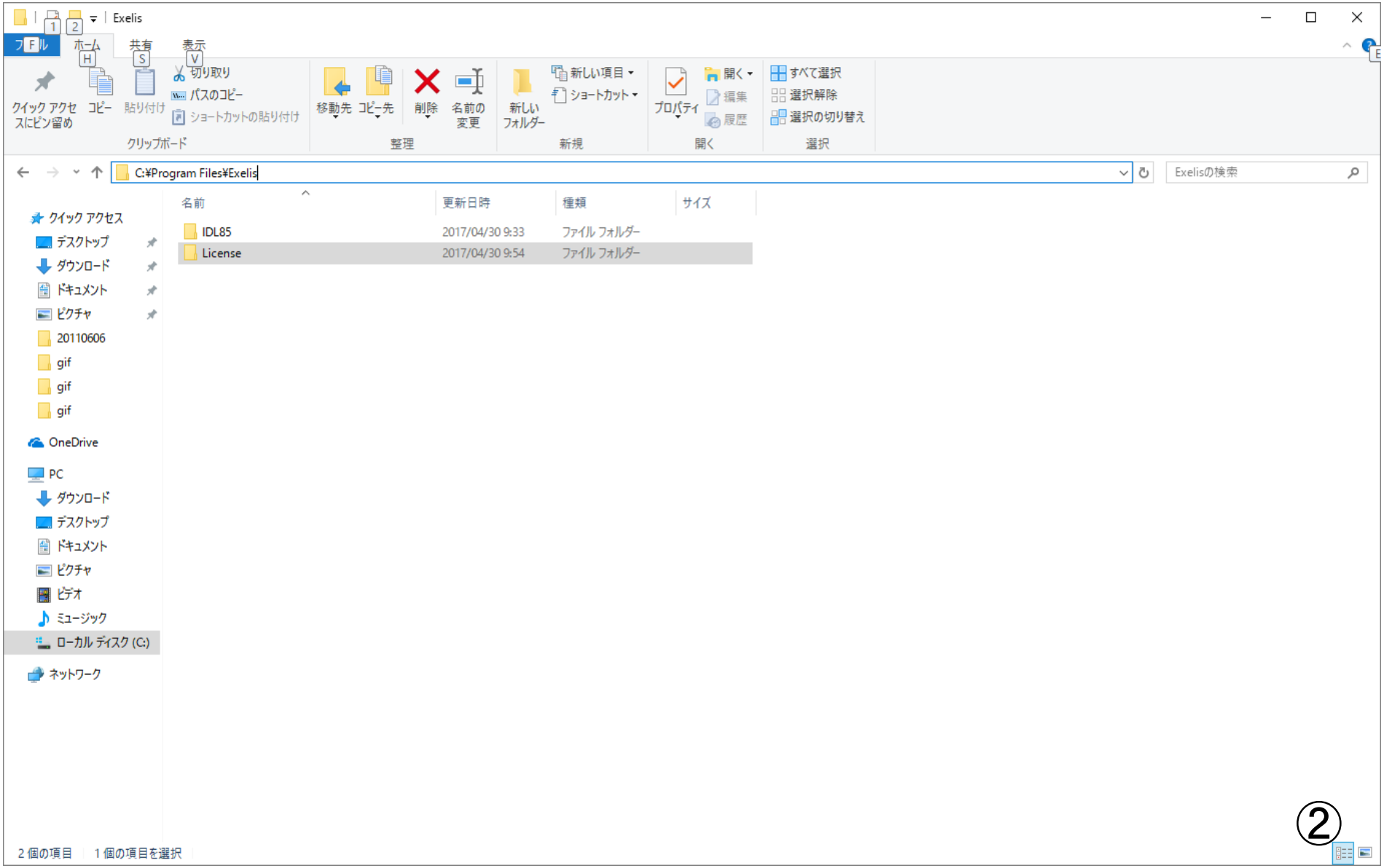
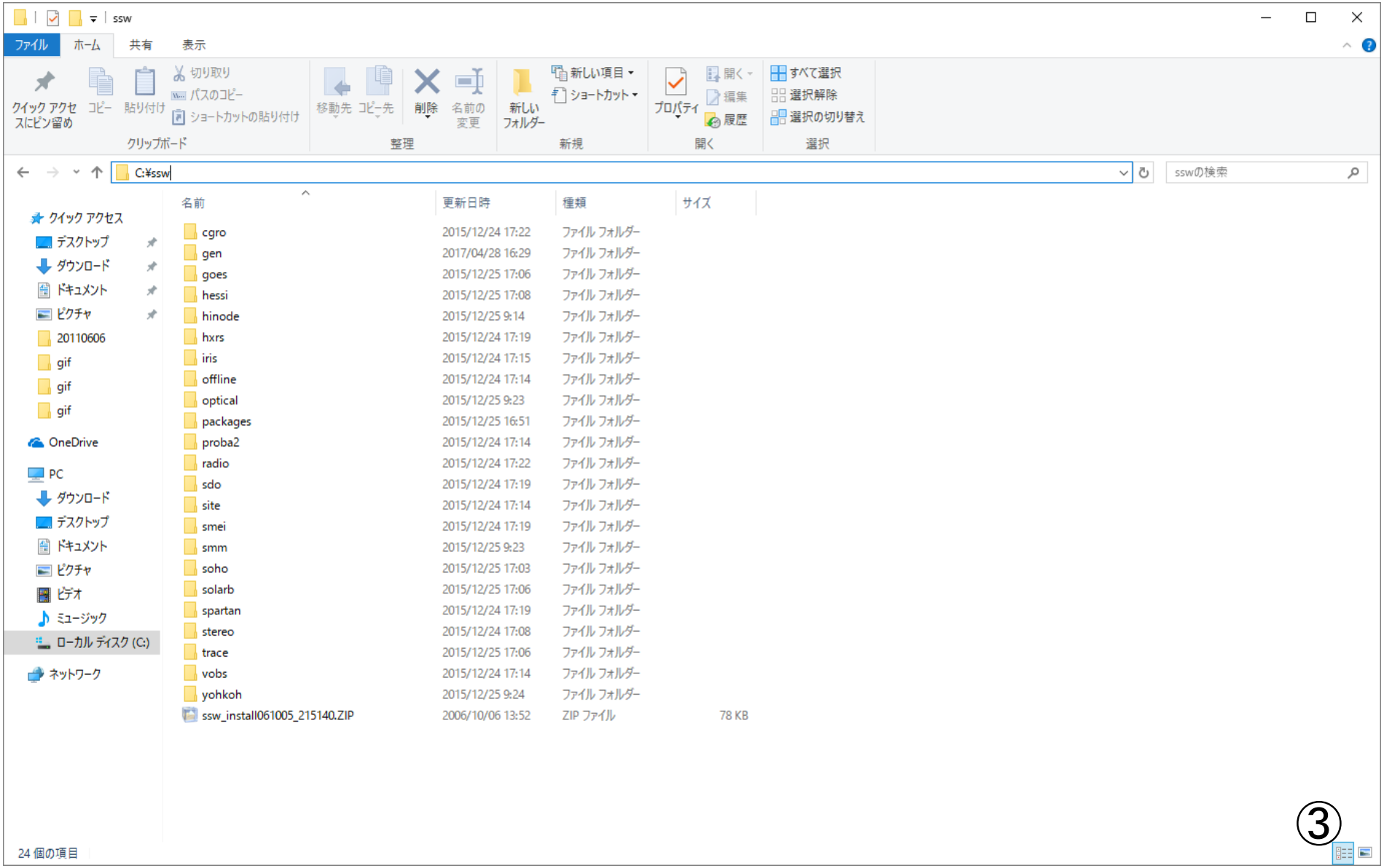
Preparation for the analysis of filament eruptions

S.UeNo & K. Otsuji
(Hida Observatory
Kyoto University)

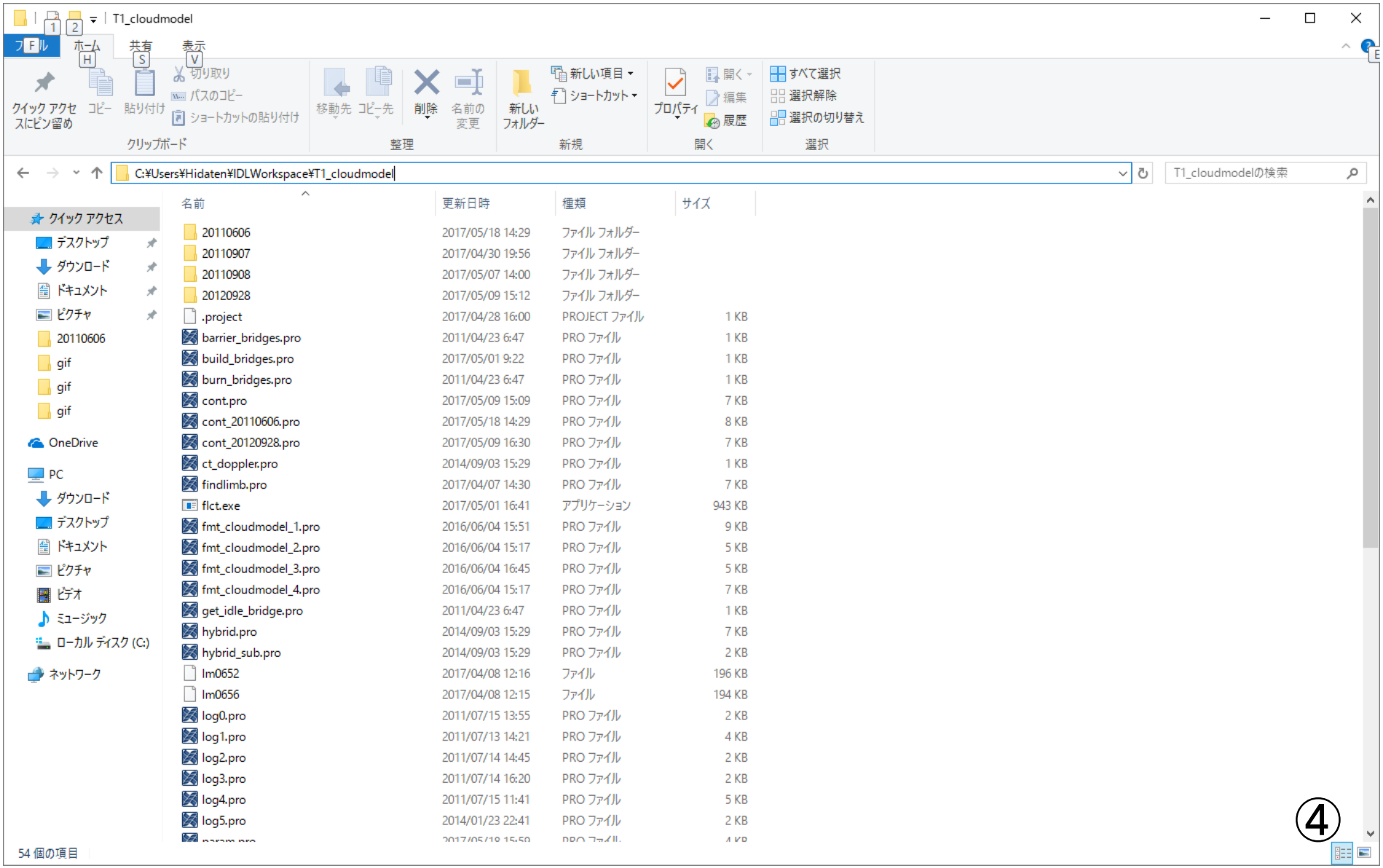
Installation of IDL in “C:¥Program Files¥”



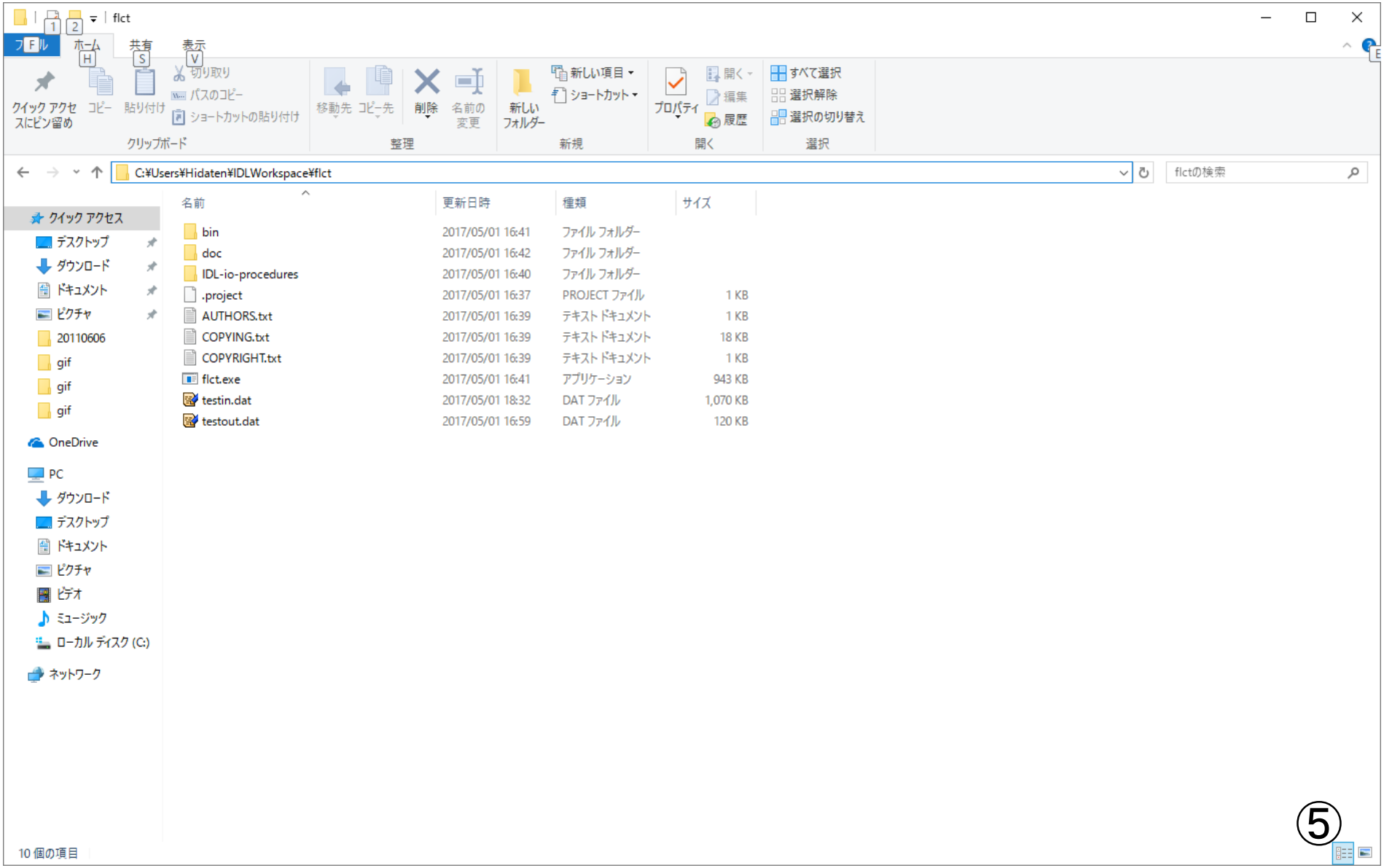
Installation of Solar SoftWare (SSW) in “C:¥” from http://www.lmsal.com/solarsoft/exe_client/ssw_install170511_195238.ZIP



Copy of IDL programs for “Cloud Model Fitting” (calculation of physical values of filaments) under user’s folder. (1)

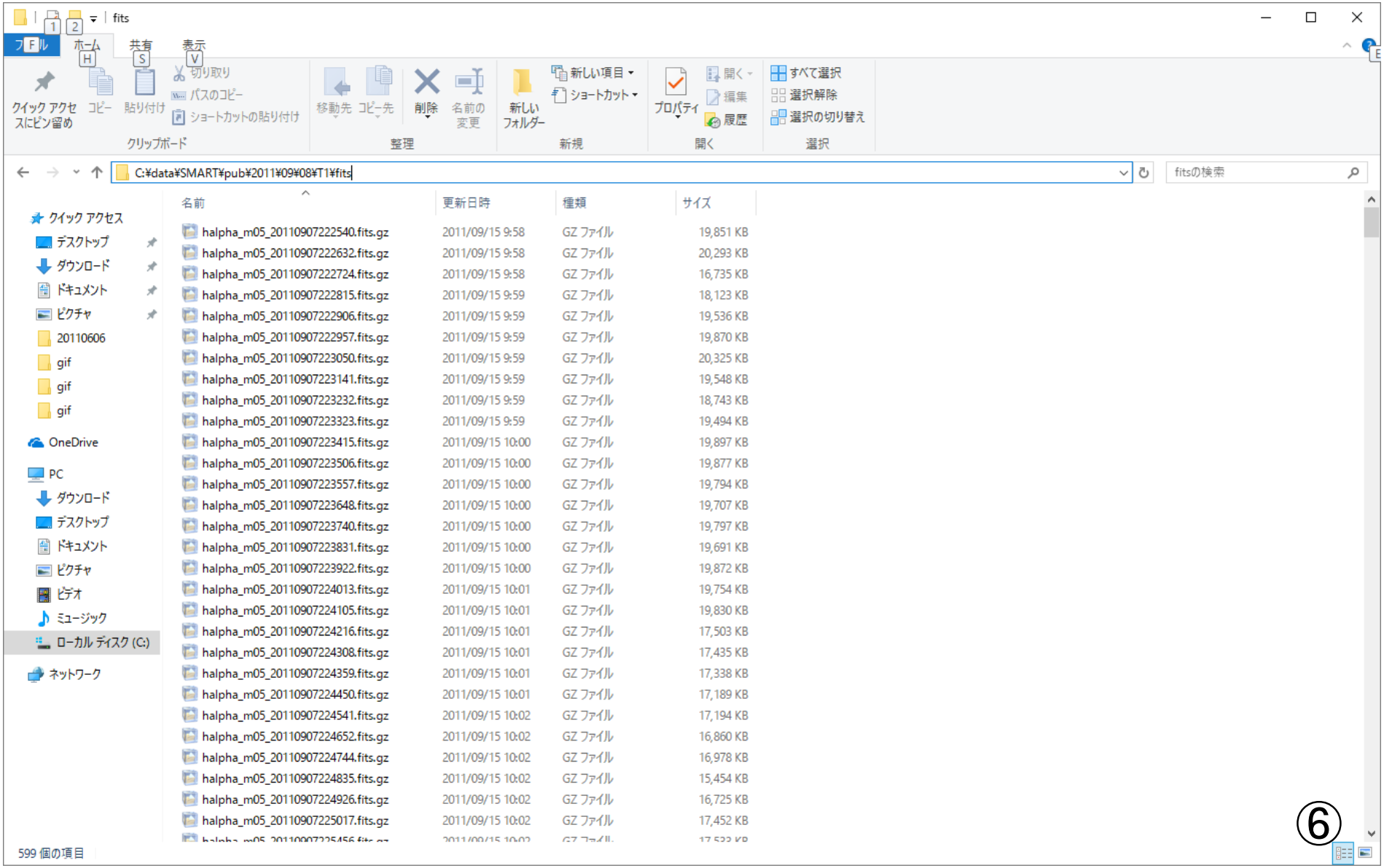


Copy of IDL programs for “Cloud Model Fitting” (calculation of physical values of filaments) under user’s folder. (2)



⑤

Download of solar image data (SMART H-alpha data) under your data folder as follows from the web-site of Kyoto University (=> see next page).



Download site of SMART solar image data: http://www.hida.kyoto-u.ac.jp/SMART/

www.hida.kyoto-u.ac.jp/SMART/

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SMART at Hida Obs., Kyoto-U.

日本語ページ

- about SMART
- Today's Sun (T1 images and movies)
- SMART LIVE (T1 real time images)
- T1 (H-alpha full disk) Data Archive log(pdf) ← **Please click "T1 Data Archive"**
- T3 (Flare Imaging System in Continuum and H-alpha: FISCH) Quick Look
- SMART movies (html/java) SDDI event report
- Flares listed in observation logs
  2009 2010 2011 2012 2013 2014
  Note: Date[JST] Time[UT]
  20140302 23:00 = 2014-Mar-01 23:00 UT
- SHABAR data log(csv) gif(plot)

Data policy
The use of data for public education efforts and non-commercial purposes is encouraged.
If you want to use the data in a published paper, book, or any other kind of (electronic) publication, please contact us.
E-mail: data_info [at] kwasan.kyoto-u.ac.jp

Back to Kwasan and Hida Observatories, Kyoto-U. English ver. Japanese ver.

Back to facility/SMART English ver. Japanese ver.

Download site of SMART solar image data: http://www.hida.kyoto-u.ac.jp/SMART/

www.hida.kyoto-u.ac.jp/SMART/T1.html

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SMART/SDDI Data Archive

(click daily image to jump daily archive)

2016
2016-May 2016-Jun 2016-Jul 2016-Aug 2016-Sep 2016-Oct 2016-Nov 2016-Dec

2017
2017-Jan 2017-Feb 2017-Mar 2017-Apr 2017-May 2017-Jun
2017-Jul 2017-Aug 2017-Sep 2017-Oct 2017-Nov 2017-Dec

Before 2016 Apr (previous system)
2005-Jul 2006-Jul 2007-Jul 2008-Jul 2009-Jul 2010-Jul
2011-Jul 2012-Jul 2013-Jul 2014-Jul 2015-Jul

← If you want to download the data on 2011/09/08, please click "Before 2016 Apr"

Data policy

The use of data for public education efforts and non-commercial purposes is encouraged.
If you want to use the data in a published paper, book, or any other kind of (electronic) publication, please contact us.
E-mail: data_info [at] kwasan.kyoto-u.ac.jp

About SDDI

Solar Dynamics Doppler Imager(SDDI) was installed on SMART in the end of 2016-Apr to observe the motion of filaments eruptions.
In contrast to the previous observing system, which was able to observe the velocity of filament eruptions up to 60km/sec, the new system can capture the velocity up to 400km/sec.

The wavelength designated on the data is not exact because of the slight variation of the central wavelength of the Lyot filter due to the temperature excursion.

Download site of SMART solar image data: http://www.hida.kyoto-u.ac.jp/SMART/

www.hida.kyoto-u.ac.jp/SMART/T1_before2015.html

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SMART T1 Data Archive

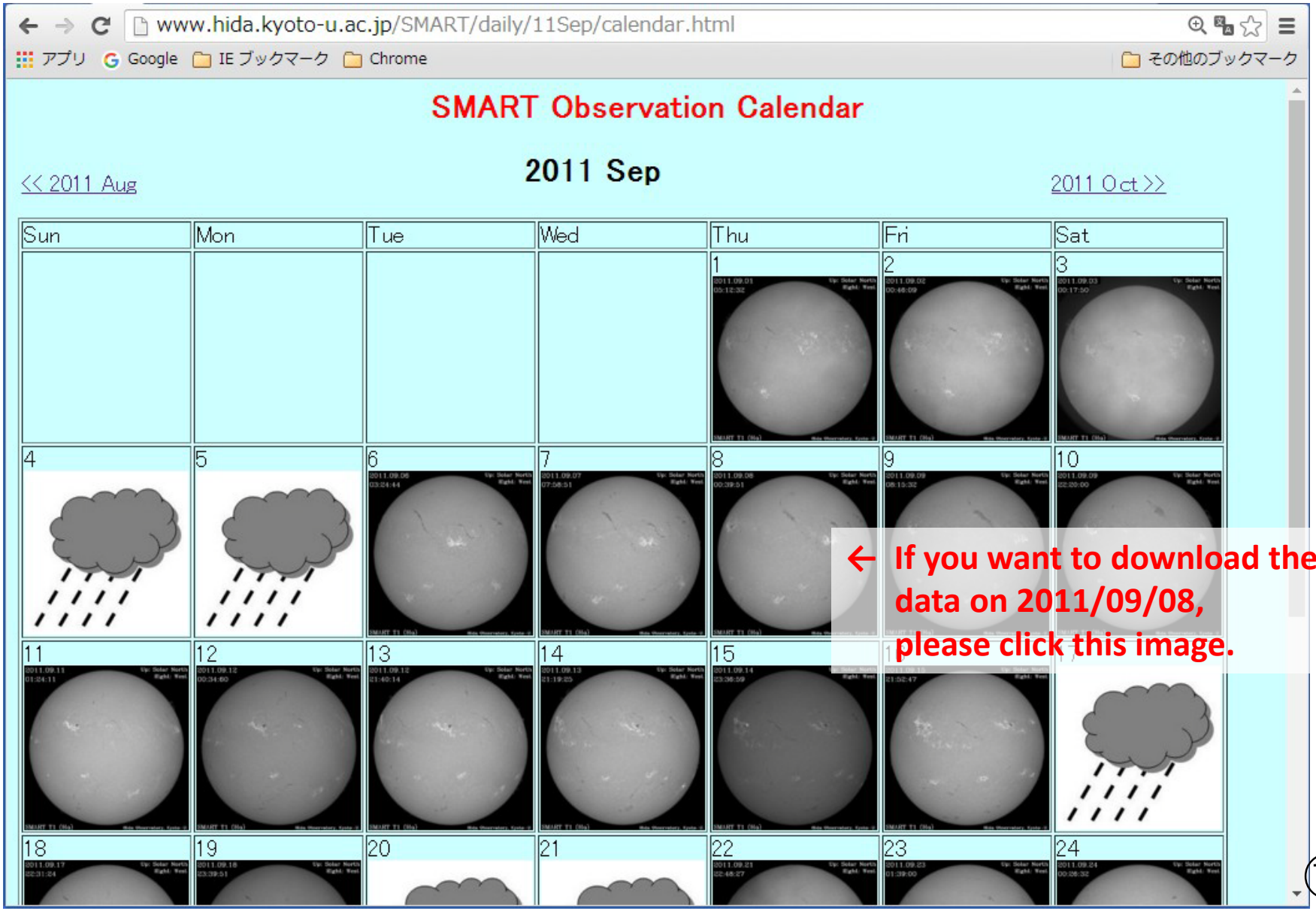
(click daily image to jump daily archive)

2016
2016-Jan 2016-Feb 2016-Mar 2016-Apr

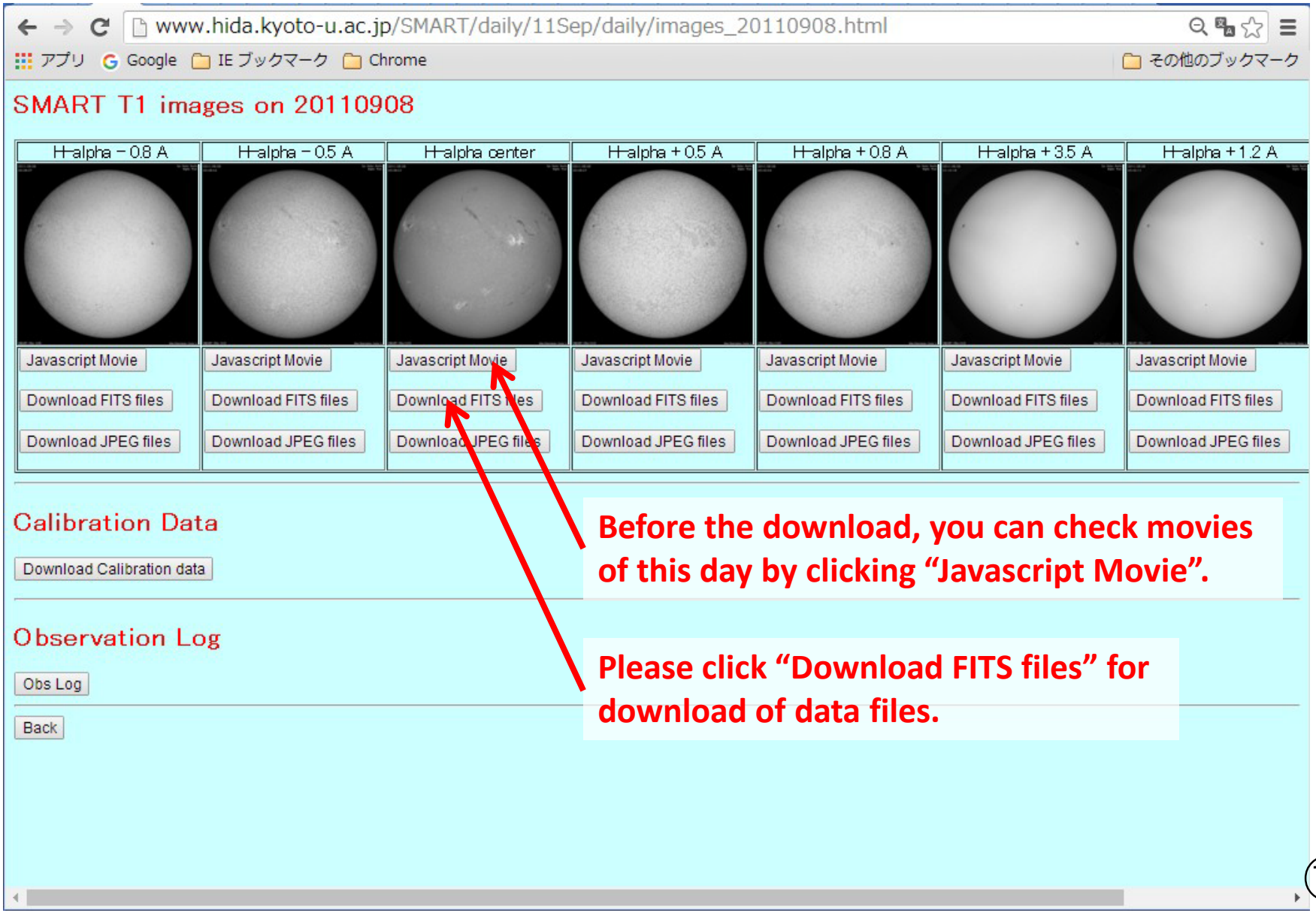
2015
2015-Jan 2015-Feb 2015-Mar 2015-Apr 2015-May 2015-Jun
2015-Jul 2015-Aug 2015-Sep 2015-Oct 2015-Nov 2015-Dec
2014
2014-Jan 2014-Feb 2014-Mar 2014-Apr 2014-May 2014-Jun
2014-Jul 2014-Aug 2014-Sep 2014-Oct 2014-Nov 2014-Dec
2013
2013-Jan 2013-Feb 2013-Mar 2013-Apr 2013-May 2013-Jun
2013-Jul 2013-Aug 2013-Sep 2013-Oct 2013-Nov 2013-Dec
2012
2012-Jan 2012-Feb 2012-Mar 2012-Apr 2012-May 2012-Jun
2012-Jul 2012-Aug 2012-Sep 2012-Oct 2012-Nov 2012-Dec
2011
2011-Jan 2011-Feb 2011-Mar 2011-Apr 2011-May 2011-Jun
2011-Jul 2011-Aug 2011-Sep 2011-Oct 2011-Nov 2011-Dec
2010
2010-Jan 2010-Feb 2010-Mar 2010-Apr 2010-May 2010-Jun
2010-Jul 2010-Aug 2010-Sep 2010-Oct 2010-Nov 2010-Dec
2009
2009-Jan 2009-Feb 2009-Mar 2009-Apr 2009-May 2009-Jun
2009-Jul 2009-Aug 2009-Sep 2009-Oct 2009-Nov 2009-Dec
2008
2008-Jan 2008-Feb 2008-Mar 2008-Apr 2008-May 2008-Jun
2008-Jul 2008-Aug 2008-Sep 2008-Oct 2008-Nov 2008-Dec
2007

← If you want to download the data on 2011/09/08, please click “2011-Sep”.

Download site of SMART solar image data: http://www.hida.kyoto-u.ac.jp/SMART/



Download site of SMART solar image data: http://www.hida.kyoto-u.ac.jp/SMART/



Download site of SMART solar image data: http://www.hida.kyoto-u.ac.jp/SMART/

www.hida.kyoto-u.ac.jp/SMART/search/fits-search.php?year=11&month=09&day=08&ist=T1&lambda=p0(

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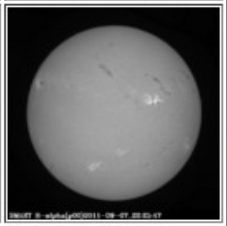
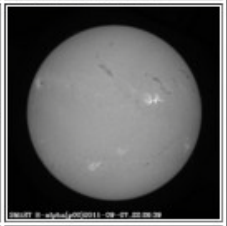
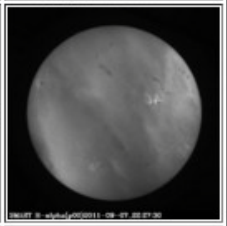
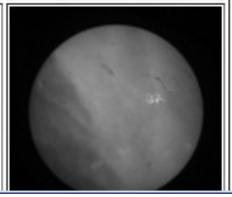
Back

checked files ▾ download

NOTICE: please choose 'unchecked files' to download all files.

(2) Select "checked files" and Push the "download" button.

411 fits files exist on 2011/09/08
Total file size: 6956MB

File No.	Obs. date (UTC)	File size (MB)	Thumbnail
1	2011/09/07 22:25:47	19	
2	2011/09/07 22:26:39	19	
3	2011/09/07 22:27:30	16	
4	2011/09/07 22:28:22	18	

(1) Please check "File No."s that you want.

Hida observatory SMART T1 Cloud model application method

K. Otsuji

Hida Observatory, Kyoto University

2017/05/22

About this manual

- To apply Beckers' cloud model (Beckers 1964) to H alpha multi-wavelengths observation by SMART in Hida observatory.
- Using IDL code, fitting the contrast profile of "cloud" on the observed data, derivation of cloud parameters (Source function, Optical depth, Doppler width and Doppler shift).
- The local correlation tracking (LCT) method is applied to derive transversal motion on the image plane.

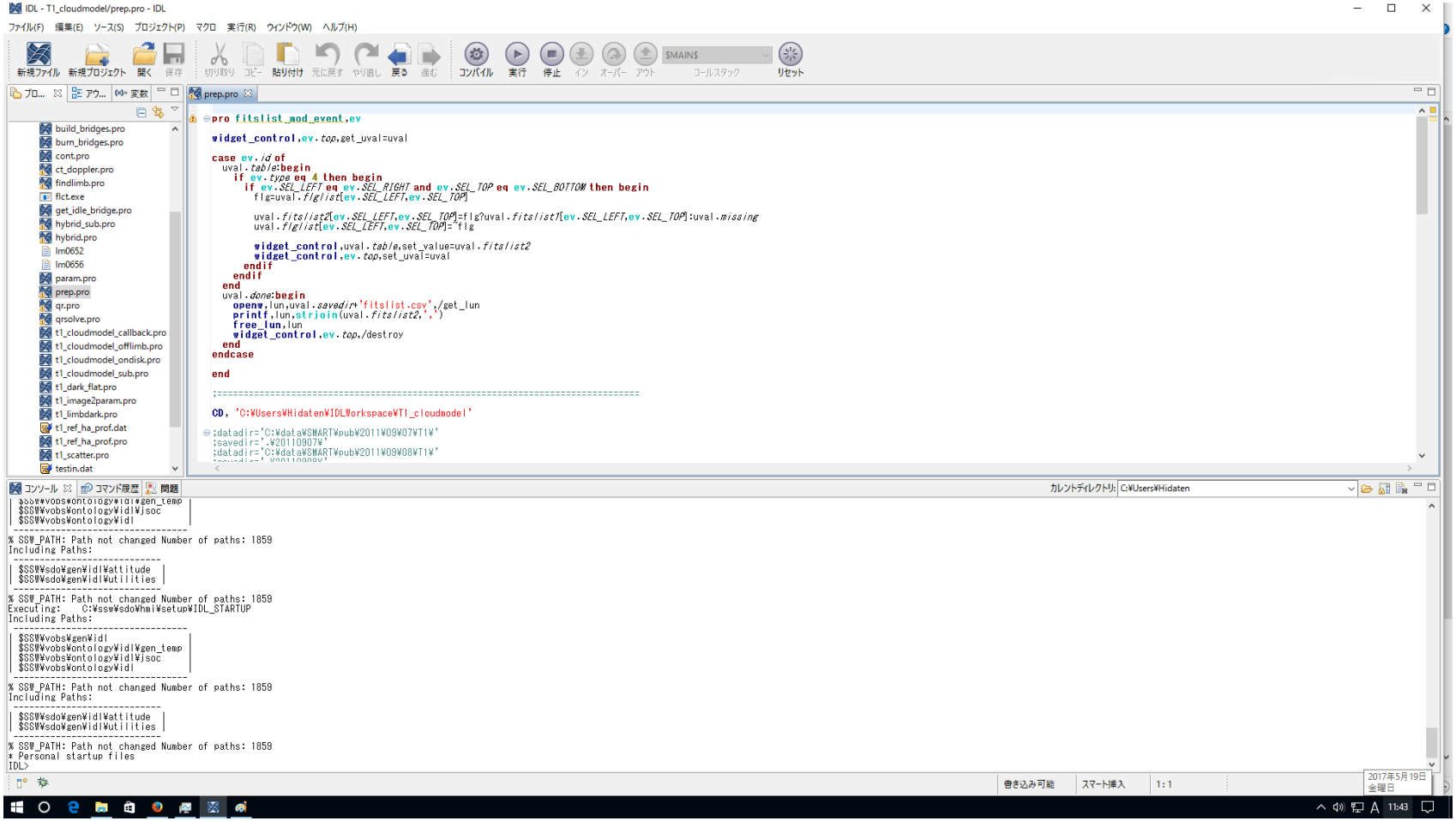
IDL programs

- prep.pro
  - Specify data directory
  - Create calibration files (dark and flat frames)
  - Select dataset and output the list of files
- cont.pro
  - Define the field of view of clipped data
  - Calibration and contrast calculation
  - Output clipped fits files and gif images
- param.pro
  - Apply cloud model to the contrast datasets
  - Output parameters fits files and gif images
- trans.pro
  - Calculate the 2nd level Hydrogen column density and derive the transversal velocity field using local correlation tracing
  - Output the parameters fits files and gif images

Startup

- Click the “SSWIDL” icon on the desktop and start the IDL with Solar SoftWare (SSW)

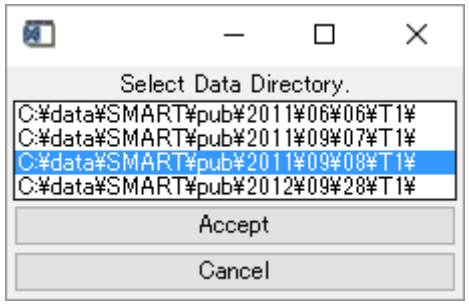
prep.pro (1)



Open prep.pro and “コンパイル(compile)” -> “実行(execute)”

prep.pro (2)

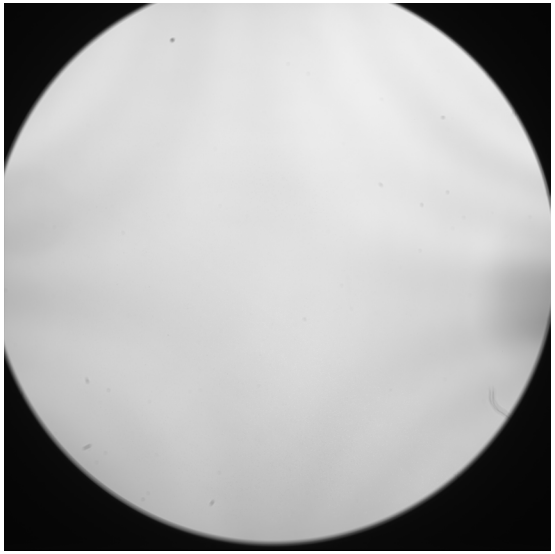
- Data directory selecting dialog open
- Select the directory for process
- In this demonstration, please select “C:¥data¥SMART¥pub¥2011¥09¥08¥T1¥”
- Click “Accept”



directory selecting dialog

prep.pro (3)

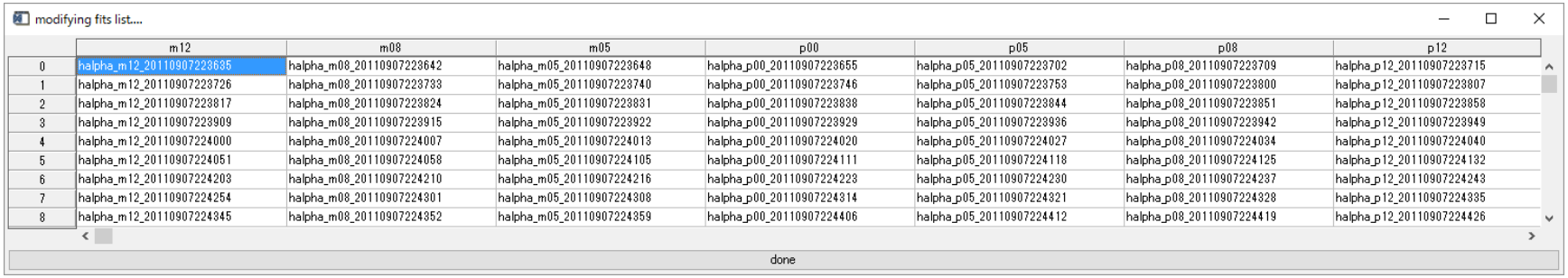
- Calibration files are output in the IDLWorkspace¥T1_cloudmodel¥20110908¥calib



Dark and flat frame images

prep.pro (4)

- File selection dialog open
- Click the file name and toggle include/exclude from the file list
- In this demonstration, all files are included
- Click “Done”



	m12	m08	m05	p00	p05	p08	p12
0	halpha_m12_20110907223635	halpha_m08_20110907223642	halpha_m05_20110907223648	halpha_p00_20110907223655	halpha_p05_20110907223702	halpha_p08_20110907223709	halpha_p12_20110907223715
1	halpha_m12_20110907223726	halpha_m08_20110907223733	halpha_m05_20110907223740	halpha_p00_20110907223746	halpha_p05_20110907223753	halpha_p08_20110907223800	halpha_p12_20110907223807
2	halpha_m12_20110907223817	halpha_m08_20110907223824	halpha_m05_20110907223831	halpha_p00_20110907223838	halpha_p05_20110907223844	halpha_p08_20110907223851	halpha_p12_20110907223858
3	halpha_m12_20110907223909	halpha_m08_20110907223915	halpha_m05_20110907223922	halpha_p00_20110907223929	halpha_p05_20110907223936	halpha_p08_20110907223942	halpha_p12_20110907223949
4	halpha_m12_20110907224000	halpha_m08_20110907224007	halpha_m05_20110907224013	halpha_p00_20110907224020	halpha_p05_20110907224027	halpha_p08_20110907224034	halpha_p12_20110907224040
5	halpha_m12_20110907224051	halpha_m08_20110907224058	halpha_m05_20110907224105	halpha_p00_20110907224111	halpha_p05_20110907224118	halpha_p08_20110907224125	halpha_p12_20110907224132
6	halpha_m12_20110907224203	halpha_m08_20110907224210	halpha_m05_20110907224216	halpha_p00_20110907224223	halpha_p05_20110907224230	halpha_p08_20110907224237	halpha_p12_20110907224243
7	halpha_m12_20110907224254	halpha_m08_20110907224301	halpha_m05_20110907224308	halpha_p00_20110907224314	halpha_p05_20110907224321	halpha_p08_20110907224328	halpha_p12_20110907224335
8	halpha_m12_20110907224345	halpha_m08_20110907224352	halpha_m05_20110907224359	halpha_p00_20110907224406	halpha_p05_20110907224412	halpha_p08_20110907224419	halpha_p12_20110907224426

File selection dialog

prep.pro (5)

fitslist.csv - TeraPad

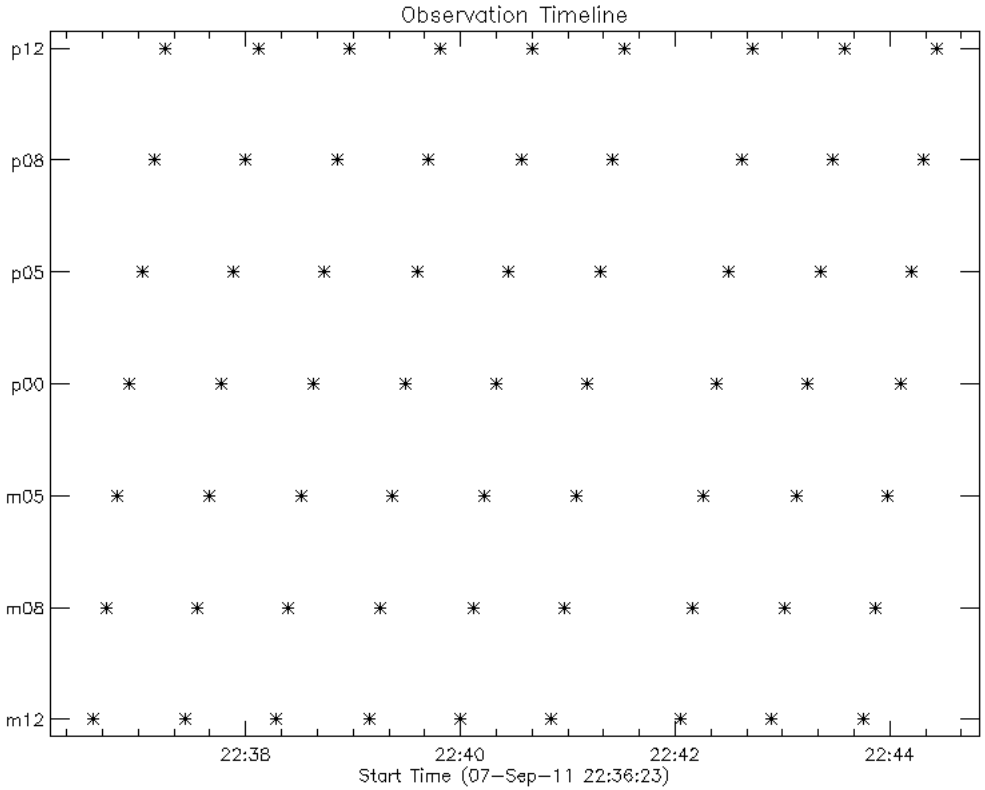
ファイル(F) 編集(E) 検索(S) 表示(V) ウィンドウ(W) ツール(T) ヘルプ(H)

```
halpha_m12_20110907223635,halpha_m08_20110907223642,halpha_m05_20110907223648,halpha_p00_20110907223655,halpha_p05_20110907223702,halpha_p08_20110907223709,halpha_p12_20110907223715
halpha_m12_20110907223726,halpha_m08_20110907223733,halpha_m05_20110907223740,halpha_p00_20110907223746,halpha_p05_20110907223753,halpha_p08_20110907223800,halpha_p12_20110907223807
halpha_m12_20110907223817,halpha_m08_20110907223824,halpha_m05_20110907223831,halpha_p00_20110907223838,halpha_p05_20110907223844,halpha_p08_20110907223851,halpha_p12_20110907223858
halpha_m12_20110907223909,halpha_m08_20110907223915,halpha_m05_20110907223922,halpha_p00_20110907223929,halpha_p05_20110907223936,halpha_p08_20110907223942,halpha_p12_20110907223949
halpha_m12_20110907224000,halpha_m08_20110907224007,halpha_m05_20110907224013,halpha_p00_20110907224020,halpha_p05_20110907224027,halpha_p08_20110907224034,halpha_p12_20110907224040
halpha_m12_20110907224051,halpha_m08_20110907224058,halpha_m05_20110907224105,halpha_p00_20110907224111,halpha_p05_20110907224118,halpha_p08_20110907224125,halpha_p12_20110907224132
halpha_m12_20110907224203,halpha_m08_20110907224210,halpha_m05_20110907224216,halpha_p00_20110907224223,halpha_p05_20110907224230,halpha_p08_20110907224237,halpha_p12_20110907224243
halpha_m12_20110907224254,halpha_m08_20110907224301,halpha_m05_20110907224308,halpha_p00_20110907224314,halpha_p05_20110907224321,halpha_p08_20110907224328,halpha_p12_20110907224335
halpha_m12_20110907224345,halpha_m08_20110907224352,halpha_m05_20110907224359,halpha_p00_20110907224406,halpha_p05_20110907224412,halpha_p08_20110907224419,halpha_p12_20110907224426
[EOF]
```

1行: 1桁 標準 SJIS CRLF 挿入

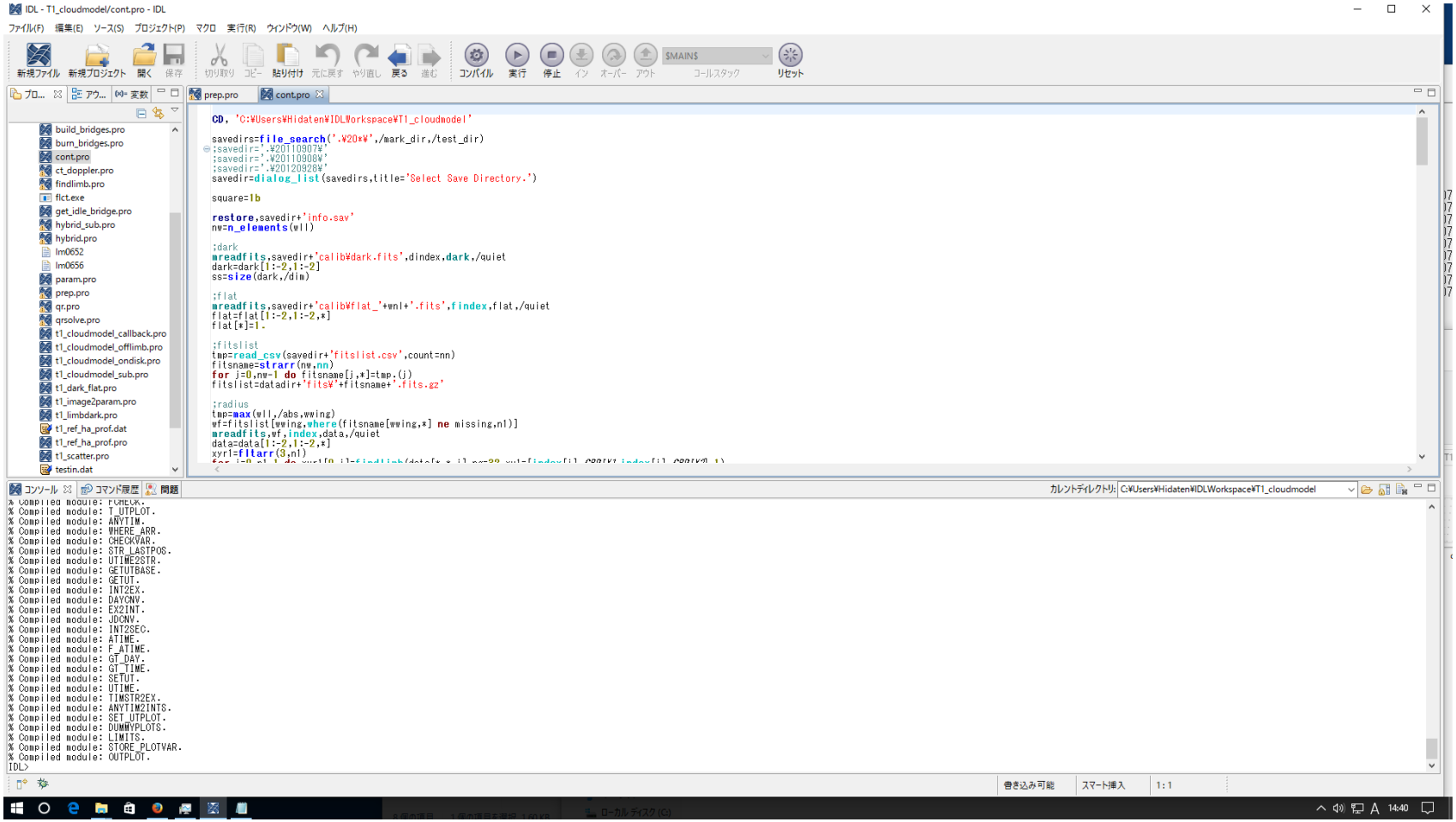
Output IDLWorkspace¥T1_cloudmodel¥20110908¥fitslist.csv

prep.pro (6)



Output IDLWorkspace¥T1_cloudmodel¥20110908¥obstime.gif

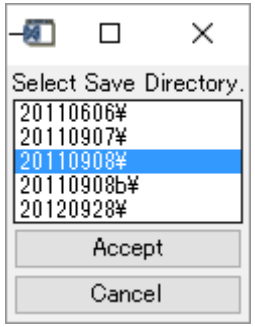
cont.pro (1)



Open cont.pro and “コンパイル(compile)” -> “実行(execute)”

cont.pro (2)

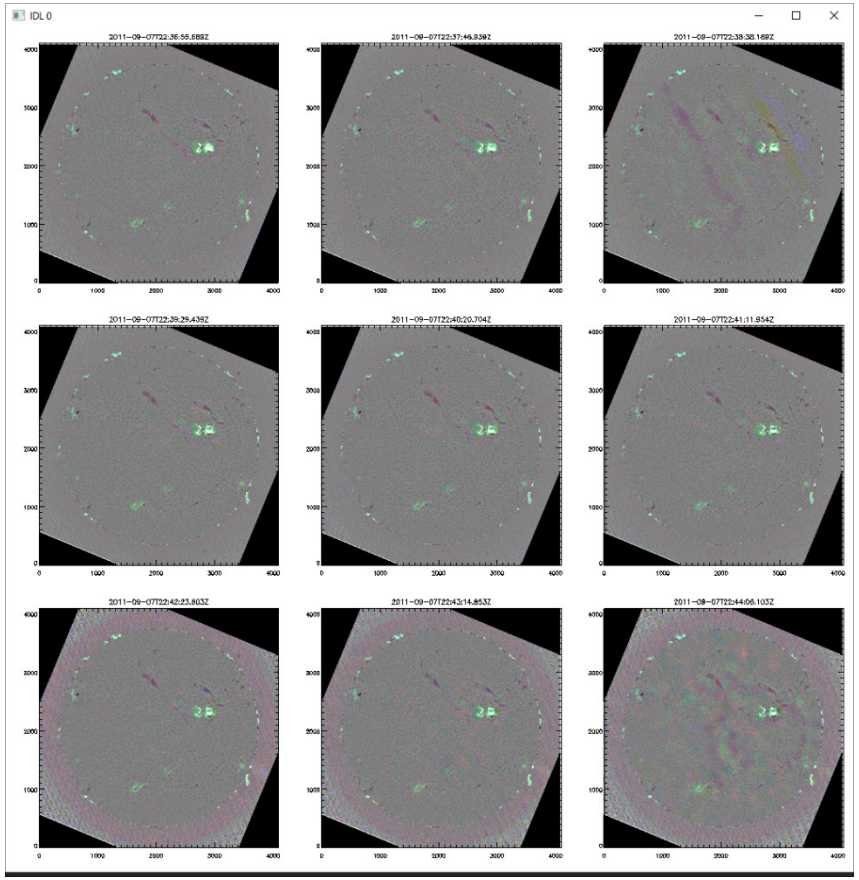
- Save directory selecting dialog open
- Select the directory for process
- In this demonstration, please select “20110908¥”
- Click “Accept”



directory selecting dialog

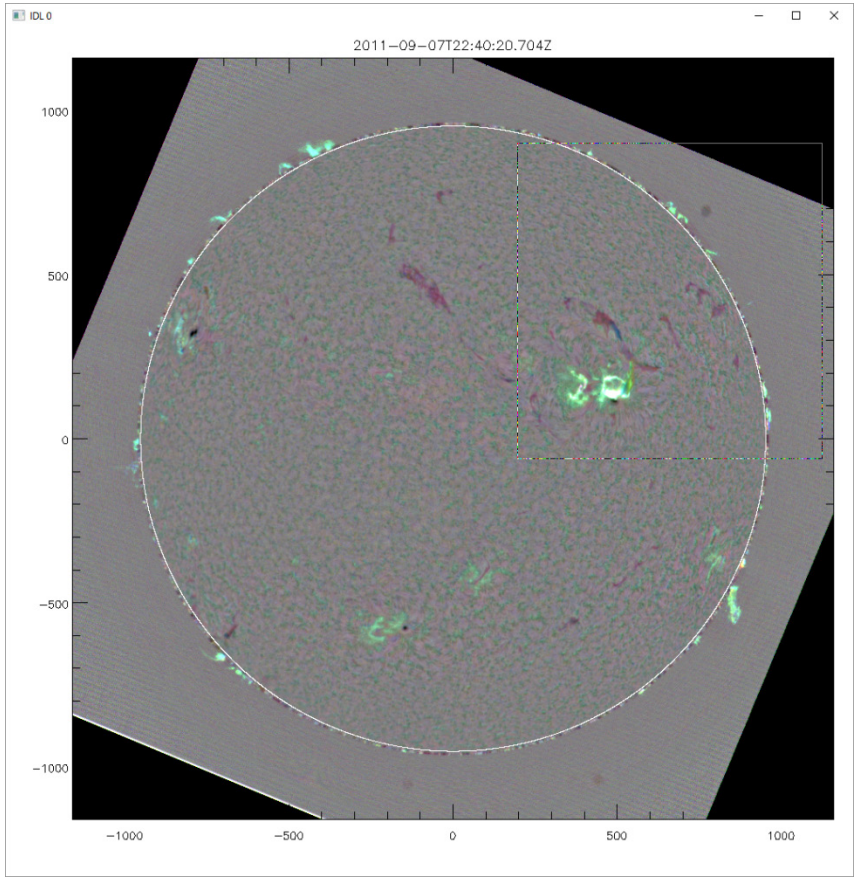
cont.pro (3)

- 9 Contrast images are calculated
- window open
- Click the image to set the FOV of clipped data

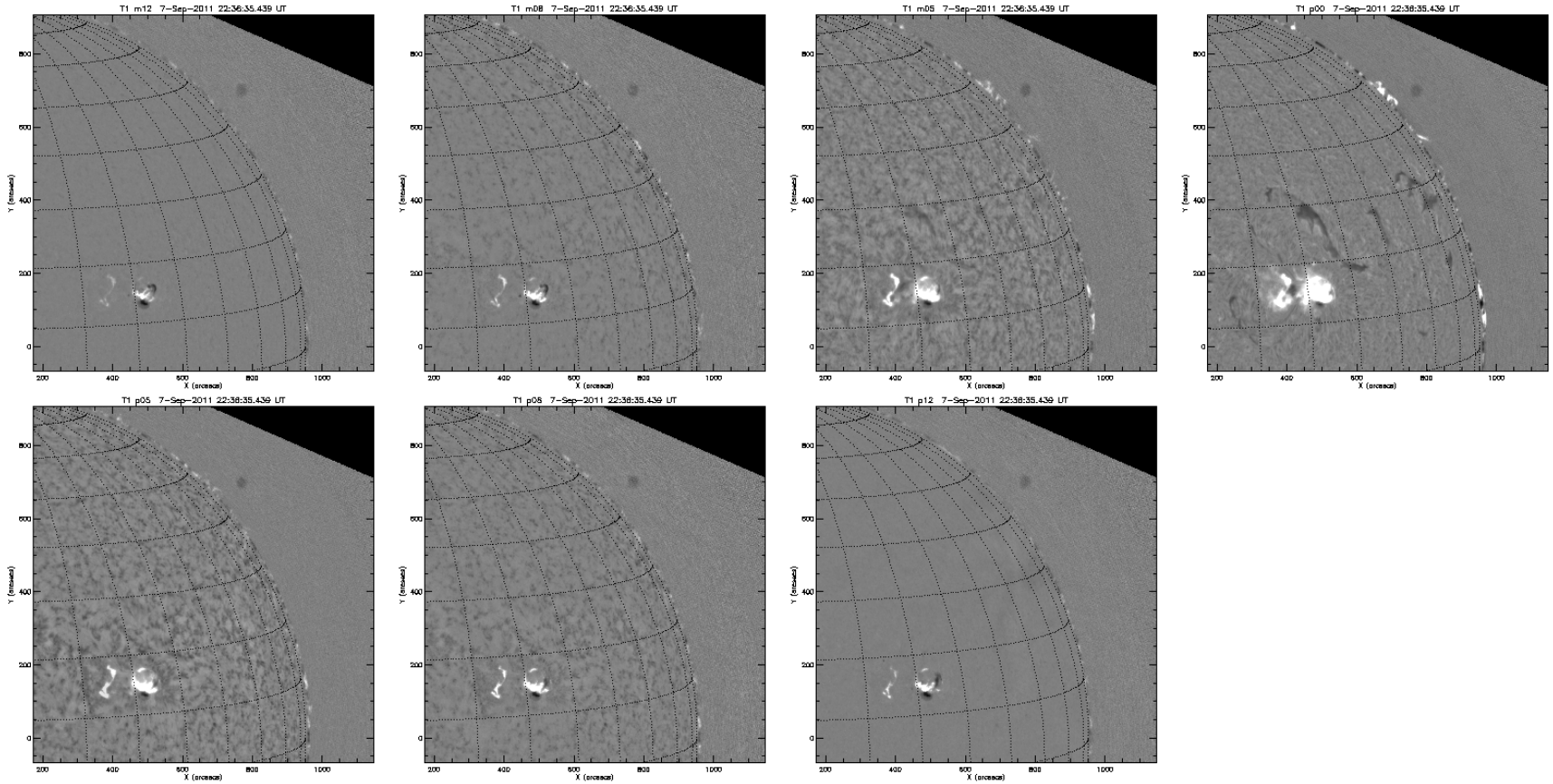


cont.pro (4)

- displaying the selected full FOV image
- Using mouse to move/enlarge/shrink the FOV of clipping area.
  - left click + drag: move
  - middle click + drag: enlarge/shrink
  - right click: done

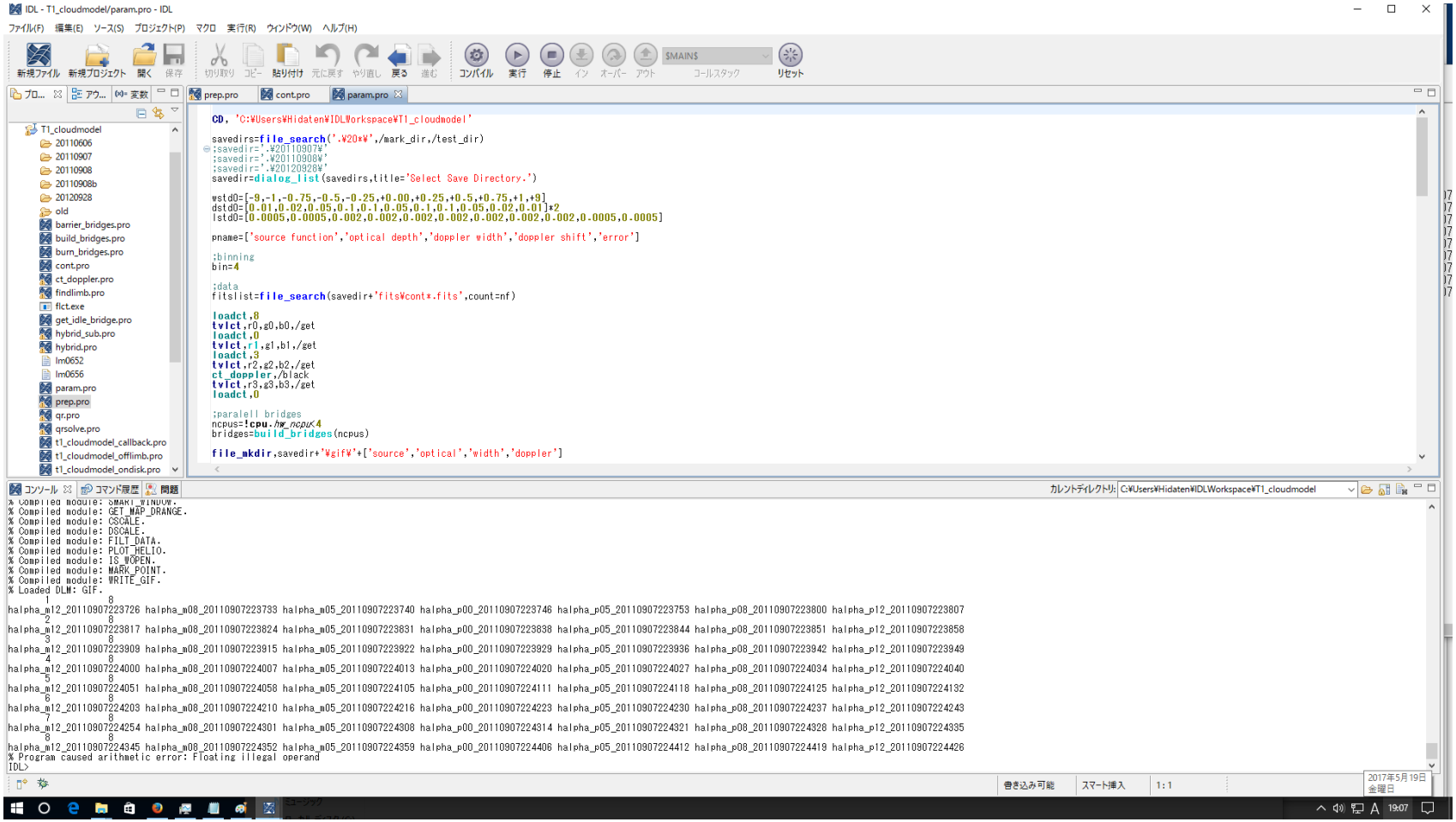


cont.pro (5)



Output contrast image gifs in IDLWorkspace¥T1_cloudmodel¥20110908¥gif¥cont¥
Fits files are output as 20110908¥fits¥cont_*.fits

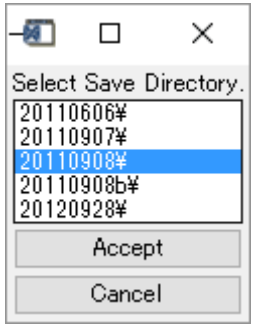
param.pro (1)



Open param.pro and “コンパイル(compile)” -> “実行(execute)”

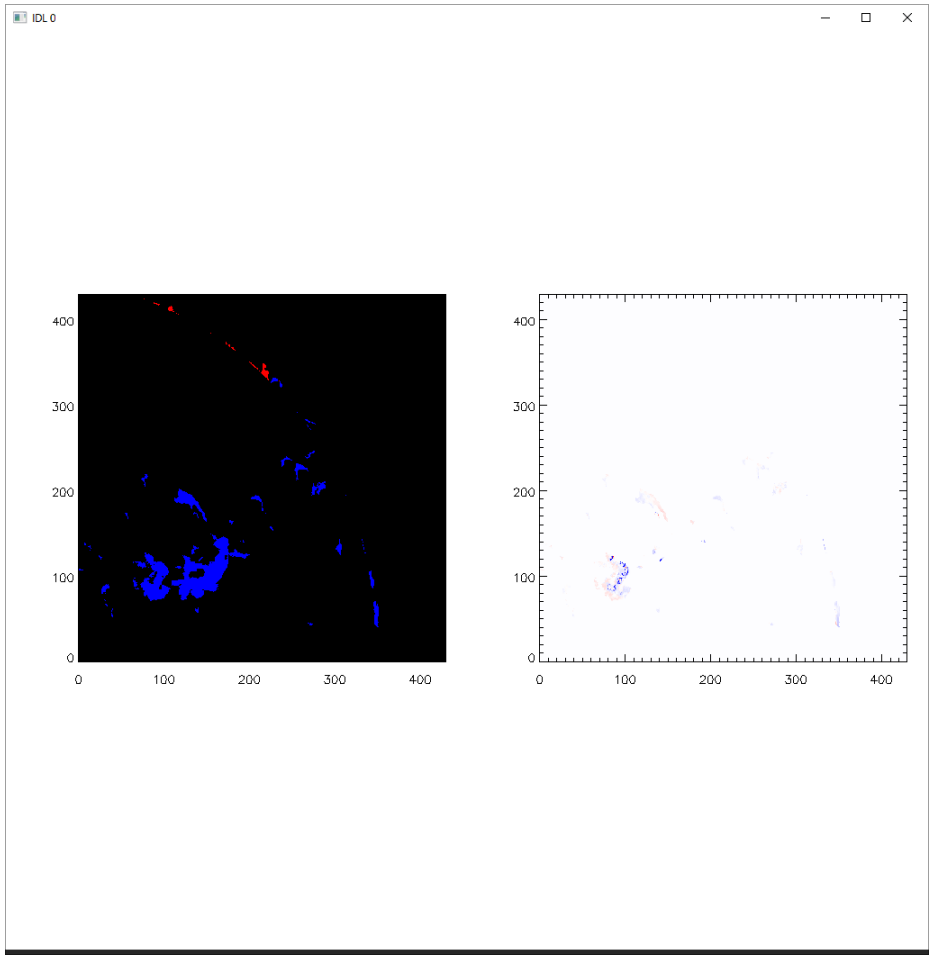
param.pro (2)

- Save directory selecting dialog open
- Select the directory for process
- In this demonstration, please select “20110908¥”
- Click “Accept”



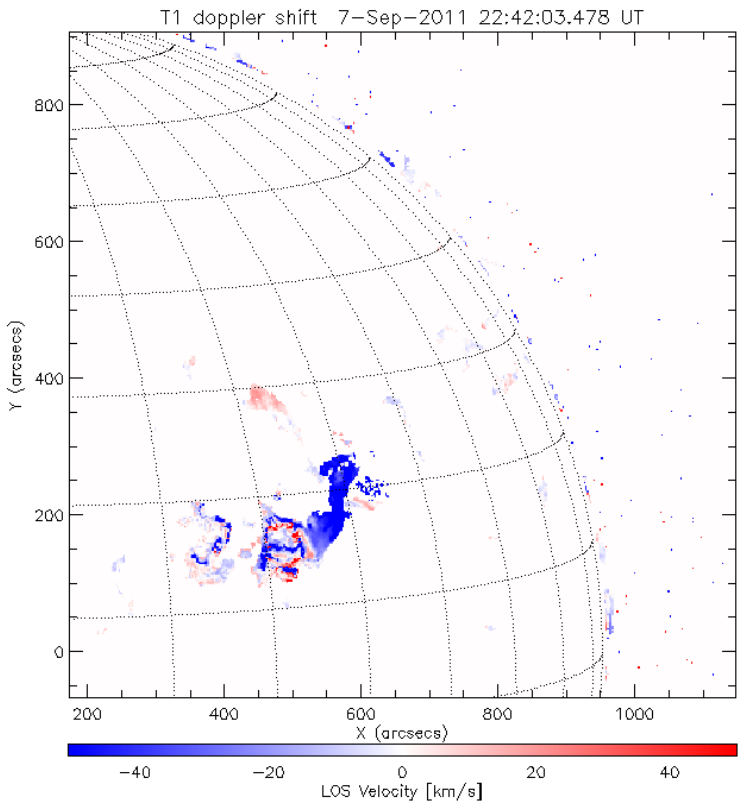
directory selecting dialog

param.pro (3)



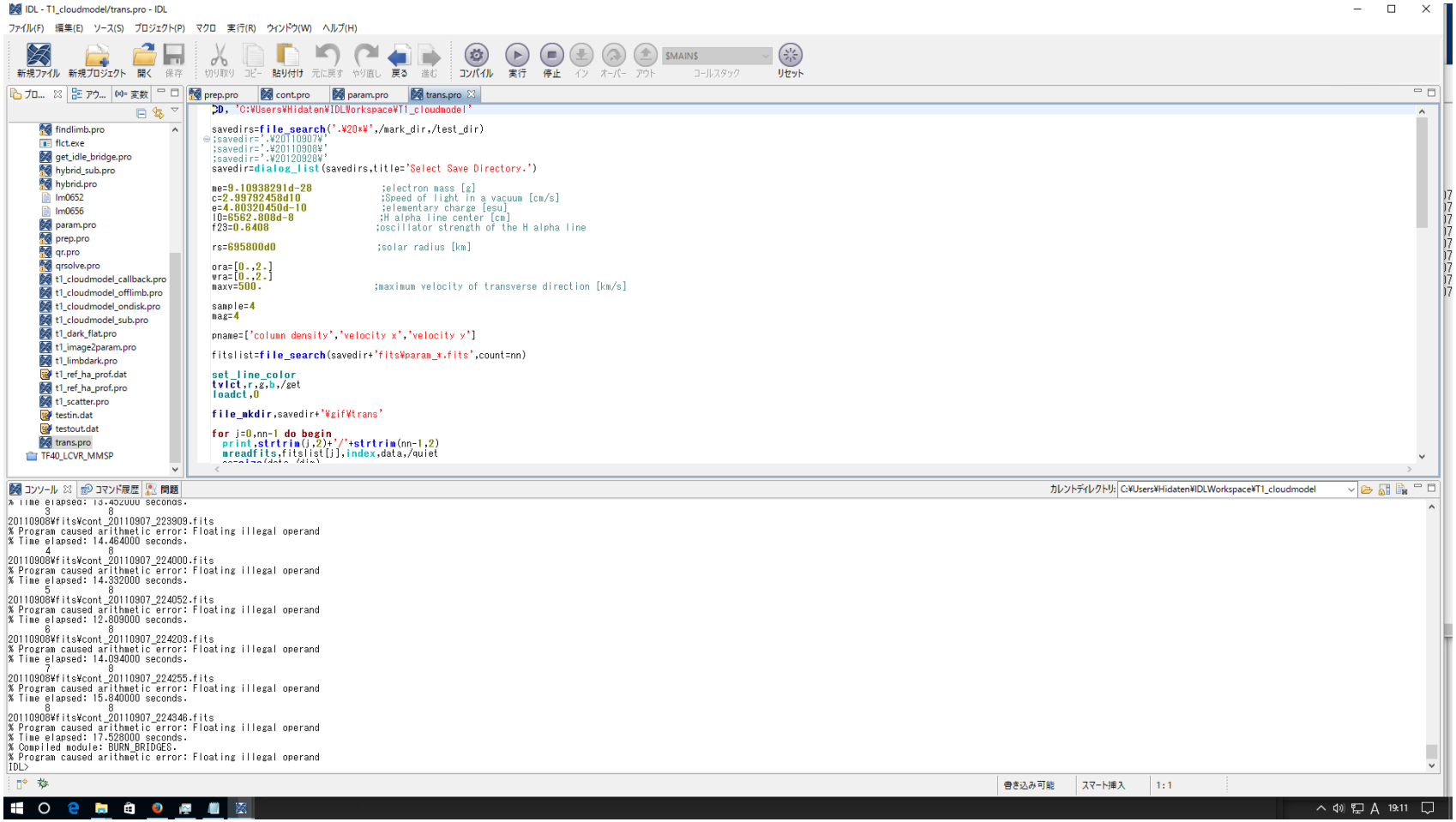
Cloud model fitting progress is shown
Doppler shift map is displayed in the right panel

param.pro (4)



Output 4 parameter image gifs in
IDLWorkspace¥T1_cloudmodel¥20110908¥gif¥{source,optical,width,doppler}¥
Fits files are output as 20110908¥fits¥param_*.fits

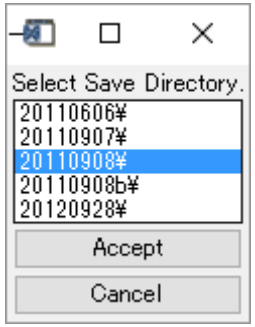
trans.pro (1)



Open trans.pro and “コンパイル(compile)” -> “実行(execute)”

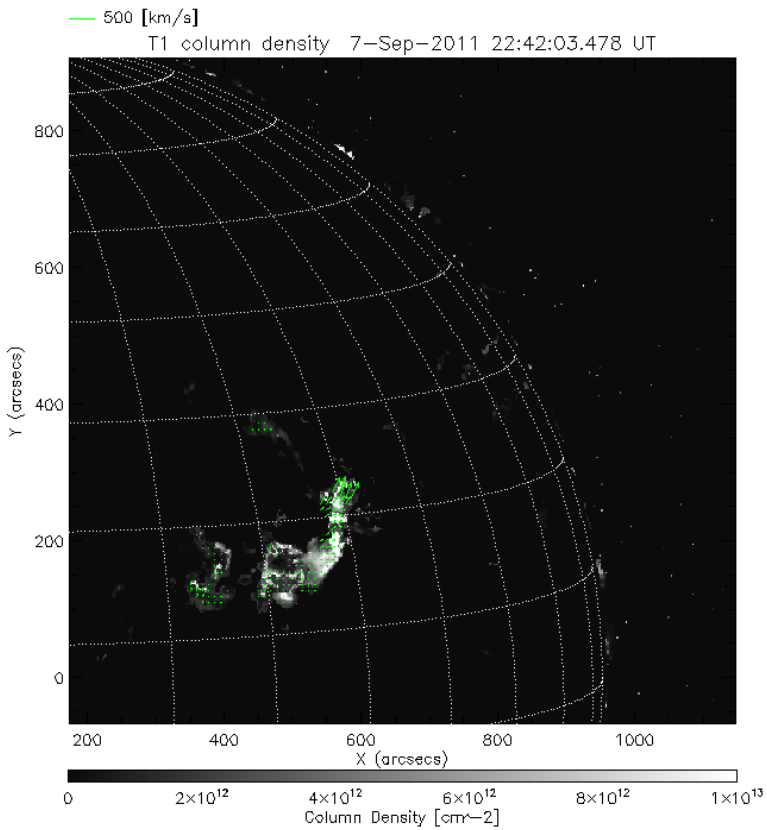
trans.pro (2)

- Save directory selecting dialog open
- Select the directory for process
- In this demonstration, please select “20110908¥”
- Click “Accept”



directory selecting dialog

trans.pro (3)



Output transversal (apparent) velocity image gifs in IDLWorkspace¥T1_cloudmodel¥20110908¥gif¥trans¥
Fits files are output as 20110908¥fits¥trans_*.fits

Summary

- Using this IDL codes, one can easily derive the physical parameters such as the 3 dimensional velocity field and the density of filaments.

- comments or questions
  - to otsuji@kwasan.kyoto-u.ac.jp