

IUGONET

Inter-university Upper atmosphere Global Observation NETwork

Instructions for data analysis software:

- Preparation
- The IUGONET project and its products for space weather study
- Installation
- How to Use SPEDAS, part1
- How to Use SPEDAS, part2

*Published by IUGONET Project Team, Sep. 2017.
<http://www.iugonet.org/?lang=en>*



IUGONET System: MetaData System for Space Weather and Earth Observation Data Analysis

Shuji Abe

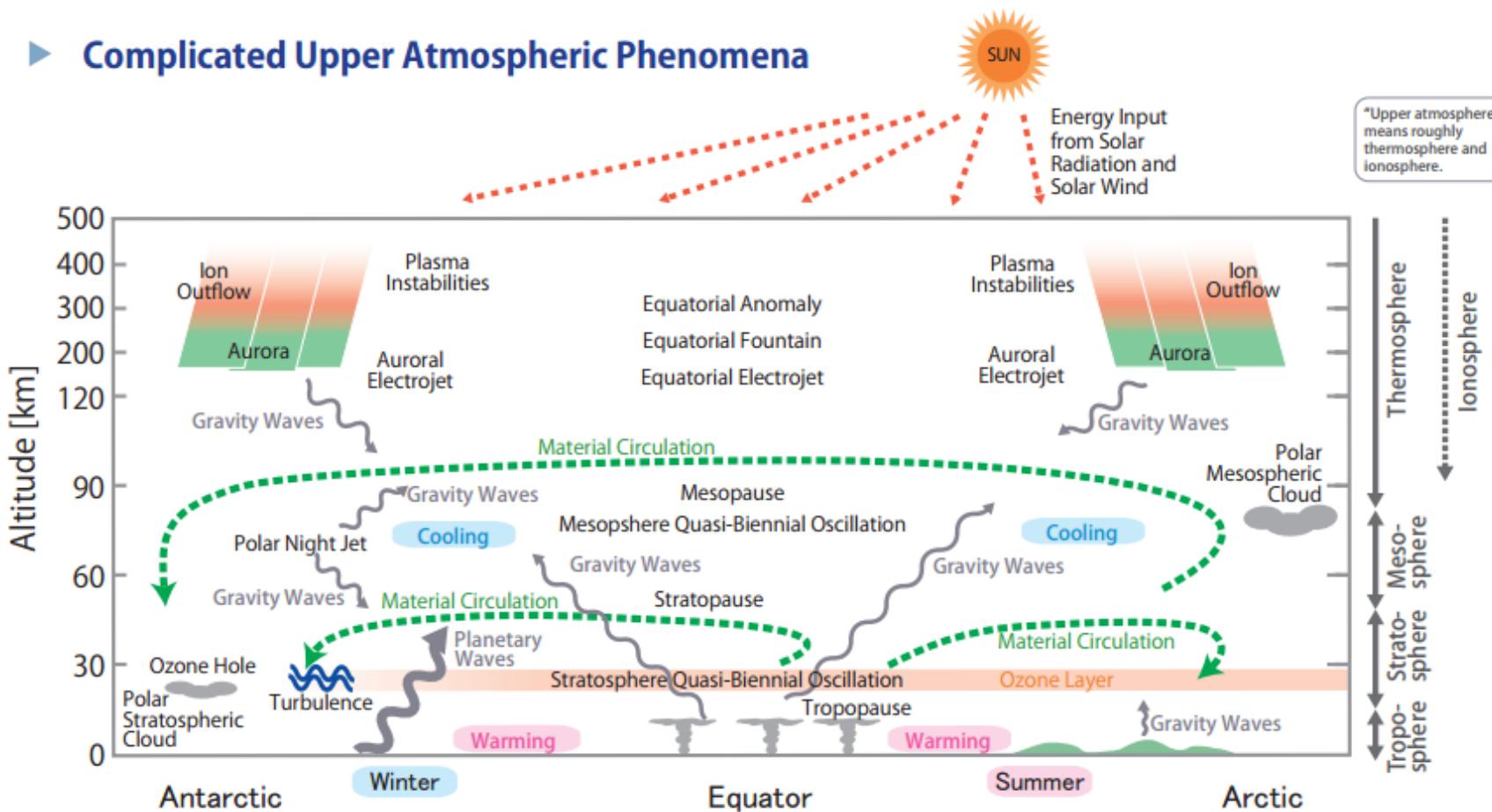
International Center for Space Weather Science and Education

Today's Outline:

This hands-on have 4 topics

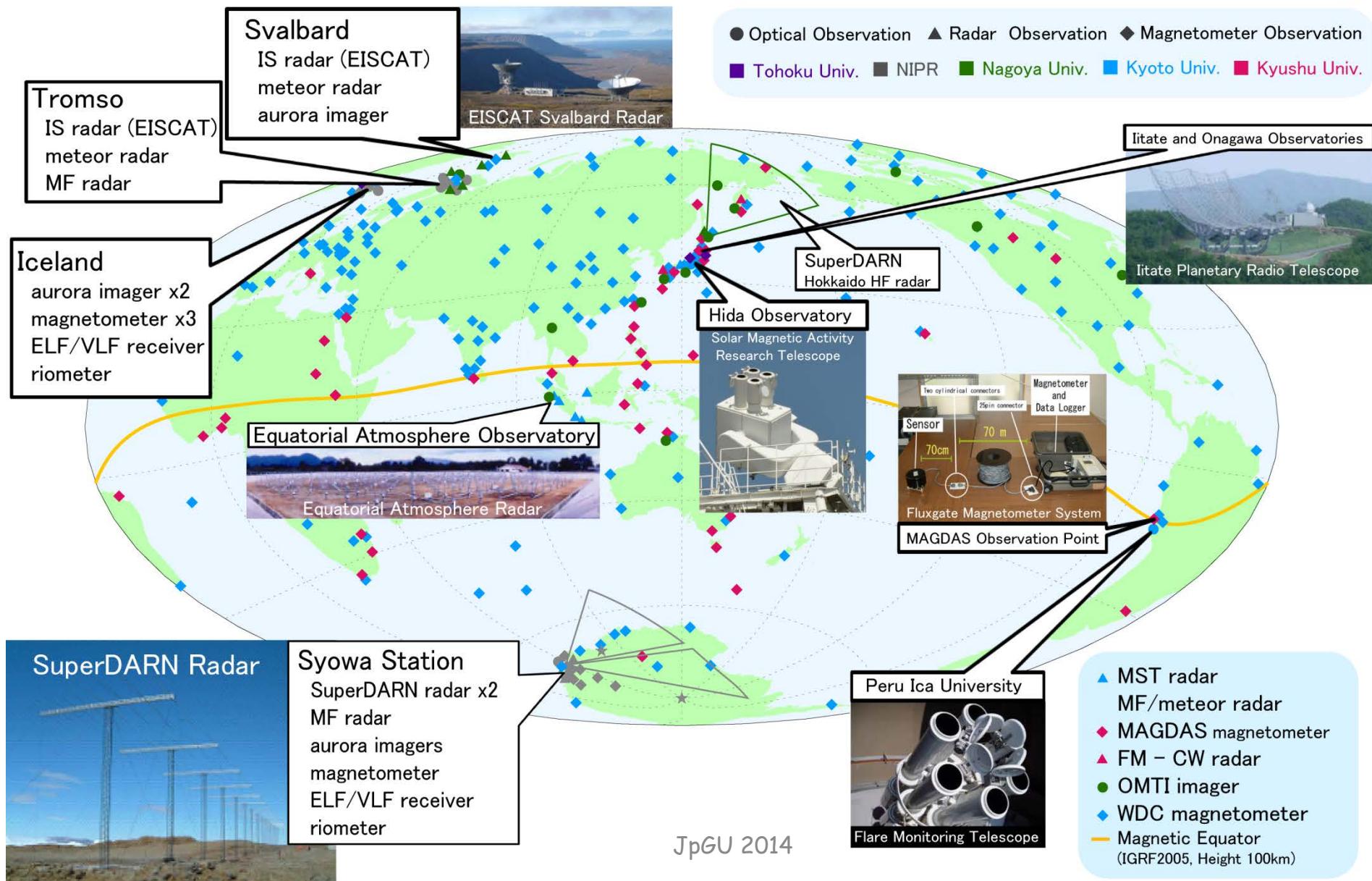
1. Introduction to the IUGONET
2. Analysis software(SPEDAS) hands-on 1
loading and plotting built-in data
break
3. Analysis software(SPEDAS) hands-on 2
figure reformation and data processing
4. Analysis software(SPEDAS) hands-on 3
loading and plotting external data

► Complicated Upper Atmospheric Phenomena



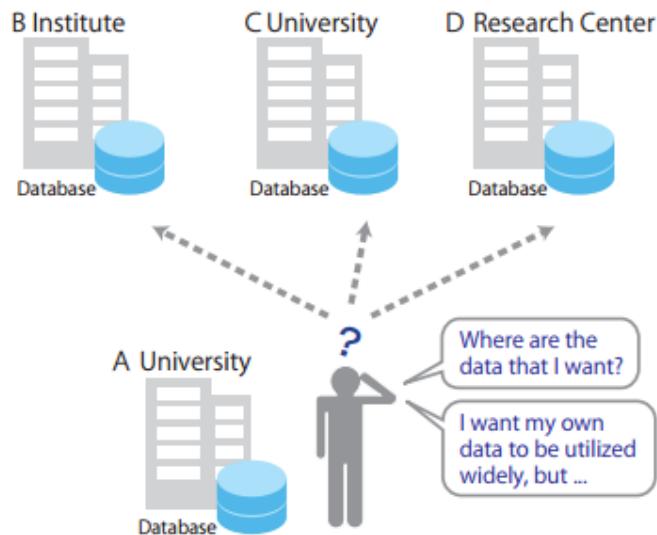
1. Affected by various phenomena from the earth surface to the space
2. Many physical parameters
3. Various variations including solar activity are overlapped

Ground Observations for Upper Atmosphere



Objectives of the IUGONET

Problem

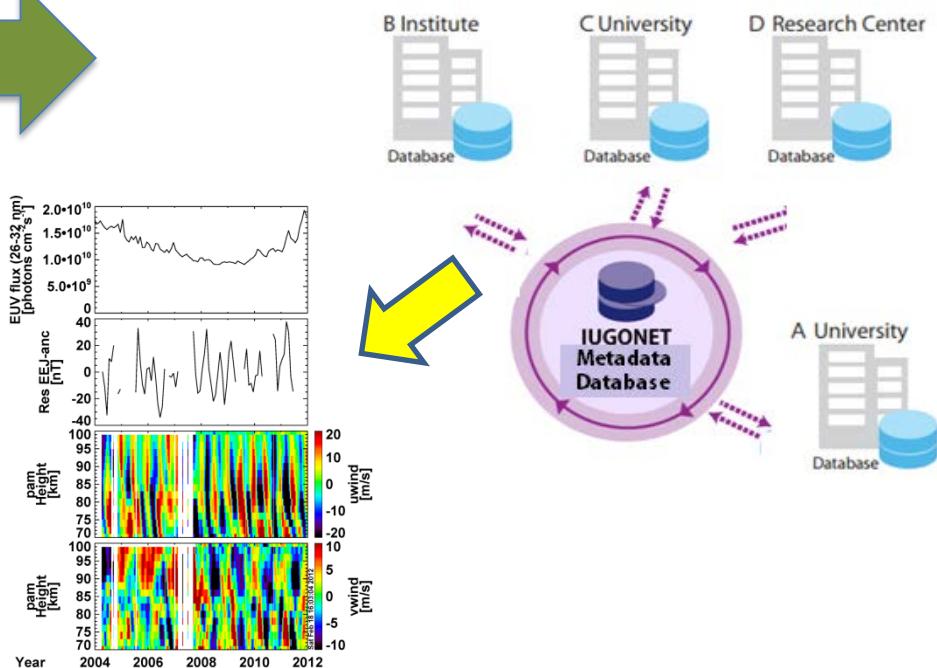


Observational data should be quality controlled and managed by the specialists who know the observations.

For users....It was not easy to reach a necessary information, since databases are distributed in various universities and institutes.

Solution

IUGONET provides a new research platform that enables metadata extracted from ground-based observation data to be shared. In addition, IUGONET developed analysis software to access and analyze data in an integrated fashion.



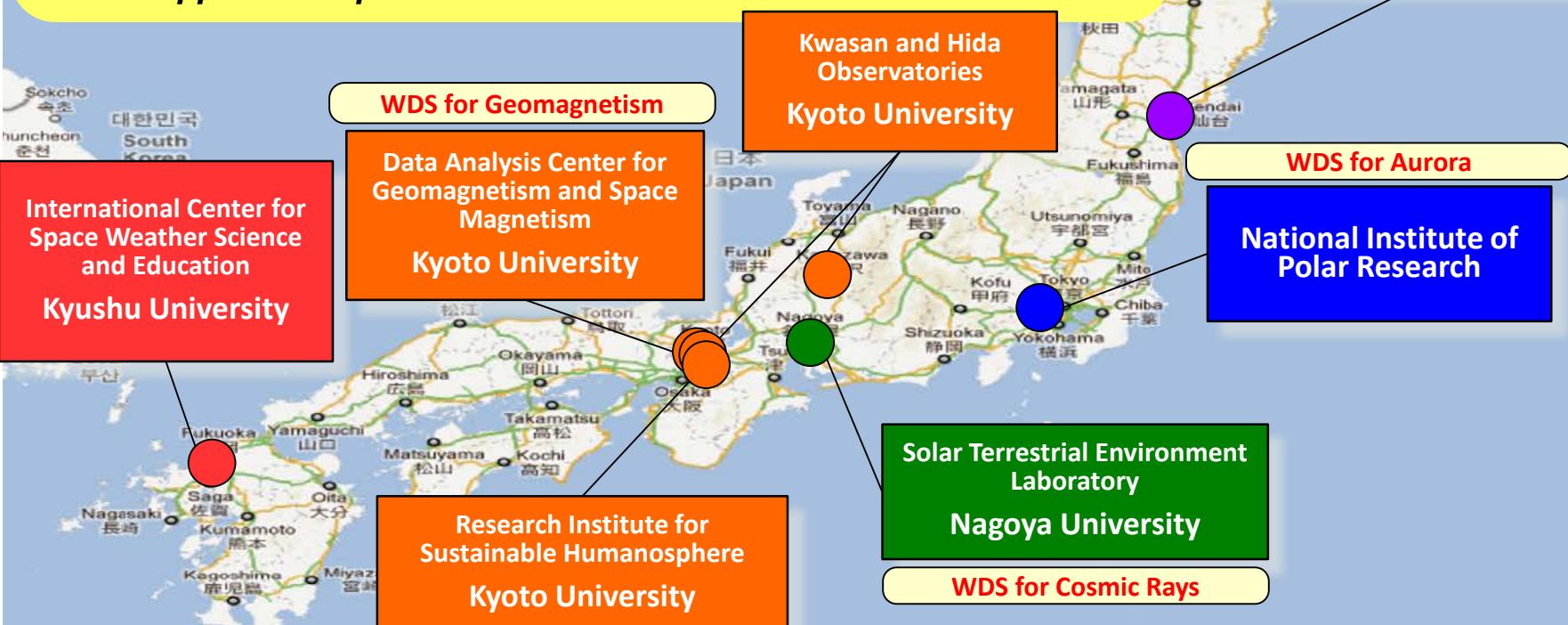
Overview of the project

The Inter-university Upper atmosphere Global Observation NETwork (IUGONET) project aims at establishing “e-infrastructure” for researchers to effectively find, get, and analyze various kinds of upper atmospheric data spread over Japanese universities and institutes.

- To exchange ground-based observation data accumulated over 50 years since IGY (both digital and analogue data)
- To promote analyses of multi-disciplinary data, which will lead to comprehensive studies of mechanisms of long-term variations in the upper atmosphere

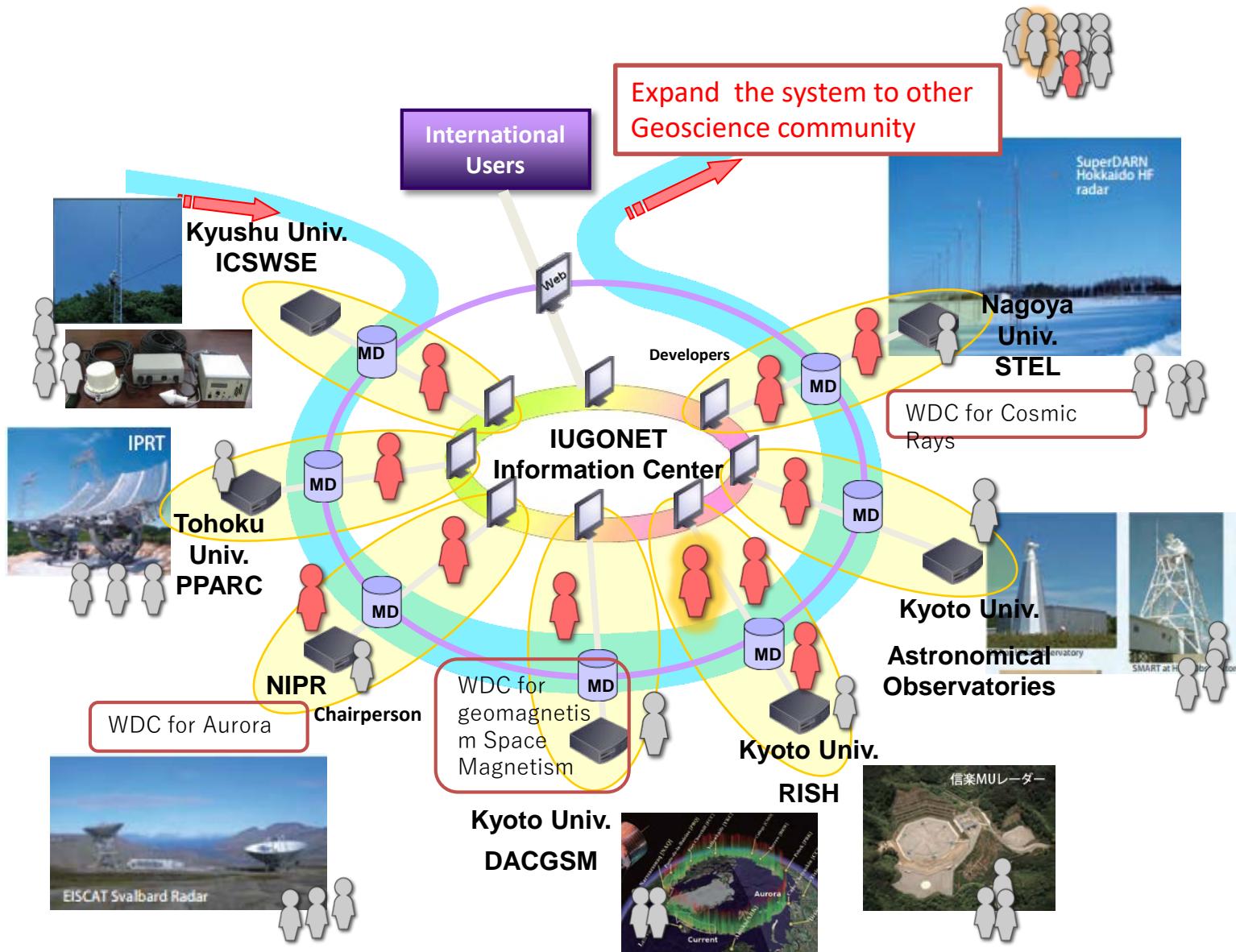


Planetary Plasma and
Atmospheric Research
Center
Tohoku University





Schematics of the project



IUGONET metadata format = SPASE + modifications

(<http://www.spase-group.org>)



The screenshot shows the homepage of the SPASE website. The header features a large "SPASE" logo on the left and "SPACE PHYSICS ARCHIVE SEARCH AND EXTRACT" on the right. Below the header is a navigation bar with links: HOME, DOCUMENTS, DATA MODEL, SCHOOL, TOOLS, SERVICES, NEWS, CONNECT, and ABOUT. The main content area has a title "Welcome to the SPASE Group". Below it, a paragraph describes the project's goals and a bulleted list of its objectives. To the right, there are sections for "Data Model Document", "Schema", "Tools", and "Registry Server".

Welcome to the SPASE Group

The Space Physics Archive Search and Extract (SPASE) effort is a Heliophysics community-based project with the goals of:

- Facilitating data search and retrieval across the Space and Solar Physics data environment with a common metadata language
- Defining and maintaining a standard Data Model for Space and Solar Physics interoperability, especially within the Heliophysics Data Environment
- Using the Data Model to create data set descriptions for all important Heliophysics data sets.
- Providing tools and services to assist SPASE data set description creators as well as the researchers/users
- Working with other groups for other Heliophysics data management and services coordination as needed

The Space Physics Archive Search and Extract (SPASE) effort is implemented by the SPASE Consortium which is composed of representatives of the international Heliophysics data community. The SPASE Working Group is currently the only international group supporting global data management for Solar and Space Physics.

[Learn more](#) about the SPASE group.

What's SPASE?

metadata format developed by international consortium to comprehensively describe research resources regarding heliospheric and magnetospheric satellite observations

- closely related to STP and upper atmosphere researches (→ easy to use as a base format)
- new metadata elements & words appendable (→ customizable according to our data)
- widely-used in VxOs (→ possible metadata exchange in the future)

IUGONET's modifications

- additional words to represent non-digital archives
- additional words to represent heliospheric coordinates
- new metadata elements to describe observation location & range



IUGONET Metadata Database

IUGONET Web Service
Using Atmospheric Lab's Web Technology

Type-A

University Upper Atmosphere Global Observation NETWORK

UDAS web Available | Rules of the Road | About Type-A

IUGONET DataSet

Instrument/Project	Observed Region	ERG Campaign		
ACEBOHO	CHAMP	COSMIC		
Ground-Based:	DST (Telescope)	FMT (Telescope)	Refractor (Telescope)	Munn (Telescope)
Geomagnetic Indices	WDC_Geomag_Kyoto	Geomag_Kakioka	MagDAS/CPMN	HM210
Induction	Magnetometer	SuperDARN	EISCAT	Imager
PWING/PSA	OMTI	Lidar	Ionesonde	IMager
VLF/ELF	HU Radar	EA Radar	MF Radar	MW Radar
VHF Radar	GPS Receiver	AWS	BL/LT/WP Radar	Radiosonde
X-Band Radar	Others			

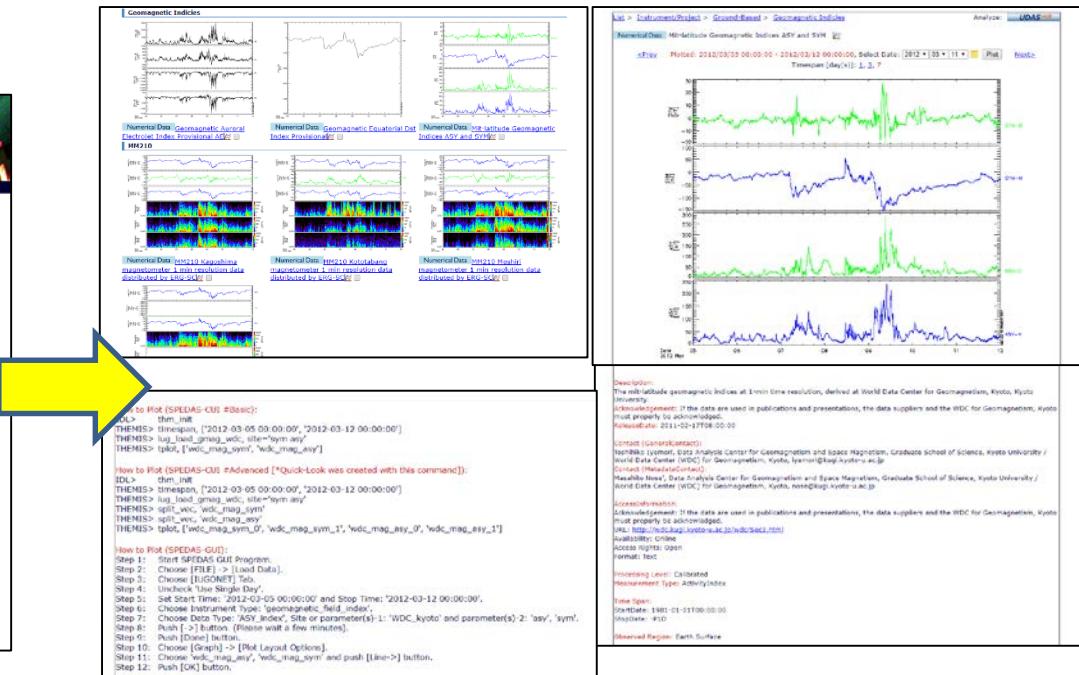
Keyword: To Search

Information

The first campaign of the ERG (Arase) - ground coordinated observations in March - April, 2017.

ERG (Arase) and Ground-Based
Campaign In March - April 2017

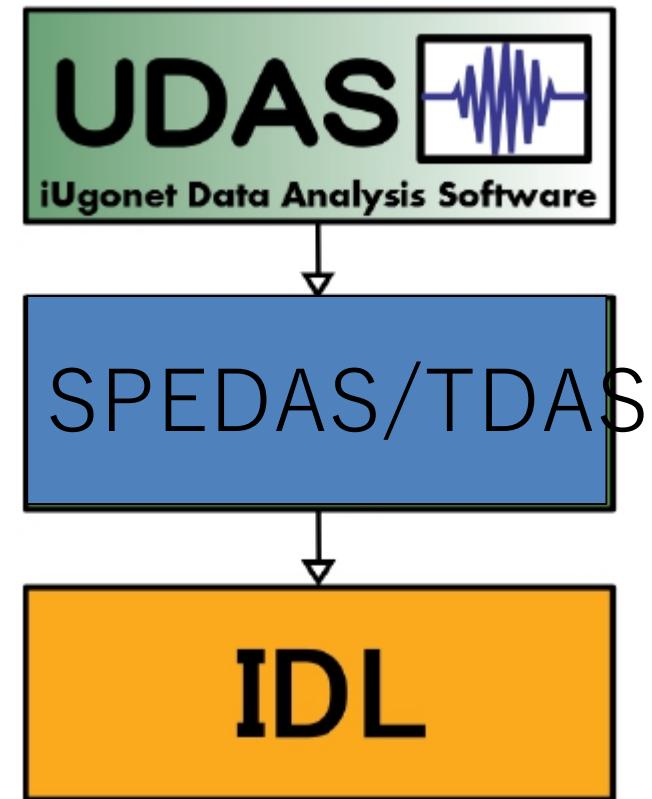
The Arase (ERG) satellite was launched at 20:00 (JST) on December 20, 2016 from Uchinoura Space Center, JAXA with an ellipse orbit period of 95 min, a perigee of 2.2 km and an apogee of 2.8 km. The satellite will study the inner magnetosphere and operate and measure DC electric and magnetic field variations, plasma waves and energetic particles in the inner magnetosphere. In the first campaign observation, we operate various kinds of ground-based instruments such as the EISCAT radar, all-sky camera, EMCCD camera, induction magnetometer, riometer and related instruments near the footprint of the orbit of the Arase satellite in order to clarify the generation and loss mechanisms of high-energy particles in Geospace and magnetosphere-ionosphere-thermosphere coupling process during geomagnetic storms and substorms. Detailed information of this campaign: <https://ergc.isee.nagoya-u.ac.jp/mw/index.php/CampaignObs/Campaign2017>



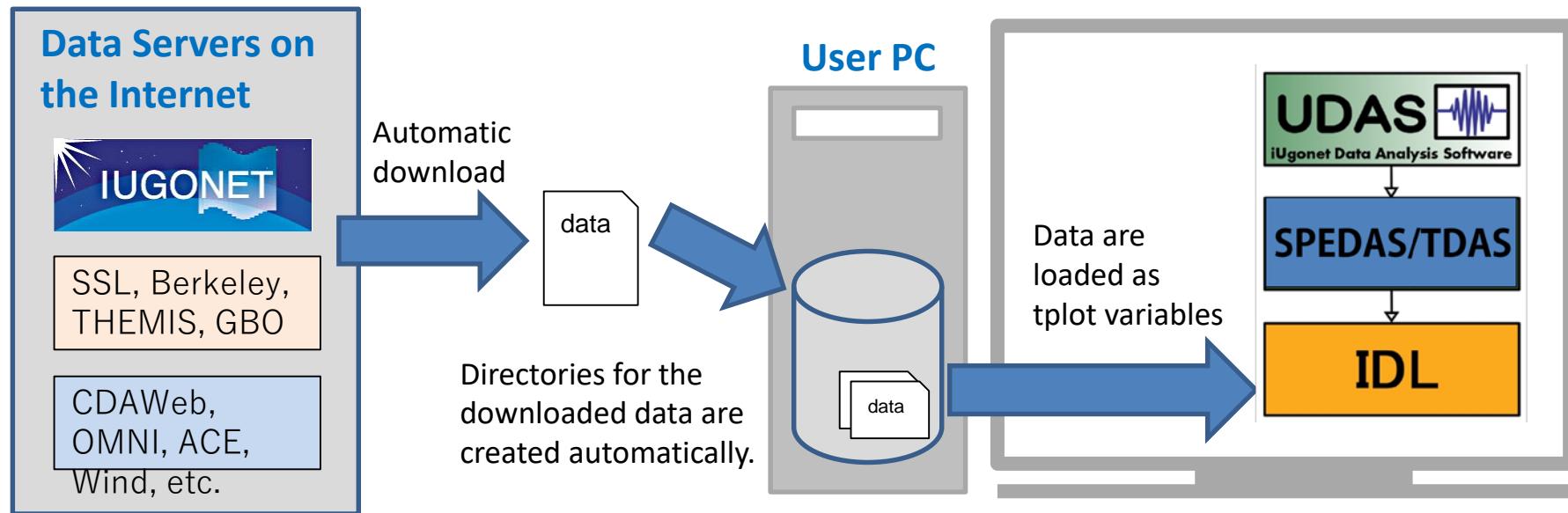
<http://search.iugonet.org/>

- IUGONET MDB (called IUGONET Type-A) is capable of cross-searching observational data distributed across the IUGONET institutions.
- IUGONET Type-A brings a remarkable advancement in accessibility to the observational data and accelerate the interdisciplinary study.
- IUGONET Type-A provides a one-stop web services such as searching data, finding interesting events, interactively plotting the data, and leading users to more detailed analysis.

- The IUGONET Data Analysis Software (UDAS) is the plug-in software for Space Physics Environment Data Analysis System(SPEDAS), formerly known as THEMIS Data Analysis Software suite (TDAS)
- The IUGONET data (e.g., geomagnetic data, aurora data, radar data, and so forth) and many satellite mission data (THEMIS, GOES, WIND, and ACE) can be handled.
- It is possible to use many routines to visualize and analyze time series data.
- It accesses the IUGONET data through the Internet, and then the data are automatically downloaded onto the user's computer



Relationship between UDAS, SPEDAS, and IDL



Data can be easily plotted, for example, by only three basis commands with the SPEDAS-CUI tool.

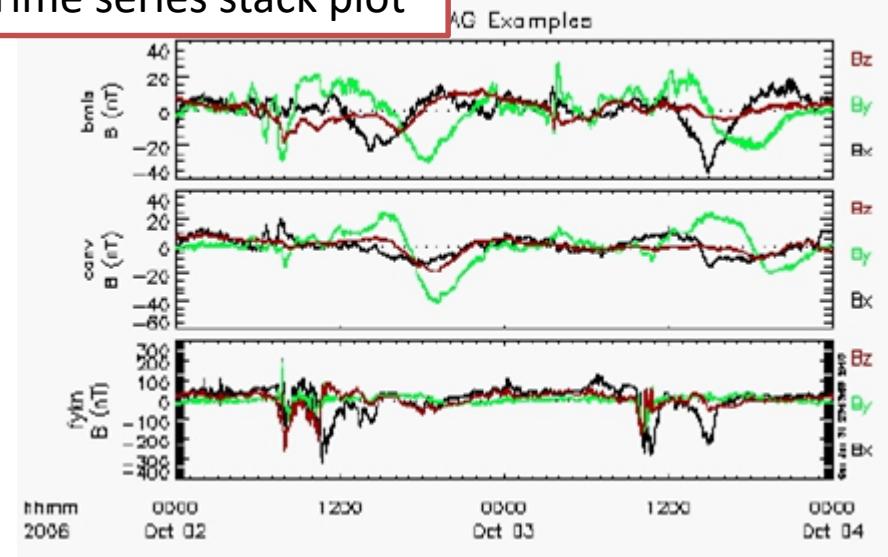
1. Set a time period
2. Load *** data
3. Plot the loaded data

timespan, 'yyyy-mm-dd'
 iug_load_***
 tplot, +++

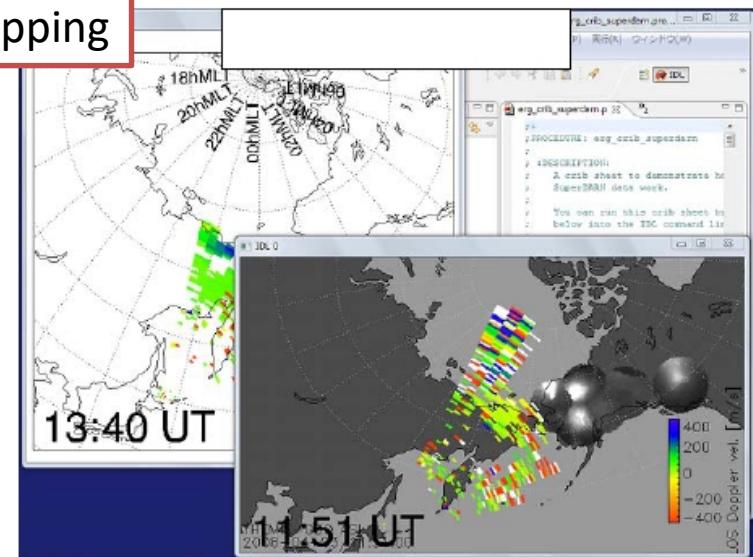
If using the GUI tool, only a few simple clicks of your mouse are required to make the same plot as that created by the above command with the CUI tool

Examples of SPEDAS visualization

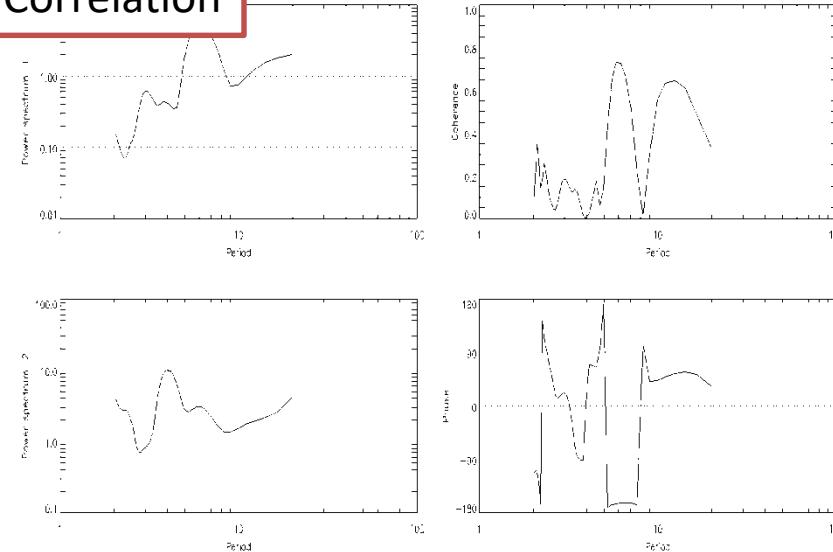
Time series stack plot



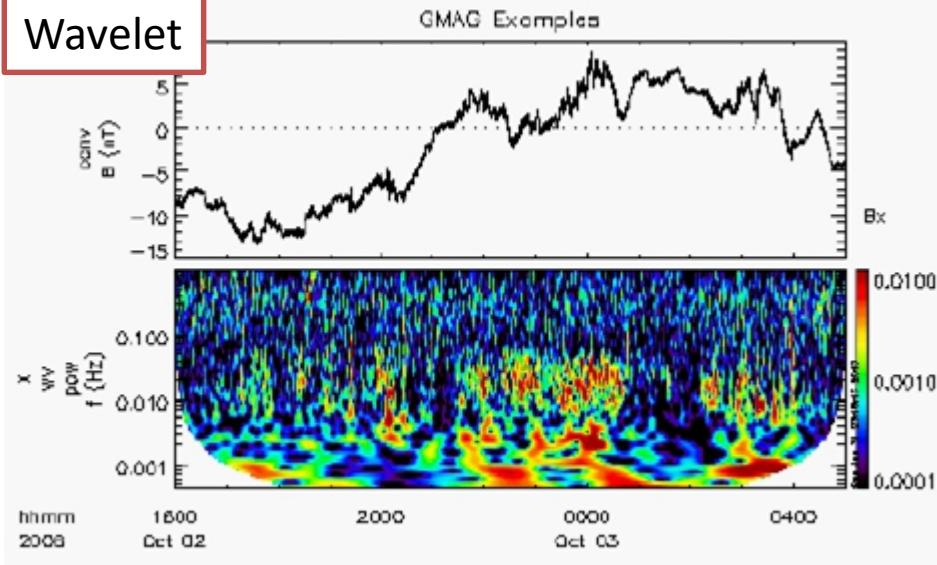
Mapping



Correlation



Wavelet



Contributions for Space weather study

Data supported by SPEDAS

Satellite data



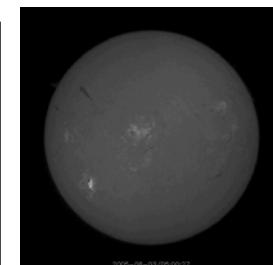
Ground-based observational data

THEMIS Geomag.	THEMIS Camera
CARISMA Geomag.	GIMA Geomag.
Greenland Geomag.	MACCS Geomag.
USGS Geomag.	

IUGONET, ERG

Solar Telescope, Solar and planetary radio telescope, Ionosphere radar (SuperDARN, EISCAT, etc.), Atmosphere radar (MU, EAR, etc.), Meteorological observation data, Geomag. network (WDC, MAGDAS, 210MM, Antarctica · Iceland, etc.)

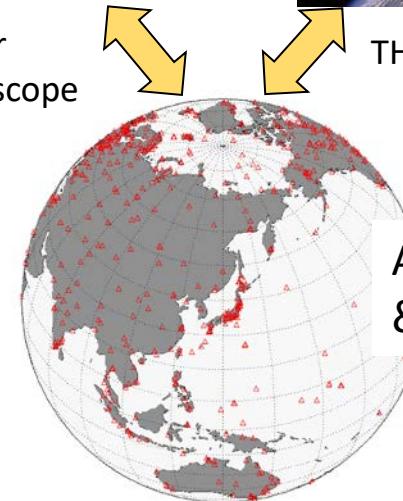
Sun



Magnetosphere



Solar Telescope



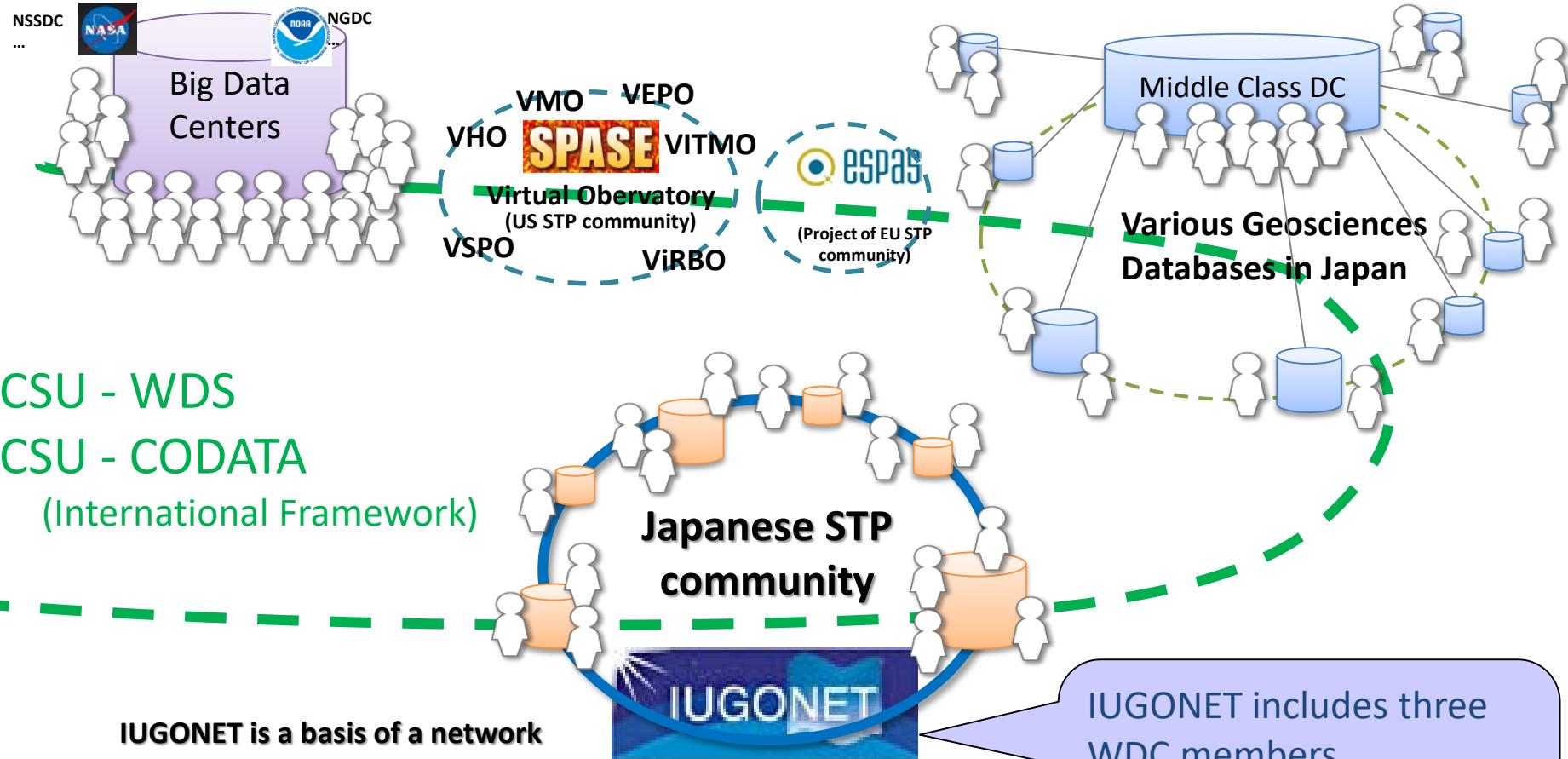
THEMIS Satellite

Atmosphere & Ionosphere

Interdisciplinary study

- ✓ Many missions have provided plugins for SPEDAS.
- ✓ IUGONET has also provided a plugin for SPEDAS, which includes many routines for loading various ground-based observation data.
- ✓ SPEDAS is suitable for Space Weather study.

Summary and Future Vision



IUGONET is a basis of a network datacenter

-> **Functioning like a big data center efficiently**

IUGONET includes three WDC members

- NIPR(Aurora)
- Kyoto Univ.(Geomagnetism)
- STEL(Cosmic Ray)

In progress



Hand on of SPEDAS



Prepare 64 bit Operating System.

1. Access the following URL

<https://archive.iii.kyushu-u.ac.jp/public/PW4ogAoJc0AApxsBi0tkoyj6RAoFJuLftBc5j4JDfbsO>

2. Download **SPEDAS 3.1** zip file for your operating system(Win or Mac), and then unzip it to your desktop.

spedas_3_1_win64_85_105_beta.zip or **spedas_3_1_mac64_85_105_beta.zip**

3. Download **data.zip** file including data for this hands-on, and then extract it to the following directory.

- Windows: **C:/data**
- MAC: **/Users/(username)/data**

Troubleshooting.pdf and SPEDAS

wiki(http://spedas.org/wiki/index.php?title=Downloads_and_Installation) will help you against some installation problems.

4. In section 3, you can load and plot your own data on SPEDAS. Please prepare it with the following format.

Supported format:

1. CDF (Common Data Format)

2. Ascii

In this hands-on two format types shown are supported:

0) Time series data arranged in the following order (i.e., date, time, and data);

```
date[0] time[0] ydata1[0] ydata2[0] ydata3[0] ...
date[0] time[1] ydata1[1] ydata2[1] ydata3[1] ...
date[0] time[2] ydata1[2] ydata2[2] ydata3[2] ...
date[0] time[3] ydata1[3] ydata2[3] ydata3[3] ...
date[0] time[4] ydata1[4] ydata2[4] ydata3[4] ...
```

where, ydata1, ydata2, ydata3, ... are the column data.

As for the date[] and time[] format string, various formats are acceptable, for example,

YYYY-MM-DD/hh:mm:ss

yy MM DD hh mm ss

hh mm ss

See example "[data/testfile_format0.txt](#)"



- 1) Time series data that includes more than one row data at the same time
-

date[0] time[0] vdata[0] ydata1[0] ydata2[0] ydata3[0] ...

date[0] time[0] vdata[1] ydata1[1] ydata2[1] ydata3[1] ...

:

date[0] time[0] vdata[99] ydata1[99] ydata2[99] ydata3[99] ...

date[0] time[1] vdata[0] ydata1[100] ydata2[100] ydata3[100] ...

date[0] time[1] vdata[1] ydata1[101] ydata2[101] ydata3[101] ...

:

date[0] time[1] vdata[99] ydata1[199] ydata2[199] ydata3[199]

where vdata repeats every time, for example, altitude for the atmosphere data, frequency for the spectral data, and range for the radar data.

See example “[data/testfile_format1.txt](#)”

For more details, let's see

http://www.iugonet.org/data/udas/How2_use_egg_en.pdf

- [1] Unzip the zipped SPEDAS file.
- [2] Double-click the executable file named ‘spedas’ in the directory ‘spedas_v_3/spd_gui’.

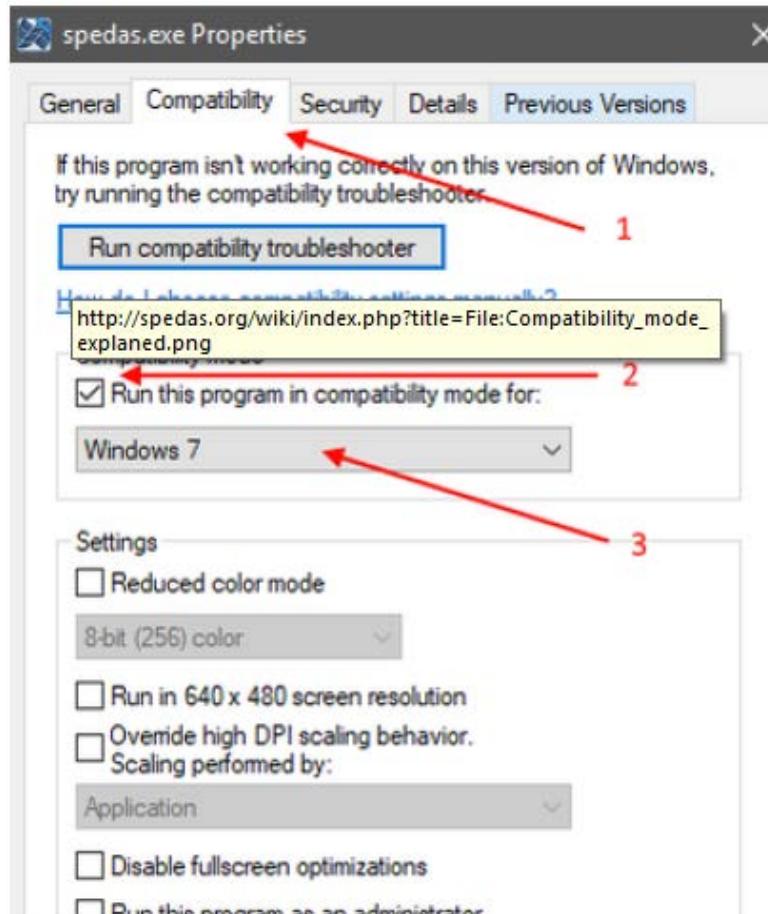


Click the icon
‘spd_gui’.

名前	更新日時
idl85	2017/08/11 8:09
colors1.tbl	2013/04/16 14:52
gmag_stations.txt	2015/11/03 14:35
grammar.sav	2014/02/20 10:34
idl.ico	2017/07/14 11:34
parse_tables.sav	2014/02/20 10:34
PutRsp.dat	2014/06/27 14:13
spd_gui.sav	2017/07/14 11:34
spd_gui_running_history.txt	2017/08/12 5:55
spedas.exe	2017/07/14 11:34
spedas.ini	2017/07/14 11:34
spin_harmonic_template.dat	2013/04/16 14:52
splash.bmp	2017/07/14 11:34

Doule-click the executable
file named ‘spedas’

- [3] IDL Virtual Machine window opens on your PC, so please **click the ‘spd_gui’ button**.



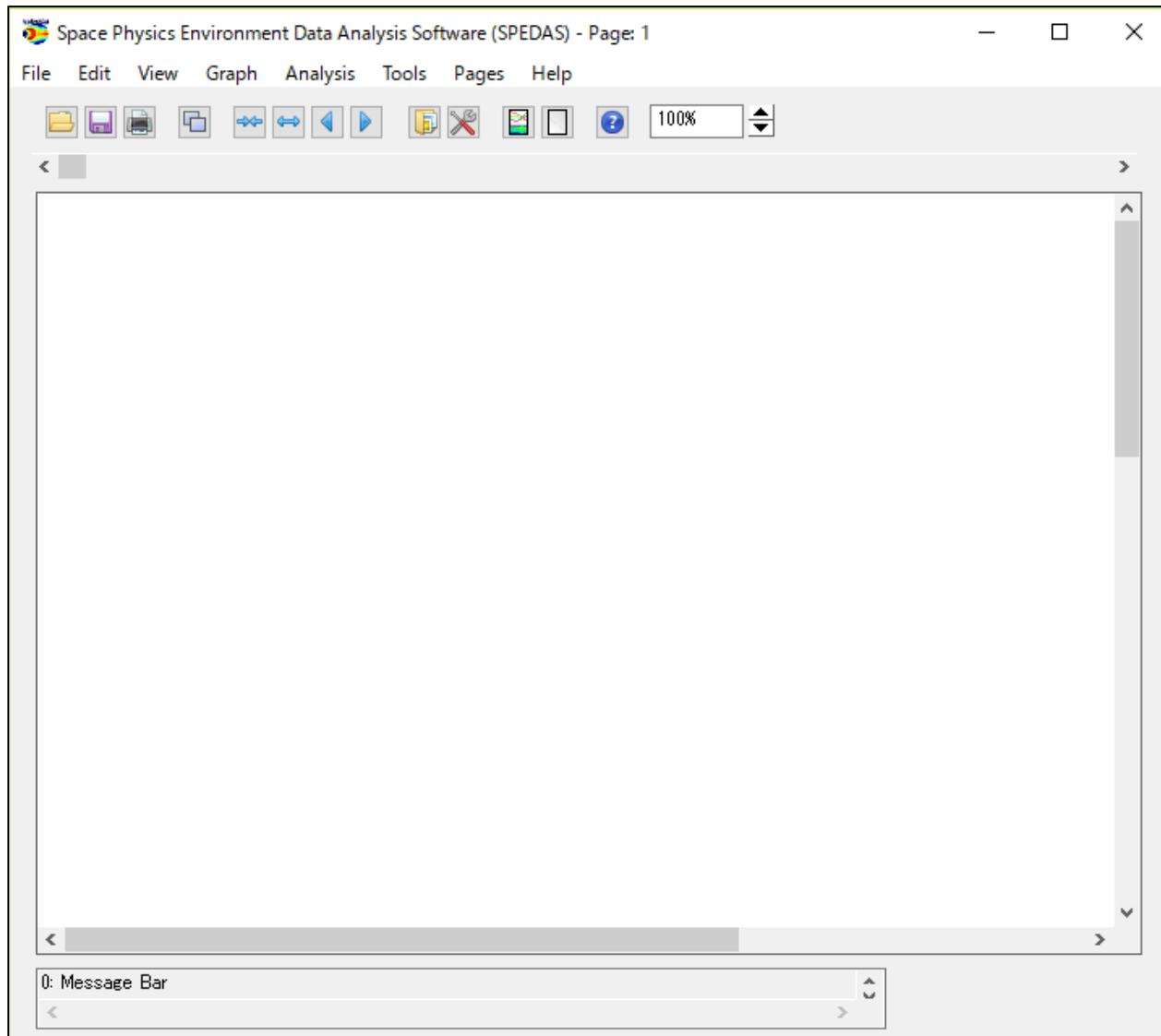
If you encountered any graphics problem on **Windows 10**, try launching IDL in "Windows 8 Compatibility Mode" or something similar. To do that:

0. Right click on the IDL or SPEDAS executable file and select "Properties".
1. Select "**Compatibility**" tab
2. Check "**Run the program in compatibility mode for:**"
3. Select "**Windows 8**" or "**Windows 7**".

Click ok to apply the changes.
Restart the program and then try your plot over again.



Start of IDL-VM(GUI) tool



Ready?



Metadata DB for Upper Atmosphere

超高層大気長期変動の全地球上ネットワーク観測・研究
Inter-university Upper atmosphere Global Observation NETwork

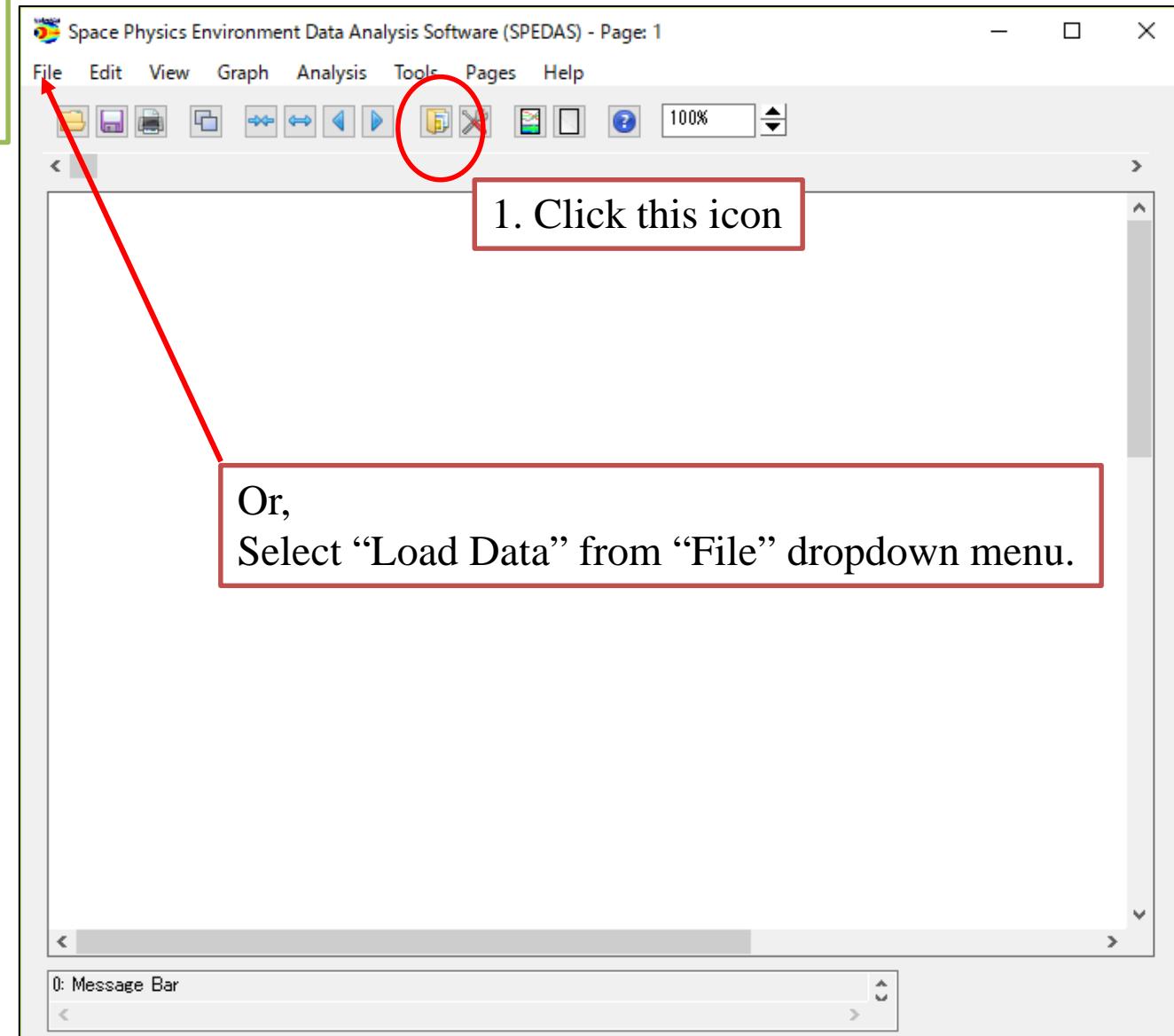
How to Use SPEDAS

part1

- **Load data**
- **Plot data**
- **Save figure, data, and your work**



Lesson: Load Dst index





GUI Basic Operation

IUGONET

ACE BARREL ELFIN Lomo FAST GOES Geomagnetic Indices IUGONET MA Products WIND

IUGONET Data Selection:

Start Time: 2012-03-04/00:00:00

Stop Time: 2012-03-11/00:00:00

Use Single Day

Instrument Type: geomagnetic_field_index

Note: # means that the load procedure has been developed
in collaboration with the ERG Science Center.

1. Click IUGONET Tab

2. Uncheck "Use Single Day"

3. Set Date and Time
Start Time: 2012-03-04/00:00:00
Stop Time: 2012-03-11/00:00:00

4. Change Instrument Type
geomagnetic_field_index

Clear Site or Parameters-1 Clear Parameters-2

Done

(2017-08-13/12:30:11) 24: Valid End Time Entered

Delete All Data



GUI Basic Operation

IUGONET

ACE BARREL ELFIN Lomo FAST GOES Geomagnetic Indices IUGONET MAVEN_PFP MMS OMNI POES THEMIS THEMIS Derived Products WIND

IUGONET Data Selection:

Start Time: 2012-03-04/00:00:00

Stop Time: 2012-03-11/00:00:00

Use Single Day

Instrument Type: geomagnetic_field_index

Data Type:

Site or parameter(s)-1: *

Parameter(s)-2: *

1. Choose three parameters

- Dst_index
- *(all)
- *

2. Click the arrow

Note: # means that the load procedure has been developed
in collaboration with the ERG Science Center.

0: Status information is displayed here.



GUI Basic Operation

IUGONET

ACE BARREL ELFIN Lomo FAST GOES Geomagnetic Indices IUGONET MAVEN_PFP MMS OMNI POES THEMIS THEMIS Derived Products WIND

IUGONET Data Selection:

Start Time: 2012-03-04/00:00:00

Stop Time: 2012-03-11/00:00:00

Use Single Day

Instrument Type: geomagnetic

Data Type: Site

Dst_index *
AE_index
ASY_index

* (all)
WDC_K

Clear

Note: # means that the load pr
in collaboration with the

Rules of Data Use:

The DST data are provided by the World Data Center for Geomagnetism, Kyoto, and are not for redistribution (<http://wdc.kugi.kyoto-u.ac.jp/>). Furthermore, we thank the geomagnetic observatories (Kakioka [JMA], Honolulu and San Juan [USGS], Hermanus [RSA], Alibag [IIG]), NiCT, INTERMAGNET, and many others for their cooperation to make the Dst index available. The distribution of DST data has been partly supported by the IUGONET (Inter-university Upper atmosphere Global Observation NETwork) project (<http://www.iugonet.org/>) funded by the Ministry of Education, Culture, Sports, Science and Technology (MEXT), Japan.

OK キャンセル

1. Click “OK”

Done

0: Status information is displayed here.



GUI Basic Operation

IUGONET

ACE BARREL ELFIN Lomo FAST GOES Geomagnetic Indices IUGONET MAVEN_PFP MMS OMNI POES THEMIS THEMIS Derived Products WIND

IUGONET Data Selection:

Start Time: 2012-03-04/00:00:00

Stop Time: 2012-03-11/00:00:00

Use Single Day

Instrument Type: geomagnetic_field_index

Data Type: Dst_index
AE_index
ASY_index

Site or parameter(s)-1: *(all)
WDC_kyoto

Parameter(s)-2: *
final
prov

Note: # means that the load procedure has been developed
in collaboration with the ERG Science Center.

Data Loaded:

IUGONET
geomagnetic_field_index
dst
wdc_mag_dst_prov [2012-03-04/00:30:00 to 2012-03-10/]

1. Data was loaded successfully!

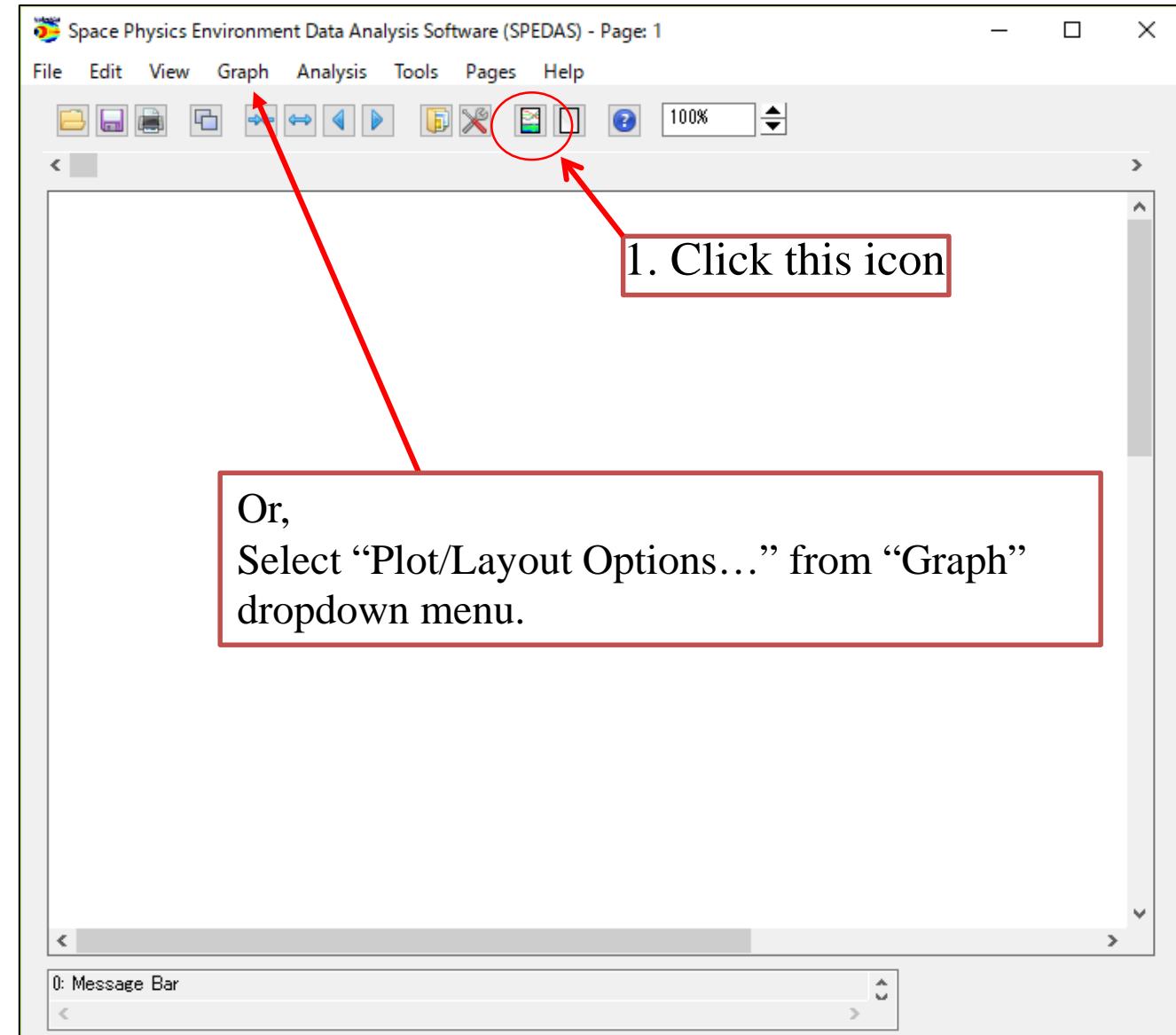
Done

(2017-08-13/12:20:39) 2: IUGONET Data Loaded Successfully

2. Click "Done"



Lesson: Plot data





GUI Basic Operation

Plot/Layout Options X

Show Data Components Automatic Panels

- CREATE PLOTS -

Dependent Variable

IUGONET
geomagnetic_field_index
dst
wdc_mag_dst_prov [2012-03-04/00:30:00]

Add:
Line -> (button circled in red)
Spec ->

2. Click “Line”

1. Select data which you want to plot:
wdc_mag_dst_prov

Variables: Add/Edit

Panels
Add
Remove
Edit
↔
↑
↓
Row:
1
Column:
1
Row Span:
1
Col Span:
1
Rows Per Page:
2
Cols Per Page:
1
Lock To Panel
Unlock Panels

OK Apply Cancel

(2017-08-15/07:25:01) 4: SPD_UI_LAYOUT_OPTIONS: Removed Panel 1



GUI Basic Operation

Plot/Layout Options X

Show Data Components Automatic Panels

- CREATE PLOTS -

Dependent Variable

- IUGONET
 - geomagnetic_field_index
 - dst
 - wdc_mag_dst_prov [2012-03-04/00:30:00]

Add:
Line ->
Spec ->

(L) Panel 1 (1, 1) -
wdc_mag_dst_prov_time -vs- wdc_mag_dst_prov_data

1. Selected variable name
is added to this box

Variables:
Add/Edit

Panels
 Add
 Remove
 Edit

Row:
1
Column:
1
Row Span:
1
Col Span:
1
Rows Per Page:
2
Cols Per Page:
1
 Lock To Panel
 Unlock Panels

OK Apply Cancel

2. Click OK

(2017-08-15/07:22:04) 3: Add Finished.



GUI Basic Operation

Plot/Layout Options

Show Data Components Automatic Panels

Dependent Variable

- IUGONET
 - geomagnetic_field_index
 - dst
 - wdc_mag_dst_prov [2012-03-04/00:30:00]

Add:

(L) Panel 1 (1, 1) -
wdc_mag_dst_prov_time -vs- wdc_mag_dst_prov_data

OK Apply Cancel

PanelX(Y,Z)

X: panel serial number
Y: row index of the panel
Z: column index of the panel

You can add, remove, and edit panels with these buttons.

You can move panels and change the number of panels per page.

Lock To Panel
Unlock Panels

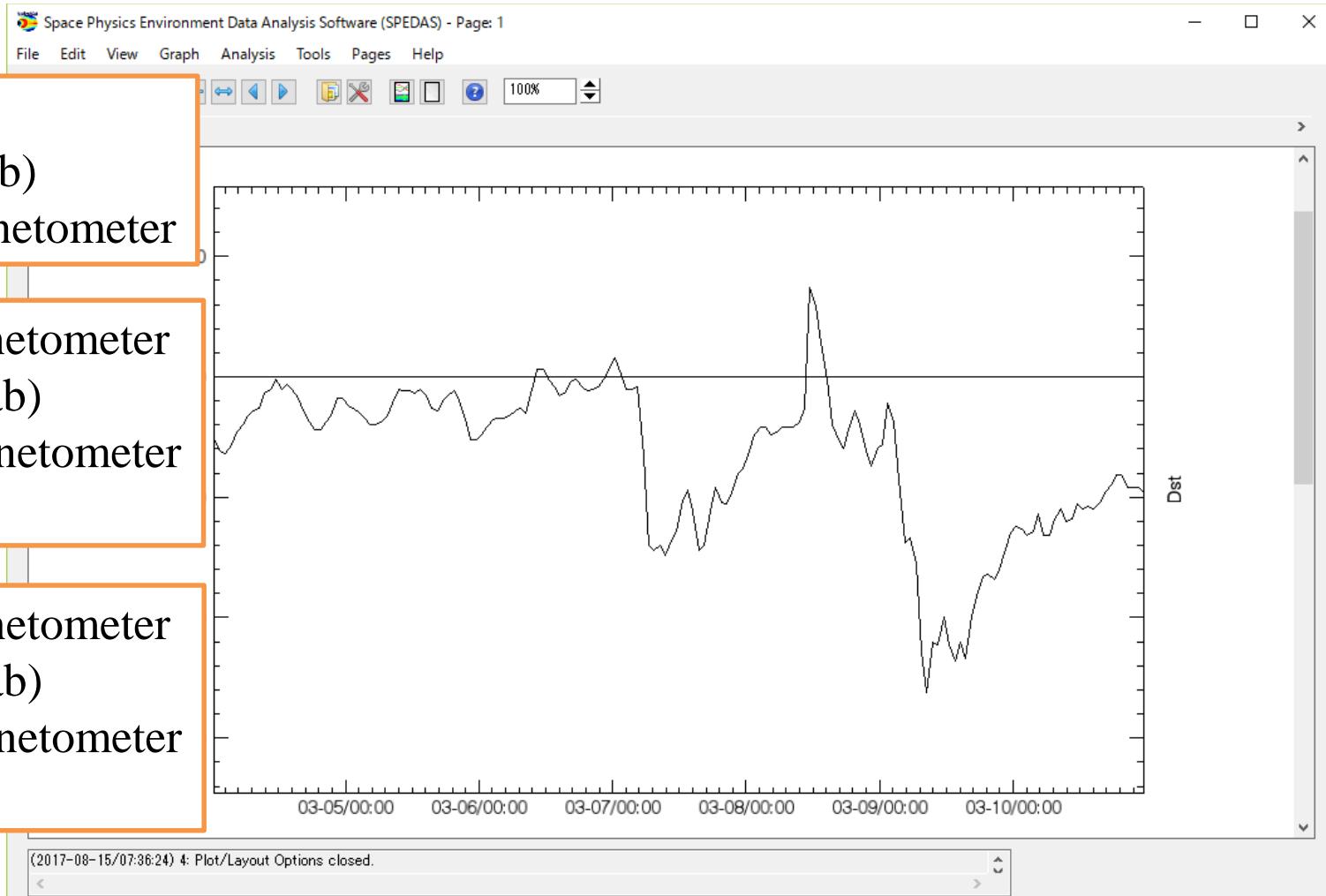
Lock to panel:
Lock panel axes to currently selected panel.

(2017-08-15/07:22:04) 3: Add Finished.



Try:

Load other three data





GUI Basic Operation

Answer

The screenshot shows the IUGONET Data Selection interface. A red box highlights the 'IUGONET' tab in the top navigation bar. Another red box highlights the 'geomagnetic_field_index' section in the main panel. A third red box highlights the 'AE_index' selection in the 'Site or parameter(s)-1' dropdown. A fourth red box highlights the 'Clear Site or Parameters-1' button. A fifth red box highlights the 'Data is loaded' message in the status bar at the bottom.

1. Select IUGONET tab

2. Select magnetic_field_index

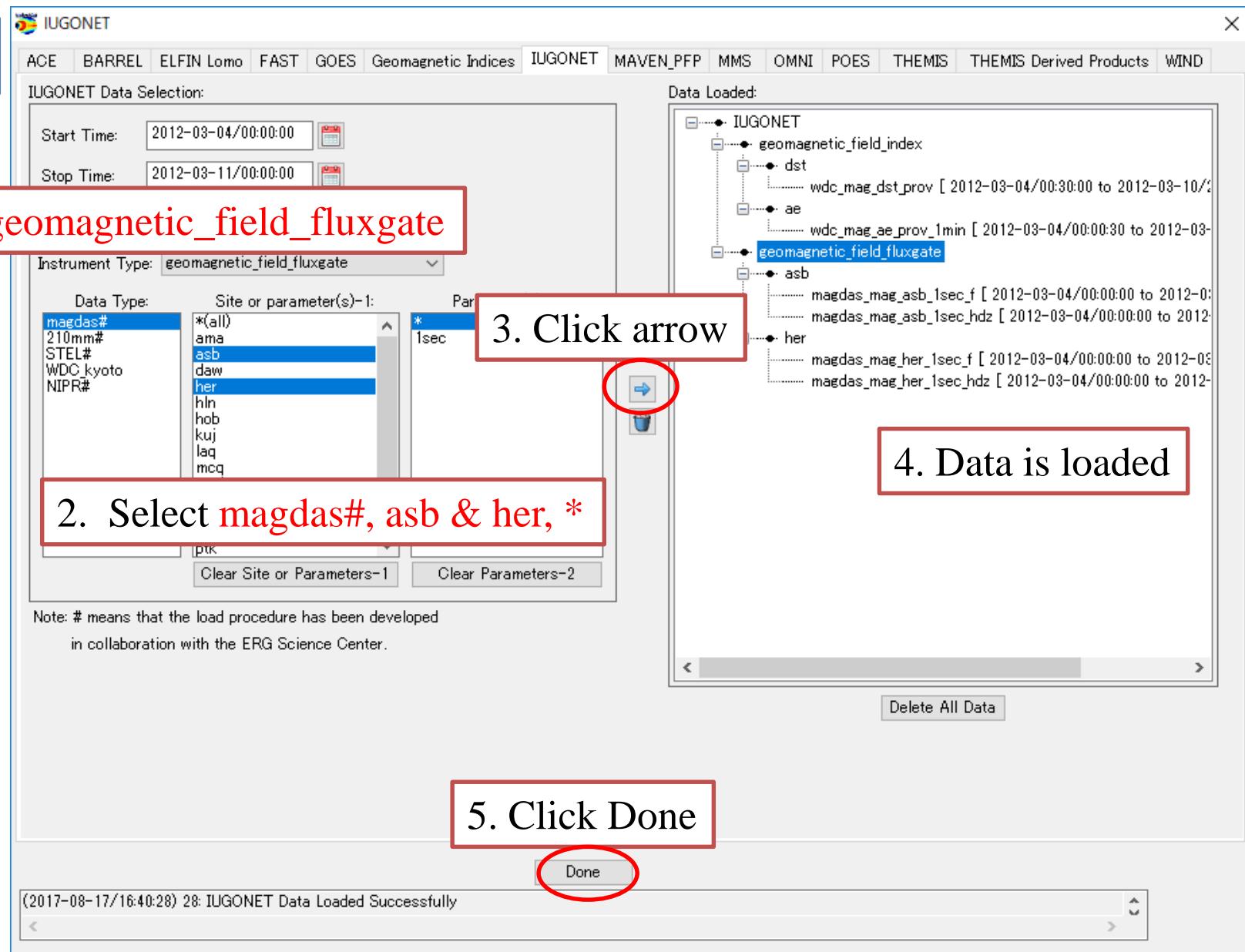
3. Select AE_index, *(all), *

4. Click arrow

5. Data is loaded

(2017-08-15/07:41:44) 2: IUGONET Data Loaded Successfully

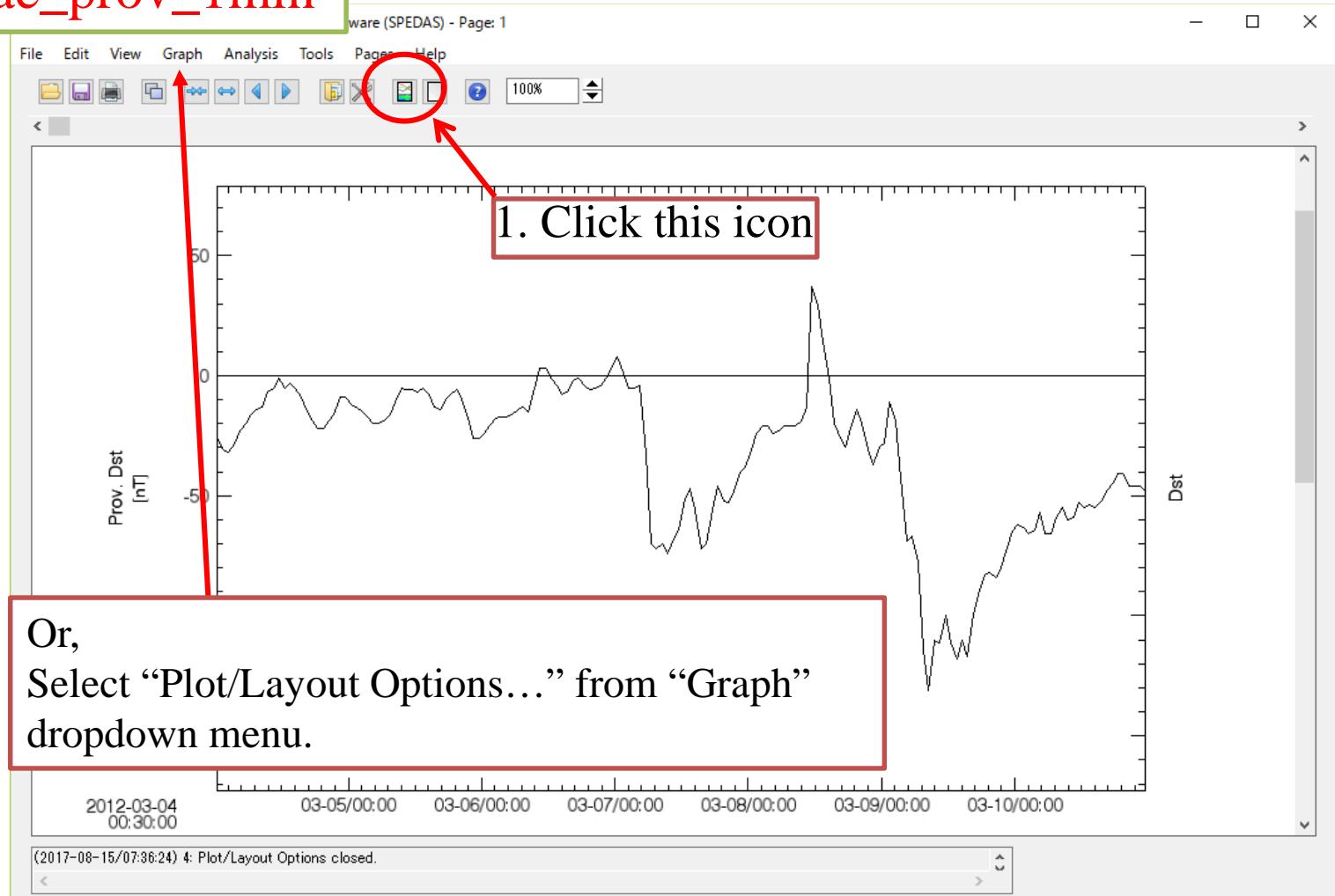
Answer





Lesson: Add Plot

wdc_mag_ae_prov_1min





GUI Basic Operation

Plot/Layout Options

Show Data Components Automatic Panels

- CREATE PLOTS -

Dependent Variable

IUGONET

- geomagnetic_field_index
 - dst
 - wdc_mag_dst_prov [2012-03-04/00:30:00 to 201]
 - ae
 - wdc_mag_ae_prov_1min [2]
- geomagnetic_field_fluxgate
 - asb
 - magdas_mag_asb_1sec_f [2012-03-04/00:00:00 to 201]
 - magdas_mag_asb_1sec_hdz [2012-03-04/00:00:00 to 201]
 - her
 - magdas_mag_her_1sec_f [2012-03-04/00:00:00 to 201]
 - magdas_mag_her_1sec_hdz [2012-03-04/00:00:00 to 201]

Panel Add
Remove
Edit
Row:
2
Column:
1
Row Span:
1
Col Span:
1
Rows Per Page:
2
Cols Per Page:
1
Lock To Panel
Unlock Panels

1. Click Add

2. Select wdc_mag_ae_prov_1min

3. Click “Line”

4. Data are added

5. Click OK

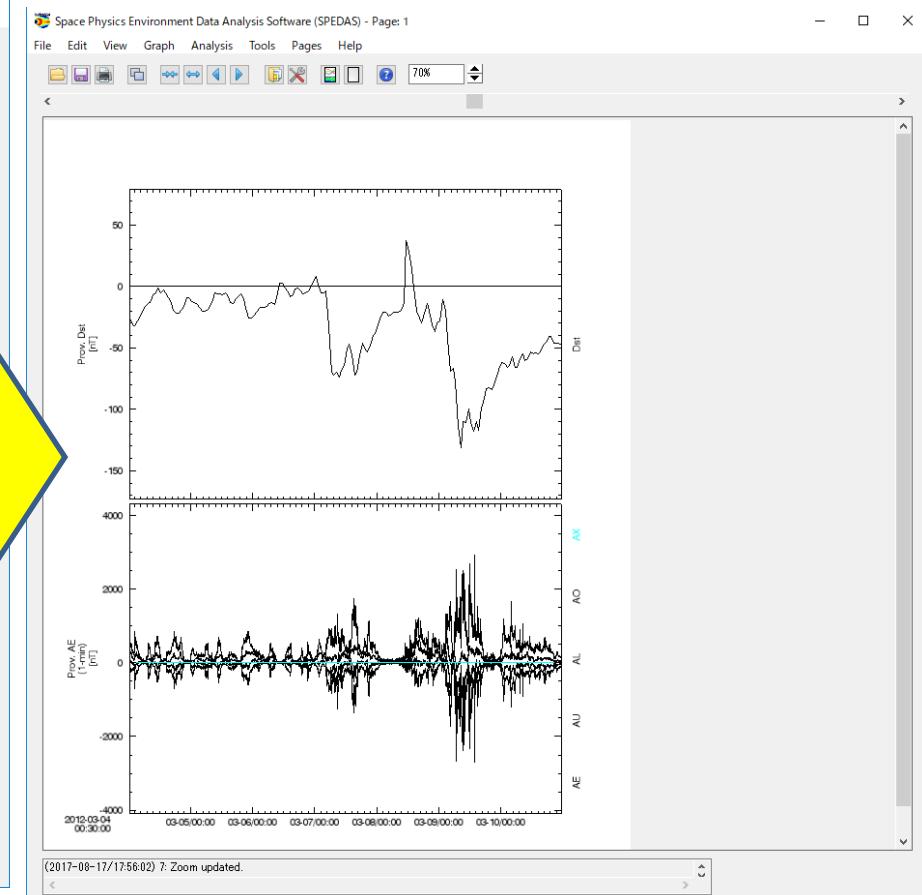
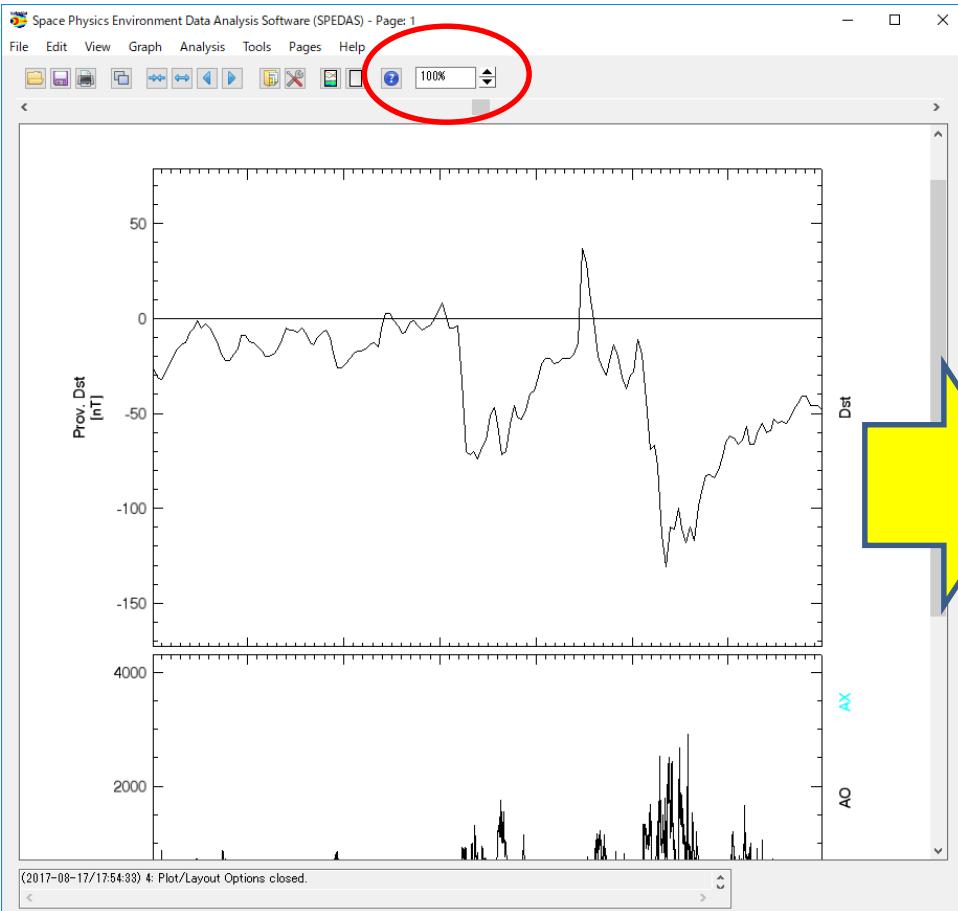
(OK button circled in red)

(2017-08-17/17:22:52) 6: Add Finished.



GUI Basic Operation

1. Click black triangles

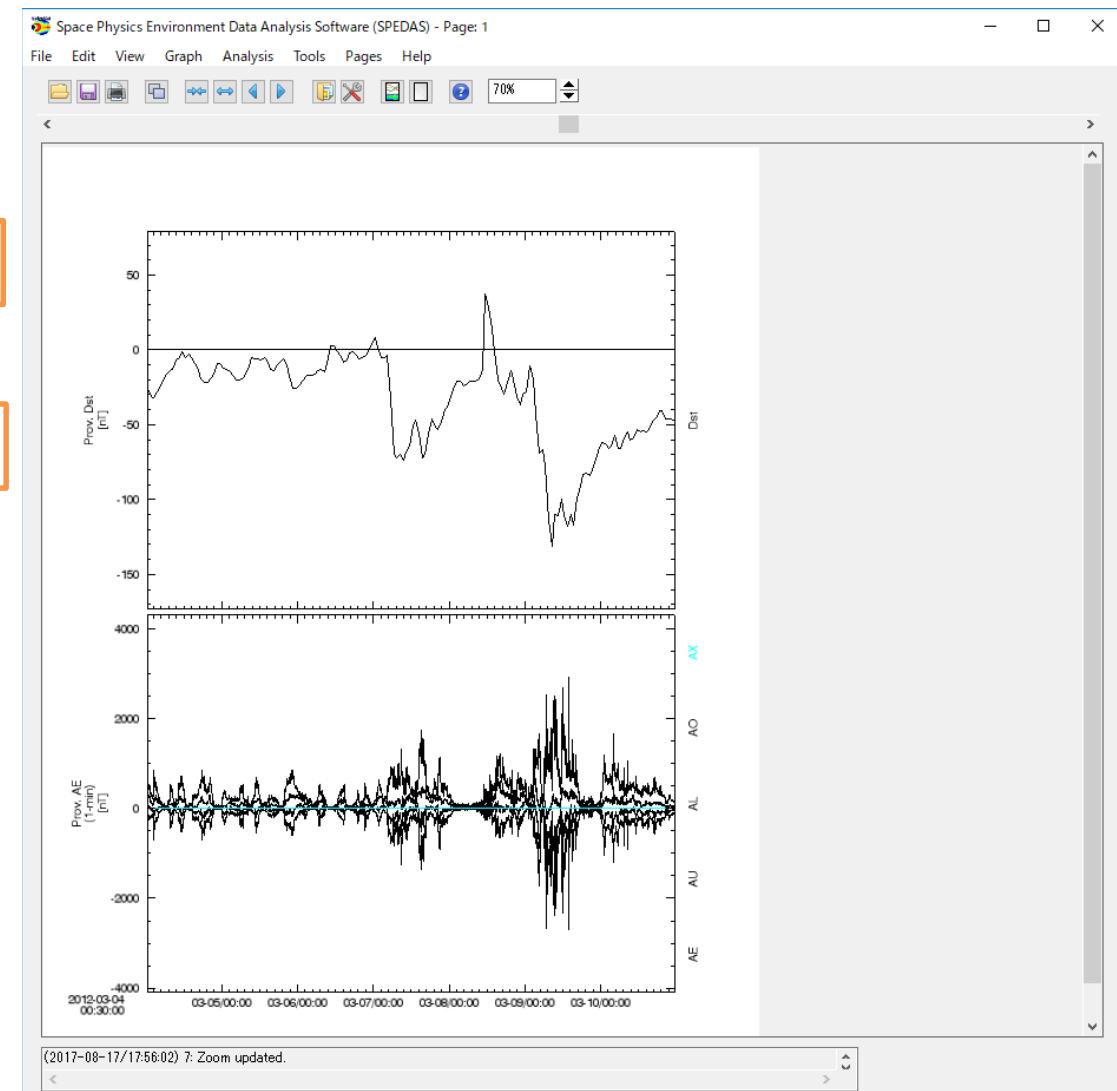




Try:
Plot other two data

magdas_mag_her_1sec_hdz

magdas_mag_asb_1sec_hdz





GUI Basic Operation

Answer

Options

X

Show Data Components Automatic Panels

- CREATE PLOTS -

Dependent Variable

- IUGONET
 - geomagnetic_field_index
 - dst
 - + wdc_mag_dst_prov [2012-03-04/00:30:00 to 201
 - ae
 - + wdc_mag_ae_prov_1min [:]
 - geomagnetic_field_fluxgate
 - asb
 - + magdas_mag_asb_1sec_f [2012-03-04/00:00:00 to 1
 - + magdas_mag_asb_1sec_hdz [2012-03-04/00:00:00 to 1
 - her
 - + magdas_mag_her_1sec_f [2012-03-04/00:00:00 to 1
 - + magdas_mag_her_1sec_hdz [2012-03-04/00:00:00 to 1

2. Click Line

Add:
Line ->
Spec ->

(L) Panel 1 (1, 1) -
- wdc_mag_dst_prov_time -vs- wdc_mag_dst_prov_data
Panel 2 (2, 1) -
- wdc_mag_ae_prov_1min_time -vs- wdc_mag_ae_prov_1min_0
- wdc_mag_ae_prov_1min_time -vs- wdc_mag_ae_prov_1min_1
- wdc_mag_ae_prov_1min_time -vs- wdc_mag_ae_prov_1min_2
- wdc_mag_ae_prov_1min_time -vs- wdc_mag_ae_prov_1min_3
- wdc_mag_ae_prov_1min_time -vs- wdc_mag_ae_prov_1min_4
Panel 3 (3, 1) -
- magdas_mag_her_1sec_hdz_time -vs- magdas_mag_her_1sec_hdz_x
- magdas_mag_her_1sec_hdz_time -vs- magdas_mag_her_1sec_hdz_y
- magdas_mag_her_1sec_hdz_time -vs- magdas_mag_her_1sec_hdz_z

1. Select magdas_mag_her_1sec_hdz

3. Data are added

Variables:
Add/Edit

Panels
Add
Remove
Edit

Row:
3
Column:
1
Row Span:
1
Col Span:
1
Rows Per Page:
4
Cols Per Page:
1
Lock To Panel
Unlock Panels

OK Apply Cancel

(2017-08-17/18:01:17) 5: Add Finished.



Answer

Options

 Show Data Components Automatic Panels

- CREATE PLOTS -

Dependent Variable

- IUGONET
 - geomagnetic_field_index
 - dst
 - + wdc_mag_dst_prov [2012-03-04/00:30:00 to 201
 - ae
 - + wdc_mag_ae_prov_1min [2]
 - geomagnetic_field_fluxgate
 - asb
 - + magdas_mag_asb_1sec_f [2012-03-04/00:00:00 t
 - + magdas_mag_asb_1sec_hdz [2012-03-04/00:00:0
 - her
 - + magdas_mag_her_1sec_f [2012-03-04/00:00:00 t
 - + magdas_mag_her_1sec_hdz [2012-03-04/00:00:0

2. Click Line

Add:
Line ->
Spec ->

(L) Panel 1 (1, 1) -
- wdc_mag_dst_prov_time -vs- wdc_mag_dst_prov_data
Panel 2 (2, 1) -
- wdc_mag_ae_prov_1min_time -vs- wdc_mag_ae_prov_1min_0
- wdc_mag_ae_prov_1min_time -vs- wdc_mag_ae_prov_1min_1
- wdc_mag_ae_prov_1min_time -vs- wdc_mag_ae_prov_1min_2
- wdc_mag_ae_prov_1min_time -vs- wdc_mag_ae_prov_1min_3
- wdc_mag_ae_prov_1min_time -vs- wdc_mag_ae_prov_1min_4
Panel 3 (3, 1) -
- magdas_mag_her_1sec_hdz_time -vs- magdas_mag_her_1sec_hdz_x
- magdas_mag_her_1sec_hdz_time -vs- magdas_mag_her_1sec_hdz_y
- magdas_mag_her_1sec_hdz_time -vs- magdas_mag_her_1sec_hdz_z
Panel 4 (4, 1) -
- magdas_mag_asb_1sec_hdz_time -vs- magdas_mag_asb_1sec_hdz_x
- magdas_mag_asb_1sec_hdz_time -vs- magdas_mag_asb_1sec_hdz_y
- magdas_mag_asb_1sec_hdz_time -vs- magdas_mag_asb_1sec_hdz_z

1. Select magdas_mag_asb_1sec_hdz

3. Data are added

4. Click OK

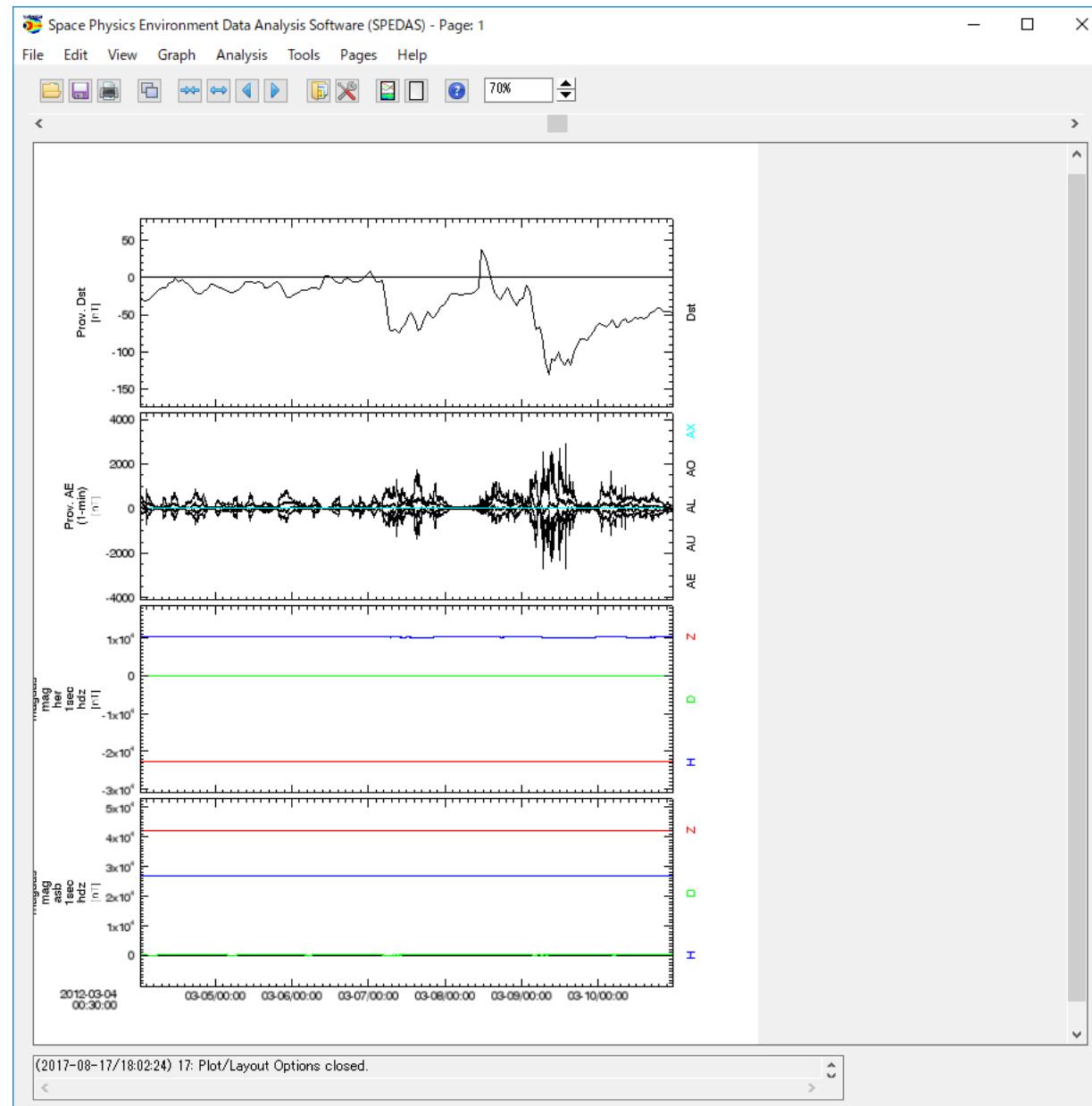
OK Apply Cancel

Panels
Add
Remove
Edit

Row:
4
Column:
1
Row Span:
1
Col Span:
1
Rows Per Page:
4
Cols Per Page:
1
Lock To Panel
Unlock Panels



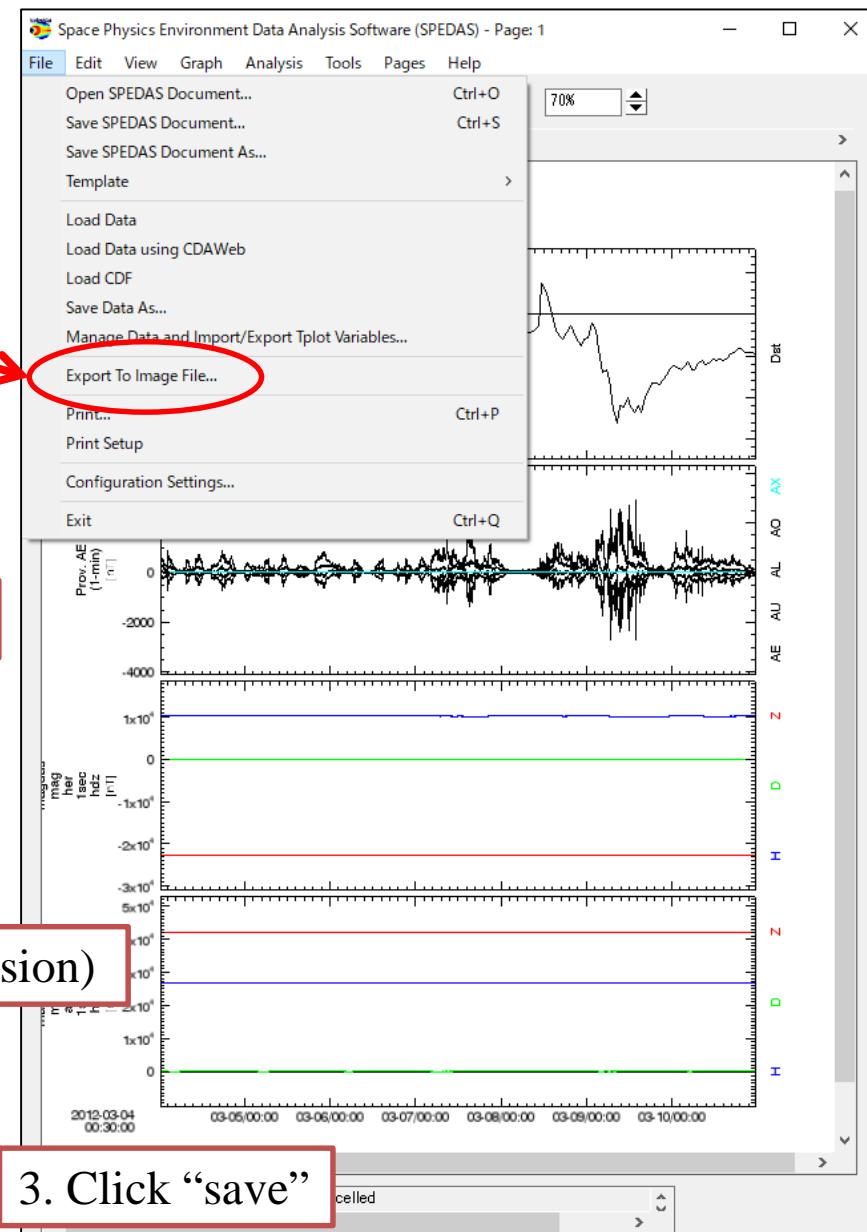
GUI Basic Operation





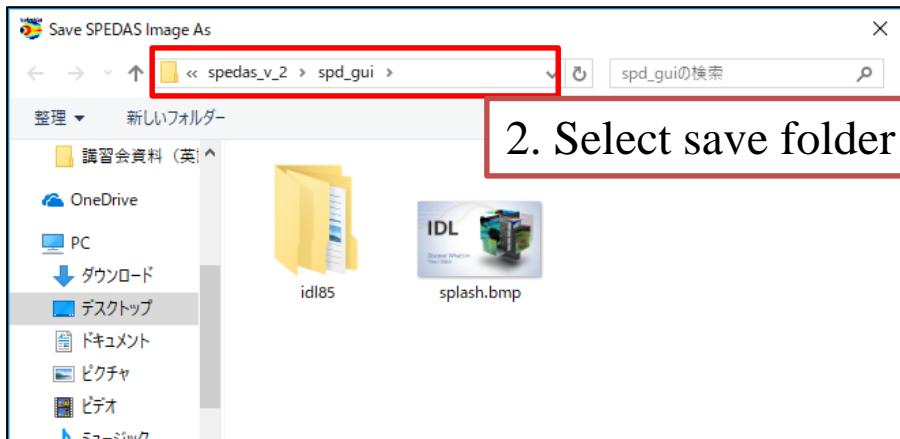
Lesson: Save plot as figure

1. Select
File – Export To Image File



2. Select save folder

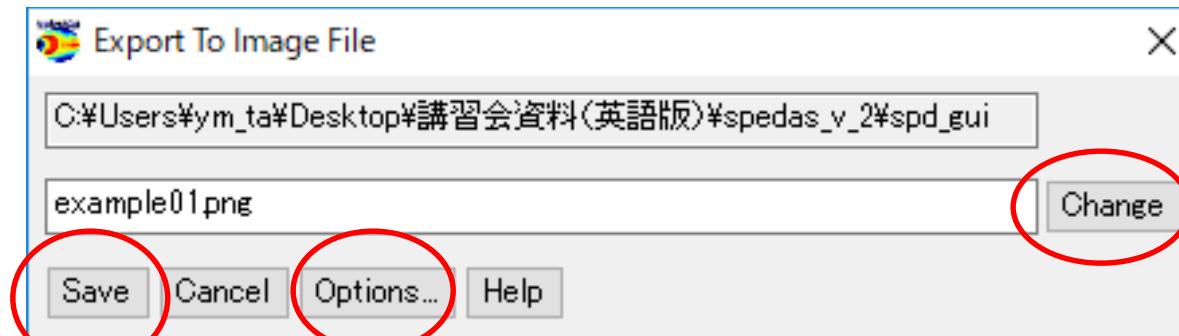
2. Input file name and select format (by extension)



3. Click “save”



Confirmation



Change

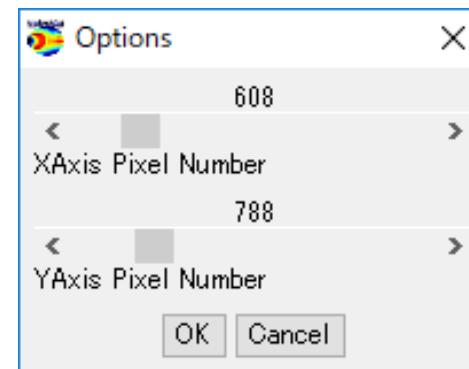
Save

Cancel

Options...

Help

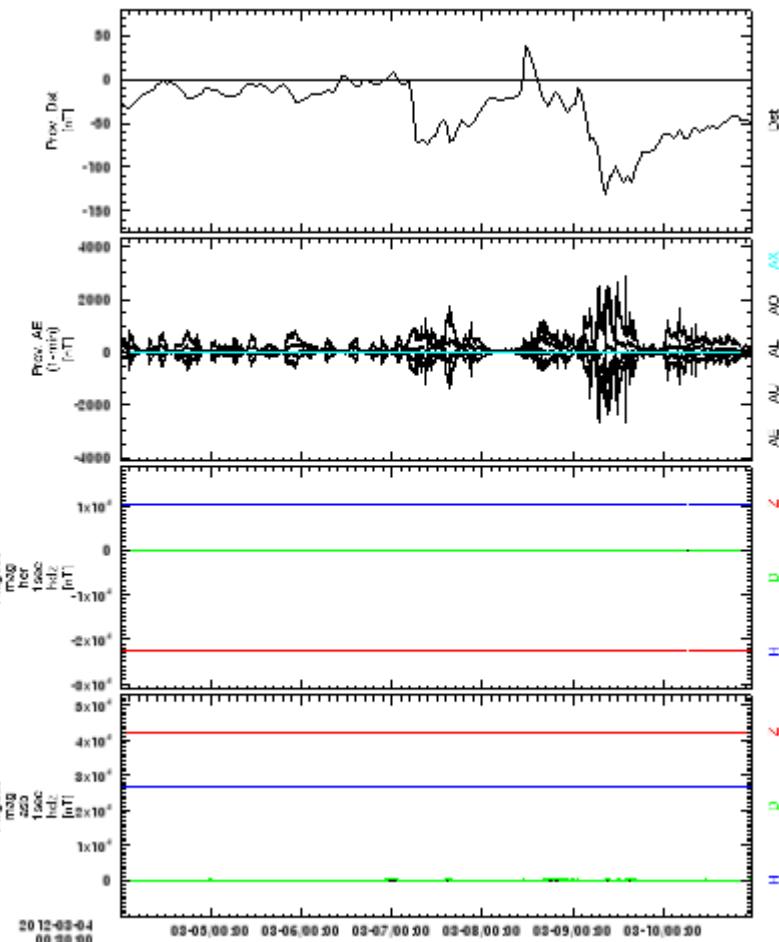
Back to previous



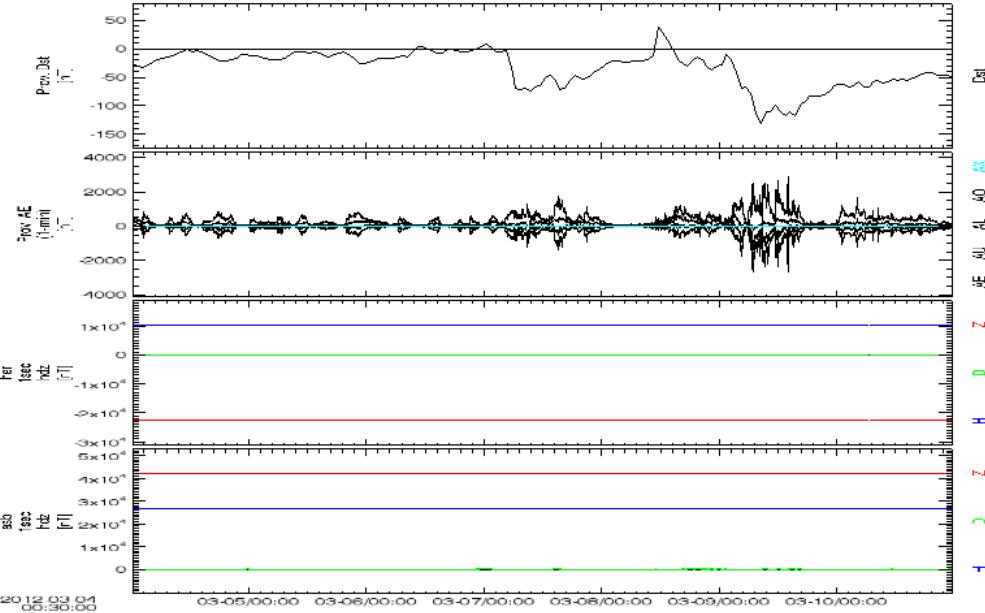
Click “Save”



GUI Basic Operation



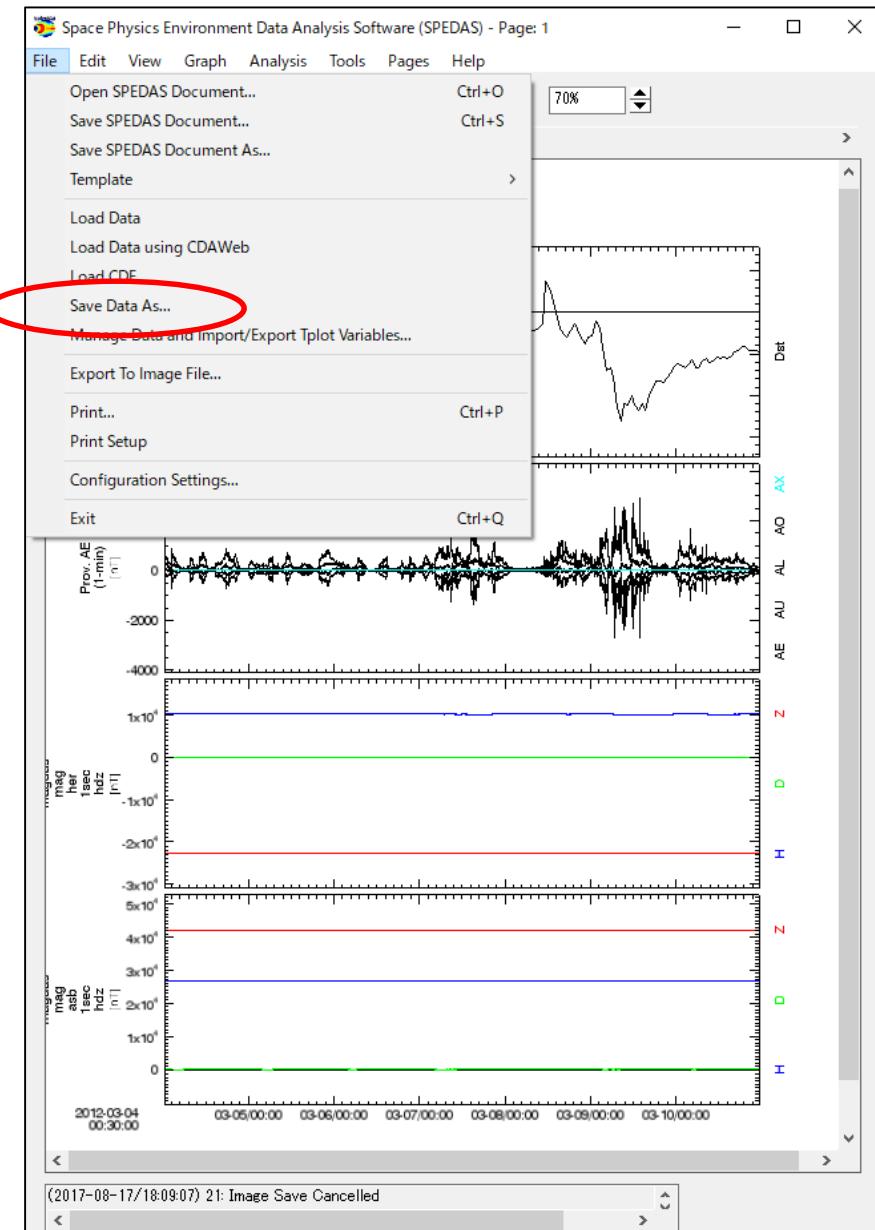
X pixel 428, Y pixel 554



X pixel 856, Y pixel 554
(65%)

Lesson: Save data as ascii

1. Select
File – Save Data As





GUI Basic Operation

1. Select data which you want to save
magdas_mag_her_1sec_hdz_x

2. check this box

3. Select time interval

4. check this box

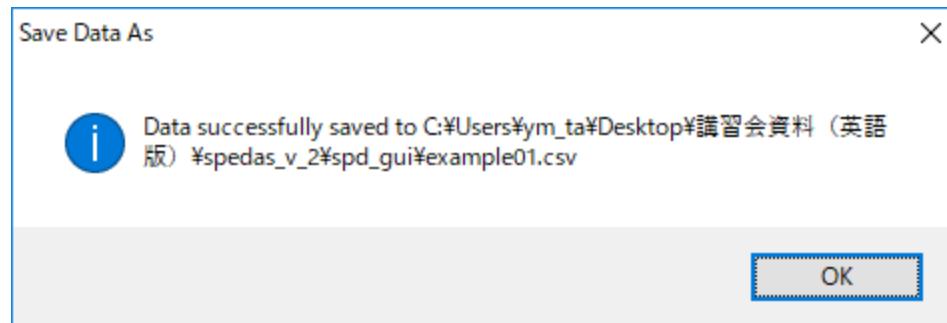
5. Click Save

6. Select save folder

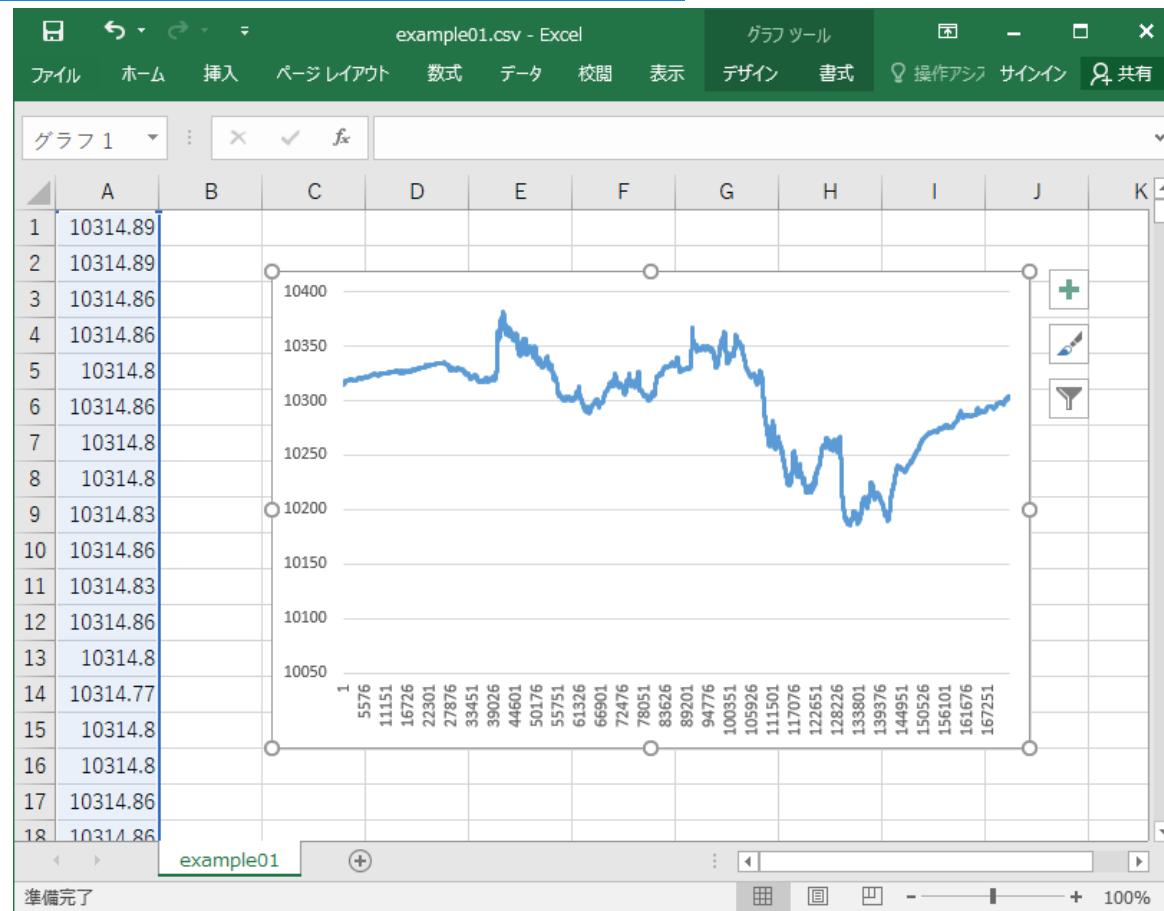
7. Input file name (data is saved in csv format)

8. Click “save”

The screenshot shows the 'Save Data As' dialog box. In the 'Loaded Data' tree, the 'magdas_mag_her_1sec_hdz_x' node is selected. The 'Restrict Time Range' checkbox is checked, and the time range is set from 'Start Time: 2012-03-08/00:00:00' to 'End Time: 2012-03-09/23:59:59'. The 'Save as ASCII data file' checkbox is also checked. The 'Time Format' dropdown shows '2007-Feb-17/00:01:15.123'. The 'Floating Point Format' is set to '3.142'. The 'Header Style' is 'None', 'Item Separator' is 'Comma', and 'Indicate flags with' is 'NaN'. The 'Ignore yaxis components' checkbox is checked. The 'Save' button is highlighted with a red arrow.



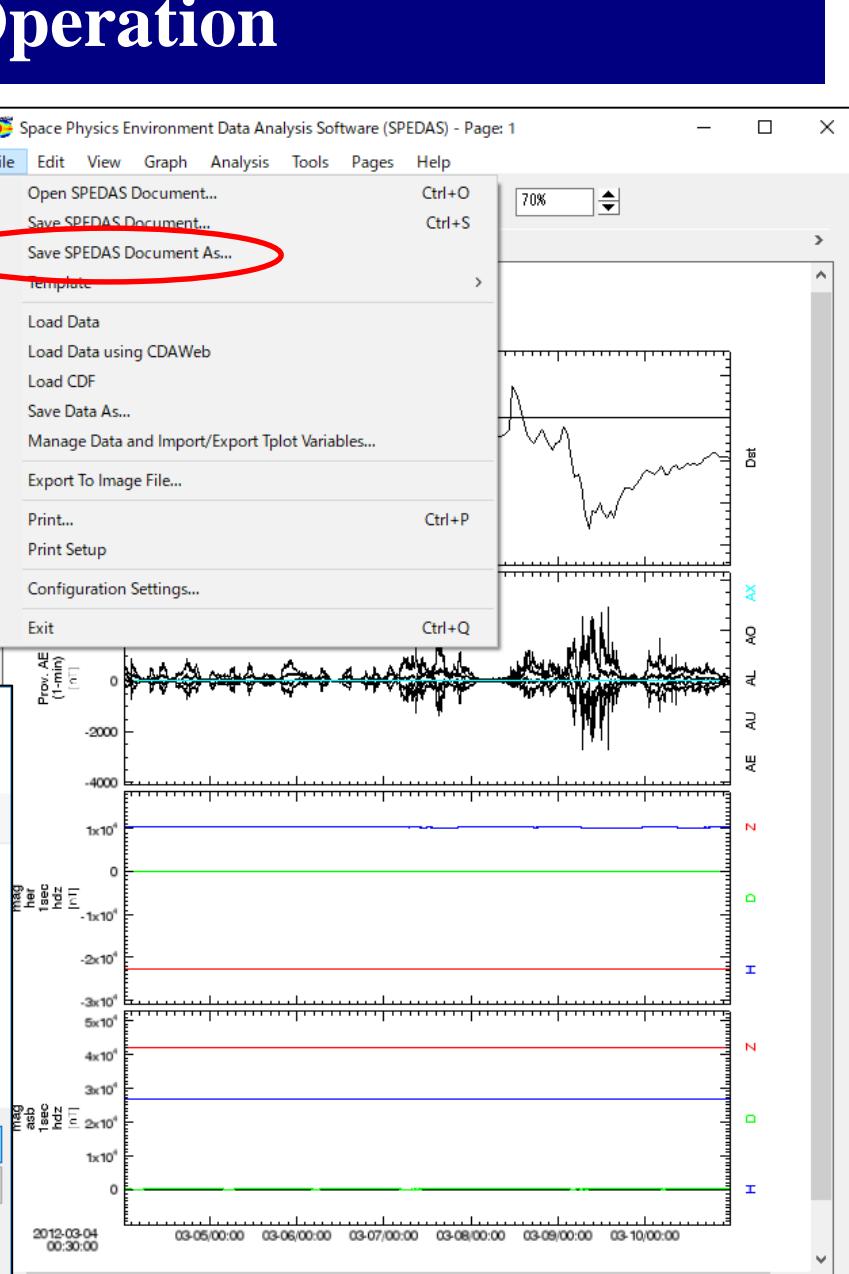
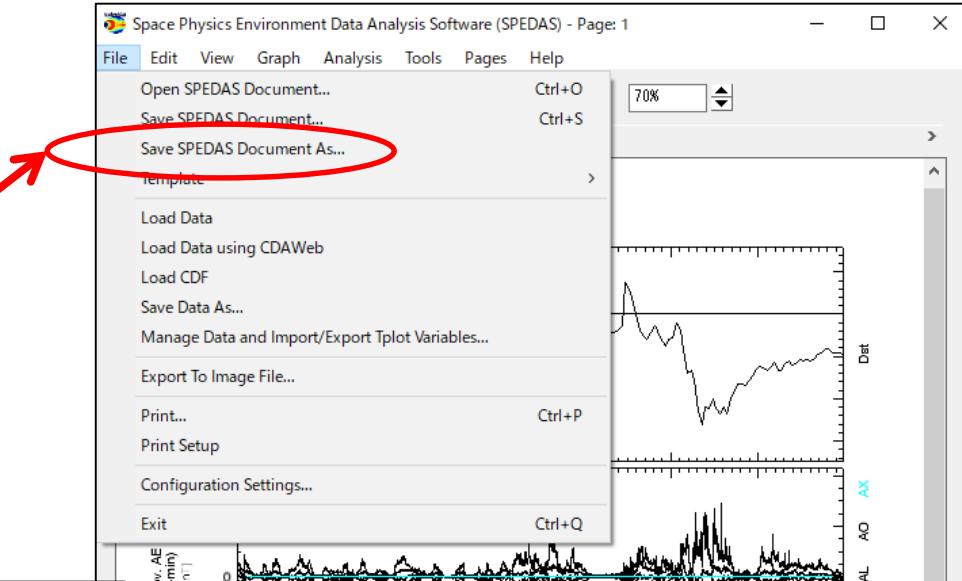
An ascii data file was
successfully saved!!!





Lesson: Dump your workspace

1. Select
File – Save SPEDAS Document



※ SPEDAS Document is written in XML format

Coffee Break...



Metadata DB for Upper Atmosphere

・ 超高層大気長期変動の全地球上ネットワーク観測・研究
Inter-university Upper atmosphere Global Observation NETwork

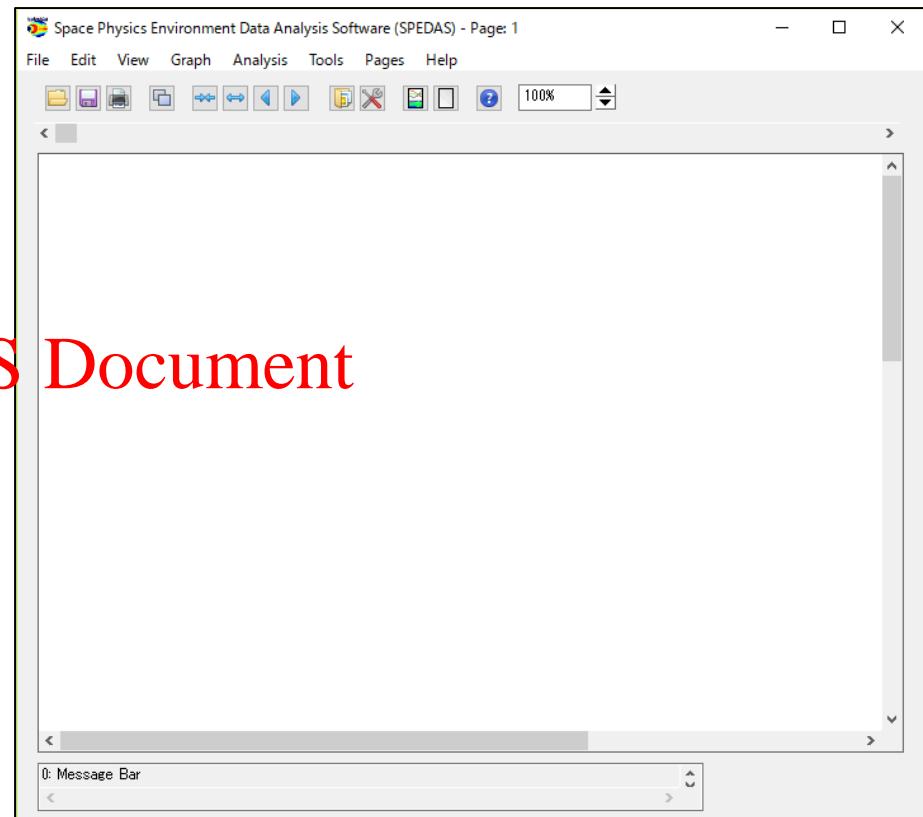
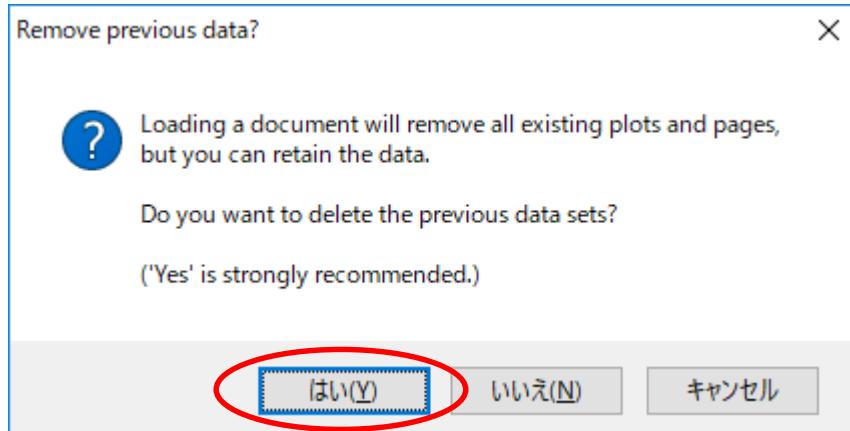
How to Use SPEDAS

part2

- **Restore your work**
- **Manage axis**
- **Process and data**

Lesson:
Restore part1 workspace

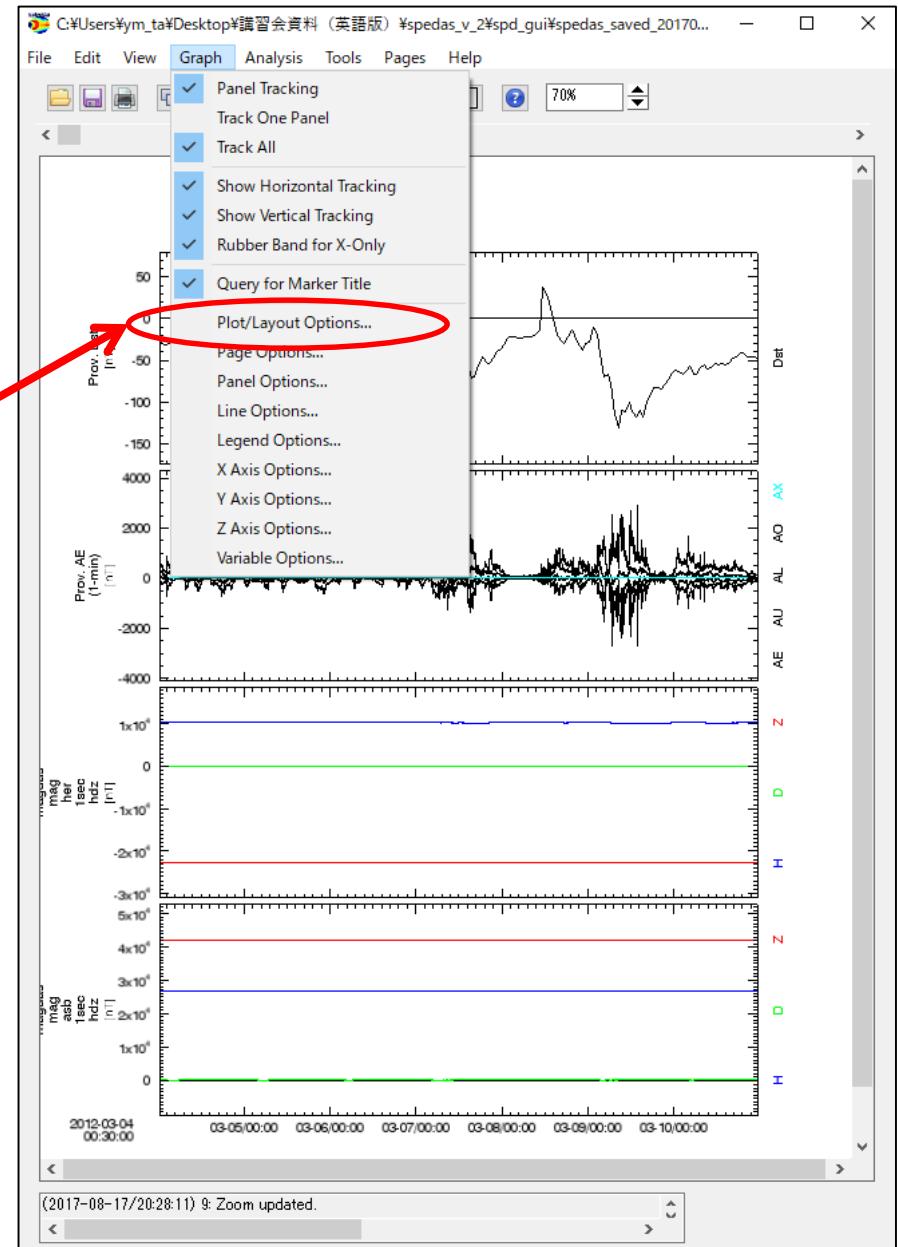
1. Exit SPEDAS
2. Run SPEDAS again
3. Select File- Open SPEDAS Document
4. Click “Yes”
5. Select the saved tgd file.





Lesson: Remove plot

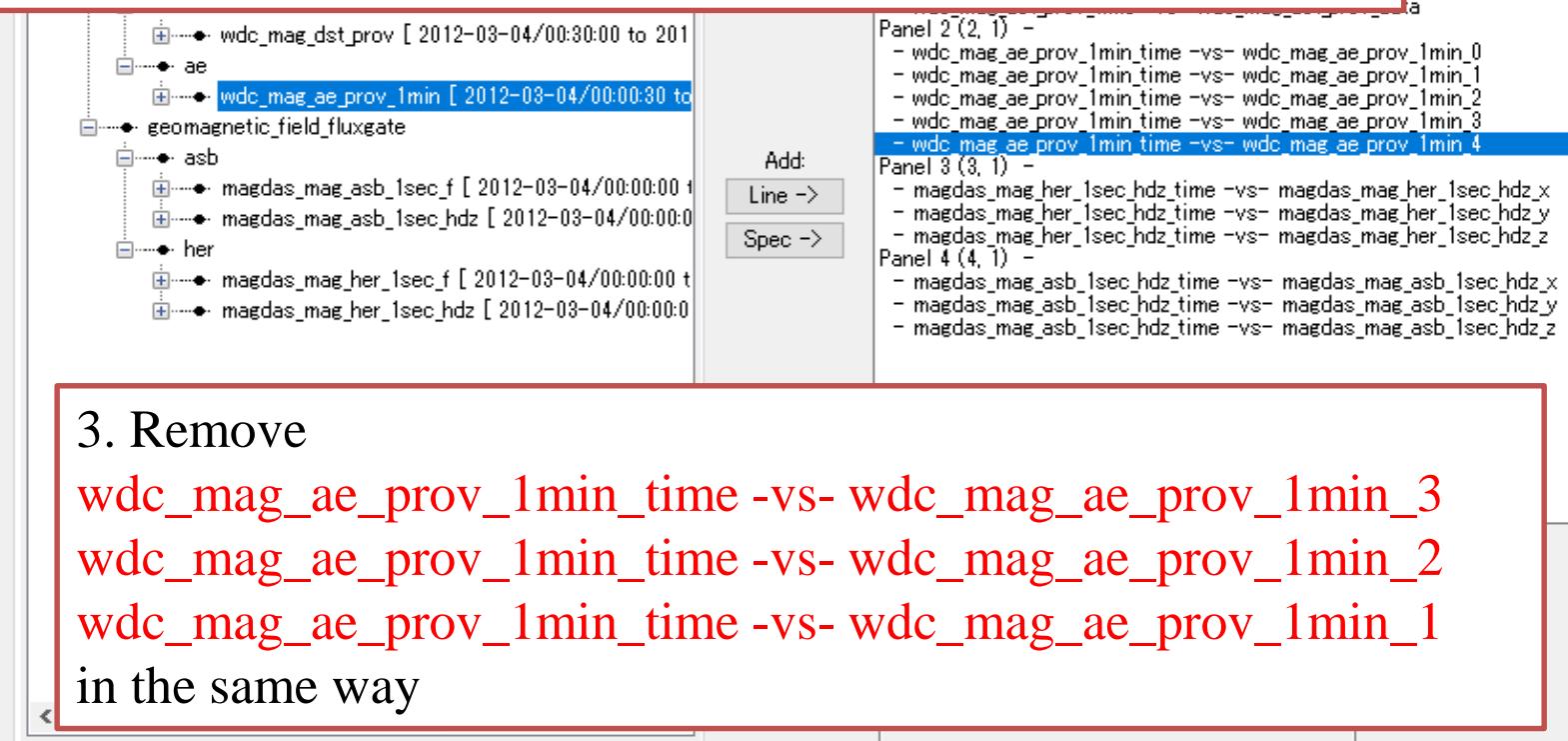
1. Select
Graph – Plot/Layout Options



 Plot/Layout Options

1. Select

wdc_mag_ae_prov_1min_time -vs- wdc_mag_ae_prov_1min_4
in the right-hand panel.



The screenshot shows the 'Plot/Layout Options' window. On the left, there's a tree view of data series under categories like 'ae', 'geomagnetic_field_fluxgate', 'asb', and 'her'. In the center, there's a list of panels and their contents. A red box highlights the 'Remove' button in the right panel settings. The 'Remove' button is located in a vertical stack of buttons labeled 'Panels', 'Add', 'Remove', and 'Edit'. Below these buttons are buttons for moving rows up and down, and dropdowns for 'Row' (set to 2) and 'Column' (set to 1). Further down are 'Row Span' (set to 1), 'Col Span' (set to 1), 'Rows Per Page' (set to 4), and 'Cols Per Page' (set to 1). At the bottom are 'Lock To Panel' and 'Unlock Panels' buttons.

3. Remove

wdc_mag_ae_prov_1min_time -vs- wdc_mag_ae_prov_1min_3
wdc_mag_ae_prov_1min_time -vs- wdc_mag_ae_prov_1min_2
wdc_mag_ae_prov_1min_time -vs- wdc_mag_ae_prov_1min_1

in the same way

2. Click "Remove"

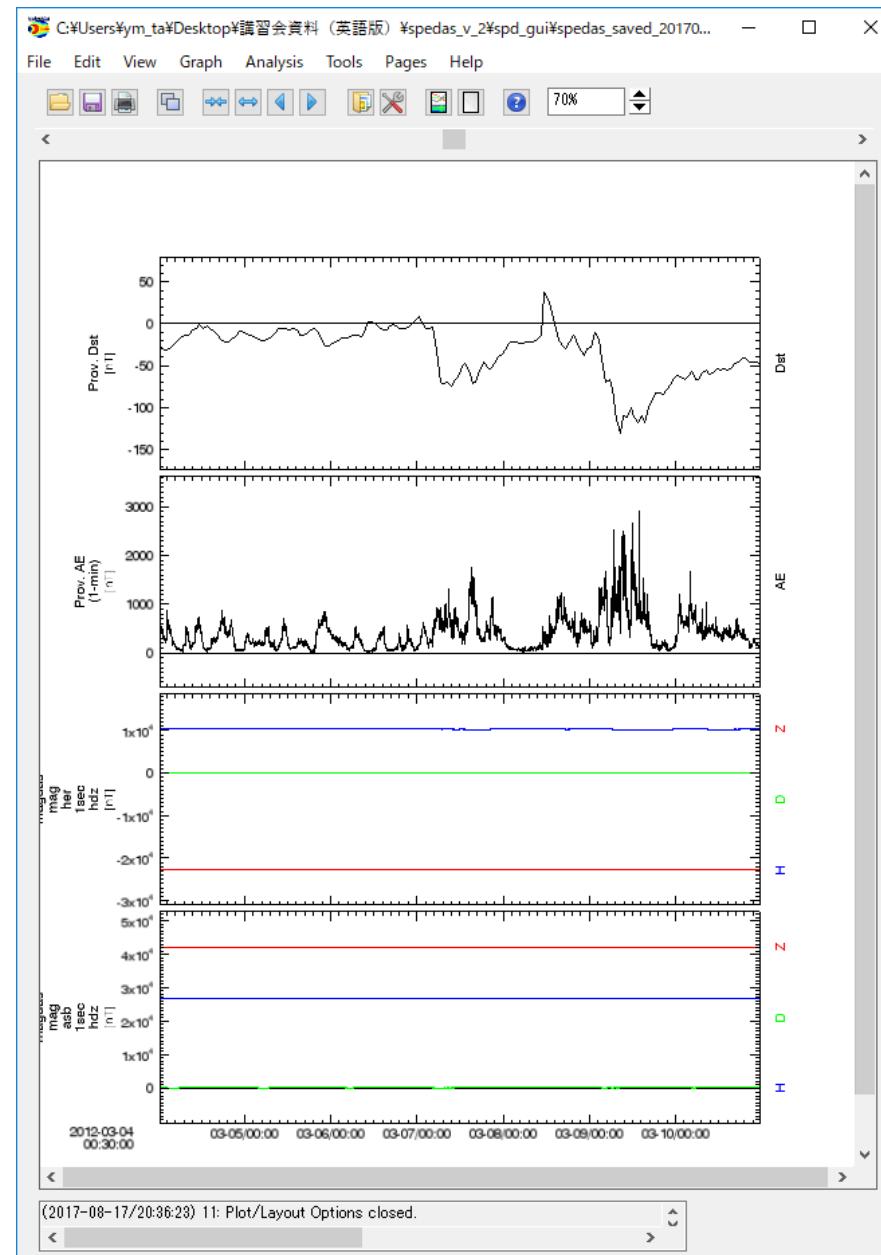
4. Click OK

(2017-08-17/20:32:02) 9: Add Finished.



GUI Basic Operation

Result



Lesson:
Change X range (time scale) of
the plot (1)



Reduces X range by
major tick marker



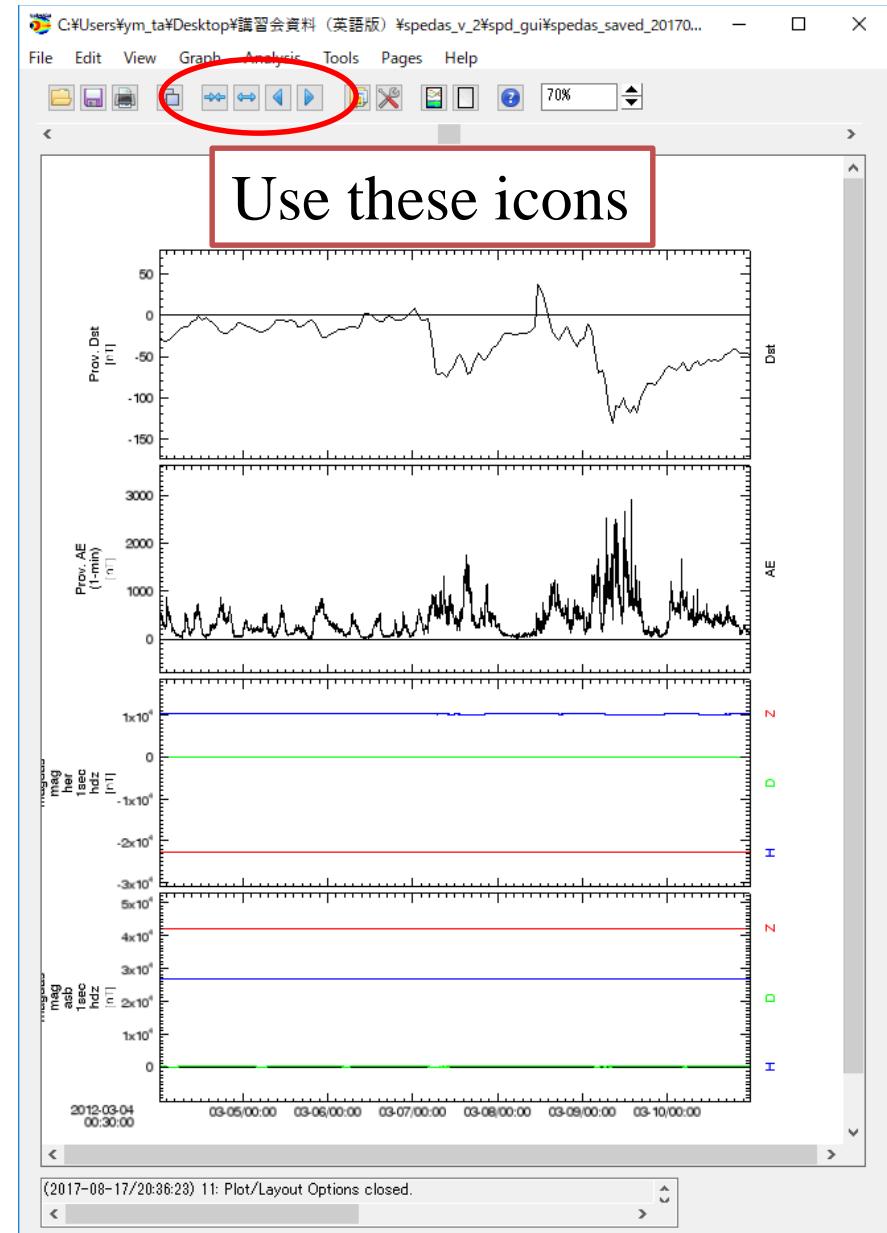
Expands X range by
major tick marker



Shift left X range by
major tick marker



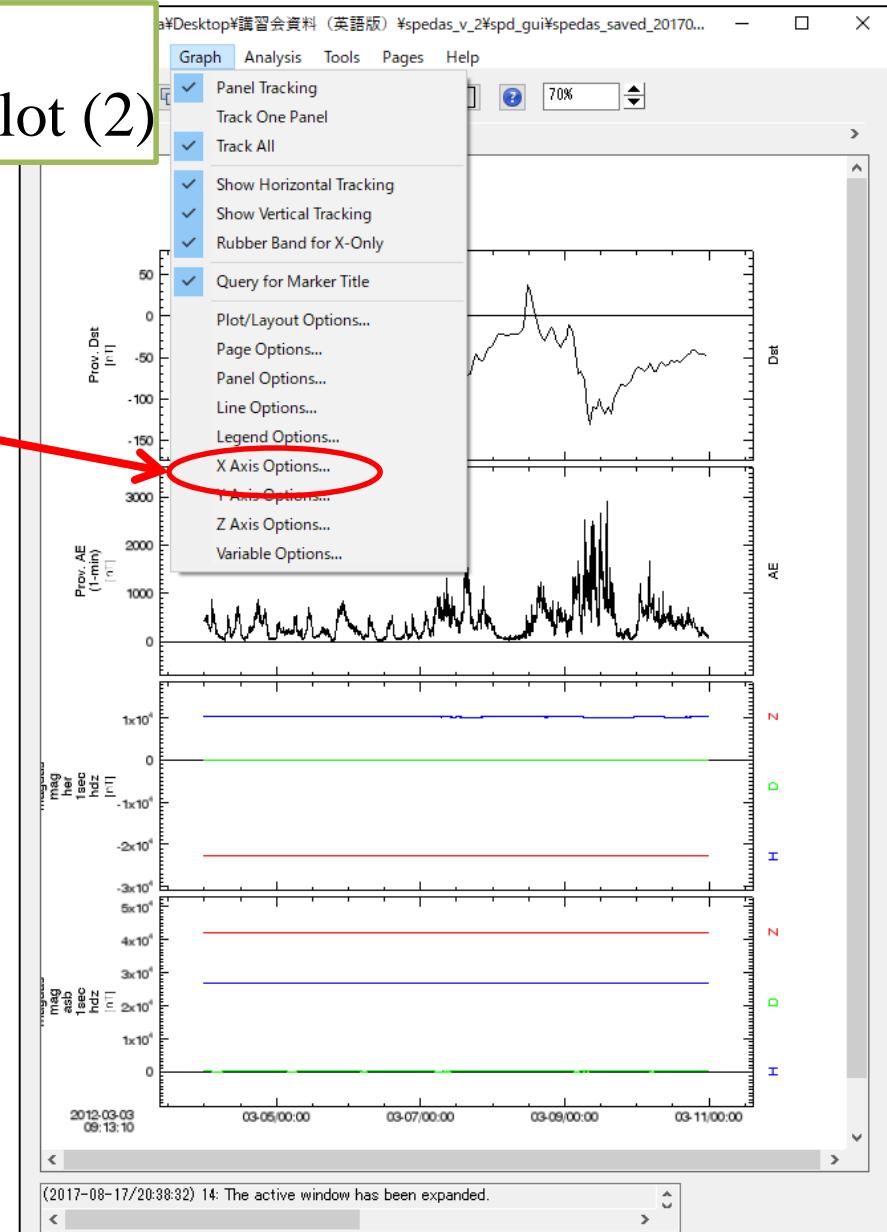
Shift right X range
by major tick marker

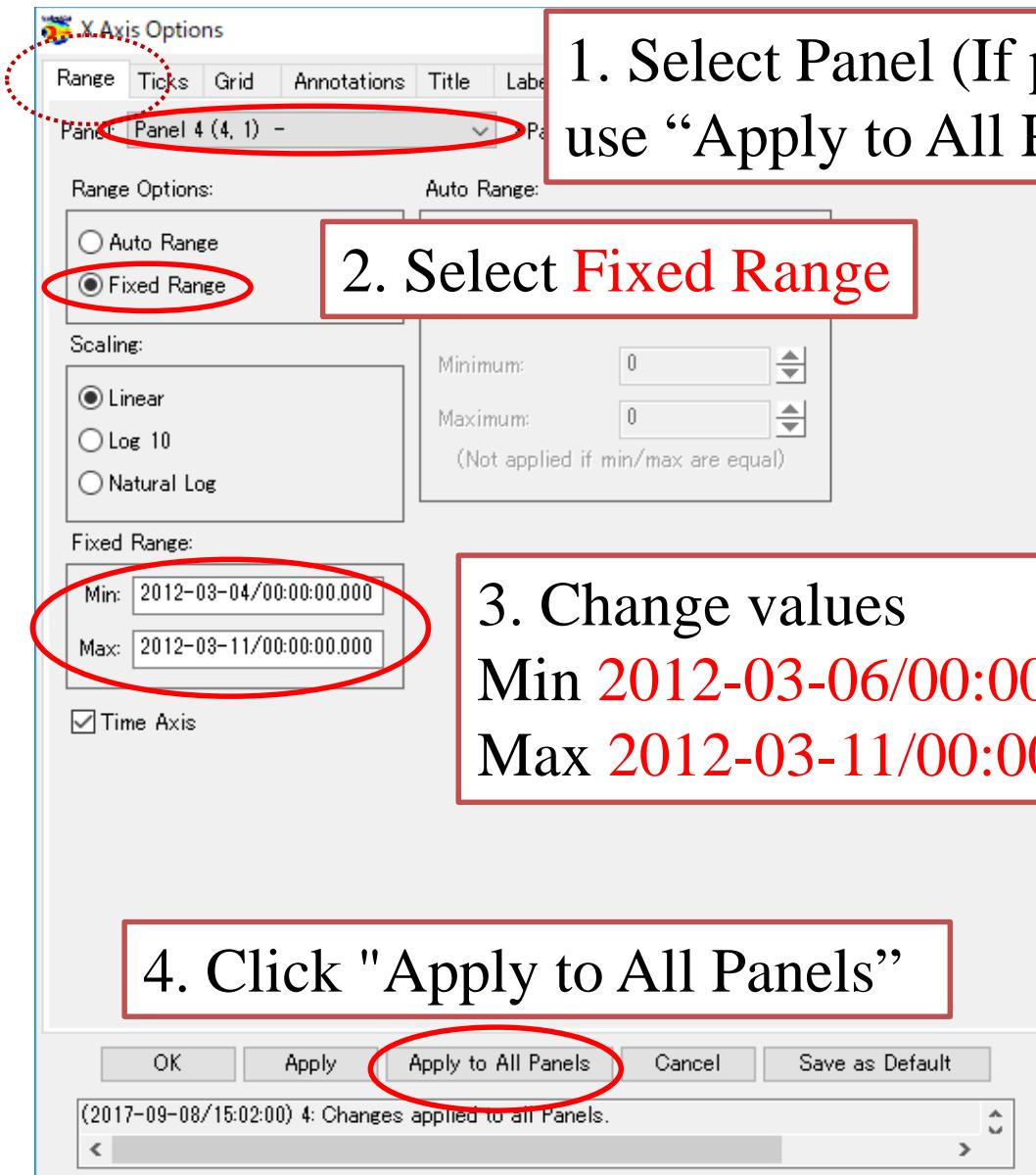




Lesson: Change X range (time scale) of the plot (2)

1. Select Graph – X Axis Options



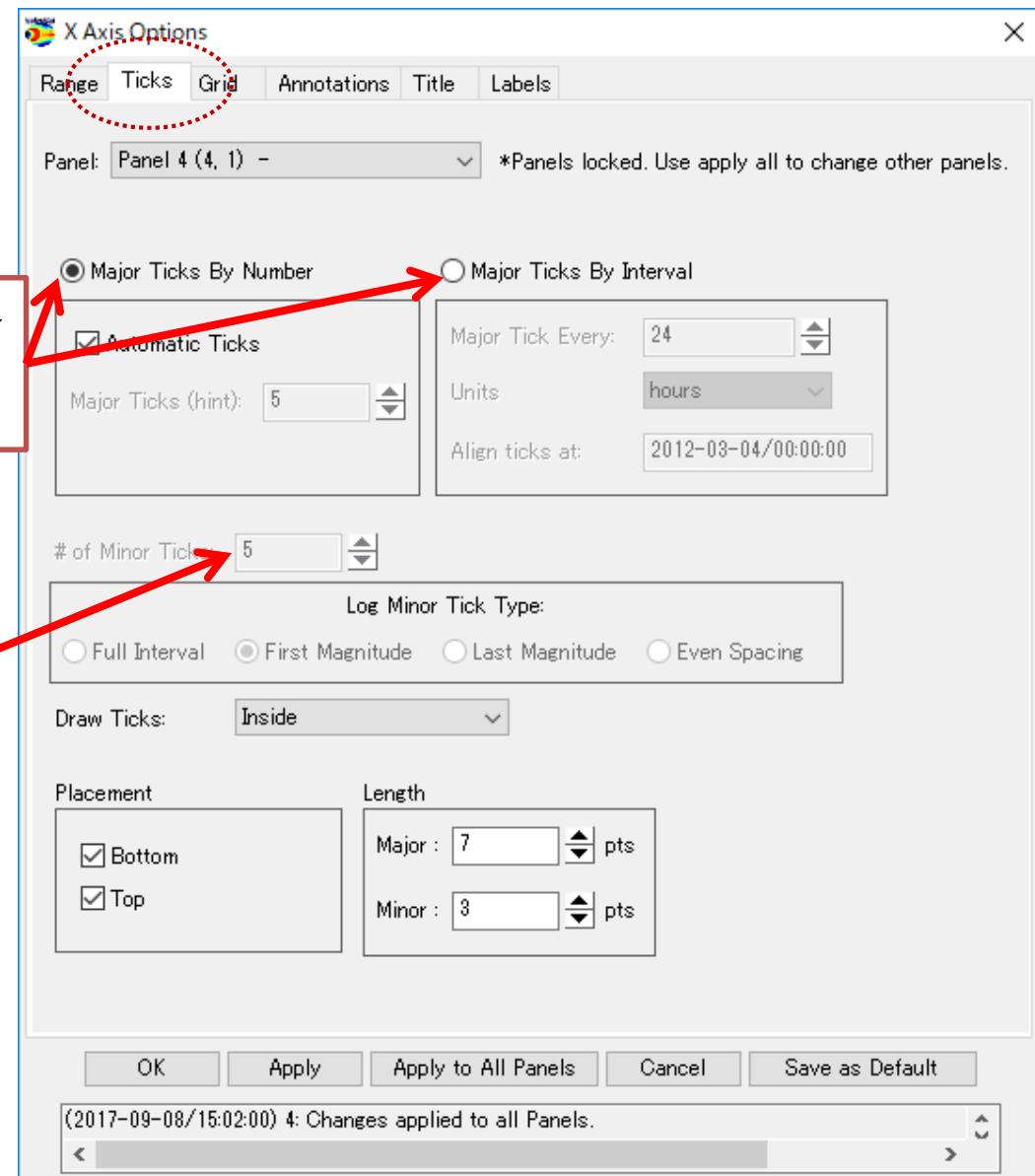




Lesson: Customize Ticks.

1. Select Major Ticks By Number or Interval.

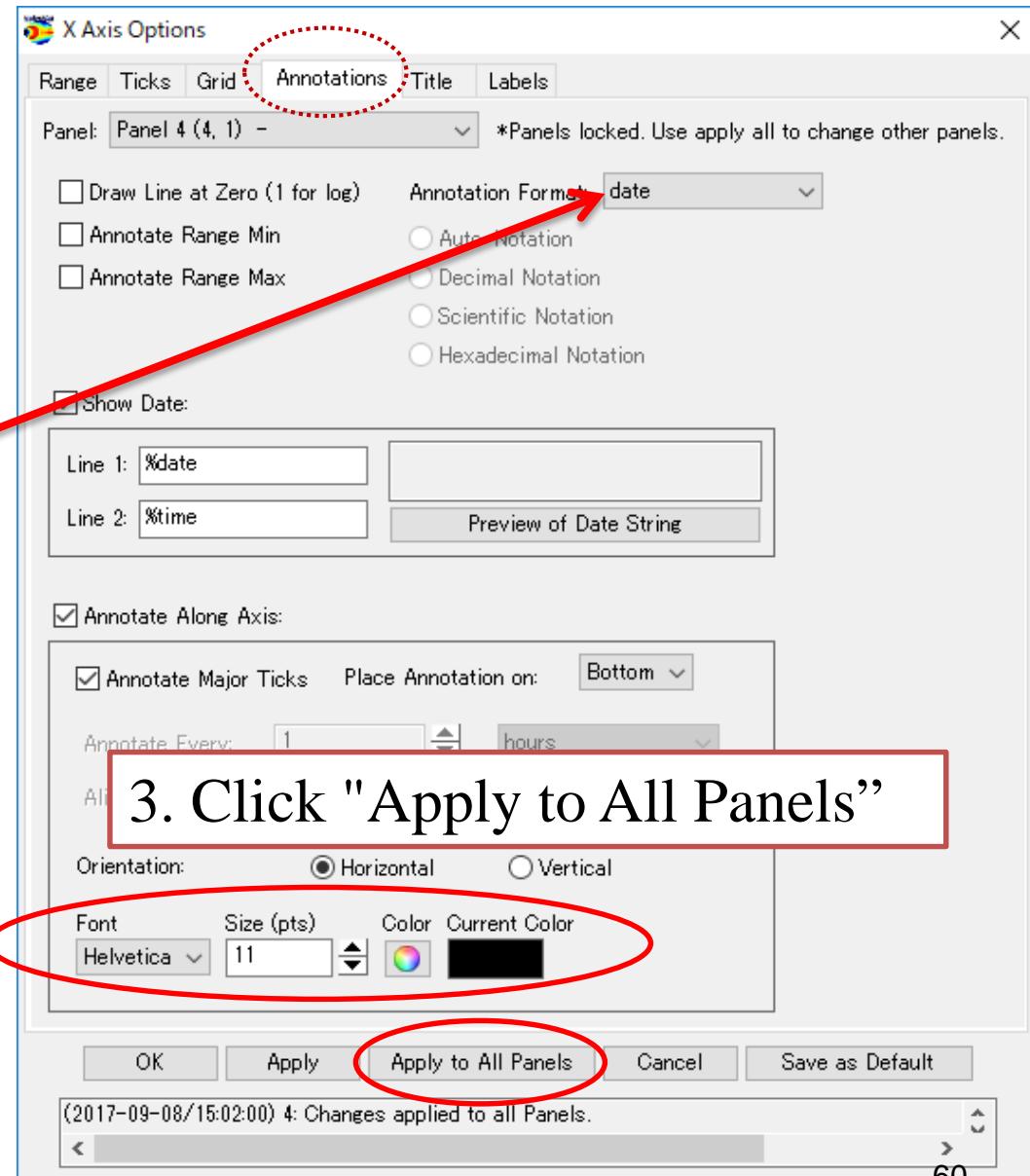
2. Input the number into # (Number or Interval) of Minor Ticks



Lesson: Change Annotations

1. Select your favorite format in the pull-down menu of Annotation Format.

2. If you want to change the character font, size, and color, select your favorite format in the pull-down menu here.



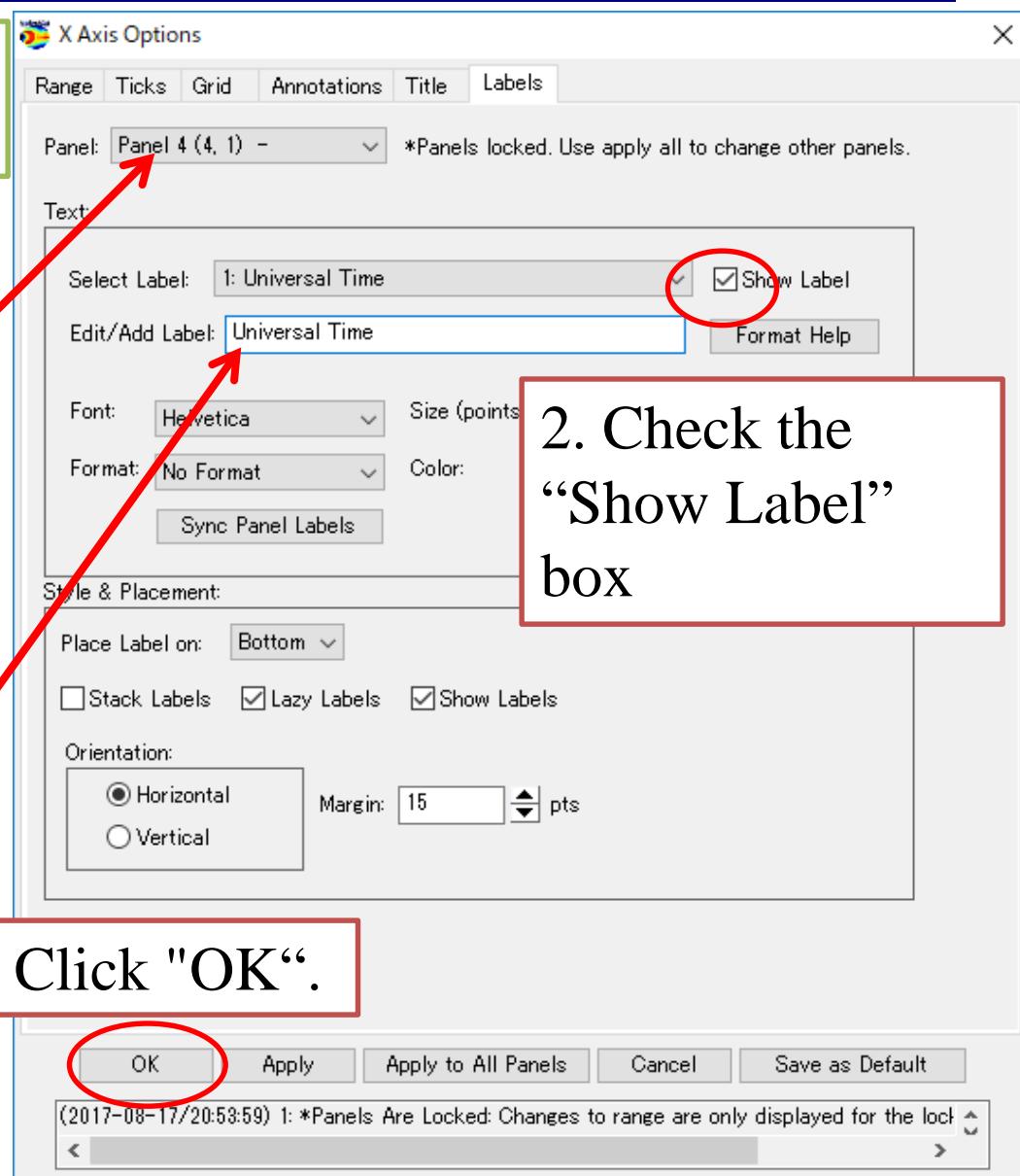
Lesson: Customize Labels (of X axis)

1. Select Panel 4 (bottom panel)

3. Type “Universal Time ” on the Edit/Add Label

2. Check the “Show Label” box

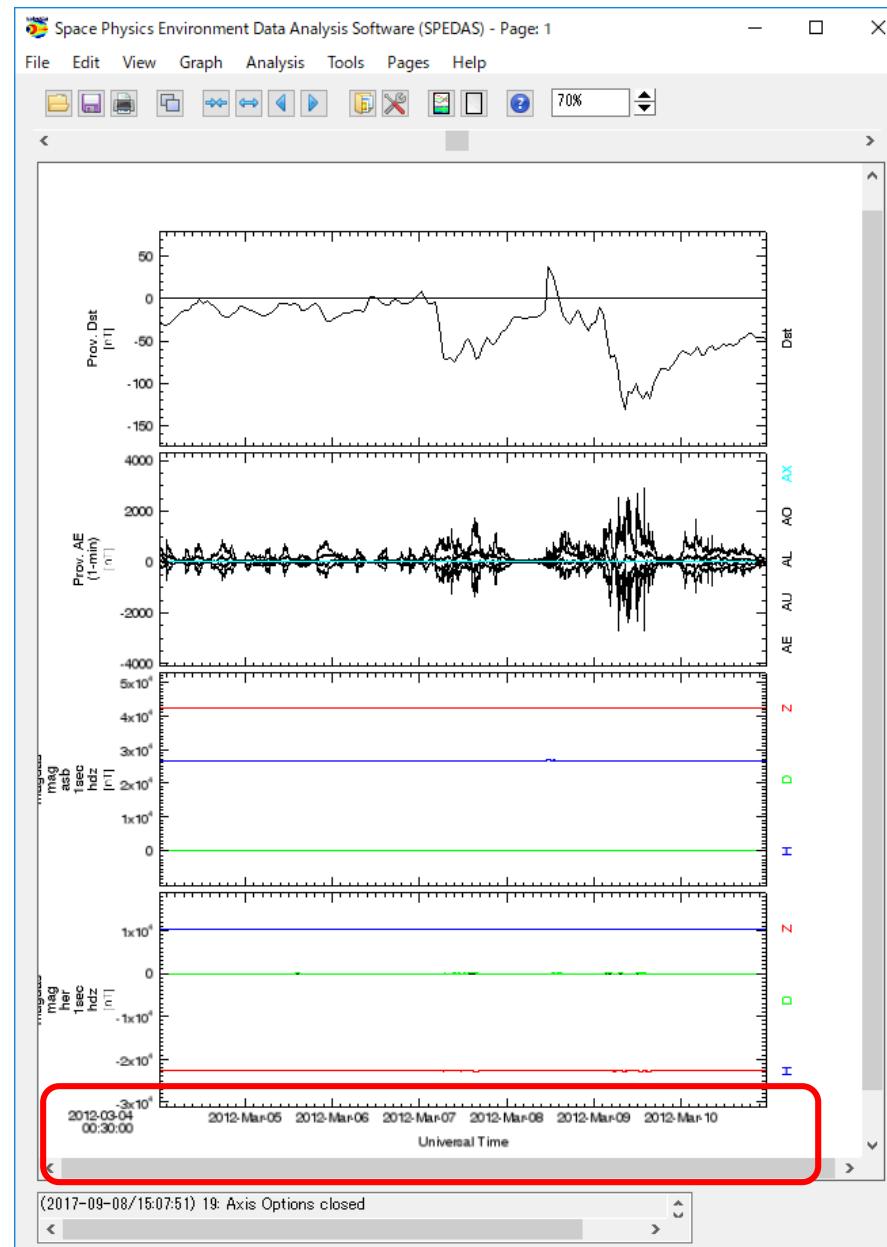
4. Click "OK".





GUI Basic Operation

Result





Other options.

- **Page Options...**

Customize the text and layout of the page.

- **Panel Options...**

Customize the title and color of each panel.

- **Line Options...**

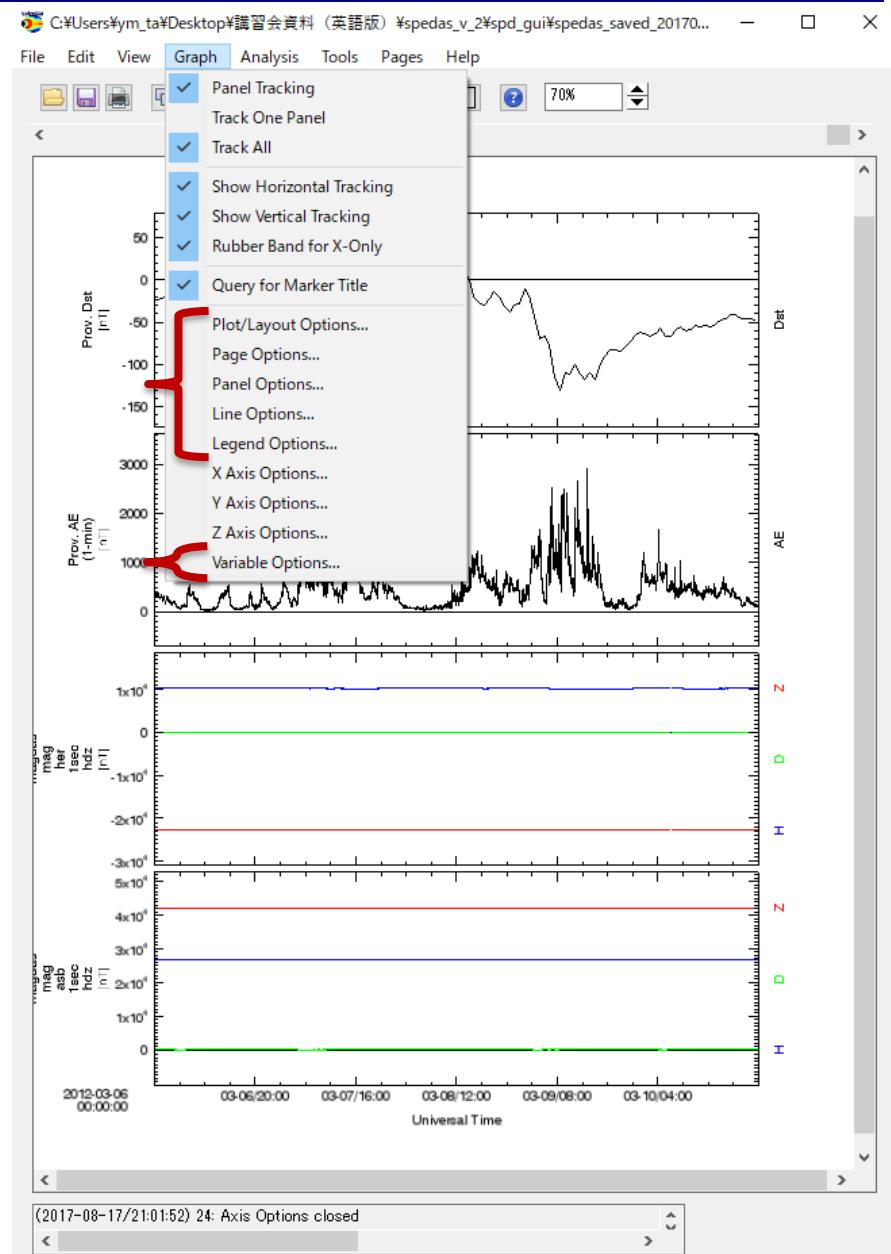
Customize the line and symbol of each plot panel.

- **Legend Options...**

Customize the legend which appears when you put the mouse cursor on the plot.

- **Variable Options...**

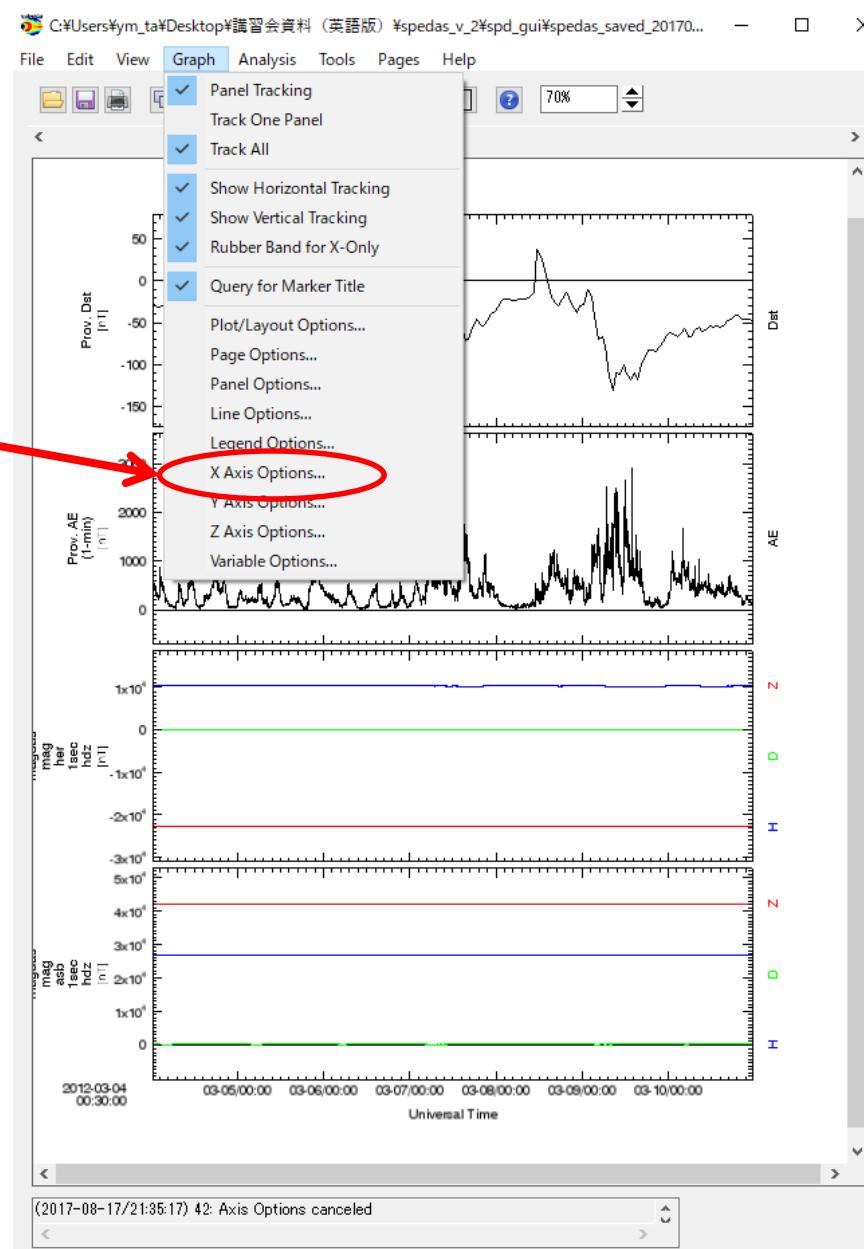
Display the values of the selected parameters under the time label.

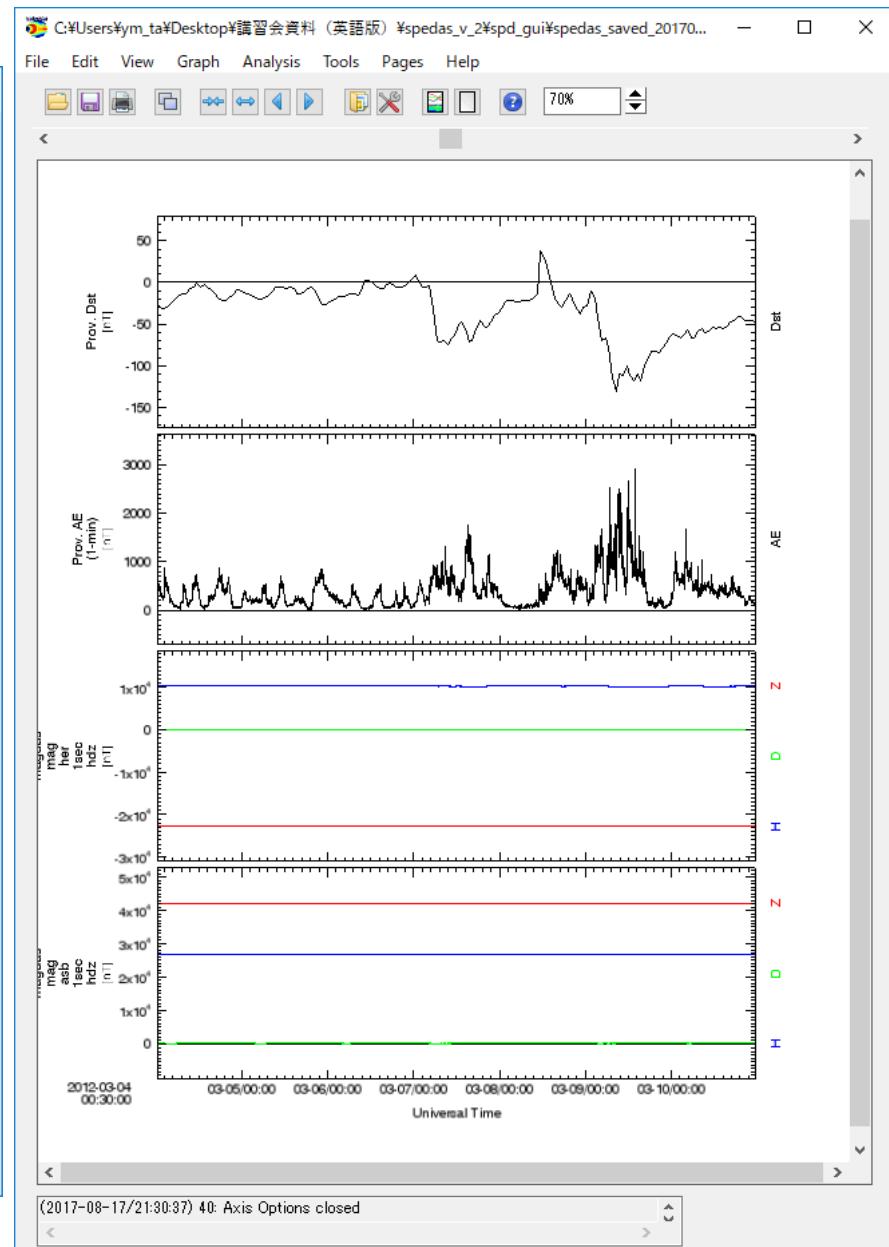




Lesson: Reset X range (time scale)

1. Select X Axis Options

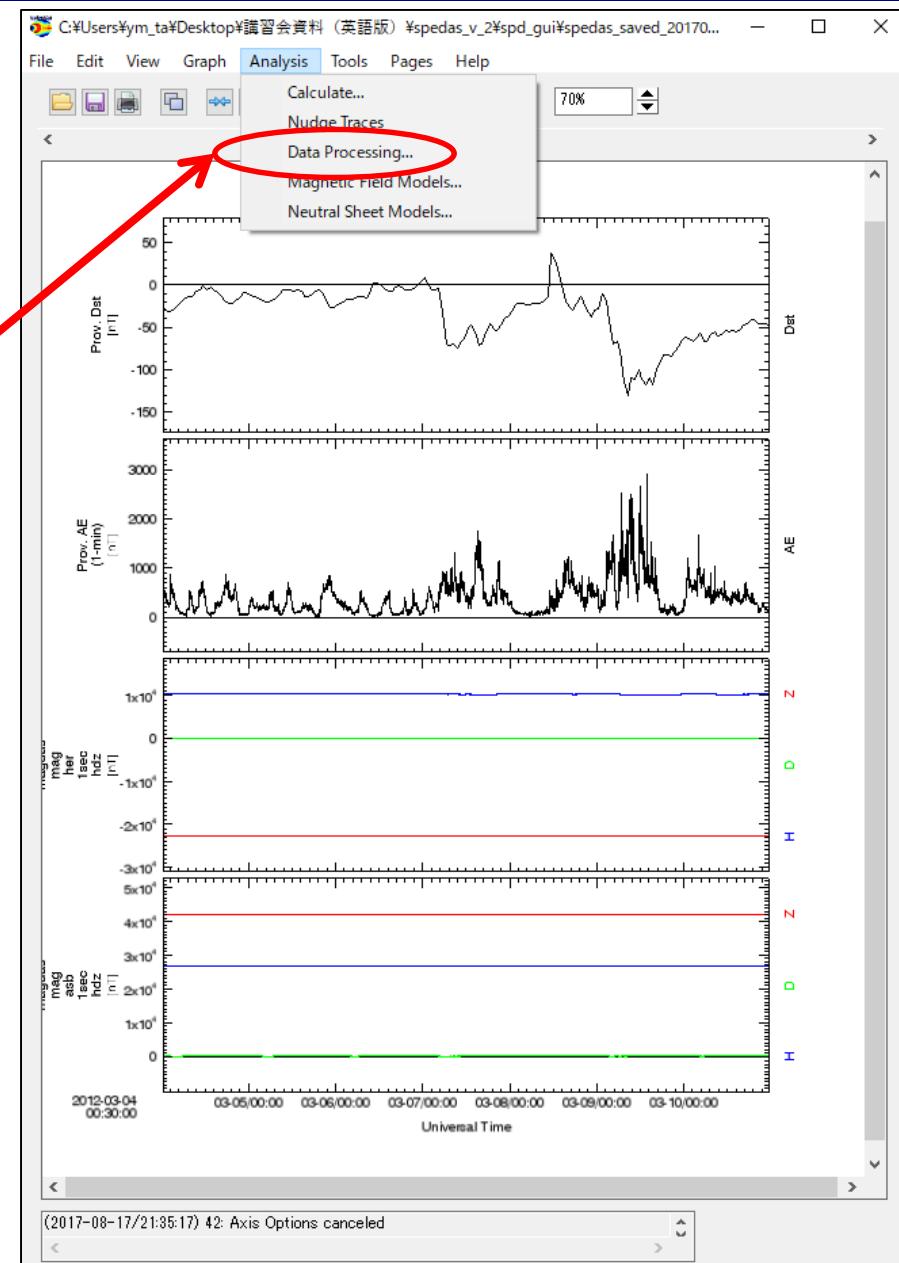






Lesson: Processing- subtract average

1. Select
Analysis – Data Processing





1. Select data you want to process
`magdas_mag_asb_1sec_hdz`
`magdas_mag_her_1sec_hdz`

2. Click right arrow

3. Active Data are added

4. Click Subtract Average

The screenshot shows the IUGONET Data Processing interface. On the left, the 'Loaded Data' tree view shows various datasets under 'IUGONET' and its sub-categories like 'geomagnetic_field_index', 'dst', 'ae', 'geomagnetic_field_flux', 'asb', and 'her'. In the center, the 'Active Data' panel lists two selected variables: 'magdas_mag_asb_1sec_hdz' and 'magdas_mag_her_1sec_hdz', both spanning from 2012-03-04/00:00:00 to 201. To the right is a vertical menu of processing tools. The 'Subtract Average' option is highlighted with a red circle and an arrow pointing to it from the '4. Click Subtract Average' instruction. Below the menu, a status bar at the bottom displays the message '(2017-08-17/21:40:49) 13: Variables set to active: magdas_mag_asb_1sec_hdz,magdas_mag_her_1sec_hdz'.

Data Processing

Loaded Data

- IUGONET
 - geomagnetic_field_index
 - dst
 - wdc_mag_dst_prov [2012-03-04/2012-03-04]
 - ae
 - wdc_mag_ae_prov_1min [2012-03-04/2012-03-04]
 - geomagnetic_field_fluxgate
 - asb
 - magdas_mag_asb_1sec_f [2012-03-04/2012-03-04]
 - magdas_mag_asb_1sec_hdz [2012-03-04/2012-03-04]
 - magdas_mag_asb_1sec_hdz-d [2012-03-04/2012-03-04]
 - her
 - magdas_mag_her_1sec_f [2012-03-04/2012-03-04]
 - magdas_mag_her_1sec_hdz [2012-03-04/2012-03-04]
 - magdas_mag_her_1sec_hdz-d [2012-03-04/2012-03-04]

Active Data

- magdas_mag_asb_1sec_hdz-d: 2012-03-04/00:00:00 to 2012-03-04/00:00:00
- magdas_mag_her_1sec_hdz-d: 2012-03-04/00:00:00 to 2012-03-04/00:00:00

Subtract Average

- Subtract Median
- Smooth Data...
- High Pass filter...
- Block Average...
- Clip...
- Deflag...
- Degap...
- Interpolate...
- Clean Spikes...
- Time Derivative...
- Wavelet Transform...
- Power Spectrum...
- Coordinate Transform...
- Split Variable
- Join Variables...
- More...

New variables are created.

magdas_mag_asb_1sec_hdz-d
magdas_mag_her_1sec_hdz-d

Clear Active Done

(2017-08-17/21:41:13) 15: Added variable: magdas_mag_her_1sec_hdz-d

1. Click Done

Open “Plot/Layout Options”

1. Remove Panel 3 and 4

2. Select
magdas_mag_her_1sec_hdz-d

3. Click line

4. Data are added

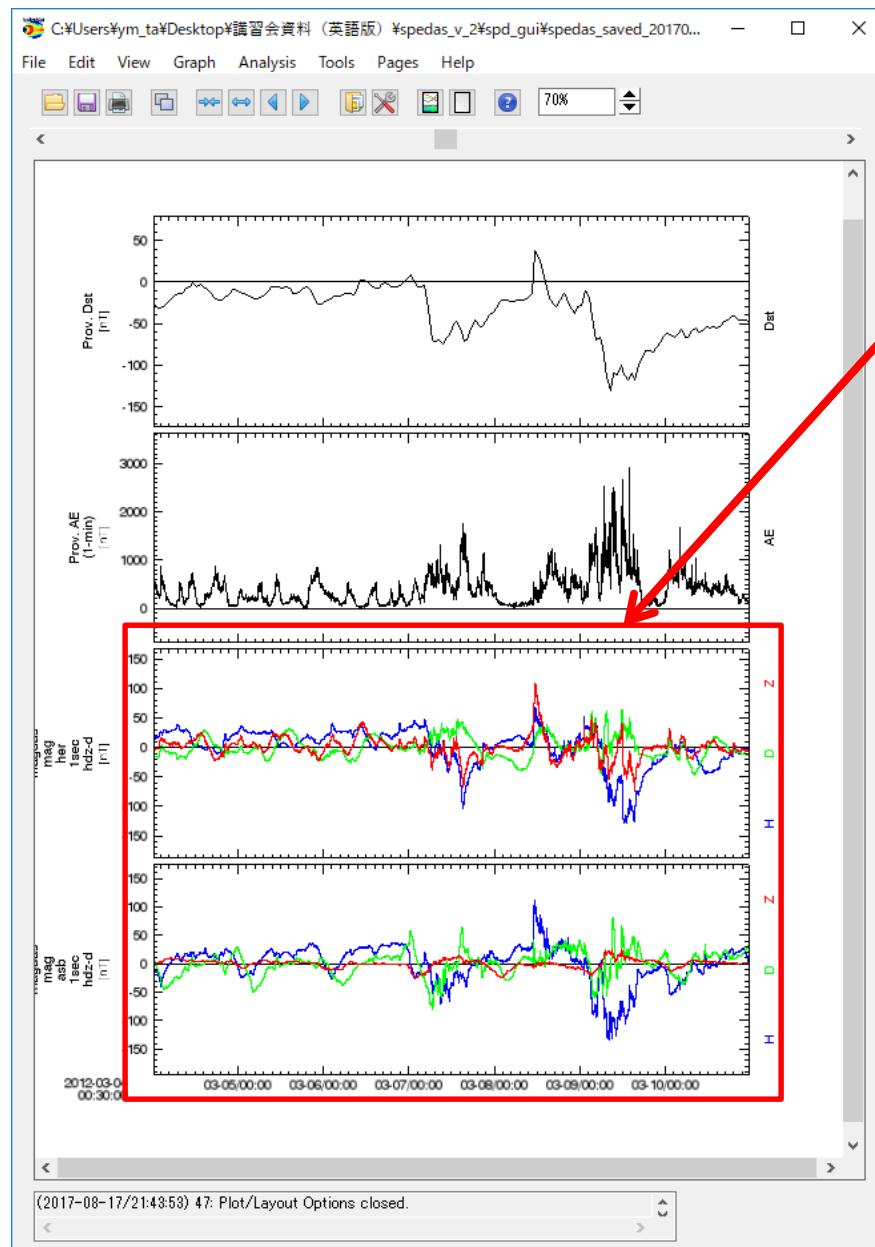
5. Then, add the other variable,
magdas_mag_asb_1sec_hdz-d
to panel in the same way.

6. Click OK

(2017-08-17/21:51:14) 5: Add Finished.



GUI Basic Operation



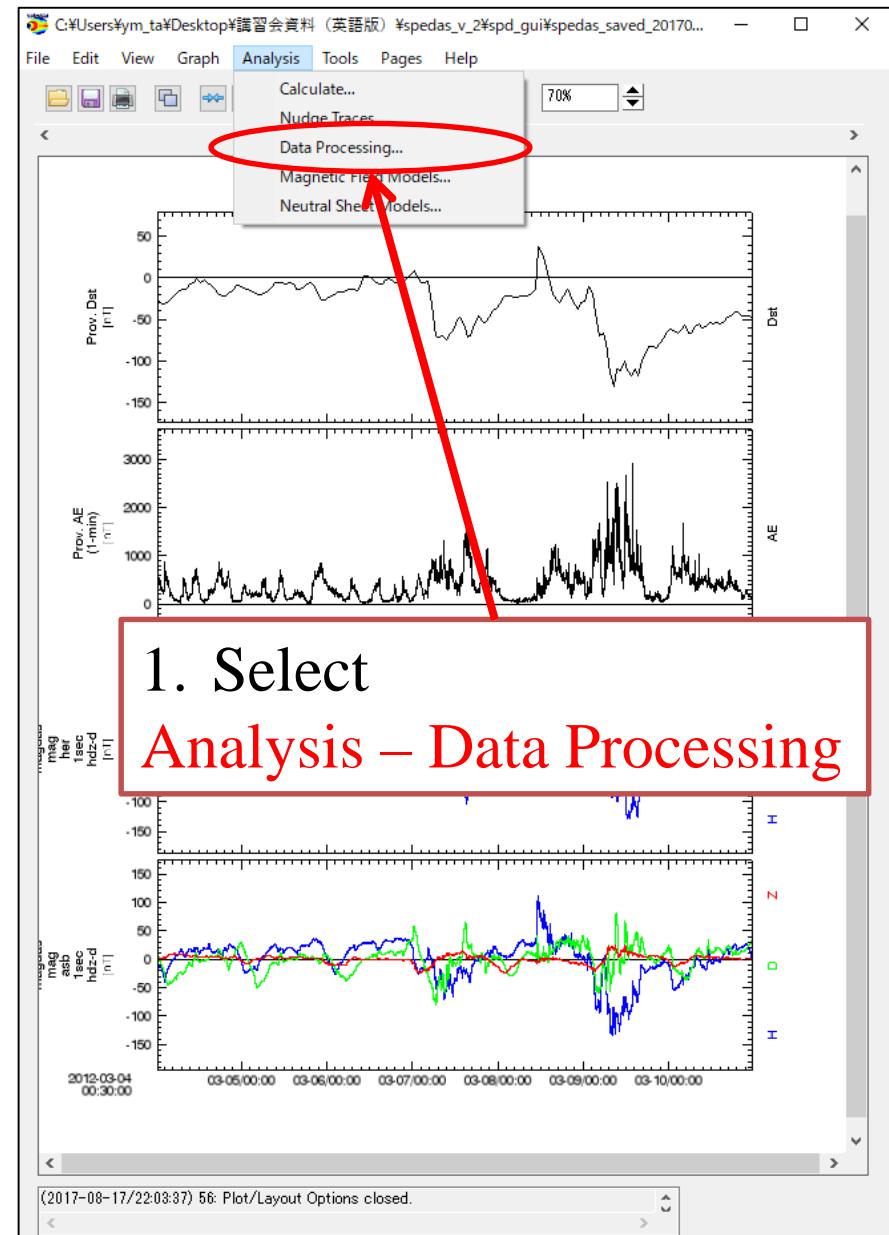
Subtracted average!

Try:

Plot Power Spectrum of
magdas_mag_her_1sec_hdz_x

Hint1: Use “Data Processing” for calculating (if you will get an option dialog, use default value)

Hint2: Use “Spec” for plotting





GUI Basic Operation

Data Processing

X

Loaded Data

IUGONET

- geomagnetic_field_index
 - dst
 - wdc_mag_dst_prov [2012-03-04]
 - ae
 - wdc_mag_ae_prov_1min [2012-03]
- geomagnetic_field_fluxgate
 - asb
 - magdas_mag_asb_1sec_f [2012-03]
 - magdas_mag_asb_1sec_hdz [2012-03]
 - magdas_mag_asb_1sec_hdz-d [2012-03]
 - her
 - magdas_mag_her_1sec_f [2012-03]
 - magdas_mag_her_1sec_hdz [2012-03]
 - magdas_mag_her_1sec_hdz-d [2012-03]

Active Data

No Active Data

Subtract Average

Subtract Median

Smooth Data...

High Pass filter...

Block Average...

Clip...

Deflag...

Degap...

Interpolate...

Clean Spikes...

Time Derivative...

Wavelet Transform...

Power Spectrum...

Coordinate Transform...

Split Variable

Join Variables...

More...

2. Active Data is removed

1. Click Clear Active

Clear Active Done

(2017-08-17/21:59:05) 6: All Active variables cleared

1. Select data
magdas_mag_her_1sec_hdz

2. Click right arrow

3. Active Data are added

4. Click Power Spectrum

5. Click OK

The screenshot shows the 'Data Processing' application interface. On the left, the 'Loaded Data' tree view shows a hierarchy of IUGONET data, including 'geomagnetic_field_index' (with 'dst' and 'ae' branches), 'geomag' (with 'asb' and 'her' branches), and specific time-series data like 'wdc_mag_dst_prov' and 'magdas_mag_asb_1sec_f'. A red box highlights the selection of 'magdas_mag_her_1sec_hdz' from the 'her' branch. In the center, the 'Active Data' panel lists the selected data as 'magdas_mag_her_1sec_hdz: 2012-03-04/00:00:00 to 201'. On the right, a context menu is open with various processing options: 'Subtract Average', 'Subtract Median', 'Smooth Data...', 'High Pass filter...', 'Block Average', 'Deflag...', 'Degap...', 'Interpolate...', 'Clean Spikes...', 'Time Derivative...', 'Wavelet Transform...', 'Power Spectrum...', 'Coordinate Transform...', 'Split Variable', 'Join Variables...', and 'More...'. The 'Power Spectrum...' option is circled in red. At the bottom, a 'Power Spectra Options' dialog is open, containing settings for 'Dynamic' power spectra, suffix '_dpwrspsc', window size 256, window shift 128, and time range from 2007-03-23 to 2007-03-24. The 'OK' button at the bottom of the dialog is also circled in red.

Data Processing

Loaded Data

- IUGONET
 - geomagnetic_field_index
 - dst
 - wdc_mag_dst_prov [2012-03-04]
 - ae
 - wdc_mag_ae_prov_1min [2012-03-04]
 - geomagnetic_field_fluxgate
 - asb
 - magdas_mag_asb_1sec_f [2012-03-04]
 - magdas_mag_asb_1sec_hdz [2012-03-04]
 - magdas_mag_asb_1sec_hdz-d [2012-03-04]

Active Data

magdas_mag_her_1sec_hdz_x_dpwrspc:	2012-03-04/00:00
magdas_mag_her_1sec_hdz_y_dpwrspc:	2012-03-04/00:00
magdas_mag_her_1sec_hdz_z_dpwrspc:	2012-03-04/00:00

Subtract Average
Subtract Median
Smooth Data...
High Pass filter...
Block Average...
Clip...
Deflag...
Degap...
Interpolate...
Clean Spikes...
Time Derivative...
Wavelet Transform...
Power Spectrum...
Coordinate Transform...
Split Variable
Join Variables...
More...

1. New variables are created!

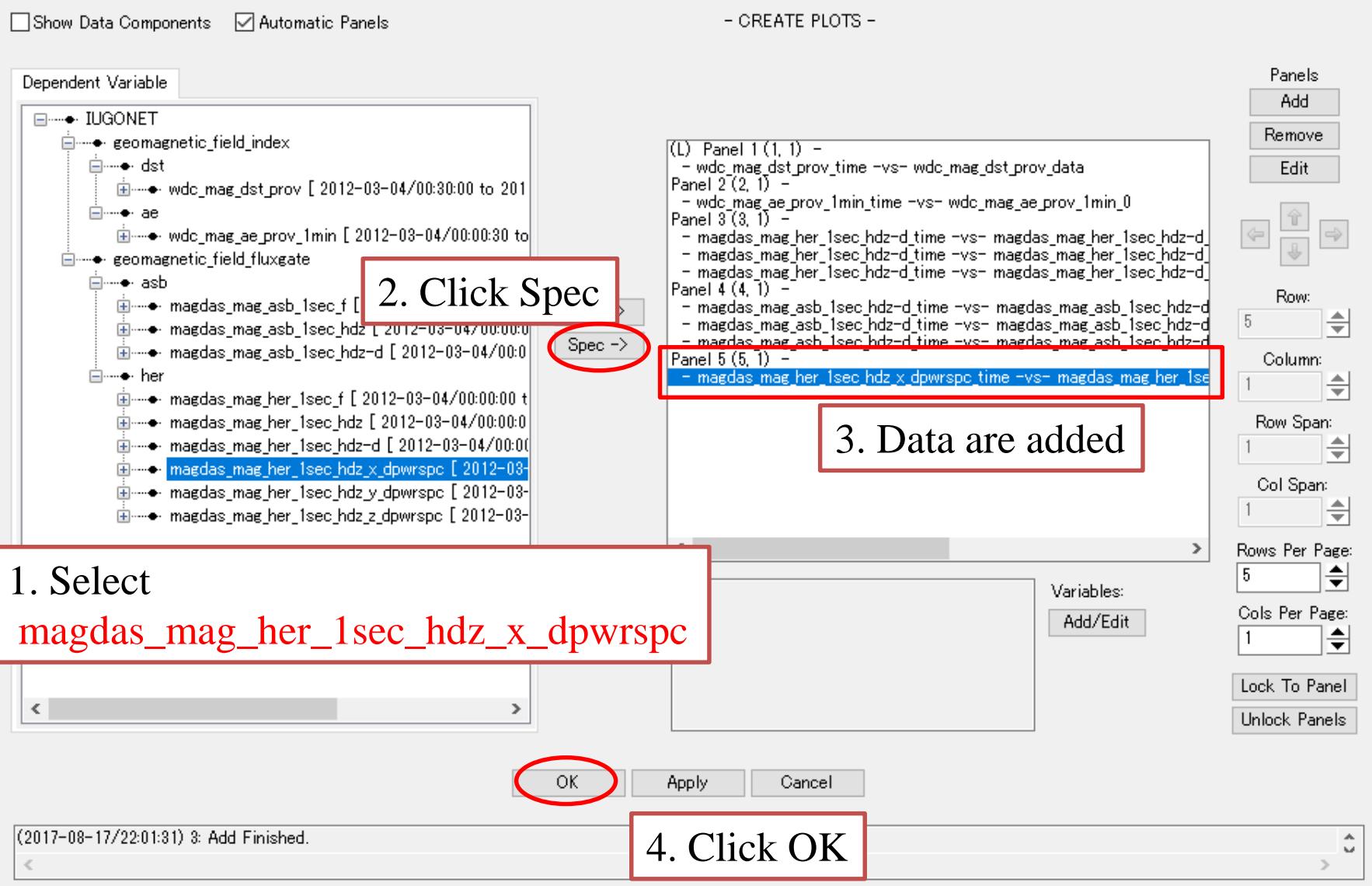
magdas_mag_her_1sec_hdz-d [2012-03-04]
magdas_mag_her_1sec_hdz_x_dpwrspc [2012-03-04]
magdas_mag_her_1sec_hdz_y_dpwrspc [2012-03-04]
magdas_mag_her_1sec_hdz_z_dpwrspc [2012-03-04]

Clear Active Done

(2017-08-17/22:00:53) 13: Spectra creation successful.

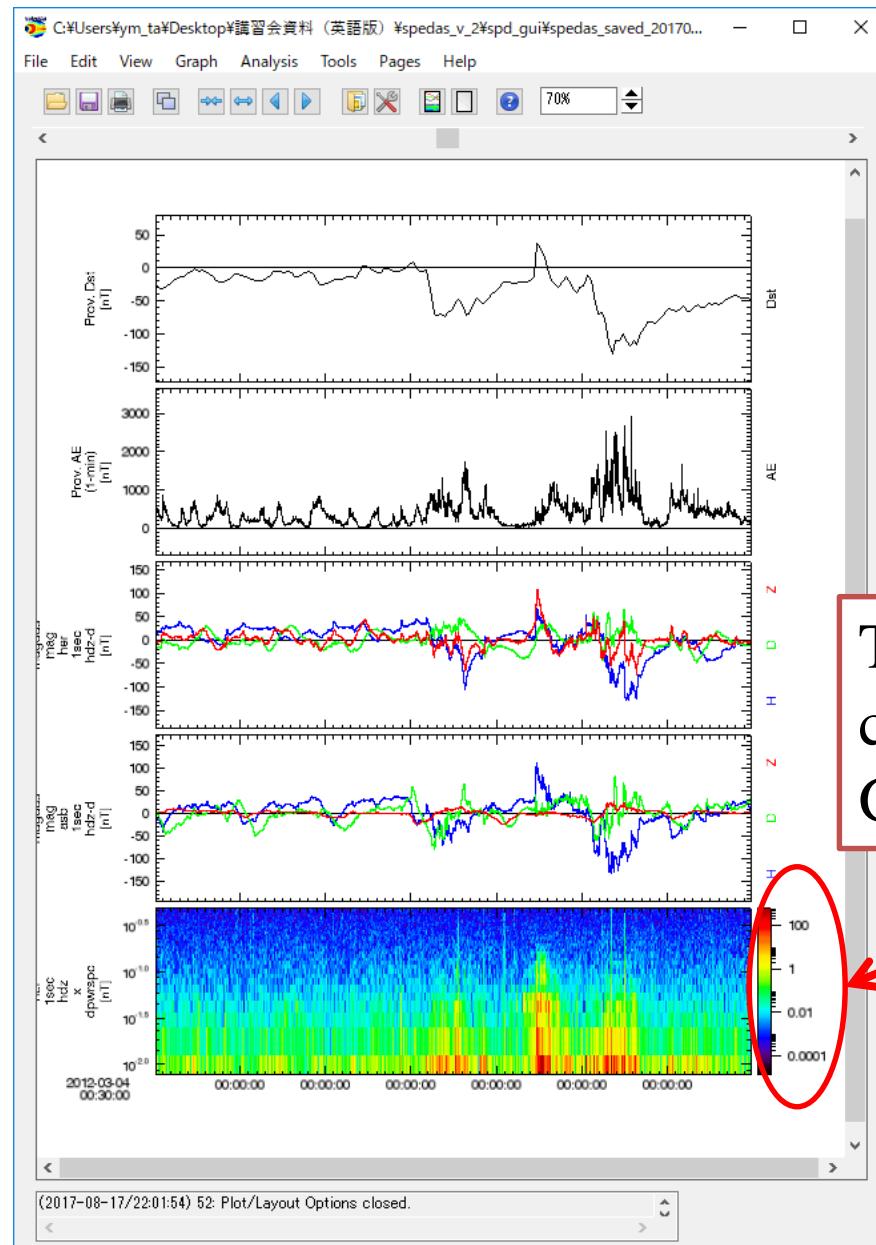
2. Click Done

Open “Plot/Layout Options”





Result

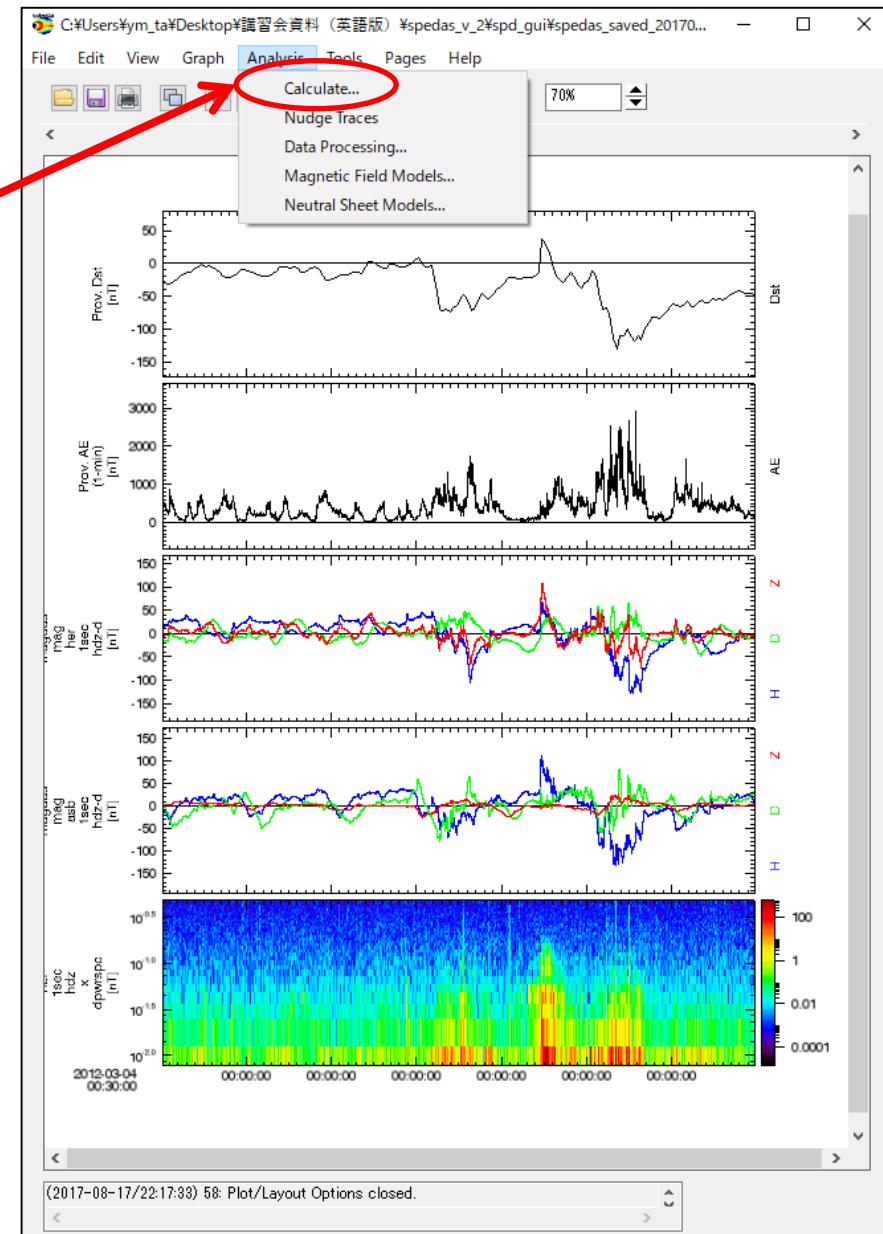


This color bar can be customized in
Graph - Z Axis Options.



Lesson: Use Calculate (Equation editor)

1. Select
Analysis – Calculate...



Equation Editor for SPEDAS

Calculate

Program: -scratch-

Insert Variable:

- IUGONET
 - geomagnetic_field_index
 - dst
 - wdc_mag_dst_prov [2012-03-04/00:30:00 to 2012-03-04/00:45:00]
 - ae
 - wdc_mag_ae_prov_1min [2012-03-04/00:00:30 to 2012-03-04/00:15:00]
 - geomagnetic_field_fluxgate
 - asb
 - magdas_mag_asb_1sec_f [2012-03-04/00:00:00 to 2012-03-04/00:15:00]
 - magdas_mag_asb_1sec_hdz [2012-03-04/00:00:00 to 2012-03-04/00:15:00]
 - magdas_mag_asb_1sec_hdz-d [2012-03-04/00:00:00 to 2012-03-04/00:15:00]
 - her
 - magdas_mag_her_1sec_f [2012-03-04/00:00:00 to 2012-03-04/00:15:00]
 - magdas_mag_her_1sec_hdz [2012-03-04/00:00:00 to 2012-03-04/00:15:00]
 - magdas_mag_her_1sec_hdz-d [2012-03-04/00:00:00 to 2012-03-04/00:15:00]
 - magdas_mag_her_1sec_hdz_x_dpwrspc [2012-03-04/00:00:00 to 2012-03-04/00:15:00]
 - magdas_mag_her_1sec_hdz_y_dpwrspc [2012-03-04/00:00:00 to 2012-03-04/00:15:00]
 - magdas_mag_her_1sec_hdz_z_dpwrspc [2012-03-04/00:00:00 to 2012-03-04/00:15:00]

Variable
=Your loaded data

Built-in function

Insert Function:

- log(x[base])
- ln(x)
- exp(x[base])
- sqrt(x)
- abs(x)
- min(x,[dim][[/nan]][/subscr
- max(x,[dim][[/nan]][/subscr
- mean(x,[dim][[/nan]])
- average(x,[dim][[/nan]])
- median(x,[dim][[/even]])
- total(x,[dim][[/nan]] [/cumu
- count(x,[dim]))

Insert Operator:

++
--
-
+
*
/
%

Insert Constant:

pi e Re

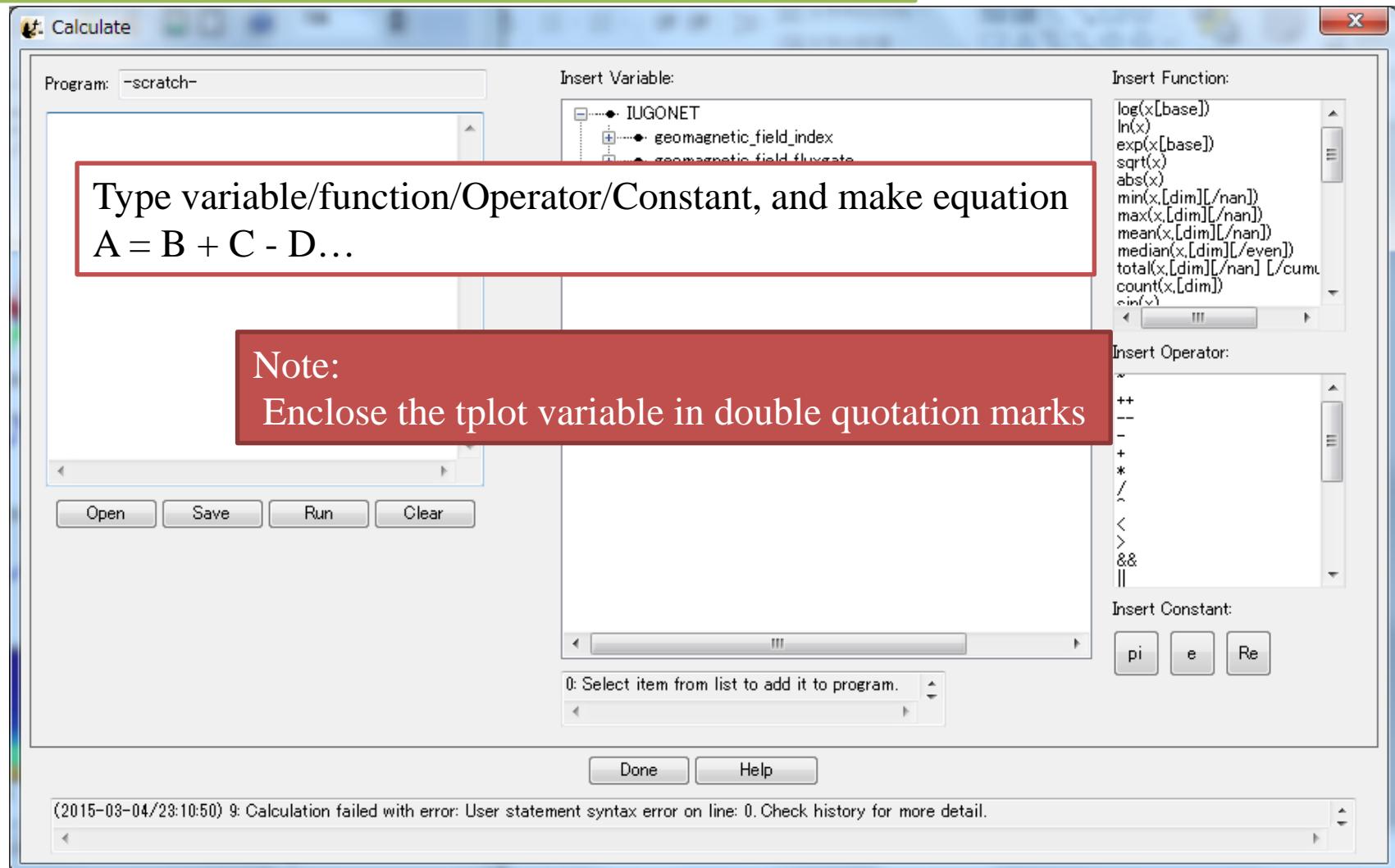
Built-in Constant

Done

Help

Lesson:

Make an equation using the loaded variables.





Lesson:

Make an equation using the loaded variables.

The screenshot shows the IUGONET GUI Calculate window. On the left, the 'Program' panel displays the command: "magdas_mag_her_1sec_hdz-d_x". The central workspace shows a tree view of loaded variables under the 'IUGONET' group. A red box labeled '1. Select magdas_mag_her_1sec_hdz-d_x' highlights the variable 'magdas_mag_her_1sec_hdz-d_x'. A red arrow points from this box to the variable in the tree view. Another red box labeled '2. Click arrow' has a red circle around the left-pointing arrow button on the toolbar below the tree view. A third red box labeled '3. Variable is added' has a red circle around the text 'magdas_mag_her_1sec_hdz-d_x' in the program panel. To the right of the workspace are panels for 'Insert Operator' (containing operators like ++, --, -, +, *, /, <, >, &&, ||) and 'Insert Constant' (containing pi, e, Re). At the bottom, there are 'Done' and 'Help' buttons, and a status bar at the very bottom.

1. Select `magdas_mag_her_1sec_hdz-d_x`

2. Click arrow

3. Variable is added

Then, try to add the offset (+200) to
`magdas_mag_her_1sec_hdz-d_x`
and plot on new panel.

(2017-08-17/22:21:28) 5: Variable selected: `magdas_mag_her_1sec_hdz-d_x`.

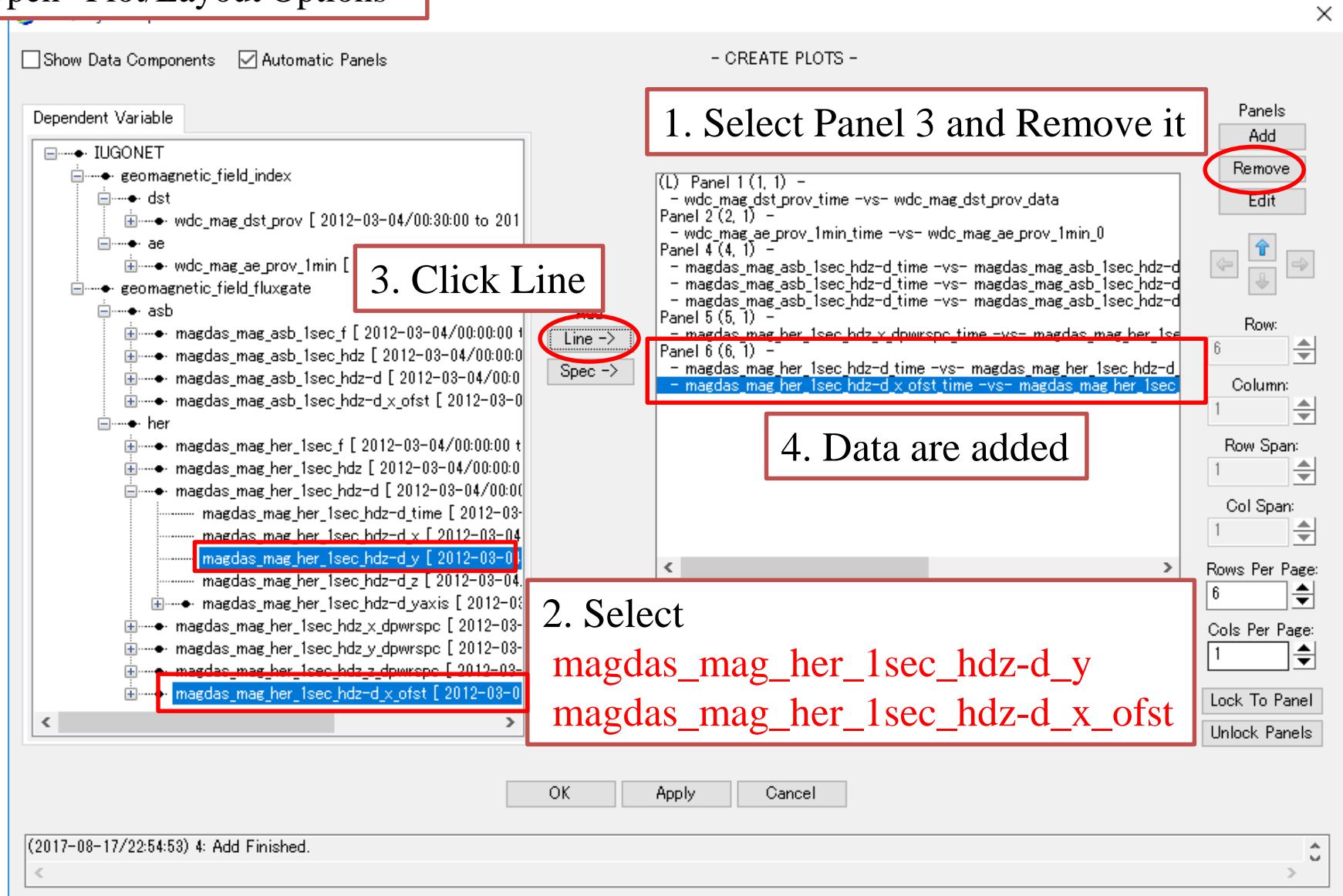
Answer

Note: one line, never return

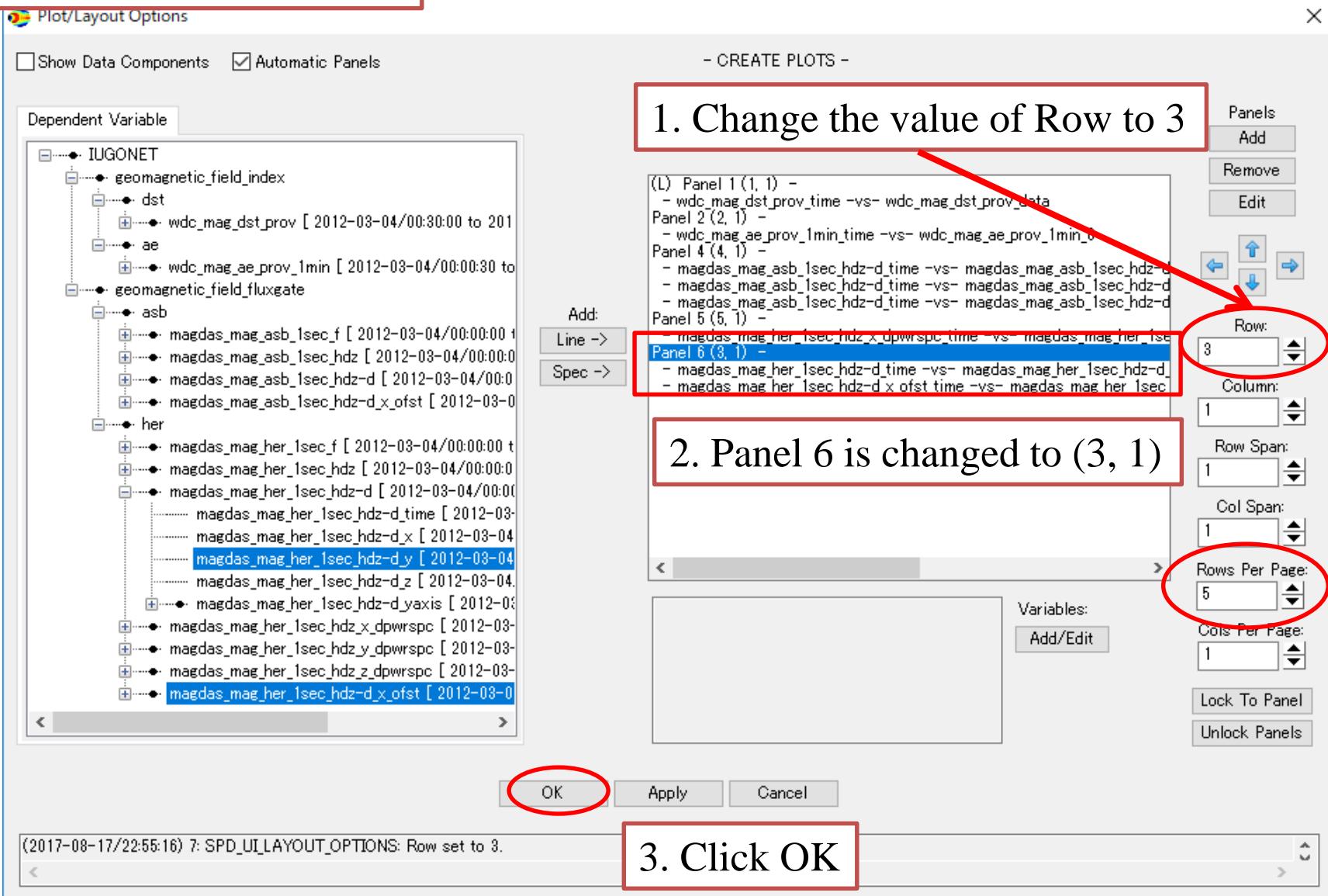
```
"magdas_mag_her_1sec_hdz-d_x_ofst" = "magdas_mag_her_1sec_hdz-d_x" + 200
```

The screenshot shows a graphical user interface for basic operation. On the left, a code editor window titled "Program: -scratch-" contains the line of code: `"z-d_x_ofst" = "magdas_mag_her_1sec_hdz-d_x" + 200`. A red arrow points from the text "z-d_x_ofst" to this line. Below the code editor are buttons for Open, Save, Run, and Clear. A red circle highlights the "Run" button, which is also enclosed in a red box with the label "1. Click Run". To the right of the code editor is a panel titled "Insert Variable:" containing a tree view of variables. A red circle highlights the variable `magdas_mag_her_1sec_hdz-d_x_ofst`, which is also enclosed in a red box with the label "2. A new variable is created". Further down the variable list, another red circle highlights the variable `magdas_mag_her_1sec_hdz-d_x`. At the bottom of the variable panel are buttons for Done and Help, with a red circle highlighting the "Done" button, which is also enclosed in a red box with the label "3. Click done". To the right of the variable panel are panels for "Insert Function:", "Insert Operator:", and "Insert Constant:", each containing a list of items.

Open “Plot/Layout Options”

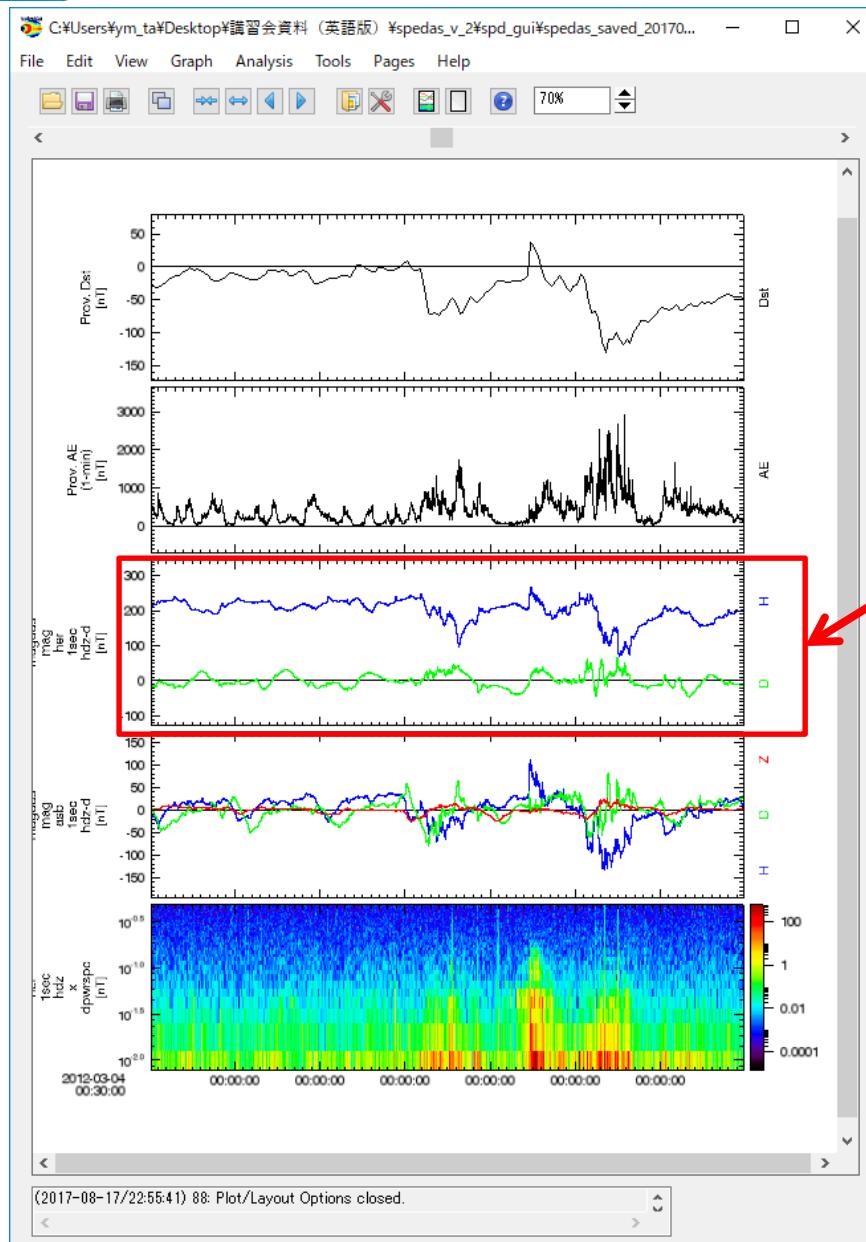


Open “Plot/Layout Options”





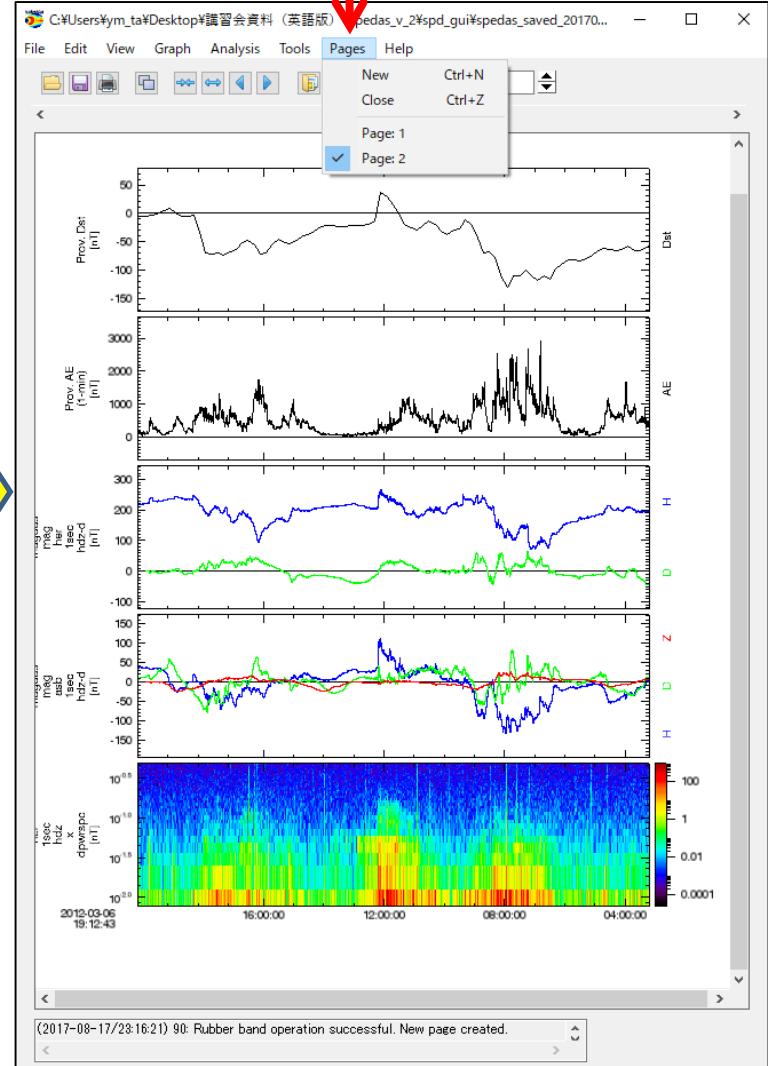
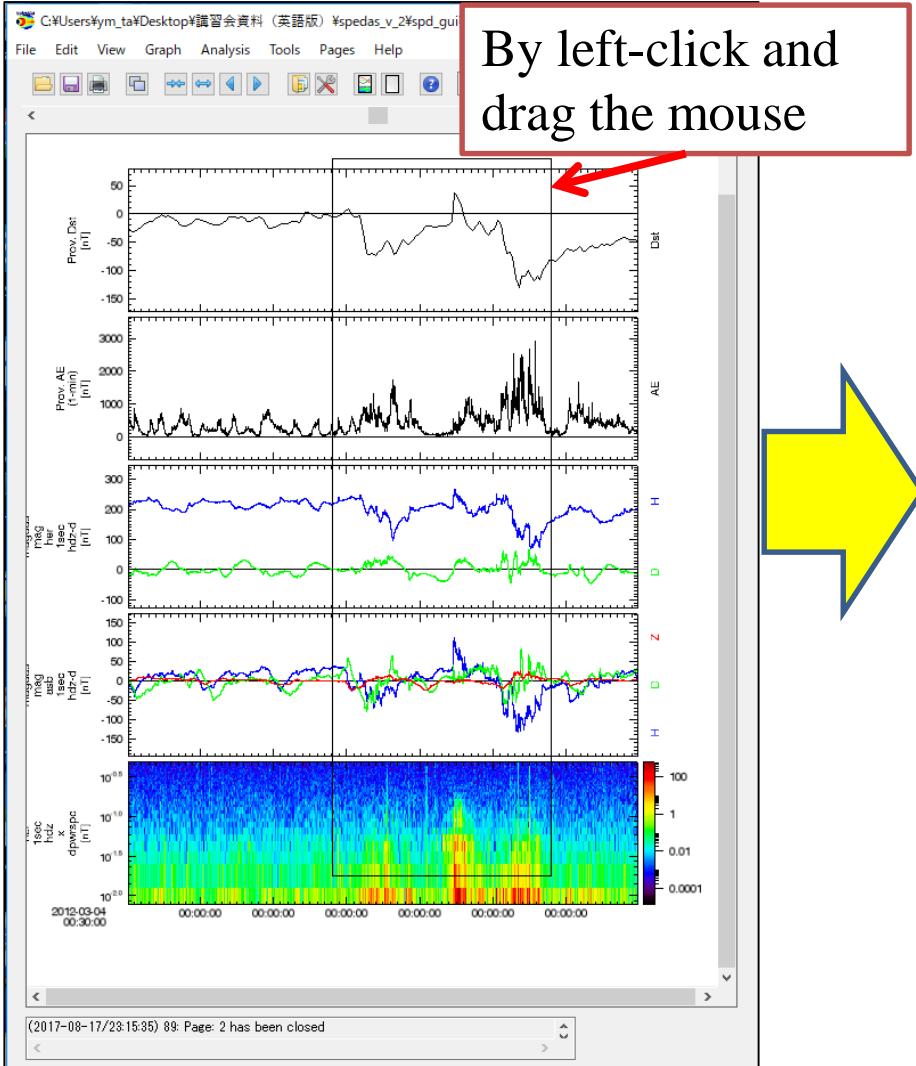
Result



Offset (+200nT) was added to the H comp.

Try:
Expand the plot using the mouse.

A new page opens





IUGONET

Metadata DB for Upper Atmosphere

・ 超高層大気長期変動の全地球上ネットワーク観測・研究
Inter-university Upper atmosphere Global Observation NETwork

How to Use SPEDAS

part3

- Additional data loading

Lesson: Load Additional ASCII Data

HEADER(13 lines)

Data(86400lines)

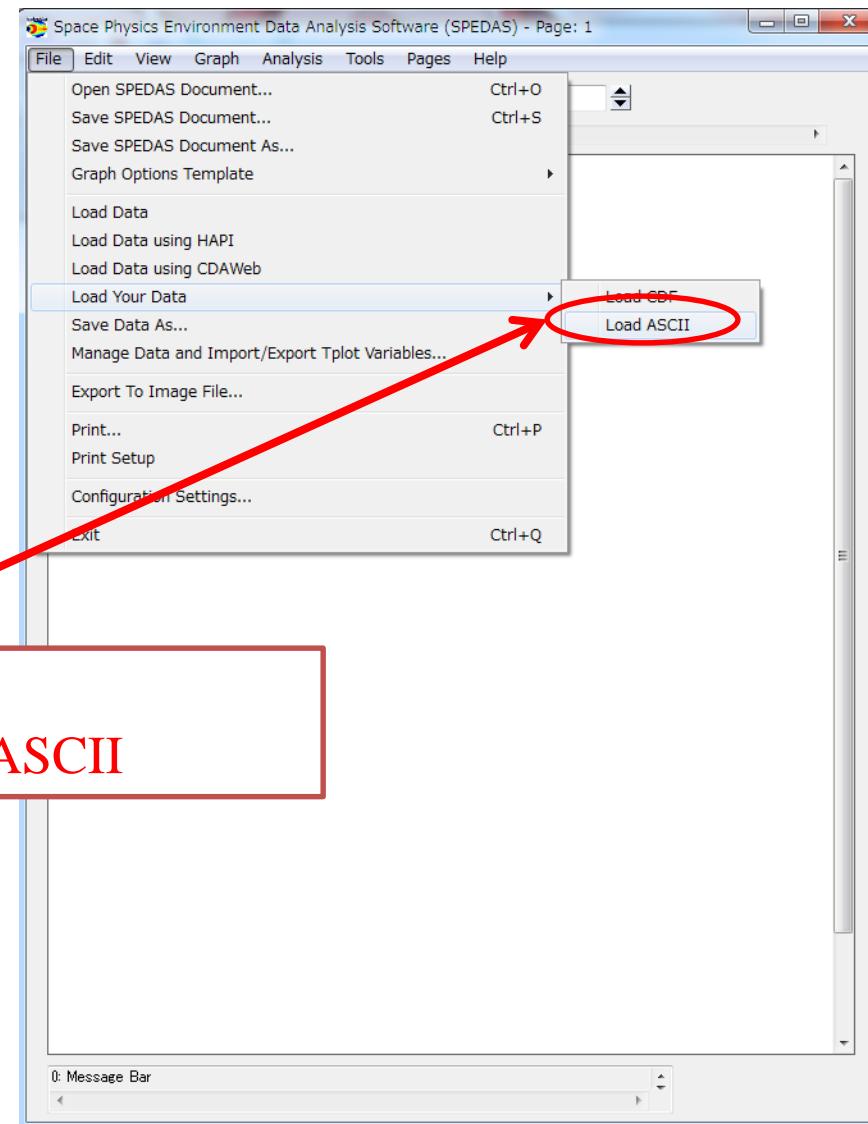
Sample1: magnetometer data

The screenshot shows the 'xyzy' application window with the title 'xyzy 0.2.2.253@LUNANUEVA - C:/Users/abeshu/Documents/IDLWorkspace/toolbox/spd_ui_...'. The menu bar includes ファイル(F), 編集(E), 検索(S), 表示(V), ウィンドウ(W), ツール(T), and ヘルプ(H). The main window displays a text file named 'testfile_format0.txt'. The file contains 13 header lines and approximately 86,400 data lines. The header lines provide metadata such as Format (IAGA-2002), Source of Data (Kyushu University (KU)), Station Name (Ashibetu), IAGA CODE (ASB (KU code)), Geodetic Latitude (043.460), Geodetic Longitude (142.170), Elevation (8888.88), Reported (HDZF), Sensor Orientation (HDZ), Digital Sampling (1 seconds), Data Interval Type (Averaged 1-minute (00:30 - 01:29)), and Data Type (Provisional). The data section starts with a header row: DATE, TIME, DOY, ASRH, ASRD, ASBZ, ASBF. Below this, there are 86,399 data rows, each containing 7 columns of numerical values. A red box highlights the first 13 header lines, and another red box highlights the first few data lines.

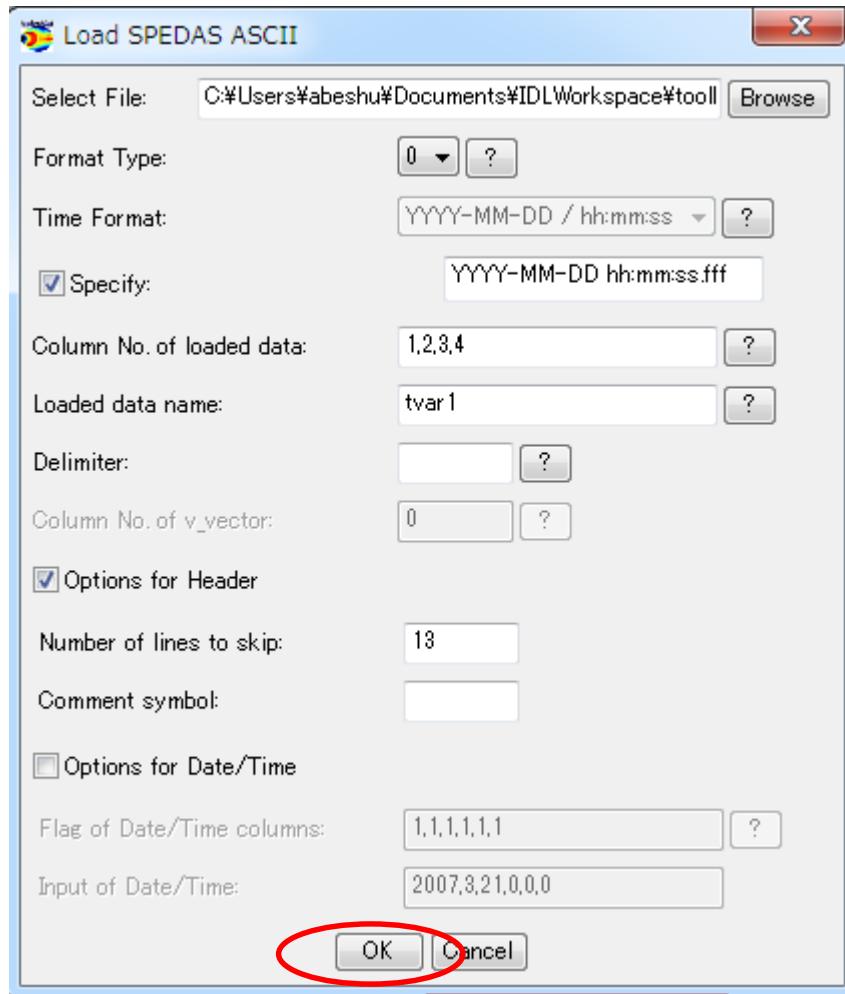
DATE	TIME	DOY	ASRH	ASRD	ASBZ	ASBF
2012-03-01	00:00:00.000	061	26723.83	111.31	42126.86	49888.35
2012-03-01	00:01:00.000	061	26723.91	110.90	42126.65	49888.22
2012-03-01	00:02:00.000	061	26723.98	110.84	42126.45	49888.09
2012-03-01	00:03:00.000	061	26723.71	111.25	42126.29	49887.80
2012-03-01	00:04:00.000	061	26723.54	111.38	42126.16	49887.61
2012-03-01	00:05:00.000	061	26723.48	111.37	42125.99	49887.43
2012-03-01	00:06:00.000	061	26723.29	111.32	42125.81	49887.18
2012-03-01	00:07:00.000	061	26723.19	111.37	42125.61	49886.95
2012-03-01	00:08:00.000	061	26723.07	111.25	42125.38	49886.70
2012-03-01	00:09:00.000	061	26722.95	110.96	42125.16	49886.44
2012-03-01	00:10:00.000	061	26722.62	110.67	42124.93	49886.08
2012-03-01	00:11:00.000	061	26722.38	110.10	42124.68	49885.73
2012-03-01	00:12:00.000	061	26722.23	109.67	42124.40	49885.41
2012-03-01	00:13:00.000	061	26721.96	109.25	42124.15	49885.06
2012-03-01	00:14:00.000	061	26721.77	108.95	42123.89	49884.74
2012-03-01	00:15:00.000	061	26721.44	108.56	42123.65	49884.35
2012-03-01	00:16:00.000	061	26721.59	107.61	42123.36	49884.19
2012-03-01	00:17:00.000	061	26721.29	107.81	42123.11	49883.82
2012-03-01	00:18:00.000	061	26720.83	108.25	42122.95	49883.44
2012-03-01	00:19:00.000	061	26721.12	107.27	42122.72	49883.10

See [Data/testfile_format0.txt](#)

Data(6 columns)



1. Select
File – Load Your Data – Load ASCII



6. Click OK

1. Click "Browse", and select 'testfile_format0.txt'.

2. Format Type: Select 0

3. Time Format: Check **Specify**, and put '**YYYY-MM-DD hh:mm:ss.fff**'

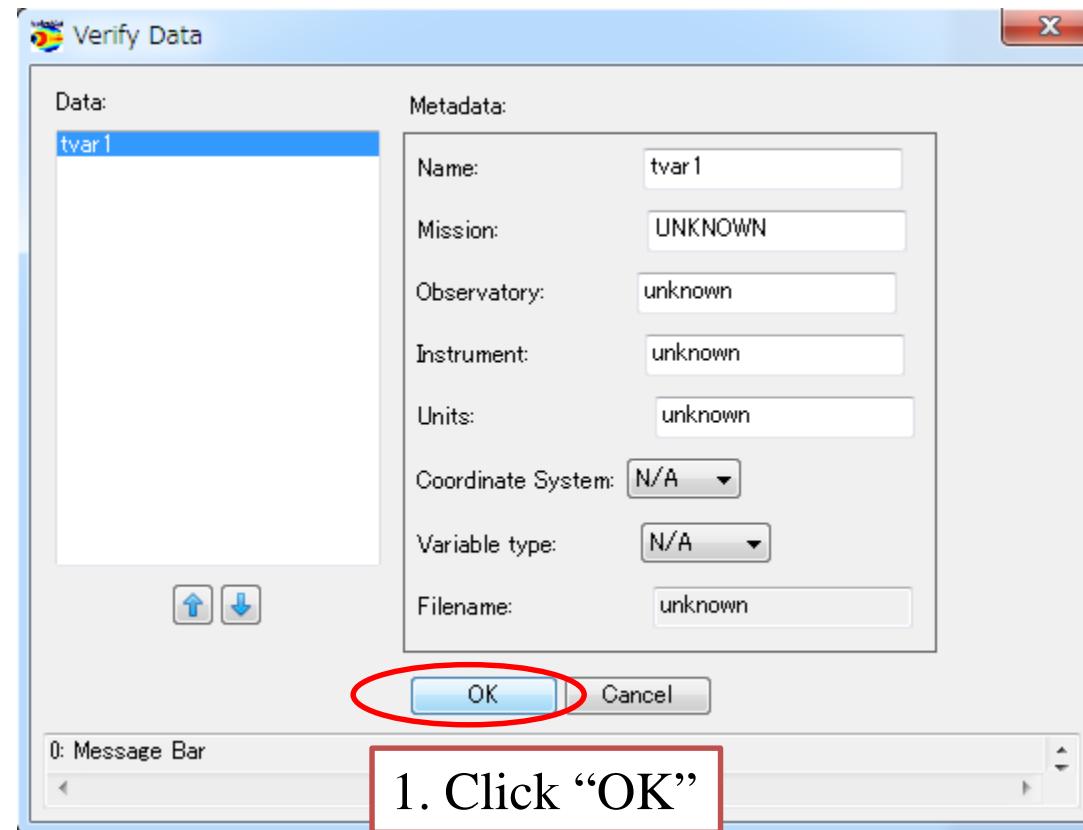
4. Column No. of loaded data:
put '**1,2,3,4**'

Note: Column number starts from 0.

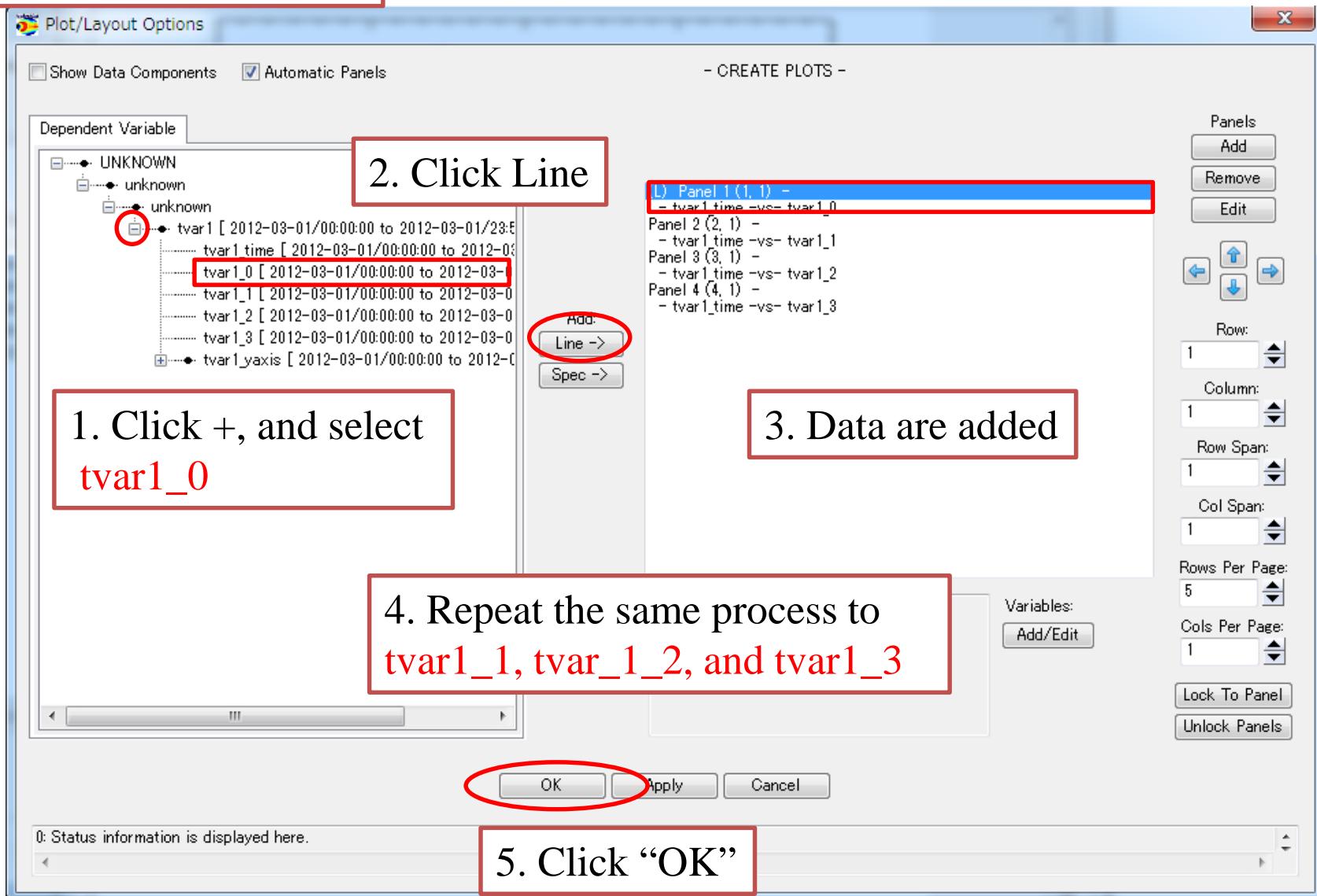
5. Options for Header:
Check **the box**, and put '**13**' to
Number of lines of skip.

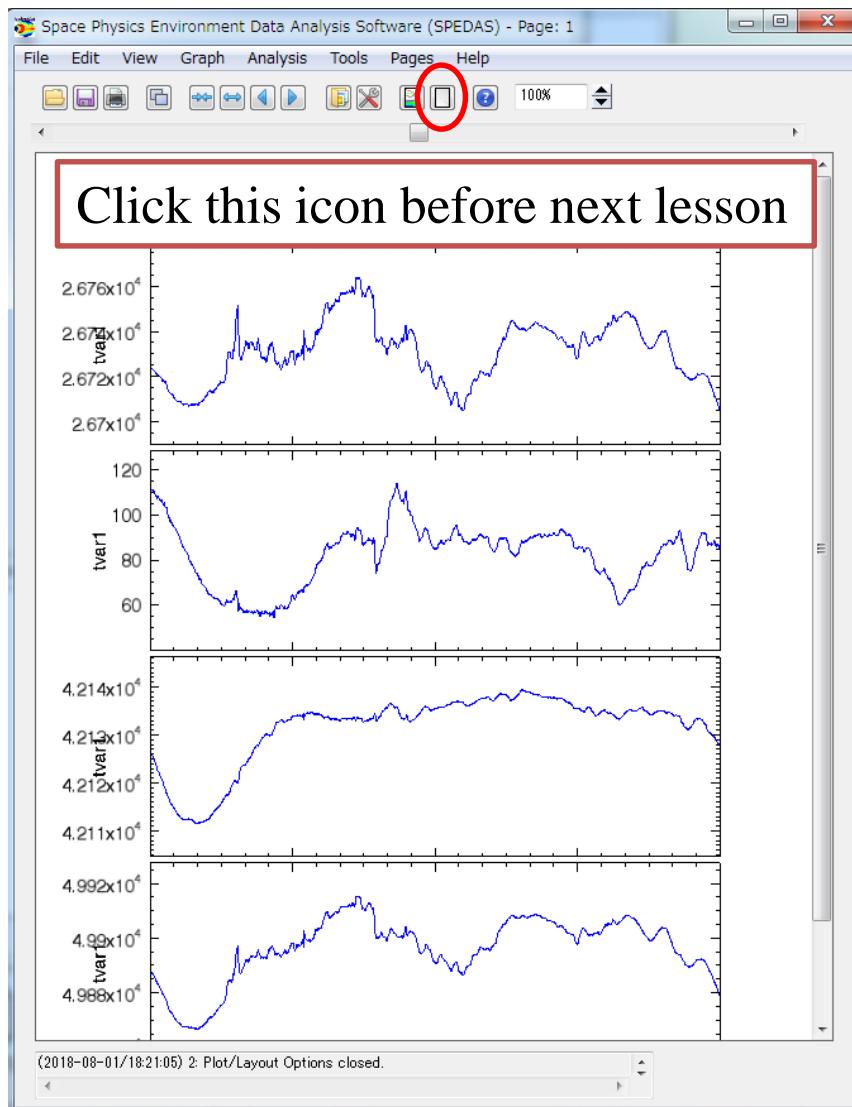


GUI Basic Operation



Open “Plot/Layout Options”





Magnetometer data written in ASCII(IAGA-2002) format are plotted.

Lesson: Load External ASCII Data

Sample2: EISCAT radar data

toolbox/spd_ui_load_ascii/gui/testfile_format1.txt

```
*scratch* testfile_format1.txt testfile_format1.txt
% Number of header line: 21
% Filename: 20140108_42m0_ipy0_0060.txt
%
% Generation date: 2014/12/24 00:08:51
% Radar site: 5
% Radar antenna: 42m
% Radar pulse code: ipy
% Experiment version: 4
% Raw data directory: ipy_fixed42p_4.11_CP@42m
% Start date and Time: 2014/01/08 18:01:24
% End date and Time: 2014/01/09 00:01:00
% Integration time: 0060
% Magic const: 1.5 * 1
% Extra settings:
% fit_altitude=[0 Inf;70 Inf;95 1000;90 95;0 Inf];
%
%
%
% Data format (Vi: positive is away from the radar):
% S & E TIME (UT) ALT LAT LONG q log(Ne) Vi Ti Te errNe errVi errTi errTe AZ EL 0+/Ne log(Co) RANGE
% YYMMDD HHMMSS.S HHMMSS.S km deg deg m^-3 m/s K K m^-3 m/s K K deg deg % rad/s km
20140108 180124.0 180200.0 77.5 78.05 16.00 0 10.17 5 796 796 8.71 5 85 85 184.50 81.60 0 5.00 78.4
20140108 180124.0 180200.0 81.1 78.05 15.99 0 10.35 14 219 219 8.59 2 25 25 184.50 81.60 0 4.76 81.9
20140108 180124.0 180200.0 84.9 78.04 15.99 0 10.36 11 123 123 8.44 2 11 11 184.50 81.60 0 4.51 85.8
20140108 180124.0 180200.0 89.1 78.04 15.99 0 10.35 8 167 167 8.52 3 9 9 184.50 81.60 0 4.24 90.0
20140108 180124.0 180200.0 93.3 78.03 15.99 3 10.29 -6 61 61 8.36 3 2 2 184.50 81.60 1 0.00 94.3
20140108 180124.0 180200.0 97.5 78.03 15.99 0 10.98 6 21 213 10.59 4 10 207 184.50 81.60 0 3.67 98.6
20140108 180124.0 180200.0 101.3 78.02 15.98 0 10.16 20 283 129 9.33 7 62 92 184.50 81.60 0 3.41 102.4
20140108 180124.0 180200.0 105.0 78.02 15.98 0 10.34 -16 127 205 9.38 7 20 72 184.50 81.60 0 3.13 106.1
20140108 180124.0 180200.0 109.1 78.01 15.98 0 10.21 7 289 252 9.11 12 38 80 184.50 81.60 0 2.82 110.3
20140108 180124.0 180200.0 113.6 78.01 15.98 0 10.04 44 244 398 9.06 16 37 137 184.50 81.60 0 2.48 114.8
20140108 180124.0 180200.0 119.1 78.00 15.98 0 9.84 113 394 714 8.94 42 69 270 184.50 81.60 0 2.09 120.4
20140108 180124.0 180200.0 125.0 77.99 15.97 0 9.70 122 372 227 8.99 22 22 210 184.50 81.60 0 1.75 126.0
-----
```

11541行読み込みました

08/01 18:08

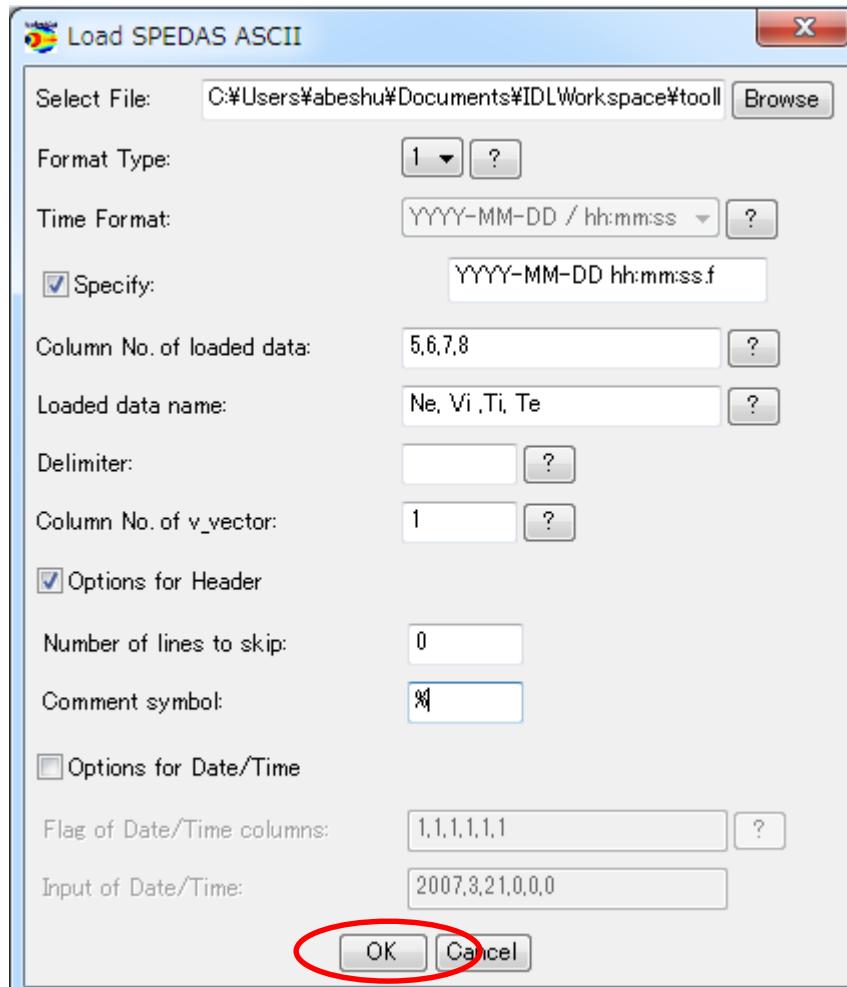
HEADER(starts from %)

Data(11520lines)

Data(19 columns)

See [Data/testfile_format1.txt](#)

Open File – Load Your Data – Load ASCII



5. Click OK

1. Click "Browse", and select 'testfile_format1.txt'.

2. Format Type: Select **1**

3. Time Format: Check **Specify**, and put '**YYYY-MM-DD hh:mm:ss.f**'

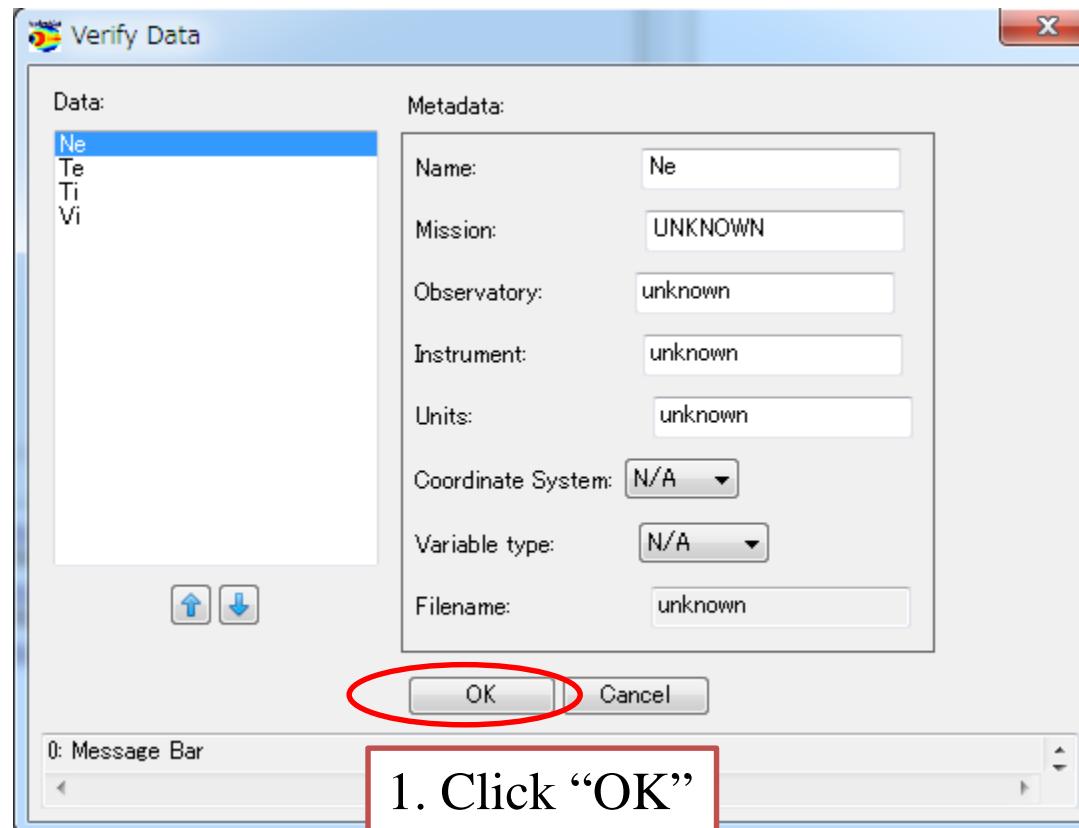
4. Column No. of loaded data:
put '**5,6,7,8**'

5. Loaded data name:
put '**Ne, Vi, Ti, Te**'

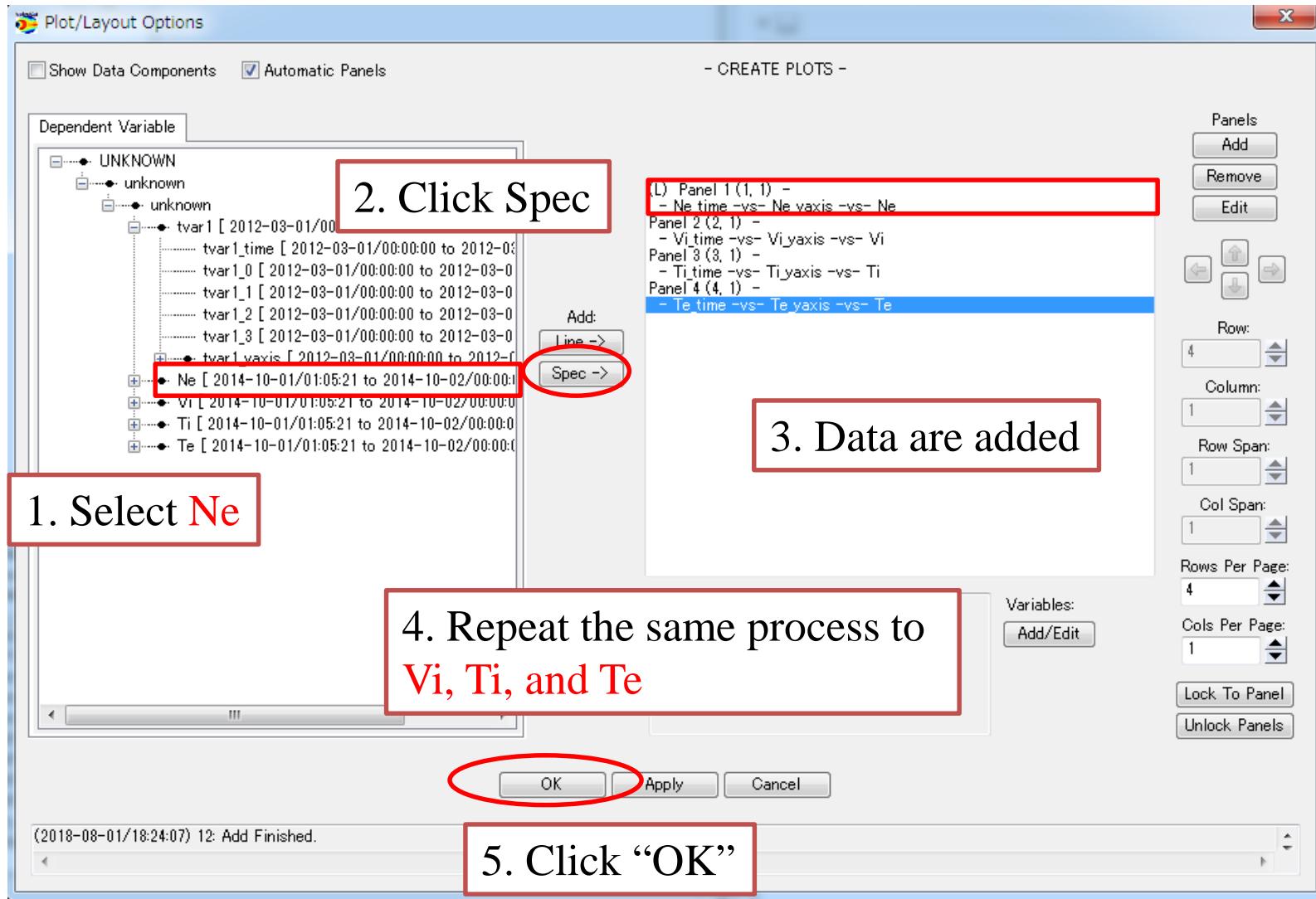
6. Column No. of v_vector:
put '**1**'

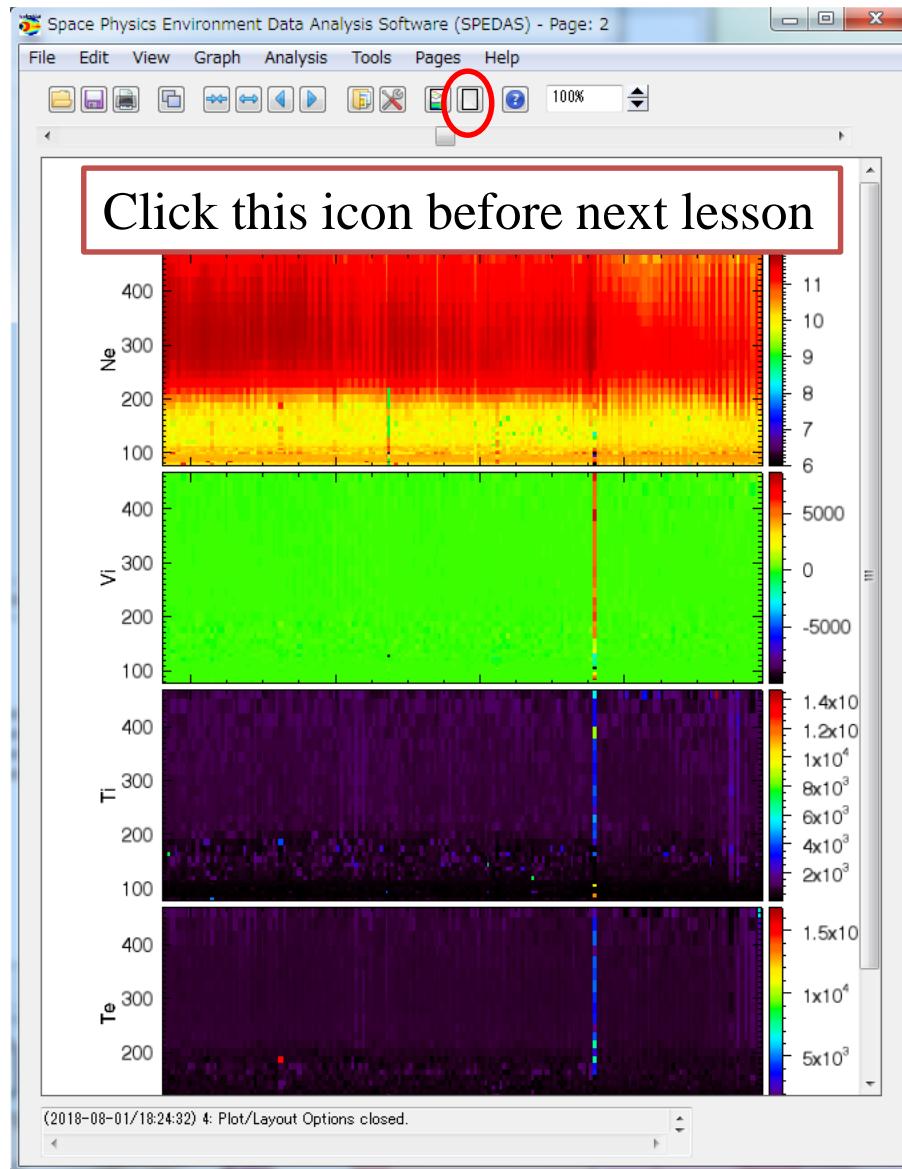
7. Options for Header:
Check **the box**, and put '**%**' to
Comment symbol

GUI Basic Operation



Open “Plot/Layout Options”



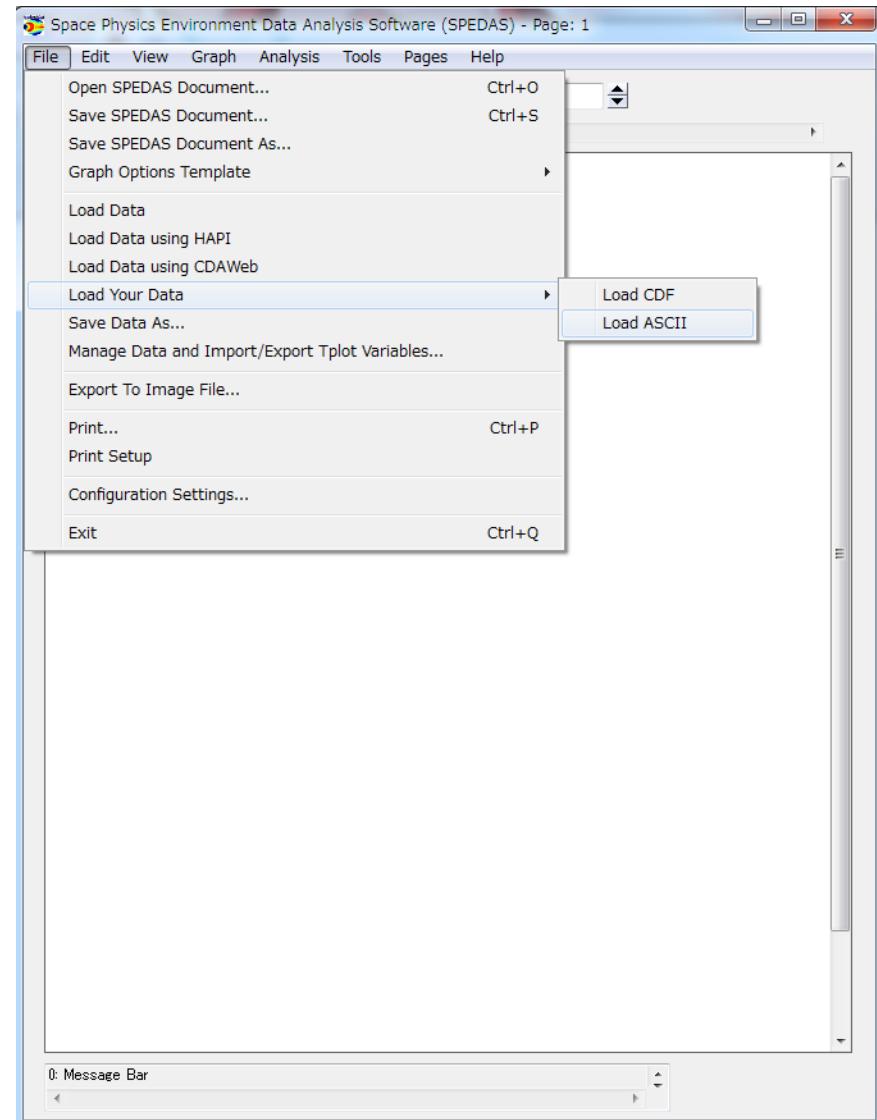


EISCAT radar data written in ASCII format are plotted in spectrogram.

Try:
Plot your own ASCII/CDF
data using File – Load Your
Data – Load ASCII

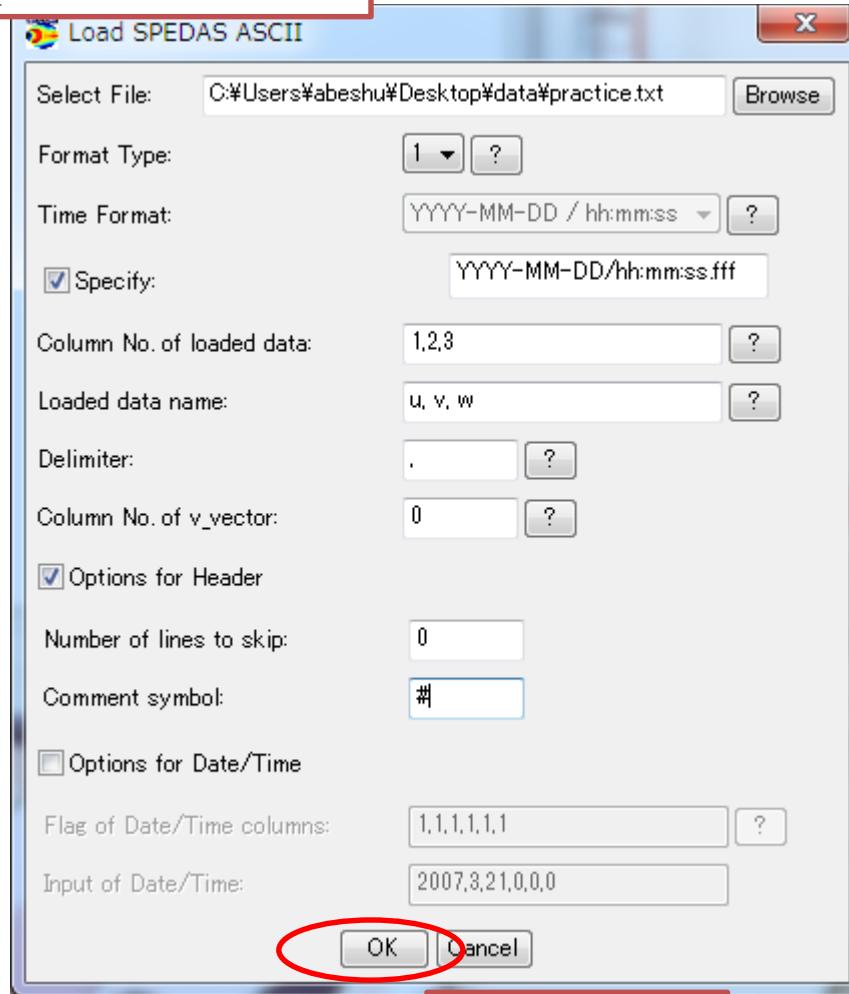
If you do not prepare your
own data, let's try to plot
Data/practice.txt

Hint: Use format 1 for data
loading, and use SPEC for
data plotting



Answer

Open “Load ASCII”



9. Click OK

1. Click “Browse”, and select ‘practice.txt’.

2. Format Type: Select **1**

3. Time Format: Check **Specify**, and put ‘**YYYY-MM-DD/hh:mm:ss.fff**’

4. Column No. of loaded data:
put ‘**1,2,3**’

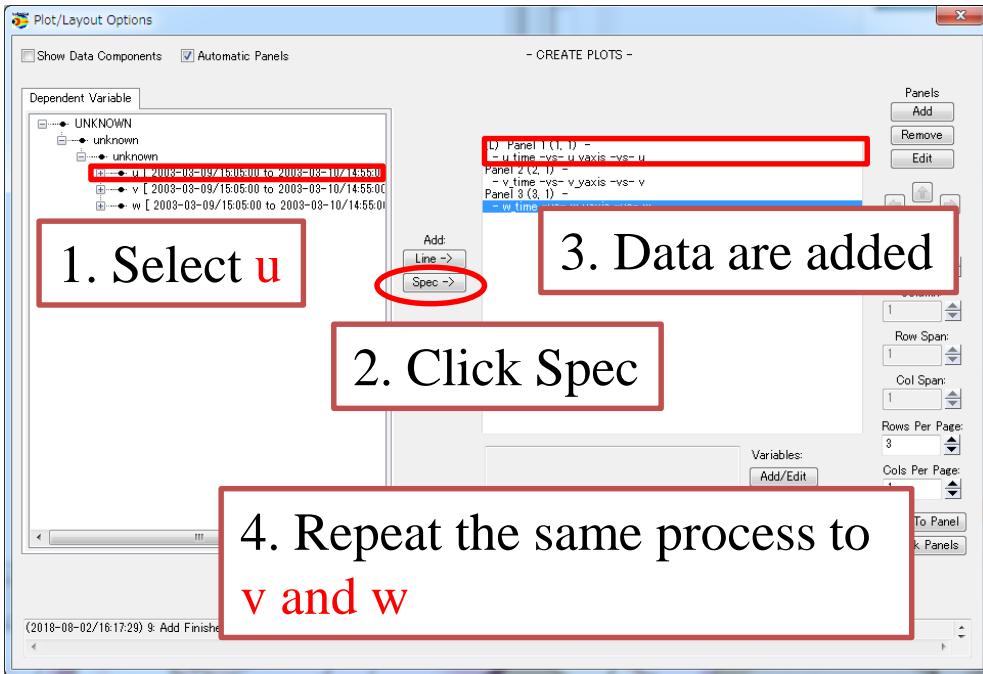
5. Loaded data name:
put ‘**u, v, w**’

6. Delimiter: put ‘**,**’

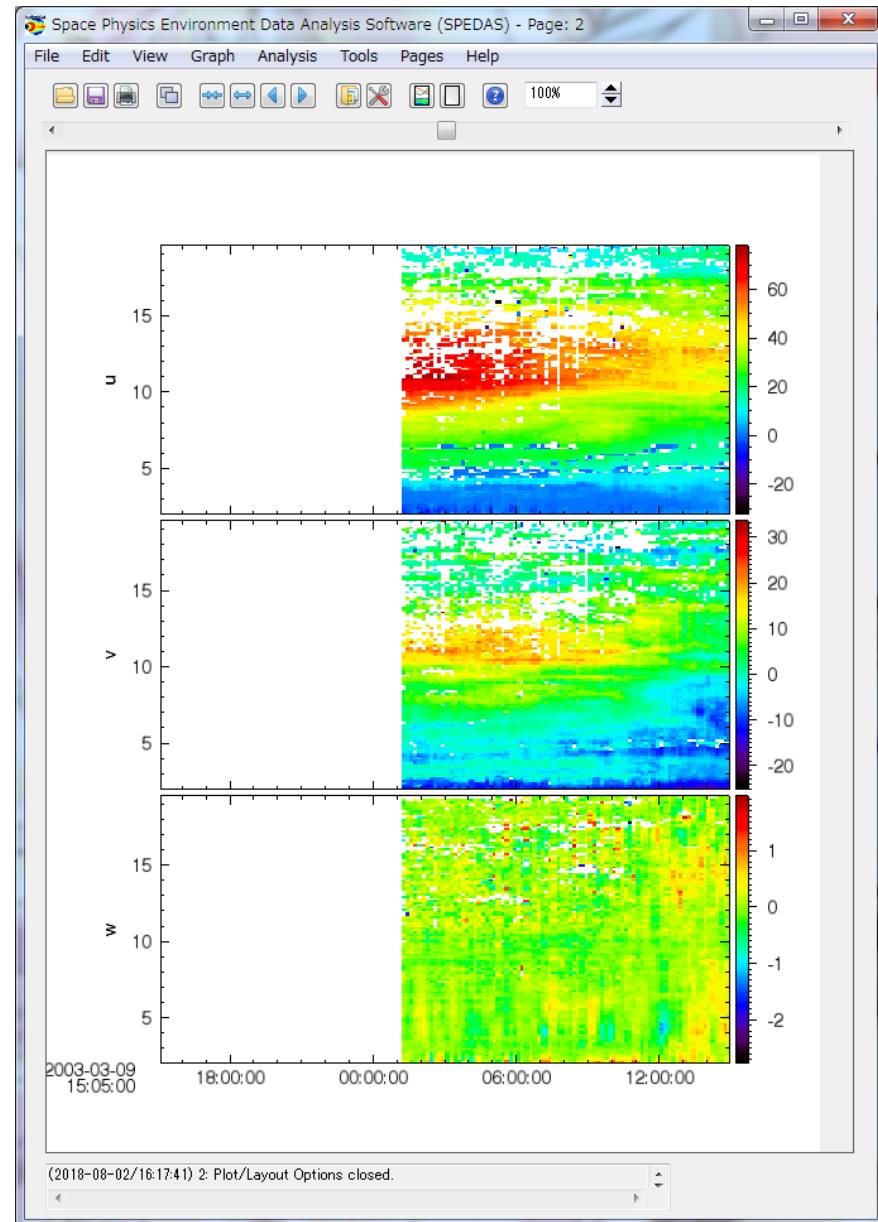
7. Column No. of v_vector:
put ‘**0**’

8. Options for Header:
Check **the box**, and put ‘**#**’ to Comment symbol

Open “Plot/Layout Options”



Practice data(wind velocity observed by MU radar) written in ASCII format are plotted in spectrogram.





For advance...

UDAS website: <http://www.iugonet.org/product/analysis.jsp>

UDAS

IUGONET has provided a plug-in software, UDAS (iUgonet Data Analysis Software), for SPEDAS.

UDAS is included as a SPEDAS standard plug-in. Once you install SPEDAS, UDAS will also be installed. To update UDAS part, please download it by clicking links below.

[Release Note](#)

Latest Version

[s3.00.1 for SPEDAS 3.00 \(zip, 1MB, already included in SPEDAS 3.00\)](#)

Previous Version

[s2.00.2 for SPEDAS 2.00 \(zip, 1MB, already included in SPEDAS 2.00\)](#)

[s2.00.1 for SPEDAS 2.00 \(zip, 1MB, already included in SPEDAS 2.00\)](#)

[s1.00.1 for SPEDAS 1.00 \(zip, 1MB, already included in SPEDAS 1.00\)](#)

[3.00.3 for TDAS 8.00 \(zip, 1MB\)](#)

[3.00.2 for TDAS 8.00 \(zip, 1MB\)](#)

[3.00.1 for TDAS 8.00 \(zip, 1MB\)](#)

[2.01.1 for TDAS 7.01 \(zip, 1MB\)](#)

[2.00.2 for TDAS 7.00 \(zip, 1MB\)](#)

[2.00.1 for TDAS 7.00 \(zip, 1MB\)](#)

[1.00.1 for TDAS 6.00 \(zip, 1MB\)](#)

UDAS egg

UDAS egg (UDAS Easy Guide to Generate your load routines) provides users with the templates for IDL procedures that can load your own data files into SPEDAS/IDL. According to the document, the users can easily create the load procedure for their own data by modifying the template procedure (about 10 lines identified in this routine). It supports Windows, Linux, and Macintosh.

It's easy to use!

1. Prepare your PC in which IDL 8.0 or higher and SPEDAS 2.00 or higher (3.00 is recommended) were installed.
2. Download UDAS egg to your PC and copy it to the directory you want.
3. Modify the template step by step according to the manual.
4. Compile and run the modified procedure to load and plot your data.
5. Further, you can analyze the loaded data using many useful functions included in the SPEDAS.

[Document \(PDF, 180KB\)](#)

Latest Version

[1.00 for CDF/ASCII \(zip, 1MB\)](#)

Acknowledgment

SPEDAS is a grass-roots data analysis software for the Space Physics community, which was developed by scientists and programmers of the UC Berkeley's Space Sciences Laboratory, UCLA's IGPP and other contributors

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Feedbacks

If you have any feedbacks, questions, requests about this hands-on and software, please send email to the following:



Subject: **ICeSSAT2018 SPEDAS hands-on**

To: **abeshu@icswse.kyushu-u.ac.jp**

We would be appreciated your many comments!