

IUGONET

Inter-university Upper atmosphere Global Observation NETwork

Instructions for data analysis software:

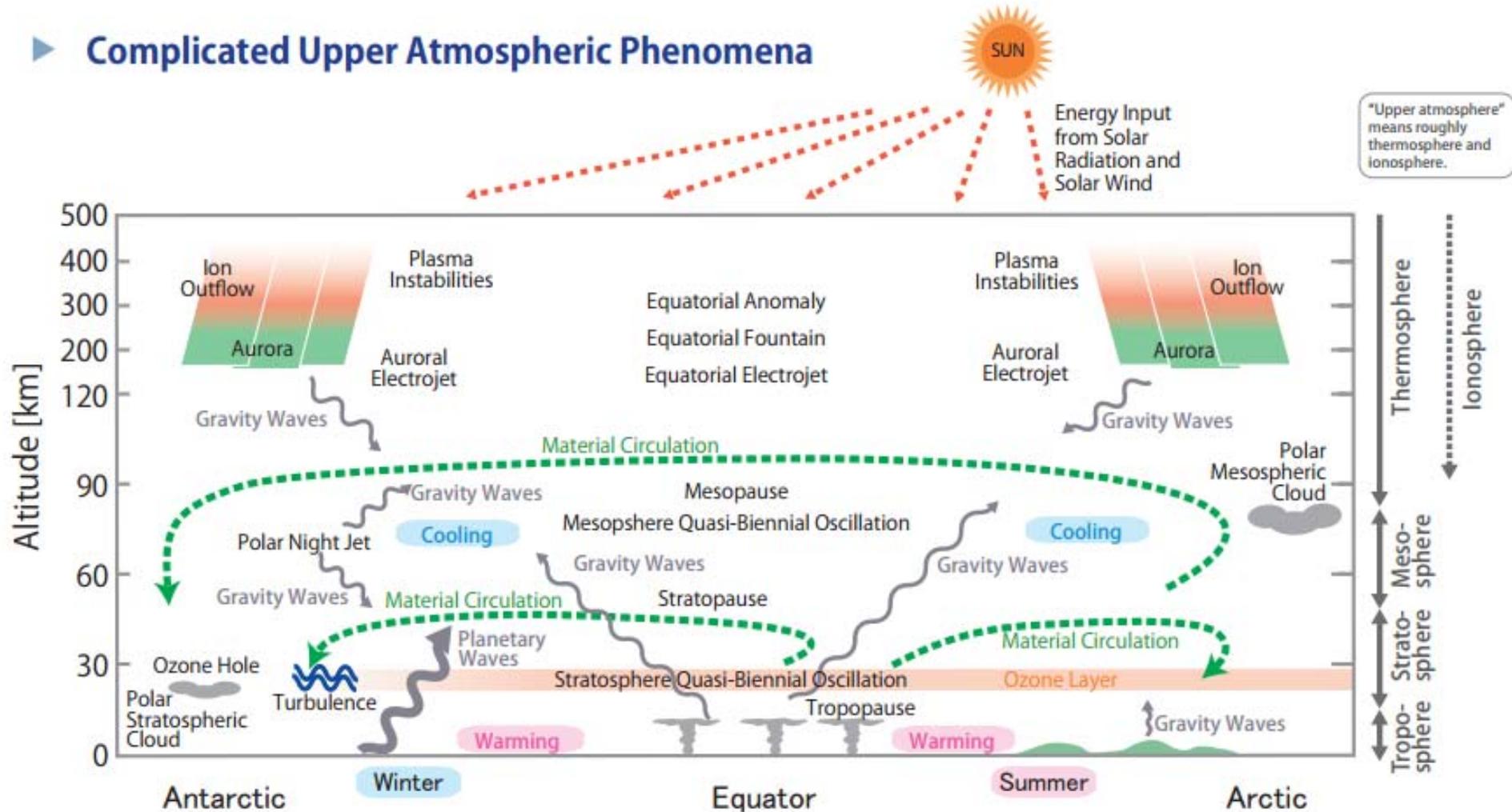
- *Preparation*
- *The IUGONET project and its products for space weather study*
- *Installation*
- *How to Use SPEDAS, part1*
- *How to Use SPEDAS, part2*

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

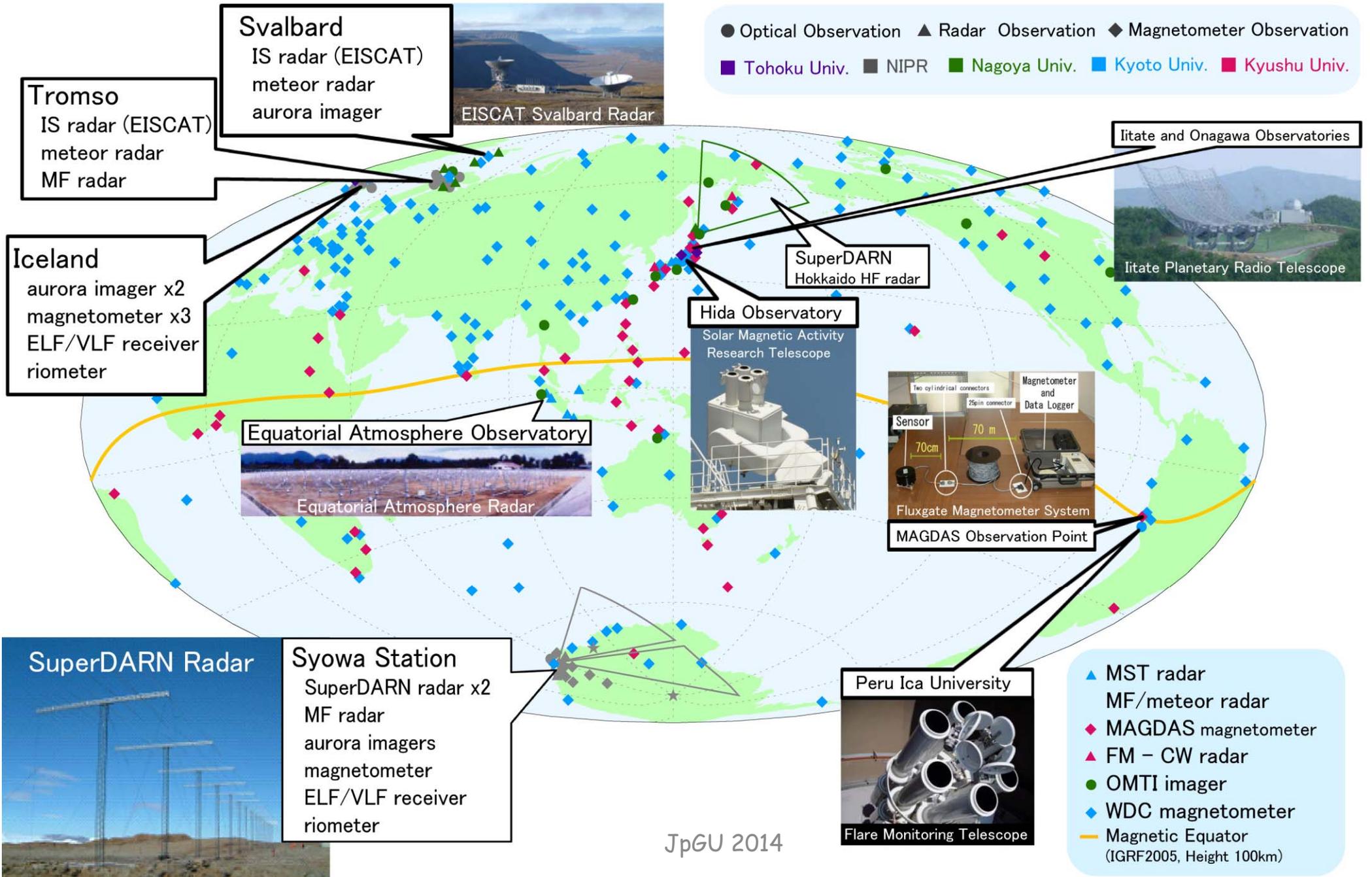


The IUGONET project and hands on seminar for its data analysis software

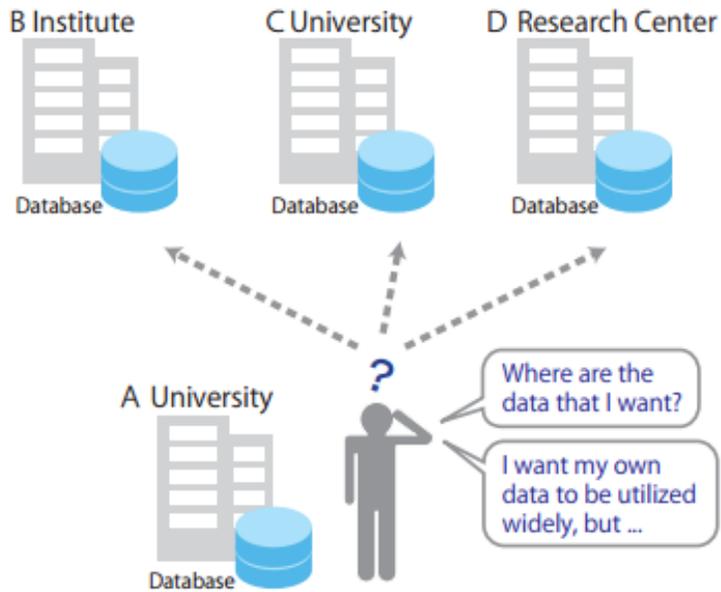
► Complicated Upper Atmospheric Phenomena



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



Problem



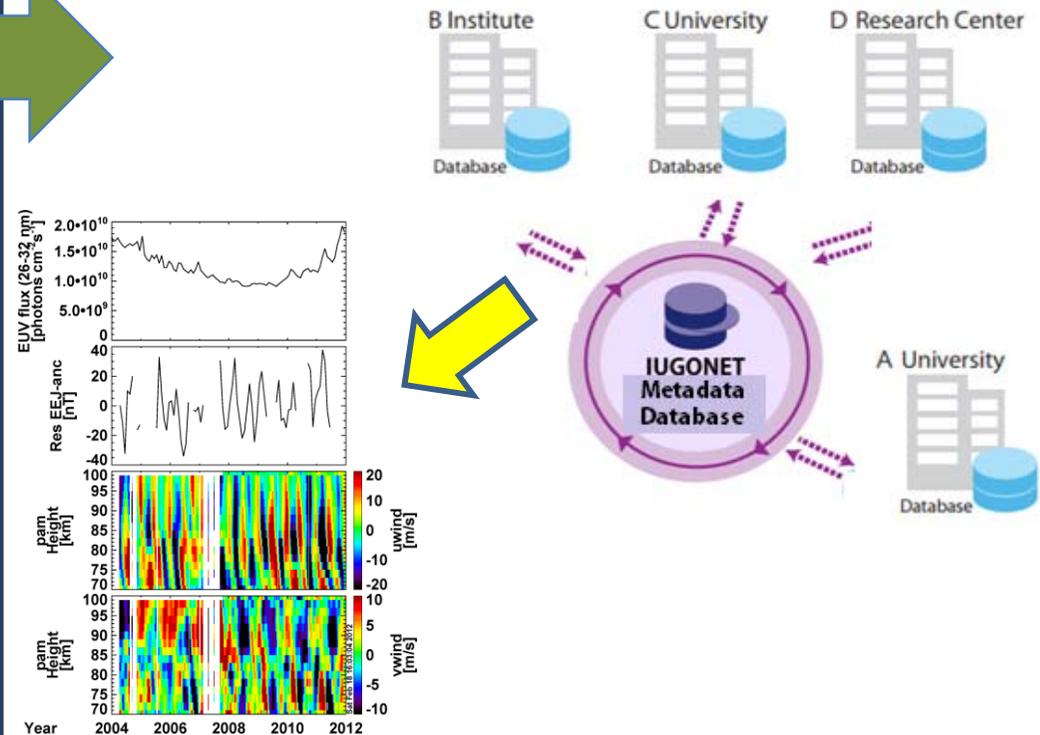
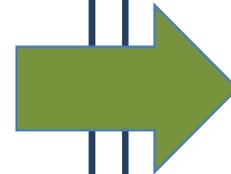
Observational data should be quality controlled and managed by the specialists who know the observations.

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

Solution

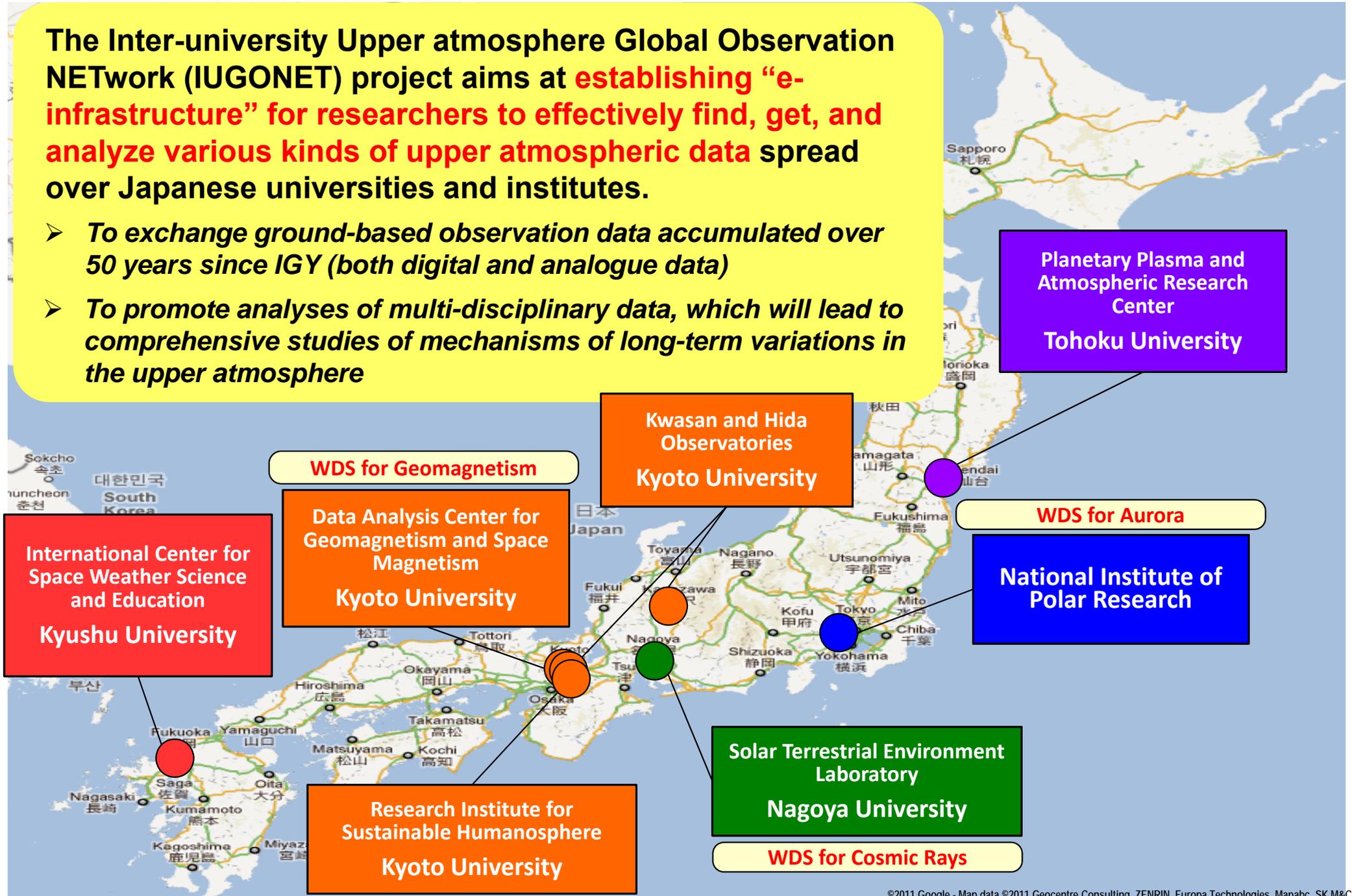
IUGONET provides a new research platform that enables metadata extracted from ground-based observation data to be shared.

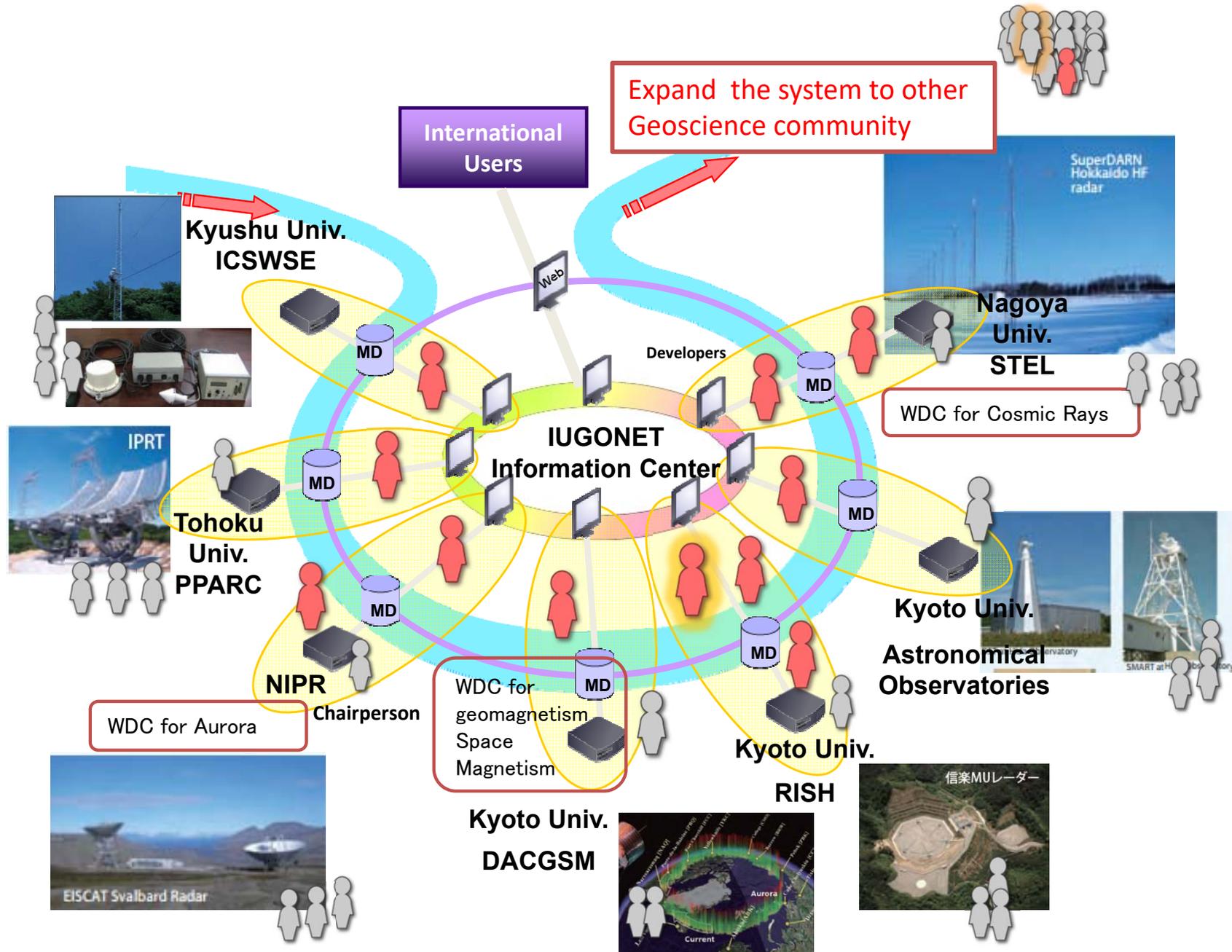
In addition, IUGONET developed analysis software to access and analyze data in an integrated fashion.



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.

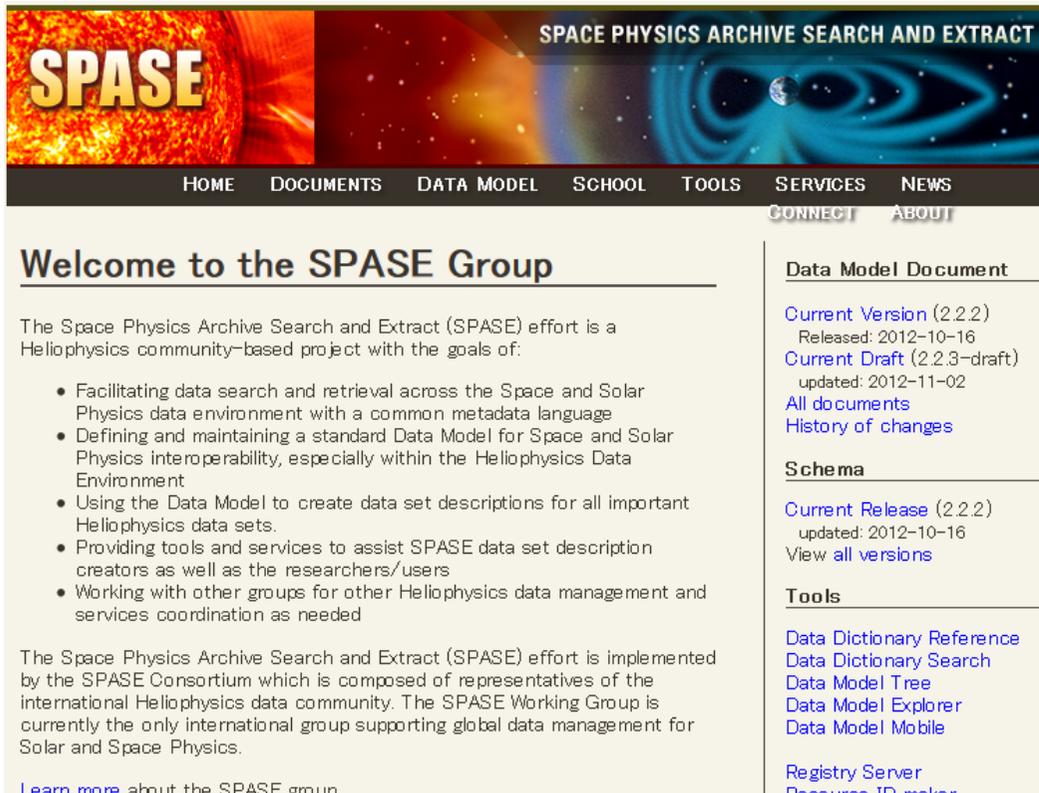
- To exchange ground-based observation data accumulated over 50 years since IGY (both digital and analogue data)
- To promote analyses of multi-disciplinary data, which will lead to comprehensive studies of mechanisms of long-term variations in the upper atmosphere





IUGONET metadata format = SPASE + modifications

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



The screenshot shows the SPASE website header with the text "SPACE PHYSICS ARCHIVE SEARCH AND EXTRACT" and a navigation menu including HOME, DOCUMENTS, DATA MODEL, SCHOOL, TOOLS, SERVICES, NEWS, CONNECT, and ABOUT. The main content area is titled "Welcome to the SPASE Group" and contains a list of bullet points describing the project's goals and a list of links for "Data Model Document", "Schema", and "Tools".

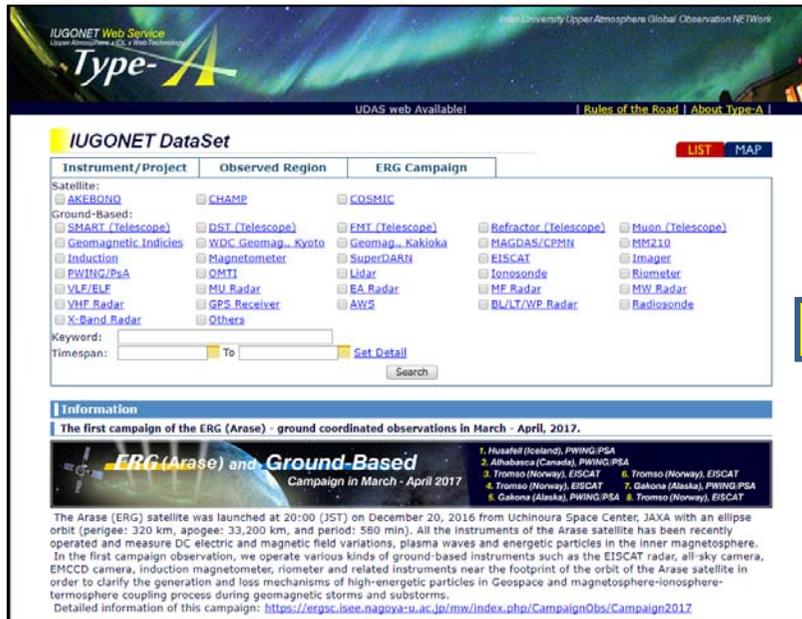
What's SPASE?

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 Web Service
Type-A

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

IUGONET DataSet

Instrument/Project	Observed Region	ERG Campaign
Satellite:		
<input type="checkbox"/> AKERONO	<input type="checkbox"/> CHAMP	<input type="checkbox"/> COSMIC
Ground-Based:		
<input type="checkbox"/> SMART (Telescope)	<input type="checkbox"/> DST (Telescope)	<input type="checkbox"/> FMT (Telescope)
<input type="checkbox"/> Geomagnetic Indices	<input type="checkbox"/> WDC Geomag., Kyoto	<input type="checkbox"/> Geomag., Kakioka
<input type="checkbox"/> Induction	<input type="checkbox"/> Magnetometer	<input type="checkbox"/> Refractor (Telescope)
<input type="checkbox"/> FWING/PSA	<input type="checkbox"/> QMTI	<input type="checkbox"/> MAGDAS/CPMN
<input type="checkbox"/> VLF/ELF	<input type="checkbox"/> MU Radar	<input type="checkbox"/> SuperDARN
<input type="checkbox"/> VHF Radar	<input type="checkbox"/> EA Radar	<input type="checkbox"/> EISCAT
<input type="checkbox"/> X-Band Radar	<input type="checkbox"/> GPS Receiver	<input type="checkbox"/> Ionosonde
	<input type="checkbox"/> AWS	<input type="checkbox"/> Riometer
	<input type="checkbox"/> Others	<input type="checkbox"/> BL/LT/WP Radar
		<input type="checkbox"/> Radiosonde

Keyword: To

Timespan: To

Information

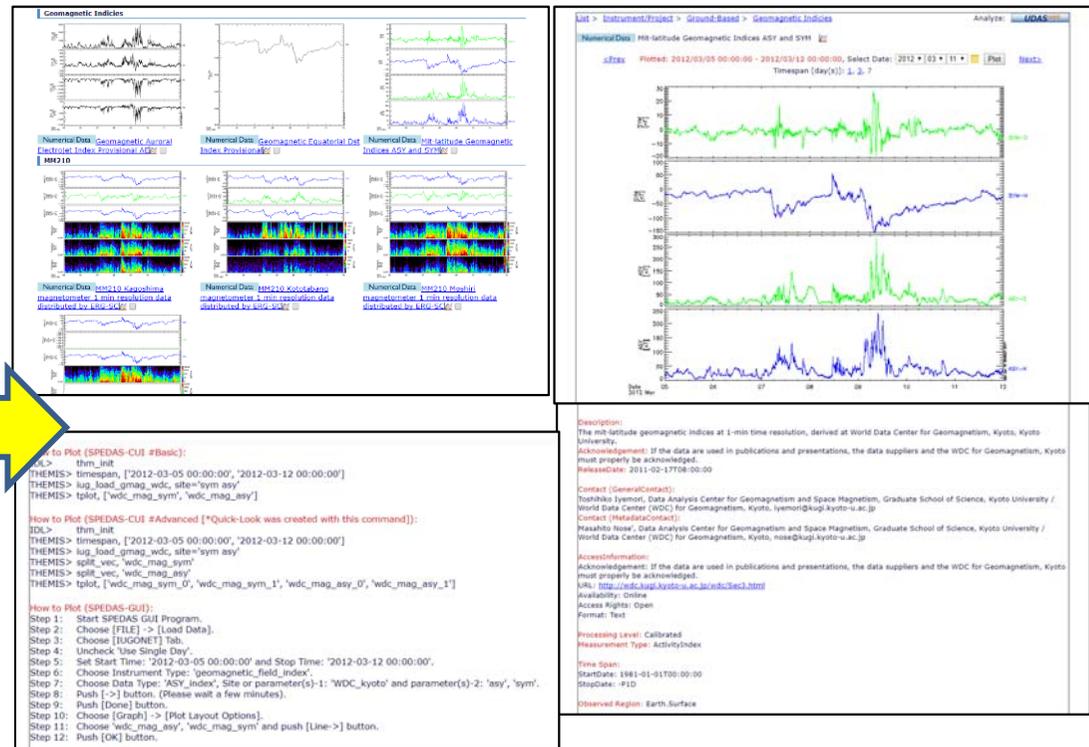
The first campaign of the ERG (Arase) - ground coordinated observations in March - April, 2017.

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

1. Fuusati (Iceland), PWING/PSA
2. Alibabeca (Canada), PWING/PSA
3. Tromso (Norway), EISCAT
4. Tromso (Norway), EISCAT
5. Gakona (Alaska), PWING/PSA
6. Tromso (Norway), EISCAT
7. Gakona (Alaska), PWING/PSA
8. Tromso (Norway), EISCAT

The Arase (ERG) satellite was launched at 20:00 (JST) on December 20, 2016 from Uchinoura Space Center, JAXA with an ellipse orbit (perigee: 320 km, apogee: 33,200 km, and period: 580 min). All the instruments of the Arase satellite has been recently operated 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-energetic particles in Geospace and magnetosphere-ionosphere-thermosphere coupling process during geomagnetic storms and substorms.

Detailed information of this campaign: <https://ergsc.isec.nagoya-u.ac.jp/mv/index.php/CampaignObs/Campaign2017>



Geomagnetic Indices

How to Plot (SPEDAS-CUI #Basic):

```

ID> item_init
THEMIS> timespan, ['2012-03-05 00:00:00', '2012-03-12 00:00:00']
THEMIS> lug_load_gmag_wdc, site='sym_asy'
THEMIS> tplot, ['wdc_mag_sym', 'wdc_mag_asy']

How to Plot (SPEDAS-CUI #Advanced [*Quick-Look was created with this command]):
ID> item_init
THEMIS> timespan, ['2012-03-05 00:00:00', '2012-03-12 00:00:00']
THEMIS> lug_load_gmag_wdc, site='sym_asy'
THEMIS> spfl_vec, 'wdc_mag_sym'
THEMIS> spfl_vec, 'wdc_mag_asy'
THEMIS> tplot, ['wdc_mag_sym_0', 'wdc_mag_sym_1', 'wdc_mag_asy_0', 'wdc_mag_asy_1']

How to Plot (SPEDAS-GUI):
Step 1: Start SPEDAS GUI Program.
Step 2: Choose [FILE] -> [Load Data].
Step 3: Choose [IUGONET] tab.
Step 4: Uncheck 'Use Single Day'.
Step 5: Set Start Time: '2012-03-05 00:00:00' and Stop Time: '2012-03-12 00:00:00'.
Step 6: Choose Instrument Type: 'geomagnetic_field_index'.
Step 7: Choose Data Type: 'ASY_index', Site or parameter(s)-1: 'WDC_kyoto' and parameter(s)-2: 'asy', 'sym'.
Step 8: Push [->] button (Please wait a few minutes).
Step 9: Push [Done] button.
Step 10: Choose [Graph] -> [Plot Layout Options].
Step 11: Choose 'wdc_mag_asy', 'wdc_mag_sym' and push [Line->] button.
Step 12: Push [OK] button.
    
```

Instrument/Project > Ground-Based > Geomagnetic Indices

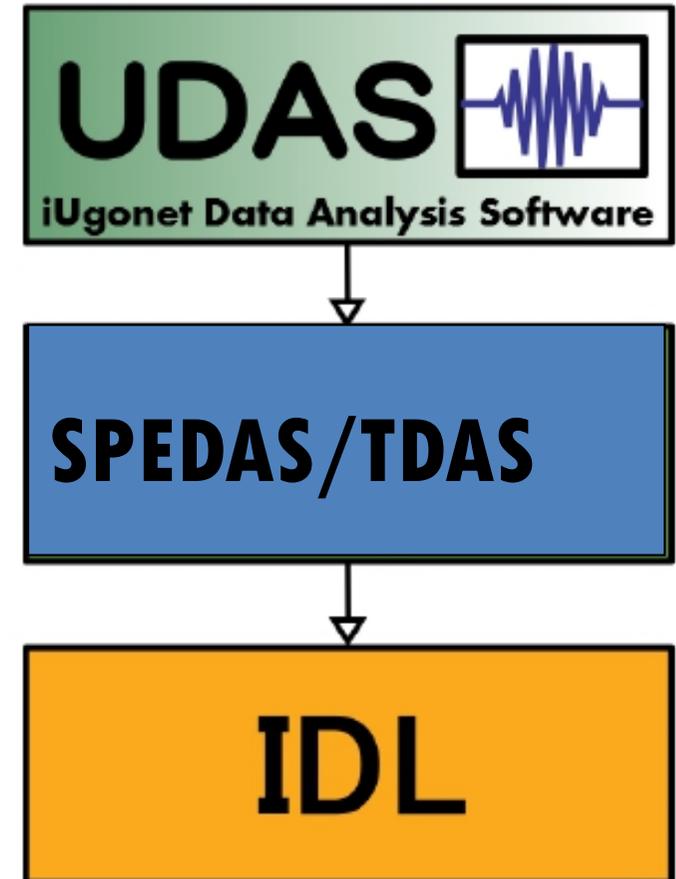
How to Plot (SPEDAS-GUI):

Time Span: StartDate: 1881-01-01T00:00:00 StopDate: #1D

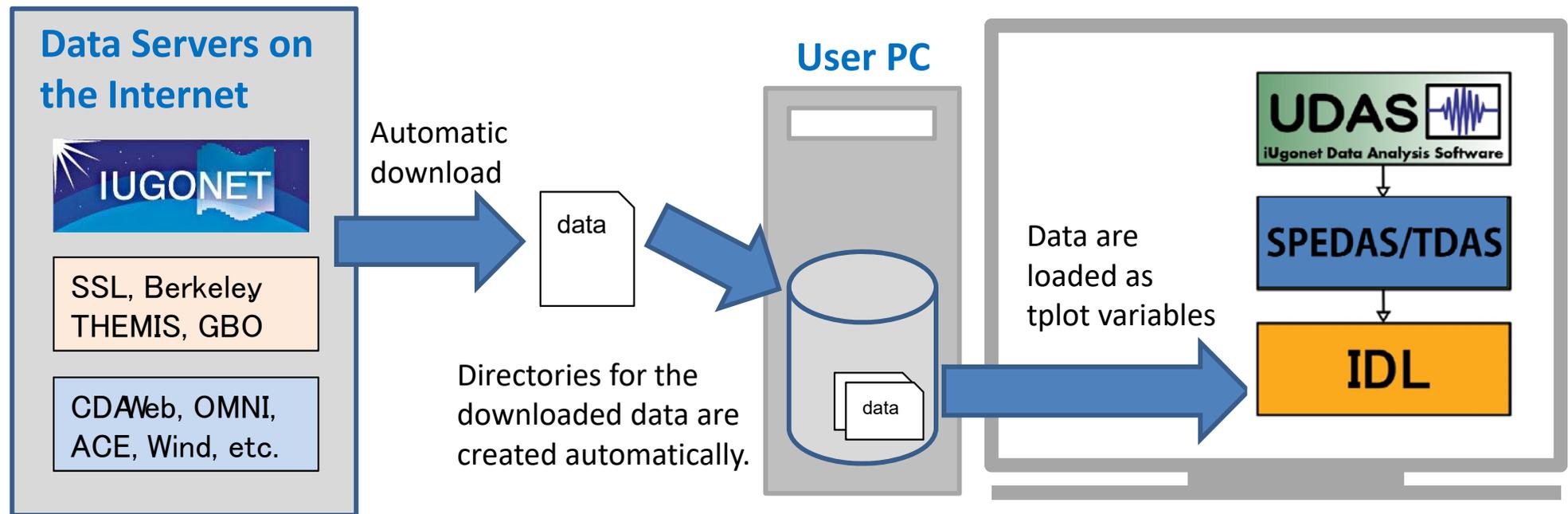
Observed Region: Earth Surface

- 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



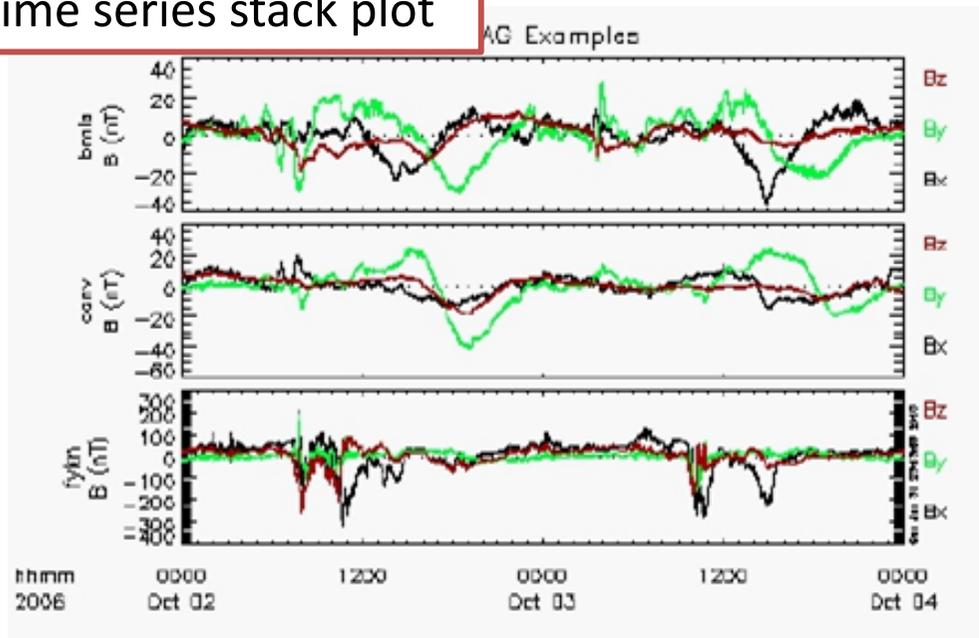
Data can be easily plotted, for example, by only three basis commands with the SPEDAS-CUI tool.

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

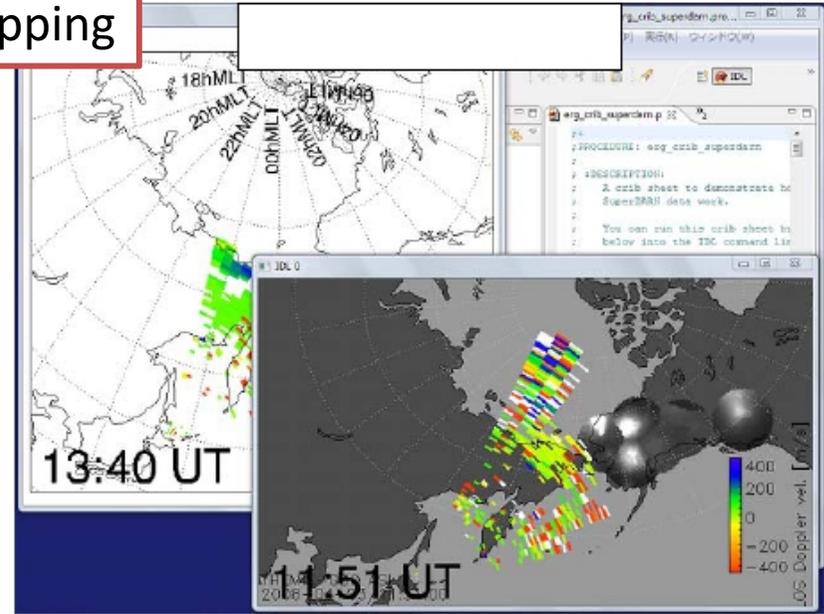
```
timespan, 'yyyy-mm-dd'
iug_load_***
tplot, +++
```

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

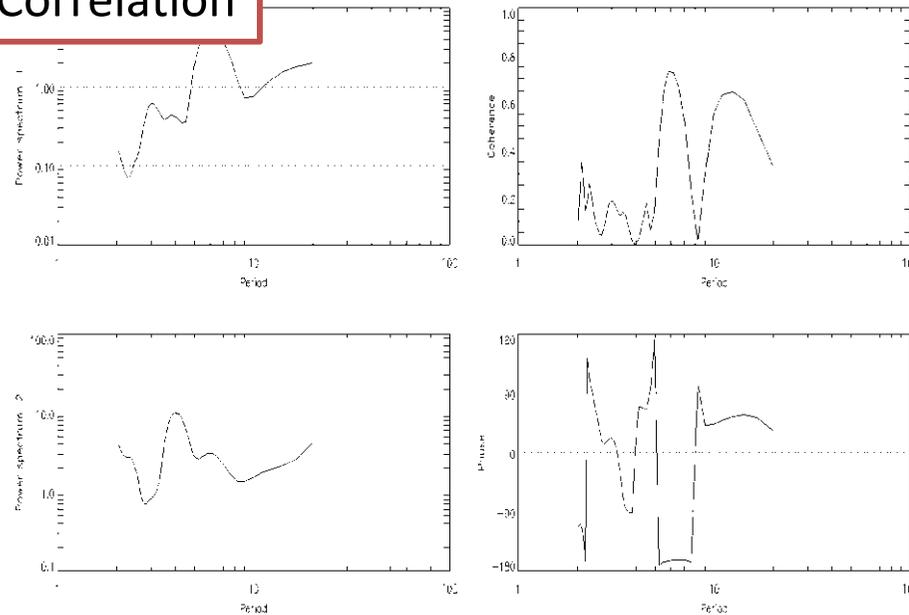
Time series stack plot



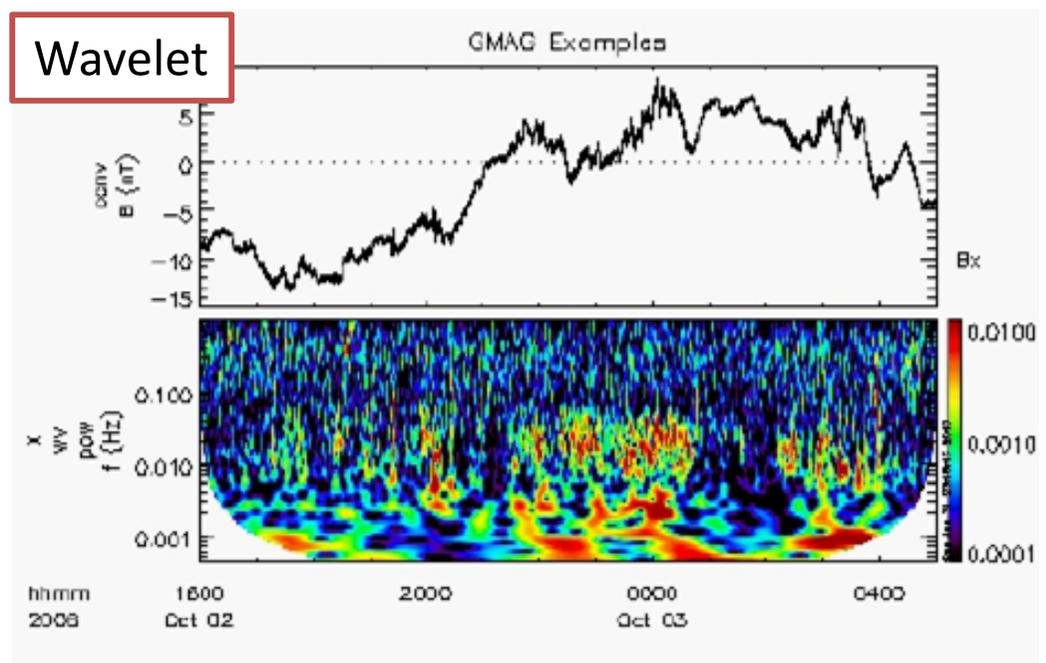
Mapping



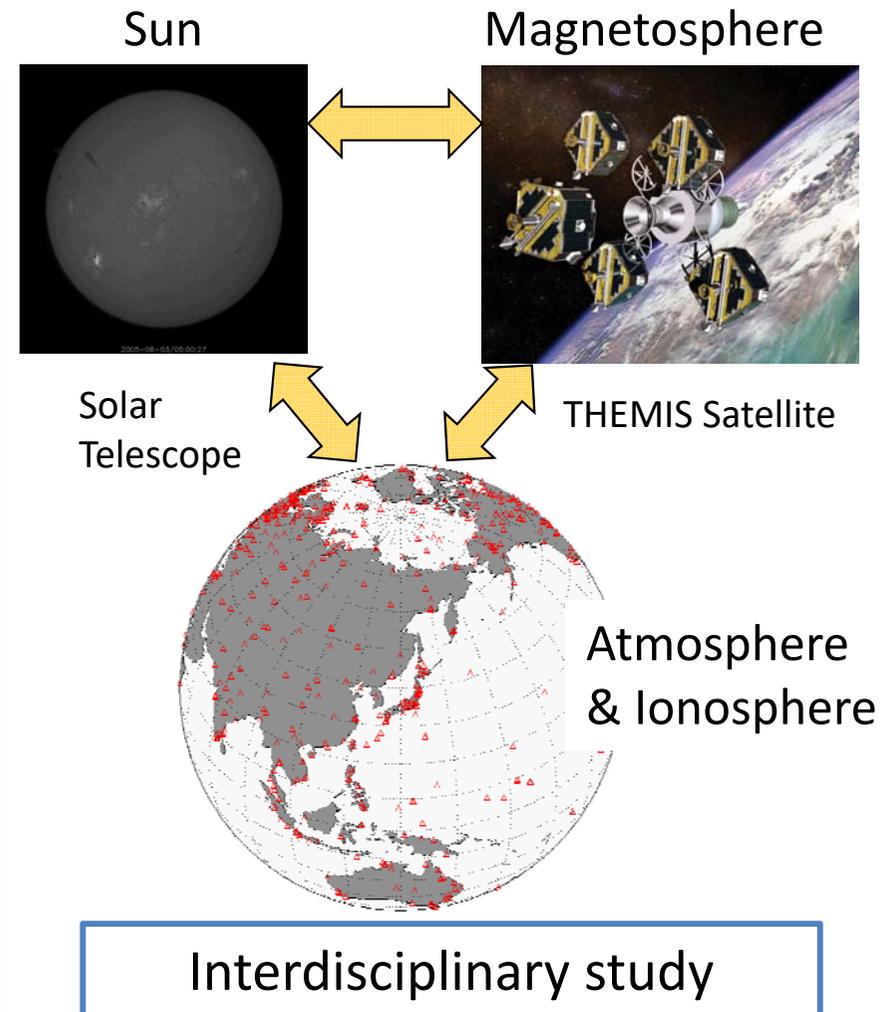
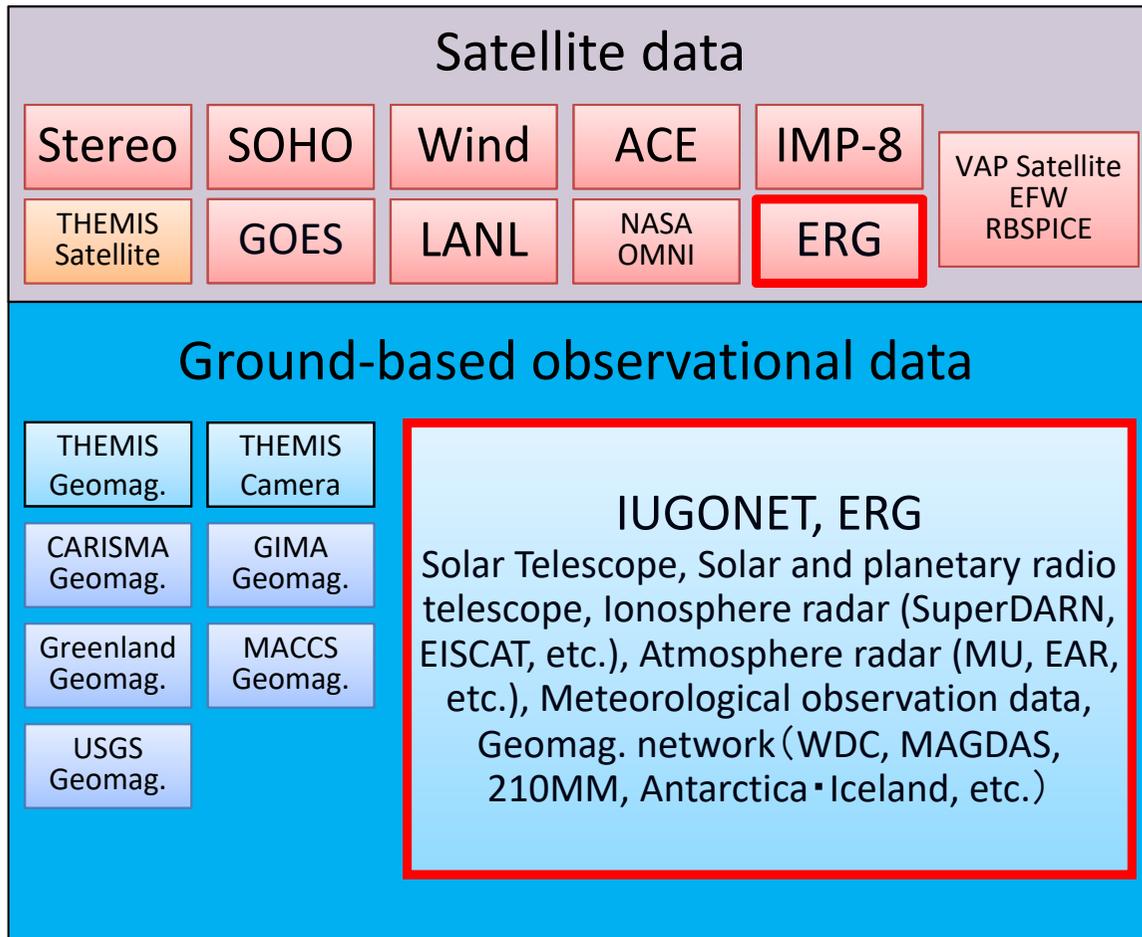
Correlation



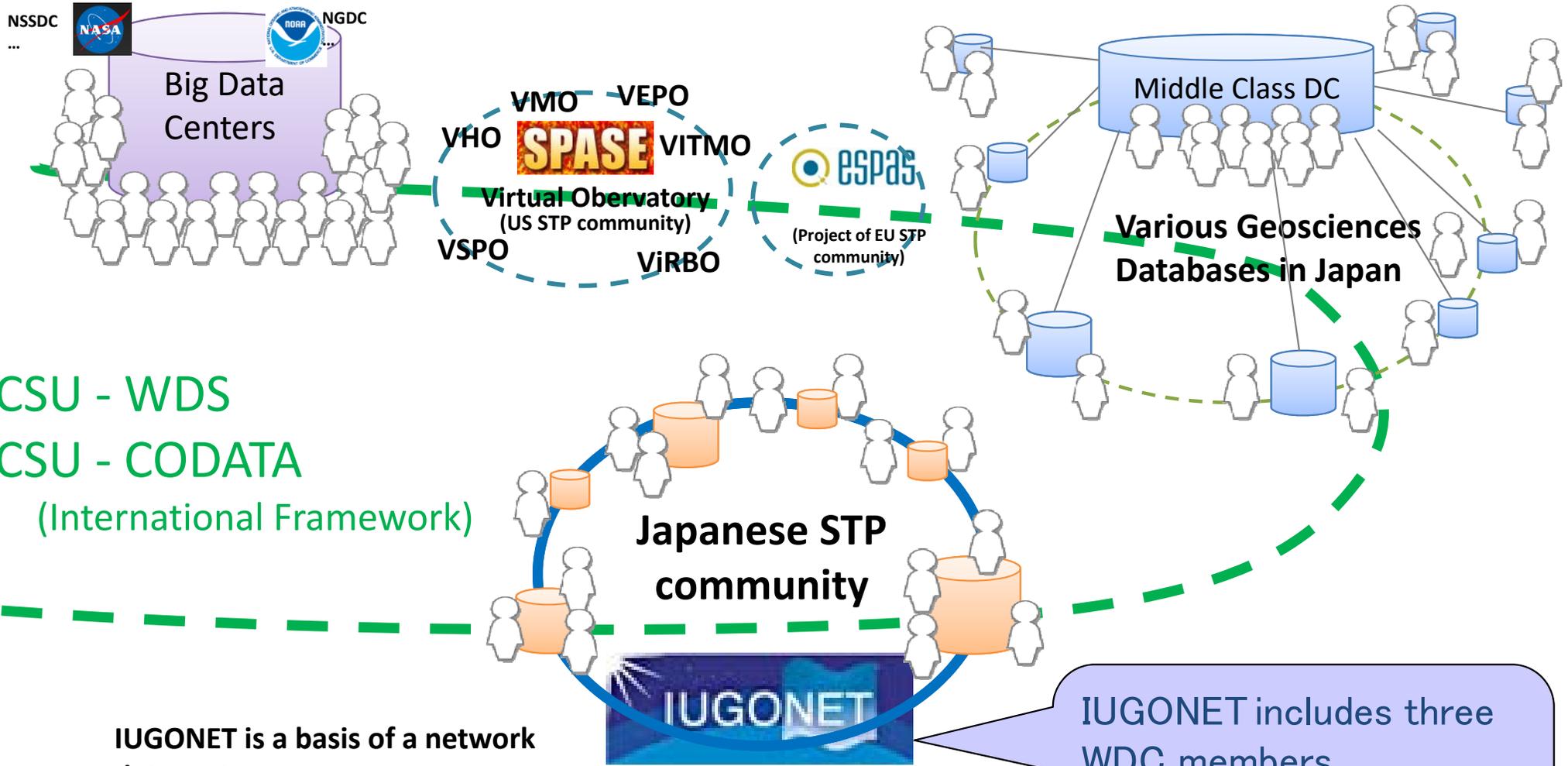
Wavelet



Data supported by SPEDAS



- ✓ 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.



ICSU - WDS
 ICNU - CODATA
 (International Framework)

IUGONET is a basis of a network datacenter

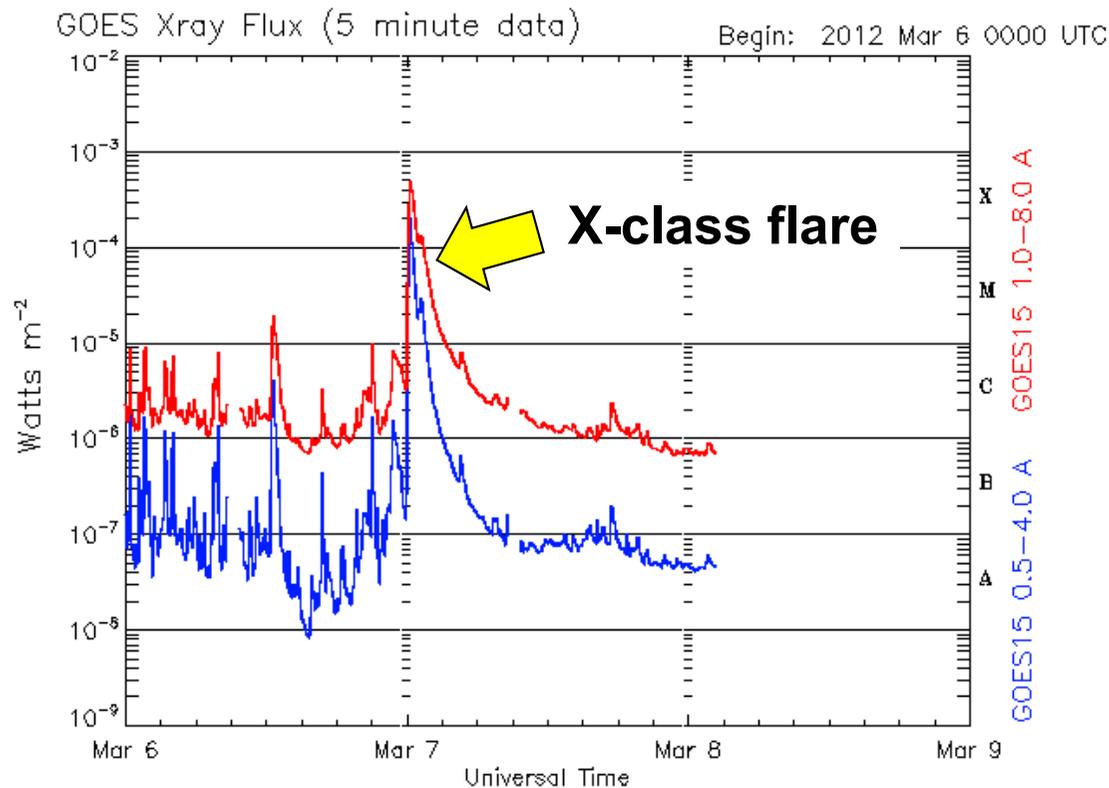
-> Functioning like a big data center efficiently

IUGONET includes three WDC members

- NIPR(Aurora)
- Kyoto Uni(Geomagnetism)
- STEL(Cosmic Ray) In progress

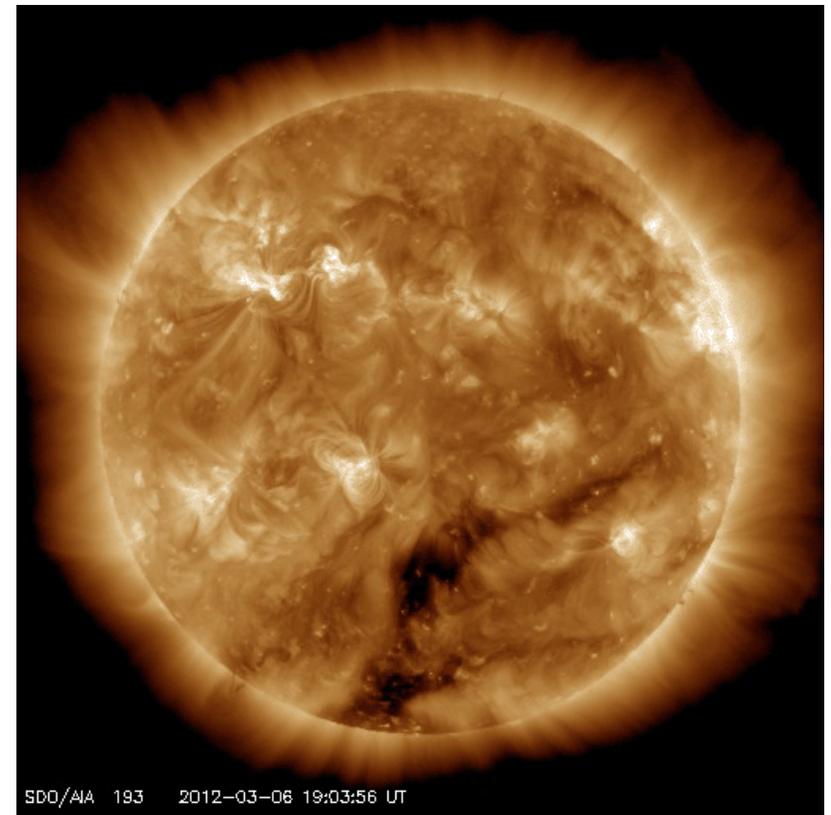
Geomagnetic storms followed by X-class flares and coronal mass ejections (CMEs) occurred on March 5-11, 2012.

GOES X-ray flux



Updated 2012 Mar 8 02:30:12 UTC

NOAA/SWPC Boulder, CO USA

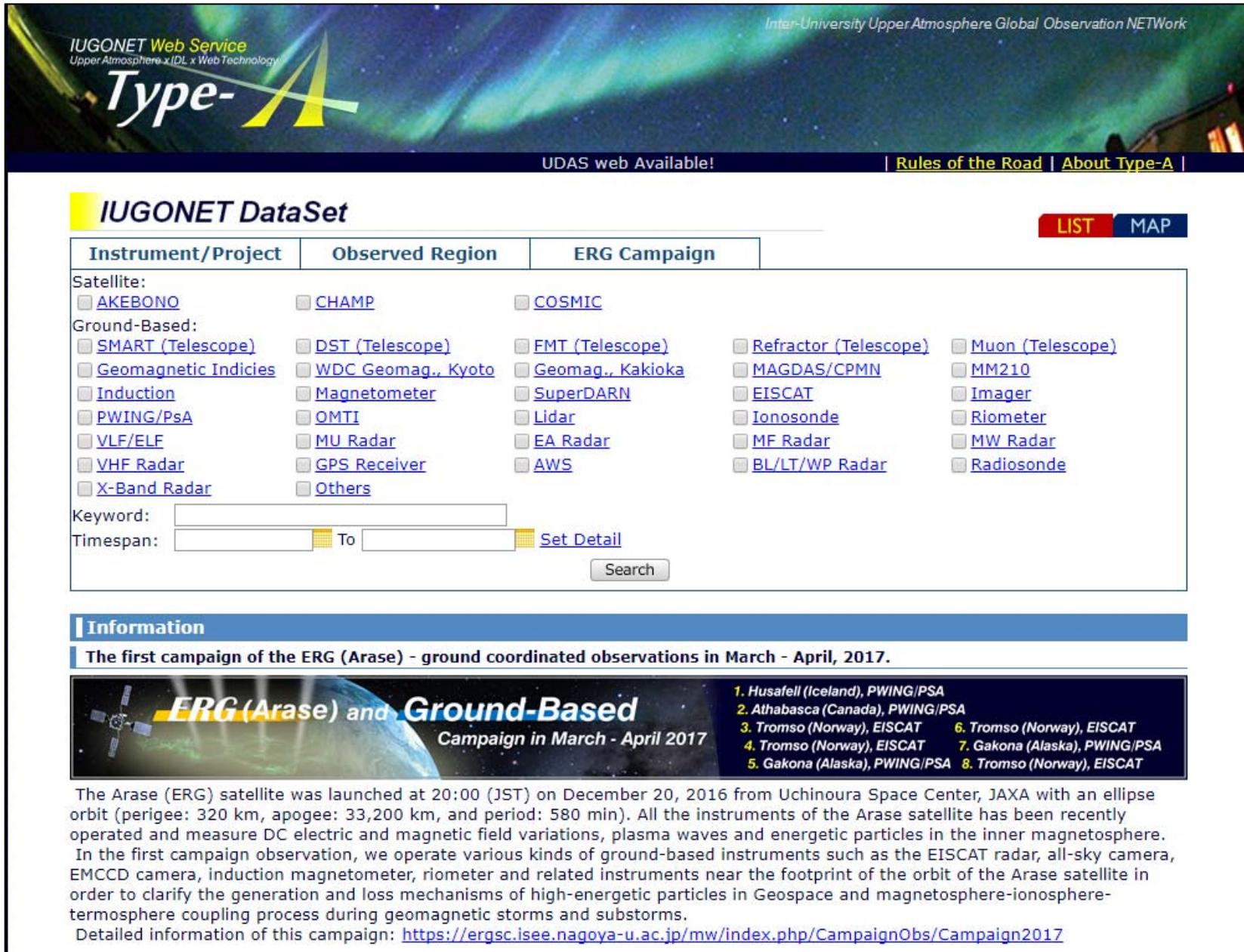


From Space Weather News
<http://swnews.jp/>



Introduction of IUGONET Type-A

1. Access to IUGONET Type-A (<http://search.iugonet.org/>)



IUGONET Web Service
Upper Atmosphere x IDL x Web Technology

Inter-University Upper Atmosphere Global Observation NETWORK

UDAS web Available! | [Rules of the Road](#) | [About Type-A](#)

IUGONET DataSet

[LIST](#) [MAP](#)

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<input type="checkbox"/> Geomagnetic Indices	<input type="checkbox"/> WDC Geomag., Kyoto	<input type="checkbox"/> Geomag., Kakioka	<input type="checkbox"/> MAGDAS/CPMN	<input type="checkbox"/> MM210
<input type="checkbox"/> Induction	<input type="checkbox"/> Magnetometer	<input type="checkbox"/> SuperDARN	<input type="checkbox"/> EISCAT	<input type="checkbox"/> Imager
<input type="checkbox"/> PWING/PsA	<input type="checkbox"/> OMTI	<input type="checkbox"/> Lidar	<input type="checkbox"/> Ionosonde	<input type="checkbox"/> Riometer
<input type="checkbox"/> VLF/ELF	<input type="checkbox"/> MU Radar	<input type="checkbox"/> EA Radar	<input type="checkbox"/> MF Radar	<input type="checkbox"/> MW Radar
<input type="checkbox"/> VHF Radar	<input type="checkbox"/> GPS Receiver	<input type="checkbox"/> AWS	<input type="checkbox"/> BL/LT/WP Radar	<input type="checkbox"/> Radiosonde
<input type="checkbox"/> X-Band Radar	<input type="checkbox"/> Others			

Keyword:

Timespan: To [Set Detail](#)

Information

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

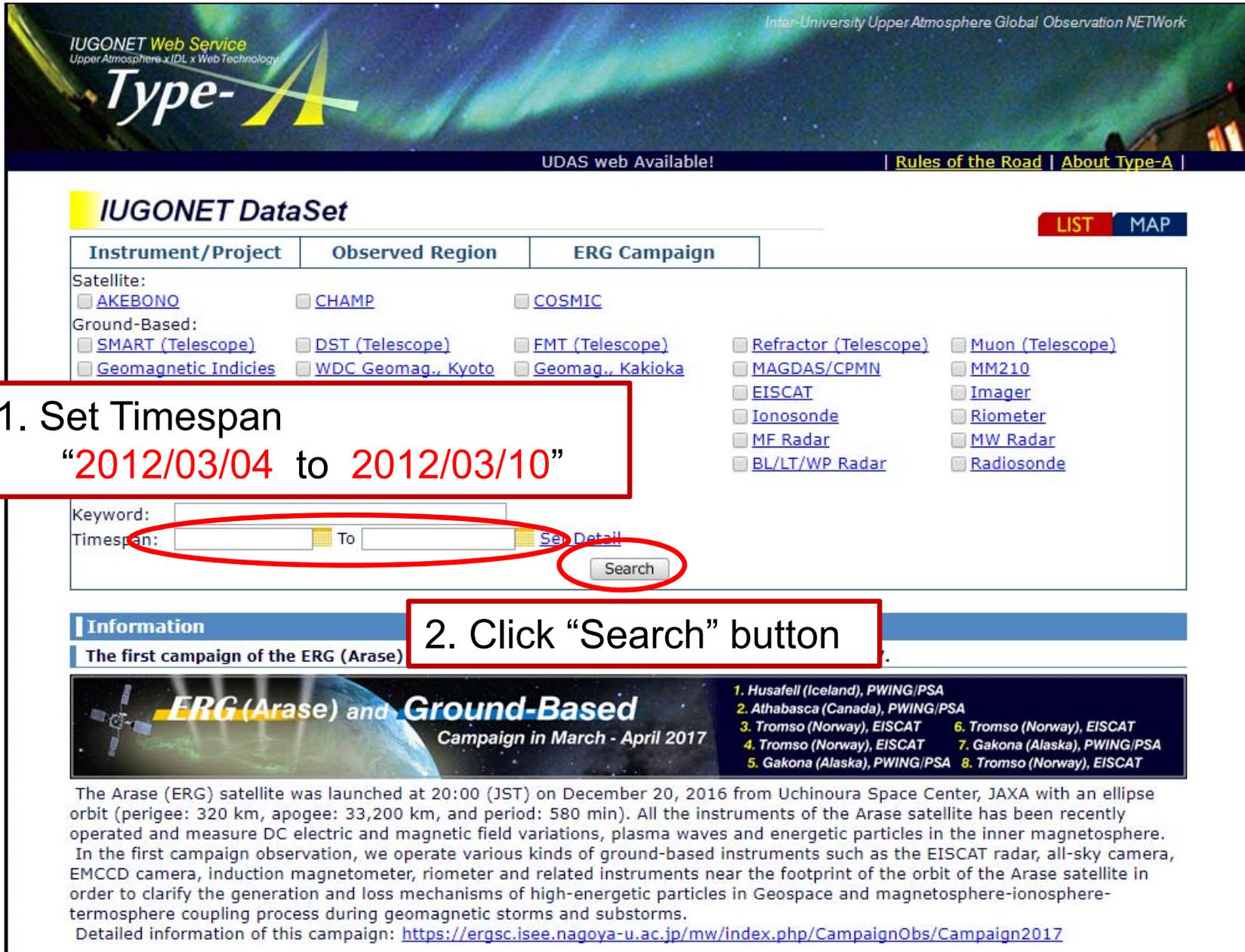


- 1. Husafell (Iceland), PWING/PSA
- 2. Athabasca (Canada), PWING/PSA
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- 4. Tromso (Norway), EISCAT
- 5. Gakona (Alaska), PWING/PSA
- 6. Tromso (Norway), EISCAT
- 7. Gakona (Alaska), PWING/PSA
- 8. Tromso (Norway), EISCAT

The Arase (ERG) satellite was launched at 20:00 (JST) on December 20, 2016 from Uchinoura Space Center, JAXA with an ellipse orbit (perigee: 320 km, apogee: 33,200 km, and period: 580 min). All the instruments of the Arase satellite has been recently operated 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-energetic particles in Geospace and magnetosphere-ionosphere-thermosphere coupling process during geomagnetic storms and substorms.

Detailed information of this campaign: <https://ergsc.isee.nagoya-u.ac.jp/mw/index.php/CampaignObs/Campaign2017>

Search Data



IUGONET Web Service
Upper Atmosphere x DL x Web Technology
Type-A
Inter-University Upper Atmosphere Global Observation Network

UDAS web Available! | [Rules of the Road](#) | [About Type-A](#)

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<input type="checkbox"/> MAGDAS/CPMN	<input type="checkbox"/> MM210	
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<input type="checkbox"/> BL/LT/WP Radar	<input type="checkbox"/> Radiosonde	

1. Set Timespan
"2012/03/04 to 2012/03/10"

Keyword:

Timespan: To [See Detail](#)

2. Click "Search" button

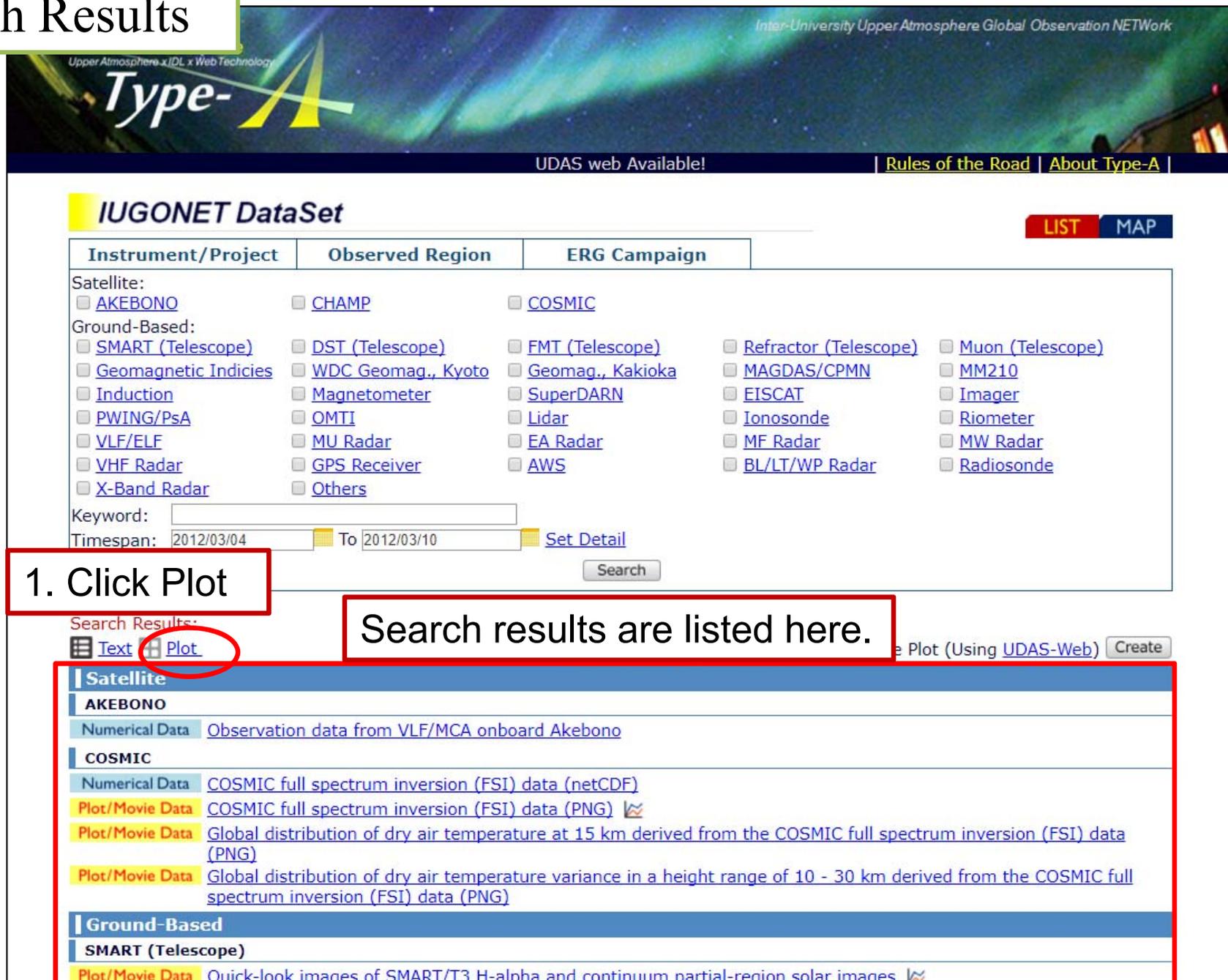
Information
The first campaign of the ERG (Arase)

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

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- Athabasca (Canada), PWING/PSA
- Tromso (Norway), EISCAT
- Tromso (Norway), EISCAT
- Gakona (Alaska), PWING/PSA
- Tromso (Norway), EISCAT
- Gakona (Alaska), PWING/PSA
- Tromso (Norway), EISCAT

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Search Results



Upper Atmosphere xIDL x Web Technology

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<input type="checkbox"/> VLF/ELF	<input type="checkbox"/> MU Radar	<input type="checkbox"/> EA Radar
<input type="checkbox"/> VHF Radar	<input type="checkbox"/> GPS Receiver	<input type="checkbox"/> AWS
<input type="checkbox"/> X-Band Radar	<input type="checkbox"/> Others	

Keyword:

Timespan: To [Set Detail](#)

1. Click Plot

Search results are listed here.

Search Results:

[Plot \(Using UDAS-Web\)](#)

- Satellite**
- AKEBONO**
- Numerical Data [Observation data from VLF/MCA onboard Akebono](#)
- COSMIC**
- Numerical Data [COSMIC full spectrum inversion \(FSI\) data \(netCDF\)](#)
- Plot/Movie Data [COSMIC full spectrum inversion \(FSI\) data \(PNG\)](#)
- Plot/Movie Data [Global distribution of dry air temperature at 15 km derived from the COSMIC full spectrum inversion \(FSI\) data \(PNG\)](#)
- Plot/Movie Data [Global distribution of dry air temperature variance in a height range of 10 - 30 km derived from the COSMIC full spectrum inversion \(FSI\) data \(PNG\)](#)
- Ground-Based**
- SMART (Telescope)**
- Plot/Movie Data [Quick-look images of SMART/T3 H-alpha and continuum partial-region solar images](#)

Search Results

Search results are displayed with QL plots

Search Results:

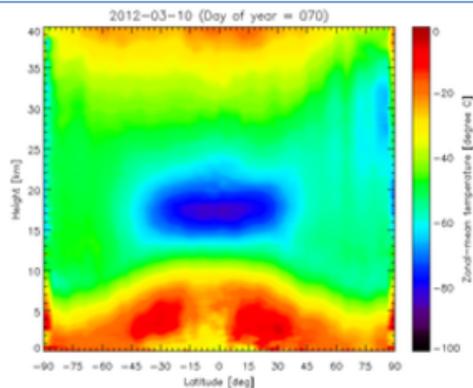
: Contains Summary Plot : Create Plot (Using [UDAS-Web](#)) [Create](#)

[Text](#) [Plot](#)

[<Prev](#) Numerical: 2012/03/04 00:00:00 - 2012/03/11 00:00:00, Plot/Movie: 2012/03/10, Timespan: [1](#), [3](#), [7](#) [Next](#)

Satellite

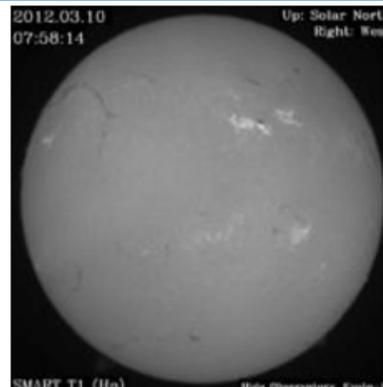
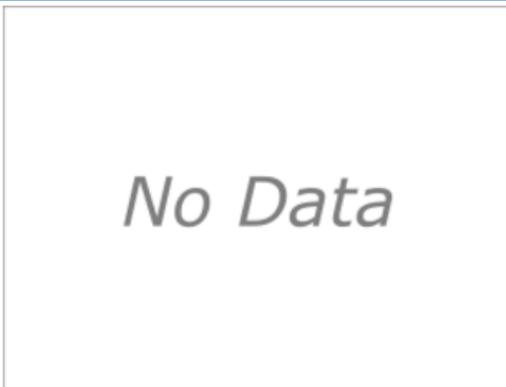
COSMIC



[Plot/Movie Data](#) [COSMIC full spectrum inversion \(FSI\) data \(PNG\)](#)

Ground-Based

SMART (Telescope)



[Plot/Movie Data](#) [Quick-look images of SMART/T3 H-alpha and continuum partial-region solar images](#)

[Plot/Movie Data](#) [SMART/T1 H-alpha full-disk solar images in JPEG format](#)

You can select a time interval from 1, 3, or 7 days for time-series data. If you select 7-days, data from 2012/03/04 to 2012/03/10 are displayed.

Images on the last day of the selected interval are displayed (i.e., 2012/03/10 in this case)



Scroll down

Search Results

Geomagnetic Indices

1. Click Dst index provisional

Geomagnetic Indices

[Numerical Data](#) [Geomagnetic Auroral Electrojet Index Provisional AE](#)

[Numerical Data](#) [Geomagnetic Equatorial Dst Index Provisional](#)

[Numerical Data](#) [Mit-latitude Geomagnetic Indices ASY and SYM](#)

MM210

[Numerical Data](#) [MM210 Kagoshima magnetometer 1 min resolution data distributed by ERG-SC](#)

[Numerical Data](#) [MM210 Kototabang magnetometer 1 min resolution data distributed by ERG-SC](#)

[Numerical Data](#) [MM210 Moshiri magnetometer 1 min resolution data distributed by ERG-SC](#)

Data Information
(Metadata)

QL plot of Dst index

Set date
(this is the last day of the interval)



Data Information (Metadata)

<p>Description: The geomagnetic equatorial Dst index at 1-hr time resolution, derived at World Data Center for Geomagnetism, Kyoto University. The provisional Dst index is calculated from geomagnetic field data which were visually</p>	Acknowledgement
<p>Acknowledgement: If the data are used in publications and presentations, the data suppliers and the WDC for Geomagnetism, Kyoto must properly be acknowledged.</p>	
<p>ReleaseDate: 2011-02-17T08:00:00</p>	Contact Person
<p>Contact (GeneralContact): Toshihiko Iyemori, Data Analysis Center for Geomagnetism and Space Magnetism, Graduate School of Science, Kyoto University / World Data Center (WDC) for Geomagnetism, Kyoto, iyemori@kugi.kyoto-u.ac.jp</p>	
<p>Contact (GeneralContact): Masahito Nose', Data Analysis Center for Geomagnetism and Space Magnetism, Graduate School of Science, Kyoto University / World Data Center (WDC) for Geomagnetism, Kyoto, nose@kugi.kyoto-u.ac.jp</p>	
<p>AccessInformation: Acknowledgement: If the data are used in publications and presentations, the data suppliers and the WDC for Geomagnetism, Kyoto must properly be acknowledged. URL: http://wdc.kugi.kyoto-u.ac.jp/wdc/Sec3.html Availability: Online Access Rights: Open Format: Text</p>	
<p>Processing Level: Calibrated Measurement Type: ActivityIndex</p>	Access Information
<p>Time Span: StartDate: 2012-01-01T00:00:00 StopDate: 2015-03-31T00:00:00</p>	



“How to plot” section shows how to plot the data by the dedicated software “IDL/SPEDAS”.

How to Plot (SPEDAS-CUI #Basic):

```
IDL> thm_init
THEMIS> timespan, ['2012-03-04 00:00:00', '2012-03-11 00:00:00']
THEMIS> iug_load_gmag_wdc, site='dst', level='provisional'
THEMIS> tplot, 'wdc_mag_dst_prov'
```

CUI #Basic: SPEDAS commands minimally required to plot the data

How to Plot (SPEDAS-CUI #Advanced [*Quick-Look was created with this command])

```
IDL> thm_init
THEMIS> timespan, ['2012-03-04 00:00:00', '2012-03-11 00:00:00']
THEMIS> iug_load_gmag_wdc, site='dst', level='provisional'
THEMIS> ylim, 'wdc_mag_dst_prov', -500, 100
THEMIS> tplot, 'wdc_mag_dst_prov'
```

CUI #Advanced: SPEDAS commands used to create QL plot in the metadata display page.

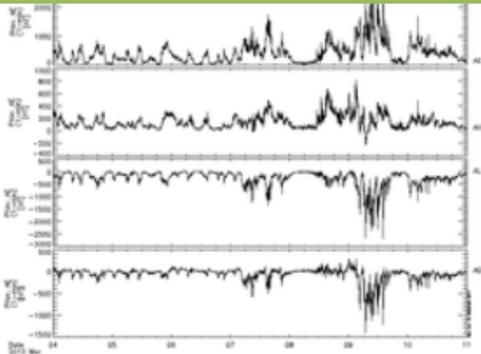
How to Plot (SPEDAS-GUI):

- Step 1: Start SPEDAS GUI Program.
- Step 2: Choose [FILE] -> [Load Data].
- Step 3: Choose [IUGONET] Tab.
- Step 4: Uncheck 'Use Single Day'.
- Step 5: Set Start Time: '2012-03-04 00:00:00' and Stop Time: '2012-03-11 00:00:00'.
- Step 6: Choose Instrument Type: 'geomagnetic_field_index'.
- Step 7: Choose Data Type: 'Dst_index', Site or parameter(s)-1: 'WDC_kyoto' and parameter(s)-2: 'prov'.
- Step 8: Push [->] button. (Please wait a few minutes).
- Step 9: Push [Done] button.
- Step 10: Choose [Graph] -> [Plot Layout Options].
- Step 11: Choose 'wdc_mag_dst_prov' and push [Line->] button.
- Step 12: Push [OK] button.

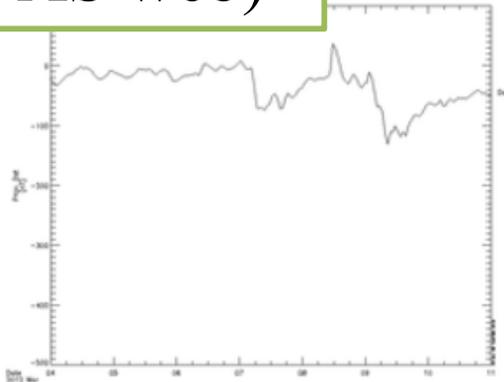
GUI: How to plot the data with SPEDAS-GUI.

You can plot Dst index with the SPEDAS-GUI tool according to this instruction.

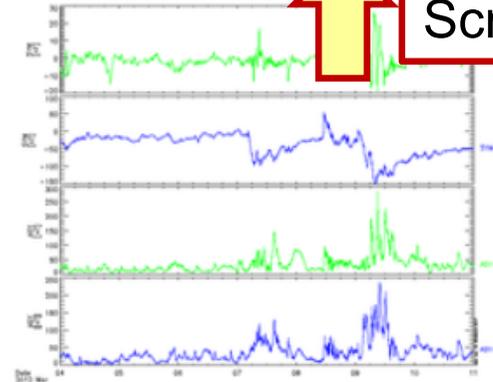
Interactive data plot (UDAS web)



Numerical Data [Geomagnetic Auroral Electrojet Index Provisional AE](#)



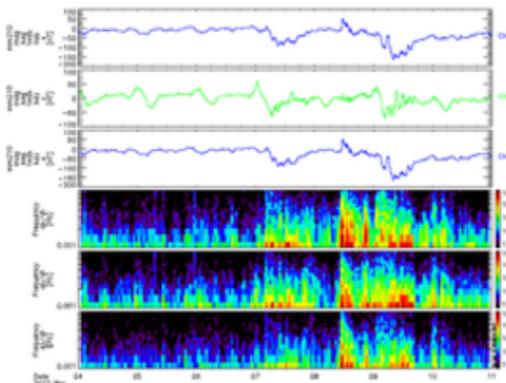
Numerical Data [Geomagnetic Equatorial Dst Index Provisional](#)



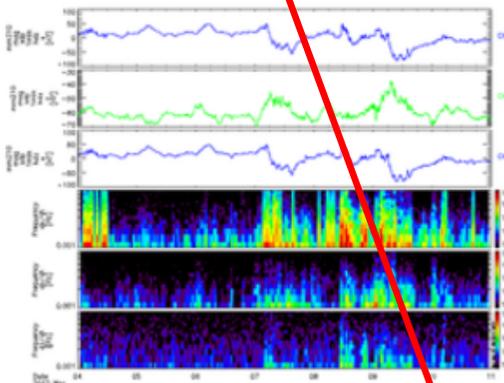
Numerical Data [Mit-latitude Geomagnetic Indices ASY and SYM](#)



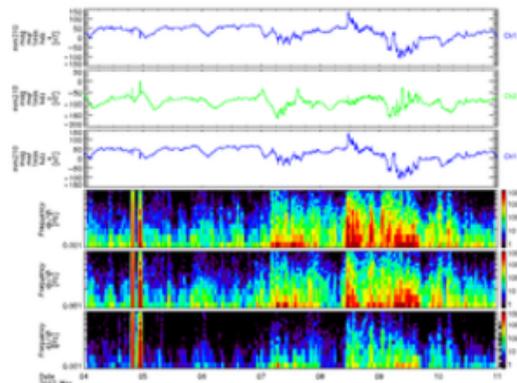
MM210



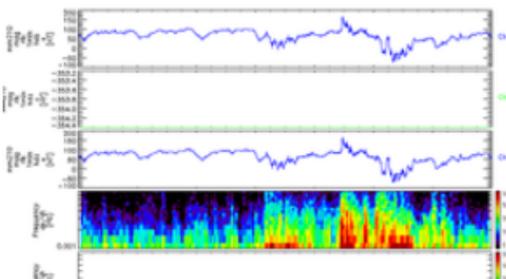
Numerical Data [MM210 Kagoshima magnetometer 1 min resolution data distributed by ERG-SC](#)



Numerical Data [MM210 Kototabang magnetometer 1 min resolution data distributed by ERG-SC](#)



Numerical Data [MM210 Moshiri magnetometer 1 min resolution data distributed by ERG-SC](#)



Check the checkboxes.
You can select 3 data at most.

Interactive data plot (UDAS web)

The screenshot shows the IUGONET Type-A web interface. At the top, there is a banner with the IUGONET logo and the text "Inter-University Upper Atmosphere Global Observation NETWORK". Below the banner, there are navigation links: "UDAS web Available!", "Rules of the Road", and "About Type-A".

The main content area is titled "IUGONET DataSet" and includes a "LIST" button and a "MAP" button. Below this is a search interface with a table of instrument/project categories:

Instrument/Project	Observed Region	ERG Campaign		
Satellite: <input type="checkbox"/> AKEBONO	<input type="checkbox"/> CHAMP	<input type="checkbox"/> COSMIC		
Ground-Based: <input type="checkbox"/> SMART (Telescope)	<input type="checkbox"/> DST (Telescope)	<input type="checkbox"/> FMT (Telescope)	<input type="checkbox"/> Refractor (Telescope)	<input type="checkbox"/> Muon (Telescope)
<input type="checkbox"/> Geomagnetic Indices	<input type="checkbox"/> WDC Geomag., Kyoto	<input type="checkbox"/> Geomag., Kakioka	<input type="checkbox"/> MAGDAS/CPMN	<input type="checkbox"/> MM210
<input type="checkbox"/> Induction	<input type="checkbox"/> Magnetometer	<input type="checkbox"/> SuperDARN	<input type="checkbox"/> EISCAT	<input type="checkbox"/> Imager
<input type="checkbox"/> PWING/PsA	<input type="checkbox"/> OMTI	<input type="checkbox"/> Lidar	<input type="checkbox"/> Ionosonde	<input type="checkbox"/> Riometer
<input type="checkbox"/> VLF/ELF	<input type="checkbox"/> MU Radar	<input type="checkbox"/> EA Radar	<input type="checkbox"/> MF Radar	<input type="checkbox"/> MW Radar
<input type="checkbox"/> VHF Radar	<input type="checkbox"/> GPS Receiver	<input type="checkbox"/> AWS	<input type="checkbox"/> BL/LT/WP Radar	<input type="checkbox"/> Radiosonde
<input type="checkbox"/> X-Band Radar	<input type="checkbox"/> Others			

Below the table, there is a "Keyword:" field and a "Timespan:" field with a date range from 2012/03/04 to 2012/03/10. A "Search" button is located below the timespan field.

The search results section shows "Search Results:" with a "Text" button and a "Plot" button. A red arrow points to the "Create" button next to the "Create Plot (Using UDAS-Web)" option. The search results include: "<Prev Numerical: 2012/03/04 00:00:00 - 2012/03/11 00:00:00, Plot/Movie: 2012/03/10, Timespan: 1, 3, 7 Next>".

The plot section is titled "Satellite" and "COSMIC". It shows a temperature plot for the period "2012-03-10 (Day of year = 070)". The plot is a heatmap showing temperature in degrees Celsius on the y-axis (ranging from 20 to 40) and height in km on the x-axis (ranging from 0 to 40). A color scale on the right indicates temperature values from 0 to -40.

Click Create button

Interactive data plot (UDAS web)

UDAS web

Step.1: Set Time Range

From: 2012 ▾ 03 ▾ 04 ▾ 00 ▾ 00 ▾ 00 ▾
 To: 2012 ▾ 03 ▾ 11 ▾ 00 ▾ 00 ▾ 00 ▾

Step.2: Choose Variables to Plot

Numerical Data [MM210 Kagoshima magnetometer 1 min resolution data distributed by ERG-SC](#)

- mm210_mag_kag_1min_hdz_x (North-South magnetic field at Kagoshima)
- mm210_mag_kag_1min_hdz_y (East-West magnetic field at Kagoshima)
- mm210_mag_kag_1min_hdz_z (Vertical magnetic field at Kagoshima)
- mm210_mag_kag_1min_hdz_x_dpwrspc (Dynamic power spectrum of North-South magnetic field at Kagoshima)
- mm210_mag_kag_1min_hdz_y_dpwrspc (Dynamic power spectrum of East-West magnetic field at Kagoshima)
- mm210_mag_kag_1min_hdz_z_dpwrspc (Dynamic power spectrum of Vertical magnetic field at Kagoshima)

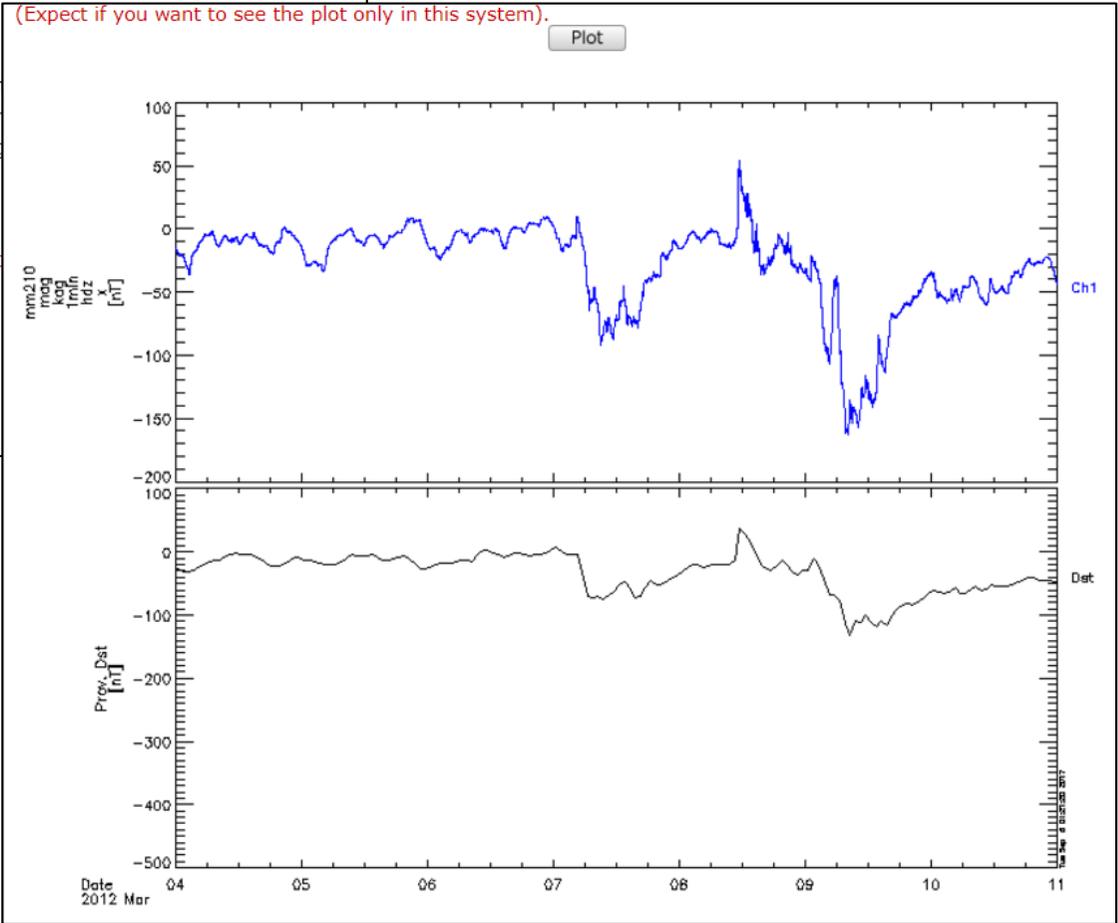
Numerical Data [Geomagnetic Equatorial Dst Index Provisional](#)

- wdc_mag_dst_prov (Disturbance storm time (Dst) index (provisional))

* At Least, one variable should be chosen.
 Attention: To create plot image requires some observational data, so read each acknowledgment.
 (Expect if you want to see the plot only in this system).

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 Copyright (c) 2009-2011 IUGONET

Select data that you want to plot, then click "Plot".





Installation of SPEDAS

Download of SPEDAS GUI tool

1. Access the THEMIS satellite software website

http://spedas.org/wiki/index.php?title=Downloads_and_Installation

2. Scroll down to “Download” section

If you don't have an IDL license

SPEDAS is free software but if you do not have an IDL license, then you cannot use the IDL command line, and hence neither the SPEDAS command line tools. You can still use the SPEDAS GUI, and you have two options:

1. Download the SPEDAS executable (for Linux, MacOS, or Windows), or
2. Download the SPEDAS save file (for Solaris or other operating systems).

Download SPEDAS 2.00 Executables (June 2017)

For users without IDL licenses, you can use the SPEDAS 2.00 executable files for Linux, Windows, and MacOS, which allow access to the Graphical User Interface capabilities of SPEDAS, with no additional IDL license required.

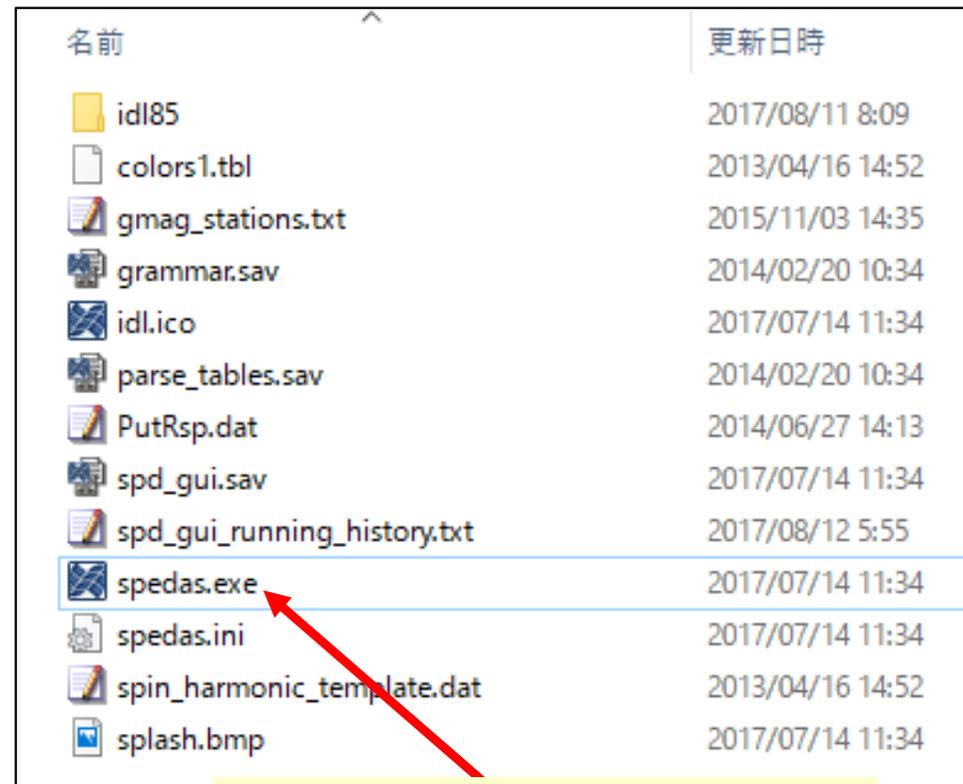
- * SPEDAS 2.00, Windows 64bit executable with IDL 8.5.1, CDF 3.6.4, Geopack 9.4 (~50 MB) [↗](#)
- * SPEDAS 2.00, MacOS 64bit executable with IDL 8.5.1, CDF 3.6.4, Geopack 9.4 (~65 MB) [↗](#)
- * SPEDAS 2.00, Linux 64bit executable with IDL 8.5.1, CDF 3.6.4, Geopack 9.4 (~65 MB) [↗](#)
- * SPEDAS 2.00, Linux 64bit executable with IDL 8.5.1, CDF 3.6.4, Geopack 7.6 (~65 MB) [↗](#)

This release contains everything you need, including the IDL VM, the Geopack DLM and the CDF DLM. You just have to unzip the file and run the executable and the SPEDAS GUI will appear.

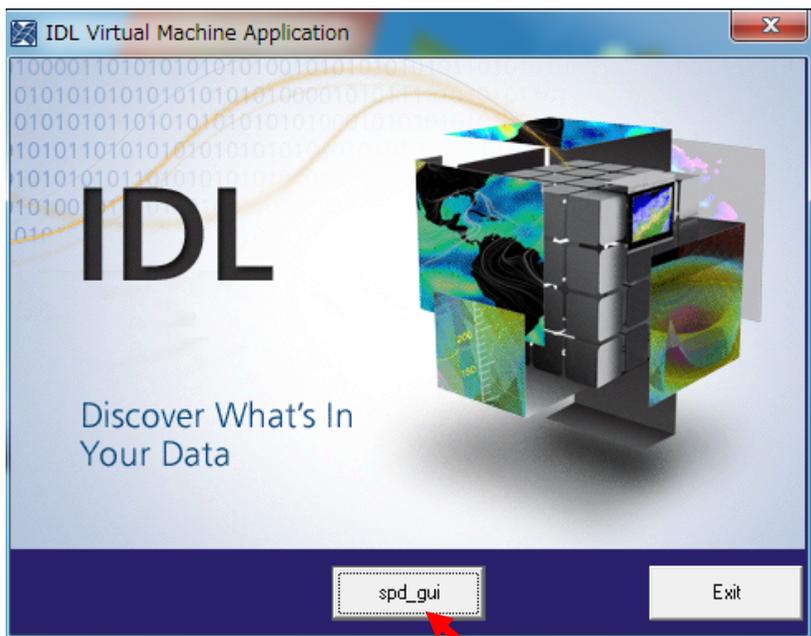
**Click the proper link for your OS.
The compressed executable file
will be downloaded in several
seconds or minutes.**



- [1] Unzip the downloaded zip file.
- [2] Double-click the executable file named 'spedas' in the directory 'spedas_v_2/spd_gui'.

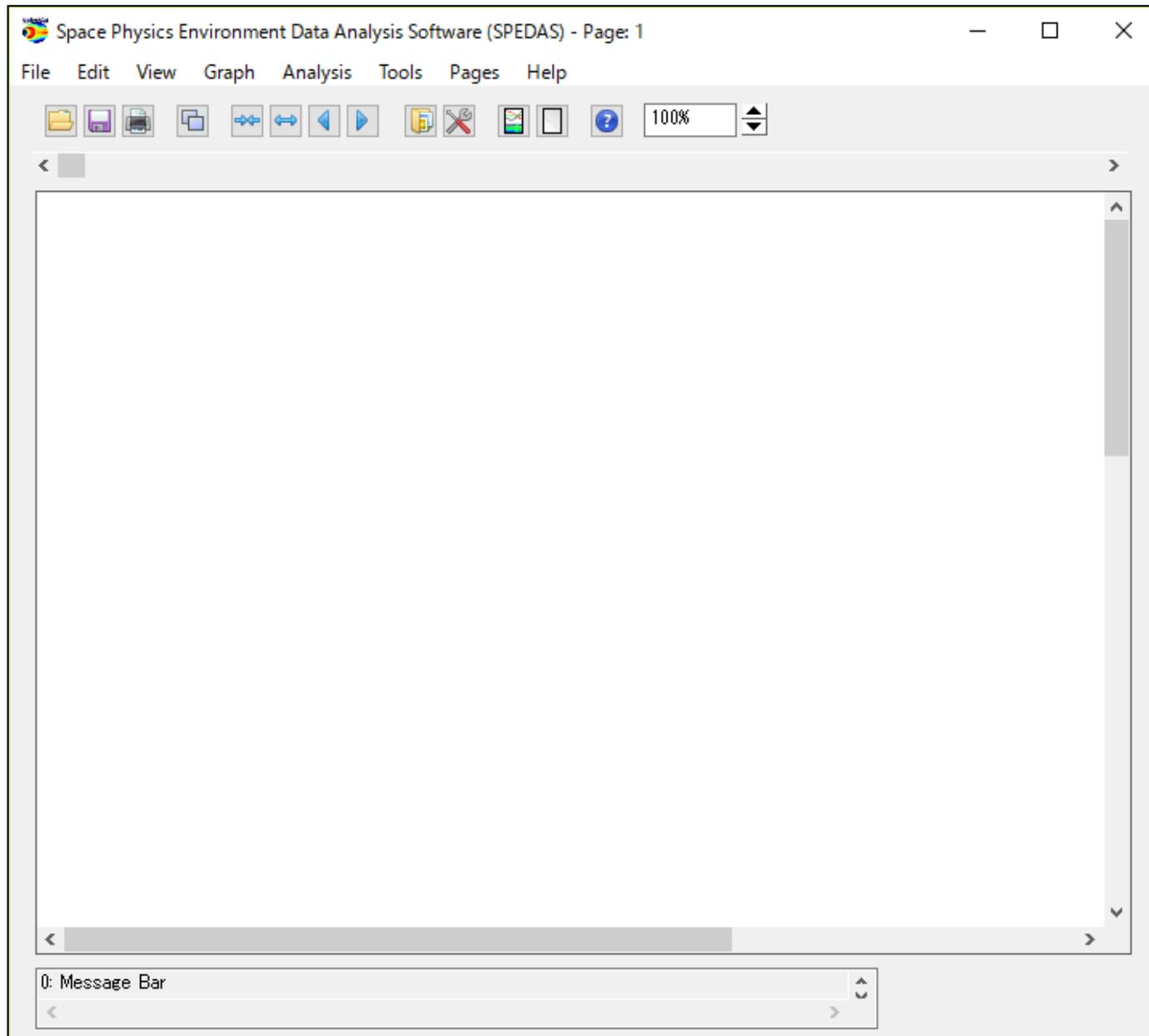


Double-click the executable file named 'spedas'



Click the icon 'spd_gui'.

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



Ready?



IUGONET

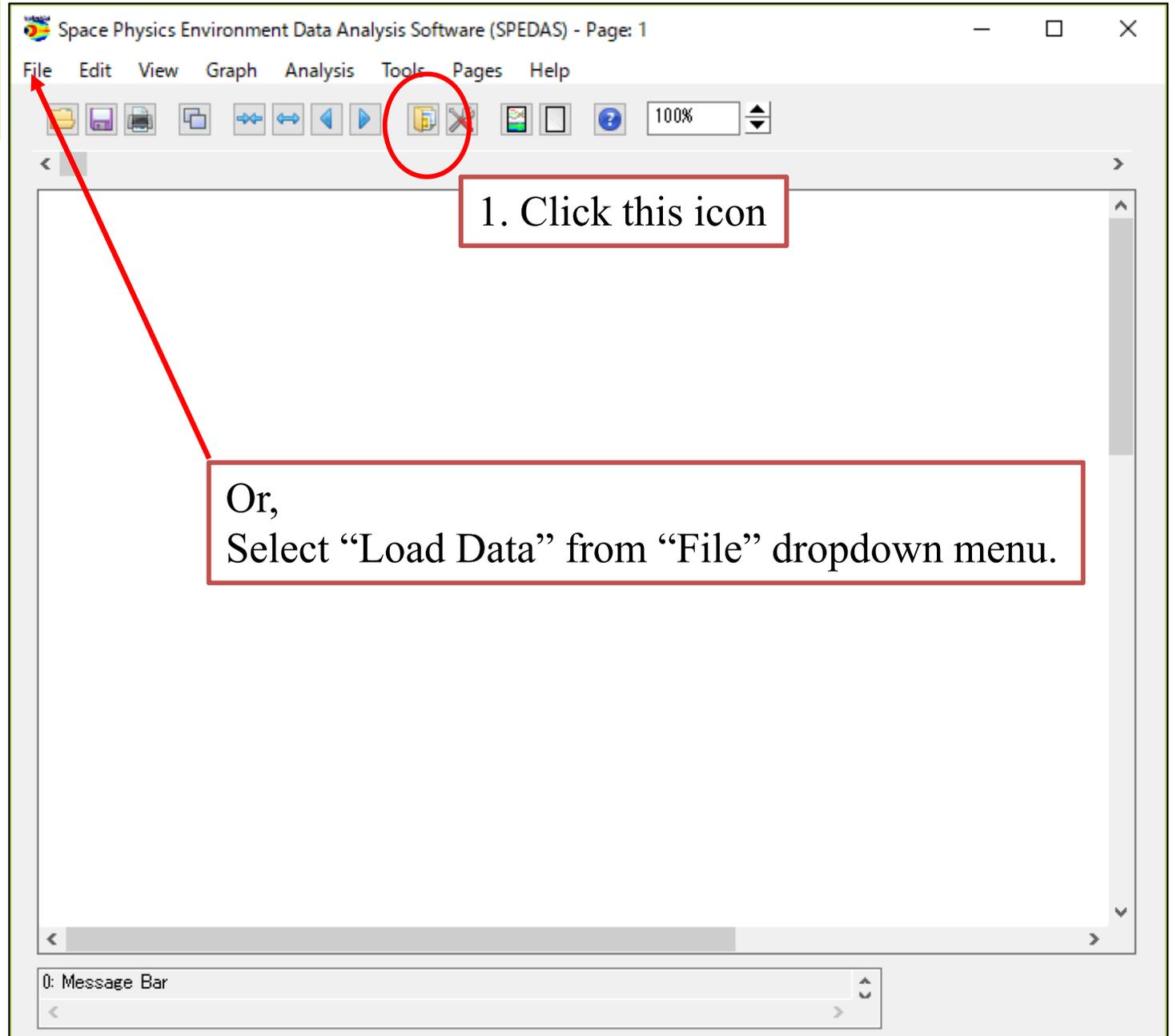
Metadata DB for Upper Atmosphere

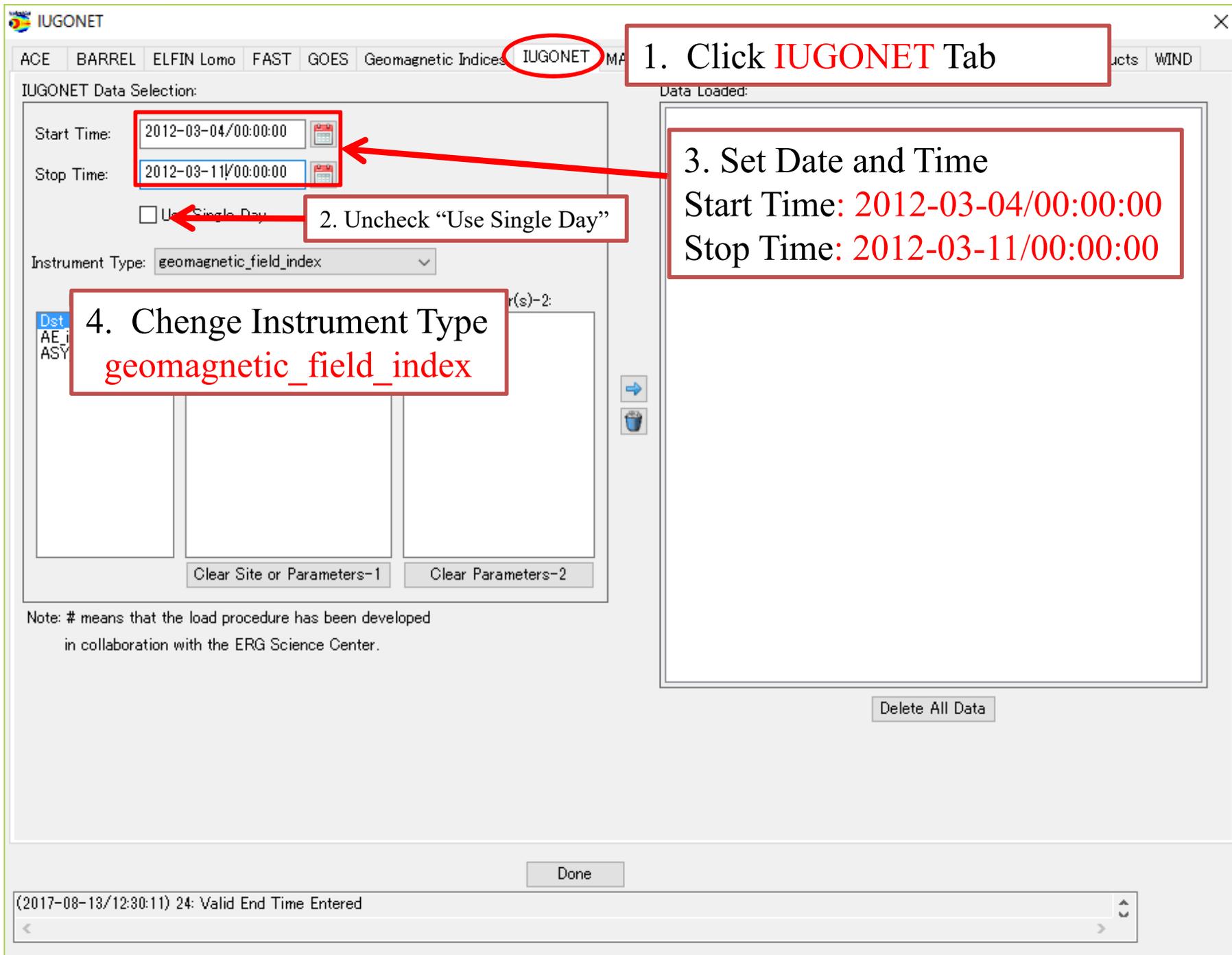
超高層大気長期変動の全地球上ネットワーク観測・研究
Inter-university Upper atmosphere Global Observation NETWORK

How to Use SPEDAS part 1

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

Lesson:
Load Dst index



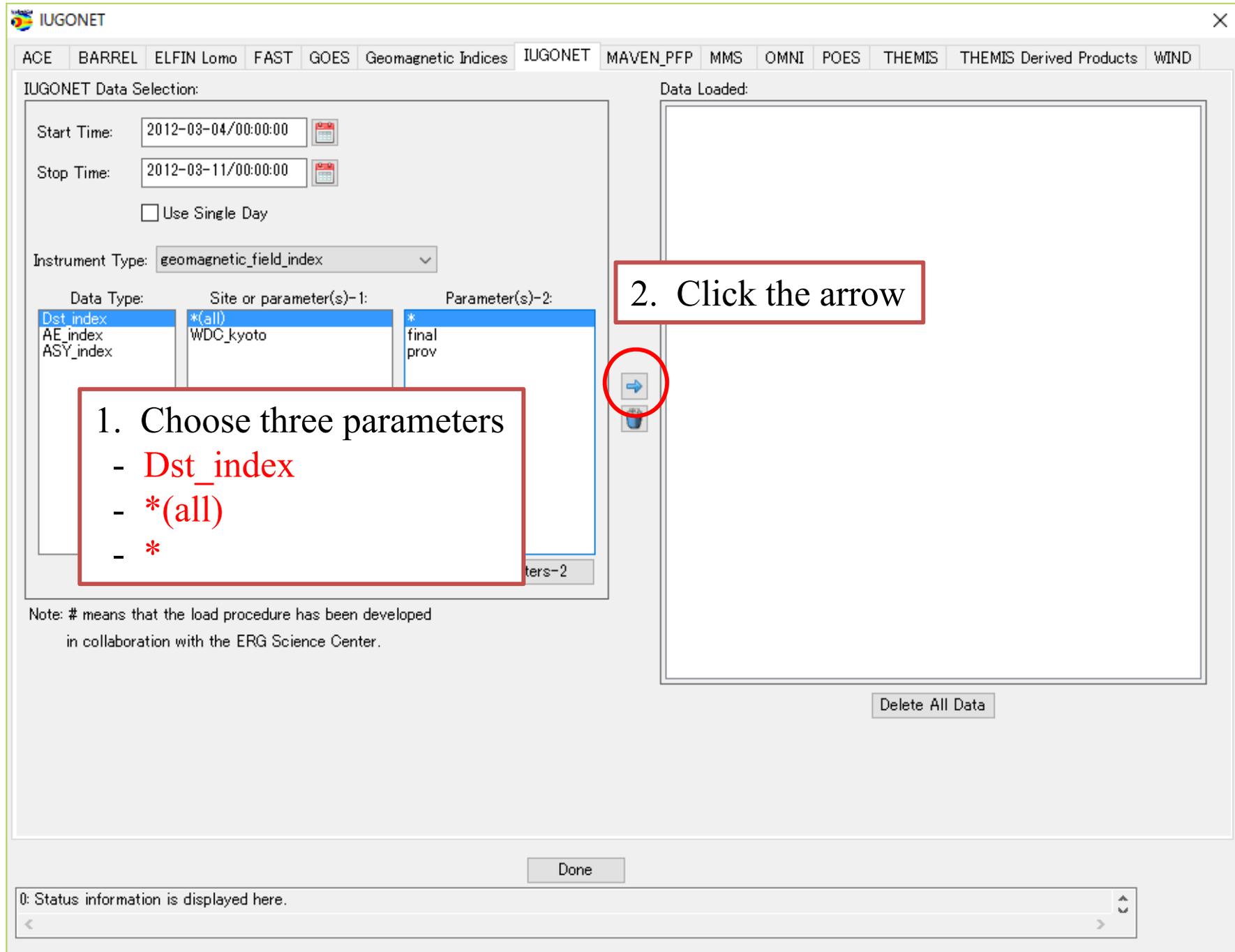


The screenshot shows the IUGONET GUI with several instructional callouts:

- 1. Click IUGONET Tab**: A red box highlights the 'IUGONET' tab in the top menu bar.
- 2. Uncheck "Use Single Day"**: A red box highlights the 'Use Single Day' checkbox, which is currently unchecked.
- 3. Set Date and Time**: A red box contains the text: 'Start Time: 2012-03-04/00:00:00' and 'Stop Time: 2012-03-11/00:00:00'. Red arrows point from this box to the date and time input fields in the 'IUGONET Data Selection' section.
- 4. Change Instrument Type**: A red box contains the text: 'geomagnetic_field_index'. A red arrow points from this box to the 'Instrument Type' dropdown menu.

The GUI interface includes the following elements:

- Top menu bar: ACE, BARREL, ELFIN Lomo, FAST, GOES, Geomagnetic Indices, **IUGONET**, MA
- Buttons: ucts, WIND
- Section: 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
- Buttons: Clear Site or Parameters-1, Clear Parameters-2
- Section: Data Loaded:
- Button: Delete All Data
- Bottom status bar: (2017-08-13/12:30:11) 24: Valid End Time Entered

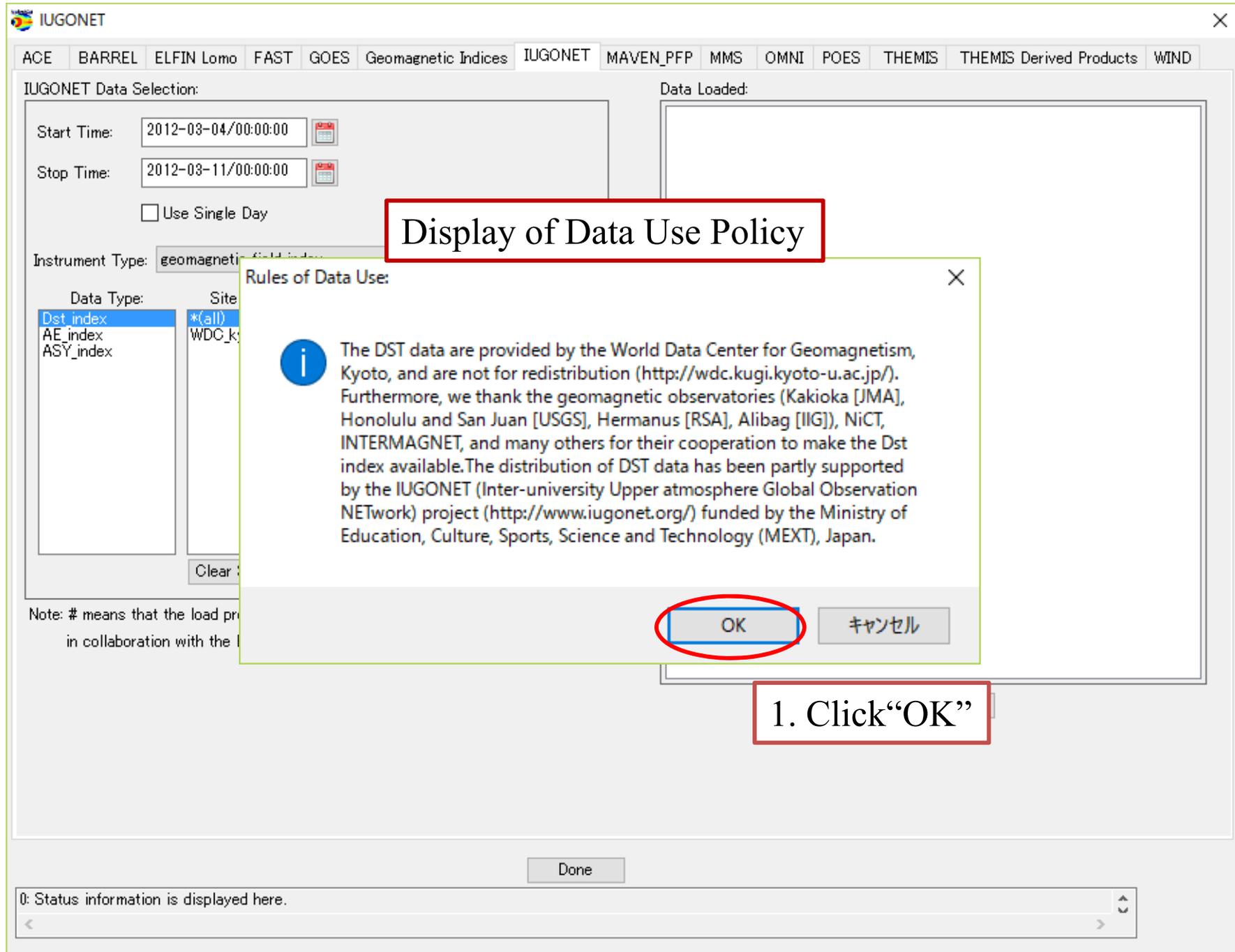


The screenshot shows the IUGONET GUI with the following elements:

- Menu Bar:** 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
- Data Loaded:** (Empty area)
- Buttons:** Done, Delete All Data
- Status Bar:** 0: Status information is displayed here.

Instructions:

1. Choose three parameters
 - Dst_index
 - *(all)
 - *
2. Click the arrow



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	*(all)
AE_index	WDC_ky
ASY_index	

Clear

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

0: Status information is displayed here.

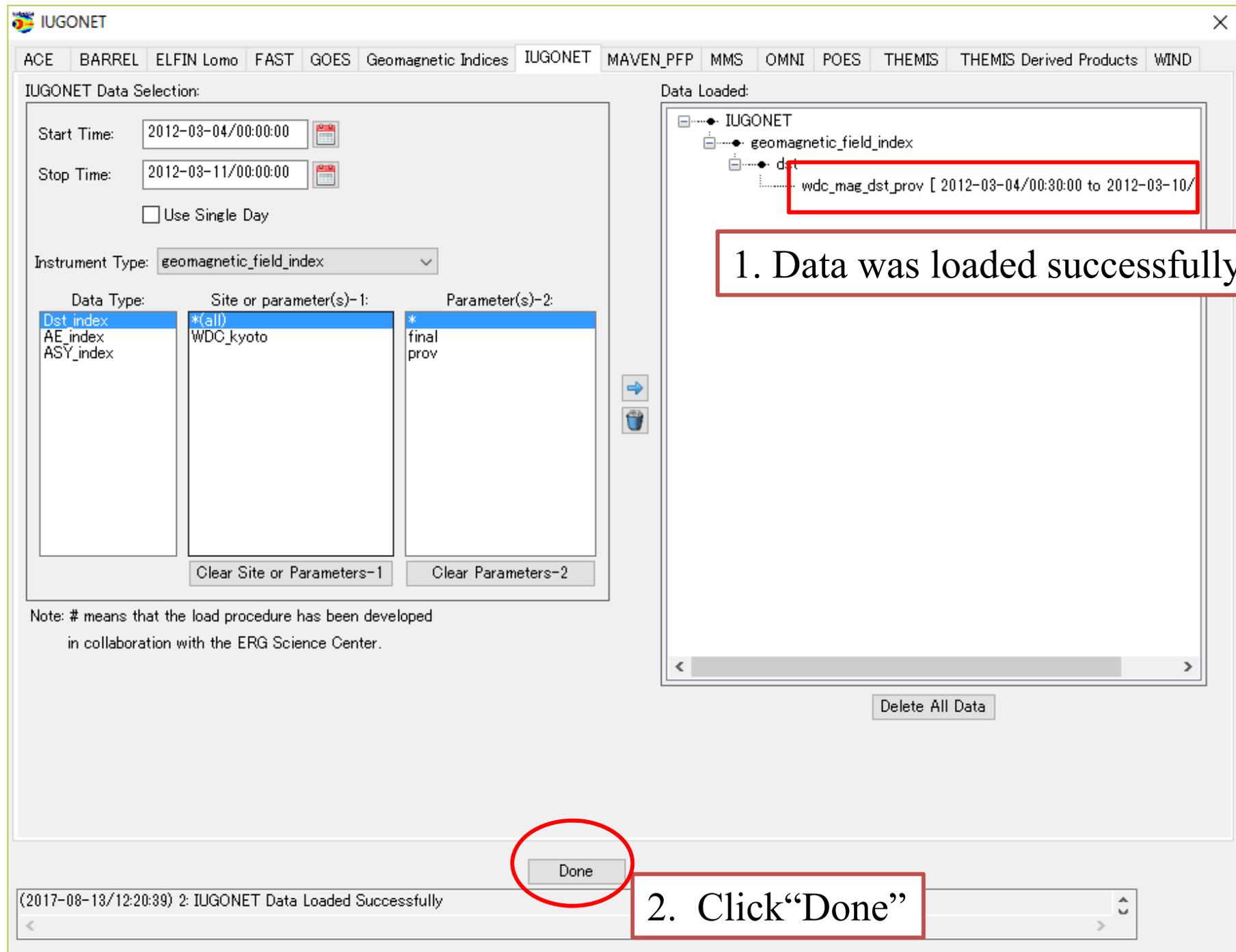
Done

Rules of Data Use:

i 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"



The screenshot displays the IUGONET software interface. The top menu bar includes options like ACE, BARREL, ELFIN Lomo, FAST, GOES, Geomagnetic Indices, IUGONET, MAVEN_PFP, MMS, OMNI, POES, THEMIS, THEMIS Derived Products, and WIND. The main window is titled "IUGONET Data Selection:" and contains several input fields and lists. The "Start Time" is set to 2012-03-04/00:00:00 and the "Stop Time" is 2012-03-11/00:00:00. The "Instrument Type" is set to "geomagnetic_field_index". Below this, there are three columns: "Data Type" (listing Dst_index, AE_index, ASY_index), "Site or parameter(s)-1" (listing *(all), WDC_kyoto), and "Parameter(s)-2" (listing *, final, prov). A "Data Loaded:" panel on the right shows a tree view with "IUGONET" expanded to "geomagnetic_field_index", which is further expanded to "dst", and finally "wdc_mag_dst_prov [2012-03-04/00:30:00 to 2012-03-10/". A red box highlights the "wdc_mag_dst_prov" entry. A large red-bordered box with the text "1. Data was loaded successfully!" is overlaid on the "Data Loaded:" panel. At the bottom of the window, a "Done" button is circled in red. A status bar at the very bottom shows the message "(2017-08-13/12:20:39) 2: IUGONET Data Loaded Successfully".

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:
Dst_index	*(all)	*
AE_index	WDC_kyoto	final
ASY_index		prov

Clear Site or Parameters-1 Clear Parameters-2

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/

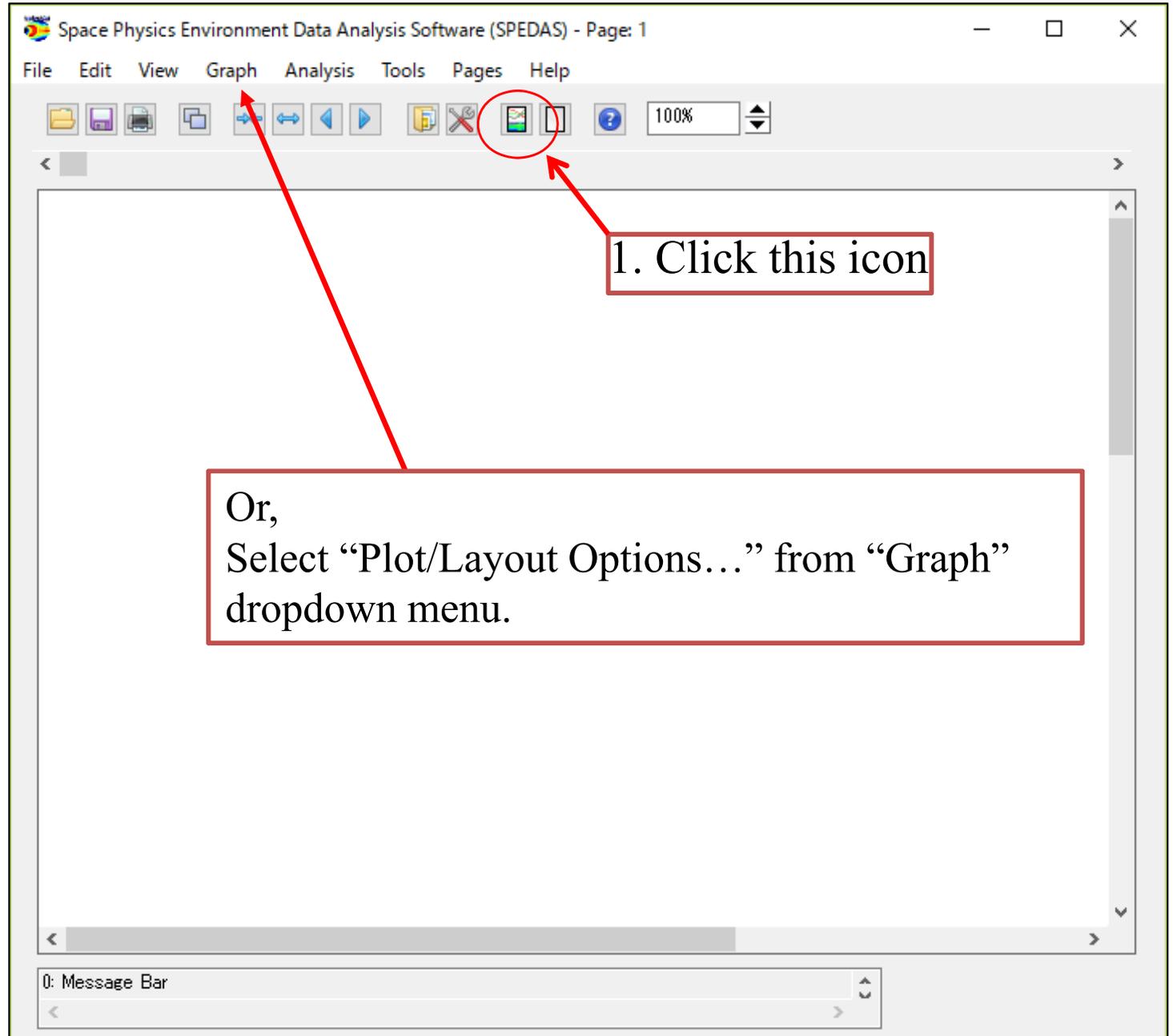
1. Data was loaded successfully!

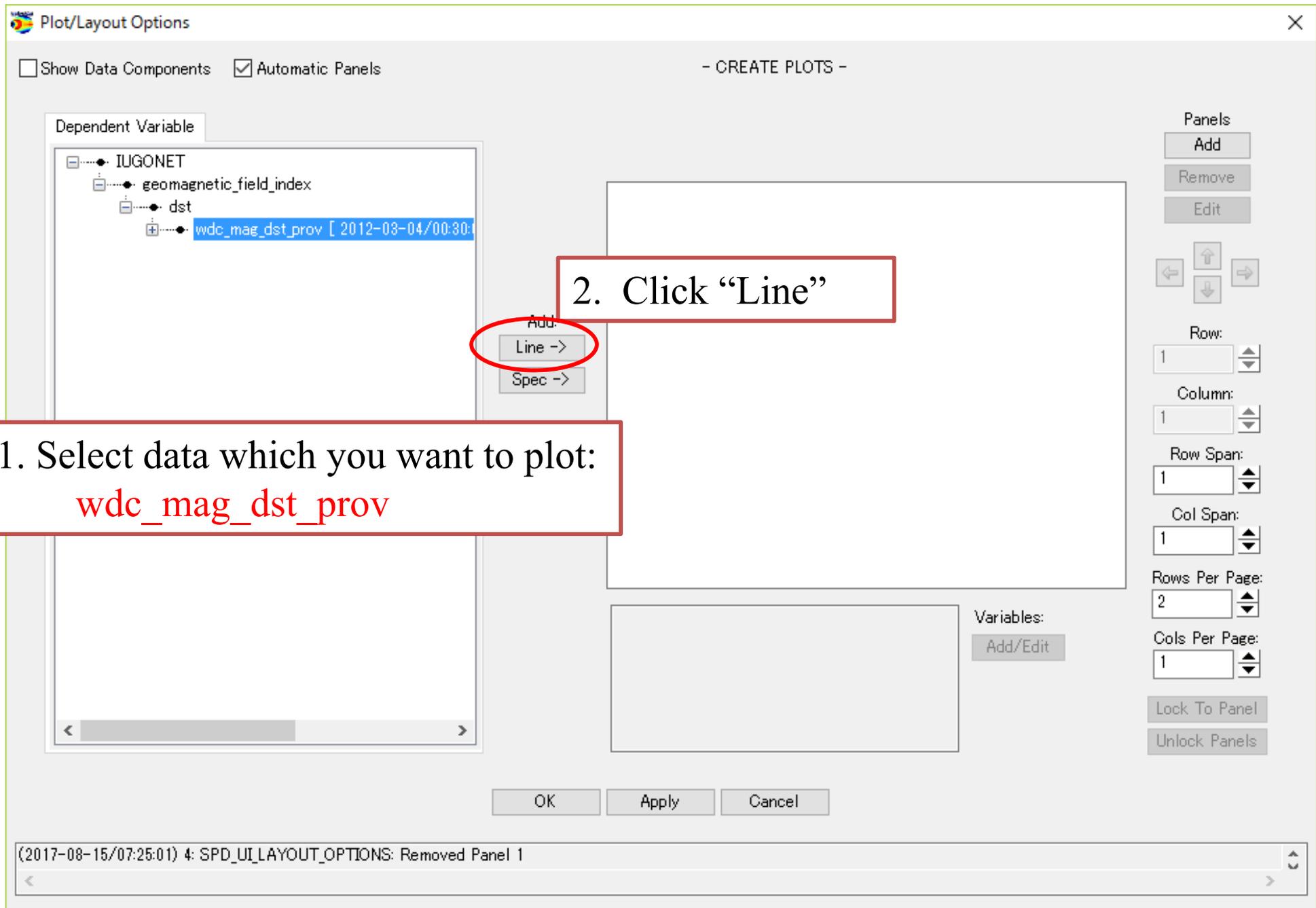
Done

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

2. Click "Done"

Lesson:
Plot data





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]

Add:

Line ->

Spec ->

2. Click "Line"

1. Select data which you want to plot:
wdc_mag_dst_prov

Panels

Add

Remove

Edit

Row: 1

Column: 1

Row Span: 1

Col Span: 1

Rows Per Page: 2

Cols Per Page: 1

Variables:

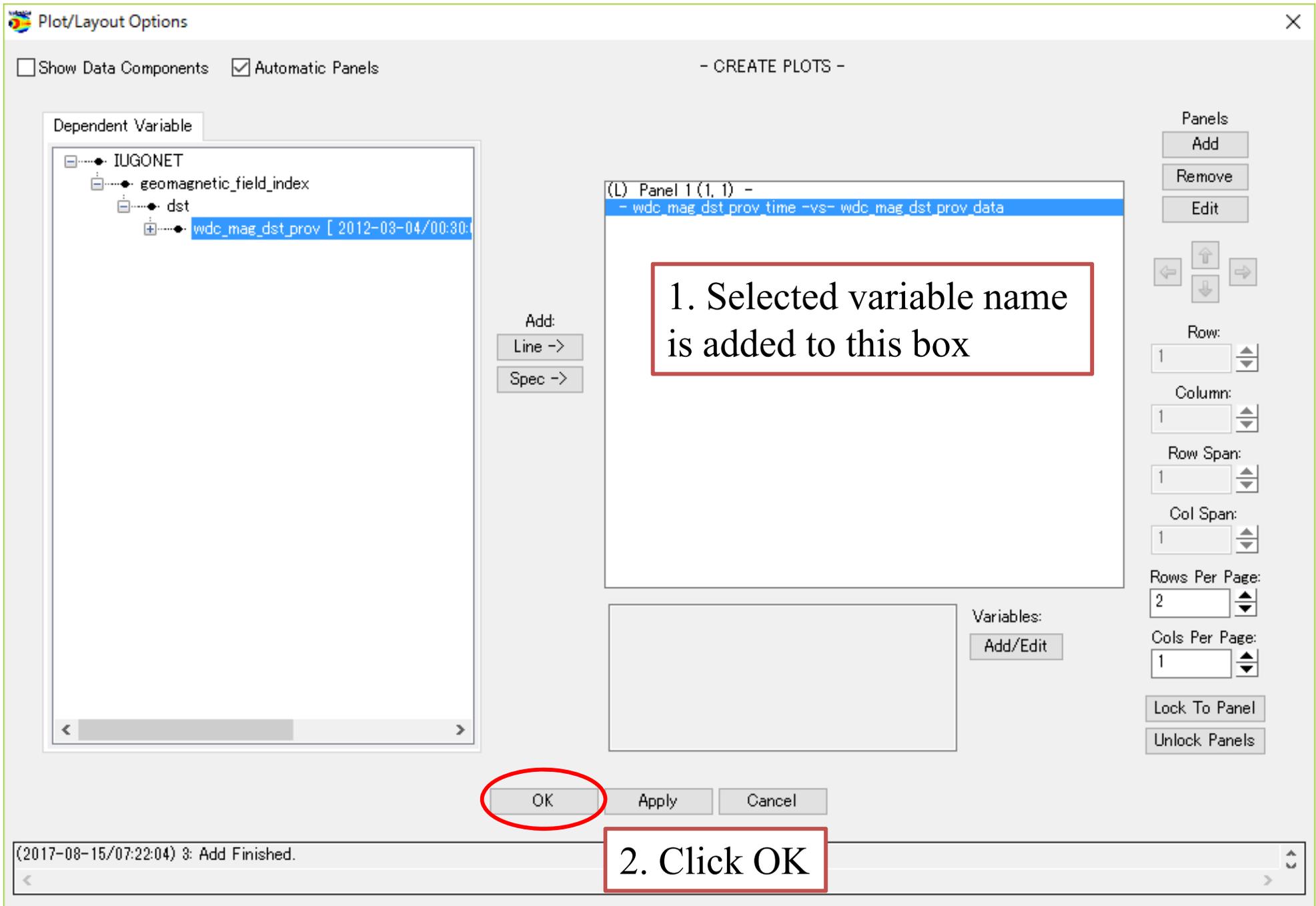
Add/Edit

Lock To Panel

Unlock Panels

OK Apply Cancel

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



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]

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

OK Apply Cancel

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

2. Click OK

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:
Lock panel axes to currently selected panel.

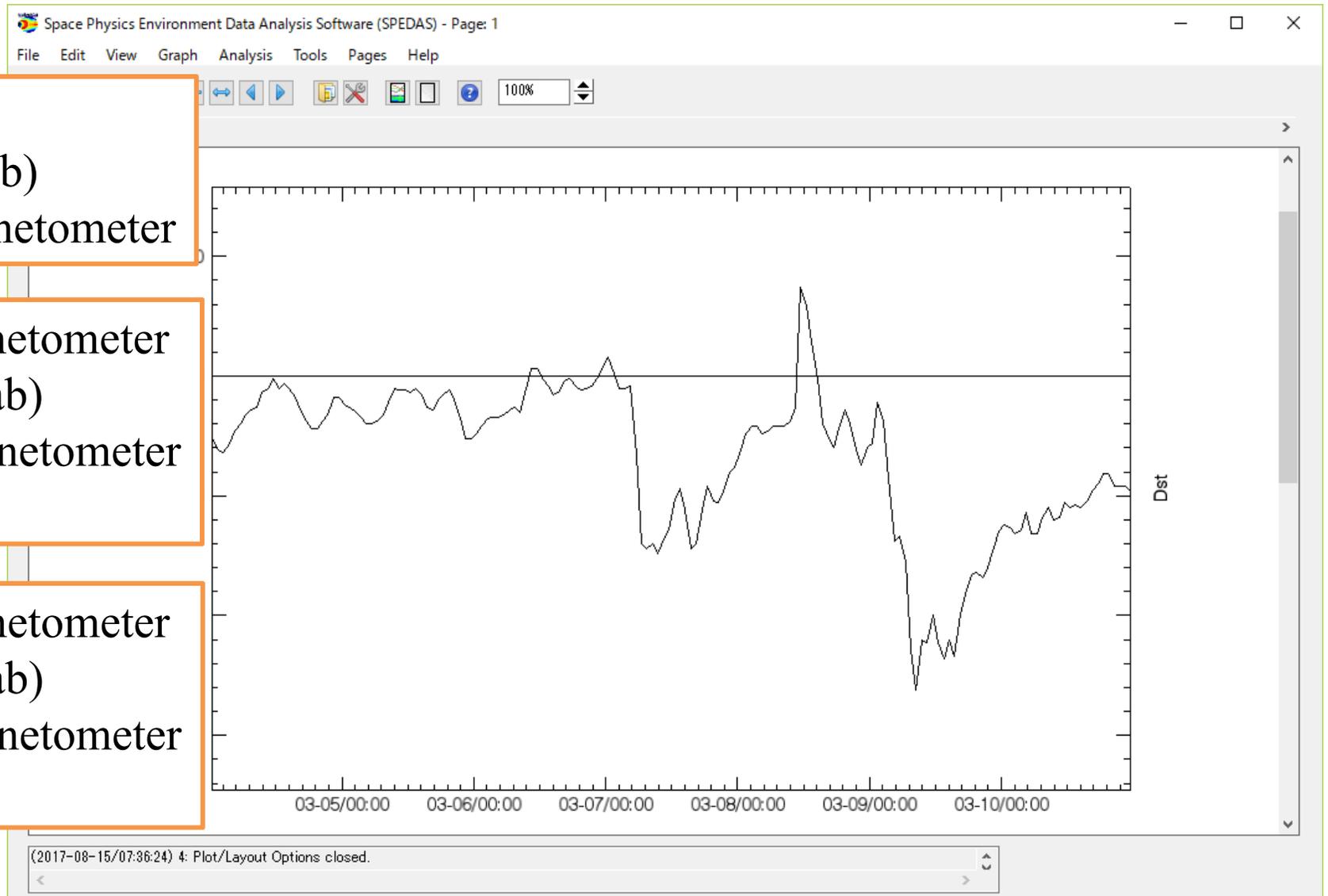
The screenshot shows the 'Plot/Layout Options' dialog box. On the left, a tree view under 'Dependent Variable' shows 'IUGONET' expanded to 'geomagnetic_field_index' and 'dst', with 'wdc_mag_dst_prov [2012-03-04/00:30:00]' selected. Below this are 'Add: Line ->' and 'Spec ->' buttons. The main area shows '(L) Panel 1 (1, 1) -' with the variable '- wdc_mag_dst_prov time -vs- wdc_mag_dst_prov_data' selected. On the right, a 'Panels' section contains 'Add', 'Remove', and 'Edit' buttons. Below these are navigation arrows and settings for 'Row', 'Column', 'Row Span', 'Col Span', 'Rows Per Page', and 'Cols Per Page', each with a spinner control. At the bottom right, there are 'Lock To Panel' and 'Unlock Panels' buttons. At the bottom of the dialog are 'OK', 'Apply', and 'Cancel' buttons. A status bar at the very bottom shows '(2017-08-15/07:22:04) 3: Add Finished.'

Try:
Load other three data

AE index
(in IUGONET tab)
Instrument: magnetometer

MAGDAS magnetometer
(in IUGONET tab)
Instrument: magnetometer
Station: HER

MAGDAS magnetometer
(in IUGONET tab)
Instrument: magnetometer
Station: ASB



Answer

1. Select **IUGONET** tab

2. Select **magnetic_field_index**

3. Select **AE_index, *(all), ***

4. Click arrow

5. Data is loaded

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

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

Answer

1. Select **geomagnetic_field_fluxgate**

Instrument Type: geomagnetic_field_fluxgate

Data Type:	Site or parameter(s)-1:	Par
magdas#	*(all)	*
210mm#	ama	1sec
STEL#	asb	
WDC_kyoto	daw	
NIPR#	her	
	hln	
	hob	
	kuj	
	laq	
	mcq	

2. Select **magdas#, asb & her, ***

3. Click arrow



4. Data is loaded

5. Click Done

Done

IUGONET Data Selection:

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

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

Instrument Type: geomagnetic_field_fluxgate

Data Loaded:

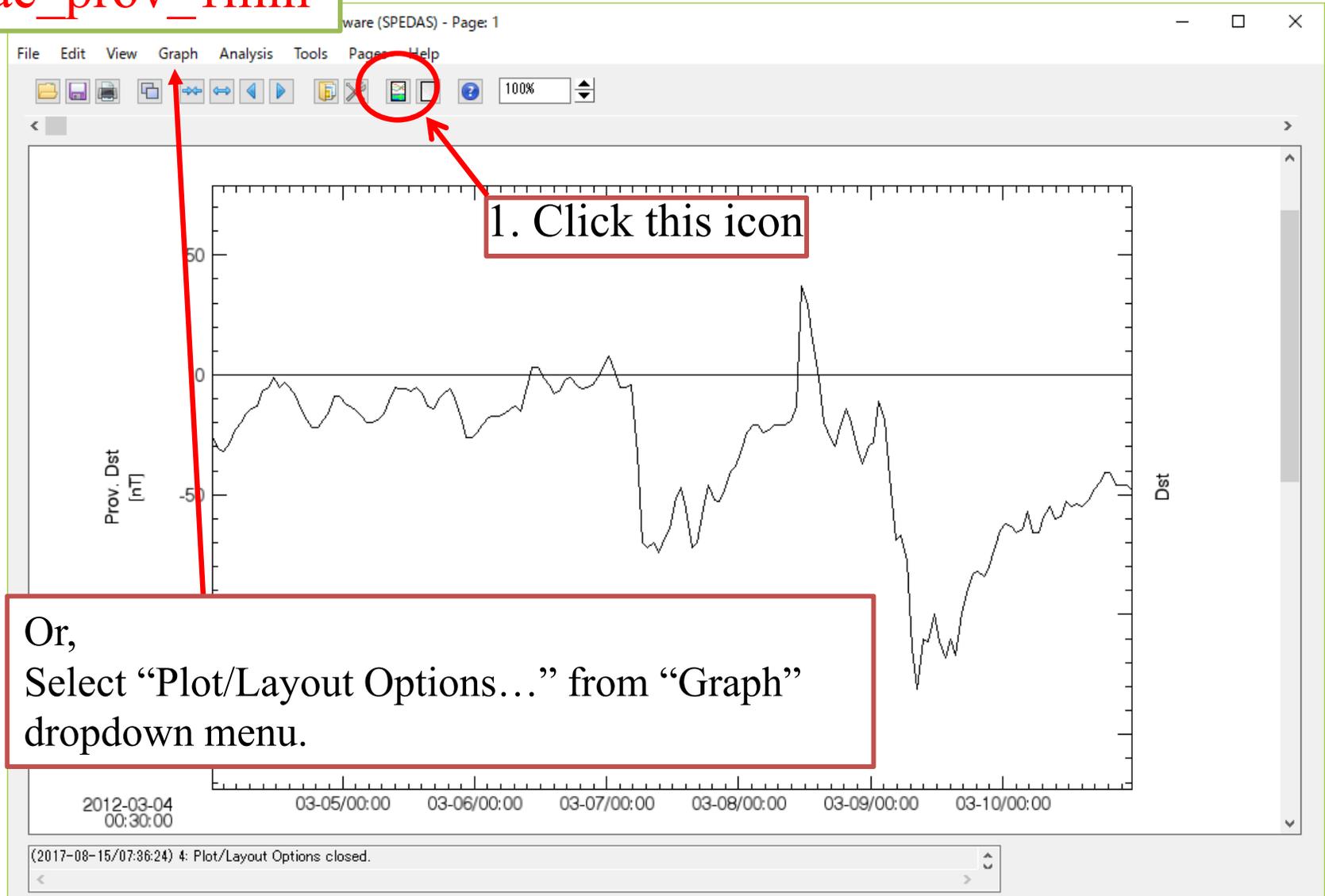
- IUGONET
 - geomagnetic_field_index
 - dst
 - wdc_mag_dst_prov [2012-03-04/00:30:00 to 2012-03-10/00:00:00]
 - ae
 - wdc_mag_ae_prov_1min [2012-03-04/00:00:30 to 2012-03-10/00:00:00]
 - geomagnetic_field_fluxgate
 - asb
 - magdas_mag_asb_1sec_f [2012-03-04/00:00:00 to 2012-03-10/00:00:00]
 - magdas_mag_asb_1sec_hdz [2012-03-04/00:00:00 to 2012-03-10/00:00:00]
 - her
 - magdas_mag_her_1sec_f [2012-03-04/00:00:00 to 2012-03-10/00:00:00]
 - magdas_mag_her_1sec_hdz [2012-03-04/00:00:00 to 2012-03-10/00:00:00]

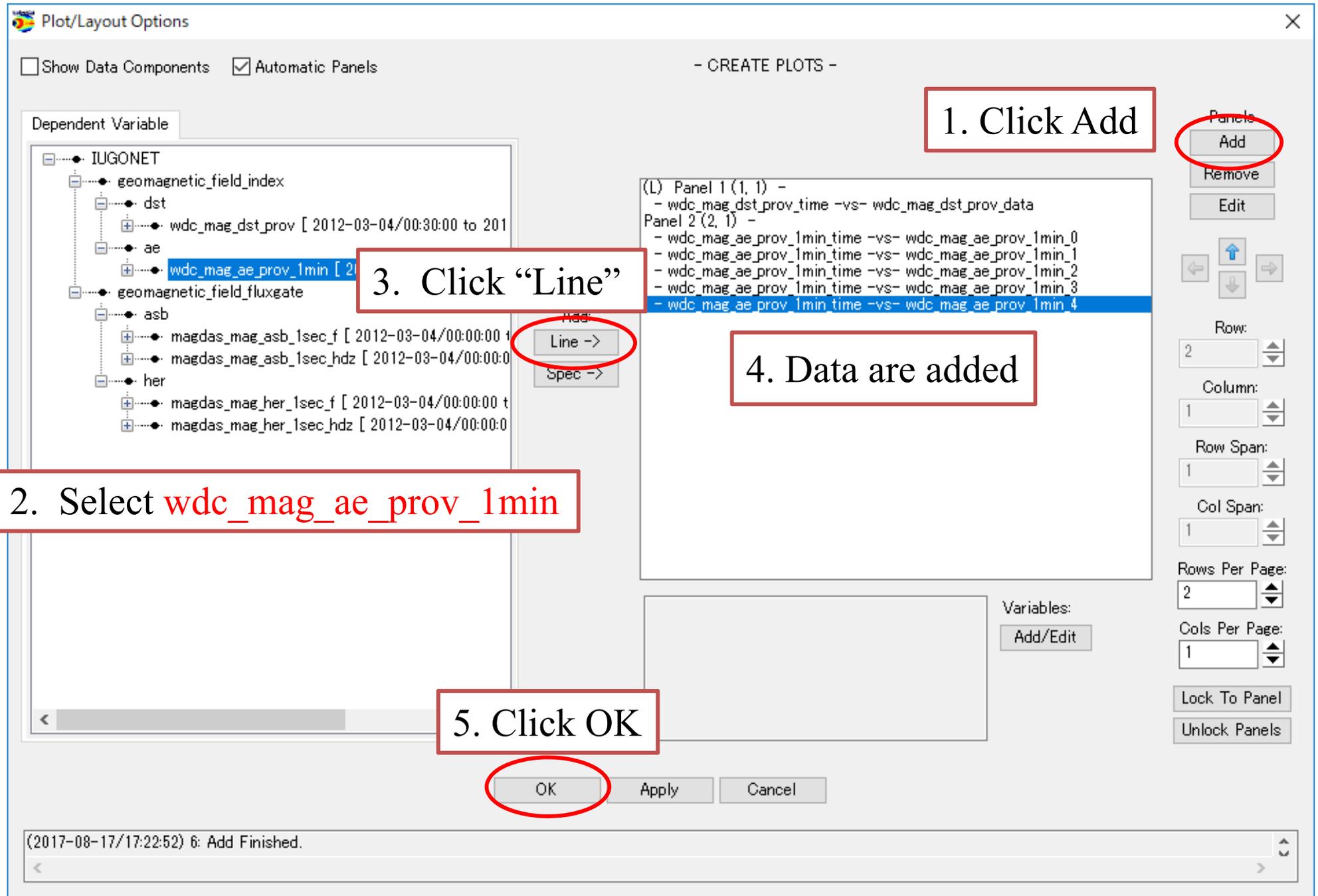
Note: # means that the load procedure has been developed in collaboration with the ERG Science Center.

(2017-08-17/16:40:28) 28: IUGONET Data Loaded Successfully

Lesson:
Add Plot

wdc_mag_ae_prov_1min





1. Click Add

2. Select `wdc_mag_ae_prov_1min`

3. Click "Line"

4. Data are added

5. Click OK

Plot/Layout Options - CREATE PLOTS -

Show Data Components Automatic Panels

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 [2012-03-04/00:00:00 to 201**
 - 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

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

Variables:
Add/Edit

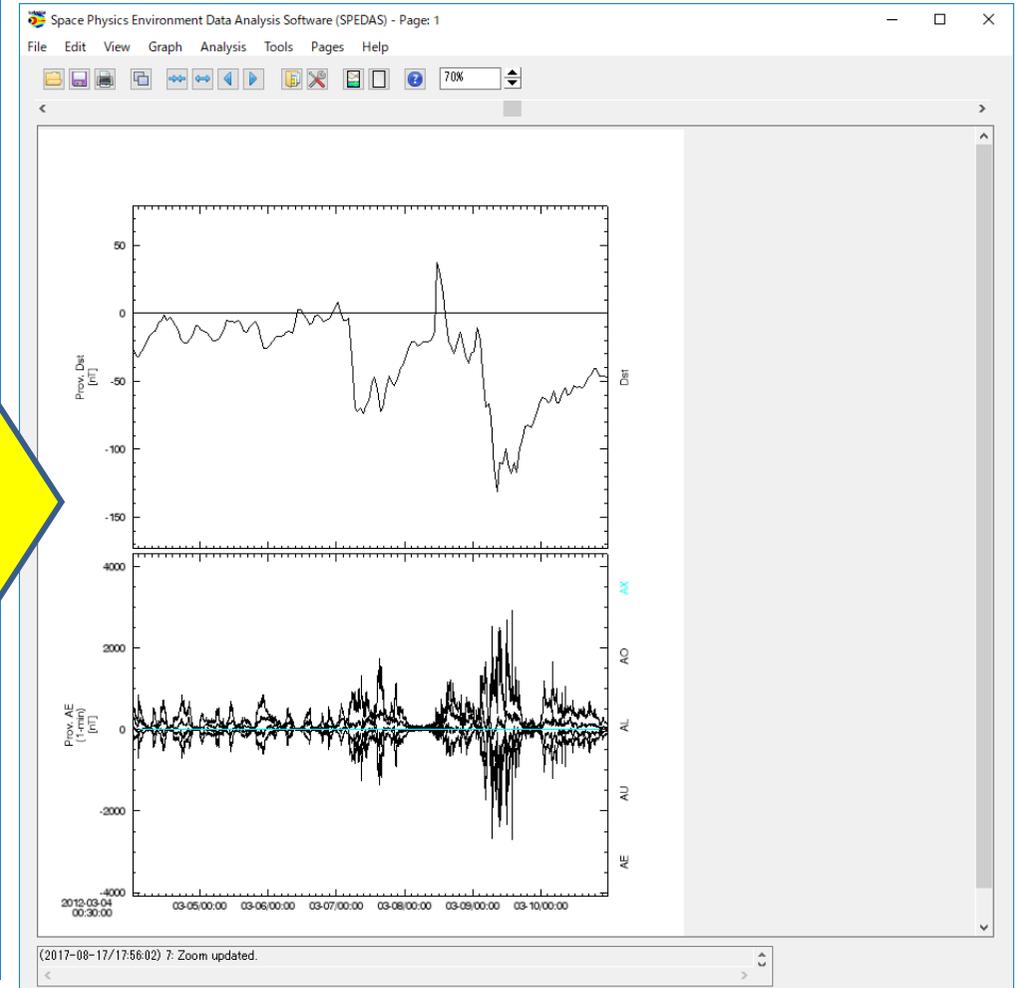
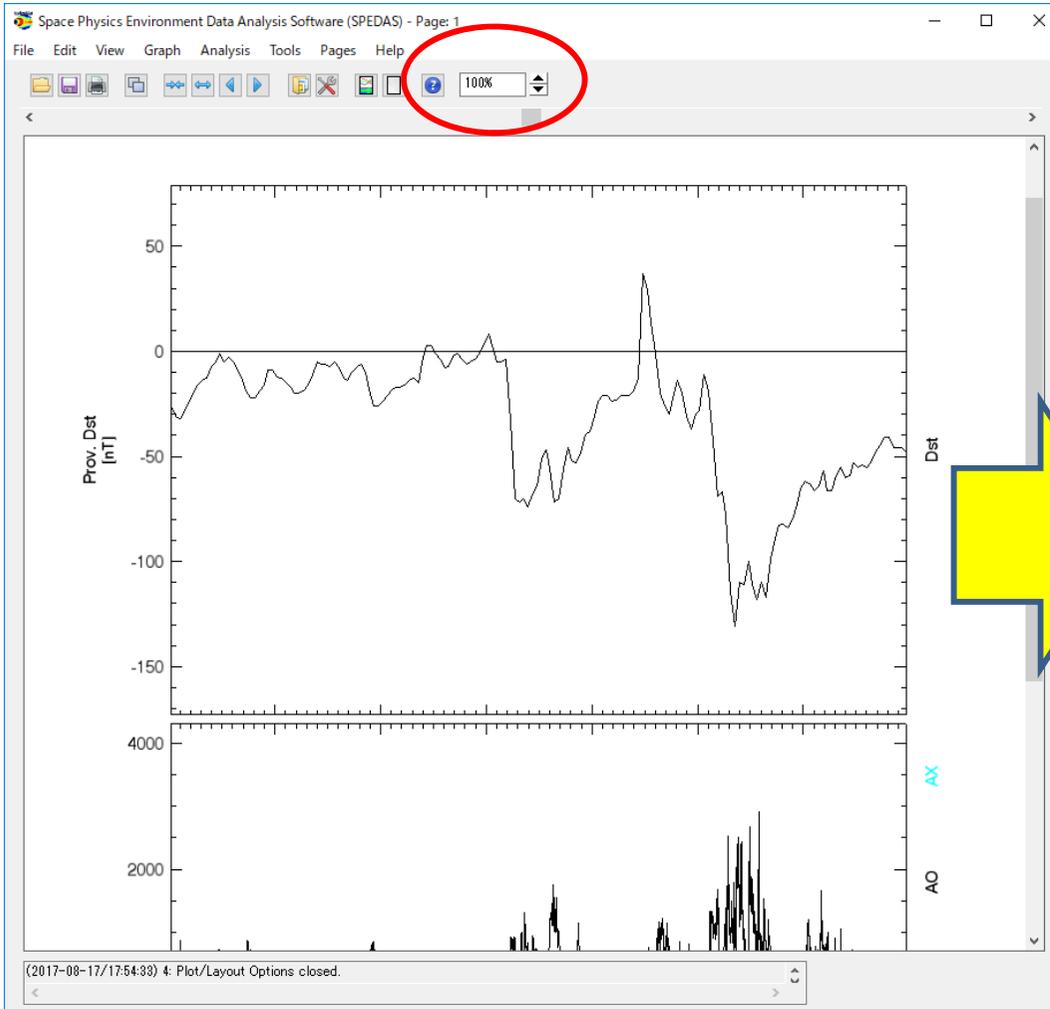
Row: 2
Column: 1
Row Span: 1
Col Span: 1
Rows Per Page: 2
Cols Per Page: 1

Lock To Panel
Unlock Panels

OK Apply Cancel

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

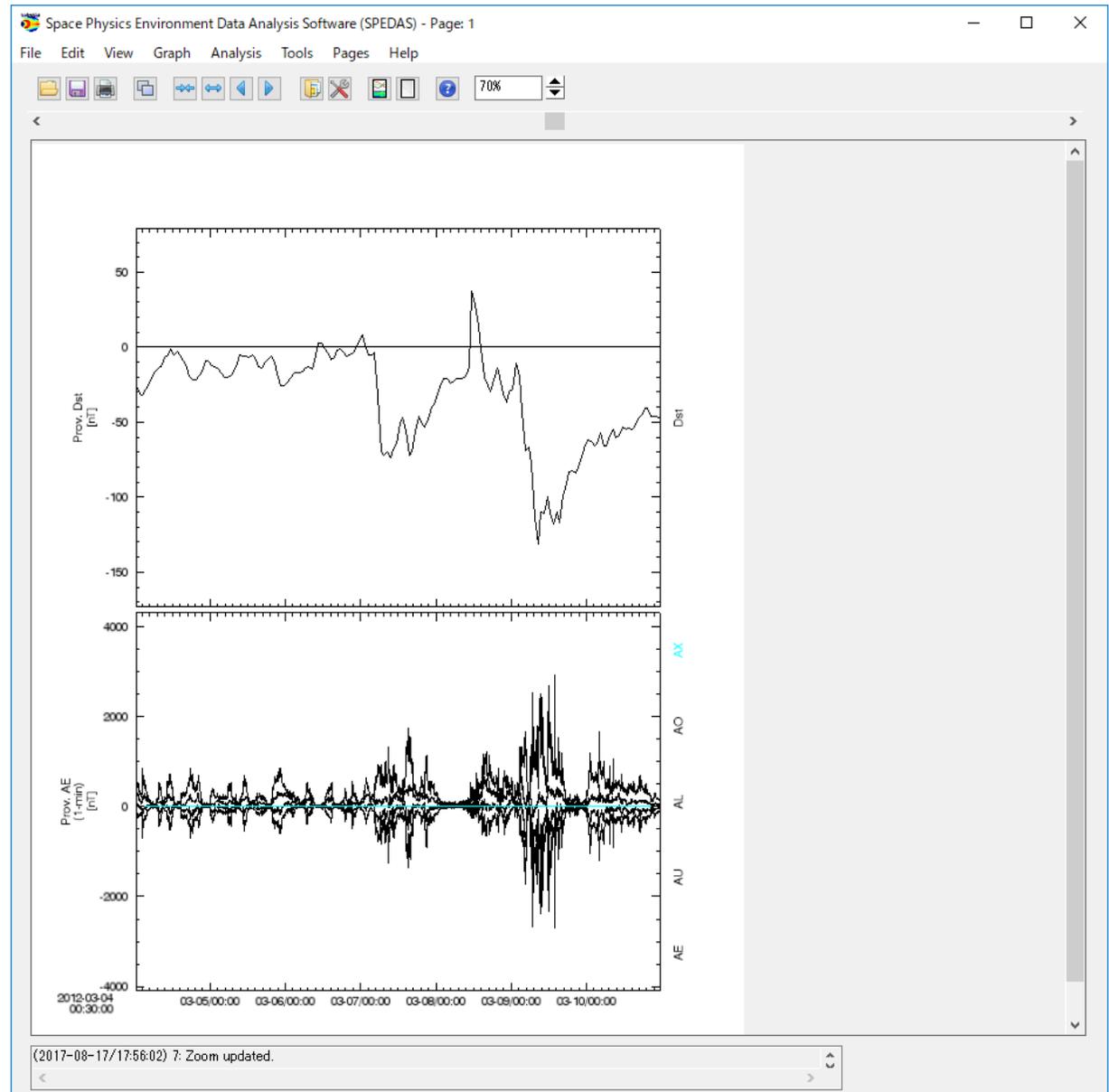
1. Click black triangles



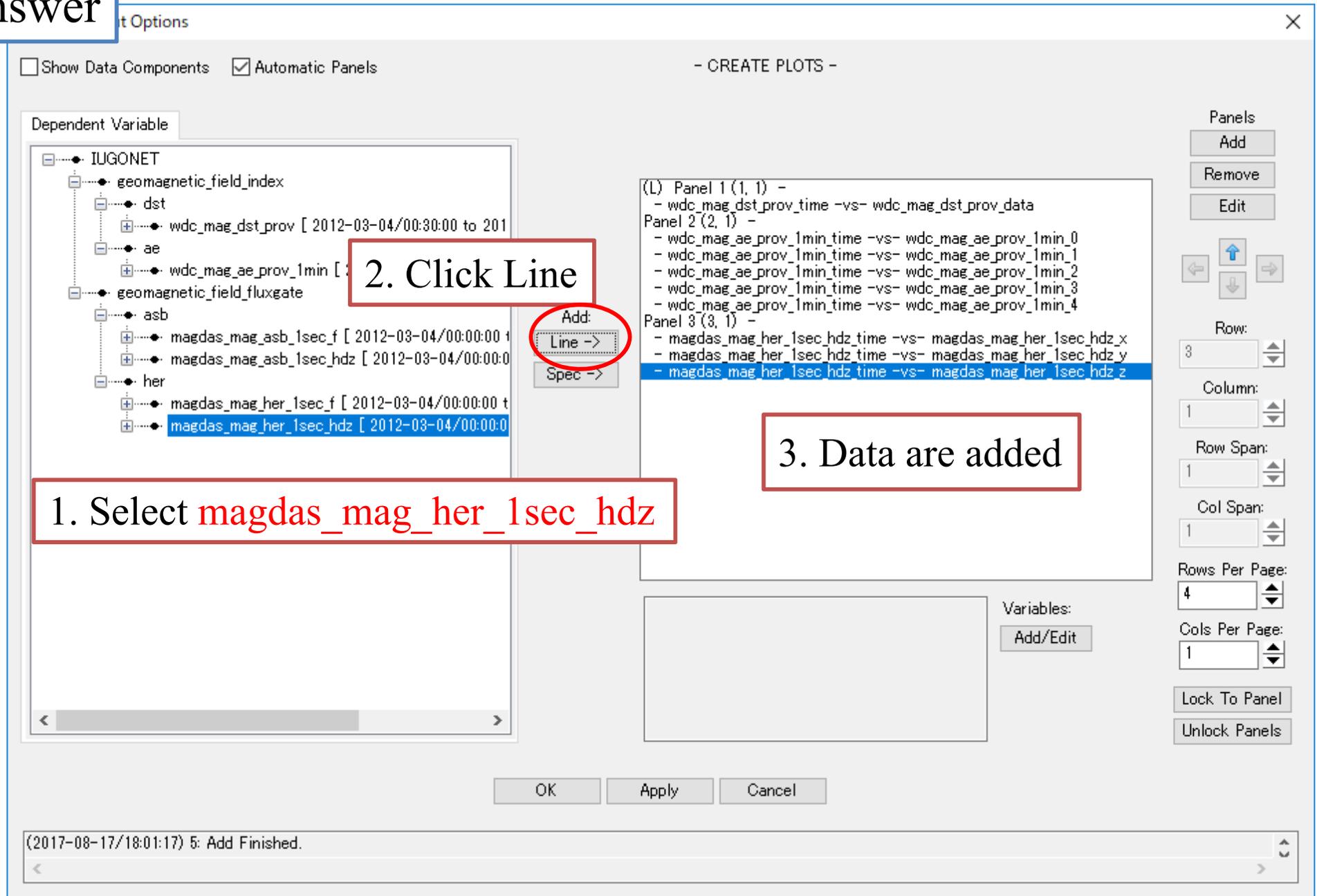
Try:
Plot other two data

magdas_mag_her_1sec_hdz

magdas_mag_asb_1sec_hdz



Answer



The screenshot shows the 'Add' dialog box in the IUGONET GUI. The dialog has a title bar with 'Add Options' and a close button. It contains several sections:

- Options:** Show Data Components, Automatic Panels.
- Dependent Variable:** A tree view showing the hierarchy of variables. The variable `magdas_mag_her_1sec_hdz` is selected and highlighted in blue.
- Buttons:** An 'Add:' button with a dropdown menu showing 'Line ->' (circled in red) and 'Spec ->'.
- Panel List:** A list of panels being created. The third panel, 'Panel 3(3, 1)', contains the selected variable: `- magdas_mag_her_1sec_hdz time -vs- magdas_mag_her_1sec_hdz z`. This line is highlighted in blue.
- Layout Controls:** A 'Panels' section with 'Add', 'Remove', and 'Edit' buttons, and a grid of arrows. Below are 'Row', 'Column', 'Row Span', and 'Col Span' spinners.
- Variables:** An 'Add/Edit' button.
- Footer:** 'OK', 'Apply', and 'Cancel' buttons.

Three red boxes with black text provide instructions:

1. Select `magdas_mag_her_1sec_hdz`
2. Click Line
3. Data are added

A status bar at the bottom left shows the message: (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 2012-03-04/00:30:00]
 - ae
 - wdc_mag_ae_prov_1min [2012-03-04/00:00:00 to 2012-03-04/00:00:00]
 - geomagnetic_field_fluxgate
 - asb
 - magdas_mag_asb_1sec_f [2012-03-04/00:00:00 to 2012-03-04/00:00:00]
 - magdas_mag_asb_1sec_hdz [2012-03-04/00:00:00 to 2012-03-04/00:00:00]**
 - her
 - magdas_mag_her_1sec_f [2012-03-04/00:00:00 to 2012-03-04/00:00:00]
 - magdas_mag_her_1sec_hdz [2012-03-04/00:00:00 to 2012-03-04/00:00:00]

2. Click Line

Line ->

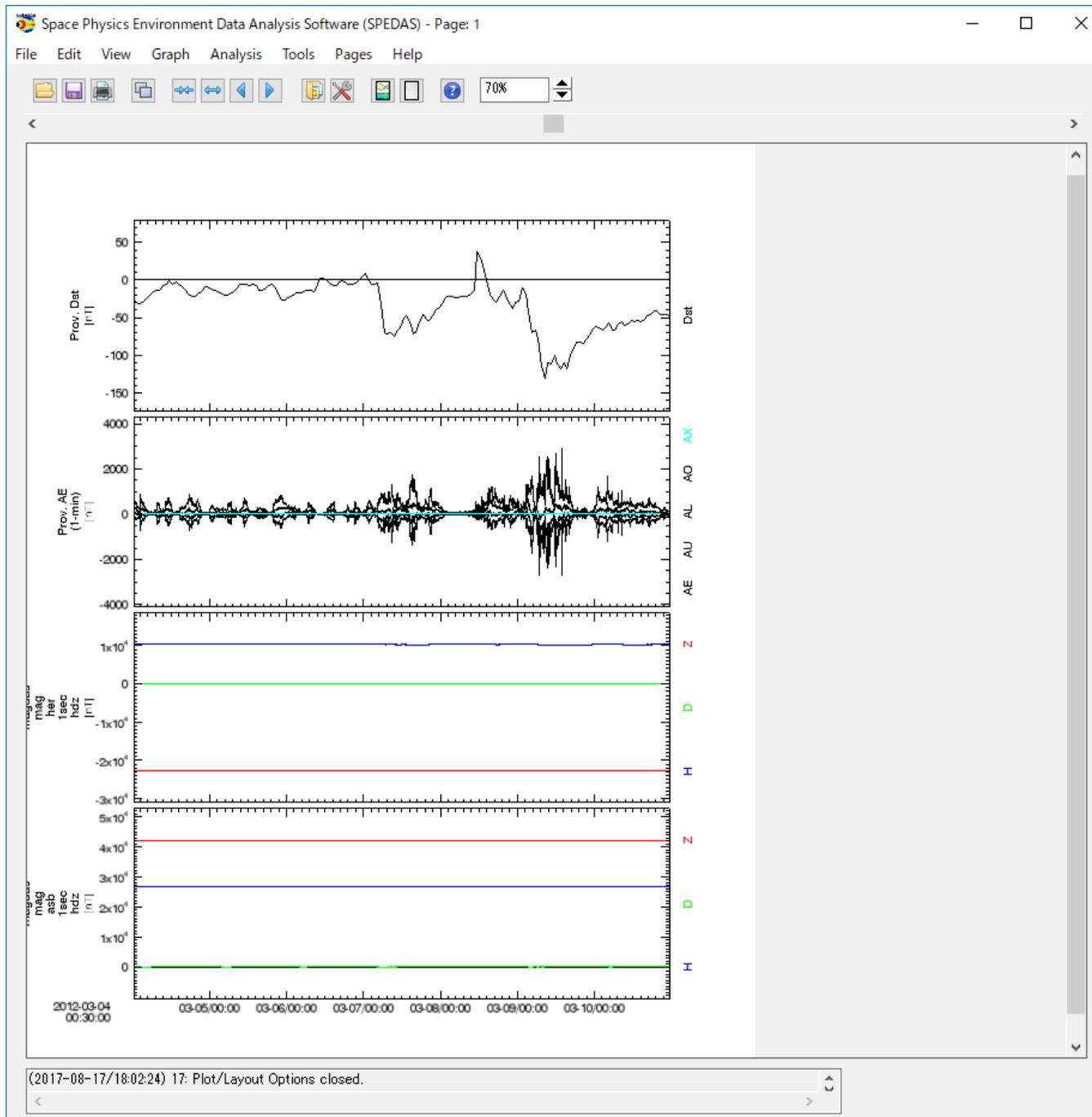
Panel 4 (4, 1) -
- magdas_mag_asb_1sec_hdz_time -vs- magdas_mag_asb_1sec_hdz_z

3. Data are added

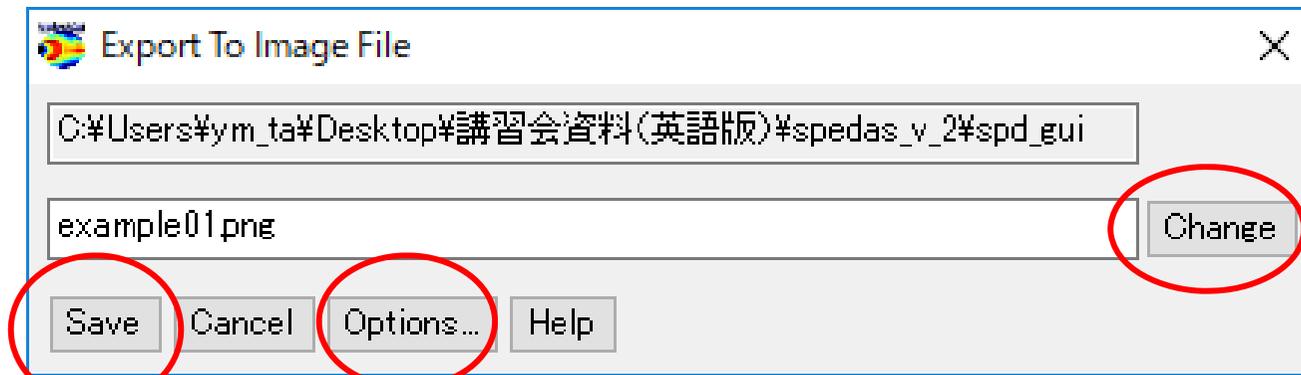
4. Click OK

OK Apply Cancel

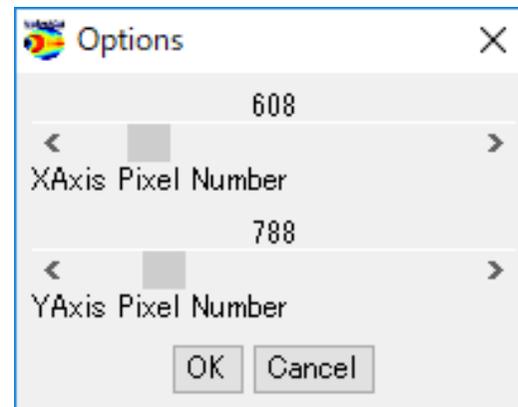
(2017-08-17/18:01:56) 8: Add Finished.



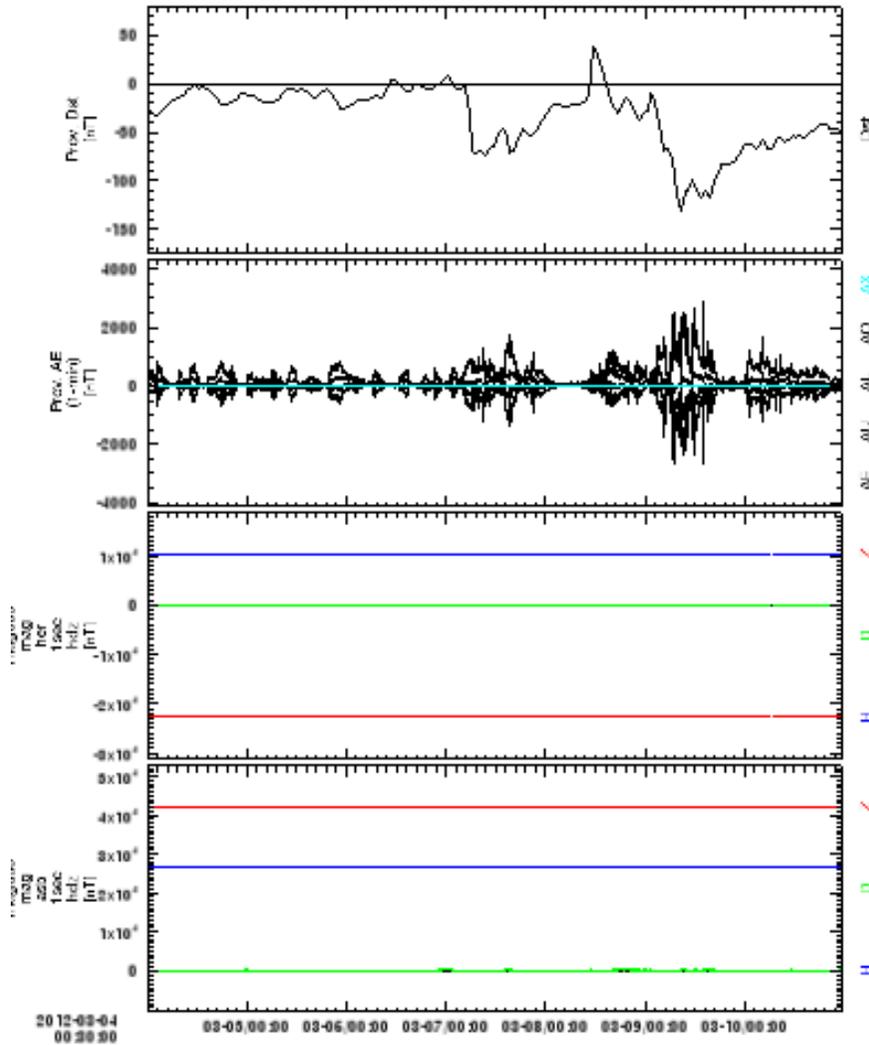
Confirmation



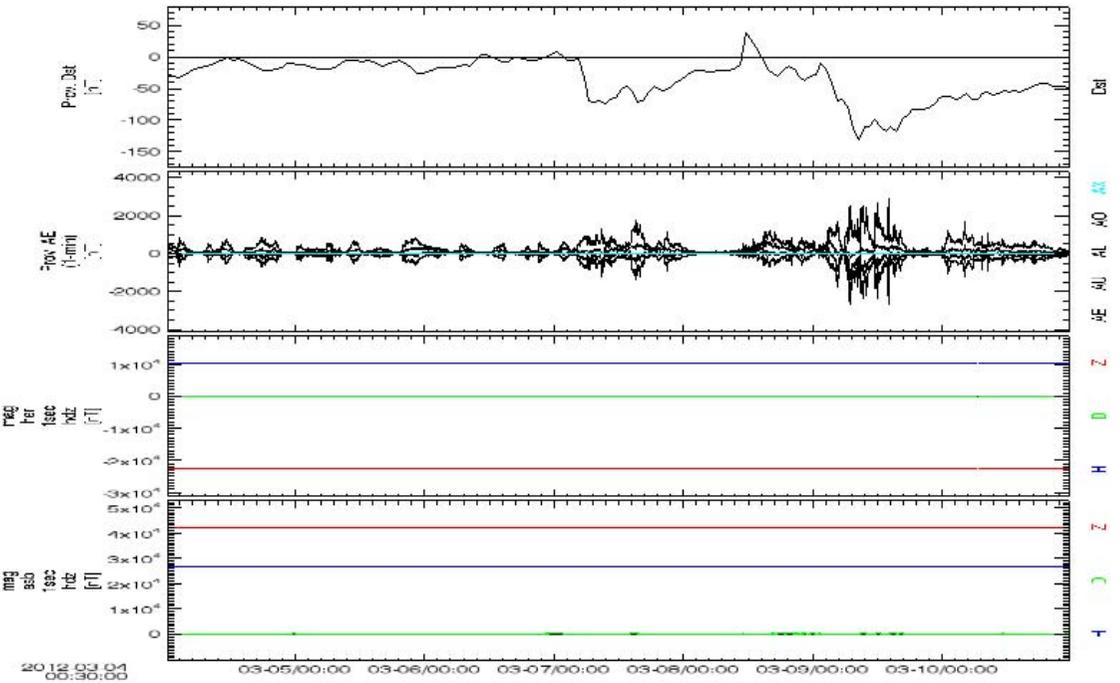
Back to previous



Click "Save"



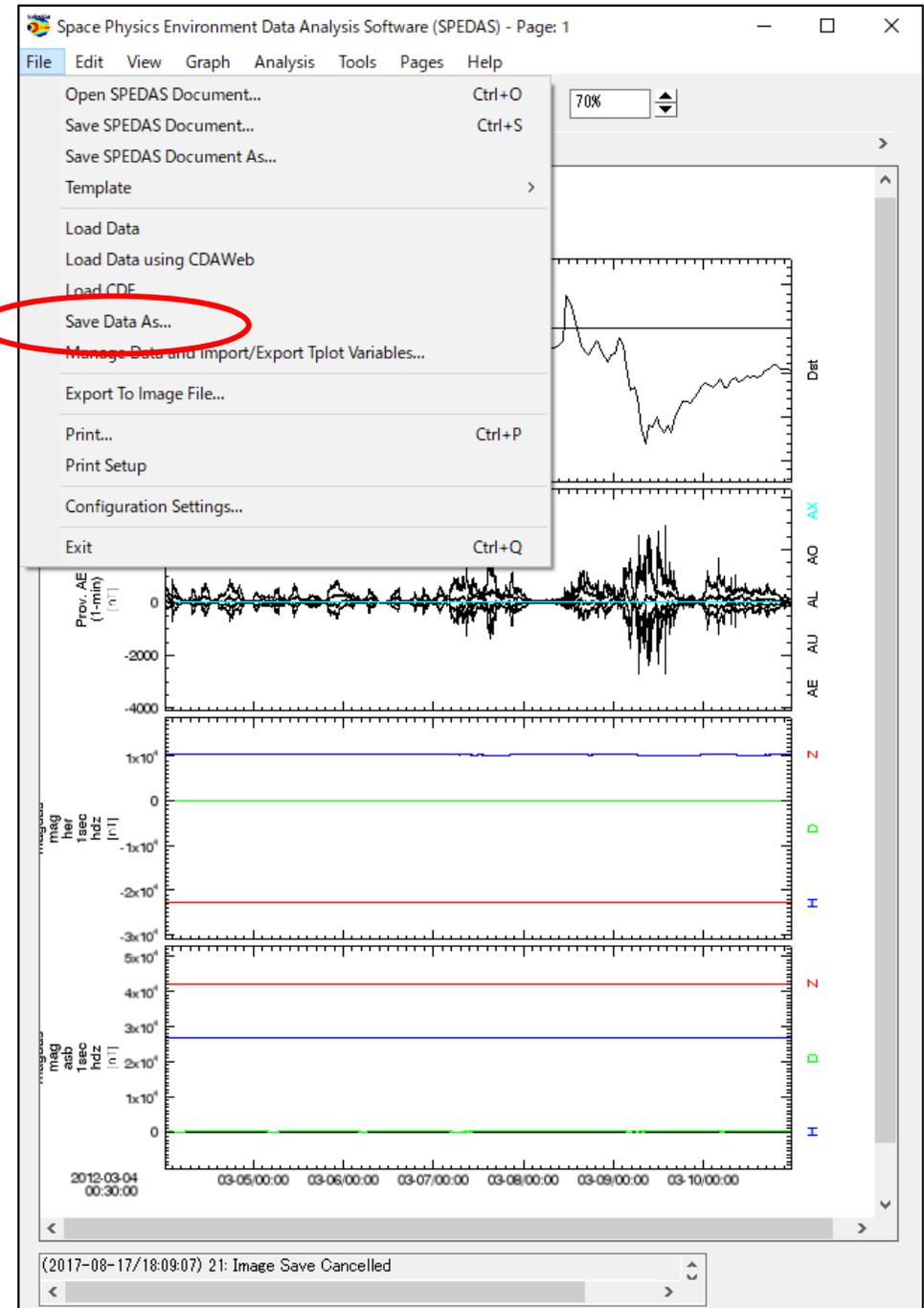
X pixel 428, Y pixel 554



X pixel 856, Y pixel 554
(65%)

Lesson: Save data as ascii

1. Select
File – Save Data As



The screenshot displays the Space Physics Environment Data Analysis Software (SPEDAS) interface. The 'File' menu is open, and the 'Save Data As...' option is circled in red. A red arrow points from the text 'File – Save Data As' in the adjacent box to this menu item. The background shows several data plots, including a time-series plot of 'Proy. AE (1-min) [nT]' and other magnetic field components (Z, D, H) over time. The status bar at the bottom indicates '(2017-08-17/18:09:07) 21: Image Save Cancelled'.

1. Select data which you want to save
`magdas_mag_her_1sec_hdz_x`

2. check this box

3. Select time interval

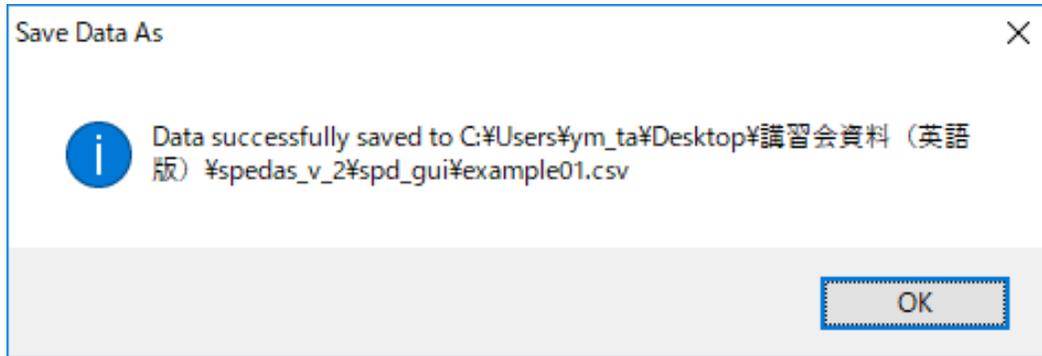
4. check this box

6. Select save folder

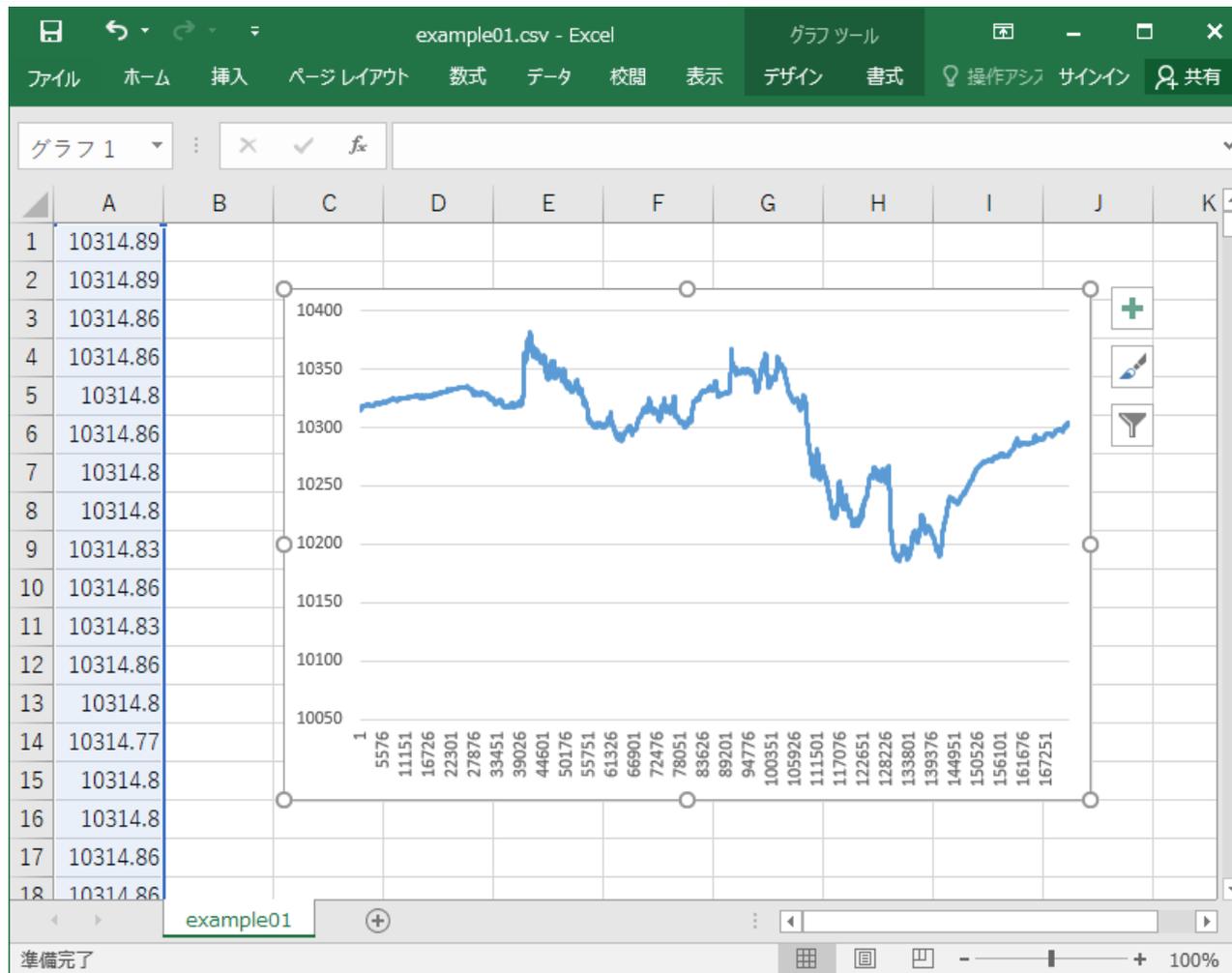
7. Input file name (data is saved in csv format)

8. Click "save"

5. Click Save

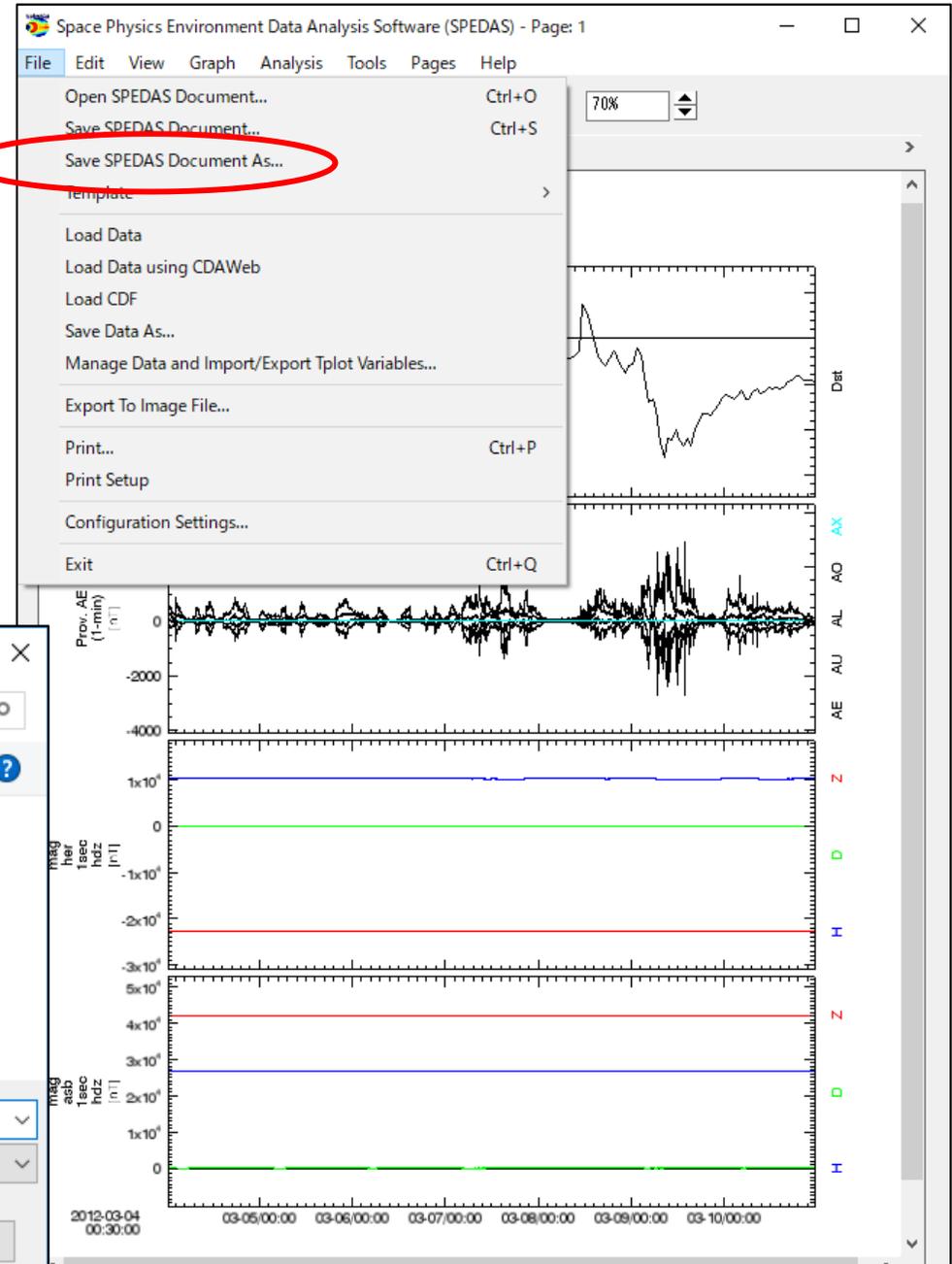


An ascii data file was successfully saved!!!



Lesson: Dump your workspace

1. Select
File – Save SPEDAS Document



The screenshot shows the 'Save SPEDAS Document' dialog box. The save folder is 'spedas_v_2 > spd_gui', the file name is 'spedas_saved_20170817_111634.tgd', and the file type is '*.tgd'. The '保存(S)' button is highlighted with a red arrow.

2. Select save folder

3. Input file name

4. Click “save”

SPEDAS Document is written in XML format



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

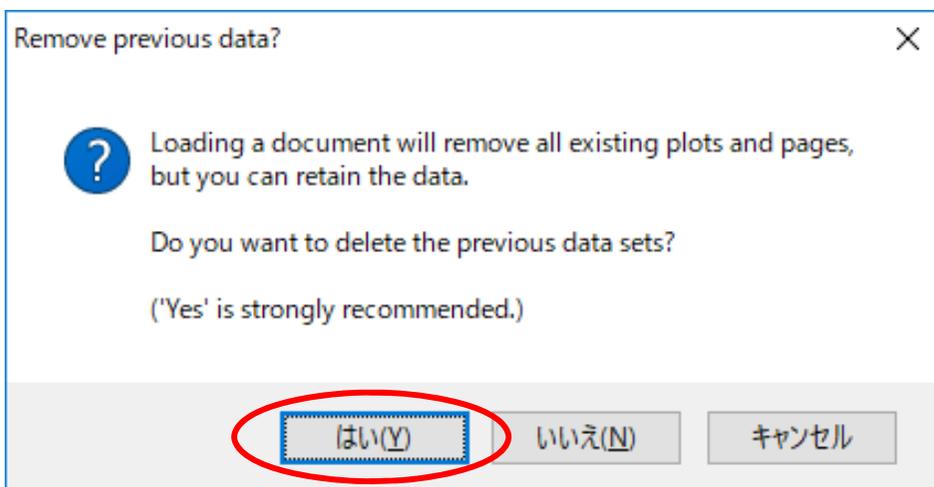
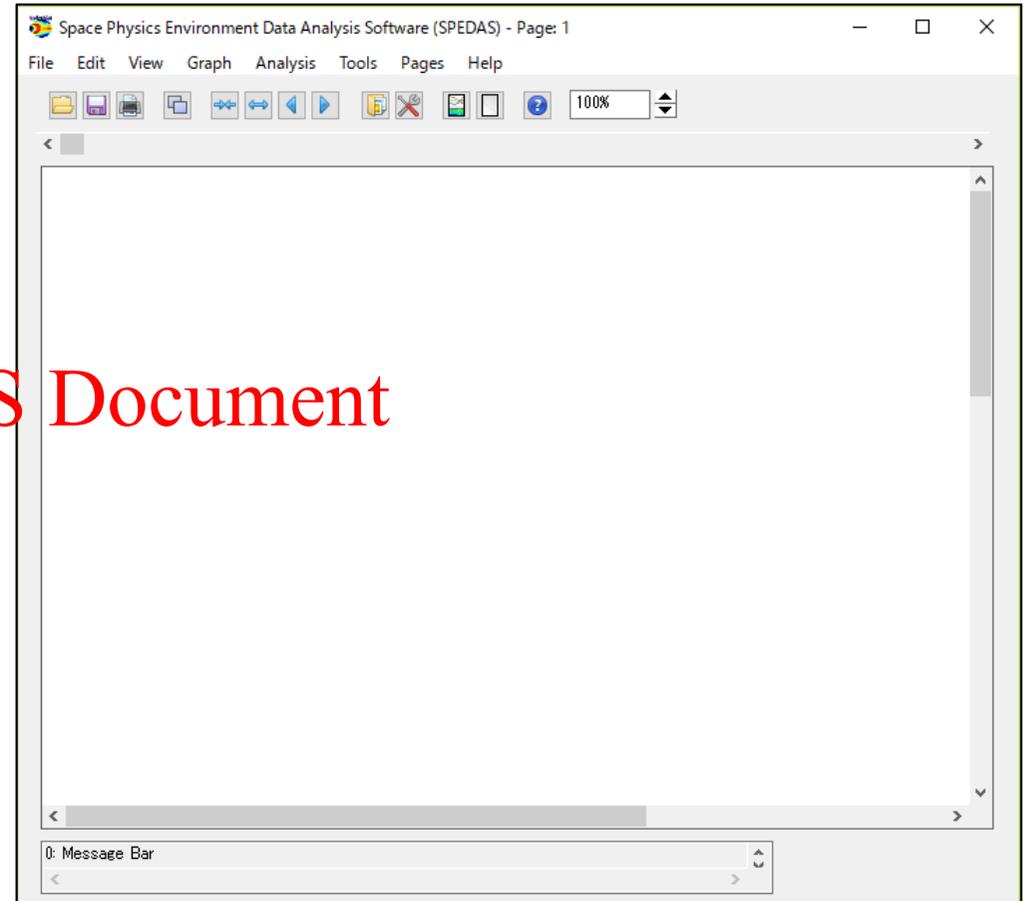
How to Use SPEDAS part2

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

Lesson:

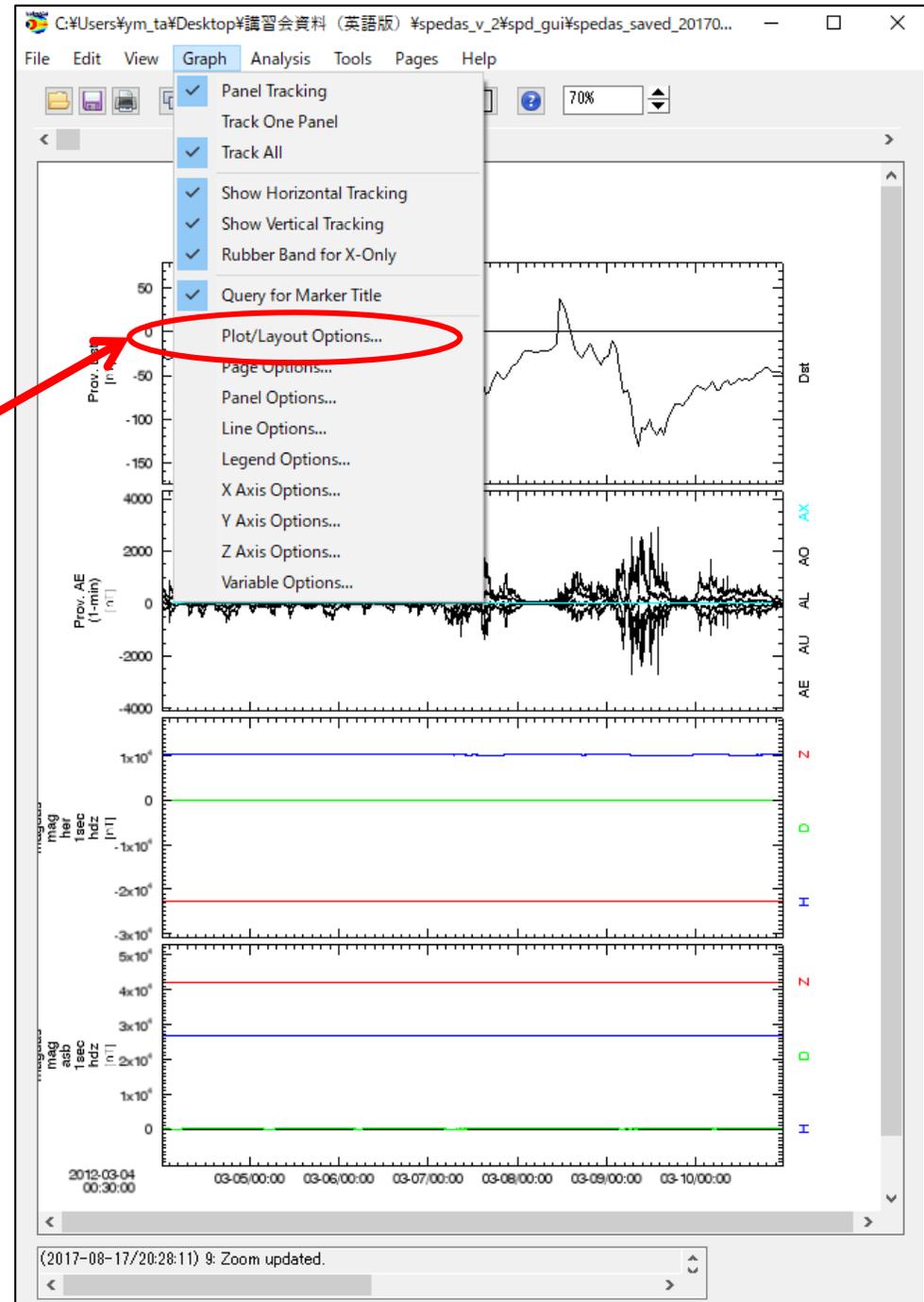
Restore part1 workspace

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.

2. Click "Remove"

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

Add:
Line ->
Spec ->

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

Panels
Add
Remove
Edit



Row:
2

Column:
1

Row Span:
1

Col Span:
1

Rows Per Page:
4

Cols Per Page:
1

Lock To Panel

Unlock Panels

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

OK

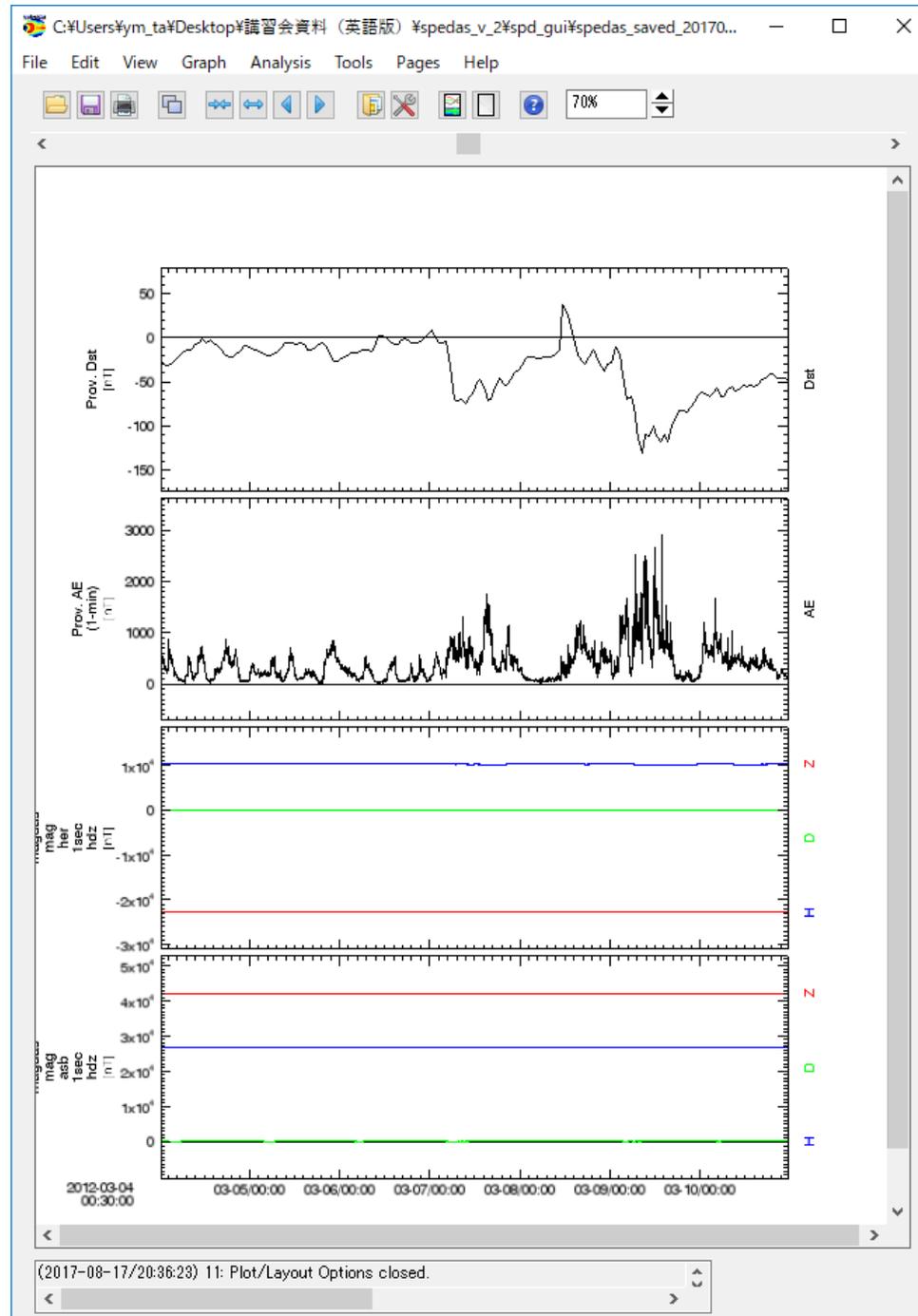
Apply

Cancel

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

4. Click OK

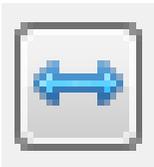
Result



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



Reduces X range by
major tick marker



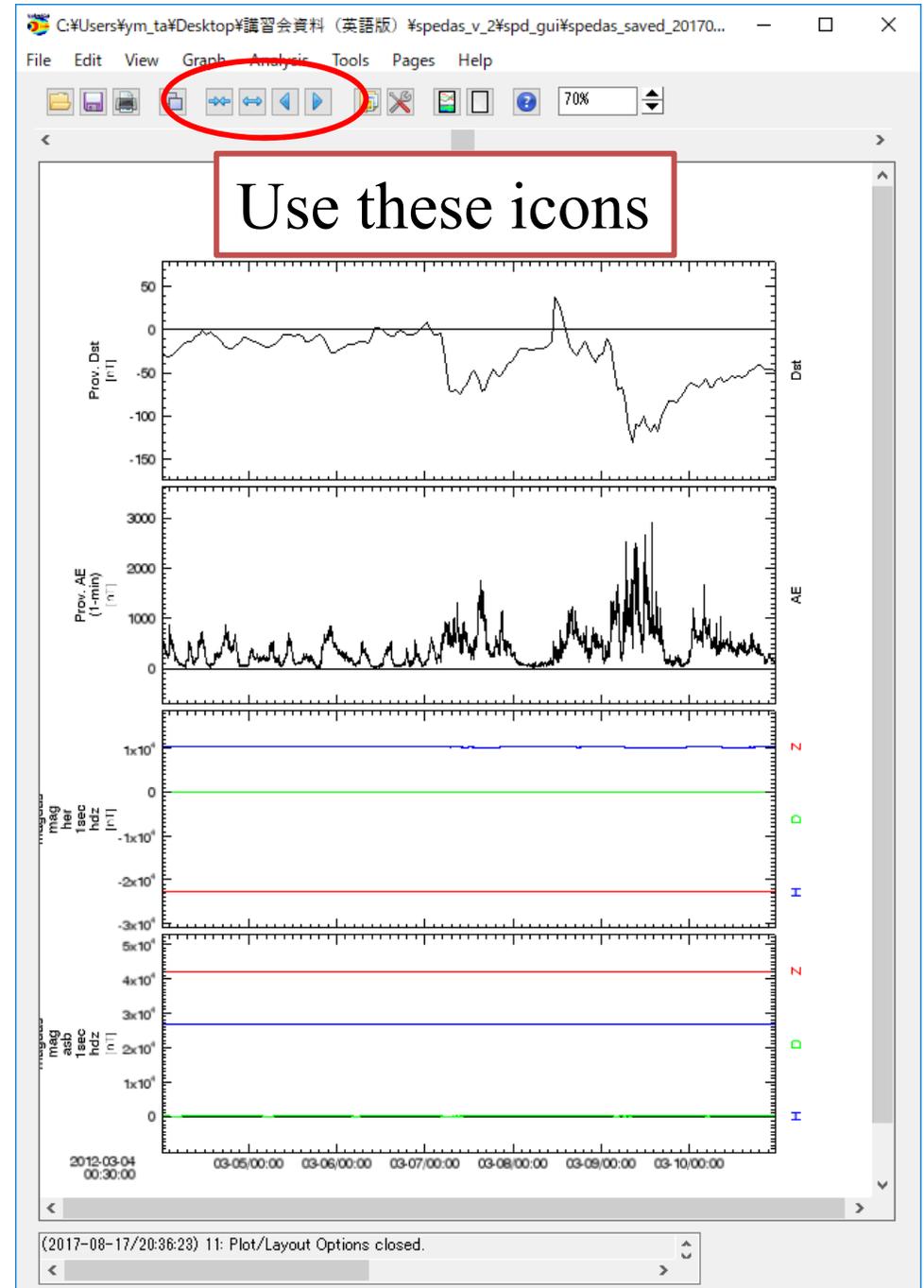
Expands X range by
major tick marker



Shift left X range by
major tick marker

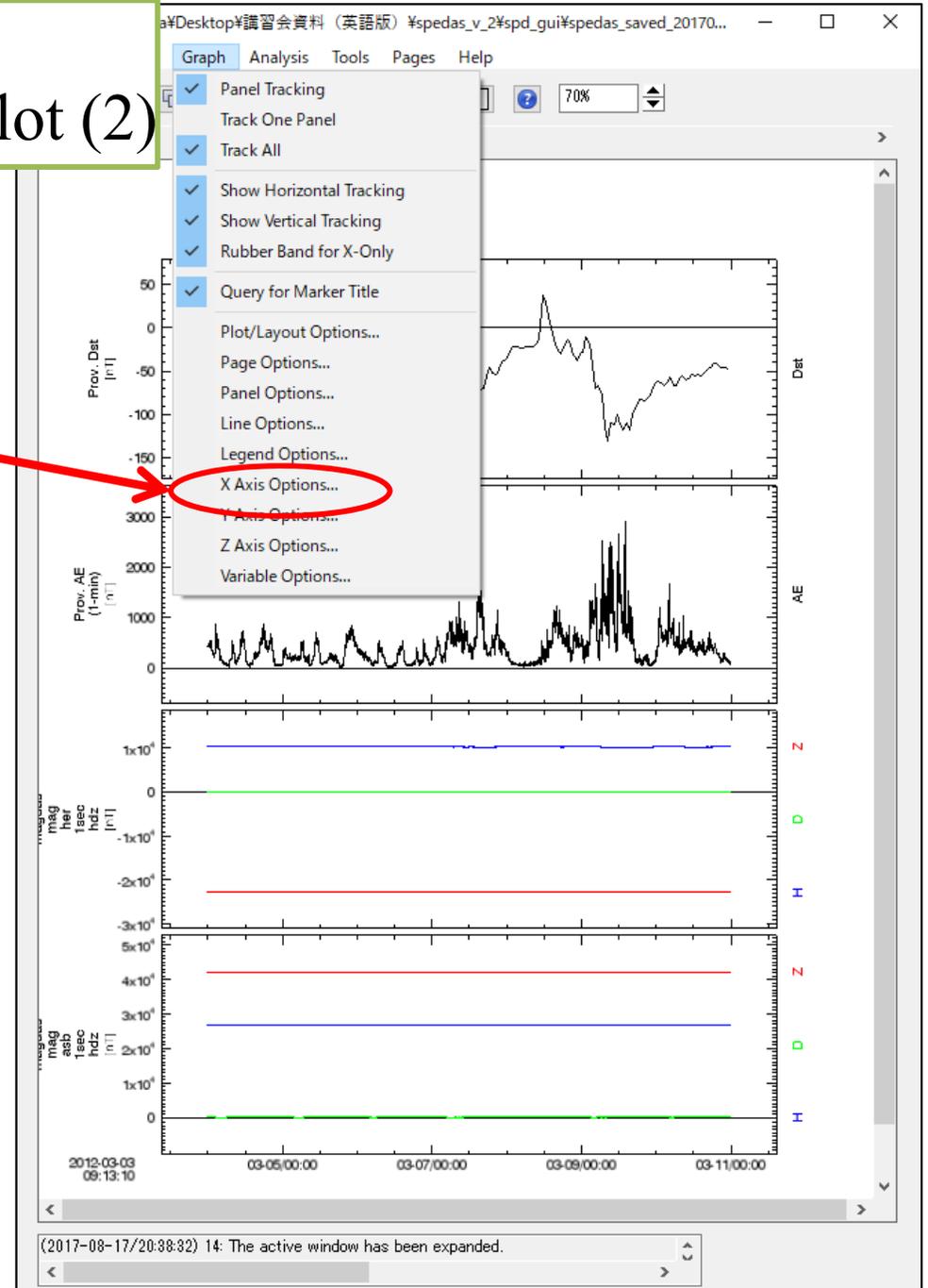


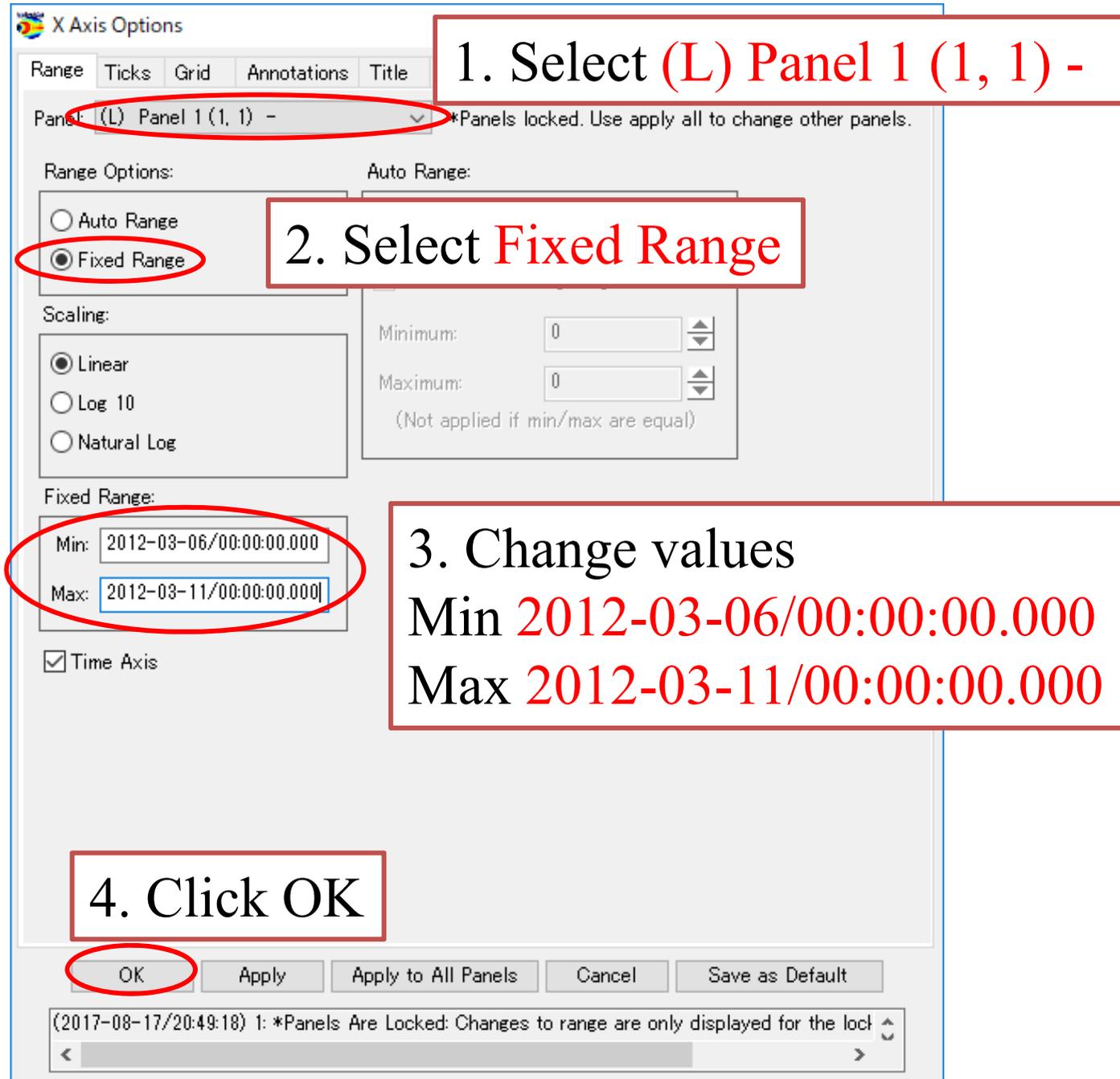
Shift right X range
by major tick marker



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

1. Select
Graph – X Axis Options





1. Select (L) Panel 1 (1, 1) -

2. Select Fixed Range

3. Change values
Min 2012-03-06/00:00:00.000
Max 2012-03-11/00:00:00.000

4. Click OK

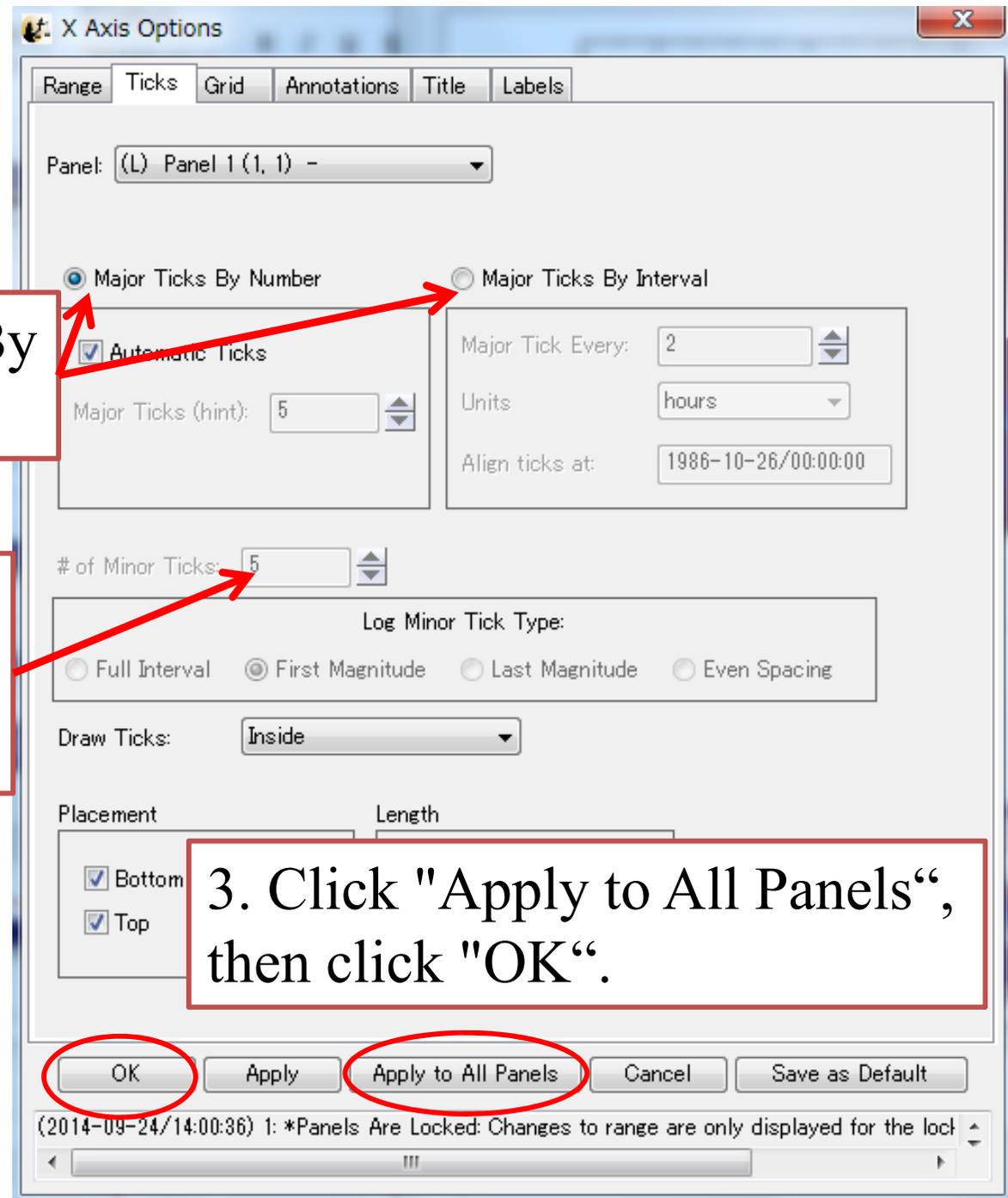
The screenshot shows the 'X Axis Options' dialog box with the following settings: Panel: (L) Panel 1 (1, 1) -; Range Options: Fixed Range selected; Scaling: Linear selected; Fixed Range: Min: 2012-03-06/00:00:00.000, Max: 2012-03-11/00:00:00.000; Time Axis: checked; OK button highlighted.

Lesson: Customize Ticks.

1. Select Major Ticks By Number or Interval.

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

3. Click "Apply to All Panels", then click "OK".

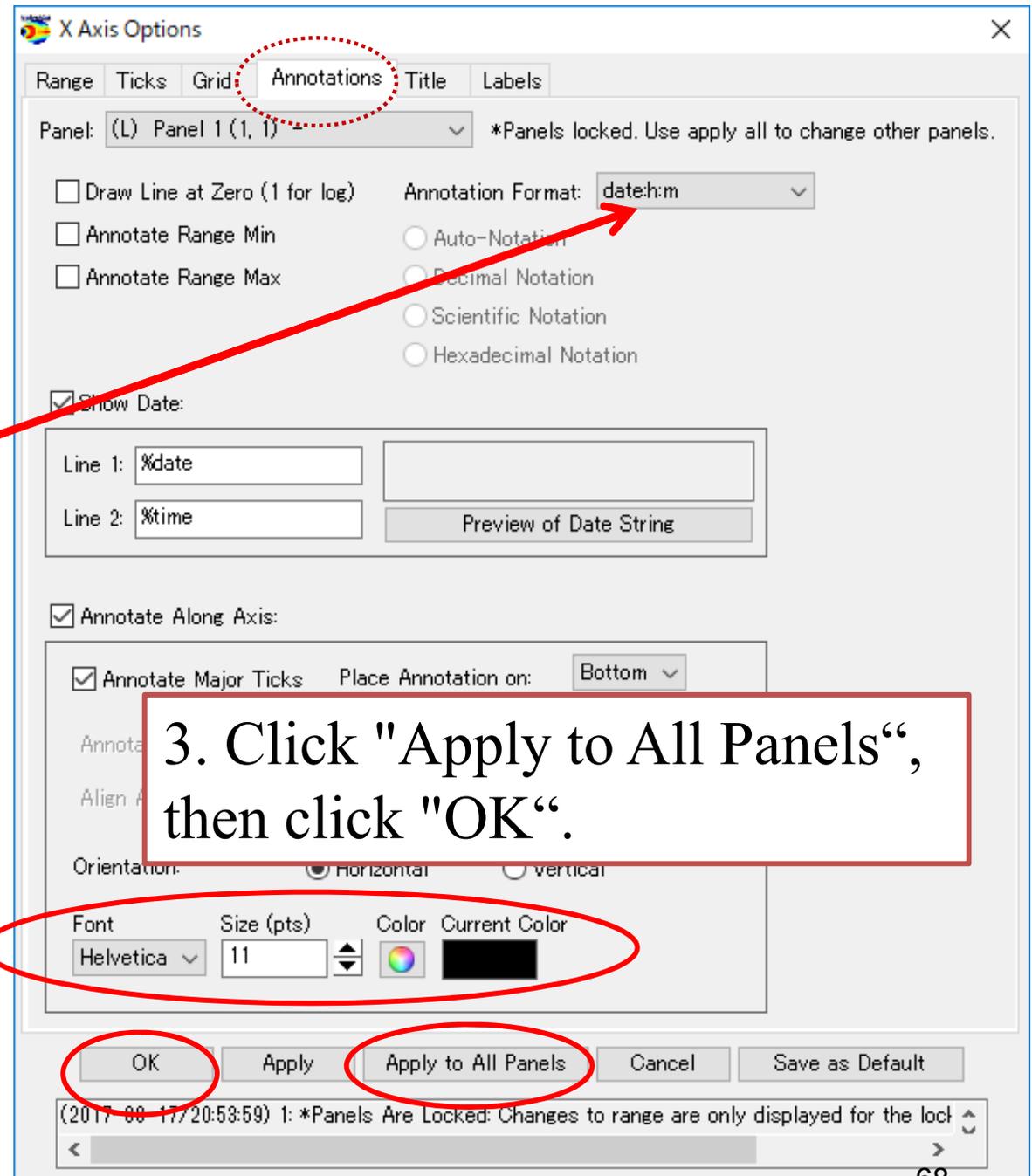


Lesson: Change Annotations

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.

3. Click "Apply to All Panels", then click "OK".



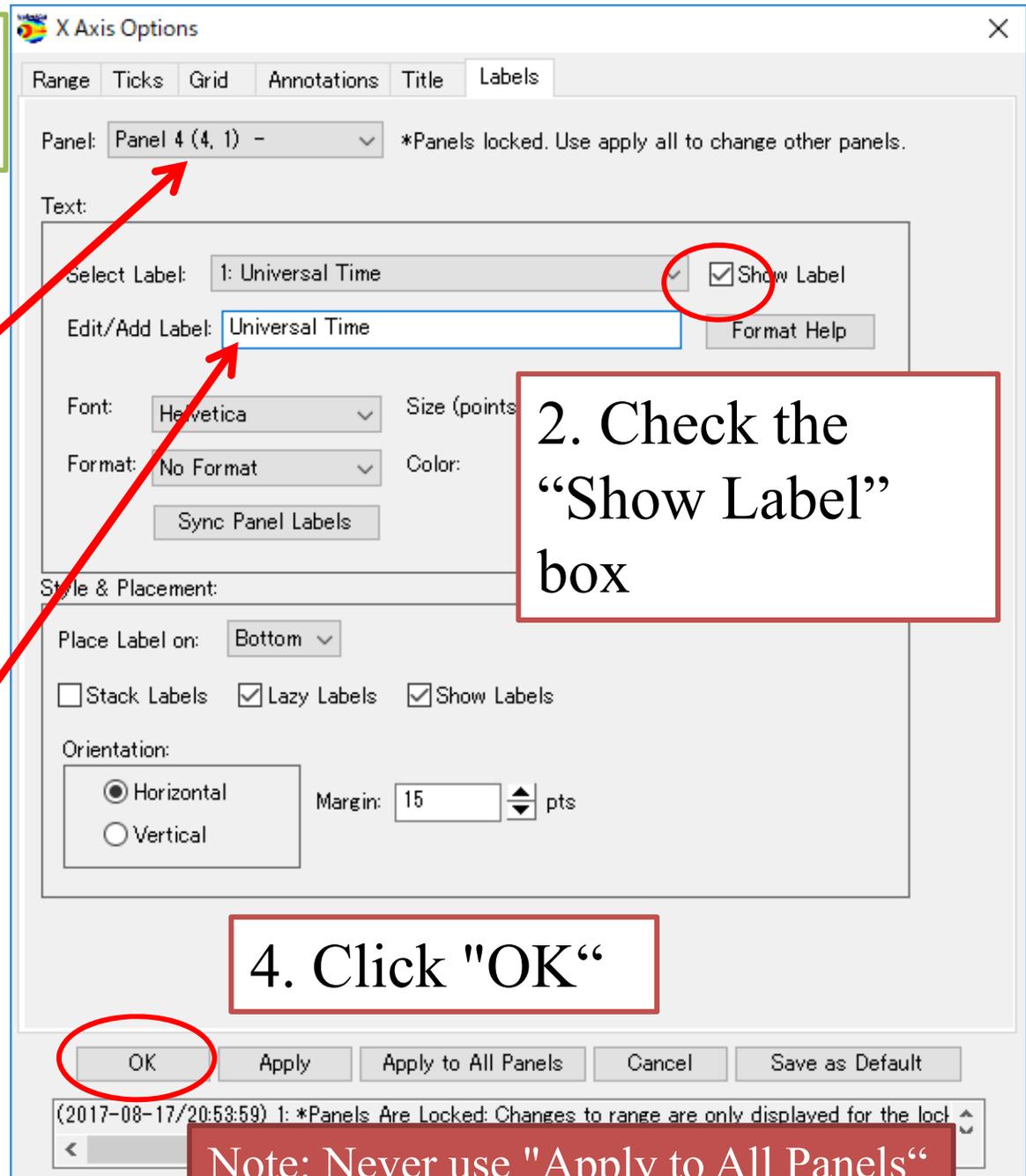
Lesson:
Customize Labels (of X axis)

1. Select the bottom panel number (“Panel 4”)

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

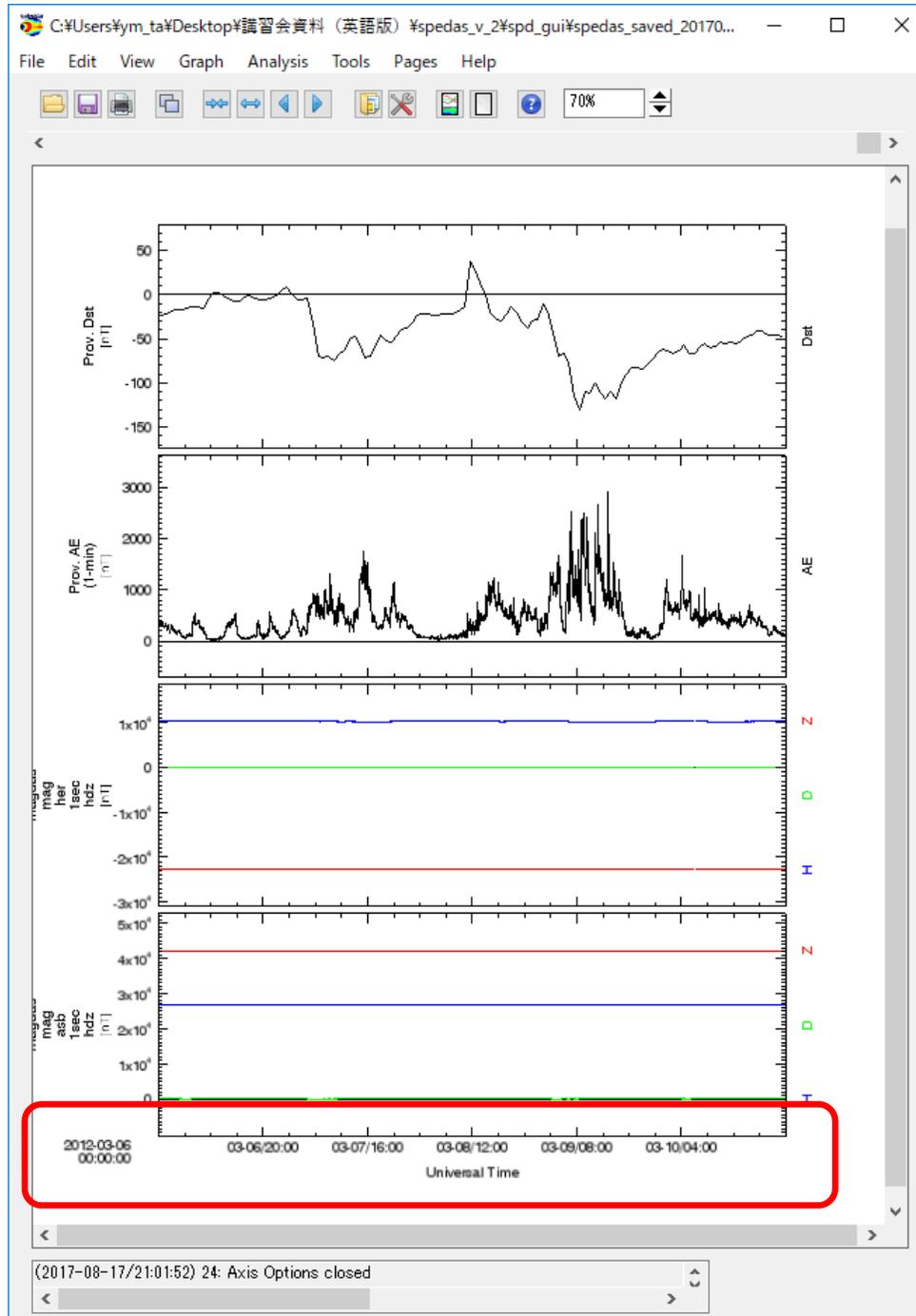
2. Check the “Show Label” box

4. Click "OK"



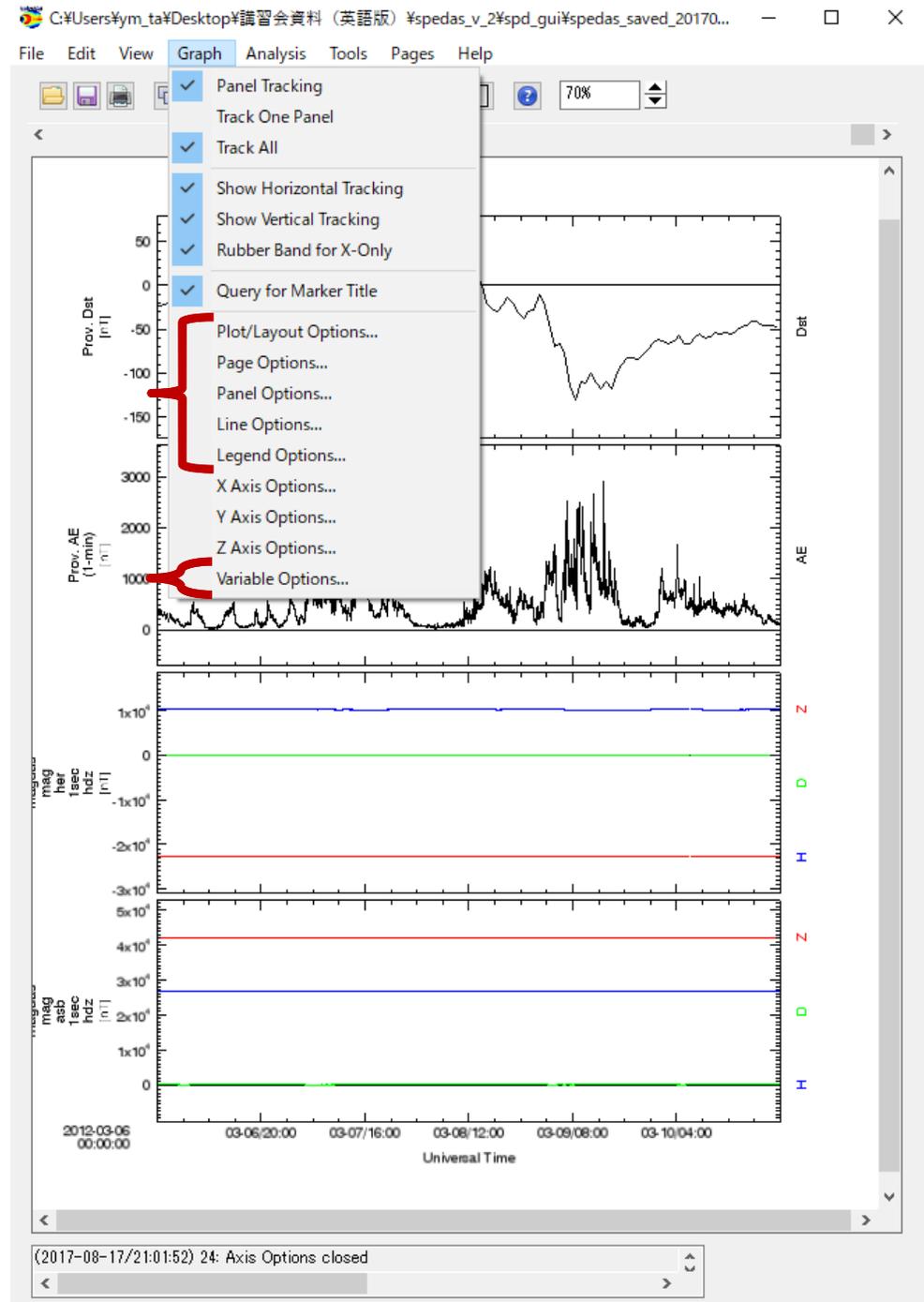
Note: Never use "Apply to All Panels"

Result



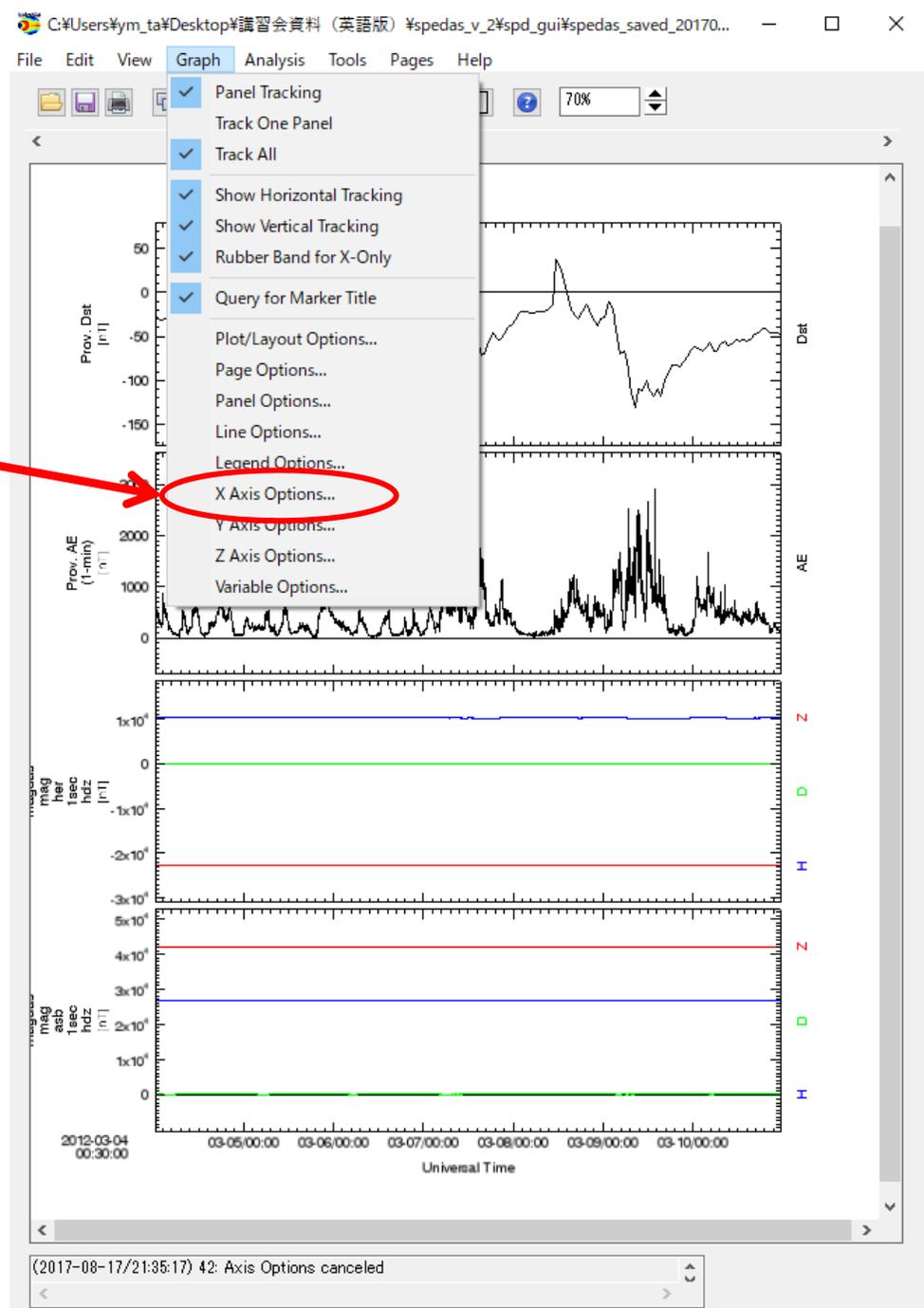
Other options.

- **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)

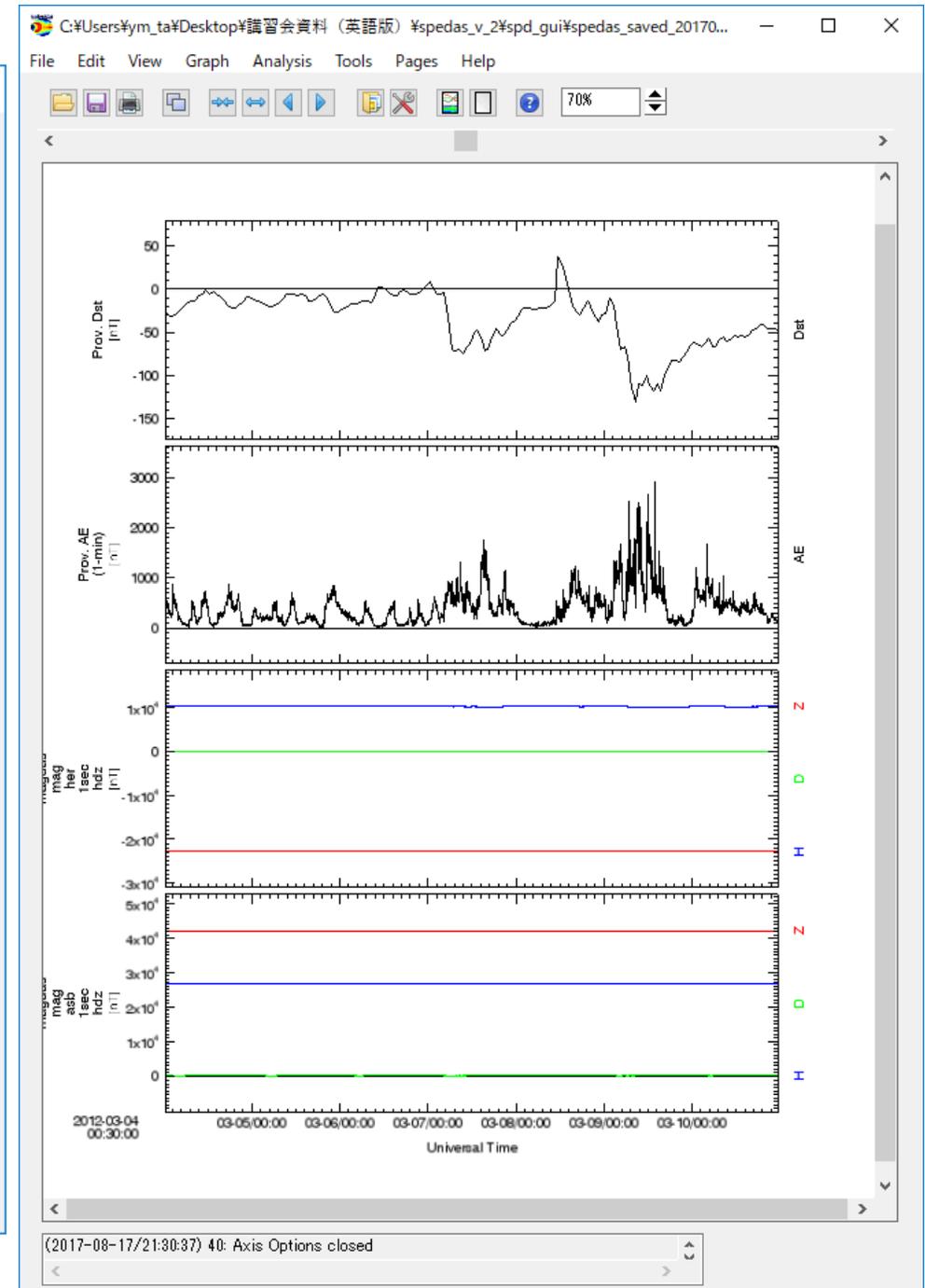
1. Select X Axis Options



1. Select (L) Panel 1(1, 1) -

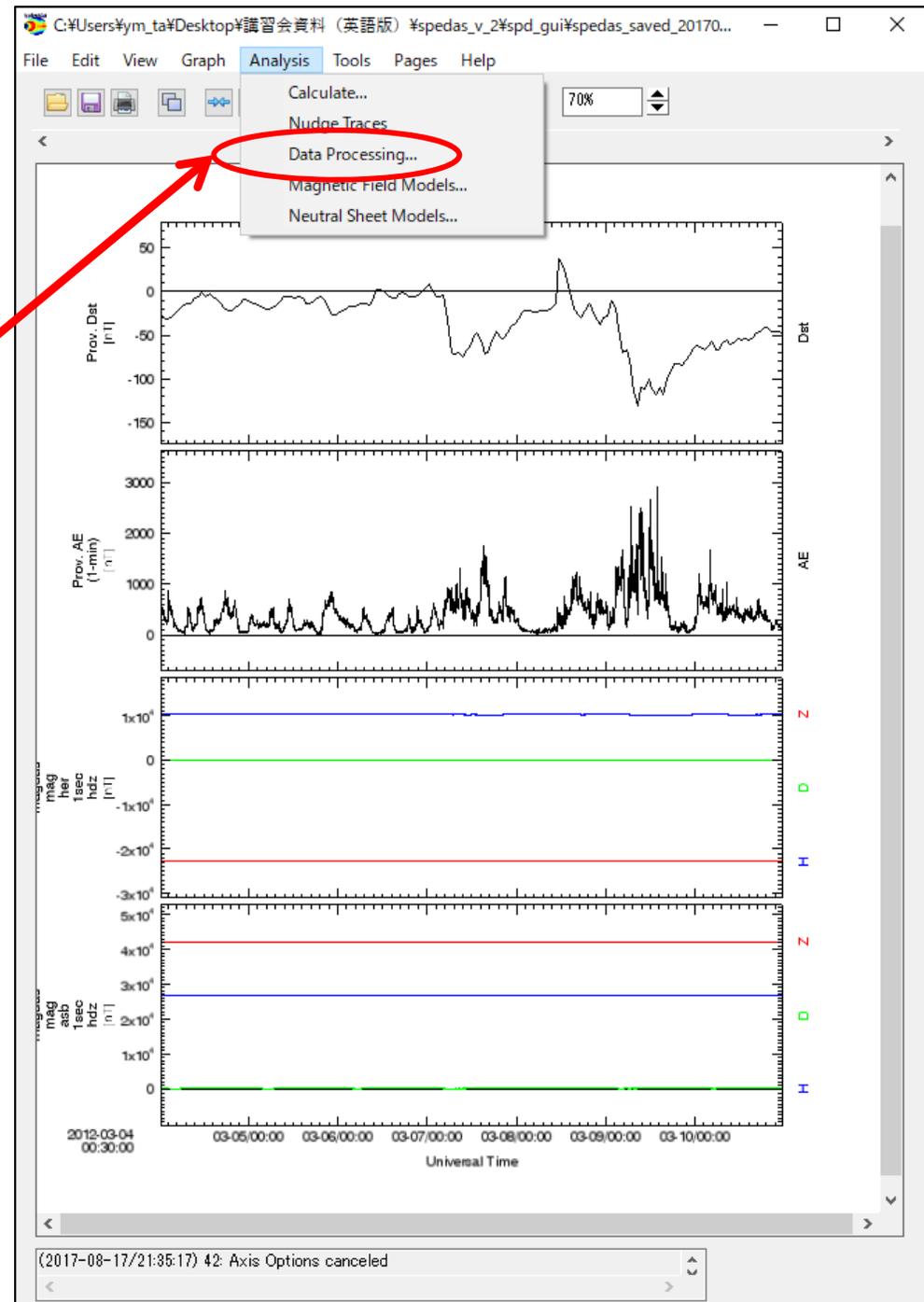
2. Select Auto Range

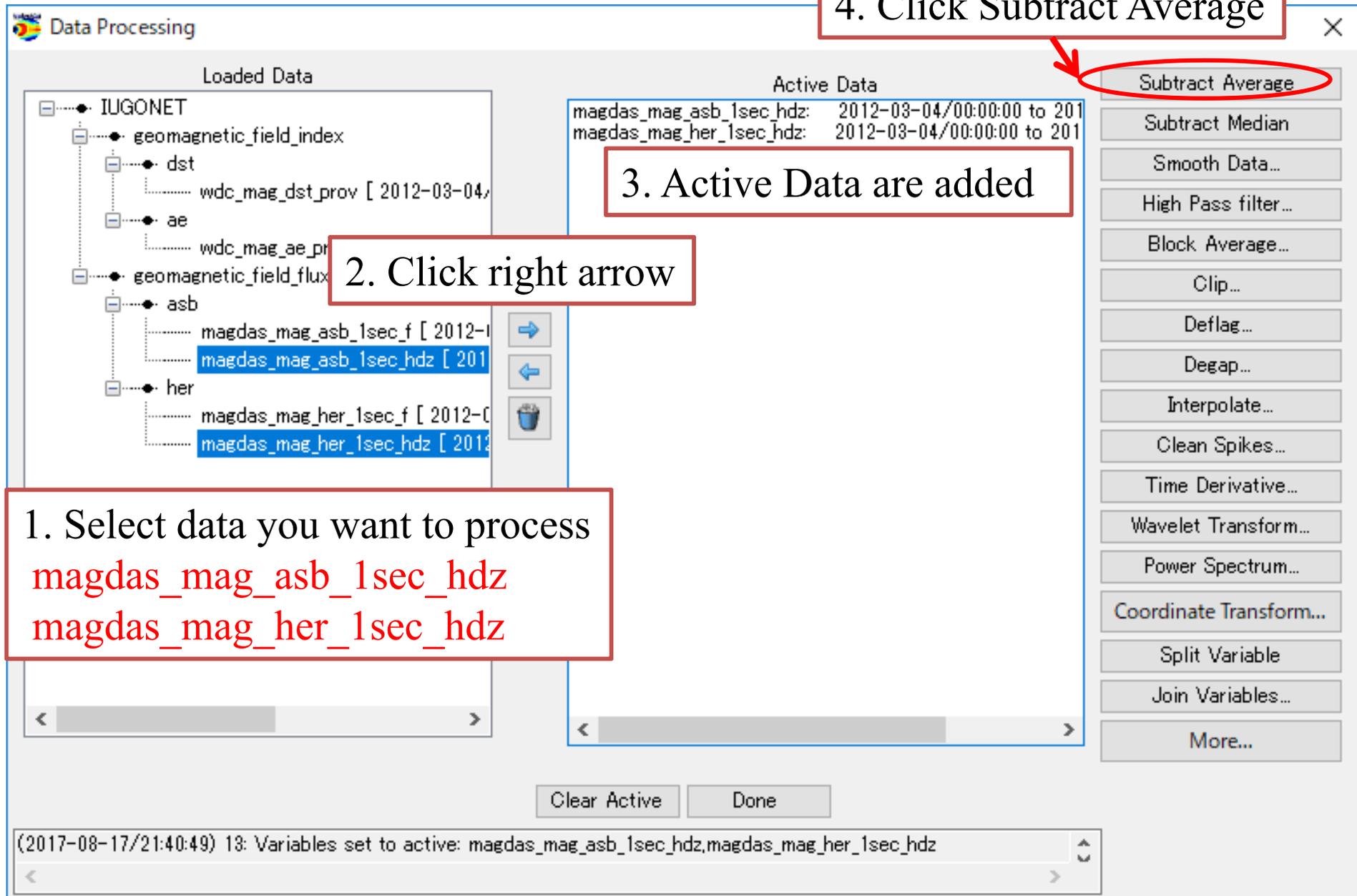
3. Click "OK"

Lesson:
Processing- subtract average

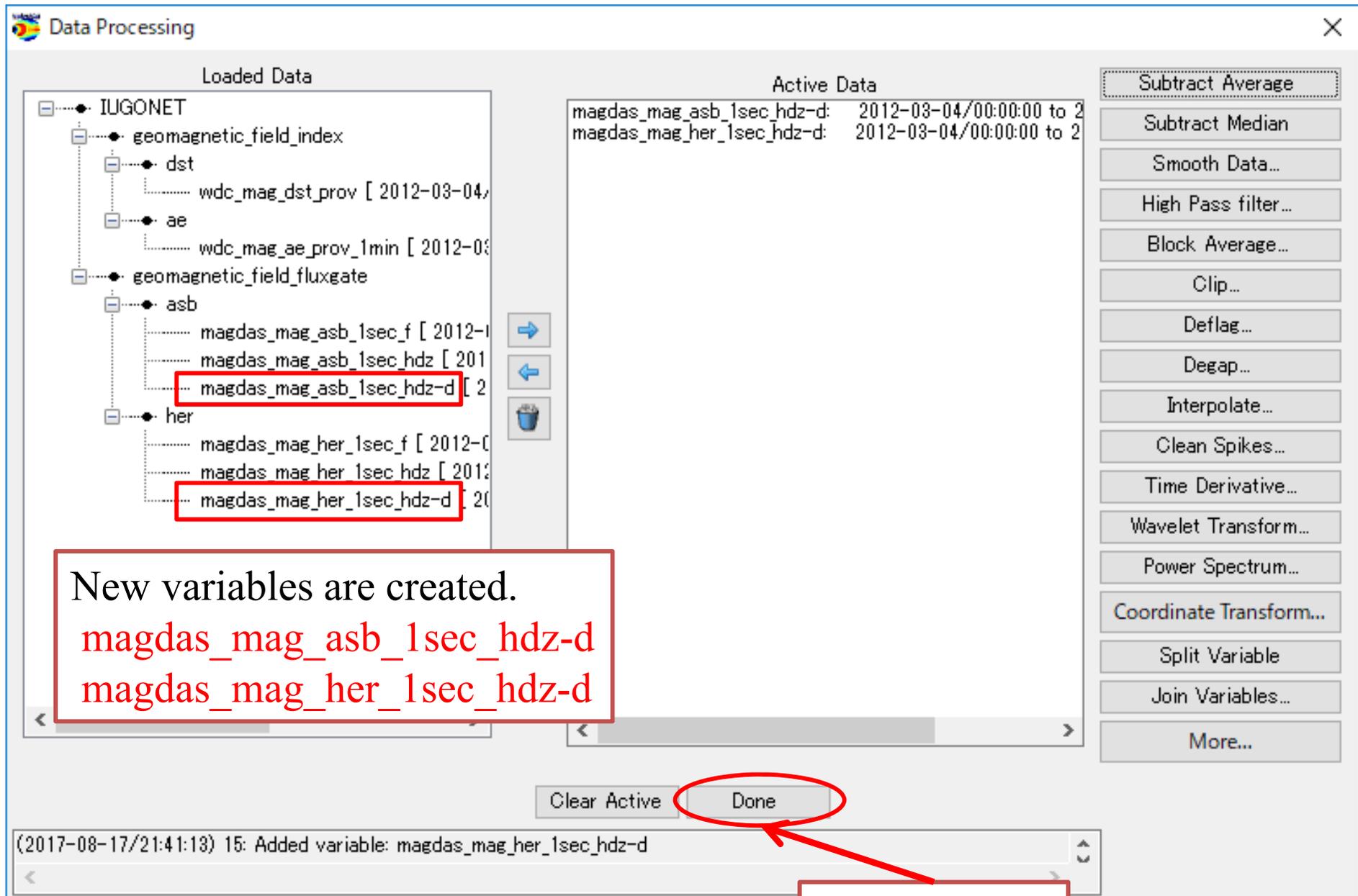
1. Select
Analysis – Data Processing





The screenshot shows the IUGONET Data Processing GUI. The interface is divided into several sections:

- Loaded Data:** A tree view on the left showing the data structure. Under 'geomagnetic_field_flux', the variables 'magdas_mag_asb_1sec_f' and 'magdas_mag_asb_1sec_hdz' are selected. A red box with the text '2. Click right arrow' points to the right-pointing arrow button next to these variables.
- Active Data:** A table on the right showing the active data variables: 'magdas_mag_asb_1sec_hdz: 2012-03-04/00:00:00 to 201' and 'magdas_mag_her_1sec_hdz: 2012-03-04/00:00:00 to 201'. A red box with the text '3. Active Data are added' points to this table.
- Processing Menu:** A vertical list of buttons on the right side of the GUI. The 'Subtract Average' button is circled in red, and a red arrow points to it from a box containing the text '4. Click Subtract Average'.
- Bottom Panel:** A status bar at the bottom shows the command '(2017-08-17/21:40:49) 13: Variables set to active: magdas_mag_asb_1sec_hdz,magdas_mag_her_1sec_hdz'. A red box with the text '1. Select data you want to process' and the variables 'magdas_mag_asb_1sec_hdz' and 'magdas_mag_her_1sec_hdz' is positioned above this status bar.



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 [2012-1
 - magdas_mag_asb_1sec_hdz [201
 - magdas_mag_asb_1sec_hdz-d [2
 - her
 - magdas_mag_her_1sec_f [2012-0
 - magdas_mag_her_1sec_hdz [201
 - magdas_mag_her_1sec_hdz-d [20

Active Data

- magdas_mag_asb_1sec_hdz-d: 2012-03-04/00:00:00 to 2
- magdas_mag_her_1sec_hdz-d: 2012-03-04/00:00:00 to 2

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...

Clear Active Done

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

New variables are created.

magdas_mag_asb_1sec_hdz-d
magdas_mag_her_1sec_hdz-d

1. Click Done

Open "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 t
 - magdas_mag_asb_1sec_hdz [2012-03-04/00:00:0
 - magdas_mag_asb_1sec_hdz-d [2012-03-04/00:0
 - her
 - magdas_mag_her_1sec_f [2012-03-04/00:00:00 t
 - magdas_mag_her_1sec_hdz [2012-03-04/00:00:0
 - magdas_mag_her_1sec_hdz-d [2012-03-04/00:00:0

3. Click line

Line ->

Spec ->

2. Select

magdas_mag_her_1sec_hdz-d

1. Remove Panel 3 and 4

Panels

Add

Remove

Edit



Row:

3

Column:

1

Row Span:

1

Span:

1

Per Page:

1

Per Page:

1

Lock To Panel

Unlock Panels

(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
Panel 3 (3, 1) -
- magdas_mag_her_1sec_hdz-d time -vs- magdas_mag_her_1sec_hdz-d
- magdas_mag_her_1sec_hdz-d time -vs- magdas_mag_her_1sec_hdz-d
- magdas_mag_her_1sec_hdz-d time -vs- magdas_mag_her_1sec_hdz-d

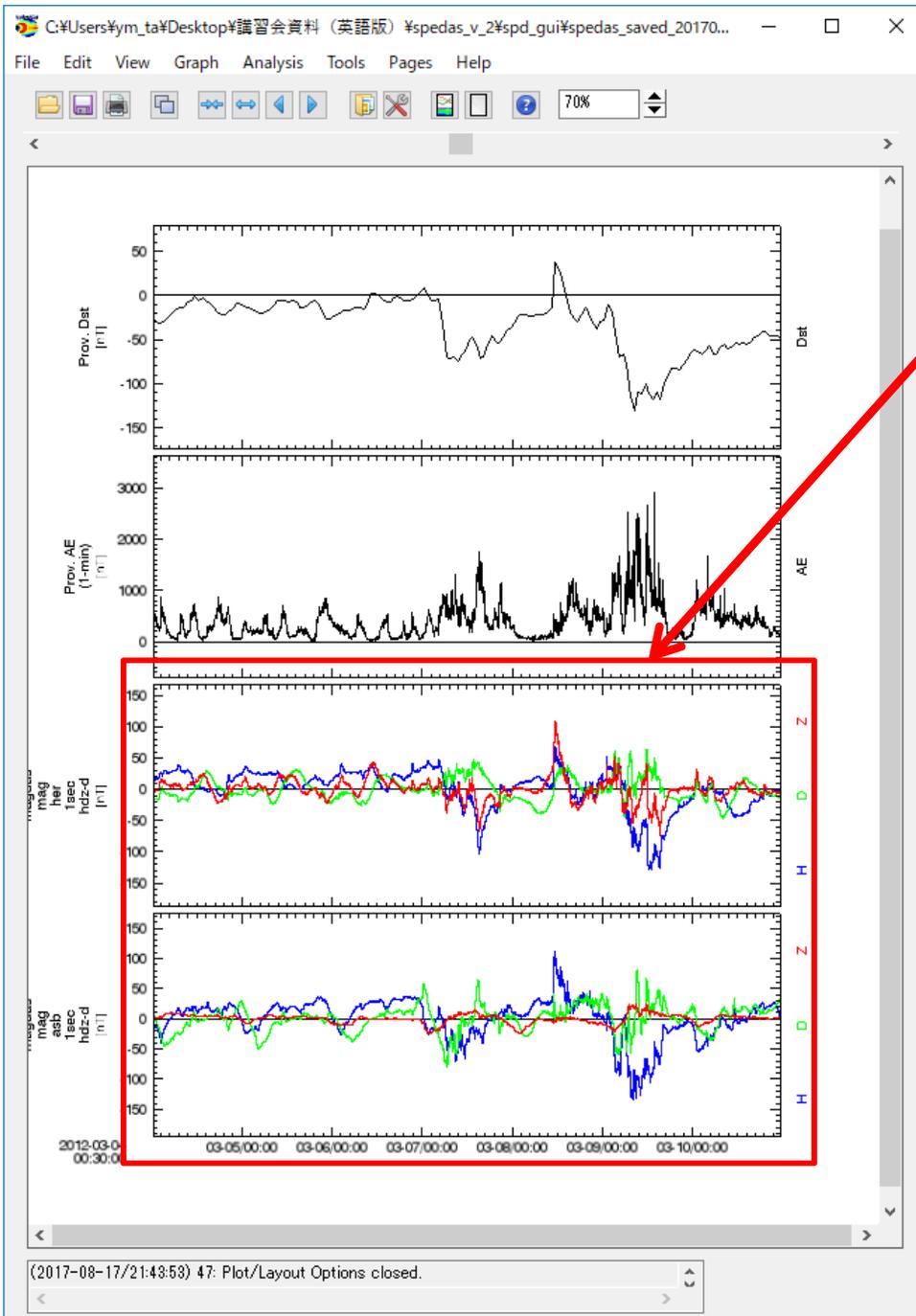
4. Data are added

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

OK

6. Click OK

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

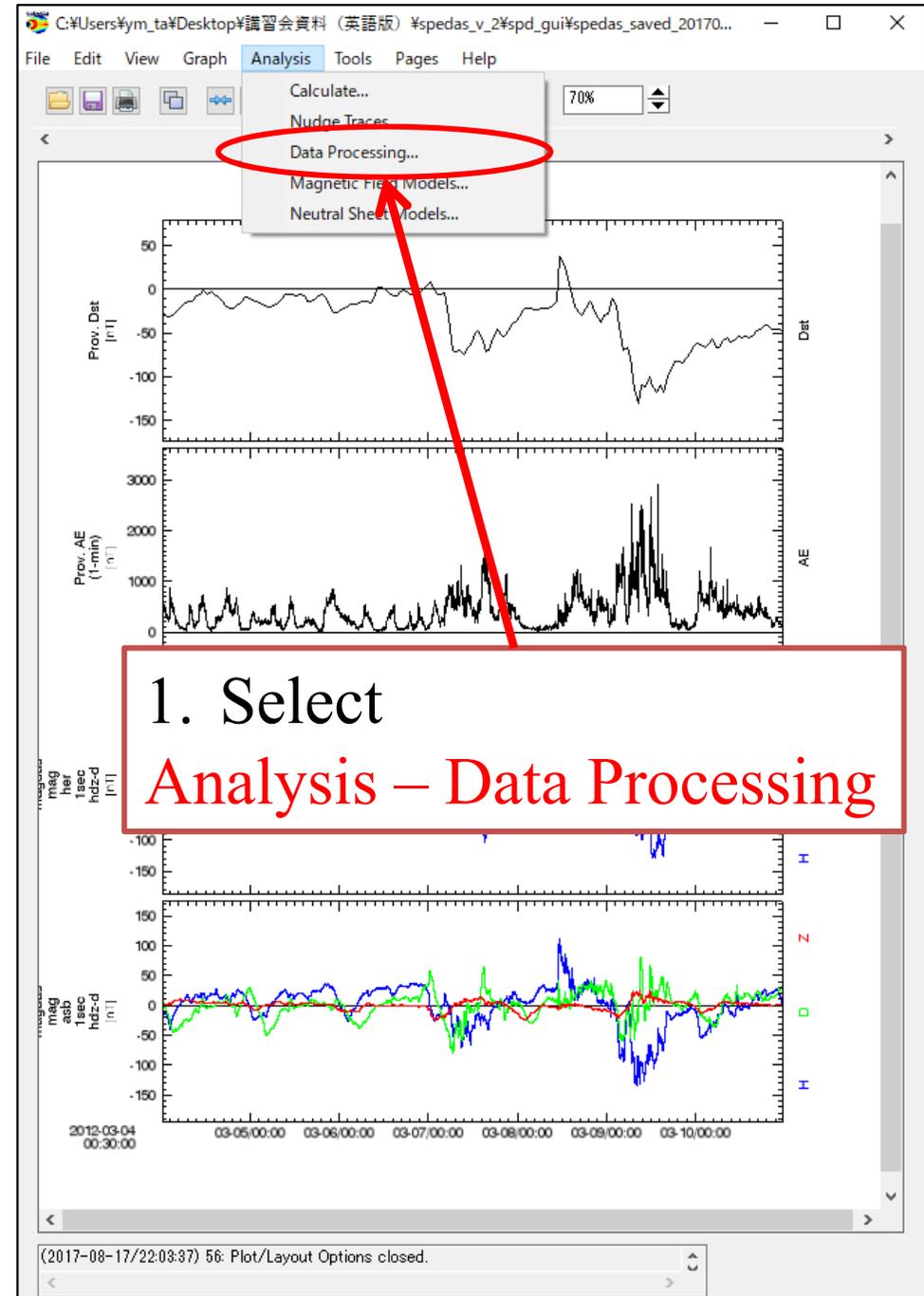


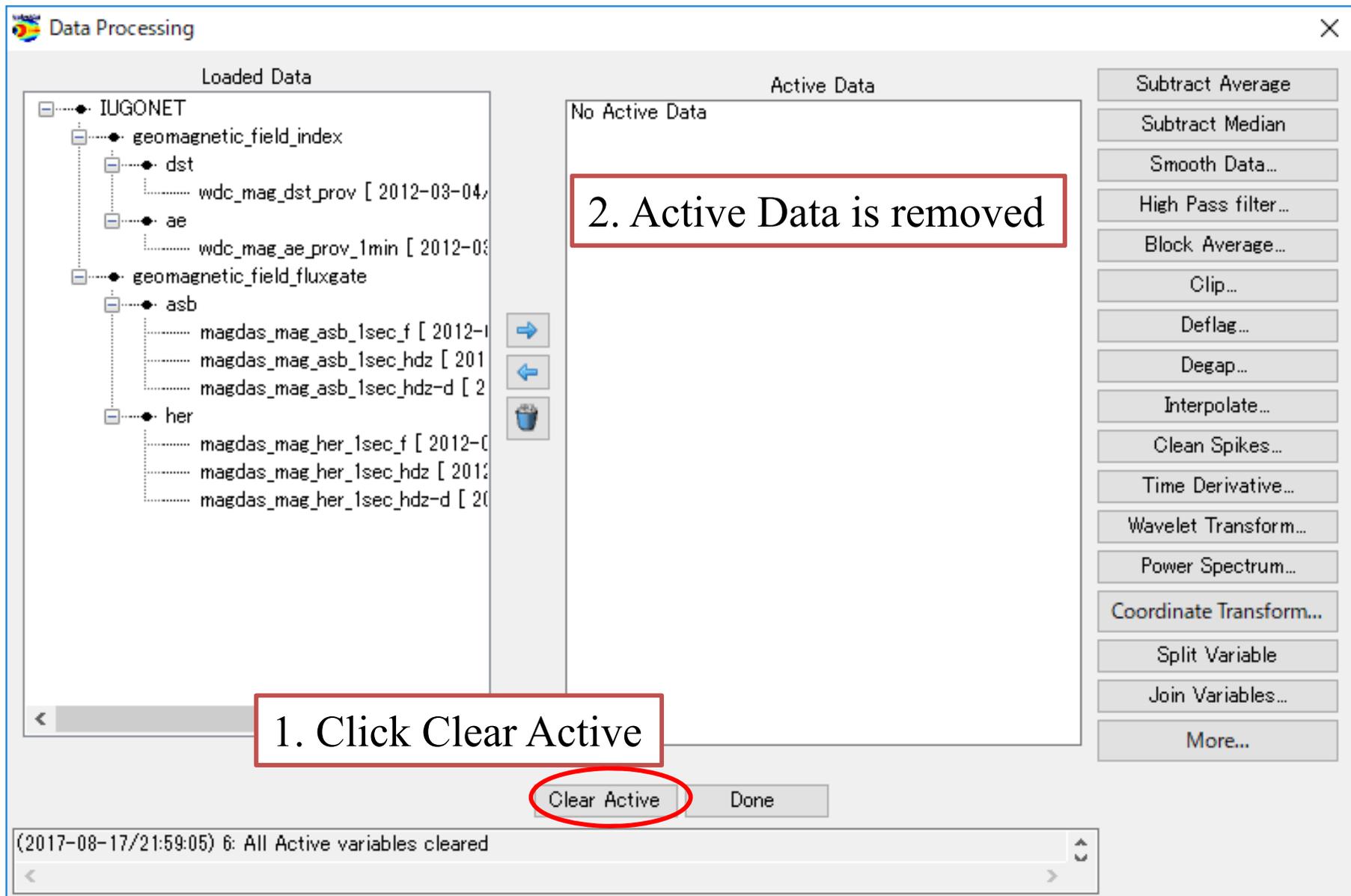
Subtracted average!

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





1. Click Clear Active

2. Active Data is removed

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

The screenshot displays the IUGONET Data Processing interface. On the left, the 'Loaded Data' tree shows a hierarchy starting with 'IUGONET', followed by 'geomagnetic_field_index', 'dst', 'ae', 'geomagnetic_field_fluxgate', 'asb', and 'her'. Each node contains specific data files with their respective dates. In the center, the 'Active Data' panel is empty, displaying 'No Active Data'. On the right, a vertical stack of processing buttons is visible, including '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...', and 'More...'. At the bottom, a 'Clear Active' button is circled in red, and a 'Done' button is next to it. The status bar at the very bottom indicates that all active variables have been cleared.

1. Select data
`magdas_mag_her_1sec_hdz`

2. Click right arrow

3. Active Data are added

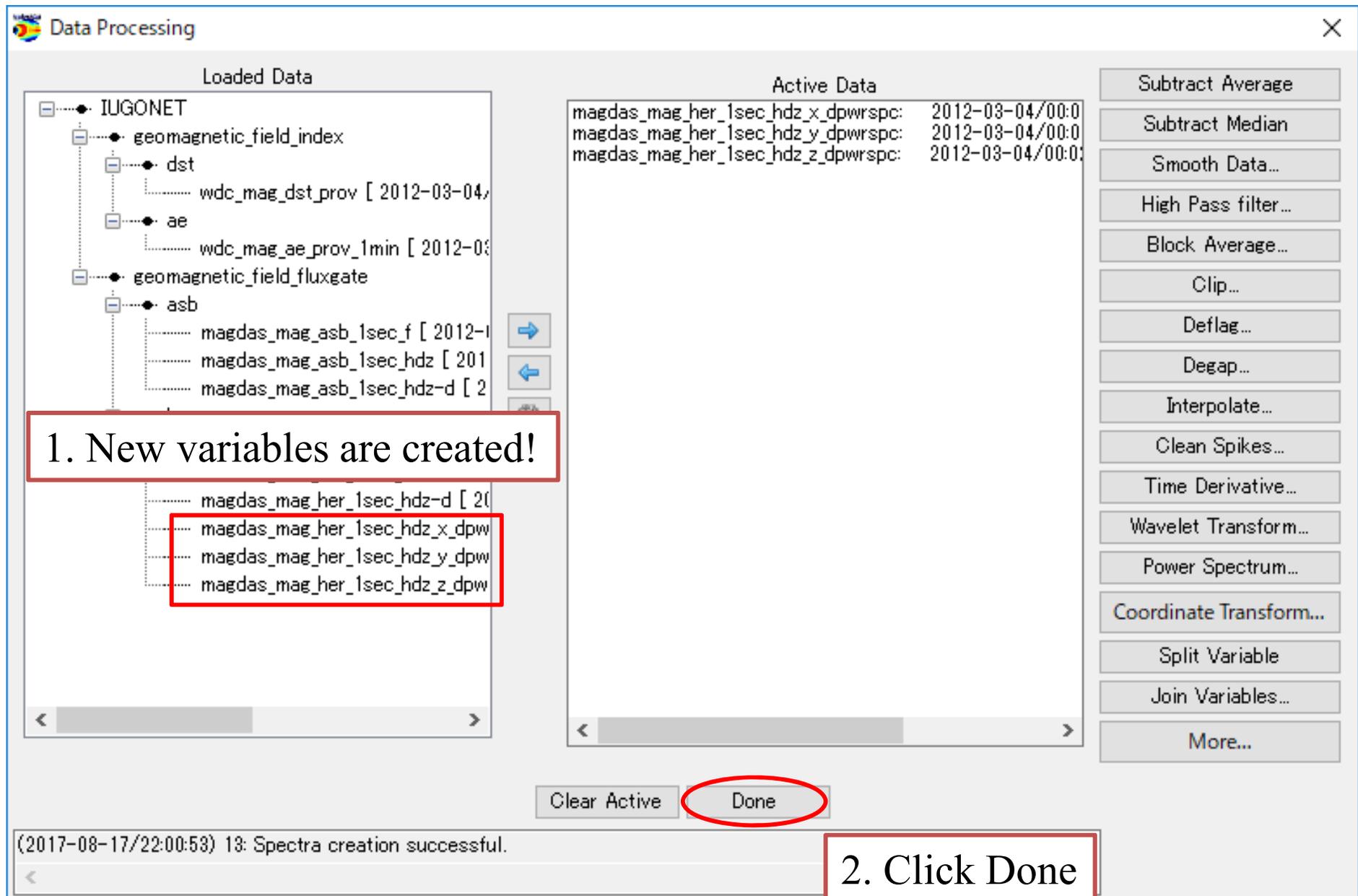
4. Click Power Spectrum

5. Click OK

Power Spectra Options

- Dynamic
- Suffix: `_dpwrspc`
- Window Size: 256
- Window Shift: 128
- Set Time Range:
 - Start Time: 2007-03-23/00:00:00
 - Stop Time: 2007-03-24/00:00:00
 - Use Single Day
- Bins: 3
- Remove NaNs From Input?
- No Line
- No Hanning
- Not Per Hz

Buttons: OK, Cancel, Help

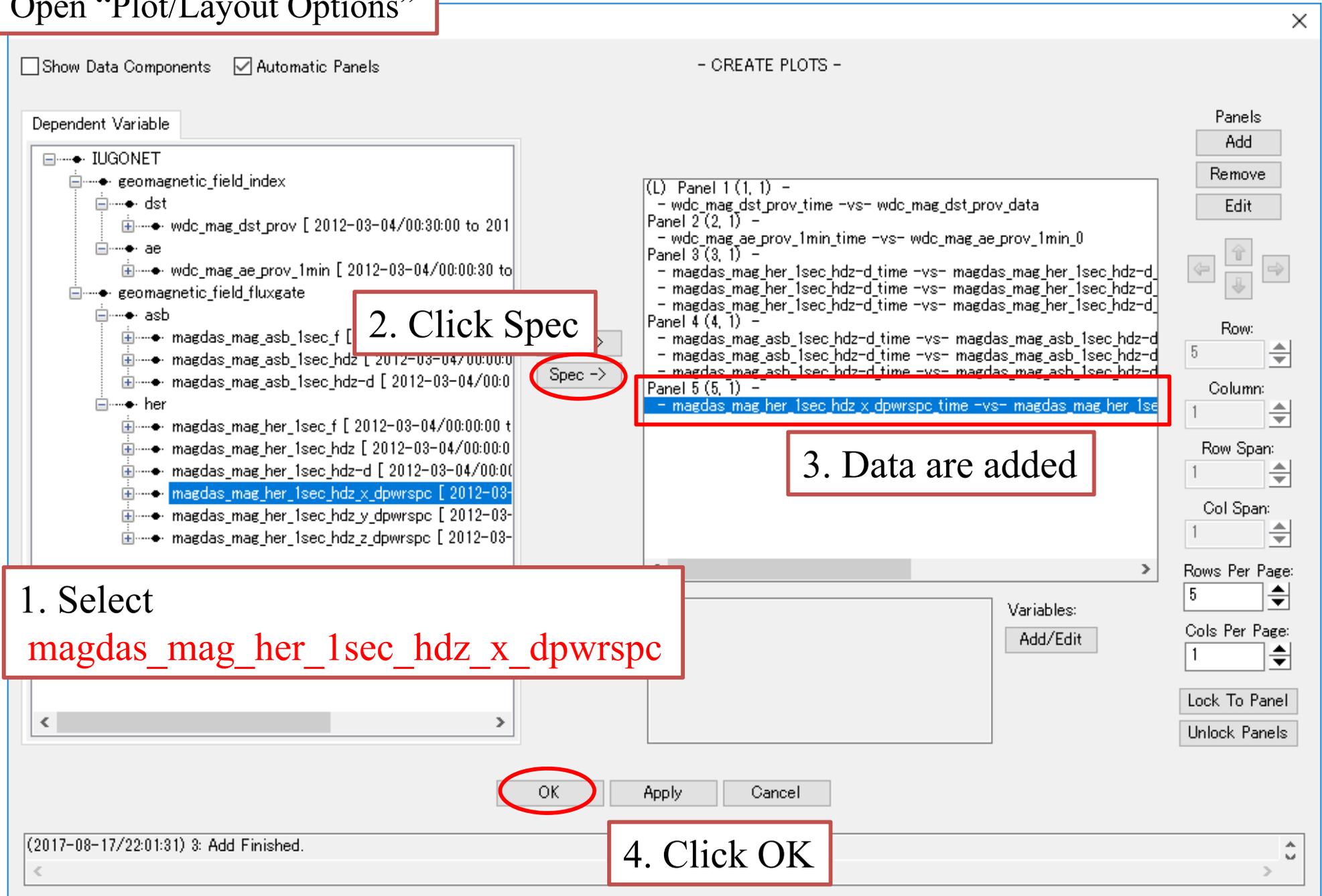


The screenshot shows the IUGONET Data Processing window. On the left, the 'Loaded Data' tree shows a hierarchy starting with 'IUGONET', followed by 'geomagnetic_field_index', 'dst', 'ae', 'geomagnetic_field_fluxgate', and 'asb'. Under 'asb', several variables are listed, including 'magdas_mag_asb_1sec_f', 'magdas_mag_asb_1sec_hdz', and 'magdas_mag_asb_1sec_hdz-d'. A red box highlights the text '1. New variables are created!' and another red box highlights the newly created variables: 'magdas_mag_asb_1sec_hdz_x_dpwrspc', 'magdas_mag_asb_1sec_hdz_y_dpwrspc', and 'magdas_mag_asb_1sec_hdz_z_dpwrspc'. On the right, the 'Active Data' list shows these three variables with their corresponding dates: '2012-03-04/00:00:00'. A red circle highlights the 'Done' button at the bottom center. On the far right, a vertical toolbar contains various processing options like 'Subtract Average', '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...', and 'More...'. At the bottom left, a status bar shows the message: '(2017-08-17/22:00:53) 13: Spectra creation successful.'

1. New variables are created!

2. Click Done

Open “Plot/Layout Options”



The screenshot shows the 'CREATE PLOTS' dialog box in the IUGONET software. The interface includes a tree view of dependent variables on the left, a list of plot panels in the center, and control buttons on the right and bottom. Red boxes and circles highlight specific actions and elements.

1. Select
magdas_mag_her_1sec_hdz_x_dpwrspc

2. Click Spec

3. Data are added

4. Click OK

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 [2012-03-04/00:00:30 to
geomagnetic_field_fluxgate
 - asb
 - magdas_mag_asb_1sec_f [2012-03-04/00:00:00 to 2012-03-04/00:00:00
 - magdas_mag_asb_1sec_hdz [2012-03-04/00:00:00 to 2012-03-04/00:00:00
 - magdas_mag_asb_1sec_hdz-d [2012-03-04/00:00:00 to 2012-03-04/00:00:00
her
 - magdas_mag_her_1sec_f [2012-03-04/00:00:00 to 2012-03-04/00:00:00
 - magdas_mag_her_1sec_hdz [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
 - magdas_mag_her_1sec_hdz_x_dpwrspc [2012-03-04/00:00:00 to 2012-03-04/00:00:00
 - magdas_mag_her_1sec_hdz_y_dpwrspc [2012-03-04/00:00:00 to 2012-03-04/00:00:00
 - magdas_mag_her_1sec_hdz_z_dpwrspc [2012-03-04/00:00:00 to 2012-03-04/00:00:00

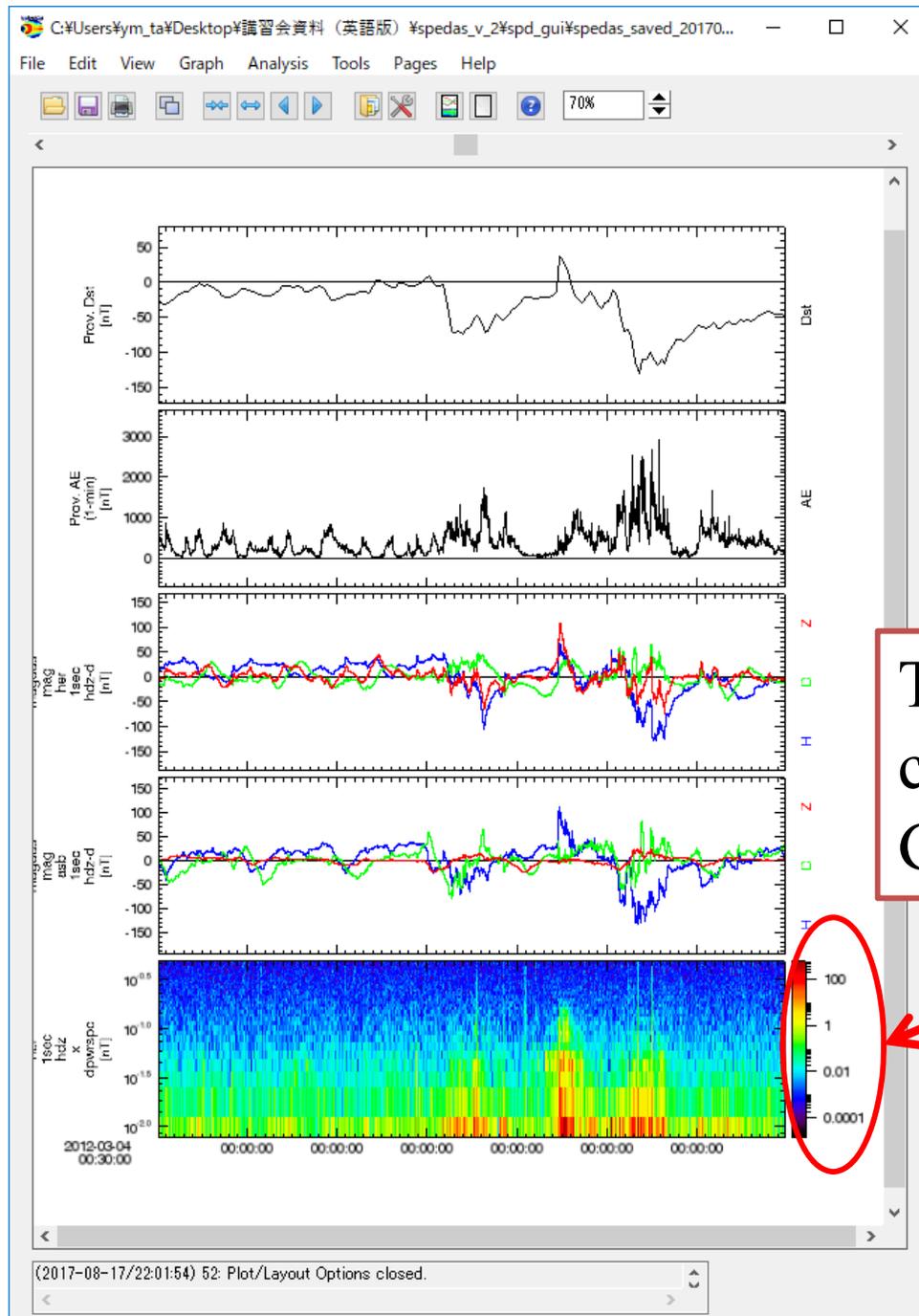
(L) Panel 1 (1, 1) -
- wdc_mag_dst_prov_time -vs- wdc_mag_dst_prov_data
Panel 2 (2, 1) -
- wdc_mag_ae_prov_1min_time -vs- wdc_mag_ae_prov_1min_0
Panel 3 (3, 1) -
- magdas_mag_her_1sec_hdz-d_time -vs- magdas_mag_her_1sec_hdz-d
- magdas_mag_her_1sec_hdz-d_time -vs- magdas_mag_her_1sec_hdz-d
- magdas_mag_her_1sec_hdz-d_time -vs- magdas_mag_her_1sec_hdz-d
Panel 4 (4, 1) -
- magdas_mag_asb_1sec_hdz-d_time -vs- magdas_mag_asb_1sec_hdz-d
- magdas_mag_asb_1sec_hdz-d_time -vs- magdas_mag_asb_1sec_hdz-d
- magdas_mag_asb_1sec_hdz-d_time -vs- magdas_mag_asb_1sec_hdz-d
Panel 5 (5, 1) -
- magdas_mag_her_1sec_hdz_x_dpwrspc_time -vs- magdas_mag_her_1sec_hdz_x_dpwrspc

Variables:
Add/Edit

OK Apply Cancel

(2017-08-17/22:01:31) 3: Add Finished.

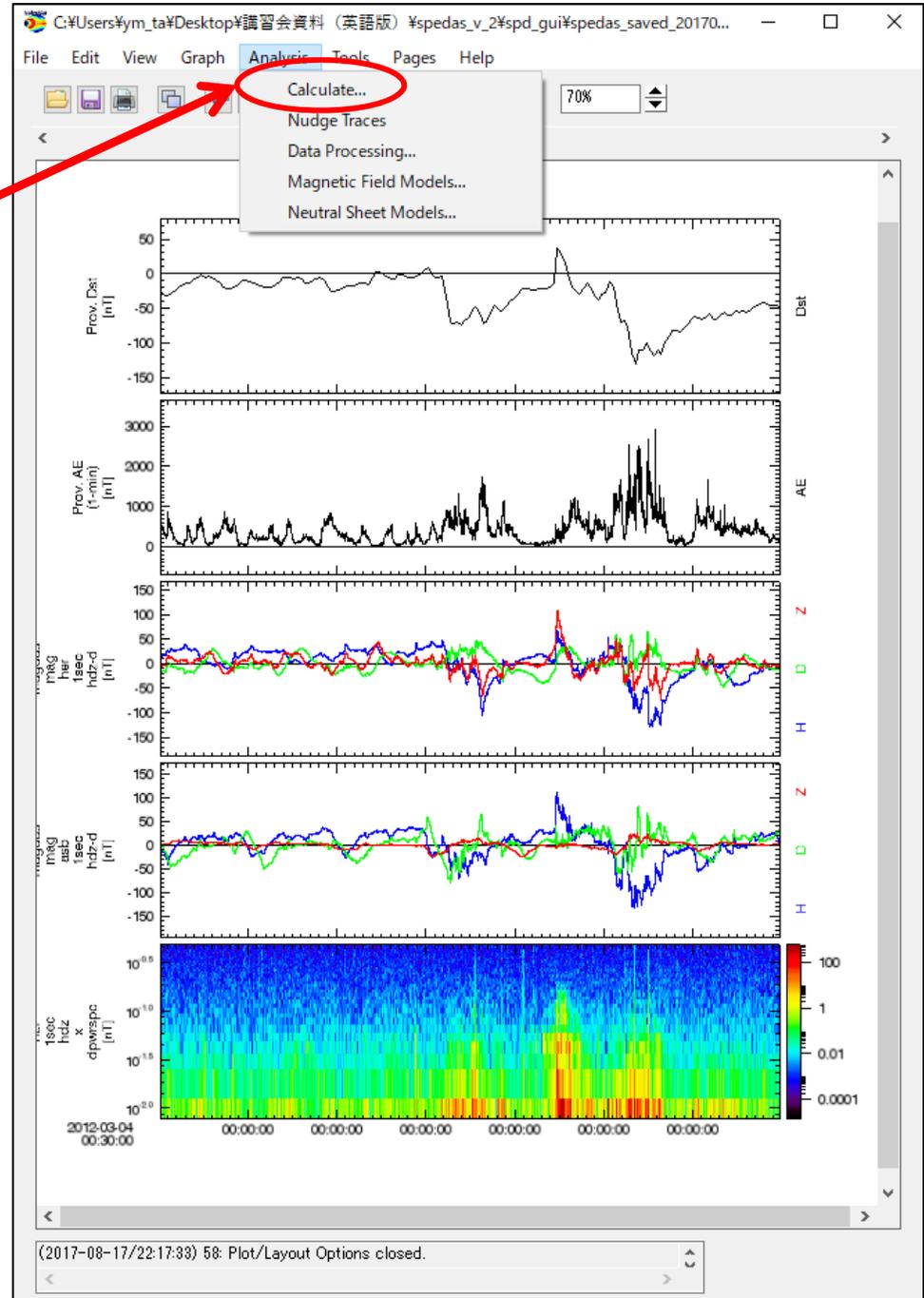
Result



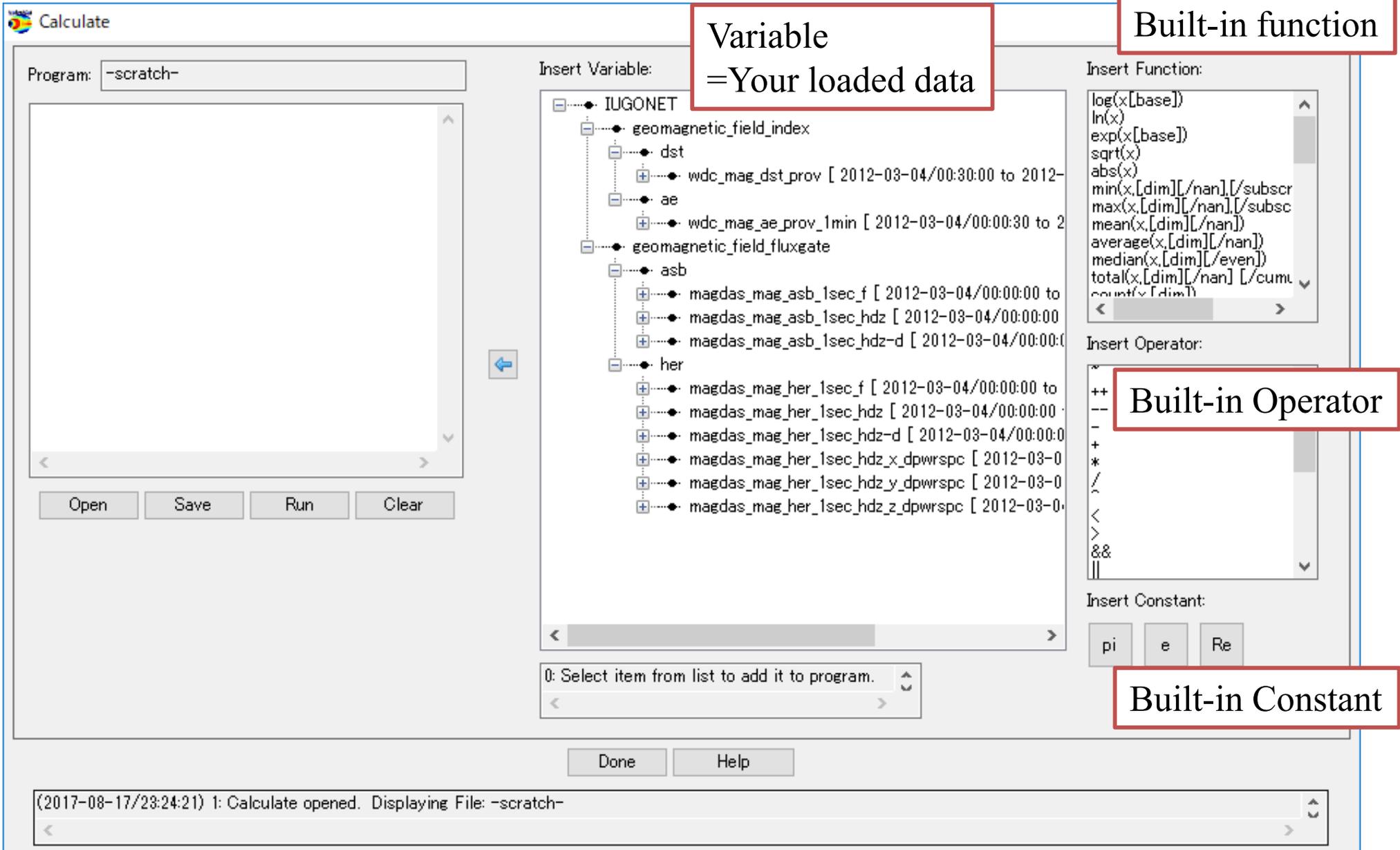
This color bar can be customized in Graph - Z Axis Options.

Lesson:
Use Calculate (Equation editor)

1. Select
Analysis – Calculate...



Equation Editor for SPEDAS



Variable
=Your loaded data

Built-in function

Built-in Operator

Built-in Constant

(2017-08-17/23:24:21) 1: Calculate opened. Displaying File: -scratch-

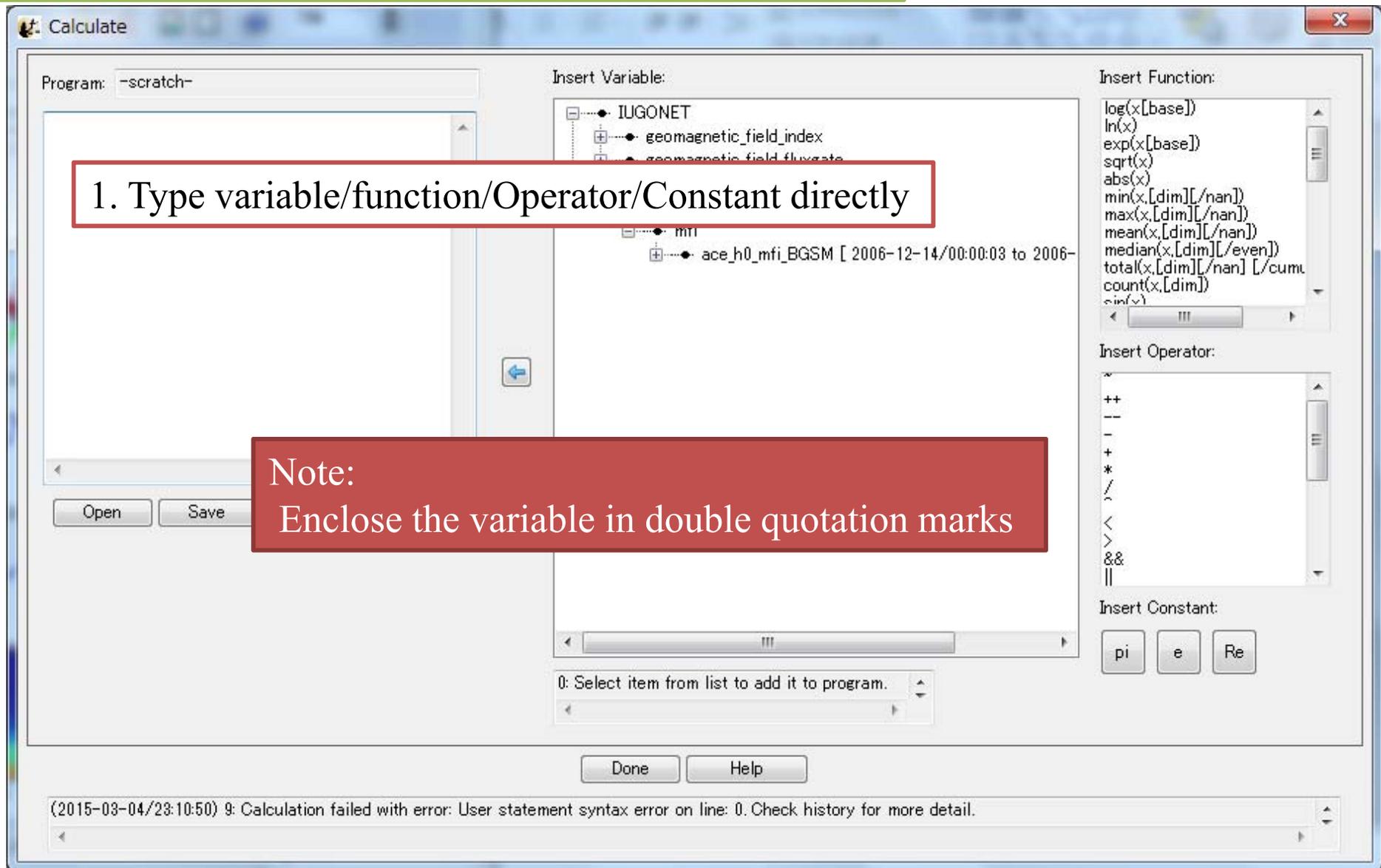
Lesson:

Make an equation using the loaded variables.

1. Type variable/function/Operator/Constant directly

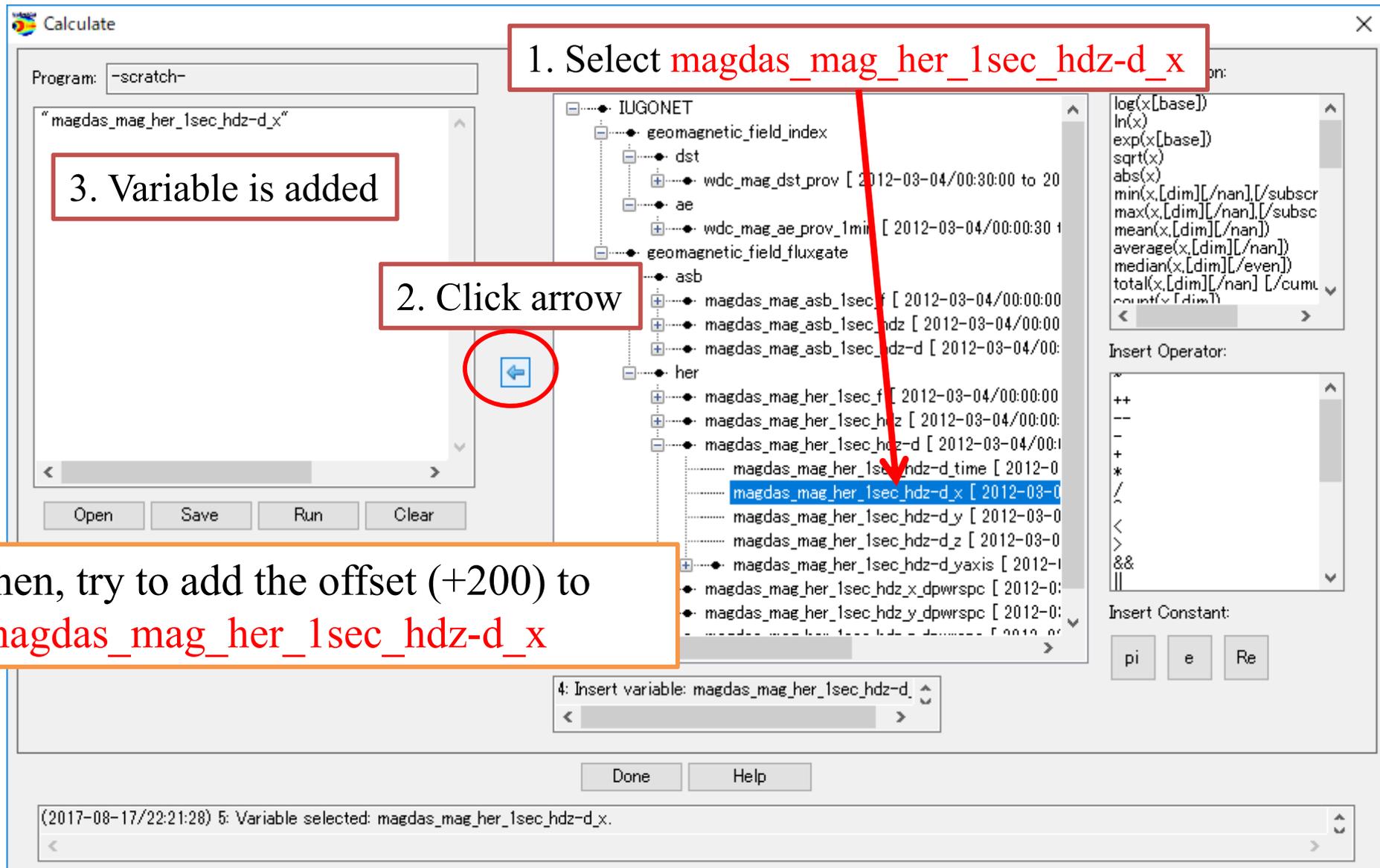
Note:

Enclose the variable in double quotation marks



Lesson:

Make an equation using the loaded variables.



The screenshot shows the 'Calculate' window with the following elements:

- Program:** -scratch-
- Equation Editor:** "magdas_mag_her_1sec_hdz-d_x"
- Variable List:** A tree view under 'IUGONET' containing various variables. The variable 'magdas_mag_her_1sec_hdz-d_x' is highlighted in blue.
- Function List:** A list of mathematical functions such as log(x), ln(x), exp(x), sqrt(x), abs(x), min(x), max(x), mean(x), average(x), median(x), total(x), and count(x).
- Insert Operator:** A list of operators including ++, --, -, +, *, /, <, >, &&, and ||.
- Insert Constant:** Buttons for pi, e, and Re.
- Status Bar:** Shows the current operation: "4: Insert variable: magdas_mag_her_1sec_hdz-d_x" and "5: Variable selected: magdas_mag_her_1sec_hdz-d_x."

Three numbered instructions are overlaid on the screenshot:

1. Select **magdas_mag_her_1sec_hdz-d_x** (indicated by a red arrow pointing to the selected variable in the list).
2. Click arrow (indicated by a red circle around a blue arrow button in the variable list).
3. Variable is added (indicated by a red box around the text in the equation editor).

Then, try to add the offset (+200) to **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

Program: -scratch-

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

Buttons: Open, Save, Run, Clear

1. Click Run

Insert Variable:

- wdc_mag_dst_prov [2012-03-04/00:30:00 to 20...
- ae
- wdc_mag_ae_prov_1min [2012-03-04/00:00:30 t...
- geomagnetic_field_fluxgate
- asb
 - magdas_mag_asb_1sec_f [2012-03-04/00:00:00
 - magdas_mag_asb_1sec_hdz [2012-03-04/00:00:
 - magdas_mag_asb_1sec_hdz-d [2012-03-04/00:
 - magdas_mag_asb_1sec_hdz-d_x_ofst [2012-03-
- her
 - magdas_mag_her_1sec_f [2012-03-04/00:00:00
 - magdas_mag_her_1sec_hdz [2012-03-04/00:00:
 - magdas_mag_her_1sec_hdz-d [2012-03-04/00:1
 - magdas_mag_her_1sec_hdz-d_time [2012-0
 - magdas_mag_her_1sec_hdz-d_x [2012-03-0
 - magdas_mag_her_1sec_hdz-d_y [2012-03-0
 - magdas_mag_her_1sec_hdz-d_z [2012-03-0
 - magdas_mag_her_1sec_hdz-d_yaxis [2012-1
 - magdas_mag_her_1sec_hdz_x_dpwrspc [2012-0:
 - magdas_mag_her_1sec_hdz_y_dpwrspc [2012-0:
 - magdas_mag_her_1sec_hdz_z_dpwrspc [2012-0:
 - magdas_mag_her_1sec_hdz-d_x_ofst [2012-03-

Insert Function:

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

Insert Operator:

- ++
-
-
- +
- *
- /
- ^
- <
- >
- &&
- ||

Insert Constant:

- pi
- e
- Re

2. A new variable is created

3. Click done

Buttons: Done, Help

(2017-08-17/22:53:49) 14: Calculation complete

Open "Plot/Layout Options"

The screenshot shows the 'CREATE PLOTS' dialog box in the IUGONET software. The interface includes a tree view of dependent variables on the left, a list of panels in the center, and a control panel on the right. Annotations in red boxes and lines provide step-by-step instructions:

- 1. Select Panel 3 and Remove it**: A red box highlights the 'Remove' button in the 'Panels' control panel.
- 2. Select**
magdas_mag_her_1sec_hdz-d_y
magdas_mag_her_1sec_hdz-d_x_ofst: A red box highlights the selected variables in the 'Dependent Variable' tree view.
- 3. Click Line**: A red box highlights the 'Line ->' button in the 'Line ->' and 'Spec ->' buttons area.
- 4. Data are added**: A red box highlights the updated list of panels in the center, showing that the selected variables have been added to Panel 6.

At the bottom of the dialog, there are 'OK', 'Apply', and 'Cancel' buttons. A status bar at the very bottom shows the message: '(2017-08-17/22:54:53) 4: Add Finished.'

Open "Plot/Layout Options"

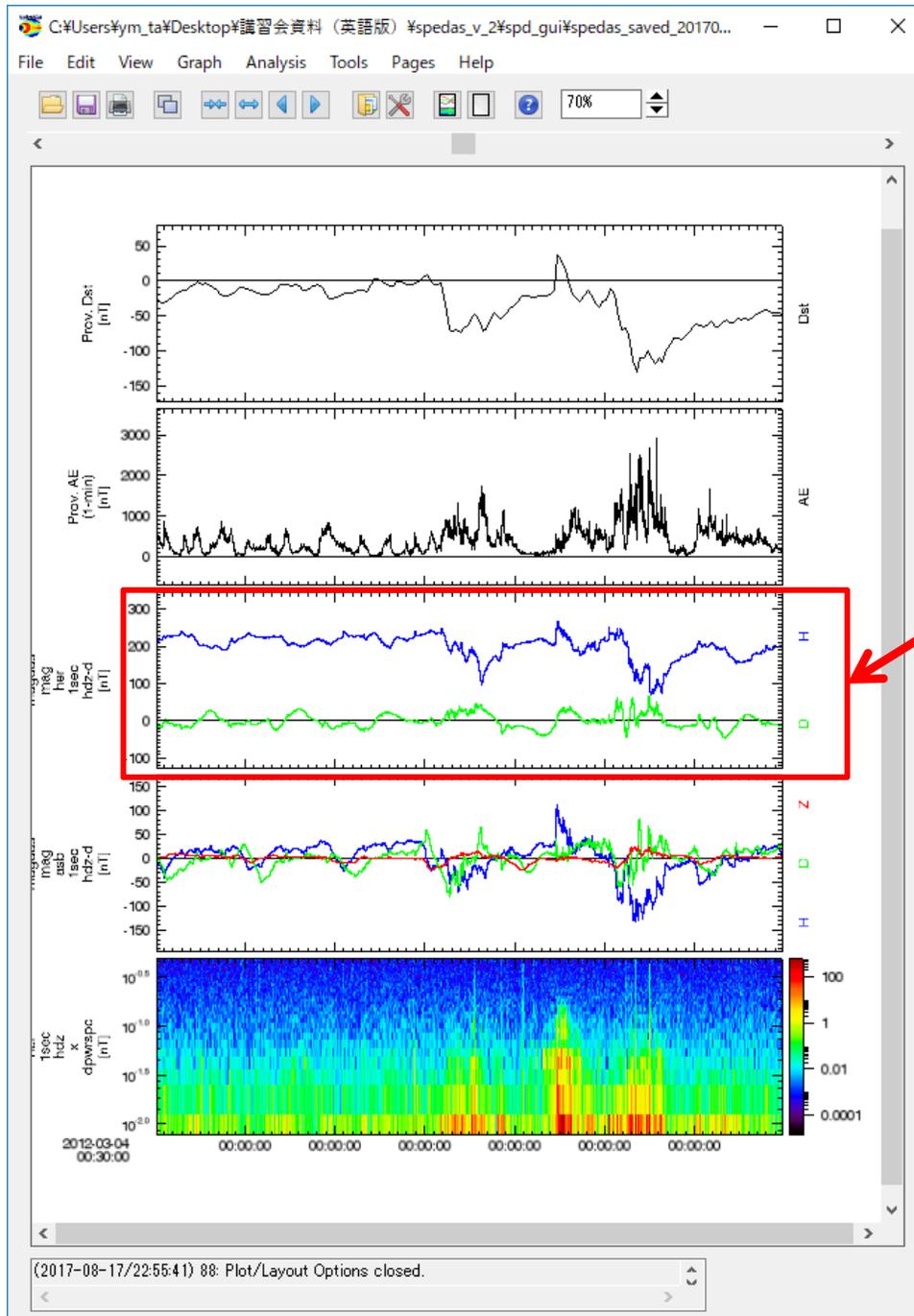
The screenshot shows the 'Plot/Layout Options' dialog box with the following elements:

- Dependent Variable:** A tree view showing the hierarchy of variables under 'IUGONET', including 'geomagnetic_field_index', 'dst', 'ae', 'geomagnetic_field_fluxgate', 'asb', and 'her'. The variable 'maedas_mag_her_1sec_hdz-d_x_ofst' is selected.
- CREATE PLOTS:** A list of panels. Panel 6 (3, 1) is highlighted in blue. The list shows variables for each panel, such as 'wdc_mag_dst_prov_time' and 'maedas_mag_her_1sec_hdz-d_x_ofst_time'.
- Row:** A spinner control set to 3, circled in red.
- Column:** A spinner control set to 1.
- Row Span:** A spinner control set to 1.
- Col Span:** A spinner control set to 1.
- Rows Per Page:** A spinner control set to 5, circled in red.
- Buttons:** 'Add', 'Remove', 'Edit', 'Lock To Panel', and 'Unlock Panels' are on the right. 'OK', 'Apply', and 'Cancel' are at the bottom.
- Status Bar:** Shows '(2017-08-17/22:55:16) 7: SPD_UI_LAYOUT_OPTIONS: Row set to 3.' The 'OK' button is circled in red.

Annotations in red boxes and arrows provide the following instructions:

1. Change the value of Row to 3
2. Panel 6 is changed to (3, 1)
3. Click OK

Result

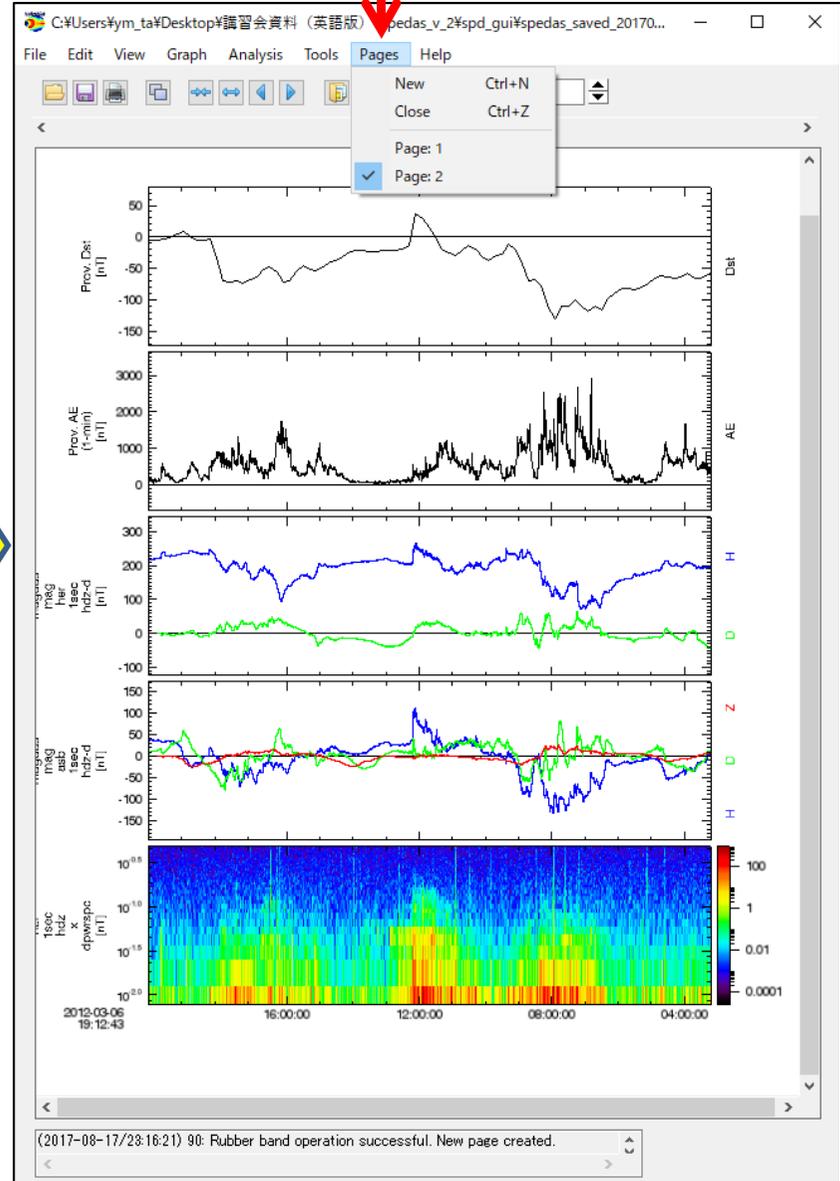
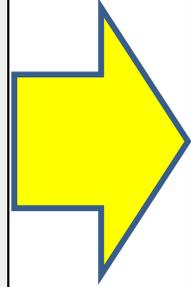
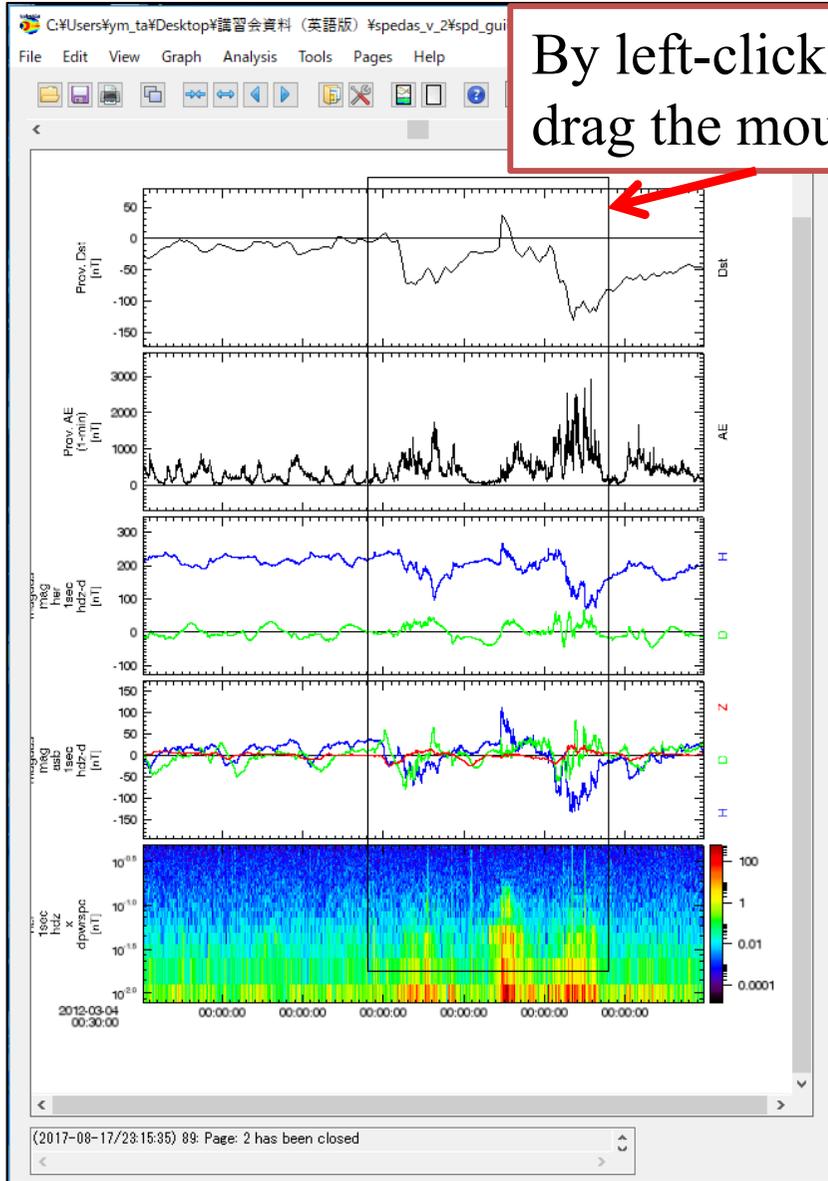


Offset (+200nT) was added to the H comp.

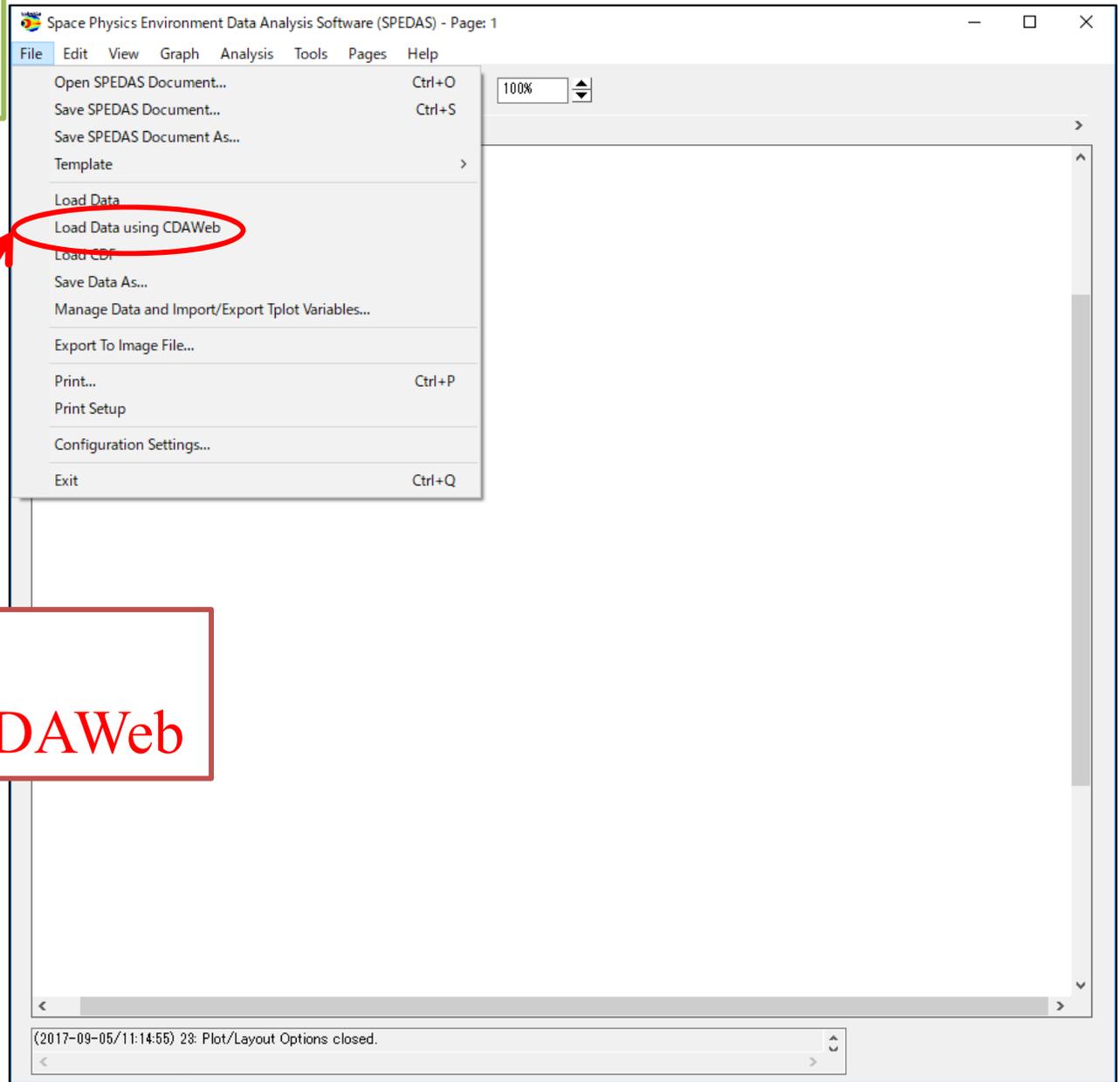
Try:
Expand the plot using the mouse.

A new page opens

By left-click and drag the mouse



Lesson:
Load data from CDAWeb.



1. Select
File – Load Data using CDAWeb

GUI Basic Operation

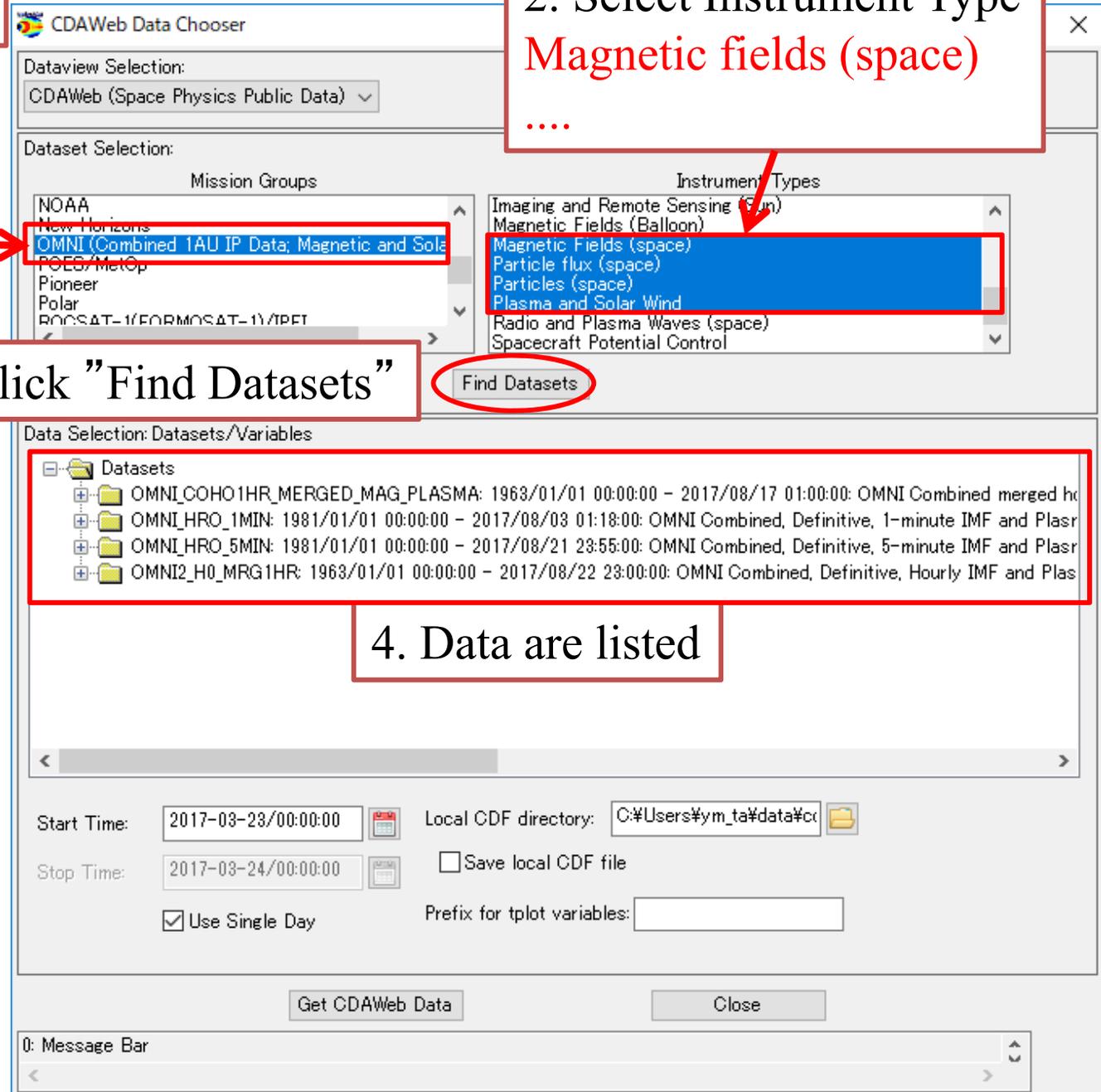
Open "CDAWeb Data Chooser"

1. Select Mission
OMNI(Combined ...)

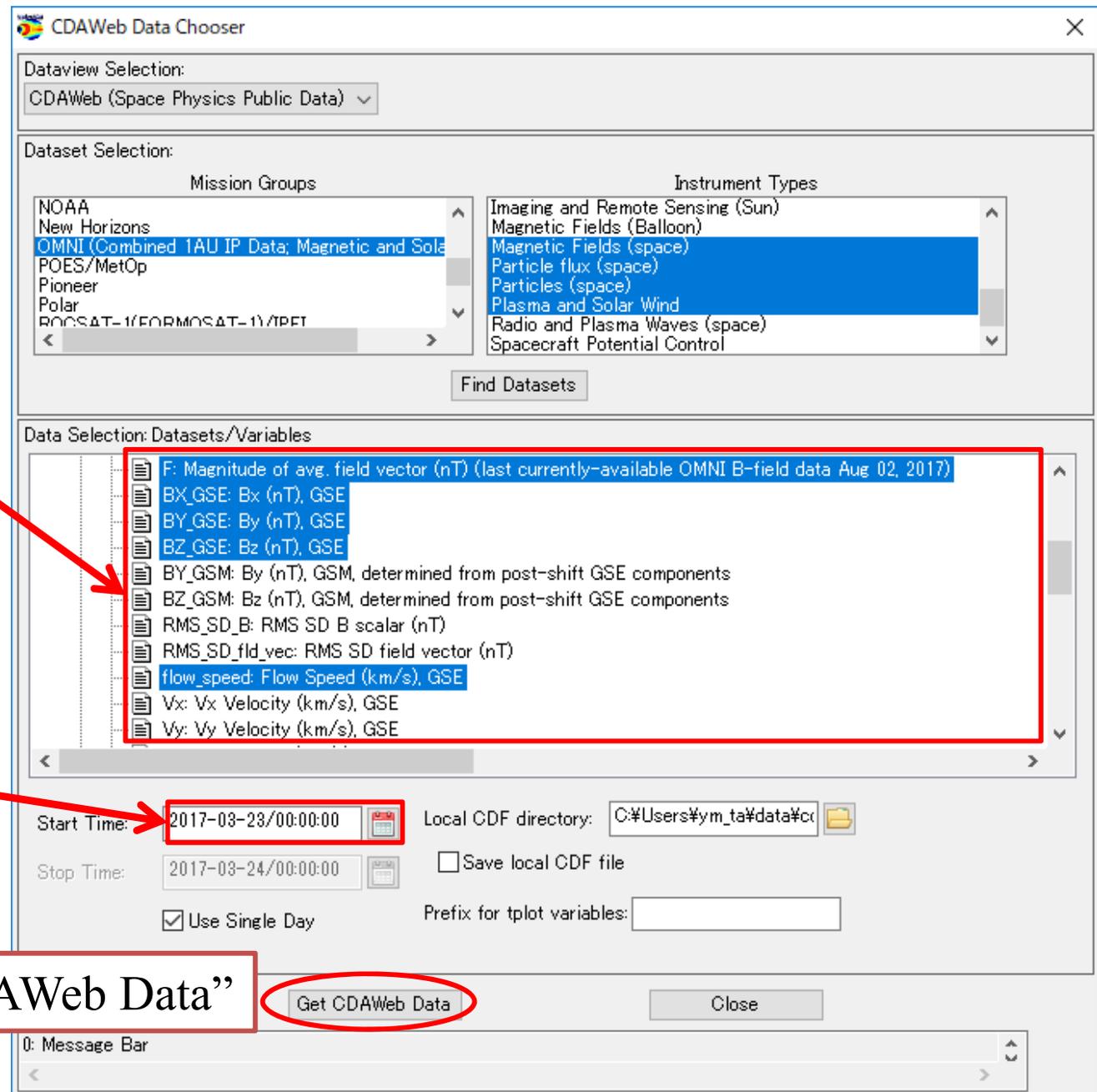
3. Click "Find Datasets"

2. Select Instrument Type
Magnetic fields (space)

4. Data are listed



The screenshot shows the CDAWeb Data Chooser interface. The 'Dataview Selection' is set to 'CDAWeb (Space Physics Public Data)'. Under 'Dataset Selection', the 'Mission Groups' list includes 'OMNI (Combined 1AU IP Data; Magnetic and Solar Wind Data)'. The 'Instrument Types' list includes 'Magnetic Fields (space)'. The 'Find Datasets' button is circled. Below, the 'Data Selection: Datasets/Variables' section shows a list of datasets, including 'OMNI_COHO1HR_MERGED_MAG_PLASMA', 'OMNI_HRO_1MIN', 'OMNI_HRO_5MIN', and 'OMNI2_H0_MRG1HR'. The 'Start Time' is set to '2017-03-23/00:00:00' and the 'Stop Time' is '2017-03-24/00:00:00'. The 'Local CDF directory' is 'C:\Users\ym_ta\data\cda'. The 'Use Single Day' checkbox is checked. The 'Get CDAWeb Data' and 'Close' buttons are at the bottom.



The screenshot shows the CDAWeb Data Chooser interface. It is divided into several sections:

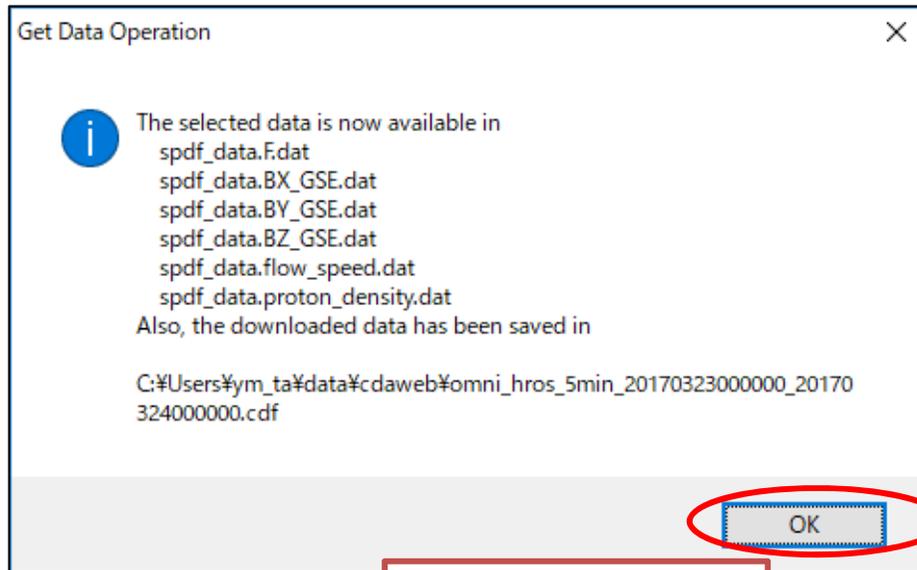
- Dataview Selection:** A dropdown menu set to "CDAWeb (Space Physics Public Data)".
- Dataset Selection:** Two lists. "Mission Groups" includes NOAA, New Horizons, OMNI (Combined 1AU IP Data; Magnetic and Solar Wind), POES/MetOp, Pioneer, Polar, and ROCSAT-1/FORMOSAT-1/TPET. "Instrument Types" includes Imaging and Remote Sensing (Sun), Magnetic Fields (Balloon), Magnetic Fields (space), Particle flux (space), Particles (space), Plasma and Solar Wind, Radio and Plasma Waves (space), and Spacecraft Potential Control. A "Find Datasets" button is below these lists.
- Data Selection: Datasets/Variables:** A list of variables. The top item, "F: Magnitude of avg. field vector (nT) (last currently-available OMNI B-field data Aug 02, 2017)", is highlighted in blue. Other variables include BX_GSE, BY_GSE, BZ_GSE, BY_GSM, BZ_GSM, RMS_SD_B, RMS_SD fld_vec, flow_speed, Vx, and Vy.
- Time and Directory Settings:** "Start Time" is set to "2017-03-23/00:00:00" and "Stop Time" to "2017-03-24/00:00:00". "Local CDF directory" is "C:\Users\ym_ta\data#c". There are checkboxes for "Use Single Day" (checked) and "Save local CDF file" (unchecked).
- Buttons:** "Get CDAWeb Data" and "Close" buttons are at the bottom.

1. Selected data that you want to load

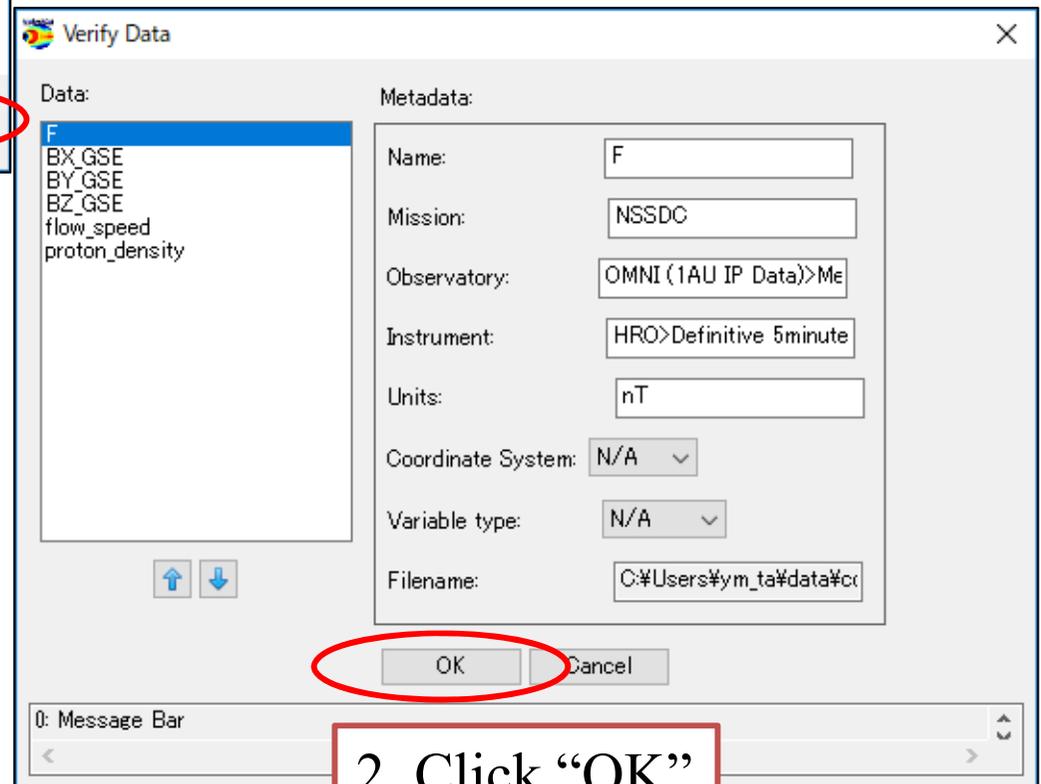
2. Set Date & Time

3. Click "Get CDAWeb Data"

Open some pop-up windows to confirm the data



1. Click "OK"



2. Click "OK"

3. Finally, click "Close" in the "CDAWeb Data Chooser" window

Open "Plot/Layout Options"

The screenshot shows the 'CREATE PLOTS' dialog box with the following elements:

- Dependent Variable:** A tree view showing data components. The 'Line ->' button is circled in red.
- Panel List:** A list of six panels, with the last panel highlighted in blue. A red box highlights the entire list.
- Buttons:** 'Add', 'Remove', 'Edit', and 'OK' (circled in red) are visible.
- Configuration:** 'Show Data Components' is unchecked, 'Automatic Panels' is checked. The title is '- CREATE PLOTS -'.
- Status Bar:** Shows '(2017-09-05/11:04:32) 18: Add Finished.' with a red box around the text.

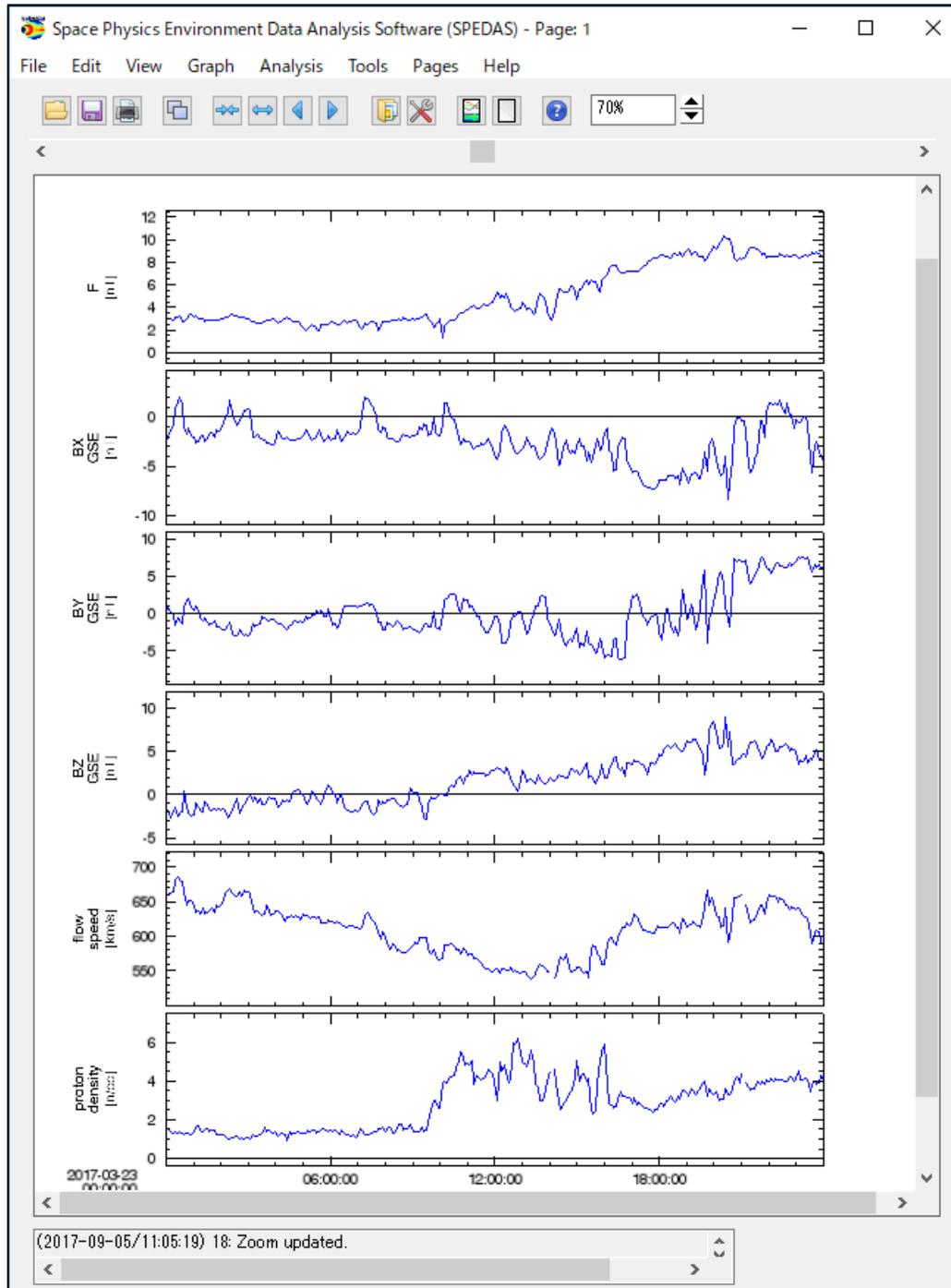
1. Select the listed all data in term

2. Click Line

3. Data are added

4. Click OK

Result



All solar wind parameters are plotted.

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

Data Analysis Software: SPEDAS

SPEDAS (Space Physics Environment Data Analysis Software) is a set of IDL (Interactive Data Language) libraries that provides an integrated analysis platform for Solar-Terrestrial Physics.

SPEDAS has useful features as follows:

1. Automatic data download without specifying the data's location
2. Data analysis without regard to the file format of the data
3. Parallel display of different types of data from many satellite and ground-based missions, including IUGONET.
4. Utilization of various analysis functions equipped in SPEDAS (e.g., frequency analysis, filtering)
5. Output into an ASCII file or image files (e.g., PNG, JPEG, GIF)
6. GUI available for those new to IDL and SPEDAS
7. SPEDAS-GUI executable on the IDL Virtual Machine without a paid IDL license.

UDAS

IUGONET has provided a plug-in software, UDAS (iUgonet Data Analysis Software), for SPEDAS. [Release Note](#)

Latest Version

[s2.00.1 for SPEDAS v2.00](#) (zip, 1MB)

Previous Version

[s1.00.1 for SPEDAS v1.00](#) (zip, 1MB)

[3.00.3 for TDAS v8.00](#) (zip, 1MB)

[3.00.2 for TDAS v8.00](#) (zip, 1MB)

[3.00.1 for TDAS v8.00](#) (zip, 1MB)

[2.01.1 for TDAS v7.01](#) (zip, 1MB)

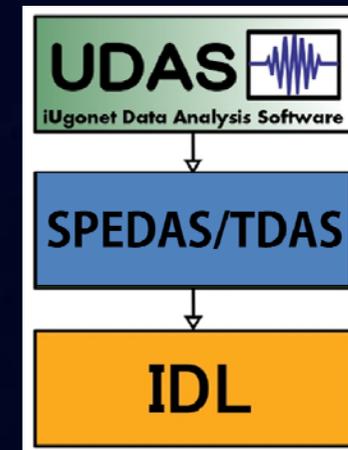
[2.00.2 for TDAS v7.00](#) (zip, 1MB)

[2.00.1 for TDAS v7.00](#) (zip, 1MB)

[1.00.1 for TDAS v6.00](#) (zip, 1MB)

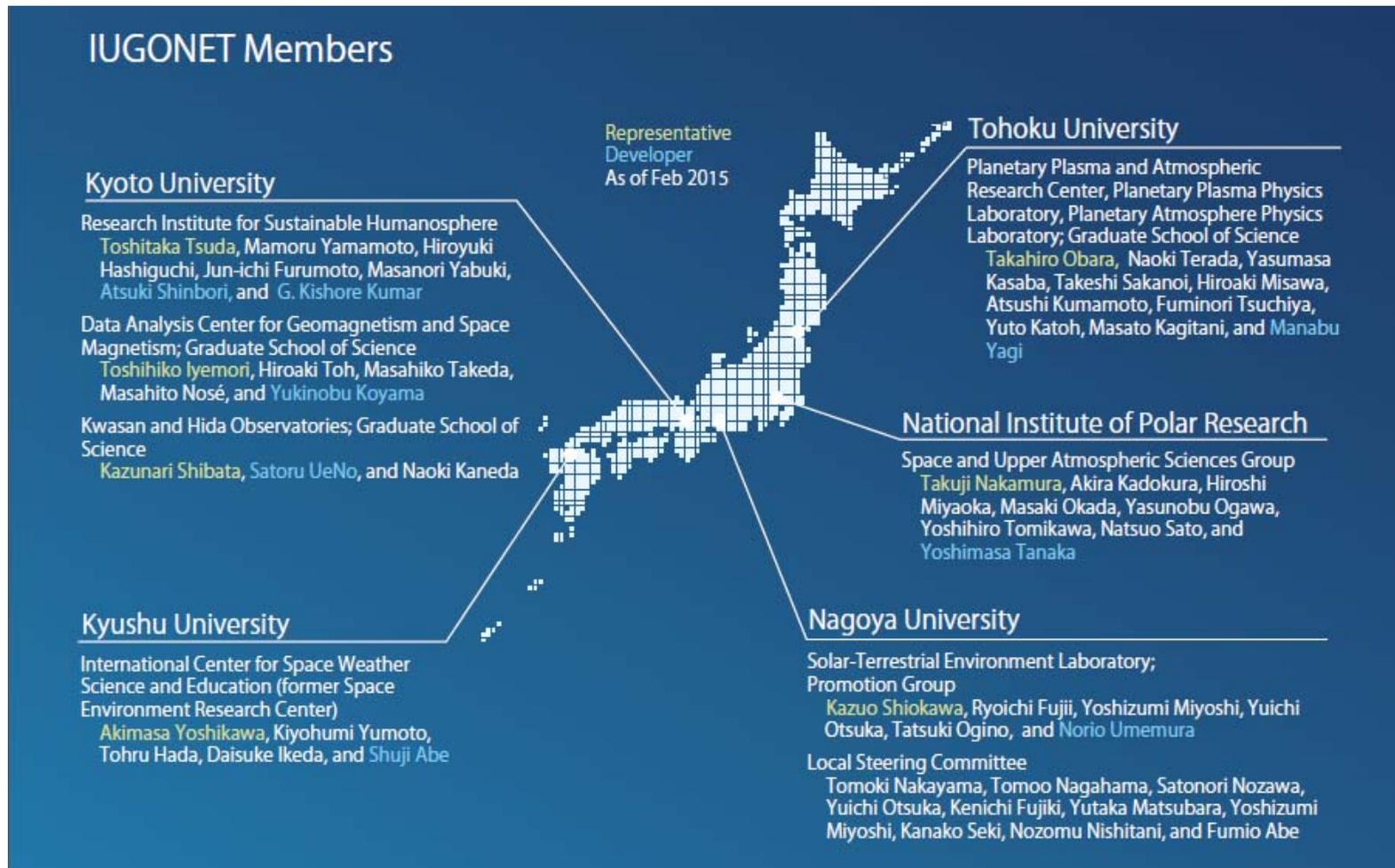
How to use SPEDAS/UDAS

1. SPEDAS/UDAS Users Guide (PDF)
2. You can learn SPEDAS using some documents (PDF files) used in the [past workshops](#).



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

IUGONET Members



Representative Developer
As of Feb 2015

Kyoto University
Research Institute for Sustainable Humanosphere
Toshitaka Tsuda, Mamoru Yamamoto, Hiroyuki Hashiguchi, Jun-ichi Furumoto, Masanori Yabuki, Atsuki Shinbori, and G. Kishore Kumar
Data Analysis Center for Geomagnetism and Space Magnetism; Graduate School of Science
Toshihiko Iyemori, Hiroaki Toh, Masahiko Takeda, Masahito Nosé, and Yukinobu Koyama
Kwasan and Hida Observatories; Graduate School of Science
Kazunari Shibata, Satoru UeNo, and Naoki Kaneda

Kyushu University
International Center for Space Weather Science and Education (former Space Environment Research Center)
Akimasa Yoshikawa, Kiyohumi Yumoto, Tohru Hada, Daisuke Ikeda, and Shuji Abe

Tohoku University
Planetary Plasma and Atmospheric Research Center, Planetary Plasma Physics Laboratory, Planetary Atmosphere Physics Laboratory; Graduate School of Science
Takahiro Obara, Naoki Terada, Yasumasa Kasaba, Takeshi Sakanoi, Hiroaki Misawa, Atsushi Kumamoto, Fuminori Tsuchiya, Yuto Katoh, Masato Kagitani, and Manabu Yagi

National Institute of Polar Research
Space and Upper Atmospheric Sciences Group
Takuji Nakamura, Akira Kadokura, Hiroshi Miyaoka, Masaki Okada, Yasunobu Ogawa, Yoshihiro Tomikawa, Natsuo Sato, and Yoshimasa Tanaka

Nagoya University
Solar-Terrestrial Environment Laboratory; Promotion Group
Kazuo Shiokawa, Ryoichi Fujii, Yoshizumi Miyoshi, Yuichi Otsuka, Tatsuki Ogino, and Norio Umemura
Local Steering Committee
Tomoki Nakayama, Tomoo Nagahama, Satonori Nozawa, Yuichi Otsuka, Kenichi Fujiki, Yutaka Matsubara, Yoshizumi Miyoshi, Kanako Seki, Nozomu Nishitani, and Fumio Abe