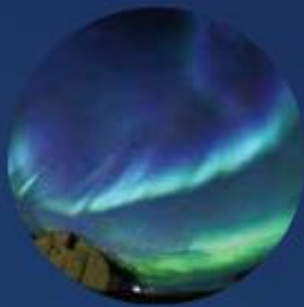




IUGONET

Inter-university Upper atmosphere Global Observation NETwork

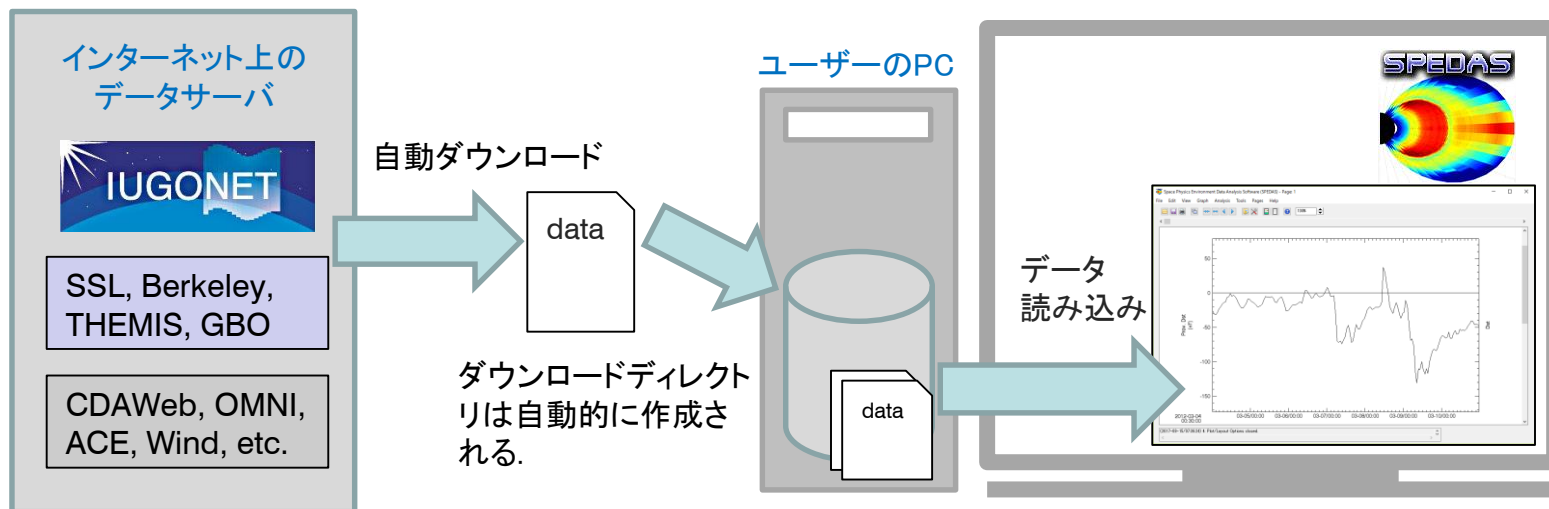
JpGU2023スーパーレッスン

「超高層大気データを解析してみよう ～地球大気から宇宙天気まで～」

- SPEDAS(GUI) Virtual Machine
- 超高層大気データの解析演習

*Published by IUGONET Project Team, May. 2023.
<http://www.iugonet.org/>*

- Space Physics Environment Data Analysis System (SPEDAS)は、米国のUCLA、UCBを中心に開発された宇宙・超高層大気データの統合解析ソフトウェア。
- 様々な地上観測・衛星観測ミッションのデータを可視化、解析可能。
- Iterative Data Language (IDL)をベースに開発。CUIとGUIの両方が利用可能。
- データはインターネット経由で自動的にダウンロード、読み込まれる。
- IDL Virtual Machineを利用した実行形式ファイル(GUI版)が公開されており、誰でも利用可能。



1. SPEDASのウェブサイトアクセスする。

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



Page Discussion

Downloads and Installation

Contents [hide]

- *New* SPEDAS 5.0 released (April 2022)
- If you have an IDL license
 - Download SPEDAS 5.0 (April 2022)
 - SPEDAS nightly build
 - IDL libraries
 - IDL Geopack library
 - IDL CDF library
 - IDL SPICE library
 - IDL DAS2 Library
- If you don't have an IDL license
 - Download the SPEDAS executables, Version 5.0 (April 2022)
 - Download the SPEDAS save file, Version 5.0 (April 2022)
- Troubleshooting and special considerations

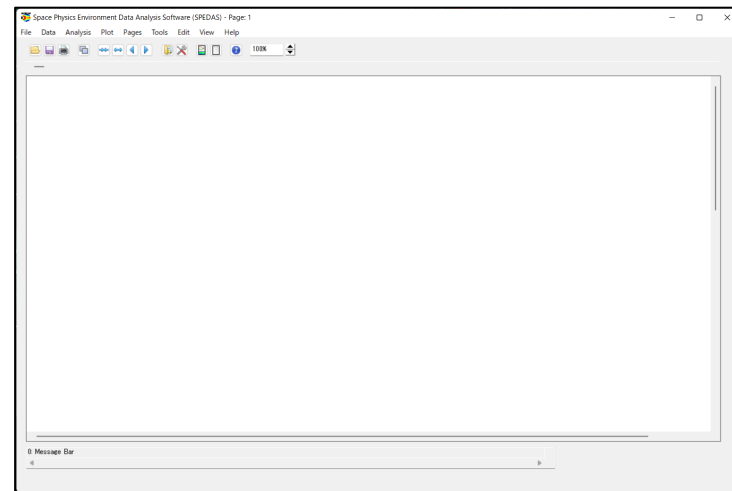


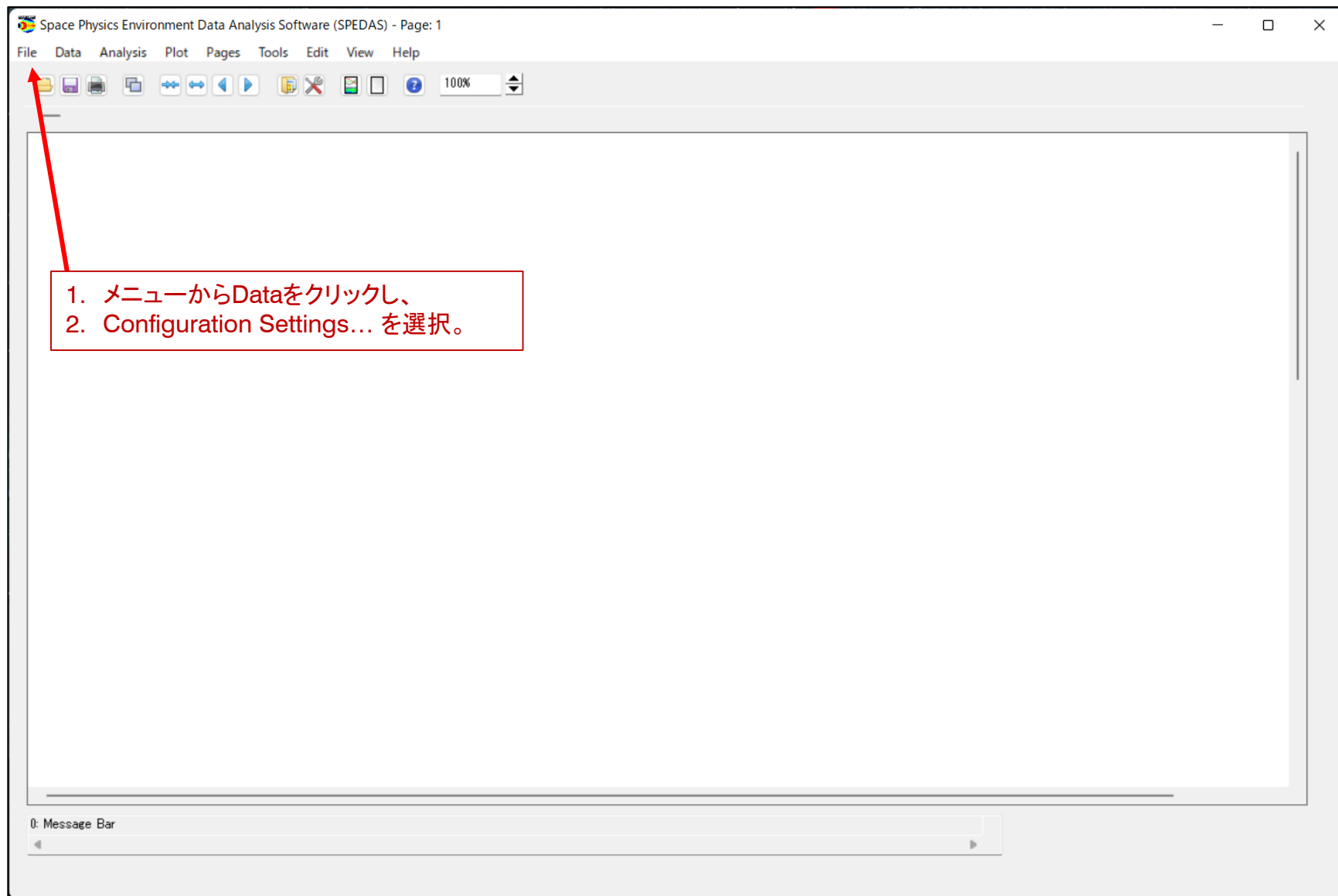
Download the SPEDAS executables, Version 5.0 (April 2022)

For users without IDL licenses, you can use the SPEDAS 5.0 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 5.0, Windows 64bit executable with IDL 8.5.1, CDF 3.8, Geopack 10.7 (~55 MB) [🔗](#)
- * SPEDAS 5.0, MacOS 64bit executable with IDL 8.5.1, CDF 3.8, Geopack 10.7 (~70 MB) [🔗](#)
- * SPEDAS 5.0, Linux 64bit executable with IDL 8.5.1, CDF 3.8, Geopack 10.7 (~70 MB) [🔗](#)
- * SPEDAS 5.0, Linux 64bit executable with IDL 8.5.1, CDF 3.8, Geopack 7.6 (~70 MB) - includes Geopack 7.6, for older Linux machines that may not work with Geopack 10.7 [🔗](#)

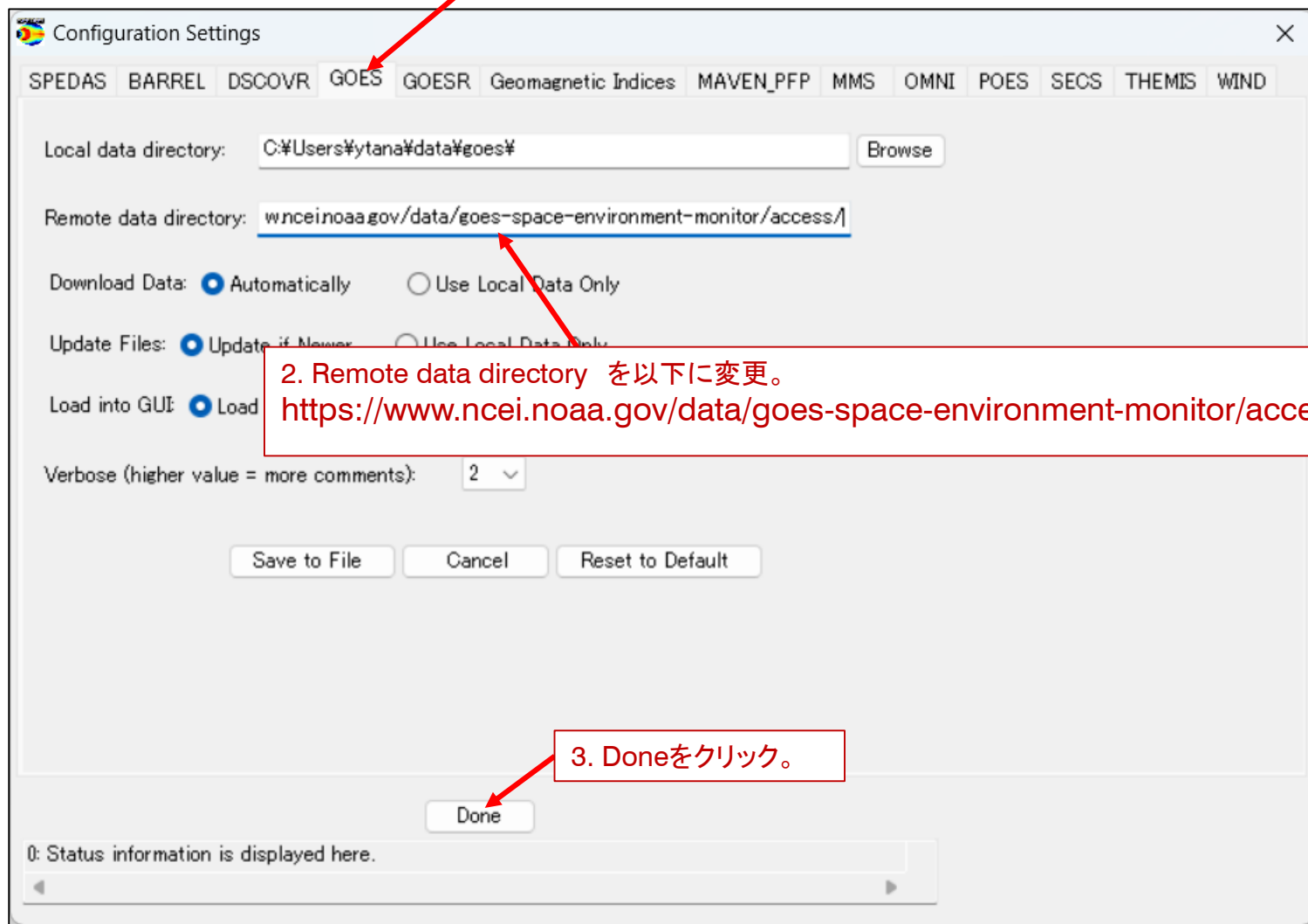
1. Download the SPEDAS executablesの欄から、SPEDASのそれぞれの環境に対応する実行ファイルをダウンロードする。
2. 適当なディレクトリにコピーして、解凍する。
3. 実行ファイルをダブルクリックして、SPEDASを起動する。





0. 準備

1. GOESタブをクリック。



The screenshot shows the 'Configuration Settings' dialog box with the 'GOES' tab selected. A red arrow points from the instruction '1. GOESタブをクリック。' to the 'GOES' tab. The 'Remote data directory' field contains the URL 'wnceinoaa.gov/data/goes-space-environment-monitor/access/'. A red arrow points from the instruction '2. Remote data directory を以下に変更。' to this field. A text box below the field contains the full URL 'https://www.ncei.noaa.gov/data/goes-space-environment-monitor/access/'. At the bottom, a red arrow points from the instruction '3. Doneをクリック。' to the 'Done' button.

Configuration Settings

SPEDAS BARREL DSCOVR **GOES** GOESR Geomagnetic Indices MAVEN_PFP MMS OMNI POES SECS THEMIS WIND

Local data directory: C:\Users\ytana\data\goes\ Browse

Remote data directory: wnceinoaa.gov/data/goes-space-environment-monitor/access/

Download Data: ☒ Automatically ☐ Use Local Data Only

Update Files: ☒ Update if Newer ☐ Use Local Data Only

Load into GUI: ☒ Load

Verbose (higher value = more comments): 2 ▾

Save to File Cancel Reset to Default

Done

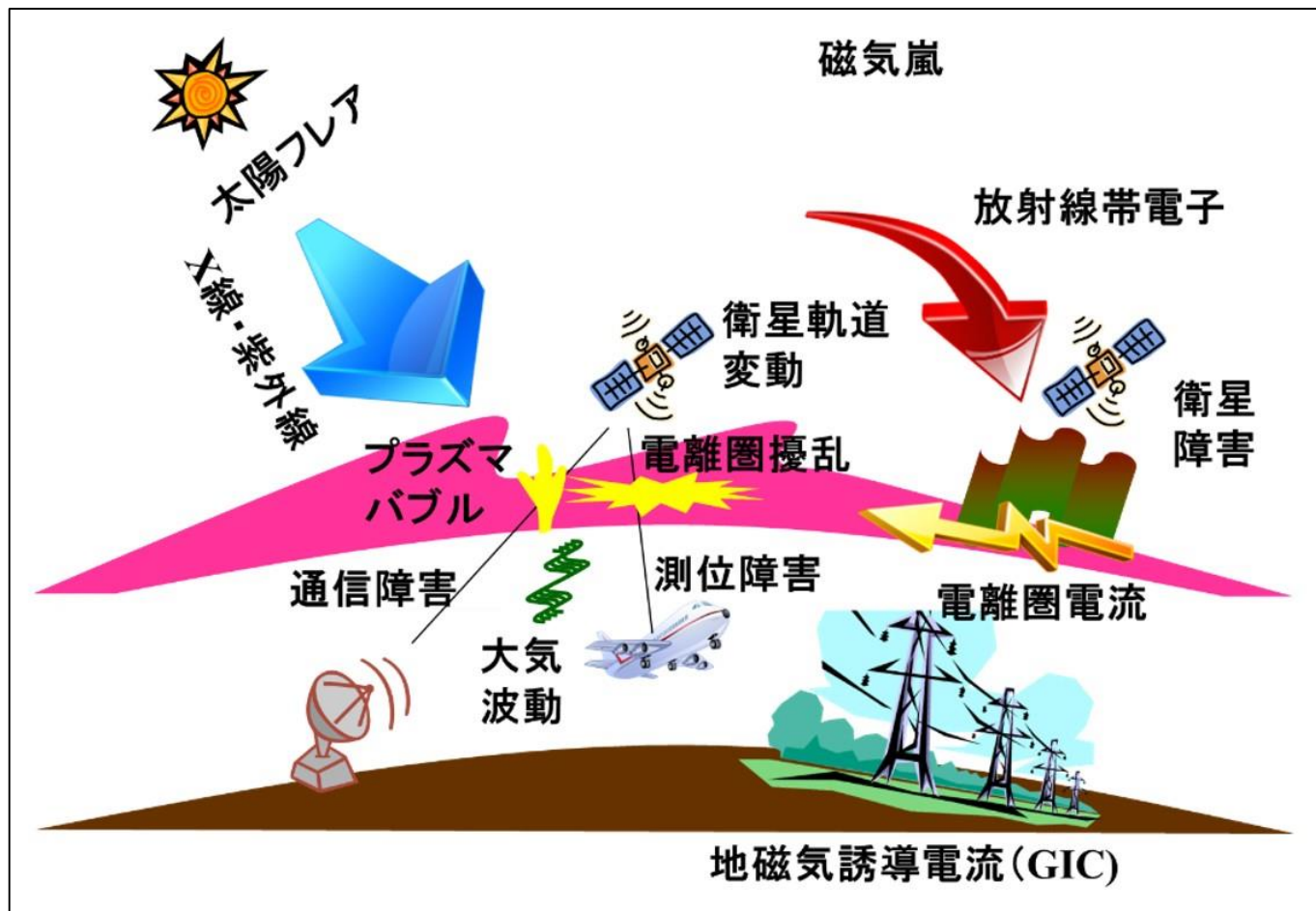
0: Status information is displayed here.

2. Remote data directory を以下に変更。

<https://www.ncei.noaa.gov/data/goes-space-environment-monitor/access/>

3. Doneをクリック。

太陽起源のフレアやコロナ質量放出等の現象は、惑星間空間や地球周辺の宇宙空間、地球大気、人間活動等へ影響を与える可能性がある。



新学術領域「太陽地球圏環境予測」ホームページから

https://www.isee.nagoya-u.ac.jp/pstep/research/research_contents.html

Space Weather Events of 4-10 September 2017

Special Issues | First published: 19 September 2017 | Last updated: 19 March 2021

An X8.2 class solar flare flashes in the edge of the Sun on Sept. 10, 2017. Credit: NASA/GSFC/SDO

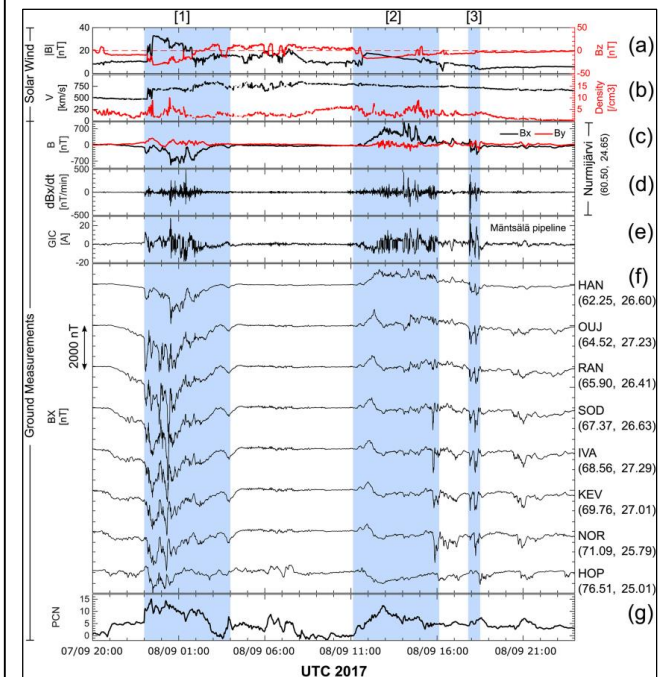
This collection addresses the heliospheric and geospace disturbances, and highlights how ground- and space-based instrumentation, combined with improved models allow us to understand the origin, dynamics and consequences of these storms. In particular, it focuses on "effects and impacts" papers, as there have been a number of media reports that HF radio blackouts caused by the X-flares disrupted emergency communications vital to recovery efforts following Hurricane Irma. It also welcomed papers that assess the importance of these impacts and any other practical impacts arising from the space weather events in early September 2017, as well as papers that address the direction, propagation and arrival time of the heliospheric structures (shock, sheath and/or core) that led to periods of forecast and/or observed strong southward Bz.

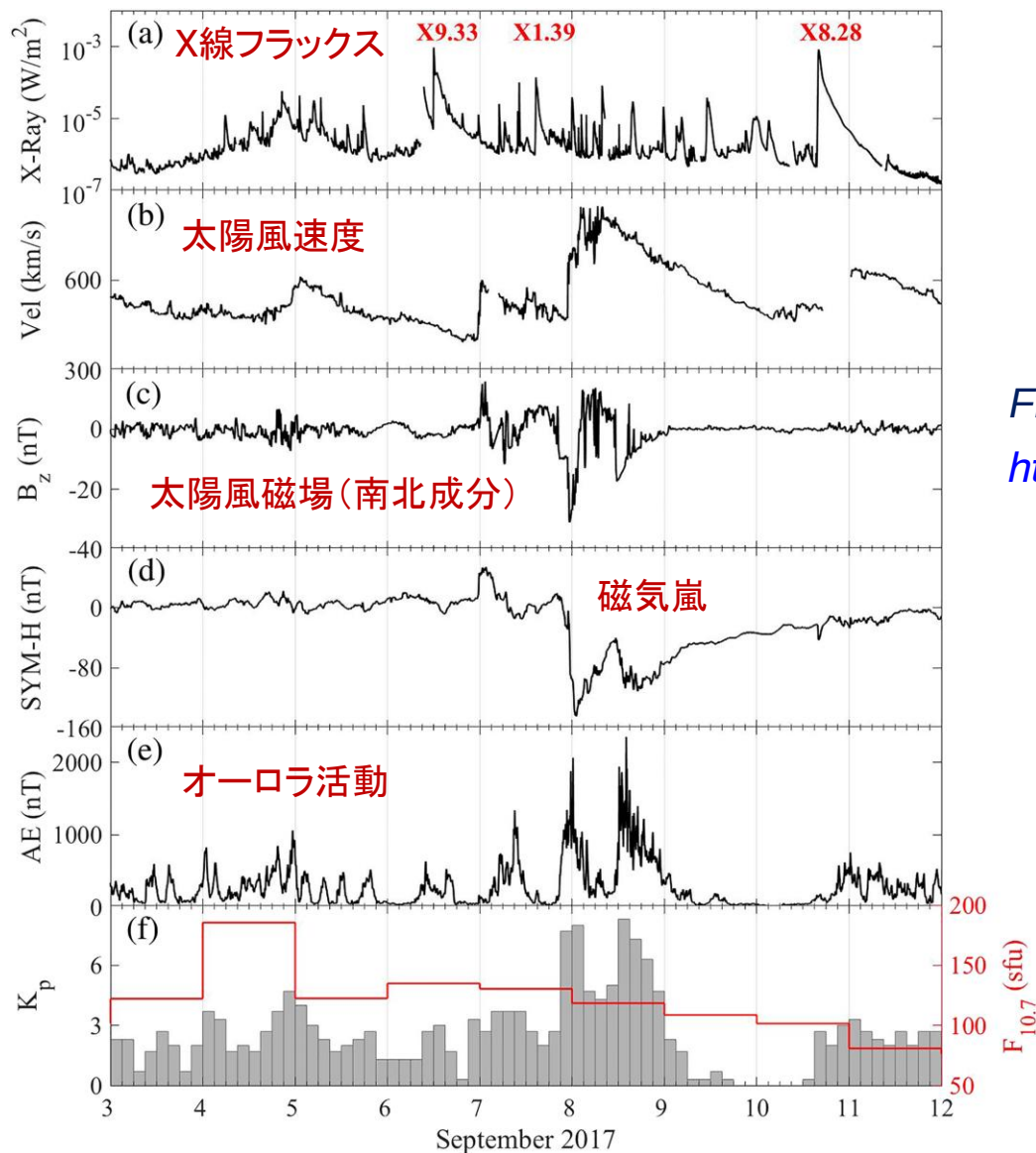
This interval was one of the most flare-productive periods of now-waning solar cycle 24. Solar active regions (AR) 2673 and 2674 both matured to complex magnetic configurations as they transited the disk. AR2673 transformed from a simple sunspot on 2 September to a complex region with order-of-magnitude growth on 4 September, rapidly reaching beta-gamma-delta configuration. In subsequent days the region issued three X-class flares and multiple partial halo ejecta. Combined, the two active regions produced more than a dozen M-class flares. As a parting shot AR2673 produced: 1) an X-9 level flare; 2) an associated moderate solar energetic particle event; and 3) a ground level event, as it arrived at the solar west limb on 10 September. From 4-16 September the radiation environment at geosynchronous orbit was at minor storm level and 100 MeV protons were episodically present in geostationary orbit during that time frame. The early arrival of the coronal mass ejection associated with the 6 September X-9 flare produced severe geomagnetic storming on 7 and 8 September. The full set of events was bracketed by high speed streams that produced their own minor-to-moderate geomagnetic storming.



X9クラスのフレアが発生した2017年
9月4～10日の宇宙天気イベント

このSpace Weatherジャーナル特集号の論文に出てくるデータを読み込み、プロットしてみる。



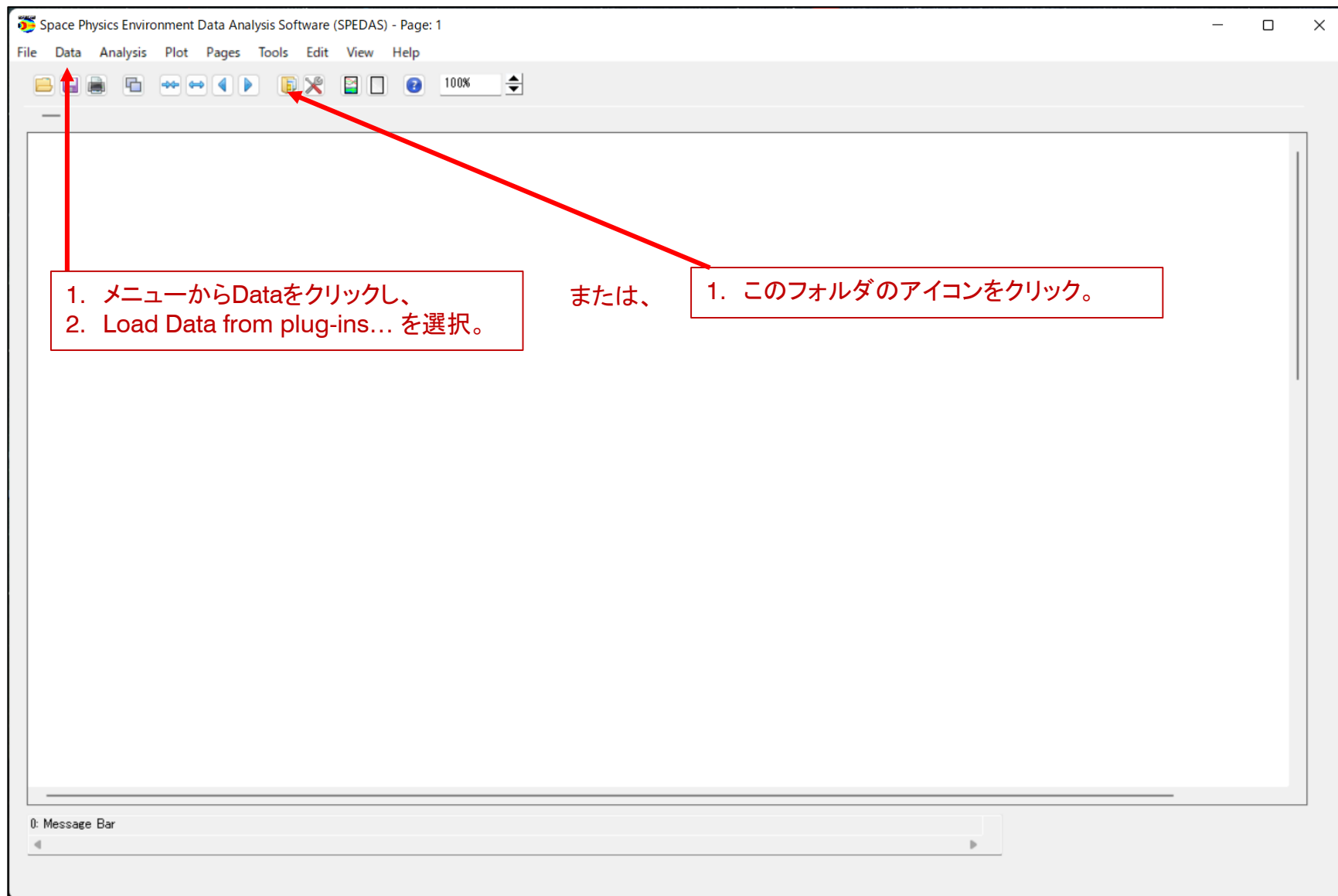


💡 X線フラックス、太陽風パラメータ、地磁気指数をプロットしてみよう。

Figure 2 of Owolabi et al., 2017

<https://doi.org/10.1029/2020SW002608>

1. データをロードする



2. OMNIデータをロードする

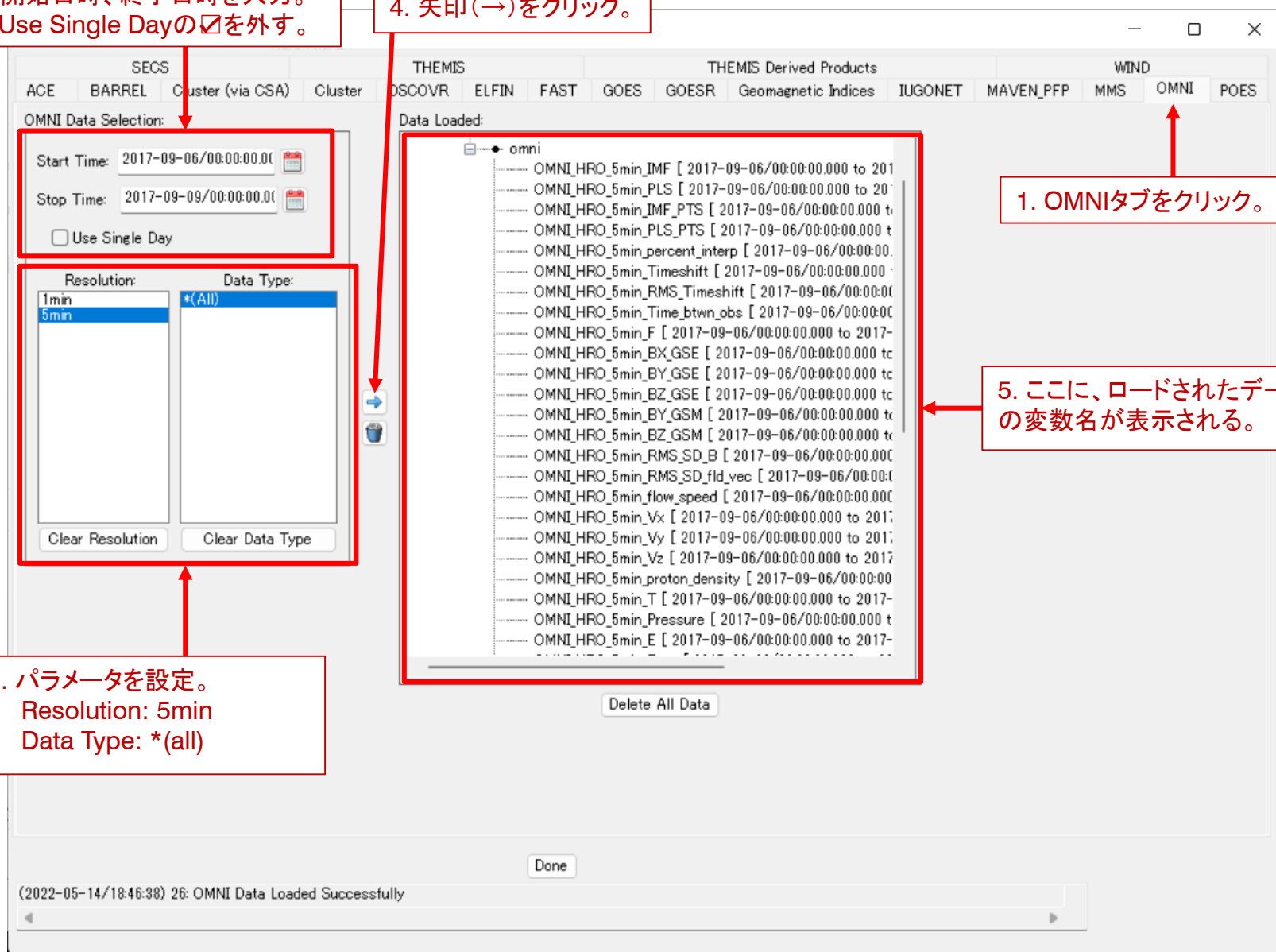
2. 開始日時、終了日時を入力。
※Use Single Dayの☑を外す。

4. 矢印(→)をクリック。

1. OMNIタブをクリック。

5. ここに、ロードされたデータ
の変数名が表示される。

3. パラメータを設定。
Resolution: 5min
Data Type: *(all)



The screenshot shows the IUGONET software interface for loading OMNI data. The 'OMNI' tab is selected under the 'THEMIS Derived Products' section. The 'OMNI Data Selection' panel on the left contains the following settings:

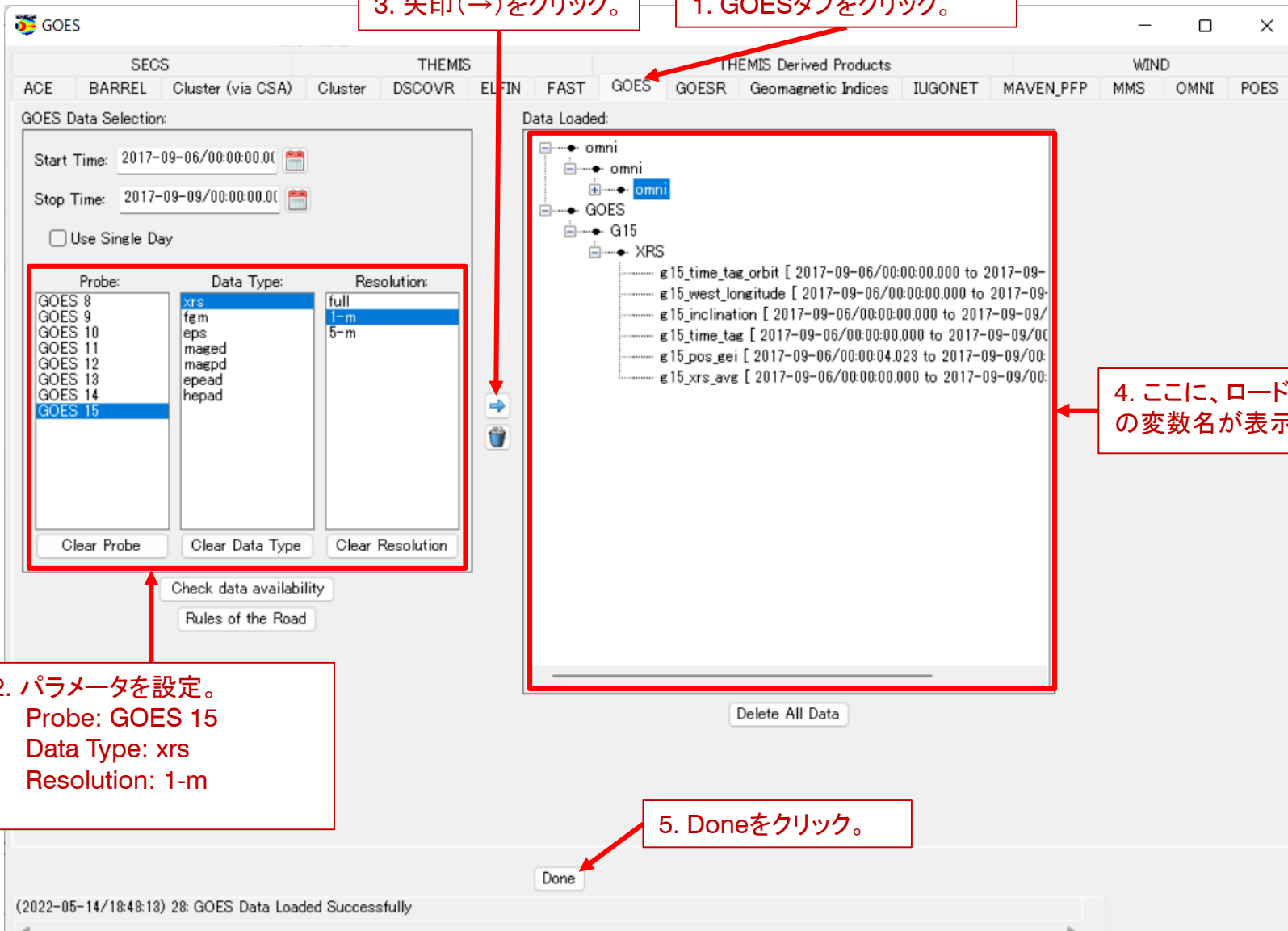
- Start Time: 2017-09-06/00:00:00.00
- Stop Time: 2017-09-09/00:00:00.00
- ☐ Use Single Day
- Resolution: 5min (selected from a list containing 1min and 5min)
- Data Type: *(All) (selected from a list)
- Buttons: Clear Resolution, Clear Data Type

A red arrow points from the 'Data Type' list to a right-pointing arrow button. Another red arrow points from this button to the 'Data Loaded' list on the right. The 'Data Loaded' list contains the following variables:

- omni
- OMNI_HRO_5min_IMF [2017-09-06/00:00:00.000 to 2017-09-06/00:00:00.000]
- OMNI_HRO_5min_PLS [2017-09-06/00:00:00.000 to 2017-09-06/00:00:00.000]
- OMNI_HRO_5min_IMF_PTS [2017-09-06/00:00:00.000 to 2017-09-06/00:00:00.000]
- OMNI_HRO_5min_PLS_PTS [2017-09-06/00:00:00.000 to 2017-09-06/00:00:00.000]
- OMNI_HRO_5min_percent_interp [2017-09-06/00:00:00.000 to 2017-09-06/00:00:00.000]
- OMNI_HRO_5min_Timeshift [2017-09-06/00:00:00.000 to 2017-09-06/00:00:00.000]
- OMNI_HRO_5min_RMS_Timeshift [2017-09-06/00:00:00.000 to 2017-09-06/00:00:00.000]
- OMNI_HRO_5min_Time_btwn_obs [2017-09-06/00:00:00.000 to 2017-09-06/00:00:00.000]
- OMNI_HRO_5min_F [2017-09-06/00:00:00.000 to 2017-09-06/00:00:00.000]
- OMNI_HRO_5min_BX_GSE [2017-09-06/00:00:00.000 to 2017-09-06/00:00:00.000]
- OMNI_HRO_5min_BY_GSE [2017-09-06/00:00:00.000 to 2017-09-06/00:00:00.000]
- OMNI_HRO_5min_BZ_GSE [2017-09-06/00:00:00.000 to 2017-09-06/00:00:00.000]
- OMNI_HRO_5min_BY_GSM [2017-09-06/00:00:00.000 to 2017-09-06/00:00:00.000]
- OMNI_HRO_5min_BZ_GSM [2017-09-06/00:00:00.000 to 2017-09-06/00:00:00.000]
- OMNI_HRO_5min_RMS_SD_B [2017-09-06/00:00:00.000 to 2017-09-06/00:00:00.000]
- OMNI_HRO_5min_RMS_SD_fld_yec [2017-09-06/00:00:00.000 to 2017-09-06/00:00:00.000]
- OMNI_HRO_5min_flow_speed [2017-09-06/00:00:00.000 to 2017-09-06/00:00:00.000]
- OMNI_HRO_5min_Vx [2017-09-06/00:00:00.000 to 2017-09-06/00:00:00.000]
- OMNI_HRO_5min_Vy [2017-09-06/00:00:00.000 to 2017-09-06/00:00:00.000]
- OMNI_HRO_5min_Vz [2017-09-06/00:00:00.000 to 2017-09-06/00:00:00.000]
- OMNI_HRO_5min_proton_density [2017-09-06/00:00:00.000 to 2017-09-06/00:00:00.000]
- OMNI_HRO_5min_T [2017-09-06/00:00:00.000 to 2017-09-06/00:00:00.000]
- OMNI_HRO_5min_Pressure [2017-09-06/00:00:00.000 to 2017-09-06/00:00:00.000]
- OMNI_HRO_5min_E [2017-09-06/00:00:00.000 to 2017-09-06/00:00:00.000]

At the bottom of the interface, a status bar displays the message: (2022-05-14/18:46:38) 26: OMNI Data Loaded Successfully.

3. GOES衛星データをロードする



The screenshot shows the GOES Data Selection window. The interface includes a top menu bar with various data sources (SECS, THEMIS, THEMIS Derived Products, WIND). The 'GOES' tab is selected. On the left, the 'GOES Data Selection' panel has fields for 'Start Time' (2017-09-06/00:00:00.00) and 'Stop Time' (2017-09-09/00:00:00.00). Below these is a table for selecting parameters:

Probe:	Data Type:	Resolution:
GOES 8	xrs	full
GOES 9	fgm	1-m
GOES 10	eps	5-m
GOES 11	magd	
GOES 12	magpd	
GOES 13	epead	
GOES 14	hepad	
GOES 15		

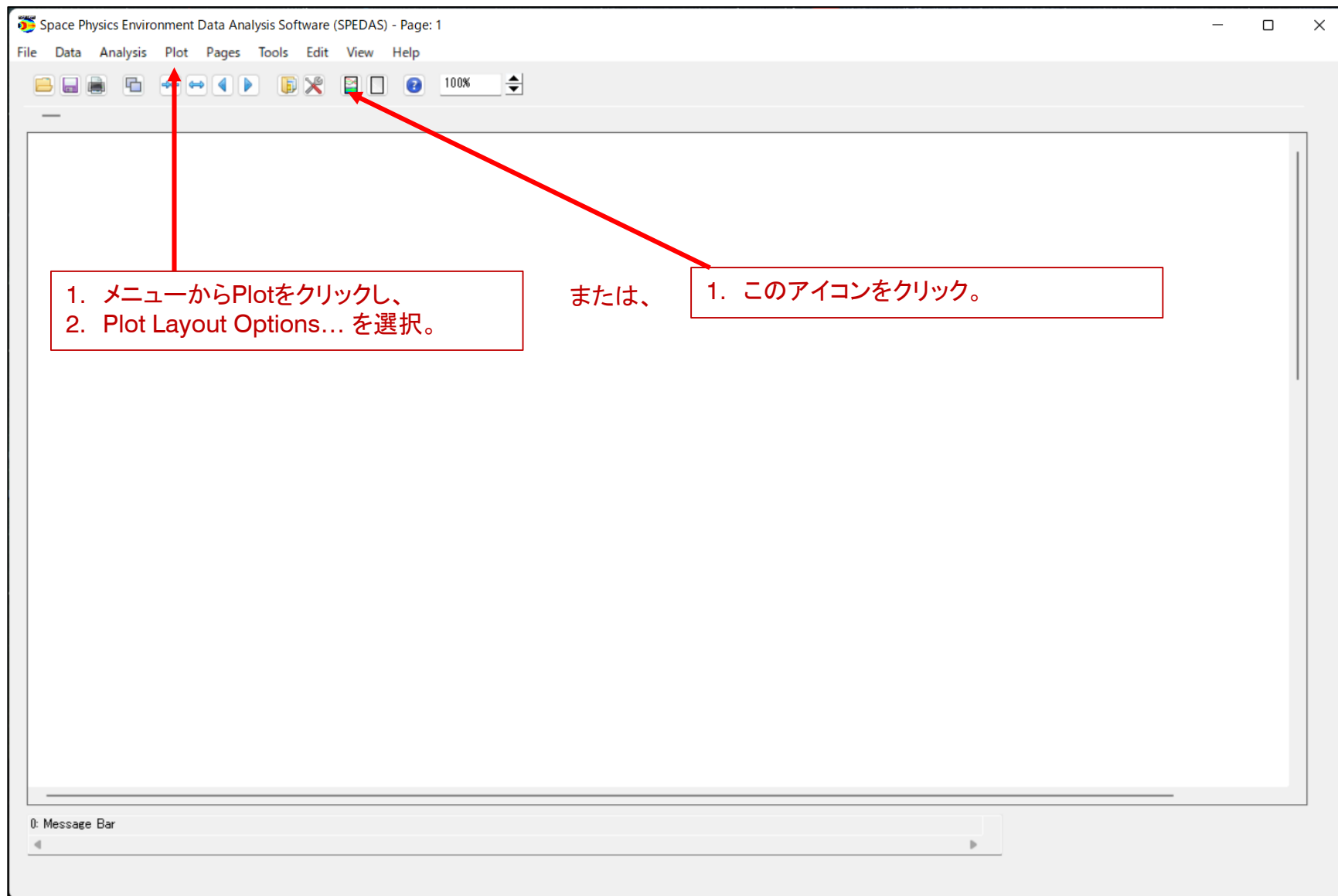
Buttons for 'Clear Probe', 'Clear Data Type', and 'Clear Resolution' are at the bottom of the table. A 'Check data availability' button is below the table. The 'Data Loaded' panel on the right shows a tree structure of loaded data, including 'omni', 'GOES', 'G15', and 'XRS'. The 'XRS' node is expanded, showing a list of variables with their time ranges. A 'Delete All Data' button is at the bottom of this panel. A 'Done' button is at the bottom of the window.

Instructions for loading the data are provided in red boxes:

1. GOESタブをクリック。
2. パラメータを設定。
Probe: GOES 15
Data Type: xrs
Resolution: 1-m
3. 矢印(→)をクリック。
4. ここに、ロードされたデータの変数名が表示される。
5. Doneをクリック。

A status bar at the bottom left shows: (2022-05-14/18:48:13) 28: GOES Data Loaded Successfully

4. データをプロットする



5. プロットするデータ(GOES X線)を選ぶ

Plot/Layout Options

☐ Show Data Components ☒ Automatic Panels

Dependent Variable

1. プロットする変数を選択。
g15_xrs_avg

2. Lineをクリック。

3. ここに、プロットする変数名が表示される。

(L) Panel 1 (1, 1) -
- g15_xrs_avg time -vs- g15_xrs_avg_0
- g15_xrs_avg time -vs- g15_xrs_avg_1

Variables:
Add/Edit

OK Apply Cancel

(2022-05-14/18:51:57) 3: Add Finished.

6. プロットするデータ(太陽風)を選ぶ

Plot/Layout Options

☐ Show Data Components ☒ Automatic Panels

Dependent Variable

Lineをクリック。

2. ここに、ロードされたデータの変数名が表示される。

1. 以下の変数を選択し、その都度Lineをクリック。

- OMNI_HRO_5min_flow_speed
- OMNI_HRO_5min_proton_density
- OMNI_HRO_5min_F と OMNI_HRO_5min_BZ_GSM は、Ctrlを押しながらクリックして2つをまとめて選択。

(2022-05-15/18:53:18) 9: Add Finished.

Variables:

OMNI_HRO_5min_IMF [2017-09-06/00:00:00
OMNI_HRO_5min_PLS [2017-09-06/00:00:00
OMNI_HRO_5min_IMF_PTS [2017-09-06/00:00:00
OMNI_HRO_5min_PLS_PTS [2017-09-06/00:00:00
OMNI_HRO_5min_percent_interp [2017-09-06/00:00:00
OMNI_HRO_5min_Timeshift [2017-09-06/00:00:00
OMNI_HRO_5min_RMS_Timeshift [2017-09-06/00:00:00
OMNI_HRO_5min_Time_btwn_obs [2017-09-06/00:00:00
OMNI_HRO_5min_F [2017-09-06/00:00:00
OMNI_HRO_5min_BX_GSE [2017-09-06/00:00:00
OMNI_HRO_5min_BY_GSE [2017-09-06/00:00:00
OMNI_HRO_5min_BZ_GSE [2017-09-06/00:00:00
OMNI_HRO_5min_BY_GSM [2017-09-06/00:00:00
OMNI_HRO_5min_BZ_GSM [2017-09-06/00:00:00
OMNI_HRO_5min_RMS_SD_B [2017-09-06/00:00:00
OMNI_HRO_5min_RMS_SD_fld_vec [2017-09-06/00:00:00
OMNI_HRO_5min_flow_speed [2017-09-06/00:00:00
OMNI_HRO_5min_Vx [2017-09-06/00:00:00
OMNI_HRO_5min_Vy [2017-09-06/00:00:00
OMNI_HRO_5min_Vz [2017-09-06/00:00:00
OMNI_HRO_5min_proton_density [2017-09-06/00:00:00
OMNI_HRO_5min_T [2017-09-06/00:00:00
OMNI_HRO_5min_Pressure [2017-09-06/00:00:00
OMNI_HRO_5min_E [2017-09-06/00:00:00
OMNI_HRO_5min_Beta [2017-09-06/00:00:00

Panel 1 (1, 1) -
- g15_xrs_avg_time -vs- g15_xrs_avg_0
- g15_xrs_avg_time -vs- g15_xrs_avg_1
Panel 2 (2, 1) -
- OMNI_HRO_5min_flow_speed_time -vs- OMNI_HRO_5min_flow_speed_0
Panel 3 (3, 1) -
- OMNI_HRO_5min_proton_density_time -vs- OMNI_HRO_5min_proton_density_0
Panel 4 (4, 1) -
- OMNI_HRO_5min_F time -vs- OMNI_HRO_5min_F data
- OMNI_HRO_5min_BZ_GSM time -vs- OMNI_HRO_5min_BZ_GSM data

Rows Per Page: 6
Cols Per Page: 1

7. プロットするデータ(地磁気指数)を選ぶ

Plot/Layout Options

☐ Show Data Components ☒ Automatic Panels

Dependent Variable

Lineをクリック。

2. ここに、ロードされたデータの変数名が表示される。

1. 以下の変数を選択し、その都度Lineをクリック。
- OMNI_HRO_5min_SYM_H
- OMNI_HRO_5min_AE_INDEX

3. OKをクリック。

OK Apply Cancel

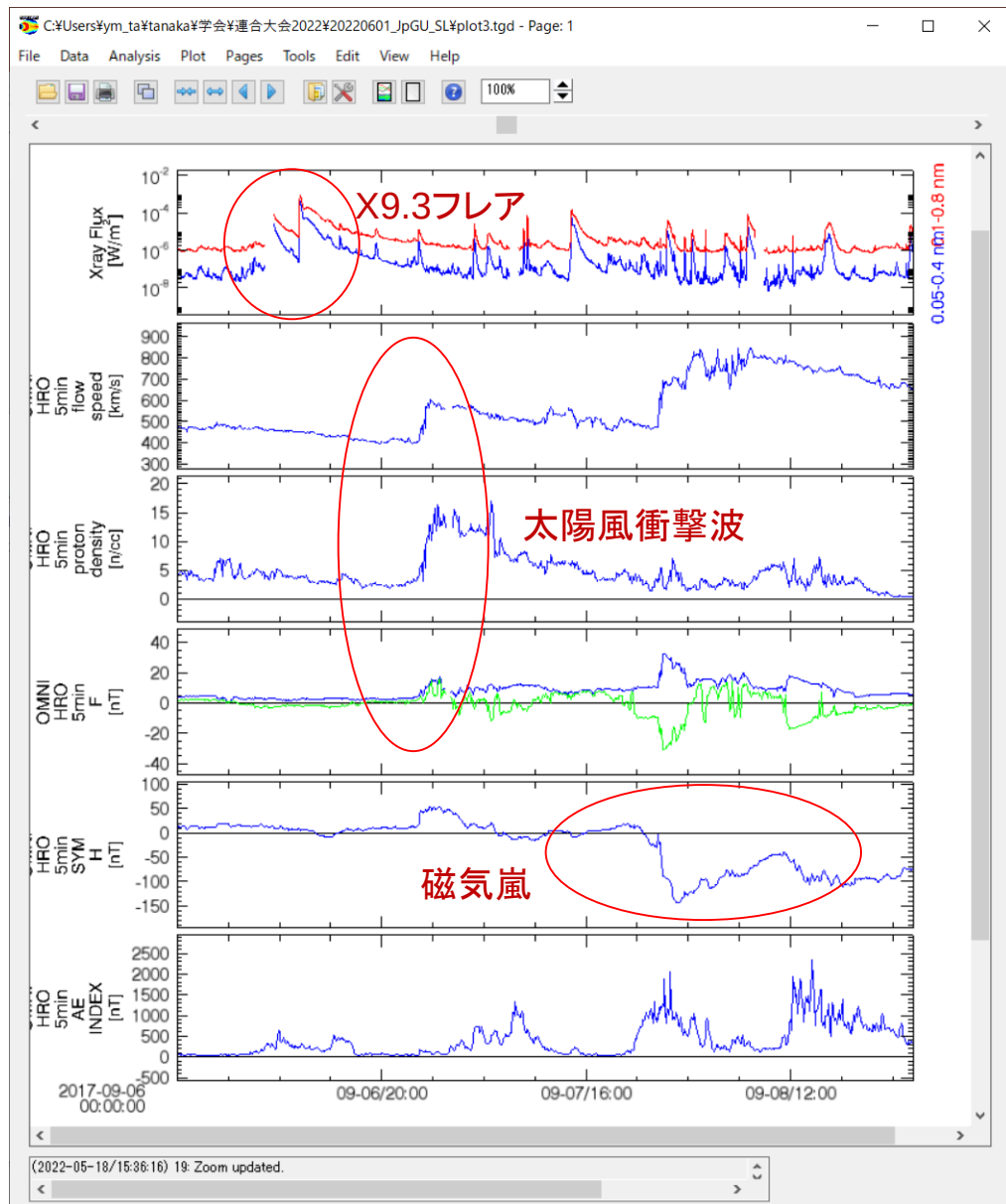
(2022-05-15/19:02:20) 15: Add Finished.

Variables:

Panel 1 (1, 1) -
- g15_xrs_avg_time -vs- g15_xrs_avg_0
- g15_xrs_avg_time -vs- g15_xrs_avg_1
Panel 2 (2, 1) -
- OMNI_HRO_5min_flow_speed_time -vs- OMNI_HRO_5min_flow_speed_data
Panel 3 (3, 1) -
- OMNI_HRO_5min_proton_density_time -vs- OMNI_HRO_5min_proton_density_data
Panel 4 (4, 1) -
- OMNI_HRO_5min_F_time -vs- OMNI_HRO_5min_F_data
- OMNI_HRO_5min_BZ_GSM_time -vs- OMNI_HRO_5min_BZ_GSM_data
Panel 5 (5, 1) -
- OMNI_HRO_5min_SYM_H_time -vs- OMNI_HRO_5min_SYM_H_data
Panel 6 (6, 1) -
- OMNI_HRO_5min_AE_INDEX_time -vs- OMNI_HRO_5min_AE_INDEX_data

Rows Per Page: 6
Cols Per Page: 1
Lock To Panel
Unlock Panels

8. プロットを確認する



X線フラックス。

太陽風速度

太陽風プロトン密度

太陽風磁場(青:磁場の大きさ、緑:南北成分)

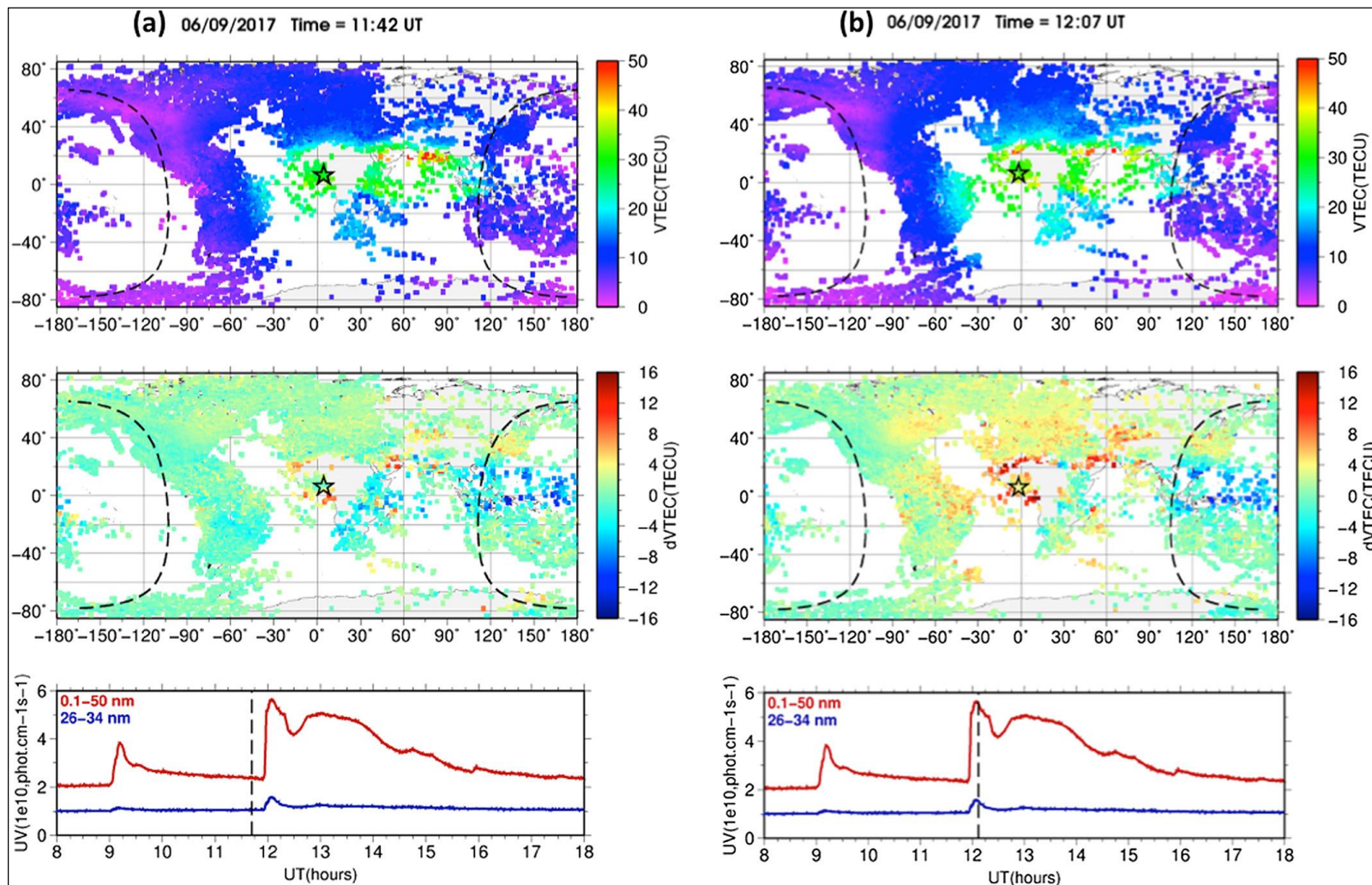
地磁気SYM-H指数(磁気嵐の指標)

地磁気AE指数(オーロラ活動の指標)

電離圏の全電子数(TEC)

💡 Xフレアに伴う電離圏の全電子数 (GPS-TEC)をプロットしてみよう。

Figure 4 of Yasyukevich et al., 2018
<http://dx.doi.org/10.1029/2018SW001932>



9. GPS-TECデータをロードする

1. p.7と同様にロードデータウィンドウを開く。

5. 矢印(→)をクリック。

2. IUGONETタブをクリック。

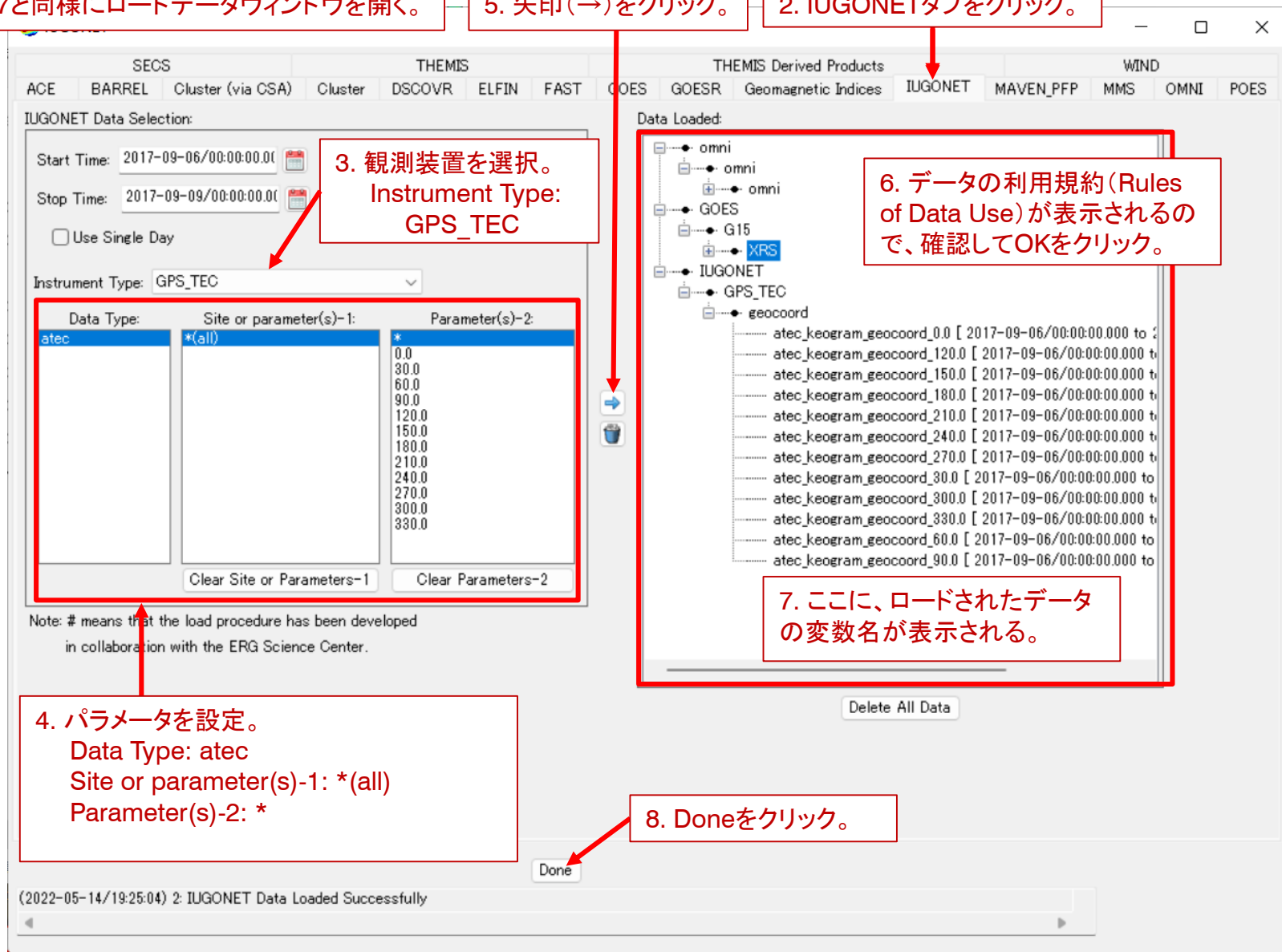
3. 観測装置を選択。
Instrument Type:
GPS_TEC

6. データの利用規約 (Rules of Data Use) が表示されるので、確認してOKをクリック。

7. ここに、ロードされたデータの変数名が表示される。

4. パラメータを設定。
Data Type: atec
Site or parameter(s)-1: *(all)
Parameter(s)-2: *

8. Doneをクリック。



SECS THEMIS THEMIS Derived Products WIND

ACE BARREL Cluster (via CSA) Cluster DSCOVR ELFIN FAST GOES GOESR Geomagnetic Indices IUGONET MAVEN_PFP MMS OMNI POES

IUGONET Data Selection:

Start Time: 2017-09-06/00:00:00.00

Stop Time: 2017-09-09/00:00:00.00

☐ Use Single Day

Instrument Type: GPS_TEC

Data Type:	Site or parameter(s)-1:	Parameter(s)-2:
atec	*(all)	*

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:

- omni
 - omni
- GOES
 - G15
 - XRS
- IUGONET
 - GPS_TEC
 - geocoord
 - atec.keogram.geocoord_0.0 [2017-09-06/00:00:00.000 to 2017-09-06/00:00:00.000]
 - atec.keogram.geocoord_120.0 [2017-09-06/00:00:00.000 to 2017-09-06/00:00:00.000]
 - atec.keogram.geocoord_150.0 [2017-09-06/00:00:00.000 to 2017-09-06/00:00:00.000]
 - atec.keogram.geocoord_180.0 [2017-09-06/00:00:00.000 to 2017-09-06/00:00:00.000]
 - atec.keogram.geocoord_210.0 [2017-09-06/00:00:00.000 to 2017-09-06/00:00:00.000]
 - atec.keogram.geocoord_240.0 [2017-09-06/00:00:00.000 to 2017-09-06/00:00:00.000]
 - atec.keogram.geocoord_270.0 [2017-09-06/00:00:00.000 to 2017-09-06/00:00:00.000]
 - atec.keogram.geocoord_30.0 [2017-09-06/00:00:00.000 to 2017-09-06/00:00:00.000]
 - atec.keogram.geocoord_300.0 [2017-09-06/00:00:00.000 to 2017-09-06/00:00:00.000]
 - atec.keogram.geocoord_330.0 [2017-09-06/00:00:00.000 to 2017-09-06/00:00:00.000]
 - atec.keogram.geocoord_60.0 [2017-09-06/00:00:00.000 to 2017-09-06/00:00:00.000]
 - atec.keogram.geocoord_90.0 [2017-09-06/00:00:00.000 to 2017-09-06/00:00:00.000]

Delete All Data

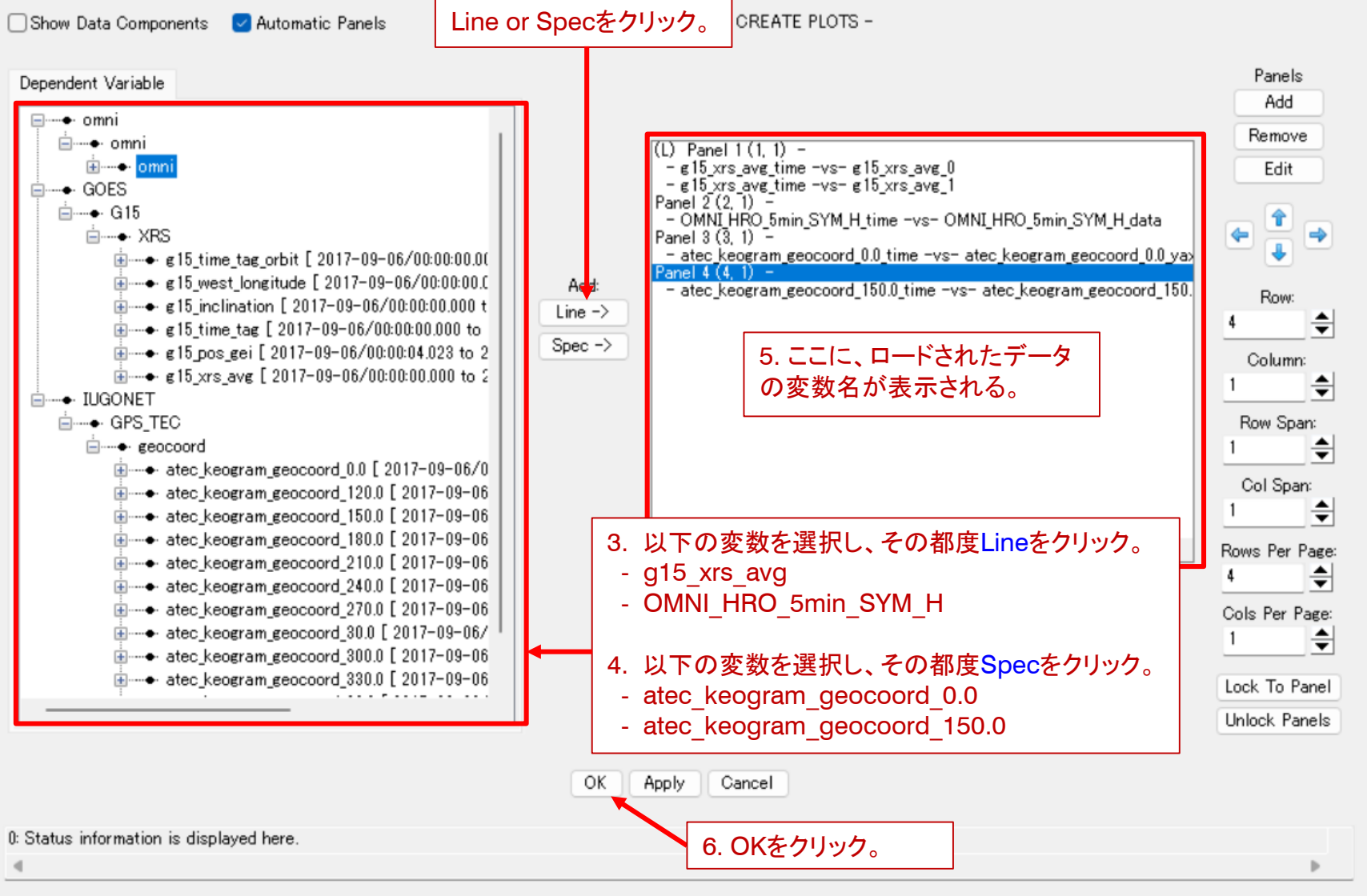
Done

(2022-05-14/19:25:04) 2: IUGONET Data Loaded Successfully

10. プロットするデータ(GPS-TEC)を選ぶ

1. メニューからPagesをクリックし、Newを選択。

2. p.10と同様にPlot/Layout Optionsウィンドウを開く。



☐ Show Data Components ☒ Automatic Panels

CREATE PLOTS -

Dependent Variable

- omni
 - omni
 - omni
- GOES
 - G15
 - XRS
 - g15_time_tag_orbit [2017-09-06/00:00:00.00 to 2017-09-06/00:00:00.00]
 - g15_west_longitude [2017-09-06/00:00:00.00 to 2017-09-06/00:00:00.00]
 - g15_inclination [2017-09-06/00:00:00.00 to 2017-09-06/00:00:00.00]
 - g15_time_tag [2017-09-06/00:00:00.00 to 2017-09-06/00:00:00.00]
 - g15_pos_gei [2017-09-06/00:00:00.00 to 2017-09-06/00:00:00.00]
 - g15_xrs_avg [2017-09-06/00:00:00.00 to 2017-09-06/00:00:00.00]
- IUGONET
 - GPS_TEC
 - geocoord
 - atec_keogram_geocoord_0.0 [2017-09-06/00:00:00.00 to 2017-09-06/00:00:00.00]
 - atec_keogram_geocoord_120.0 [2017-09-06/00:00:00.00 to 2017-09-06/00:00:00.00]
 - atec_keogram_geocoord_150.0 [2017-09-06/00:00:00.00 to 2017-09-06/00:00:00.00]
 - atec_keogram_geocoord_180.0 [2017-09-06/00:00:00.00 to 2017-09-06/00:00:00.00]
 - atec_keogram_geocoord_210.0 [2017-09-06/00:00:00.00 to 2017-09-06/00:00:00.00]
 - atec_keogram_geocoord_240.0 [2017-09-06/00:00:00.00 to 2017-09-06/00:00:00.00]
 - atec_keogram_geocoord_270.0 [2017-09-06/00:00:00.00 to 2017-09-06/00:00:00.00]
 - atec_keogram_geocoord_30.0 [2017-09-06/00:00:00.00 to 2017-09-06/00:00:00.00]
 - atec_keogram_geocoord_300.0 [2017-09-06/00:00:00.00 to 2017-09-06/00:00:00.00]
 - atec_keogram_geocoord_330.0 [2017-09-06/00:00:00.00 to 2017-09-06/00:00:00.00]

Line or Specをクリック。

Add:
Line ->
Spec ->

(L) Panel 1 (1, 1) -
- g15_xrs_avg_time -vs- g15_xrs_avg_0
- g15_xrs_avg_time -vs- g15_xrs_avg_1
Panel 2 (2, 1) -
- OMNI_HRO_5min_SYM_H_time -vs- OMNI_HRO_5min_SYM_H_data
Panel 3 (3, 1) -
- atec_keogram_geocoord_0.0_time -vs- atec_keogram_geocoord_0.0_yax
Panel 4 (4, 1) -
- atec_keogram_geocoord_150.0_time -vs- atec_keogram_geocoord_150.0_yax

5. ここに、ロードされたデータの変数名が表示される。

3. 以下の変数を選択し、その都度Lineをクリック。
- g15_xrs_avg
- OMNI_HRO_5min_SYM_H

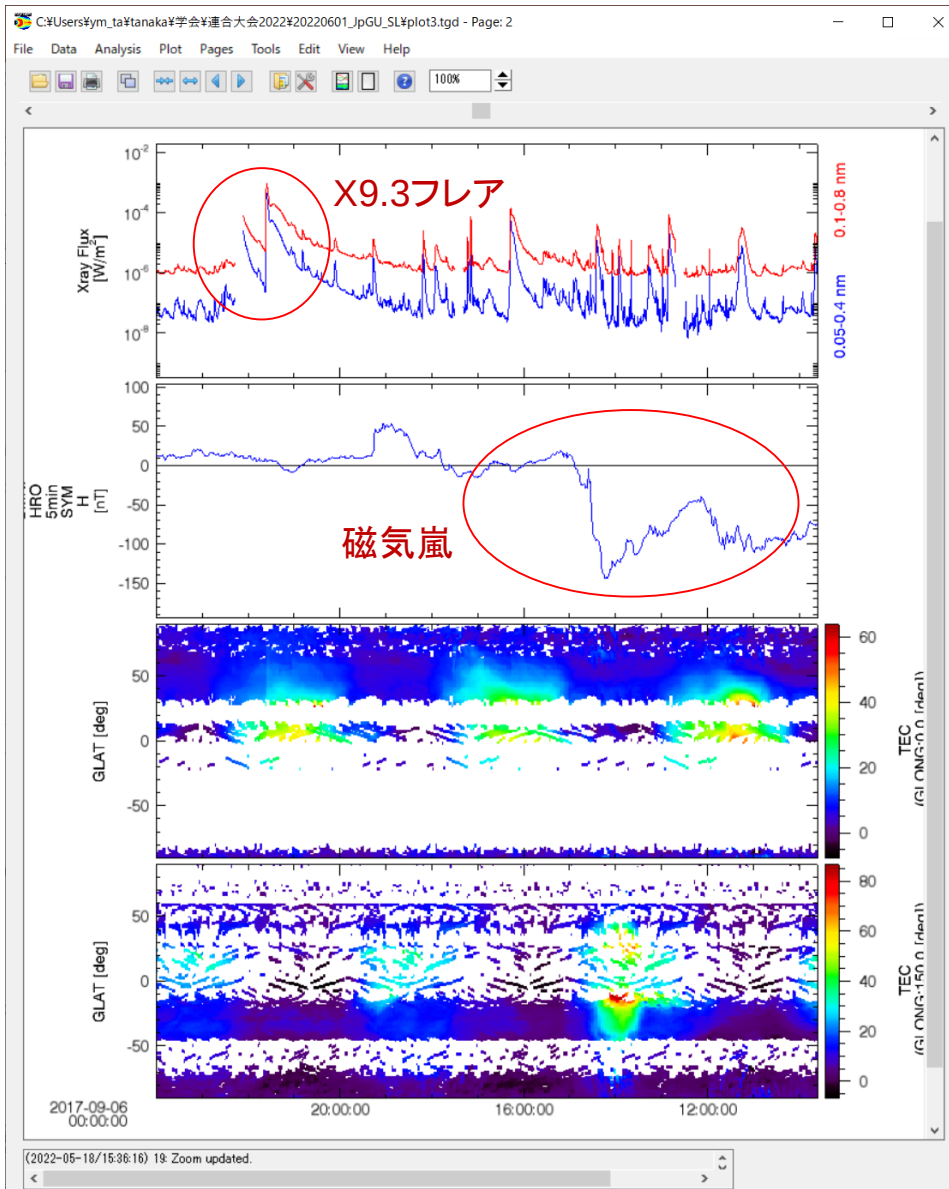
4. 以下の変数を選択し、その都度Specをクリック。
- atec_keogram_geocoord_0.0
- atec_keogram_geocoord_150.0

6. OKをクリック。

OK Apply Cancel

0: Status information is displayed here.

11. プロットを確認する



X線フラックス。

地磁気SYM-H指数(磁気嵐の指標)

経度0° におけるGPS-TEC(電離圏全電子数)

経度150° におけるGPS-TEC(電離圏全電子数)



極域の電離圏パラメータ、地磁気変動、地磁気誘導電流(GIC)をプロットしてみよう。

Figure 4 of Dimmock et al., 2017
<https://doi.org/10.1029/2018SW002132>

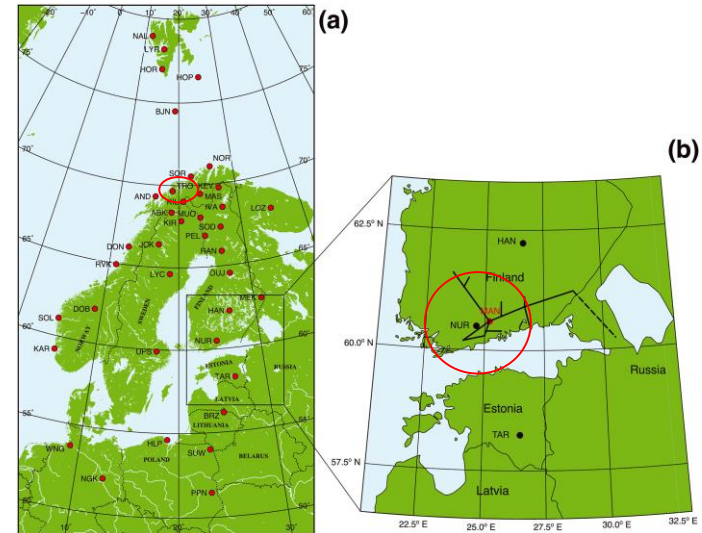
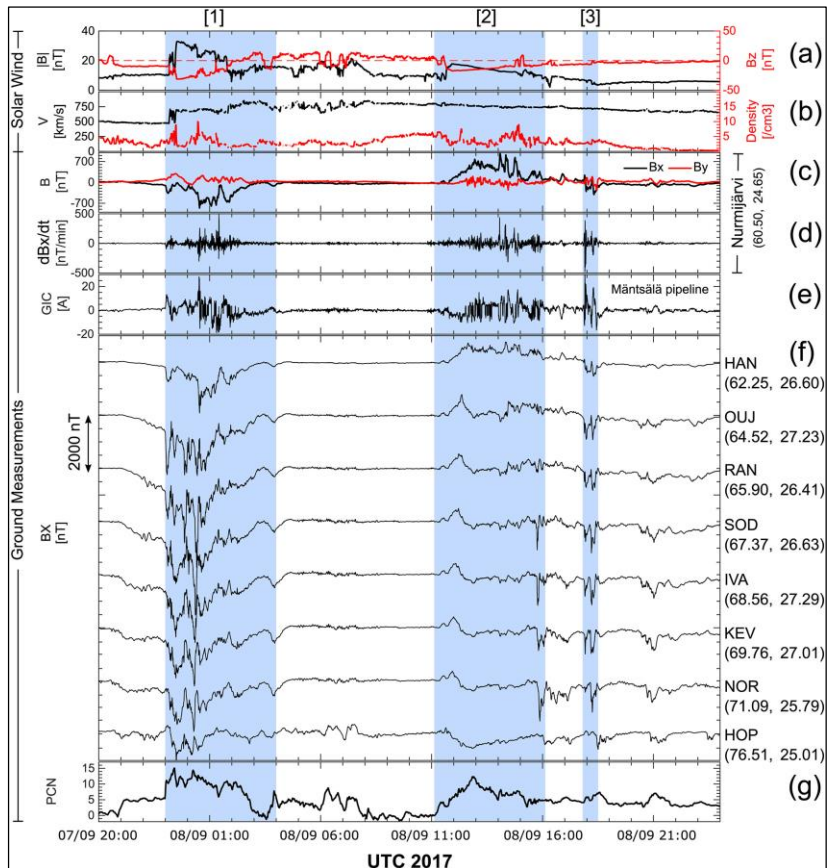
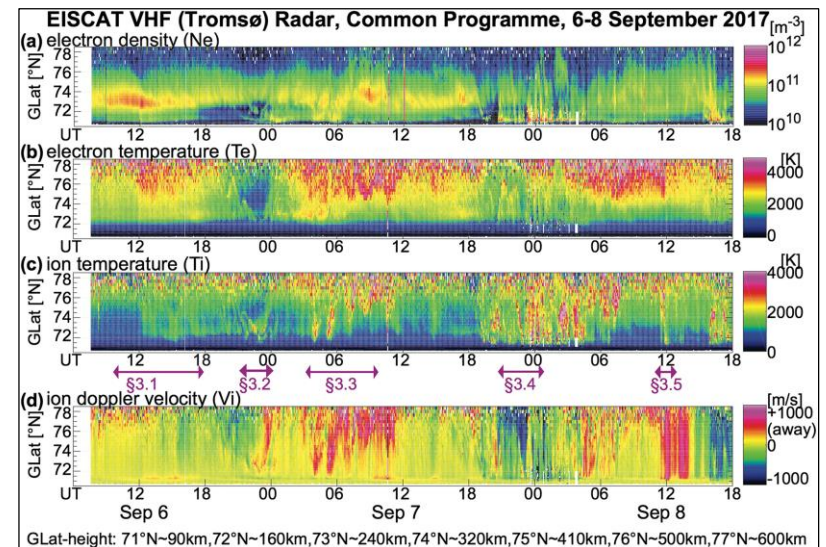


Figure 2 of Yamauchi et al., 2018
<https://doi.org/10.1029/2018SW001937>

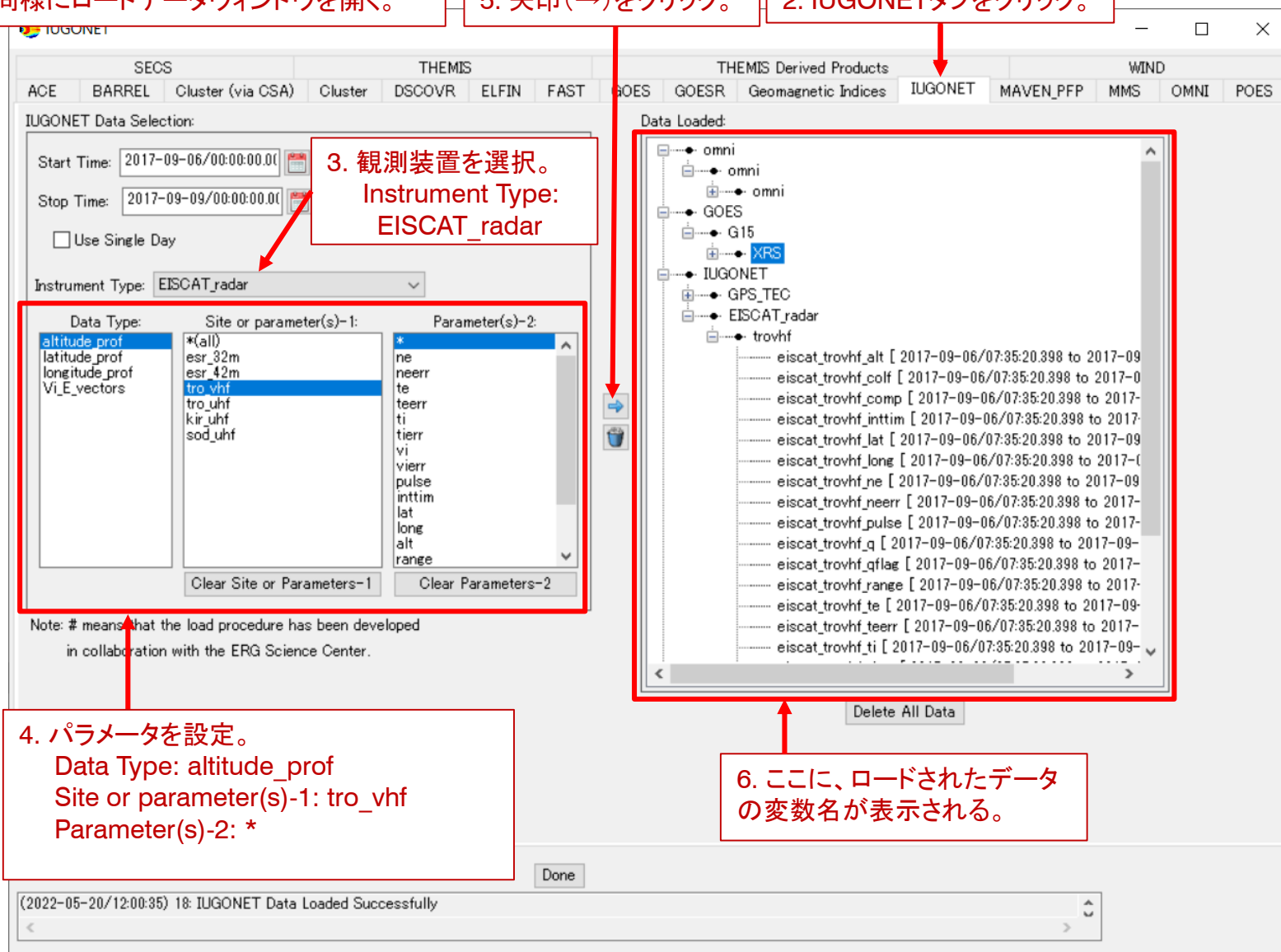


12. 極域電離圏データをロードする

1. p.7と同様にロードデータウィンドウを開く。

5. 矢印(→)をクリック。

2. IUGONETタブをクリック。



The screenshot shows the IUGONET Data Selection window. The 'THEMIS Derived Products' tab is selected. The 'Data Loaded' list on the right shows the loaded data. The 'Data Type' dropdown is set to 'altitude_prof'. The 'Site or parameter(s)-1' dropdown is set to 'tro_vhf'. The 'Parameter(s)-2' dropdown is set to '*'. The 'Data Loaded' list shows the loaded data, including 'eiscat_trovhf_alt', 'eiscat_trovhf_colf', 'eiscat_trovhf_comp', 'eiscat_trovhf_inttim', 'eiscat_trovhf_lat', 'eiscat_trovhf_long', 'eiscat_trovhf_ne', 'eiscat_trovhf_neerr', 'eiscat_trovhf_pulse', 'eiscat_trovhf_q', 'eiscat_trovhf_qflag', 'eiscat_trovhf_range', 'eiscat_trovhf_te', 'eiscat_trovhf_teerr', and 'eiscat_trovhf_ti'.

3. 観測装置を選択。
Instrument Type:
EISCAT_radar

4. パラメータを設定。
Data Type: altitude_prof
Site or parameter(s)-1: tro_vhf
Parameter(s)-2: *

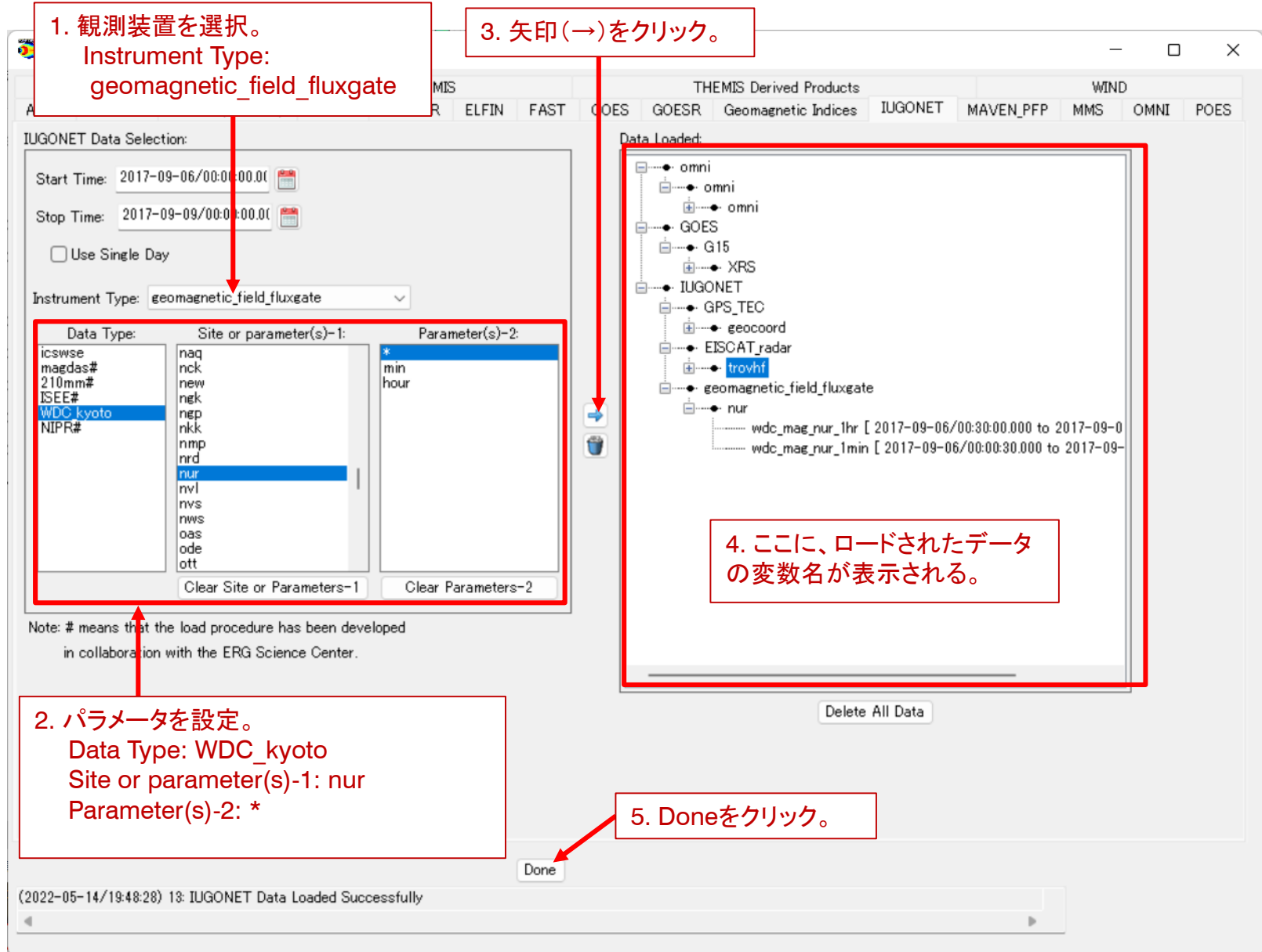
6. ここに、ロードされたデータ
の変数名が表示される。

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

Done

(2022-05-20/12:00:35) 18: IUGONET Data Loaded Successfully

13. 極域地磁気データをロードする



**1. 観測装置を選択。
Instrument Type:
geomagnetic_field_fluxgate**

**2. パラメータを設定。
Data Type: WDC_kyoto
Site or parameter(s)-1: nur
Parameter(s)-2: ***

3. 矢印(→)をクリック。

4. ここに、ロードされたデータの変数名が表示される。

5. Doneをクリック。

THEMIS Derived Products
WIND
MIS
R ELFIN FAST GOES GOESR Geomagnetic Indices IUGONET MAVEN_PFP MMS OMNI POES

IUGONET Data Selection:

Start Time: 2017-09-06/00:00:00.00
Stop Time: 2017-09-09/00:00:00.00
☐ Use Single Day

Instrument Type: geomagnetic_field_fluxgate

Data Type:	Site or parameter(s)-1:	Parameter(s)-2:
icswse	naq	*
magdas#	nck	min
210mm#	new	hour
ISEE#	nek	
WDC_kyoto	nep	
NIPR#	nkk	
	nmp	
	nrd	
	nur	
	nv1	
	nvs	
	nws	
	oas	
	ode	
	ott	

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:

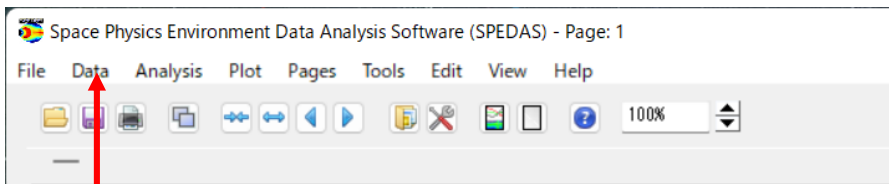
- omni
 - omni
- GOES
 - G15
 - XRS
- IUGONET
 - GPS_TEC
 - geocoord
 - EISCAT_radar
 - trvvhf
 - geomagnetic_field_fluxgate
 - nur
 - wdc_mag_nur_1hr [2017-09-06/00:30:00.000 to 2017-09-09/00:00:00.000]
 - wdc_mag_nur_1min [2017-09-06/00:00:30.000 to 2017-09-09/00:00:00.000]

Delete All Data

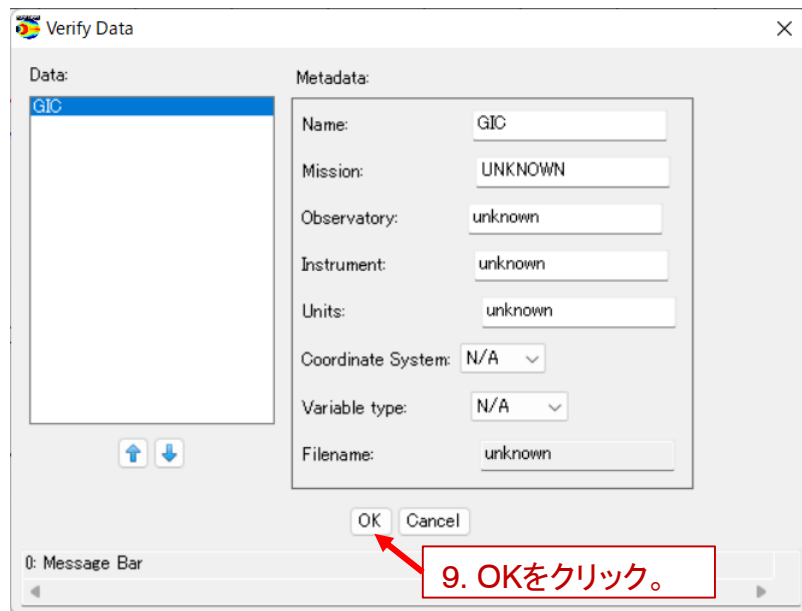
Done

(2022-05-14/19:48:28) 13: IUGONET Data Loaded Successfully

14. 地磁気誘導電流 (GIC) データをロードする



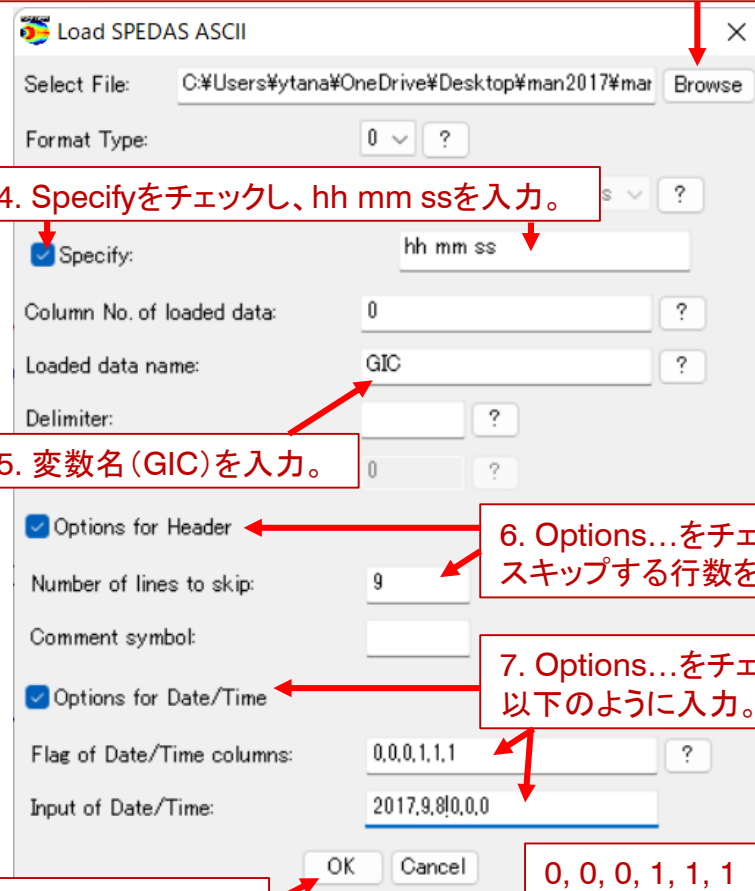
2. メニューからDataをクリックし、
Load Single Fileから
Load ASCII... を選択。



9. OKをクリック。

1. GICデータ(man2017)を
https://space.fmi.fi/gic/man_ascii/man.php
からダウンロードし、解凍する。

3. Browseをクリックし、解凍したman20170908.txtを選択。



4. Specifyをチェックし、hh mm ssを入力。

5. 変数名 (GIC) を入力。

6. Options...をチェックし、
スキップする行数を入力。

7. Options...をチェックし、
以下のように入力。

0, 0, 0, 1, 1, 1
2017, 9, 8, 0, 0, 0

8. OKをクリック。

15. プロットするデータを選ぶ

1. メニューからPagesをクリックし、Newを選択。

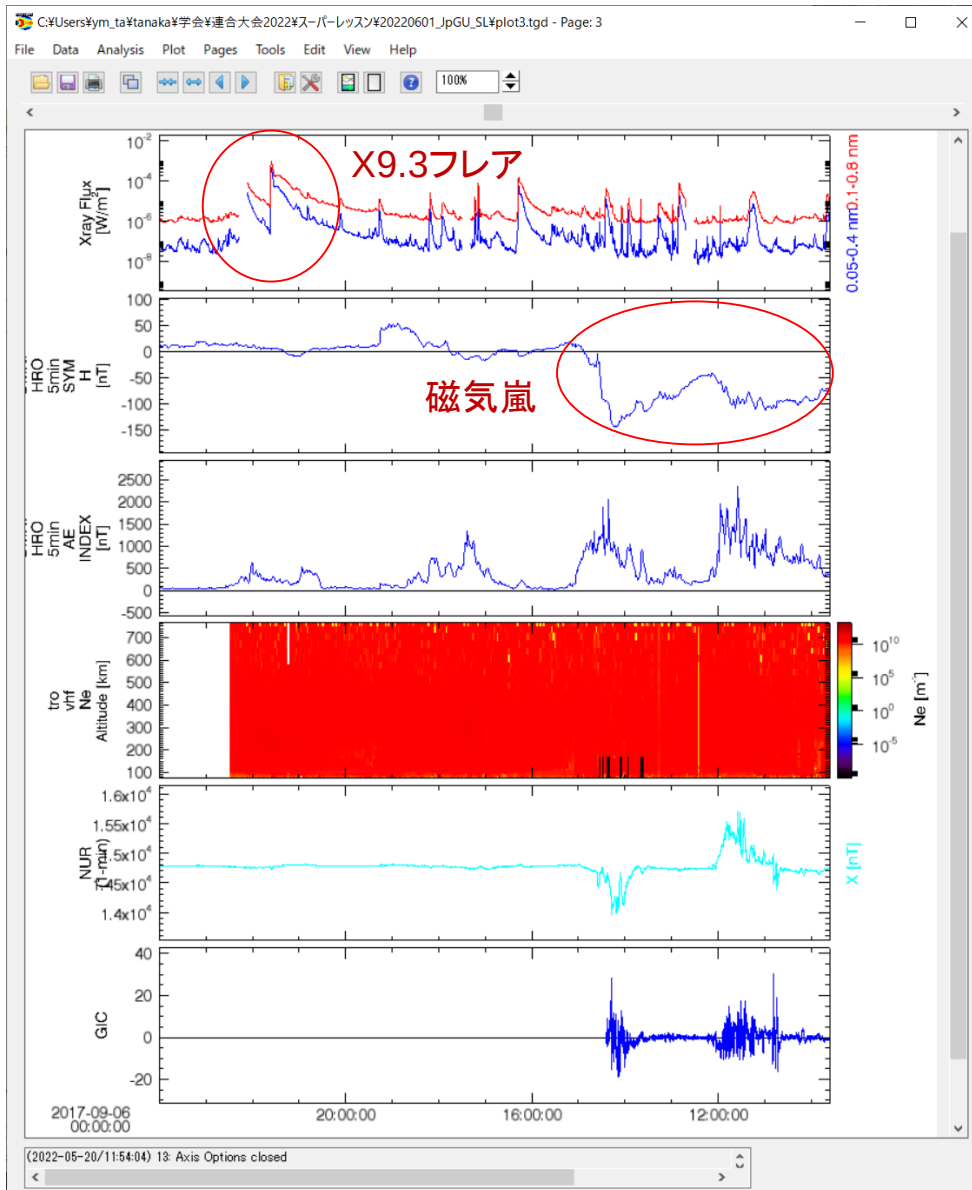
2. p.10と同様にPlot/Layout Optionsウィンドウを開く。

The screenshot shows the 'CREATE PLOTS' window in IUGONET. The 'Dependent Variable' tree on the left lists various data sources, with 'GIC' selected under the 'UNKNOWN' category. The 'Add:' section in the center has 'Line ->' and 'Spec ->' buttons. The 'Plots' list on the right shows six panels, with 'Panel 6 (6, 1)' selected, displaying the variables 'GIC_time' and 'GIC_data'. The 'Status' bar at the bottom indicates '0: Status information is displayed here.'.

Annotations for steps 1 through 7:

- 1. メニューからPagesをクリックし、Newを選択。
- 2. p.10と同様にPlot/Layout Optionsウィンドウを開く。
- 3. 以下の変数を選択し、その都度Lineをクリック。
 - g15_xrs_avg
 - OMNI_HRO_5min_SYM_H
 - OMNI_HRO_5min_AE_INDEX
- 4. 以下の変数を選択し、Specをクリック。
 - eiscat_trovhf_ne
- 5. 以下の変数を選択し、その都度Lineをクリック。
 - wdc_mag_nur_1min_2
 - GIC
- 6. ここに、ロードされたデータの変数名が表示される。
- 7. OKをクリック。

16. プロットを確認する



X線フラックス。

地磁気SYM-H指数(磁気嵐の指標)

地磁気AE指数(オーロラ活動の指標)

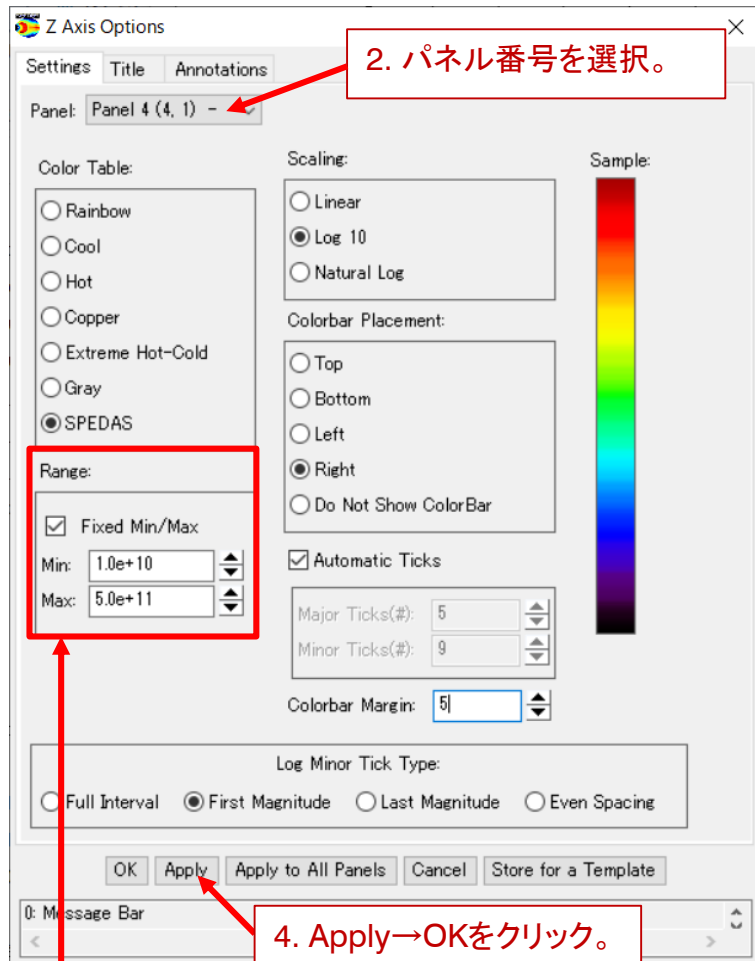
極域(ノルウェー)の電離圏電子密度。

極域(フィンランド)の地磁気変動(南北成分)。

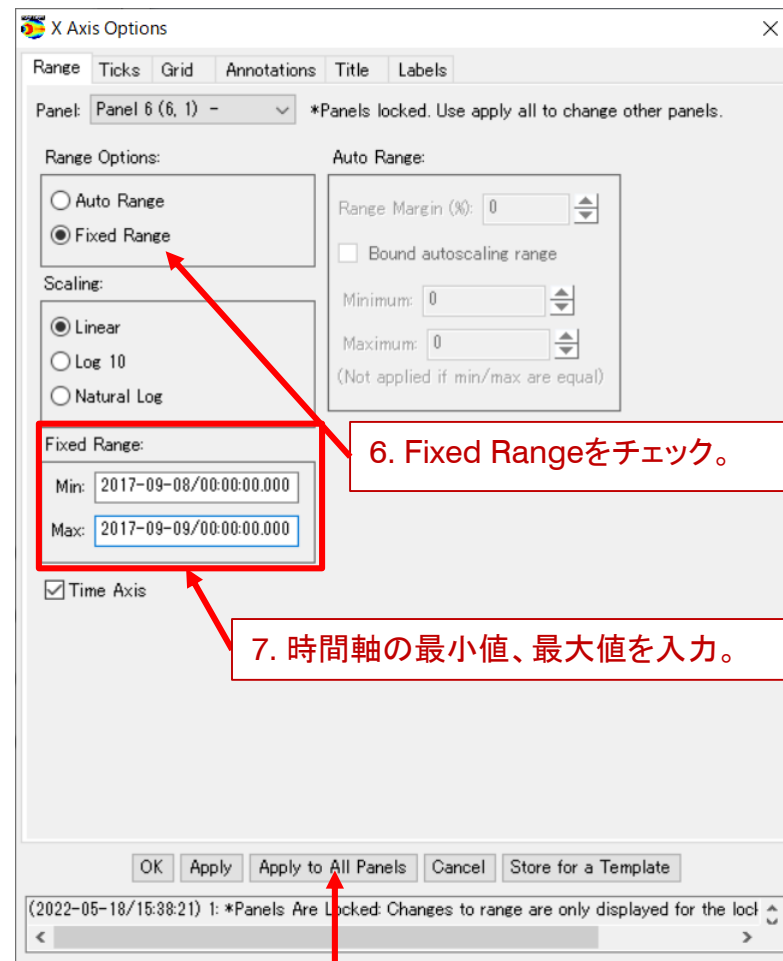
極域(フィンランド)の地磁気誘導電流(GIC)。

17. X軸, Y軸, Z軸の範囲を変更する

1. メニューからPlotをクリックし、Z Axis Options...を選択。

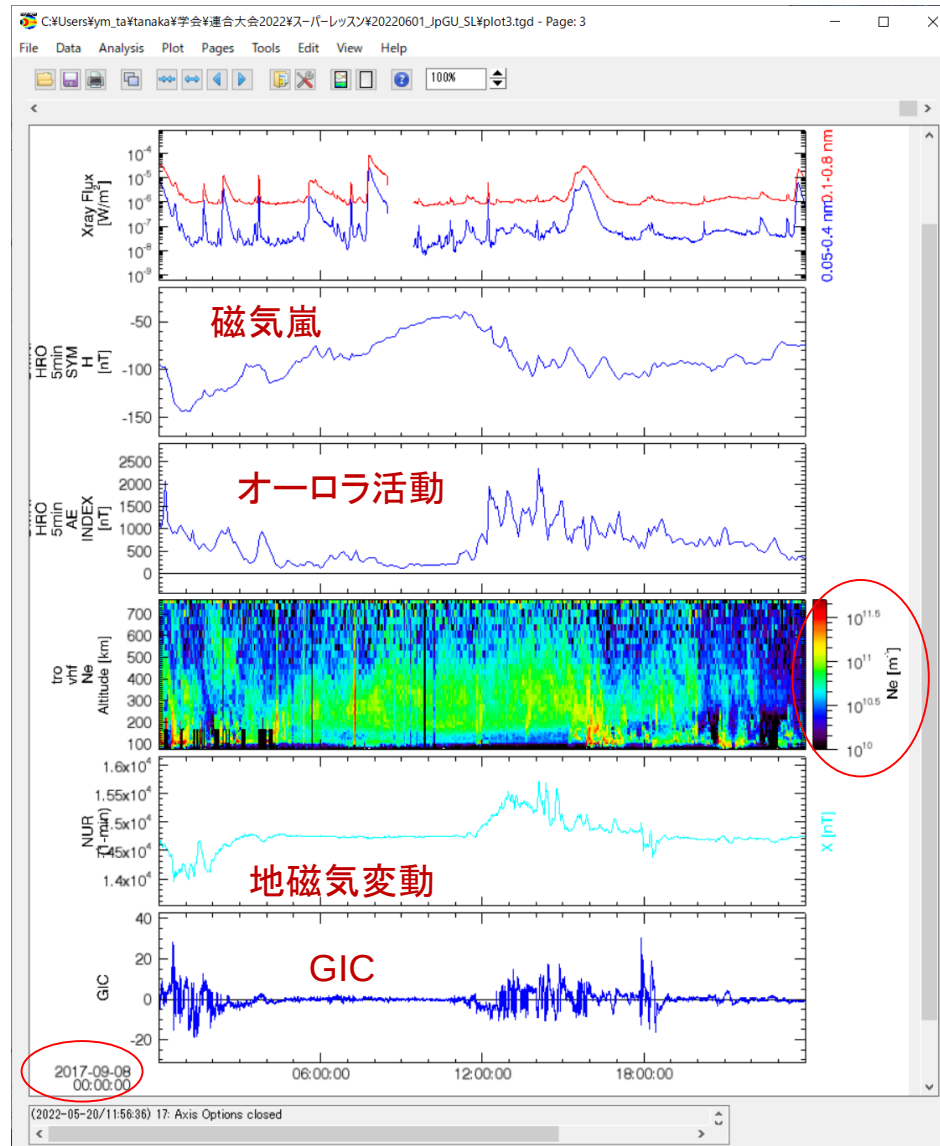


5. メニューからPlotをクリックし、X Axis Options...を選択。



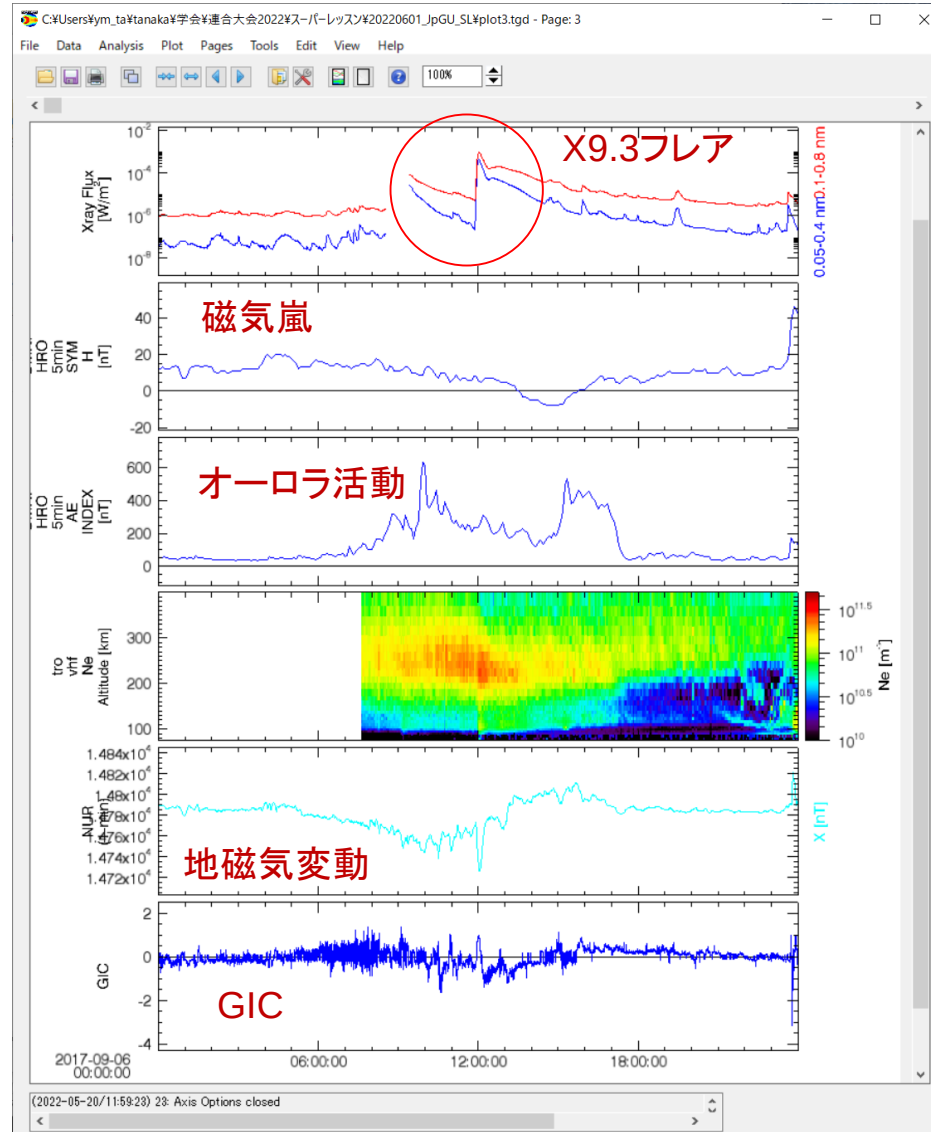
18. プロットを確認する

Sep. 8, 2017



【演習】次の図を作成してみよう

Sep. 6, 2017



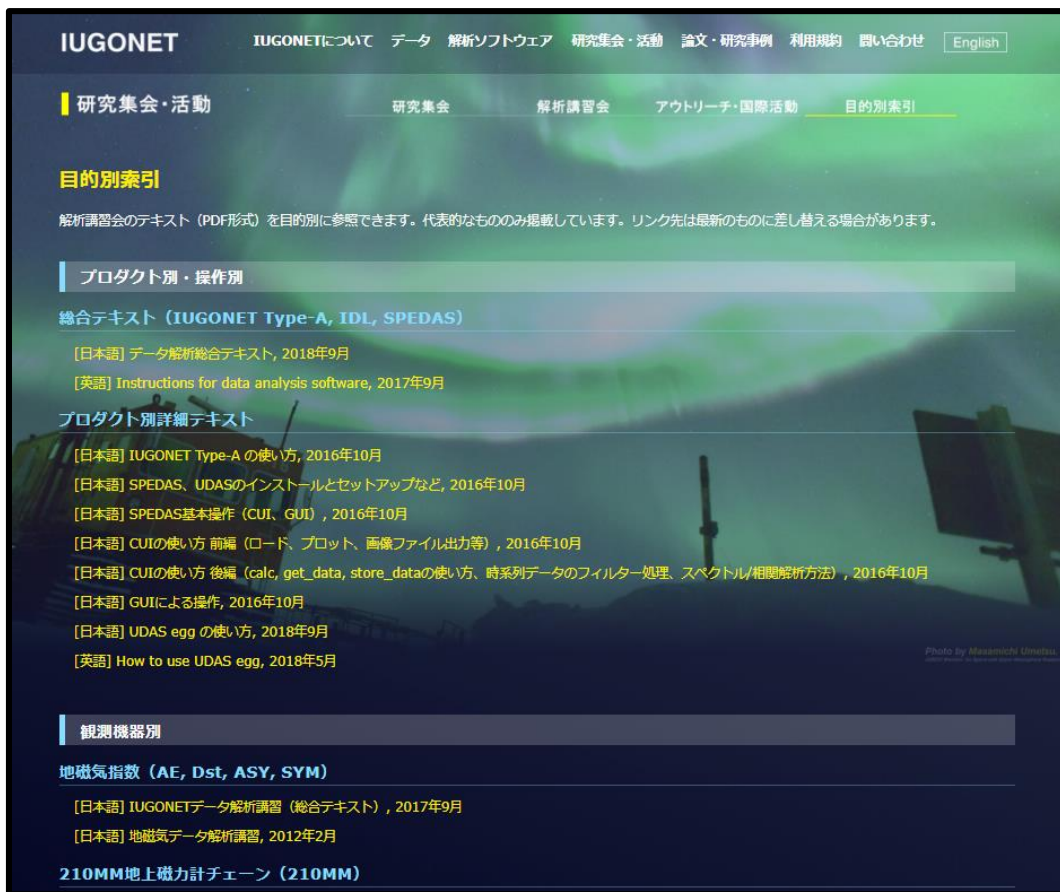
1. SPEDASのWiki (英語)

<https://spedas.org/wiki/index.php?title=GUI>

GUI操作方法がまとめられたウェブサイト。

2. IUGONETの過去の講習会資料(日本語 or 英語)

<http://www.iugonet.org/activity/purpose.jsp>



IUGONET IUGONETについて データ 解析ソフトウェア 研究集会・活動 論文・研究事例 利用規約 問い合わせ English

研究集会・活動 研究集会 解析講習会 アウトリーチ・国際活動 目的別索引

目的別索引

解析講習会のテキスト (PDF形式) を目的別に参照できます。代表的なもののみ掲載しています。リンク先は最新のものに差し替える場合があります。

プロダクト別・操作別

総合テキスト (IUGONET Type-A, IDL, SPEDAS)

[日本語] データ解析総合テキスト, 2018年9月

[英語] Instructions for data analysis software, 2017年9月

プロダクト別詳細テキスト

[日本語] IUGONET Type-A の使い方, 2016年10月

[日本語] SPEDAS, UDASのインストールとセットアップなど, 2016年10月

[日本語] SPEDAS基本操作 (CUI, GUI), 2016年10月

[日本語] CUIの使い方 前編 (ロード、プロット、画像ファイル出力等), 2016年10月

[日本語] CUIの使い方 後編 (calc, get_data, store_dataの使い方、時系列データのフィルター処理、スペクトル/相関解析方法), 2016年10月

[日本語] GUIによる操作, 2016年10月

[日本語] UDAS egg の使い方, 2018年9月

[英語] How to use UDAS egg, 2018年5月

観測機器別

地磁気指数 (AE, Dst, ASY, SYM)

[日本語] IUGONETデータ解析講習 (総合テキスト), 2017年9月

[日本語] 地磁気データ解析講習, 2012年2月

210MM地上磁力計チェーン (210MM)

これまでにIUGONETで開催された講習会で使用した資料(GUI操作方法を含む)が置かれている。