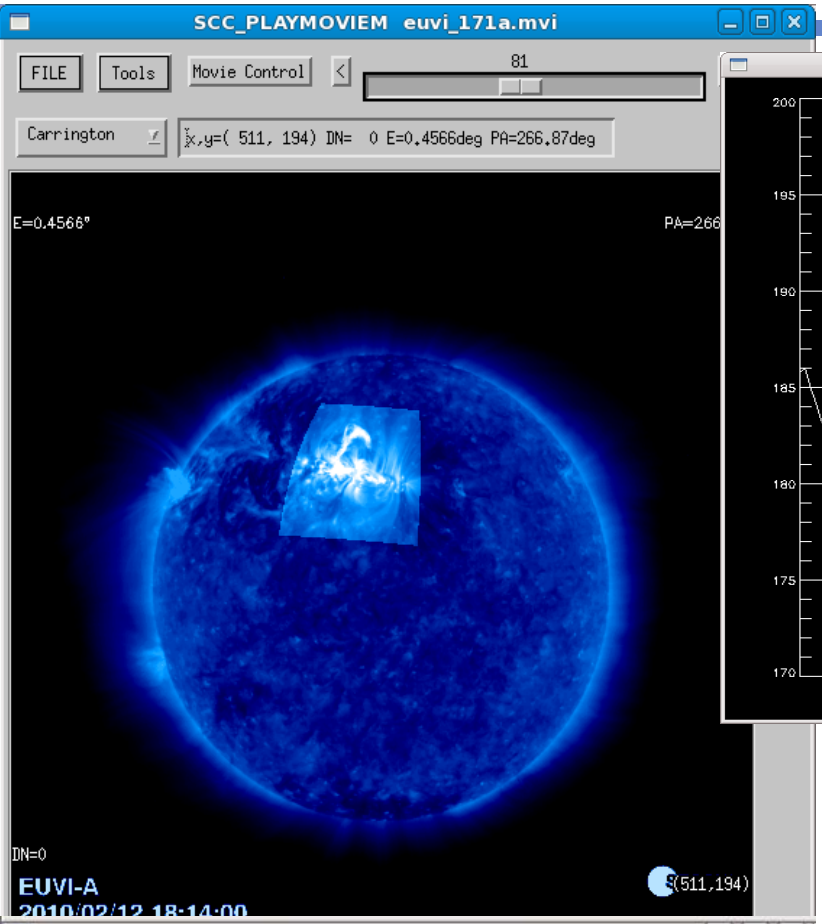
SCC_PLAYMOVIEM

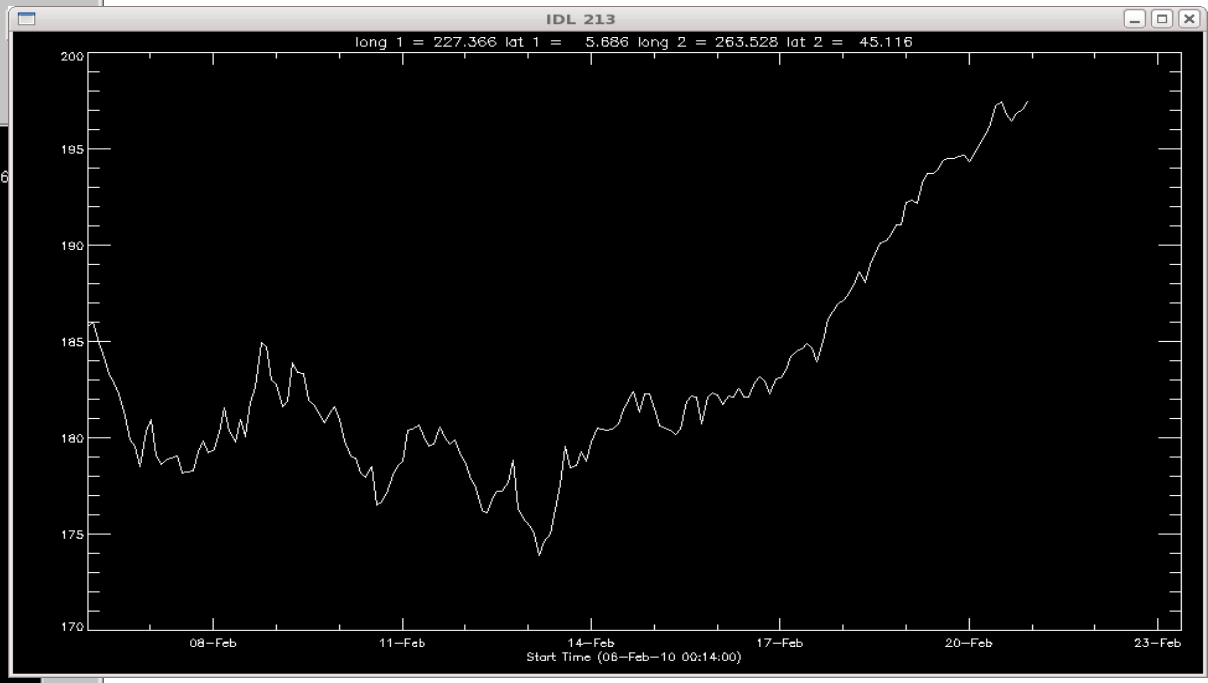
- **Display cursor position in Heliocentric Radial, Heliocentric Cartesian, or Carrington coordinates**
  - Coordinates are corrected for distortion and spherical projection (a factor for HI and COR2)
- **Track subfield by Carrington coordinate**
- **Generate “Height-Time” plots using manual pixel/feature selection**
- **Synchronize time and position with Jmaps via TOOL2A.PRO (and vice versa)**

SCC_PLAYMOVIEM: AB movies



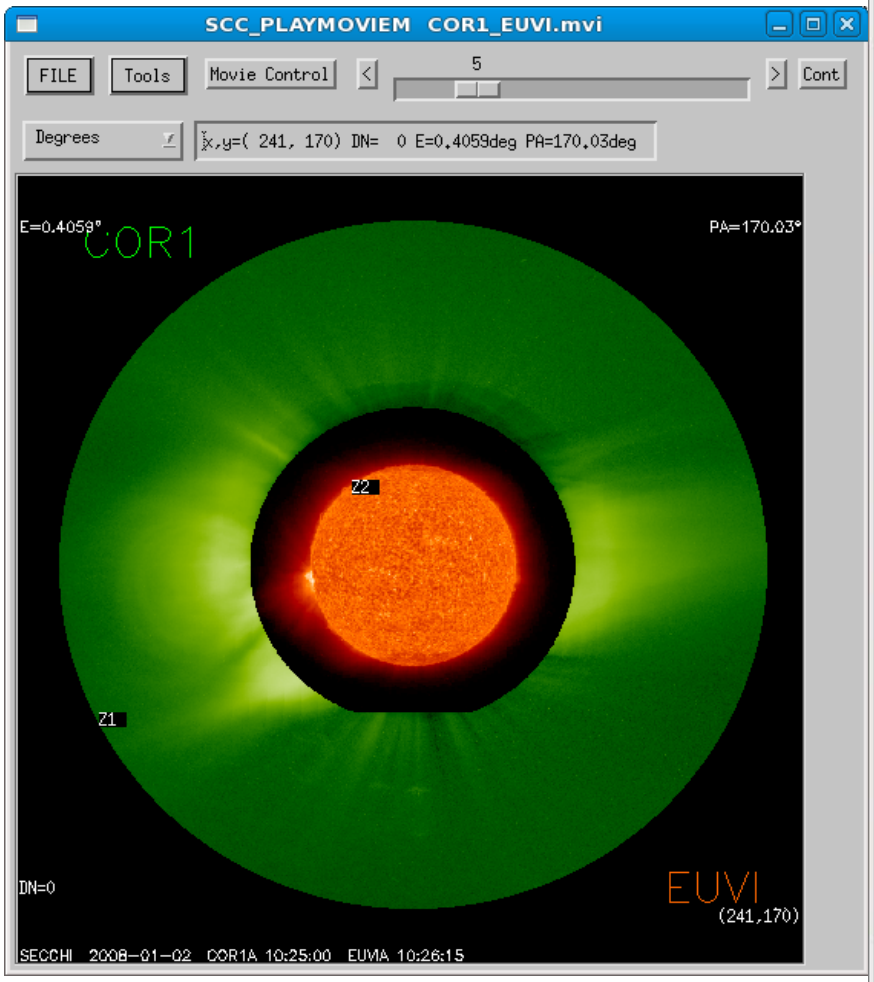
SCC_PLAYMOVIEM: EUVI Track Spot

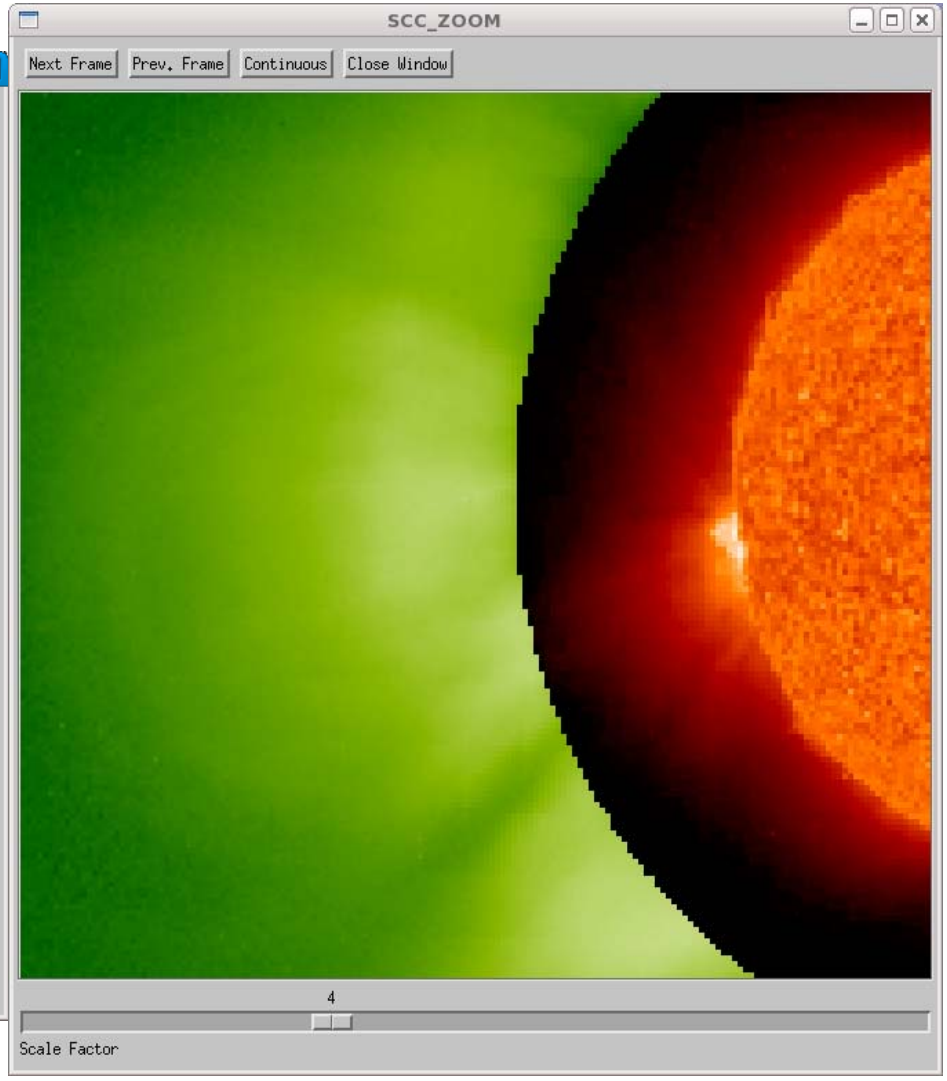




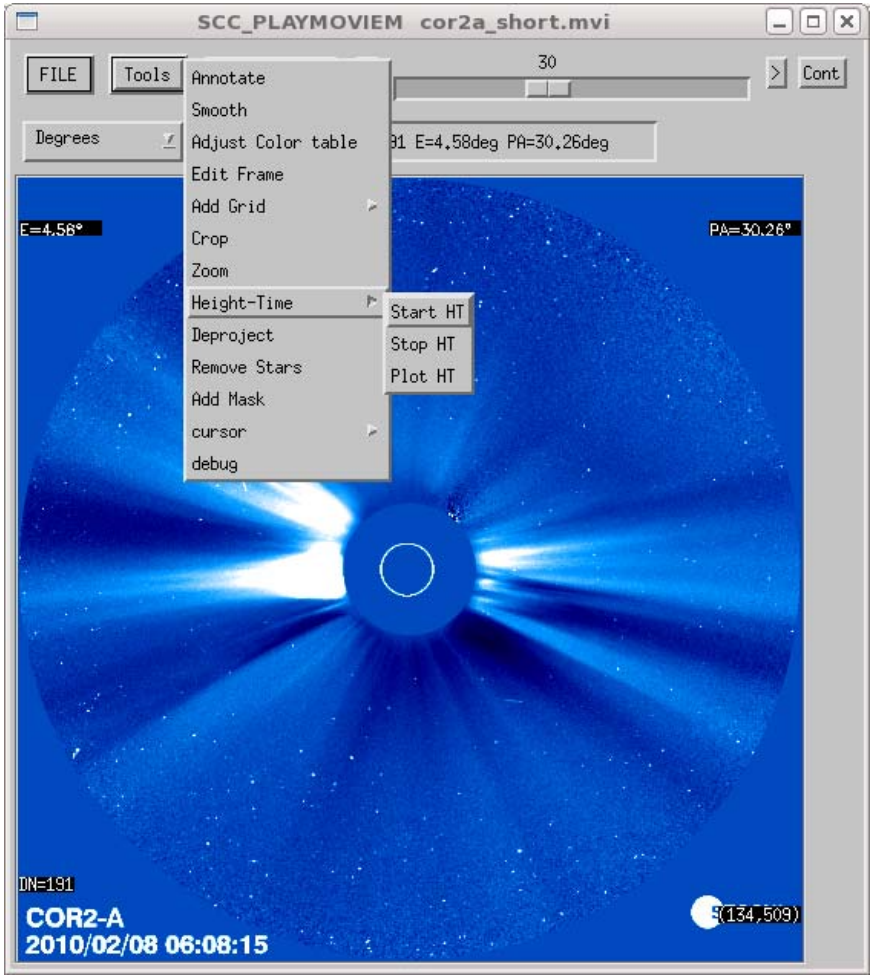

```
long 1 = 227.366 lat 1 =   5.686 long 2 = 263.528 lat 2 =  45.116
OBSRVTRY  STEREO_A
DETECTOR  EUVI
FILTER    S1
WAVELNTH  171
DATE/TIME                   Total       N_pixels    Average
2010-02-06T00:14:00.007     16534.0        89       185.775
2010-02-06T02:14:00.008     22692.0       122       186.000
```

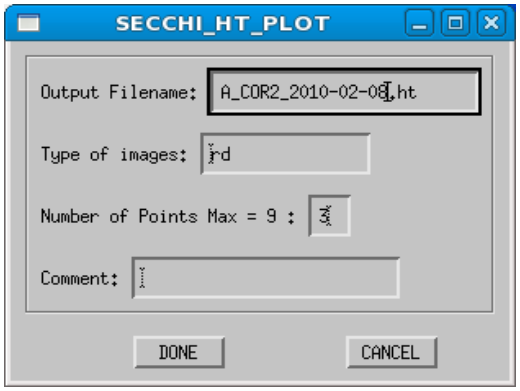
SCC_PLAYMOVIEM: ZOOM

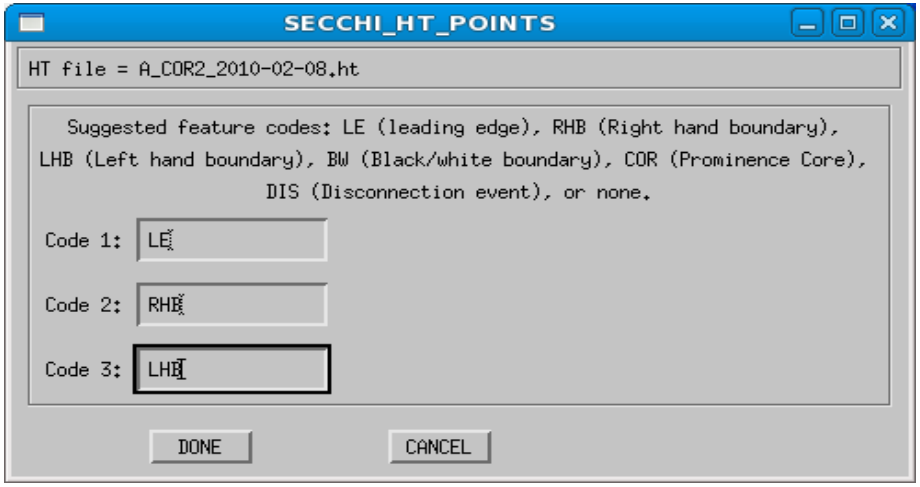




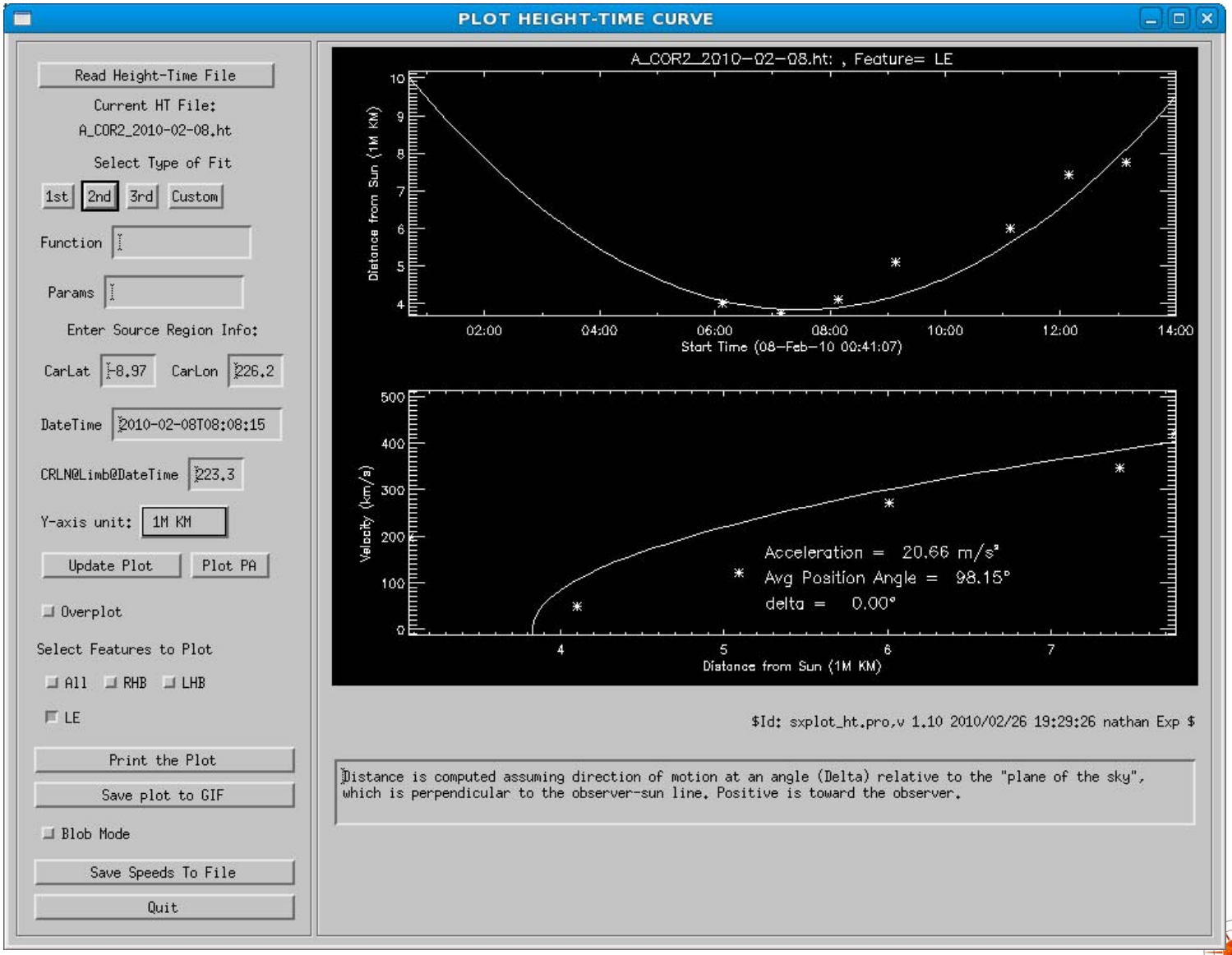
SCC_PLAYMOVIEM: HT Plot



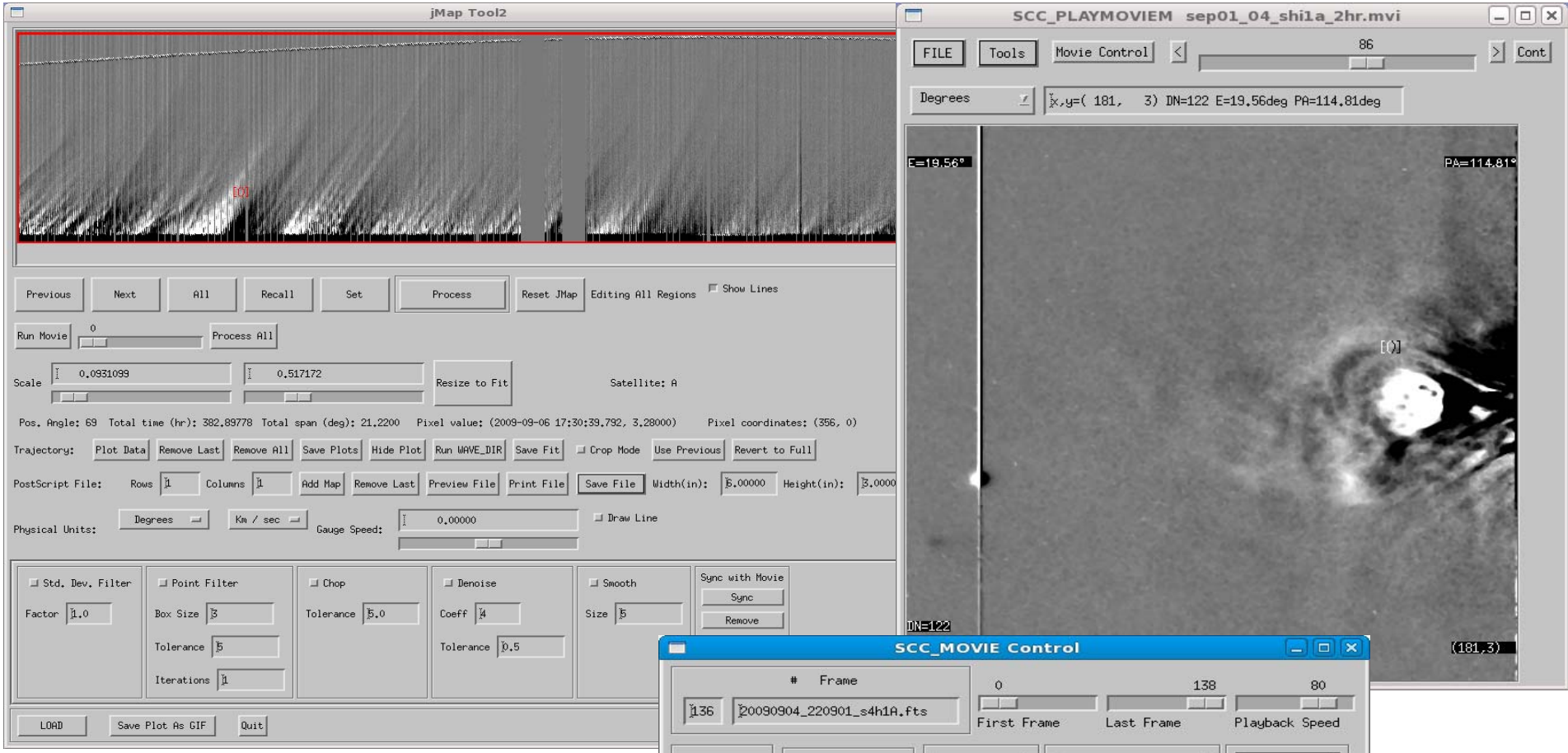




SXPLOT_HT


PLOT HEIGHT-TIME CURVE
Read Height-Time File
Current HT File:
A_COR2_2010-02-08.ht
Select Type of Fit
1st
2nd
3rd
Custom
Function
Params
Enter Source Region Info:
CarLat
-8.97
CarLon
226.2
DateTime
2010-02-08T08:08:15
CRLN@Limb@DateTime
223.3
Y-axis unit:
1M KM
Update Plot
Plot PA
Overplot
Select Features to Plot
All
RHB
LHB
LE
Print the Plot
Save plot to GIF
Blob Mode
Save Speeds To File
Quit
A_COR2_2010-02-08.ht: , Feature= LE
Distance from Sun (1M KM)
Start Time (08-Feb-10 00:41:07)
Velocity (km/s)
Acceleration = 20.66 m/s²
Avg Position Angle = 98.15°
delta = 0.00°
Distance from Sun (1M KM)
$Id: sxplot_ht.pro,v 1.10 2010/02/26 19:29:26 nathan Exp $
Distance is computed assuming direction of motion at an angle (Delta) relative to the "plane of the sky", which is perpendicular to the observer-sun line. Positive is toward the observer.

Jmaps and Tool2a



Movies serve as inputs to tool2a.pro

Jmaps created using tool2a.pro

Jmaps are HT plots along specified PA

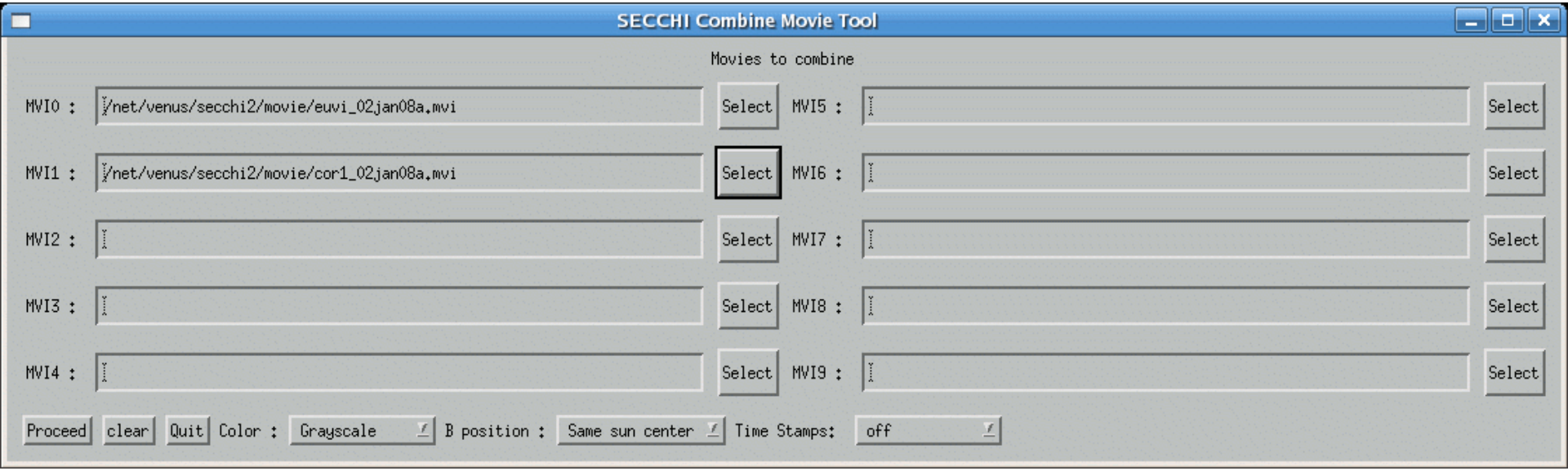
Jmaps allow user to perform feature tracking

To Sync use the center mouse button

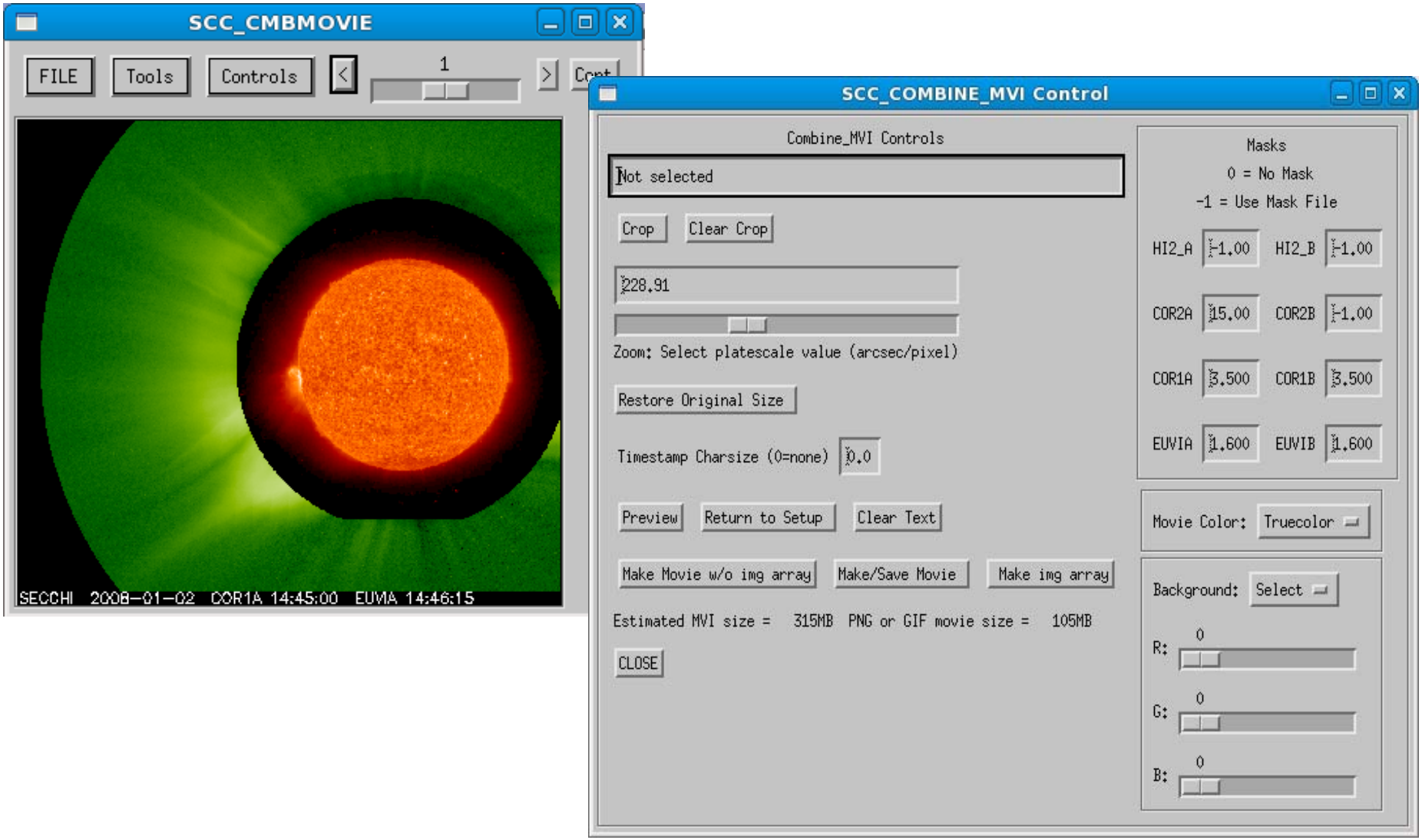
WSCC_COMBINE_MVI

Combines frames from existing .mvi/.hdr files from a combination of SECCHI telescopes into single frames at the correct relative platescale and orientation.

IDL> wscc_combine_mvi

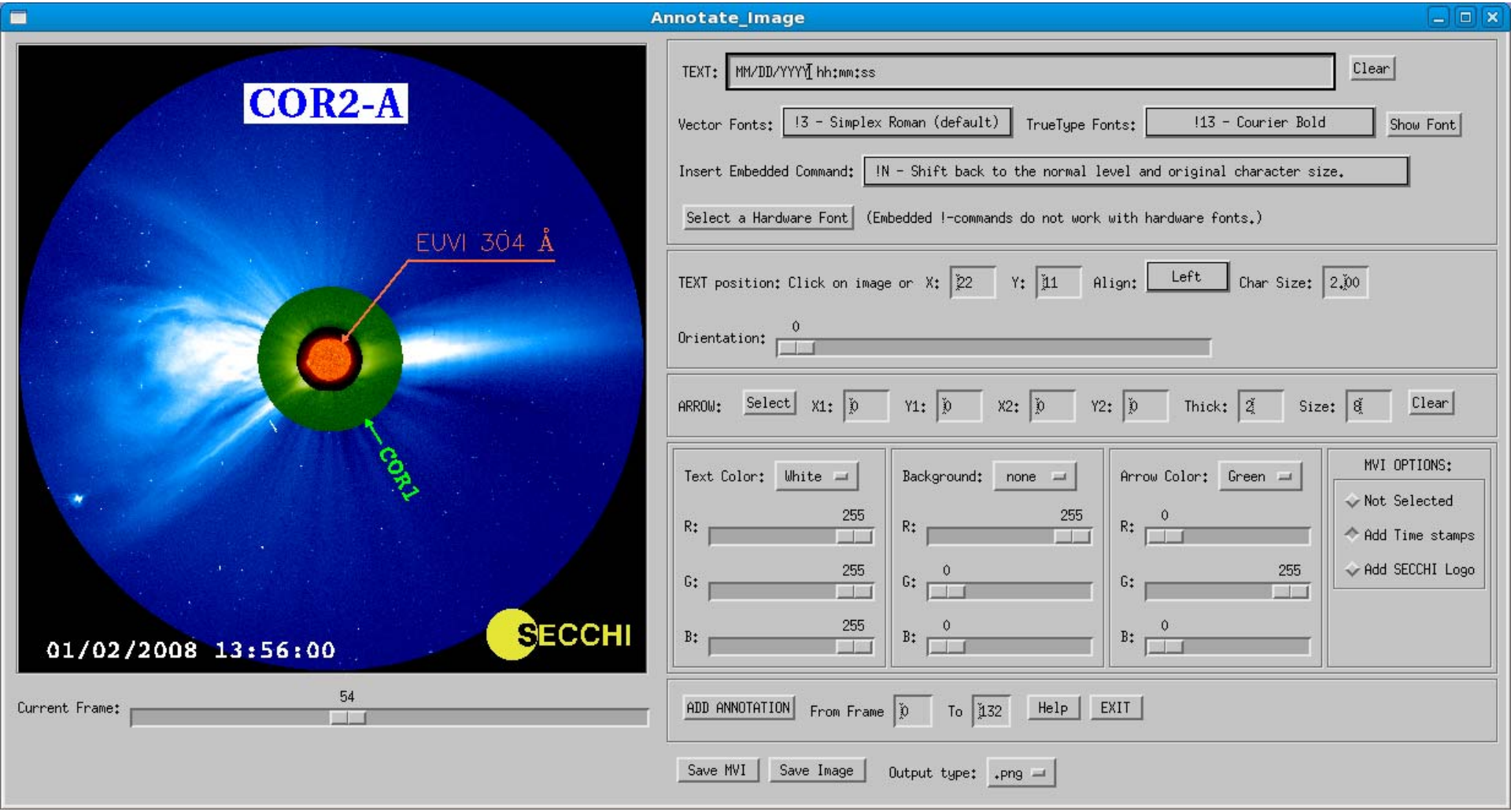


WSCC_COMBINE_MVI: Control



ANNOTATE_IMAGE

IDL> annotate_image ,['some.mvi' or 'some_image.gif']

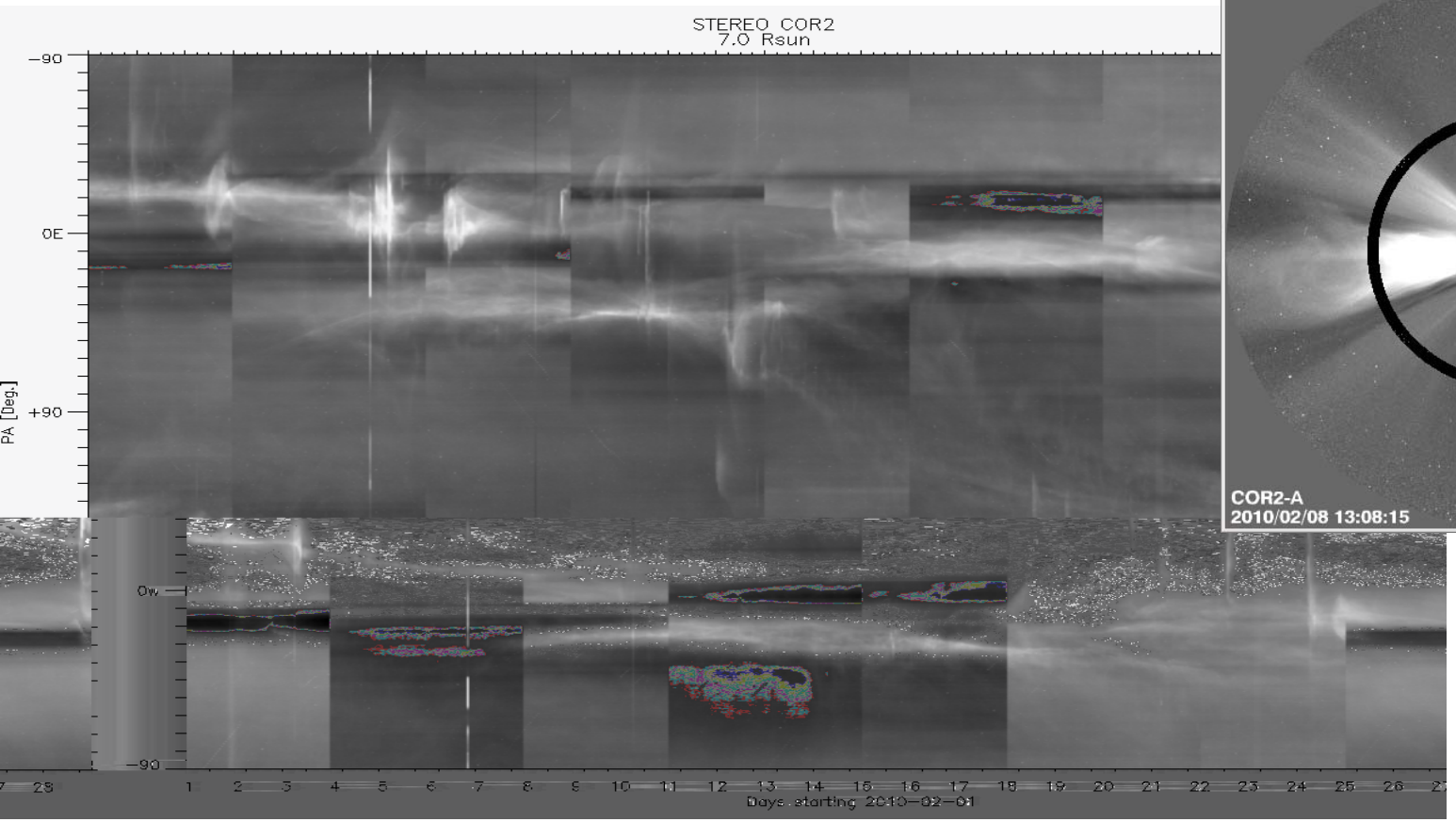


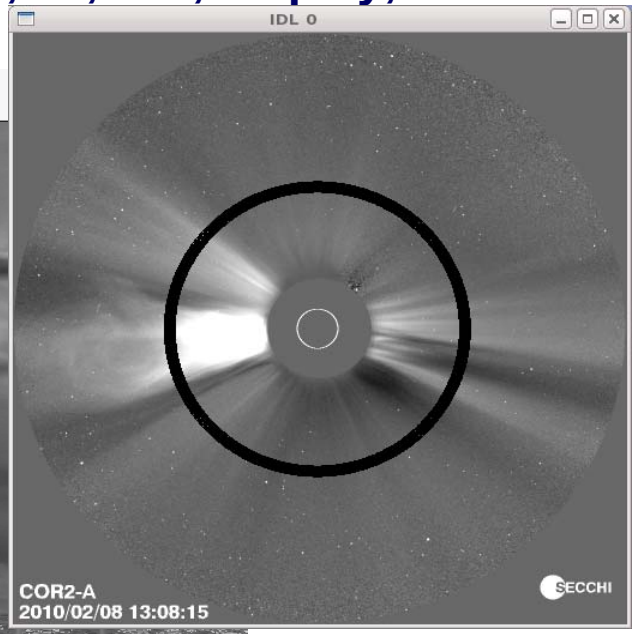
MVI2CARRMAP

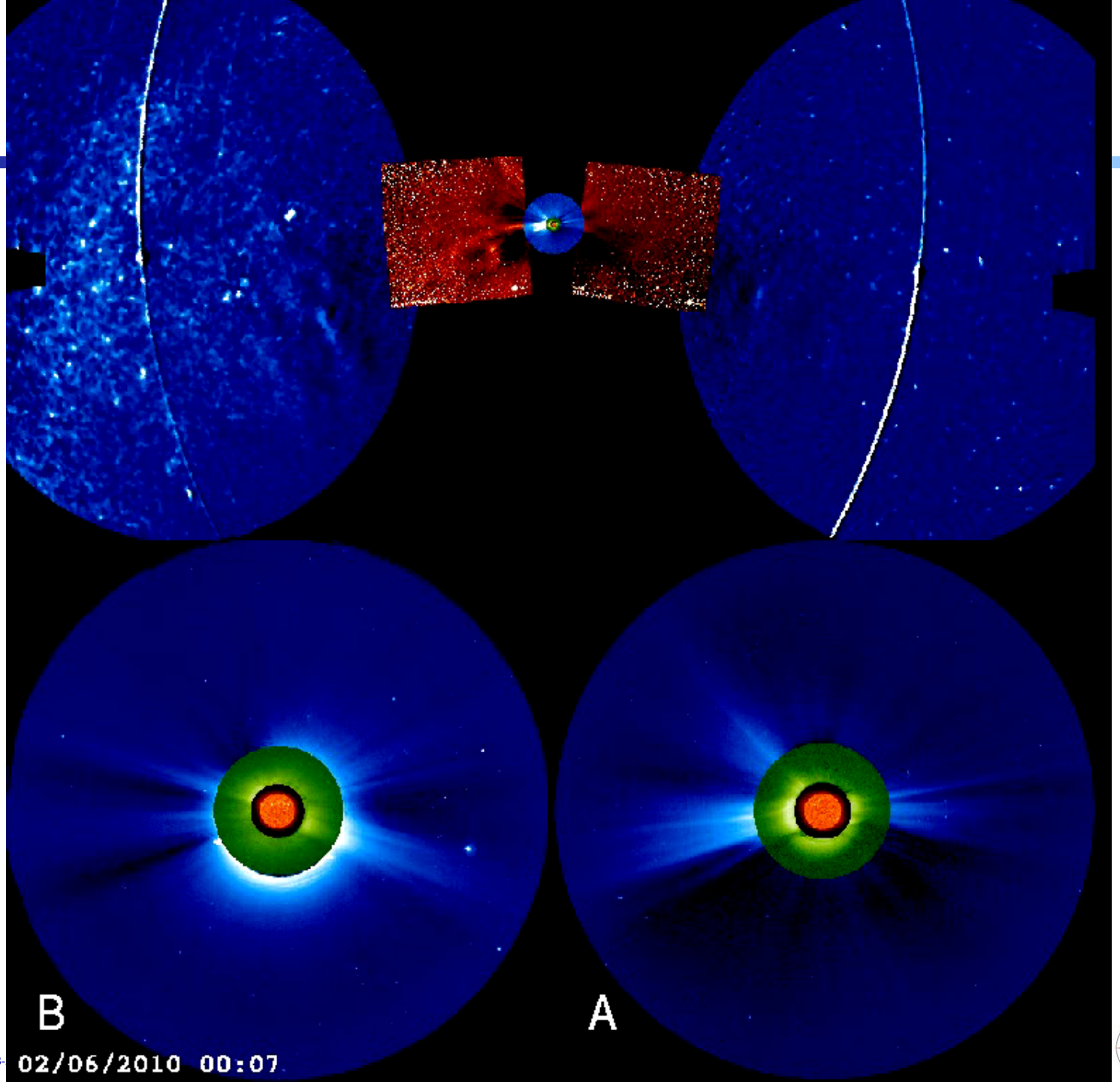
Creates Carrington/Synoptic maps from MVI movies

- **Works for EIT/LASCO movies**

IDL> mvi2carrmap,'201002/cor2a_0201_0228.mvi', 7.0, 10, .25 ,/display, /synoptic, png='synoptic'






B
A
02/06/2010 00:07