

Creating Calibrated Images with SECCHI_PREP

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What is SECCHI_PREP?

- IDL software routine to read in and perform the latest calibration and image correction procedures for all SECCHI instruments.
- Available through SolarSoftWare
- SECCHI_PREP is intended to be the single routine that the user would interact with to process level 0.5 data level 1.0 data.



SECCHI Data Levels

- Level 0 : data downloaded from spacecraft
- Level 0.5 : data processed through pipeline
 - data users interact with
 - Comes from three sources : lz, pb, rt
 - Come in several flavors :
 - Intensity, Polarized, TB (Total Brightness), Calibration, TBPP
- Level 1 : fully calibrated data
- Level 2 : any combination of level 1.0 data



The SECCHI_PREP Way

- **Fast, Efficient, Flexible and Friendly**
 - All procedures are modular
 - Calibration is easily updatable
 - Everything has a keyword
 - History contains all applied factors
- **Error Handling**

```
ERROR WHILE PROCESSING 20070504_154820_s7h2A.fts IMAGE SKIPPED
```

```
Traceback Report from SECCHI_PREP :
```

```
% Variable is undefined: OBS
```

```
% Execution halted at:  SCC_BYTSCL      87  ~/idl/prep/scc_bytscl.pro
```

```
%          SECCHI_PREP  500 ~/idl/prep/secchi_prep.pro
```



SECCHI_PREP

- General Procedures
 - Reads Image and Header
 - Trims Image
 - Generates Output Array
 - scales image and handles subfields
 - Calibrates Images
 - Updates Header
 - Writes Image Files
 - FITS, PNG, and JPG



Using SECCHI_PREP with EUVI

- Correction
 - SEB Image Processing Correction
 - SEB IP - divide by 2, 3, 4 and square root
 - Normalize to 'Clear Filter'
 - Subtract the Bias
 - Normalize Exposure Time
 - Apply a Calibration Image
 - flat field
 - DN to Detected Photons Correction



Using SECCHI_PREP with COR1

- Calibration
 - SEB Image Processing Correction
 - SEB IP - divide by 2, 3, 4 and square root
 - Subtract the Bias
 - Subtract Stray-light Background
 - Normalize Exposure Time
 - Apply a Calibration Image
 - vignetting and flat fielding
 - DN to MSB Calibration Factor



Using SECCHI_PREP with COR2

- Calibration
 - SEB Image Processing Correction
 - SEB IP - divide by 2, 3, 4 and square root
 - Subtract the Bias
 - Normalize Exposure Time
 - Apply a Calibration Image
 - vignetting and flat fielding
 - DN to MSB Calibration Factor



Creating Level 2 Images

- Polarization Image
 - Total Brightness
 - Polarized Brightness
 - Percent Polarized
 - Polarization Angle
- Restrictions
 - Input files must be sorted into triples
 - Only one type of image can be returned



Using SECCHI_PREP with HI1 & HI2

- Correction
 - SEB Image Processing Correction
 - SEB IP - divide by 2, 3, 4 and square root
 - Remove Cosmic Rays
 - Set Saturated Pixels to NaN
 - Corrects for Shutterless Mode (DN/sec)
 - Apply a Calibration Image
 - flat field
 - **Coming Soon** : DN to MSB Calibration Factor
 - HI1 only



Calibration Status

Calibration	EUVI	COR1	COR2	HI1	HI2
Shutterless readout correction	NA	NA	NA	hi_desmear.pro, v1.6, 2007/06/13	hi_desmear.pro, v1.6, 2007/06/13
Photometric calibration	get_calfac.pro, v1.1 2006/10/03	get_calfac.pro, v1.8 2008/02/13	get_calfac.pro, v1.9 2008/08/05	Publication imminent	Ongoing
Geometric distortion	NA	NA	Cor2_distortion.pro, v1.9 2008/08/06	get_hi_parameters.pro, v1.5 (PV2_1) 2008/07/28	get_hi_parameters.pro, v1.5 (PV2_1) 2008/07/28
Flat field + vignetting via get_calimg.pro	20060823_wav, 20080416_(grd,raw)	20071003_flatfd	20060929_vignet	20080129_flatfd	20080129_flatfd
Pointing	euvi_pointing.pro, v1.5 2007/05/08	cor1_pointing.pro, v1.9 2008/01/17	Cor2_pointing.pro, v1.1 2008/03/27	Hi_fix_pointing.pro, v1.1 2008/07/28	Hi_fix_pointing.pro, v1.1 2008/07/28



Example Calls

Default call:

```
IDL> secchi_prep, files, image, header
```

To limit the memory usage:

```
IDL> secchi_prep, files, image ,header, outsize = 512
```

To save FITS file and return to memory:

```
IDL> secchi_prep, files, image, header, /write_fts
```

To only save FITS file :

```
IDL> secchi_prep, files, /write_fts
```



SECCHI_PREP Keywords

SECCHI_PREP, filenames, images, headers
[,SAVEPATH=path] [,OUTSIZE=value] [,/WRITE_FTS]
[,/WRITE_PNG] [,/WRITE_JPG] [,/TRIM_OFF]
[,/ROTATE_ON] [,/CALIBRATE_OFF] [,/CALFAC_OFF]
[,/NORMAL_OFF] [,/DN2P_OFF] [,/BIAS_OFF]
[,/EXPTIME_OFF] [,/CALIMG_OFF] [,/SEBIP_OFF]
[,/NEW_CALIMG] [,/CALIMG_FILENAME=filename]
[,/SHUTTERLESS_OFF] [,/SMASK_ON] [,/TELE_ONLY]
[,/MASK_ONLY] [,/FILL_MEAN] [,/FILL_VALUE=value]
[,/POLARIZ_ON] [,/pB] [,/MU] [,/PERCENT]
[,/COLOR_ON] [,/DATE_ON] [,/LOGO_ON]



Websites

- **SECCHI_PREP User Guide**

<http://secchi.nrl.navy.mil/wiki/pmwiki.php?n=Main.SecchiPrep>

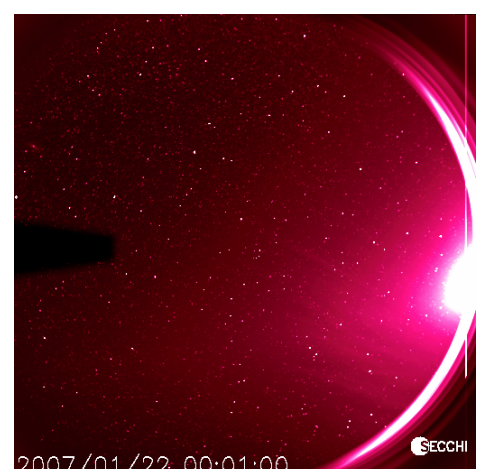
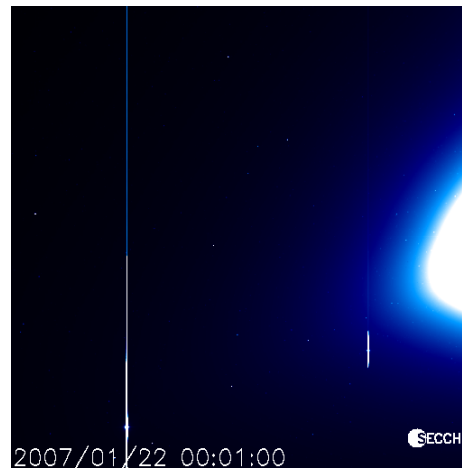
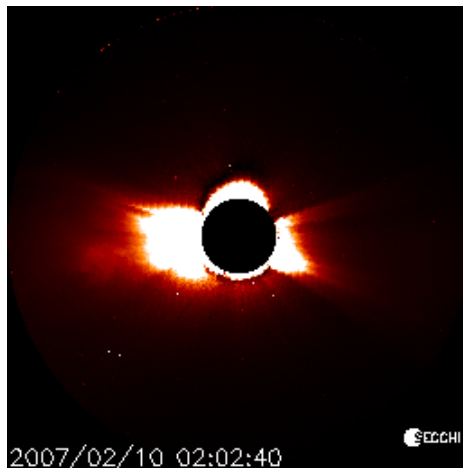
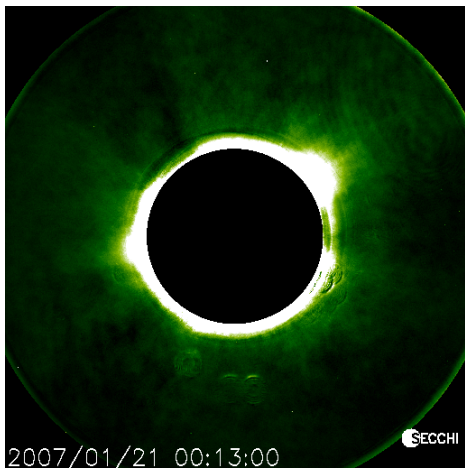
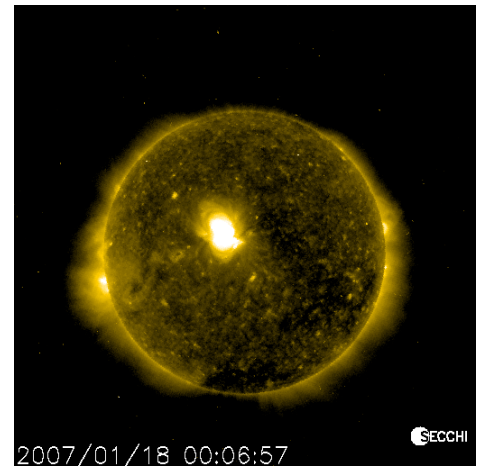
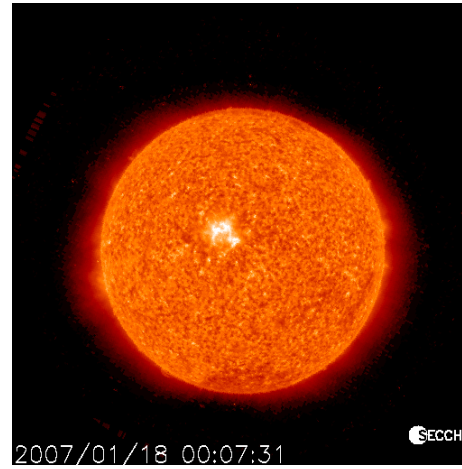
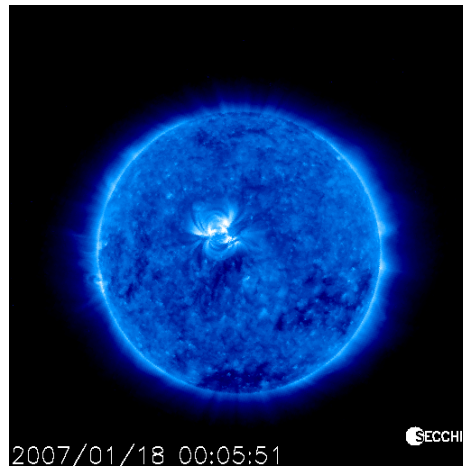
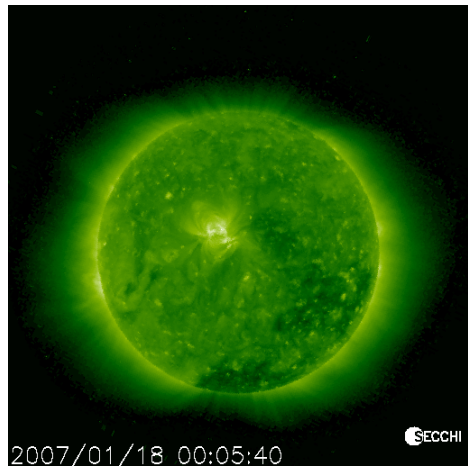
- **Feedback**

- SECCHI Bugzilla

<http://secchi.nrl.navy.mil/bugzilla/>



SECCHI Prepped



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