

On-Demand Analysis Tools for Space Science (Hands-On Activities)

Yukinaga Miyashita

Korea Astronomy and Space Science Institute (KASI)

Korea University of Science and Technology (UST)

Planetary Science and Astrophysics Workshop, Thailand, 30 Jul 2022

■ Contents

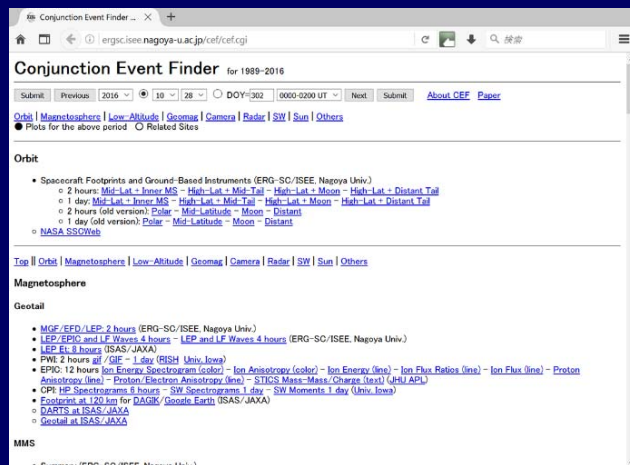
- **Introduction**
- **Comprehensive On-Demand Analysis Tools**
 - Conjunction Event Finder (CEF)
 - NASA CDAWeb
 - NASA SSCWeb (introduction only)
 - IUGONET Type-A
- **Comprehensive Analysis Tool (advanced)**
 - SPEDAS (introduction only)

■ Introduction

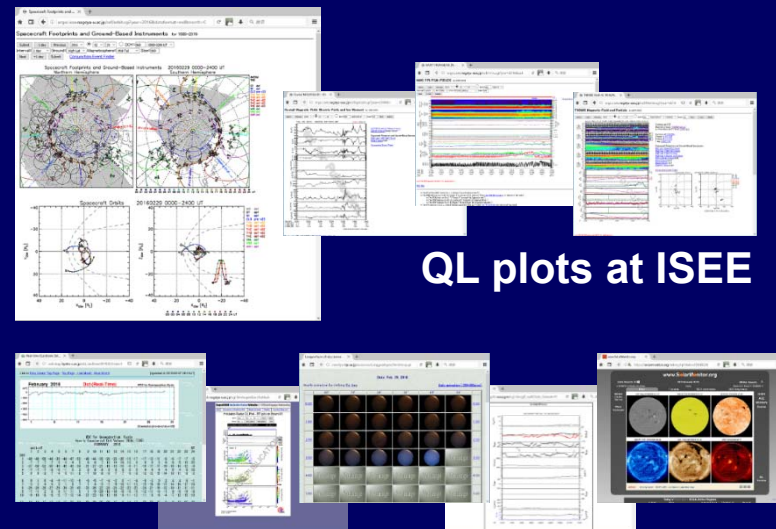
- In space science, we often need to check various kinds of data from various spacecraft-borne and ground-based instruments.
- To check and analyze data, we use:
 - Quick-look (QL) or ready-made plots
 - the easiest, quickest way to check data
 - **CEF, IUGONET Type-A**
 - On-demand plots-making tools
 - an easy way to check data and make plots
 - **NASA CDAWeb, NASA SSCWeb, IUGONET Type-A**
 - Analysis software
 - not so easy, for advanced serious analysis
 - **SPEDAS**

■ Conjunction Event Finder (CEF)

- <https://ergsc.isee.nagoya-u.ac.jp/cef/cef.cgi>
- Miyashita et al. (2011, doi:10.5047/eps.2011.01.003)
- Links to QL plots for various kinds of spacecraft and ground-based observations for a selected period.
- **Browse QL plots** one after another simply by clicking.
- Useful for **finding conjunction events** and planning future collaborations between spacecraft and ground-based observations.



>100 links to QL plots available
at ISEE and other institute



QL plots at ISEE

QL plots at other institutes

■ How to Use CEF (1-1)

- If you want to find an interesting event from a specific spacecraft or ground-based instrument
- Open the website of QL plots (via the CEF).
- Browse them one after another.

- Example:
To find an interesting spacecraft conjunction
- Open the CEF.
- Click the link to
“**High-Lat + Mid-Tail**”
at “**Orbit**”
- “**Spacecraft footprints...**”
- “**2 hours**”.

<https://ergsc.isee.nagoya-u.ac.jp/cef/cef.cgi>

Conjunction Event Finder for 1989-2022

Submit Previous 2022 07 30 DOY=211 0000-0200 UT Next Submit [About CEF](#) [Paper](#)

[Orbit](#) | [Magnetosphere](#) | [Low-Altitude](#) | [Geomag](#) | [Camera](#) | [Radar](#) | [SW](#) | [Sun](#) | [Others](#)

• Plots for the above period ☐ Related Sites

Orbit

- Spacecraft Footprints and Ground-Based Instruments (ERG-SC/ISEE, Nagoya Univ.)
 - 2 hours: [Mid-Lat + Inner MS](#) - [High-Lat + Mid-Tail](#) - [High-Lat + Moon](#) - [High-Lat + Distant Tail](#)
 - 1 day: [Mid-Lat + Inner MS](#) - [High-Lat + Mid-Tail](#) - [High-Lat + Moon](#) - [High-Lat + Distant Tail](#)
 - 2 hours (old version): [Polar](#) - [Mid-Latitude](#) - [Moon](#) - [Distant](#)
 - 1 day (old version): [Polar](#) - [Mid-Latitude](#) - [Moon](#) - [Distant](#)
 - [NASA SSCWeb](#)
 - [Space-Track.Org](#)

[Top](#) | [Orbit](#) | [Magnetosphere](#) | [Low-Altitude](#) | [Geomag](#) | [Camera](#) | [Radar](#) | [SW](#) | [Sun](#) | [Others](#)

Magnetosphere

ERG (Arase)

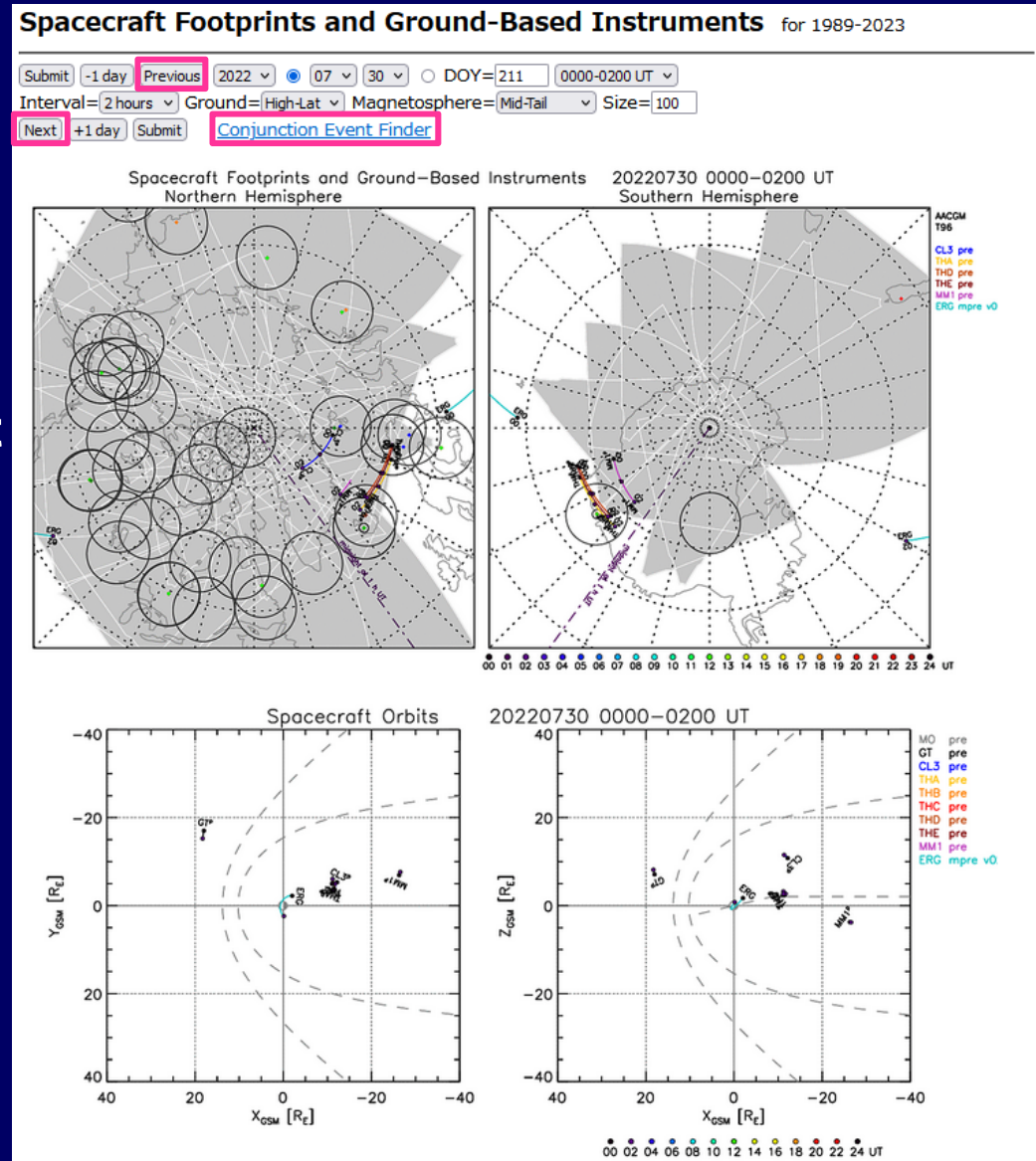
- Summary (ERG-SC/ISEE, Nagoya Univ.)
 - All: [2 hours](#) - [8 hours](#) - [1 day](#)
 - PWE/WFC (Chorus-burst, SWPIA-burst) 1 hour: [1](#) [2](#)
 - PWE: [8 hours](#) - [1 day](#)
 - HEP: [8 hours](#) - [1 day](#)
 - LEP-i: [8 hours](#) - [1 day](#)
 - [Near-Real Time 1 day](#) (SEES/JAXA)
 - [Orbit](#) (SEES/JAXA)
 - [ERG-GB0 Conjunction Interval Finder](#)
 - [ERG-SC at ISEE, Nagoya Univ.](#)

Geotail

■ How to Use CEF (1-2)

- Click the “**Next**” button to show plots for the next interval.
- Click the “**Previous**” button to show plots for the previous interval.
- If you find an interesting event
 - Click the link to “**Conjunction Event Finder**” to browse QL plots of various kinds of data.

<https://ergsc.isee.nagoya-u.ac.jp/cef/orbit.cgi>



■ How to Use CEF (2-1)

- If you already have an event or a time interval of interest
 - (1) Open the CEF (<https://ergsc.isee.nagoya-u.ac.jp/cef/cef.cgi>).
 - (2) Select the date and time period of interest at the top and click the “Submit” button, and the links to QL plots for the selected period will be generated.
 - (3) Scroll down in the CEF and click links to spacecraft and instruments of interest.
- Note that some links are dead, because the selected projects do not cover the selected period, the data are unavailable for some reason, and/or the CEF has not been updated yet. Even so, the CEF is still useful.

■ How to Use CEF (2-2)

- Example events: The ~0357 UT and ~0450 UT substorms on 26 February 2008

(Miyashita et al., 2018, doi:10.1029/2018GL078589;
Angelopoulos et al, 2008, doi:10.1126/science.1160495)

- (1) Open the CEF (<https://ergsc.isee.nagoya-u.ac.jp/cef/cef.cgi>).
- (2) Select “2008”, “02”, “26”, and “0400-0600 UT” at the top and click the “Submit” button, and the links to QL plots for the selected period will be generated.

Conjunction Event Finder

for 1989-2022

2008 ▾

☒ 02 ▾

26 ▾

☐ DOY=

057

0400-0600 UT ▾

[About CEF](#) [Paper](#)

[Orbit](#) | [Magnetosphere](#) | [Low-Altitude](#) | [Geomag](#) | [Camera](#) | [Radar](#) | [SW](#) | [Sun](#) | [Others](#)

☒ Plots for the above period ☐ Related Sites

Orbit

- Spacecraft Footprints and Ground-Based Instruments (ERG-SC/ISEE, Nagoya Univ.)

■ How to Use CEF (2-3)

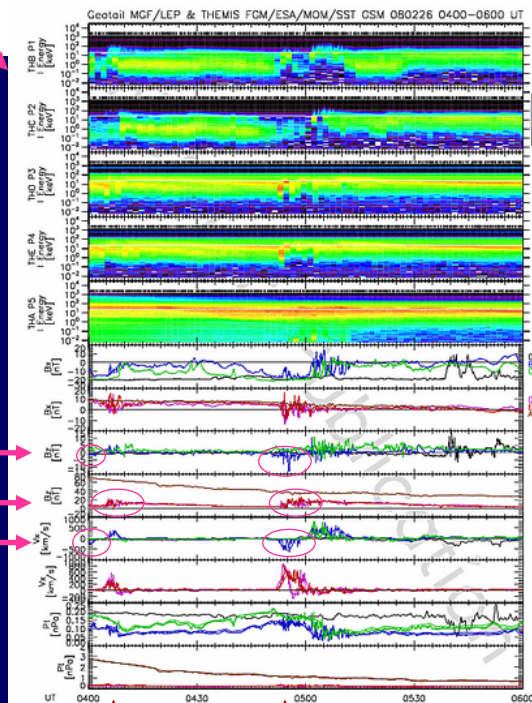
(3-1) Scroll down the CEF page and click the link to “**Multi-SC+Geotail**” at “**THEMIS**” “**L2 FGM/ESA/SST: 2 hours**”.

THEMIS

- L2 FGM/ESA/SST: 2 hours [Multi-SC+Geotail](#) [A](#) [B](#) [C](#) [D](#) [E](#) (ERG-SC/ISEE, Nagoya Univ.)
- Summary: 2 hours [A](#) [B](#) [C](#) [D](#) [E](#) — 6 hours [A](#) [B](#) [C](#) [D](#) [E](#) — 1 day [A](#) [B](#) [C](#) [D](#) [E](#) ([UCB SSL](#))
- [THEMIS Mission Site at UCB SSL](#)
- [THEMIS Mission Site at NASA](#)
- [Taiwan AIDA for THEMIS at NCU](#)
- [ARTEMIS Mission Site at UCB SSL](#)

THEMIS Magnetic Field and Particle for 2007-2022

Submit -1 day Previous 2008 02 26 DOY=057 0400-0600 UT Multi-SC Size=100 Next +1 day Submit



plasmoids
dipolarizations
plasmoids

substorms

Summary at ISEE

Multi-SC 2 hours: [THEMIS+Geotail](#)

L2 FGM/ESA/SST 2 hours: [A](#) [B](#) [C](#) [D](#) [E](#)

Summary at [UCB SSL](#)

2 hours: [A](#) [B](#) [C](#) [D](#) [E](#)

6 hours: [A](#) [B](#) [C](#) [D](#) [E](#)

1 day: [A](#) [B](#) [C](#) [D](#) [E](#)

Spacecraft Footprints and Ground-Based Instruments:

[Mid-Lat + Inner MS 2 hours](#)

[High-Lat + Mid-Tail 2 hours](#)

[High-Lat + Moon 2 hours](#)

[High-Lat + Distant Tail 2 hours](#)

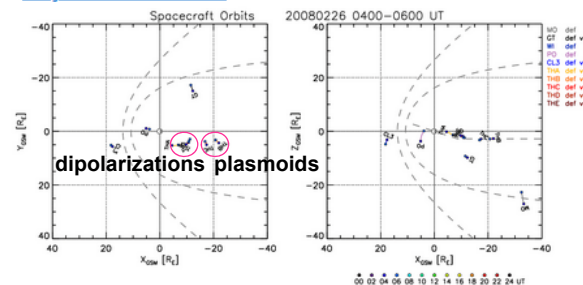
[Mid-Latitude 2 hours](#) (old)

[Polar 2 hours](#) (old)

[Moon 2 hours](#) (old)

[Distant 2 hours](#) (old)

[Conjunction Event Finder](#)



■ How to Use CEF (2-4)

(3-2) Scroll down the CEF page or click the link “**Camera**”, and click the link to “**Keograms**” at “**THEMIS GBO ASI**”.

[Top](#) | [Orbit](#) | [Magnetosphere](#) | [Low-Altitude](#) | [Geomag](#) | [Camera](#) | [Radar](#) | [SW](#) | [Sun](#) | [Others](#)

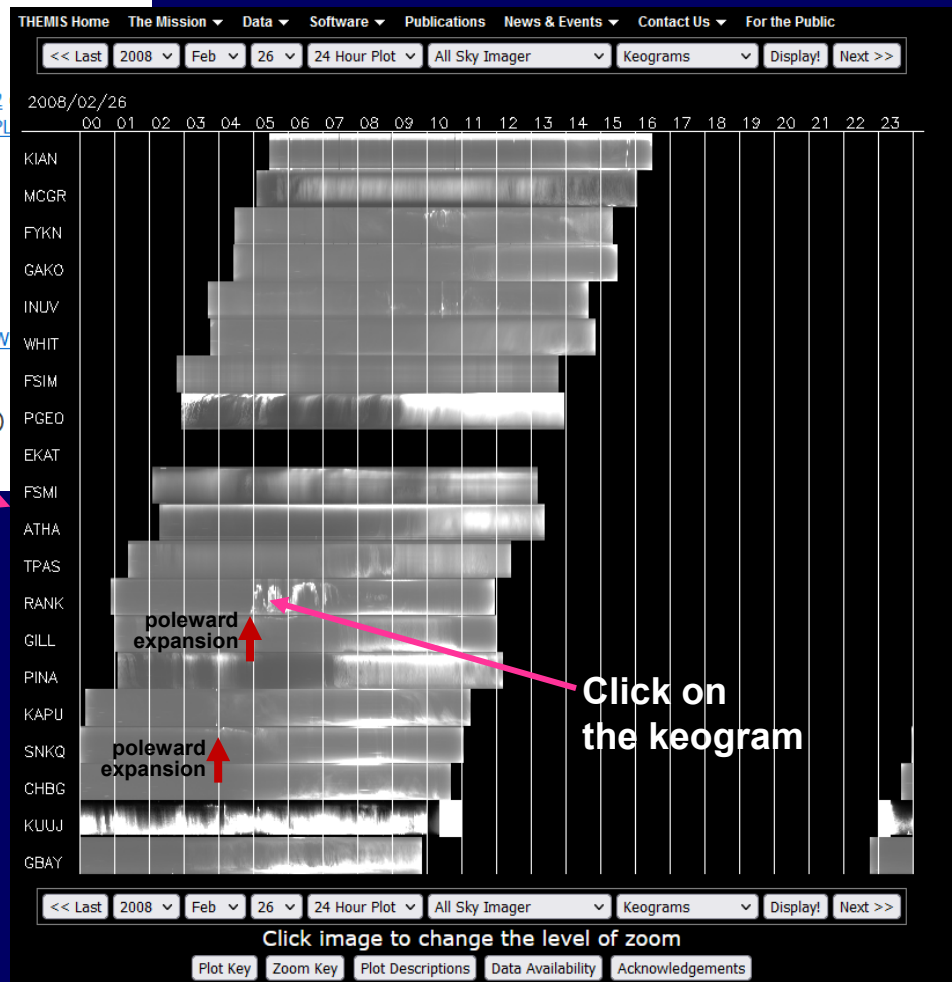
Camera/Riometer/Ionosonde

Spacecraft-Borne

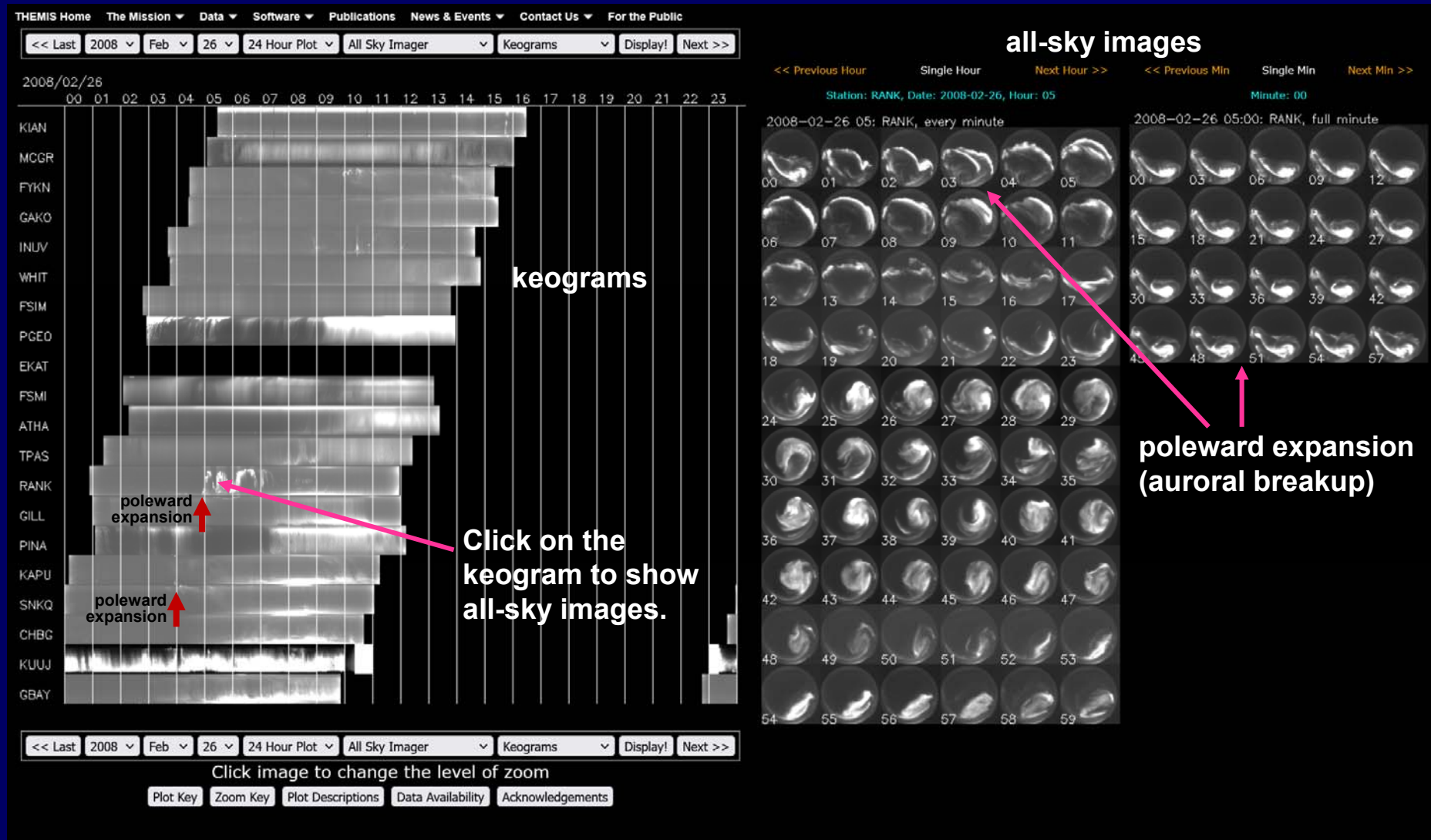
- Polar: UVI ([NASA MSFC](#)) - [VIS 1 day](#) ([Univ. Iowa](#)) - PIXIE 1 day [Low High](#) ([Lockheed Martin](#))
- IMAGE FUV Auroral Images: 1 hour WIC [1](#) [2](#) - S13 [1](#) [2](#) - S12 [1](#) [2](#) ([NASA CDAWeb](#)) — 1 day [0](#) [1](#) [2](#)
- TIMED: [GUVI Maps of Auroral Electron Mean Energy and Energy Flux 1 day](#) ([JHU APL](#)) — [JHU APL](#)

Ground-Based

- OMTI Japanese Meridian and Canada: [Map](#) ([ISEE, Nagoya Univ.](#))
- FMI ASC Northern Europe: Keogram 1 day [previous day](#) [selected day](#) - [Map](#) ([FMI](#))
- NIPR ASC Norway Tromso: [1 Day](#) ([NIPR](#))
- NIPR ASC Svalbard Longyearbyen: [1 Day](#) - [Map](#) ([UNIS](#) and [NIPR](#))
- PsA + PWING EMCCD Northern Europe & Alaska: [1 Day](#) ([ERG-SC/ISEE, Nagoya Univ.](#)) — [PsA](#), [PW](#)
- THEMIS GBO ASI Canada-Alaska: 1 day [Mosaic Summary](#) [Keograms](#) [REGO Keograms](#) ([UCB SSL](#))
- UofC Space Physics Data Portal Canada-Alaska: [all instruments 1 day](#) ([Univ. Calgary](#))
- NORSTAR Canada: MSP 12 hours [Churchill Line](#) [486 nm all](#) [557 nm all](#) [630 nm all](#) ([Univ. Calgary](#))
- [Univ. Calgary MSI Summary 1 hour](#) ([Univ. Calgary](#))
- [GAIA Canada and Northern Europe](#)



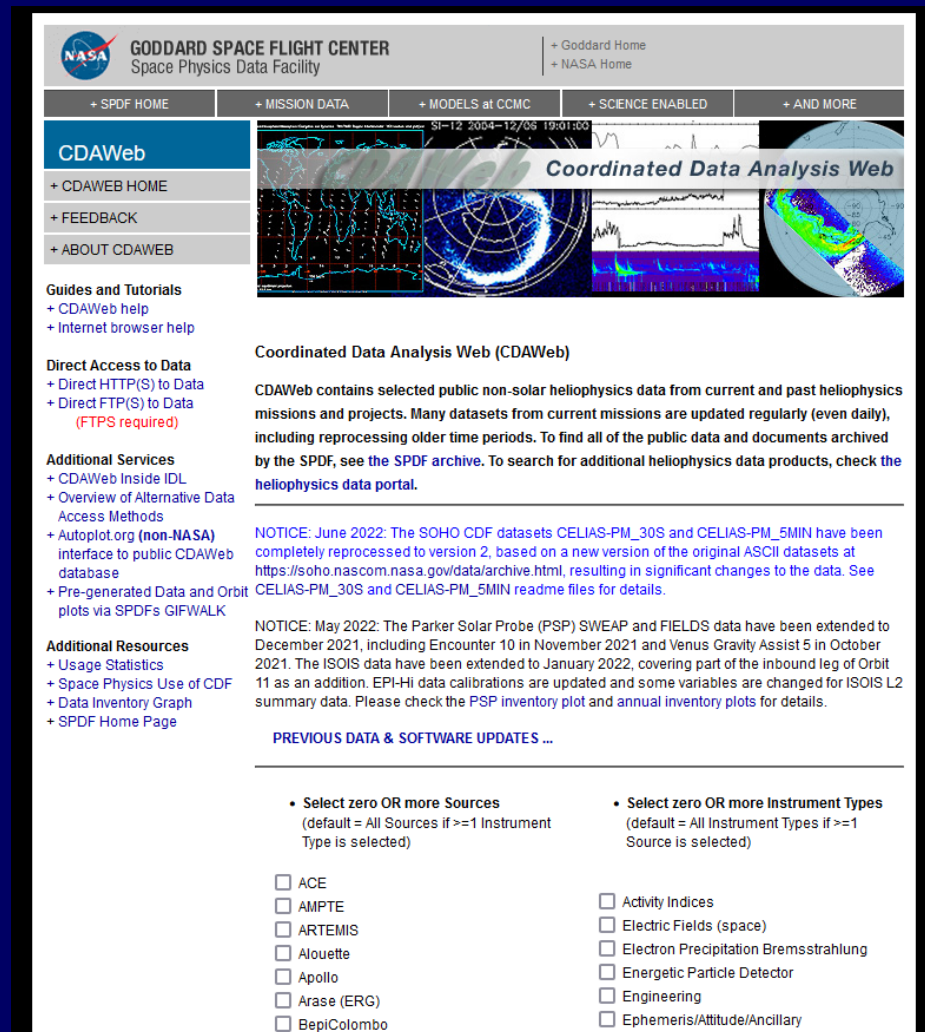
■ How to Use CEF (2-5)



■ NASA CDAWeb

- Coordinated Data Analysis Web
- <https://cdaweb.gsfc.nasa.gov/>
- Mainly for spacecraft data.
- Can make plots on demand and also download data.
- Can combine different data sets and specify a period flexibly.

- (1) Select spacecraft and instrument types.
- (2) Select data set.
- (3) Input a period and select plot options and data parameters.



The screenshot displays the NASA CDAWeb interface. At the top, the header includes the NASA logo, "GODDARD SPACE FLIGHT CENTER Space Physics Data Facility", and links to "Goddard Home" and "NASA Home". Below the header is a navigation bar with buttons for "+ SPDF HOME", "+ MISSION DATA", "+ MODELS at CCMC", "+ SCIENCE ENABLED", and "+ AND MORE". A sidebar on the left contains a "CDAWeb" section with links to "+ CDAWEB HOME", "+ FEEDBACK", and "+ ABOUT CDAWEB". Below this are "Guides and Tutorials" (CDAWeb help, Internet browser help), "Direct Access to Data" (Direct HTTP(S) to Data, Direct FTP(S) to Data (FTP(S) required)), "Additional Services" (CDAWeb Inside IDL, Overview of Alternative Data Access Methods, Autoplot.org (non-NASA) interface to public CDAWeb database, Pre-generated Data and Orbit plots via SPDFs GIFWALK), and "Additional Resources" (Usage Statistics, Space Physics Use of CDF, Data Inventory Graph, SPDF Home Page). The main content area features a large banner with the text "Coordinated Data Analysis Web" and a background image of a solar flare. Below the banner, there are two notices: one from June 2022 regarding SOHO CDF datasets and another from May 2022 regarding Parker Solar Probe (PSP) SWEAP and FIELDS data. At the bottom, there are two sections for selecting data: "Select zero OR more Sources" (default = All Sources if >=1 Instrument Type is selected) and "Select zero OR more Instrument Types" (default = All Instrument Types if >=1 Source is selected). Each section contains a list of checkboxes for various spacecraft and instruments.

Coordinated Data Analysis Web (CDAWeb)

CDAWeb contains selected public non-solar heliophysics data from current and past heliophysics missions and projects. Many datasets from current missions are updated regularly (even daily), including reprocessing older time periods. To find all of the public data and documents archived by the SPDF, see the [SPDF archive](#). To search for additional heliophysics data products, check the [heliophysics data portal](#).

NOTICE: June 2022: The SOHO CDF datasets CELIAS-PM_30S and CELIAS-PM_5MIN have been completely reprocessed to version 2, based on a new version of the original ASCII datasets at <https://soho.nascom.nasa.gov/data/archive.html>, resulting in significant changes to the data. See CELIAS-PM_30S and CELIAS-PM_5MIN readme files for details.

NOTICE: May 2022: The Parker Solar Probe (PSP) SWEAP and FIELDS data have been extended to December 2021, including Encounter 10 in November 2021 and Venus Gravity Assist 5 in October 2021. The ISOIS data have been extended to January 2022, covering part of the inbound leg of Orbit 11 as an addition. EPI-Hi data calibrations are updated and some variables are changed for ISOIS L2 summary data. Please check the [PSP inventory plot](#) and [annual inventory plots](#) for details.

PREVIOUS DATA & SOFTWARE UPDATES ...

• **Select zero OR more Sources**
(default = All Sources if >=1 Instrument Type is selected)

☐ ACE
☐ AMPTE
☐ ARTEMIS
☐ Alouette
☐ Apollo
☐ Arase (ERG)
☐ BepiColombo

• **Select zero OR more Instrument Types**
(default = All Instrument Types if >=1 Source is selected)

☐ Activity Indices
☐ Electric Fields (space)
☐ Electron Precipitation Bremsstrahlung
☐ Energetic Particle Detector
☐ Engineering
☐ Ephemeris/Attitude/Ancillary

■ How to Use CDAWeb (1)

- Example events: The ~0357 UT and ~0450 UT substorms on 26 February 2008

- (1) Select spacecraft and instrument types.
- Select “**THEMIS**” from “**Sources**” (left), and “**Magnetic Fields (space)**” and “**Particles (space)**” from “**Instrument Types** (right).”
- Click the “**Submit**” button.

☐ ST5
☐ STEREO
☐ Sakigake
☐ Solar Orbiter
☒ **THEMIS**
☐ TIMED
☐ TSS-1R
☐ TWINS
☐ Ulysses
☐ Van Allen Probes (RBSP)
☐ Voyager
☐ Wind
☐ Balloons
☐ Ground-Based Investigations
☐ Helio ephemeris
☐ OMNI (Combined 1AU IP Data; Magnetic and Solar Indices)
☐ Smallsats/Cubesats
☐ Sounding Rockets

NASA Official: Robert M. Candey
(301)286-6707, Robert.M.Candey@nasa.gov
Curator: Tami Kovalick
Last Modified: 20 Jul 2022

Contact SPDF: NASA-SPDF-
Support@nasa.onmicrosoft.com
+ Privacy Policy and Important Notices

GODDARD SPACE FLIGHT CENTER
Space Physics Data Facility

+ SPDF HOME + MISSION DATA + MODELS at CCMC + SCIENCE ENABLED + AND MORE

CDAWeb
+ CDAWEB HOME
+ FEEDBACK
+ ABOUT CDAWEB

Guides and Tutorials
+ CDAWeb help
+ Internet browser help

Direct Access to Data
+ Direct HTTP(S) to Data
+ Direct FTP(S) to Data (FTPS required)

Additional Services
+ CDAWeb Inside IDL
+ Overview of Alternative Data Access Methods
+ Autoplot.org (non-NASA) interface to public CDAWeb database
+ Pre-generated Data and Orbit plots via SPDFs GIFWALK

Additional Resources
+ Usage Statistics
+ Space Physics Use of CDF
+ Data Inventory Graph
+ SPDF Home Page

Coordinated Data Analysis Web (CDAWeb)

CDAWeb contains selected public non-solar heliophysics data from current and past heliophysics missions and projects. Many datasets from current missions are updated regularly (even daily), including reprocessing older time periods. To find all of the public data and documents archived by the SPDF, see the SPDF archive. To search for additional heliophysics data products, check the heliophysics data portal.

NOTICE: June 2022: The SOHO CDF datasets CELIAS-PM_30S and CELIAS-PM_5MIN have been completely reprocessed to version 2, based on a new version of the original ASCII datasets at <https://soho.nascom.nasa.gov/data/archive.html>, resulting in significant changes to the data. See CELIAS-PM_30S and CELIAS-PM_5MIN readme files for details.

NOTICE: May 2022: The Parker Solar Probe (PSP) SWEAP and FIELDS data have been extended to December 2021, including Encounter 10 in November 2021 and Venus Gravity Assist 5 in October 2021. The ISOIS data have been extended to January 2022, covering part of the inbound leg of Orbit 11 as an addition. EPI-Hi data calibrations are updated and some variables are changed for ISOIS L2 summary data. Please check the PSP inventory plot and annual inventory plots for details.

PREVIOUS DATA & SOFTWARE UPDATES ...

• Select zero OR more Sources
(default = All Sources if >=1 Instrument Type is selected)

☐ ACE
☐ AMPTE
☐ ARTEMIS
☐ Alouette
☐ Apollo
☐ Arase (ERG)
☐ BepiColombo
☐ CNOFS
☐ CRRES
☐ Cassini
☐ Cluster
☐ DMSP
☐ DSCOVR
☐ Dawn
☐ Dynamics Explorer
☐ Equator-S
☐ FAST
☐ Formosat


• Select zero OR more Instrument Types
(default = All Instrument Types if >=1 Source is selected)

☐ Activity Indices
☐ Electric Fields (space)
☐ Electron Precipitation Bremsstrahlung
☐ Energetic Particle Detector
☐ Engineering
☐ Ephemeris/Attitude/Ancillary
☐ Gamma and X-Rays
☐ Housekeeping
☐ Imaging and Remote Sensing (ITM/Earth)
☐ Imaging and Remote Sensing (Magnetosphere/Earth)
☐ Imaging and Remote Sensing (Sun)
☐ Magnetic Fields (Balloon)
☒ **Magnetic Fields (space)**
☒ **Particles (space)**
☐ Plasma and Solar Wind
☐ Pressure gauges (space)

■ How to Use CDAWeb (2)

(2) Select data set.


- Click “Click here to CLEAR All checkboxes”.
- Select “THD_L2_ESA” and “THD_L2_FGM”.
- Click the “Submit” button.

**GODDARD SPACE FLIGHT CENTER**
Space Physics Data Facility

[+ Goddard Home](#)
[+ NASA Home](#)

[+ SPDF HOME](#) [+ MISSION DATA](#) [+ MODELS at CCMC](#) [+ SCIENCE ENABLED](#) [+ AND MORE](#)

[+ CDAWeb Home](#)
CDAWeb
[+ FEEDBACK](#)



CDAWeb Data Selector

• To go forward to plot, list and retrieve your selected data, press the “submit” button directly below or at the bottom of this page.

• For any special notes on usage of a given data set, please click on that data set name below.

• As needed to select the datasets of actual interest to you:

[manually check/uncheck one or more data sets from the list below OR](#)
[Click here to CLEAR All checkboxes, OR](#)
[Click here to SELECT All checkboxes](#)

☐ **THEMIS_R0_GIFWALK:** Links to THEMIS pre-generated MP Crossing Survey plots - David Sibeck (NASA GSFC)
[Available Time Range: Select dataset for details] [Info](#) [Metadata](#)

☐ **THA_L2_ESA:** THEMIS-A (P5): Electrostatic Analyzer (ESA): Electron/Ion Ground-Calculated Energy Fluxes (ions: 5 eV to 25 keV) electrons: 6 eV to 30 keV) and Moments (density, velocity, pressure, and temperature). Includes FULL, REDUCED and BURST modes. FULL: high angular resolution, low (few min) time resolution. REDUCED: degraded angular resolution, high (approx. 3 sec) time resolution. BURST: high angular resolution, high time resolution; only short bursts of data. Note that angular resolution affects moments since they are obtained integrating over the mode-specific angular distribution. - V. Angelopoulos, C.W. Carlson & J. McFadden (UCB, NASA NAS5-02099)
[Available Time Range: 2007/03/07 00:00:00 - 2022/07/19 00:00:00] [Info](#) [Metadata](#)

☐ **THB_L2_ESA:** THEMIS-B (P1/ARTEMIS-P1): Electrostatic Analyzer (ESA): Electron/Ion Ground-Calculated Energy Fluxes (ions: 5 eV to 25 keV) electrons: 6 eV to 30 keV) and Moments (density, velocity, pressure, and temperature). Includes FULL, REDUCED and BURST modes. FULL: high angular resolution, low (few min) time resolution. REDUCED: degraded angular resolution, high (approx. 3 sec) time resolution. BURST: high angular resolution, high time resolution; only short bursts of data. Note that angular resolution affects moments since they are obtained integrating over the mode-specific angular distribution. - V. Angelopoulos, C.W. Carlson & J. McFadden (UCB, NASA NAS5-02099)
[Available Time Range: 2007/03/07 00:00:00 - 2022/07/18 00:00:00] [Info](#) [Metadata](#)

☐ **THC_L2_ESA:** THEMIS-C (P2/ARTEMIS-P2): Electrostatic Analyzer (ESA): Electron/Ion Ground-Calculated Energy Fluxes (ions: 5 eV to 25 keV) electrons: 6 eV to 30 keV) and Moments (density, velocity, pressure, and temperature). Includes FULL, REDUCED and BURST modes. FULL: high angular resolution, low (few min) time resolution. REDUCED: degraded angular resolution, high (approx. 3 sec) time resolution. BURST: high angular resolution, high time resolution; only short bursts of data. Note that angular resolution affects moments since they are obtained integrating over the mode-specific angular distribution. - V. Angelopoulos, C.W. Carlson & J. McFadden (UCB, NASA NAS5-02099)
[Available Time Range: 2007/03/07 00:00:00 - 2022/07/18 00:00:00] [Info](#) [Metadata](#)

☒ **THD_L2_ESA:** THEMIS-D (P3): Electrostatic Analyzer (ESA): Electron/Ion Ground-Calculated Energy Fluxes (ions: 5 eV to 25 keV) electrons: 6 eV to 30 keV) and Moments (density, velocity, pressure, and temperature). Includes FULL, REDUCED and BURST modes. FULL: high angular resolution, low (few min) time resolution. REDUCED: degraded angular resolution, high (approx. 3 sec) time resolution. BURST: high angular resolution, high time resolution; only short bursts of data. Note that angular resolution affects moments since they are obtained integrating over the mode-specific angular distribution. - V. Angelopoulos, C.W. Carlson & J. McFadden (UCB, NASA NAS5-02099)
[Available Time Range: 2007/03/07 00:00:00 - 2022/07/20 00:00:00] [Info](#) [Metadata](#)

☐ **THE_L2_ESA:** THEMIS-E (P4): Electrostatic Analyzer (ESA): Electron/Ion Ground-Calculated Energy Fluxes (ions: 5 eV to 25 keV) electrons: 6 eV to 30 keV) and Moments (density, velocity, pressure, and temperature). Includes FULL, REDUCED and BURST modes. FULL: high angular resolution, low (few min) time resolution. REDUCED: degraded angular resolution, high (approx. 3 sec) time resolution. BURST: high angular resolution, high time resolution; only short bursts of data. Note that angular resolution affects moments since they are obtained integrating over the mode-specific angular distribution. - V. Angelopoulos, C.W. Carlson & J. McFadden (UCB, NASA NAS5-02099)
[Available Time Range: 2007/03/07 00:00:00 - 2022/07/20 00:00:00] [Info](#) [Metadata](#)

☐ **THD_L2_FFT:** THEMIS-D: On Board Fast Fourier Transform (FFT) power spectra of Electric (EFI) and Magnetic (SCM) field, for particle and wave burst survey modes. - V. Angelopoulos (UCB, NASA NAS5-02099)
[Available Time Range: 2007/02/24 00:00:00 - 2022/07/20 00:00:00] [Info](#) [Metadata](#)

☐ **THE_L2_FFT:** THEMIS-E: On Board Fast Fourier Transform (FFT) power spectra of Electric (EFI) and Magnetic (SCM) field, for particle and wave burst survey modes. - V. Angelopoulos (UCB, NASA NAS5-02099)
[Available Time Range: 2007/02/24 00:00:00 - 2022/07/20 00:00:00] [Info](#) [Metadata](#)

☐ **THA_L2_FGM:** Spacecraft-collected fluxgate magnetometer, Decimated TeleMetry High, DSL, GSE and GSM coordinates - V. Angelopoulos, U. Auster & K.H. Glassmeier and W. Baumjohann (UCB, TUBS and IWF respectively, NASA NAS5-02099)
[Available Time Range: 2007/02/23 00:00:00 - 2022/07/20 00:00:00] [Info](#) [Metadata](#)

☐ **THB_L2_FGM:** Spacecraft-collected fluxgate magnetometer, Decimated TeleMetry High, DSL, GSE and GSM coordinates - V. Angelopoulos, U. Auster & K.H. Glassmeier and W. Baumjohann (UCB, TUBS and IWF respectively, NASA NAS5-02099)
[Available Time Range: 2007/02/24 00:00:00 - 2022/07/19 00:00:00] [Info](#) [Metadata](#)

☐ **THC_L2_FGM:** Spacecraft-collected fluxgate magnetometer, Decimated TeleMetry High, DSL, GSE and GSM coordinates - V. Angelopoulos, U. Auster & K.H. Glassmeier and W. Baumjohann (UCB, TUBS and IWF respectively, NASA NAS5-02099)
[Available Time Range: 2007/02/22 00:00:00 - 2022/07/18 00:00:00] [Info](#) [Metadata](#)

☒ **THD_L2_FGM:** Spacecraft-collected fluxgate magnetometer, Decimated TeleMetry High, DSL, GSE and GSM coordinates - V. Angelopoulos, U. Auster & K.H. Glassmeier and W. Baumjohann (UCB, TUBS and IWF respectively, NASA NAS5-02099)
[Available Time Range: 2007/02/23 00:00:00 - 2022/07/20 00:00:00] [Info](#) [Metadata](#)

☐ **THE_L2_FGM:** Spacecraft-collected fluxgate magnetometer, Decimated TeleMetry High, DSL, GSE and GSM coordinates - V. Angelopoulos, U. Auster & K.H. Glassmeier and W. Baumjohann (UCB, TUBS and IWF respectively, NASA NAS5-02099)
[Available Time Range: 2007/02/23 00:00:00 - 2022/07/20 00:00:00] [Info](#) [Metadata](#)

☐ **THA_L2_FIT:** THEMIS-A: On Board spin fits of Electric (EFI) and Magnetic (FGM) field. - V. Angelopoulos (UCB, NASA NAS5-02099)
[Available Time Range: 2007/02/26 00:00:00 - 2022/07/20 00:00:00] [Info](#) [Metadata](#)

☐ **THB_L2_FIT:** THEMIS-B (P1/ARTEMIS-P1): On Board spin fits of Electric (EFI) and Magnetic (FGM) field. - V. Angelopoulos (UCB, NASA NAS5-02099)
[Available Time Range: 2007/02/26 00:00:00 - 2022/07/19 00:00:00] [Info](#) [Metadata](#)

☐ **THD_L2_MOM:** THEMIS-D (P3): On Board moments: Electron/ion moments density, flux, velocity, pressure and temperature. - V. Angelopoulos, C.W. Carlson & J. McFadden (UCB, NASA NAS5-02099)
[Available Time Range: 2007/08/10 00:00:00 - 2022/07/20 00:00:00] [Info](#) [Metadata](#)

☐ **THE_L2_MOM:** THEMIS-E (P4): On Board moments: Electron/ion moments density, flux, velocity, pressure and temperature. - V. Angelopoulos, C.W. Carlson & J. McFadden (UCB, NASA NAS5-02099)
[Available Time Range: 2007/08/10 00:00:00 - 2022/07/20 00:00:00] [Info](#) [Metadata](#)



NASA Official: Robert M. Candey
(301)286-6707, Robert.M.Candey@nasa.gov
Curator: Tami Kovalick
Last Modified: 21 Jul 2022

Contact SPDF: NASA-SPDF-
Support@nasa.onmicrosoft.com
+ Privacy Policy and Important Notices

■ How to Use CDAWeb (3-1)

(3) Input a period and select plot options and data parameters.

- Input a period.
 - Start time:
2008/02/26 03:30:00.000
 - Stop time:
2008/02/26 05:30:00.000
- Select plot options.
 - Check “**Combine all time-series ... into one plot file**”.
 - Check “**Plot overlay options**” and then select “**Overlay vector components of selected variables**”.
- Note that there are several other options, including downloading the data.

NASA GODDARD SPACE FLIGHT CENTER
Space Physics Data Facility

+ Goddard Home
+ NASA Home

+ SPDF HOME + MISSION DATA + MODELS at CCMC + SCIENCE ENABLED + AND MORE

+ CDAWeb Home
CDAWeb
+ FEEDBACK

Coordinated Data Analysis Web

CDAWeb Data Explorer

Select start and stop times from which to GET or PLOT data:

Start time (YYYY/MM/DD HH:MM:SS.mmm): 2008/02/26 03:30:00.000

Stop time (YYYY/MM/DD HH:MM:SS.mmm): 2008/02/26 05:30:00.000

☐ Compute uniformly spaced binned data for scalar/vector/spectrogram data (not available with noise filtering) **NEW**

☐ Use spike removal to filter data without binning (not available with noise filtering)(Warning: Experimental !!).

Select an activity:

☒ Plot Data: select one or more variables from list below and press submit.

☐ Also create PS and PDF best quality outputs (all plot types except images and plasmagrams).
Many panels per dataset are allowed but <=4 panels optimal for standard Y-axis height and single page display.

☐ Use coarse noise filtering to remove values outside 3 deviations from mean of all values in the plotted time interval.

☐ Increase the Y-axis height for time-series and spectrogram plots. **NEW**

☒ Combine all time-series and spectrogram plots, for all requested datasets, into one plot file.

☒ Plot overlay options. **NEW**

☒ Overlay vector components of selected variables.

☐ Overlay selected variables or variable components that are identical among the datasets chosen
(Supported constellations: MMS, Van Allen Probes (RBSP), THEMIS, Cluster, and GOES).

☐ List Data (ASCII/CSV): select one or more variables from list below and press submit. (Works best for < 31 days)

☐ Download original files: press submit button to retrieve list of files. (Max. 200 days - use [HTTPS site](https://cdaweb.gsfc.nasa.gov/cdfx/) for larger requests)

☐ Create V3.8 CDFs for download or Autoplot demonstration: select one or more variables from the list below and press submit.

☐ Create audio files based on data from selected variables. **NEW**

[More information about audification is available here.](#)

Note: [CDF patch](#) required for reading Version 3.8 CDFs in IDL or MATLAB.
Get [CDFX](#) - IDL GUI plotting/listing toolkit software. To be used with either the daily or "created" CDF files available above.

NEW Pressing the "Submit" button will spawn a new window/tab in order to support the new "Previous" and "Next" functions.

Submit Reset

■ How to Use CDAWeb (3-2)

- Select data parameters.
- For **THD_L2_ESA**:
Select “**Ion Velocity Vector in GSM**” under “**ESA Reduced Mode, Ion Moment**”.
- For **THD_L2_FGM**:
Select “**FGS (spin-resolution/~3 sec) magnetic field B in XYZ GSM coordinates**” under “**FGM-FGS Data**”.
- Click the “**Submit**” button at the top or the bottom.

THD_L2_FGM: [Info](#) [Metadata](#)

Spacecraft-collected fluxgate magnetometer, Decimated TeleMetry High, DSL, GSE and GSM coordinates - V. Angelopoulos, U. Auster & K.H. Glassmeier and W. Baumjohann (UCB, TUBS and IWF respectively, NASA NAS5-02099)

Available dates: 2007/02/23 00:00:00 - 2022/07/20 00:00:00
(Continuous coverage not guaranteed - check the [inventory graph](#) for coverage)

- ☐ FGM-FGS Data Quality (0: Good data, 1: boom not deployed, 2: in shadow, 3: uncorrected shadow, 4: noisy waveforms)
- ☐ (Good data only) FGS magnetic field B magnitude
- ☒ FGS (spin-resolution/~3 sec) magnetic field B in XYZ GSM Coordinates
- ☐ FGS magnetic field B in DSL (Despun Spacecraft) Coordinates
- ☐ (All Qualities data) FGS magnetic field B magnitude
- ☐ FGS (spin-resolution/~3 sec) magnetic field B in XYZ GSE Coordinates
- ☐ FGS magnetic field B in XYZ GSM Coordinates
- ☐ FGS magnetic field B in XYZ DSL (Despun Spacecraft) Coordinates
- ☐ FGM-FGL Data Quality (0: Good data, 1: boom not deployed, 2: in shadow, 3: uncorrected shadow, 4: noisy waveforms)
- ☐ (Good data only) FGL magnetic field B magnitude
- ☐ FGL (low-resolution/~0.25 sec) magnetic field B in XYZ GSE Coordinates
- ☐ FGL (low-resolution/~0.25 sec) magnetic field B in XYZ GSM Coordinates

THD_L2_ESA: [Info](#) [Metadata](#)

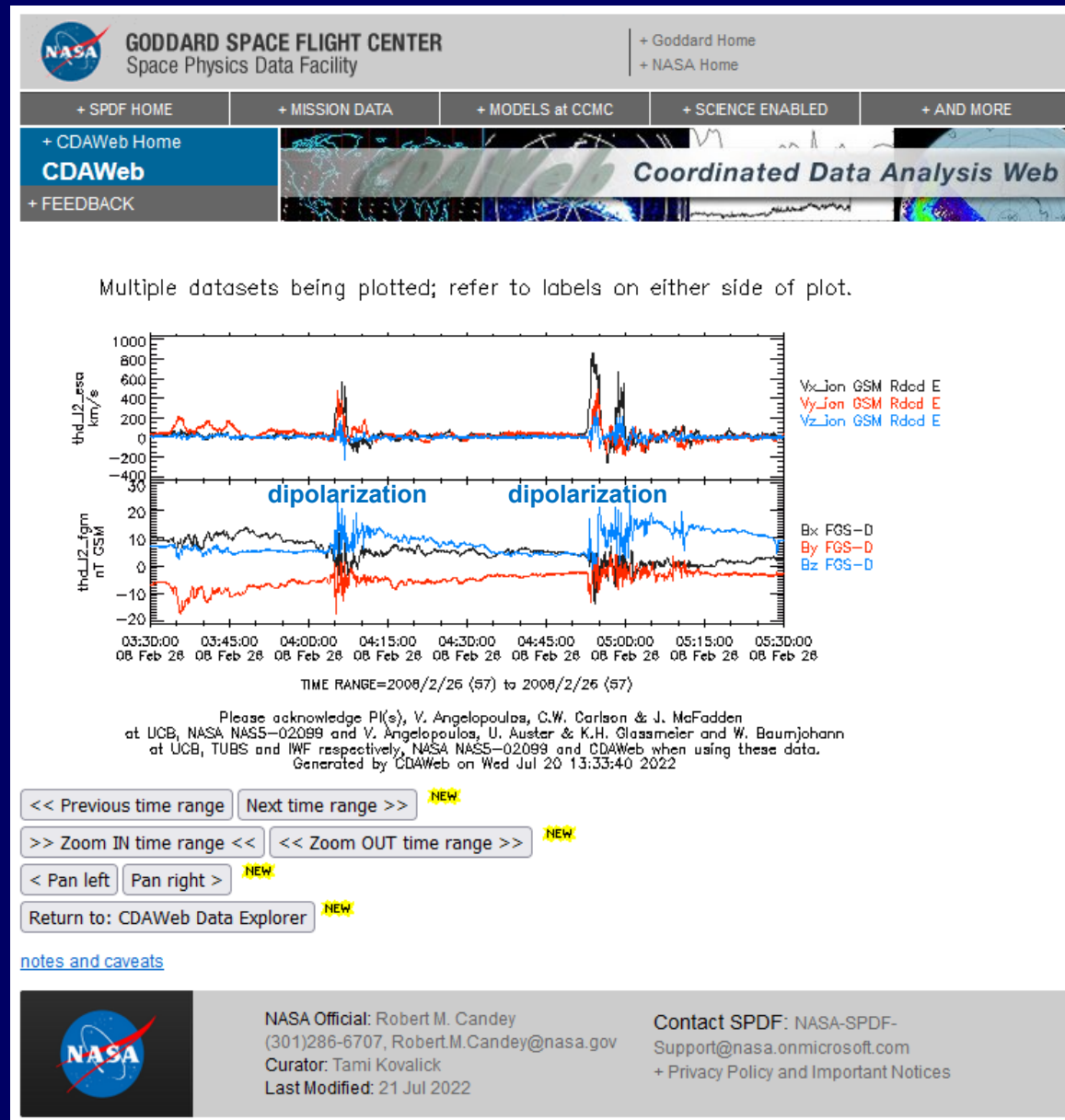
THEMIS-D (P3): Electrostatic Analyzer (ESA): Electron/Ion Ground-Calculated Energy Fluxes (ions: 5 eV to 25 keV) electrons: 6 eV to 30 keV) and Moments (density, velocity, pressure, and temperature). Includes FULL, REDUCED and BURST modes. FULL: high angular resolution, low (few min) time resolution. REDUCED: degraded angular resolution, high (approx. 3 sec) time resolution. BURST: high angular resolution, high time resolution; only short bursts of data. Note that angular resolution affects moments since they are obtained integrating over the mode-specific angular distribution. - V. Angelopoulos, C.W. Carlson & J. McFadden (UCB, NASA NAS5-02099)

Available dates: 2007/03/07 00:00:00 - 2022/07/20 00:00:00
(Continuous coverage not guaranteed - check the [inventory graph](#) for coverage)

- ☐ ESA Full Mode Ion Moment Data Quality (0: Good data, non-zero: Data may not be suitable, see: http://themis.ssl.berkeley.edu/esa_flag.shtml.)
- ☐ (Good data only) ESA Full (High Angular Resolution, few minute time res.) Mode, Ion Density
- ☐ Ion Average Temperature
- ☐ Ion Thermal Velocity
- ☐ SC Potential (Same time array as Full Ion ESA data)
- ☐ Ion Energy Flux spectrogram w/
- ☐ Ion Diagonalized Temperature (Tprp1, Tprp2, Tpar)
- ☐ Temperature, Field Aligned (TprpFA1, TprpFA2, TparFA)
- ☐ Ion Pressure Tensor
- ☐ Ion Momentum Flux Tensor
- ☐ Ion Particle Flux Vector *W* Quality
- ☐ Ion Symmetry Vector (direction of pressure tensor symmetry (DSL))
- ☐ Ion Symmetry Angle (between symmetry direction and B)
- ☐ Magnetic Field Vector in DSL (Same time array as Full Ion ESA data)
- ☐ Ion Velocity Vector in DSL
- ☐ Ion Velocity Vector in GSE
- ☐ Ion Velocity Vector in GSM
- ☐ ESA Full Mode, Electron Moment Data Quality (0: Good data, non-zero: Data may not be suitable, see: http://themis.ssl.berkeley.edu/esa_flag.shtml.)
- ☐ (Good data only) ESA Full (High Angular Resolution, few minute time res.) Mode, Electron Density
- ☐ Electron Average Temperature
- ☐ Electron Thermal Velocity
- ☐ SC Potential (Same time array as Full Electron ESA data)
- ☐ Electron Energy Flux spectrogram
- ☐ Electron Diagonalized Temperature (Tprp1, Tprp2, Tpar)
- ☐ Electron Temperature, Field Aligned (Tprp1FA, Tprp2FA, TparFA)
- ☐ Electron Pressure Tensor
- ☐ Electron Momentum Flux Tensor
- ☐ Electron Particle Flux Vector
- ☐ Electron Symmetry Vector (direction of pressure tensor symmetry (DSL))
- ☐ Electron Symmetry Angle (between symmetry direction and B)
- ☐ Magnetic Field Vector in DSL (Same time array as Full Electron ESA data)
- ☐ Electron Velocity Vector in DSL
- ☐ Electron Velocity Vector in GSE
- ☐ Electron Velocity Vector in GSM
- ☒ ESA Reduced Mode, Ion Moment Data Quality (0: Good data, non-zero: Data may not be suitable, see: http://themis.ssl.berkeley.edu/esa_flag.shtml.)
- ☐ (Good data only) ESA Reduced (Low Angular Res., 3-s Time Res.) Mode, Ion Density
- ☐ Ion Average Temperature
- ☐ Ion Thermal Velocity
- ☐ SC Potential (Same time array as Reduced Ion ESA data)
- ☐ Ion Energy Flux spectrogram
- ☐ Ion Diagonalized Temperature (Tprp1, Tprp2, Tpar)
- ☐ Temperature, Field Aligned (Tprp1FA, Tprp2FA, TparFA)
- ☐ Ion Pressure Tensor
- ☐ Ion Momentum Flux Tensor
- ☐ Ion Particle Flux Vector
- ☐ Ion Symmetry Vector (direction of pressure tensor symmetry (DSL))
- ☐ Ion Symmetry Angle (between symmetry direction and B)
- ☐ Magnetic Field Vector in DSL (Same time array as Reduced Ion ESA data)
- ☐ Ion Velocity Vector in DSL
- ☐ Ion Velocity Vector in GSE
- ☒ Ion Velocity Vector in GSM
- ☐ ESA Reduced Mode, Electron Moment Data Quality (0: Good data, non-zero: Data may not be suitable, see: http://themis.ssl.berkeley.edu/esa_flag.shtml.)
- ☐ (Good data only) ESA Reduced (Low Angular Res., 3-s Time Res.) Mode, Electron Density
- ☐ Electron Average Temperature
- ☐ Electron Thermal Velocity

■ How to Use CDAWeb (4)

(4) Plot.



■ NASA SSCWeb

- Satellite Situation Center
- <https://sscweb.gsfc.nasa.gov/>
- Orbit data of many spacecraft (definitive and predictive)
- Can make plots on demand and also download data.
- Can combine different spacecraft and specify a period flexibly.
- More options than CDAWeb

The screenshot shows the NASA SSCWeb website. At the top is the NASA logo and the text "GODDARD SPACE FLIGHT CENTER Space Physics Data Facility". Navigation links include "Goddard Home" and "NASA Home". A menu bar contains "SPDF HOME", "MISSION DATA", "ModelWeb at CCMC", "SCIENCE ENABLED", and "AND MORE". The left sidebar lists various tools: "SSCWeb", "SSCWEB HOME", "FEEDBACK", "LOCATOR GRAPHICS", "4-D ORBIT VIEWER", "LOCATOR TABULAR", "QUERY", "COORD. CALCULATOR", and "ABOUT SSCWEB". Below this are sections for "Important Cluster Ephemeris Changes", "Guides and Tutorials", "Additional Services", and "Additional Resources". The main content area features a header image with the text "Satellite Situation Center Web" and a list of spacecraft names: ACE, Cluster, DMSP, FAST, Geotail, GOES, IMAGE, IMP, ISEE, Moon, Polar, SAMPEX, Viking, and Wind. Below the header is a section titled "SATELLITE SITUATION CENTER (SSCWeb) SYSTEM AND SERVICES" containing "SPDF News & Announcements" with two notices dated September 30, 2021, and February 2021. Further down are sections for "Database Contents", "Graphics", and "Listings". The footer includes the NASA logo, contact information for Robert Candey, and links to the SPDF contact page and privacy policy.

GODDARD SPACE FLIGHT CENTER
Space Physics Data Facility

+ Goddard Home
+ NASA Home

+ SPDF HOME + MISSION DATA + ModelWeb at CCMC + SCIENCE ENABLED + AND MORE

SSCWeb

- + SSCWEB HOME
- + FEEDBACK
- + LOCATOR GRAPHICS
- + 4-D ORBIT VIEWER
- + LOCATOR TABULAR
- + QUERY
- + COORD. CALCULATOR
- + ABOUT SSCWEB

Important Cluster Ephemeris Changes

- + Download pdf

Guides and Tutorials

- + Users Guide
- + Navigation Tips
- + Models and Regions of Geospace
- + Query Tutorial
- + Locator Tutorial

Additional Services

- + Web Service Access to SSCWeb
- + Heliospheric spacecraft, planet and comet trajectories
- + Space Physics models at CCMC
- + IGRF/IGRF and CGM coordinate transformations
- + Products and information
- + Data Format Translations

Additional Resources

- + Usage Statistics
- + Key parameter and orbit plots produced by the THEMIS & PWG projects
- + JPL NAIF provided observation geometry computations: WebGeoCalc

SATELLITE SITUATION CENTER (SSCWeb) SYSTEM AND SERVICES

SPDF News & Announcements

NOTICE: September 30 2021: The SPDF websites use Let's Encrypt for our web site HTTPS certification. One of the Let's Encrypt root certificates (DST Root CA X3) expired on Sept. 30, 2021. You may find that some web tools report that our SSL certificates cannot be verified. If so, please update those tools to support the latest root certificates, and to use OpenSSL 1.1.0 or later. This includes updating the root certificates used by curl and wget, and IDL (IDL 8.7.1 and 8.8's ca-bundle.crt work). Compatible software package versions are listed at <https://letsencrypt.org/docs/certificate-compatibility/>.

NOTICE: February, 2021: To reach SPDF support services staff please use our new email address: NASA-SPDF-Support@nasa.onmicrosoft.com (for help with CDAWeb, SSCWeb, SPDF Web Services and OMNIWeb). To reach CDF support staff please use our new email address: NASA-CDF-Support@nasa.onmicrosoft.com.

Database Contents

- + Spacecraft Availability & Time Ranges

Graphics

- + Locator Graphics
The Locator graphics component provides the ability to plot the orbits of multiple spacecraft. In addition to orbit plots, mapped and time series plots can also be generated. (THEMIS Saved Examples)
- + 4-D Orbit Viewer
This application provides the user with the capability to select spacecraft(s) and time ranges of interest, and see their orbits represented as an interactive 4-D animation.

Listings

- + Locator Tabular
The Locator component provides tabular information. As tabular output, the spacecraft's coordinate location can be listed in a variety of coordinate systems, as well as other location related items. (THEMIS Saved Examples)
- + Query
The Query component provides two query matching options: magnetospheric region occupancy and magnetic field line tracing. The region query lists the entry and exit times during which specified satellite(s) were in particular magnetospheric regions. The trace query identifies periods when one or more spacecraft are on the same magnetic flux tube of force, or periods when one or more spacecraft occupy a field line which traces down to a specified ground station. (THEMIS Saved Examples)
- + Coordinate Calculator

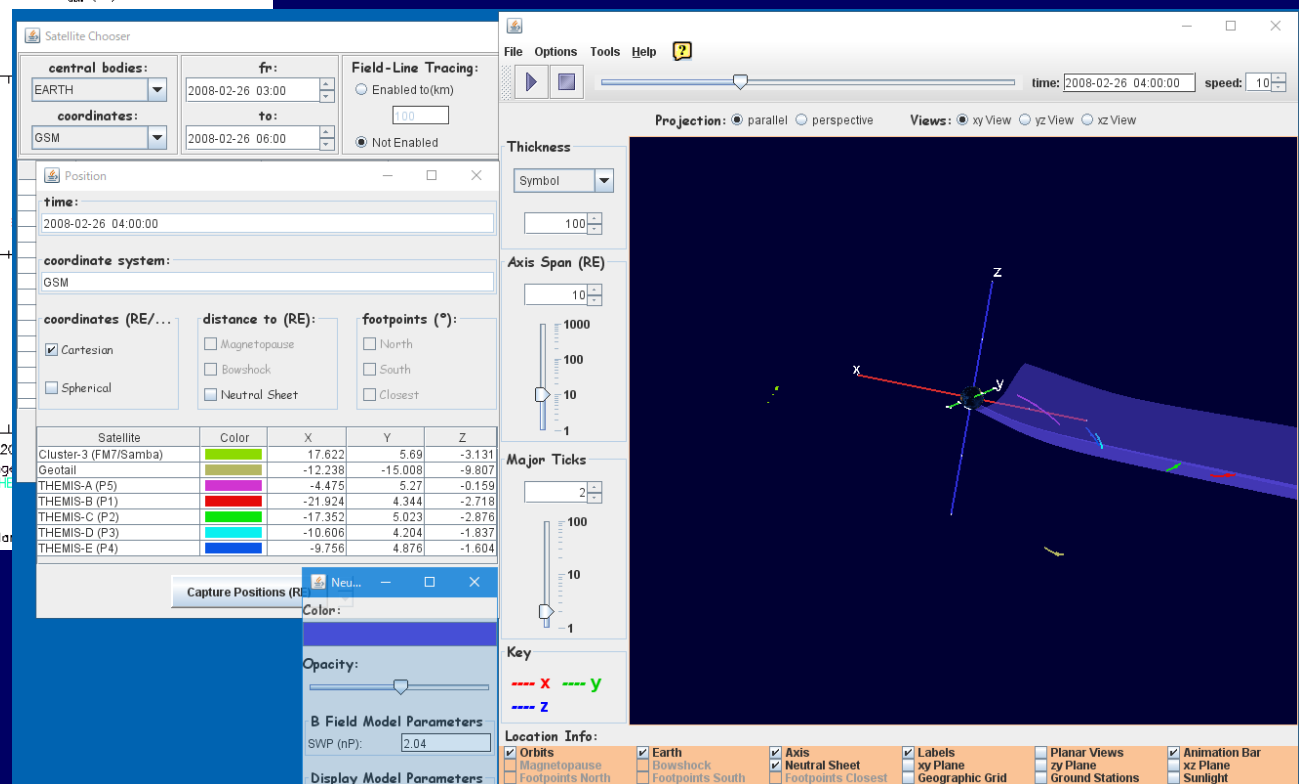
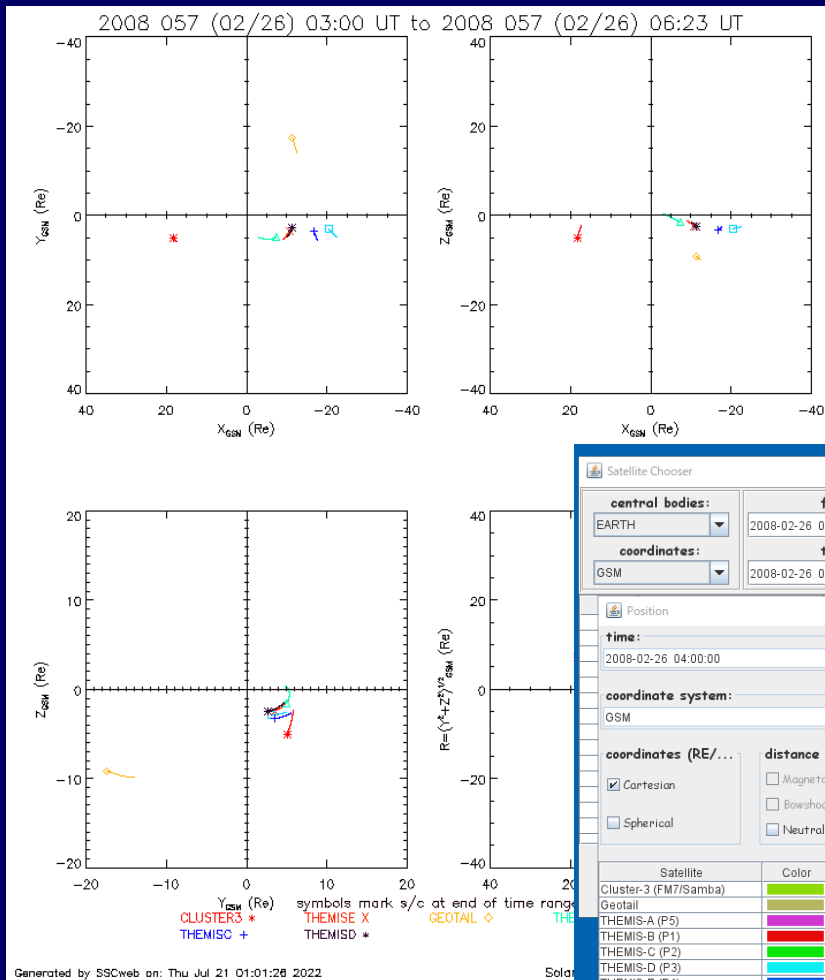
NASA Official: Robert Candey
(301)286-6707, Robert.M.Candey@nasa.gov
Curator: Tami Kovalick
Last Modified: 21 Jul 2022

Contact SPDF: NASA-SPDF-Support@nasa.onmicrosoft.com
+ Privacy Policy and Important Notices

■ NASA SSCWeb

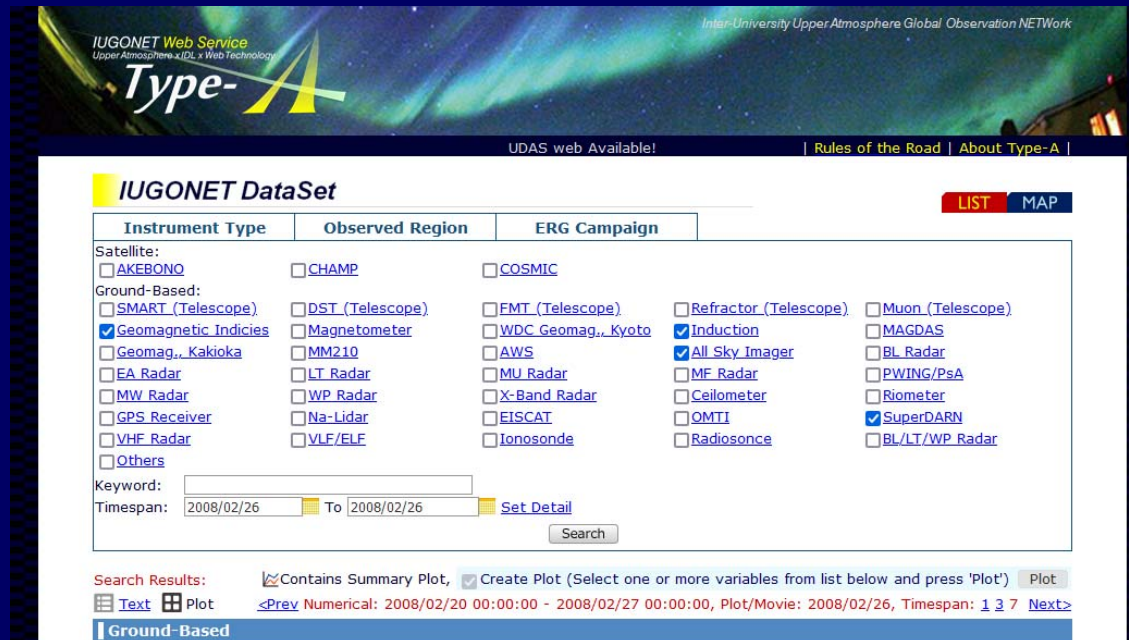
Locator Graphics
(on demand on browsers)

SSC 4D Orbit Viewer
(Java-based software)



■ IUGONET Type-A

- Inter-university Upper atmosphere Global Observation NETwork (<http://search.iugonet.org/>)
- Tanaka et al. (2022, doi:10.1002/gdj3.170)
- Various kinds of ground-based instrument related to Japanese projects
- Display QL plots, make plots on demand, and also download data.



The screenshot displays the IUGONET Type-A Web Service interface. At the top, there is a header with the IUGONET logo and the text "IUGONET Web Service" and "Upper Atmosphere xIDL x Web Technology". Below the header, there is a navigation bar with links for "UDAS web Available!", "Rules of the Road", and "About Type-A". The main content area is titled "IUGONET DataSet" and features a search form. The form includes a table with columns for "Instrument Type", "Observed Region", and "ERG Campaign". Under "Instrument Type", there are checkboxes for "Satellite" (AKEBONO, CHAMP, COSMIC) and "Ground-Based" (SMART, Geomagnetic Indices, Geomag., Kakioka, EA Radar, MW Radar, GPS Receiver, VHF Radar, Others). Under "Observed Region", there are checkboxes for "CHAMP" and "COSMIC". Under "ERG Campaign", there are checkboxes for "COSMIC", "FMT (Telescope)", "WDC Geomag., Kyoto", "AWS", "MU Radar", "X-Band Radar", "EISCAT", "Ionosonde", "Refractor (Telescope)", "Induction", "All Sky Imager", "MF Radar", "Ceilometer", "OMTI", "Radiosonde", "Muon (Telescopes)", "MAGDAS", "BL Radar", "PWING/PSA", "Riometer", "SuperDARN", and "BL/LT/WP Radar". Below the table, there is a "Keyword:" field and a "Timespan:" field with a date range from 2008/02/26 to 2008/02/26. A "Set Detail" link and a "Search" button are also present. At the bottom, there is a "Search Results:" section with checkboxes for "Contains Summary Plot" and "Create Plot (Select one or more variables from list below and press 'Plot')". A "Plot" button is also visible. The bottom of the page shows a navigation bar with "Ground-Based" selected.

Instrument Type	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 checked="" type="checkbox"/> Geomagnetic Indices	<input type="checkbox"/> Magnetometer	<input type="checkbox"/> WDC Geomag., Kyoto
<input type="checkbox"/> Geomag., Kakioka	<input type="checkbox"/> MM210	<input type="checkbox"/> AWS
<input type="checkbox"/> EA Radar	<input type="checkbox"/> LT Radar	<input type="checkbox"/> MU Radar
<input type="checkbox"/> MW Radar	<input type="checkbox"/> WP Radar	<input type="checkbox"/> X-Band Radar
<input type="checkbox"/> GPS Receiver	<input type="checkbox"/> Na-Lidar	<input type="checkbox"/> EISCAT
<input type="checkbox"/> VHF Radar	<input type="checkbox"/> VLF/ELF	<input type="checkbox"/> Ionosonde
<input type="checkbox"/> Others		

Keyword:

Timespan: 2008/02/26 To 2008/02/26 [Set Detail](#)

Search Results: ☒ Contains Summary Plot, ☒ Create Plot (Select one or more variables from list below and press 'Plot')

[Text](#) [Plot](#) [Prev](#) Numerical: 2008/02/20 00:00:00 - 2008/02/27 00:00:00, Plot/Movie: 2008/02/26, Timespan: 1 3 7 [Next](#)

Ground-Based

■ How to Use IUGONET Type-A (1)

One instrument can be selected from the MAP.

The screenshot displays the IUGONET Web Service Type-A interface. At the top, the header reads "IUGONET Web Service" and "Upper Atmosphere xIDL x Web Technology". Below this, the "Type-A" logo is visible. The main navigation bar includes "UDAS web Available!", "Rules of the Road", and "About Type-A". The "Observatories" section is active, showing a list of instruments on the left and a map of Southeast Asia on the right. The map includes labels for Myanmar (Burma), Laos, Thailand, Vietnam, and Cambodia, along with various cities and regions. The "MAP" button is highlighted in red. The sidebar lists instruments under "Satellite" and "Ground-Based" categories, with "SMART (Telescope)" and "DST (Telescope)" selected. The bottom of the page contains copyright information: "All Rights Reserved. Copyright (c) 2009-2022 IUGONET".

Observatories

INST./PROJECT

All (Close Panel)

Satellite

✓ AKEBONO

✓ CHAMP

✓ COSMIC

Ground-Based

✓ SMART (Telescope)

✓ DST (Telescope)

✓ FMT (Telescope)

✓ Refractor (Telescope)

✓ Muon (Telescope)

✓ Geomagnetic Indices

✓ Magnetometer

✓ WDC Geomag., Kyoto

✓ Induction

✓ MAGDAS

✓ Geomag., Kakioka

✓ MM210

✓ AWS

✓ All Sky Imager

✓ BL Radar

✓ EA Radar

✓ LIT Radar

✓ MU Radar

✓ MF Radar

✓ PWING/PsA

✓ MW Radar

✓ WP Radar

✓ X-Band Radar

Map Satellite

Map data ©2022 Google, TMap Mobility Imagery ©2022 TerraMetrics | 100 km | Terms of Use

All Rights Reserved.
Copyright (c) 2009-2022 IUGONET

OMTI Fabry-Perot interferometer wind data at Chiang Mai and LF radio wave data at Saraburi are also registered.

■ How to Use IUGONET Type-A (2-1)

To search for data and show QL plots

- (1) Select instruments and specify a time span.
- (2) Click the “Search” button.
- (3) Click the “Plot” button to show QL plots.

The screenshot displays the IUGONET Web Service Type-A interface. At the top, there is a banner with the text "IUGONET Web Service" and "Upper Atmosphere x JDL x Web Technology". Below the banner, the text "Type-A" is prominently displayed. The main content area is titled "IUGONET DataSet" and contains a table with three columns: "Instrument Type", "Observed Region", and "ERG Campaign". The table lists various instruments and their corresponding regions and campaigns. The "Instrument Type" column includes "Satellite" (AKEBONO, CHAMP, COSMIC) and "Ground-Based" (SMART, DST, FMT, Refractor, Muon, Geomag., Kakioka, Magnetometer, WDC Geomag., Kyoto, All Sky Imager, EA Radar, LT Radar, MU Radar, MF Radar, Ceilometer, GPS Receiver, WP Radar, X-Band Radar, OMTI, VHF Radar, Na-Lidar, Ionosonde, Radiosonde, Others, BL/LT/WP Radar). The "Observed Region" column includes "CHAMP", "DST", "FMT", "Refractor", "Muon", "Geomag., Kakioka", "Magnetometer", "WDC Geomag., Kyoto", "All Sky Imager", "EA Radar", "LT Radar", "MU Radar", "MF Radar", "Ceilometer", "GPS Receiver", "WP Radar", "X-Band Radar", "OMTI", "VHF Radar", "Na-Lidar", "Ionosonde", "Radiosonde", "Others", "BL/LT/WP Radar". The "ERG Campaign" column includes "COSMIC", "WDC Geomag., Kyoto", "AWS", "MU Radar", "X-Band Radar", "EISCAT", "Ionosonde", "Radiosonde", "BL/LT/WP Radar". The "All Sky Imager" and "SuperDARN" checkboxes are checked. The "Search" button is highlighted with a red box. The "Plot" button is highlighted with a red box. The "Text" button is highlighted with a red box. The "Ground-Based" tab is selected. The "Search Results" section shows the search criteria: "Contains Summary Plot" and "Create Plot (Select one or more variables from list below and press 'Plot')". The "Search Results" section also displays the search results: "Numerical: 2008/02/20 00:00:00 - 2008/02/27 00:00:00, Plot/Movie: 2008/02/26, Timespan: 1 3 7".

IUGONET Web Service
Upper Atmosphere x JDL x Web Technology
Type-A

Inter-University Upper Atmosphere Global Observation NETWork

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

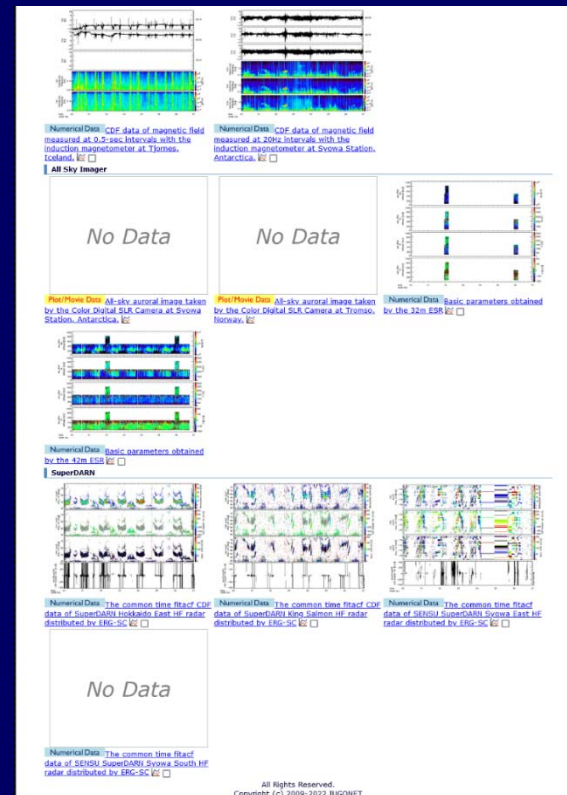
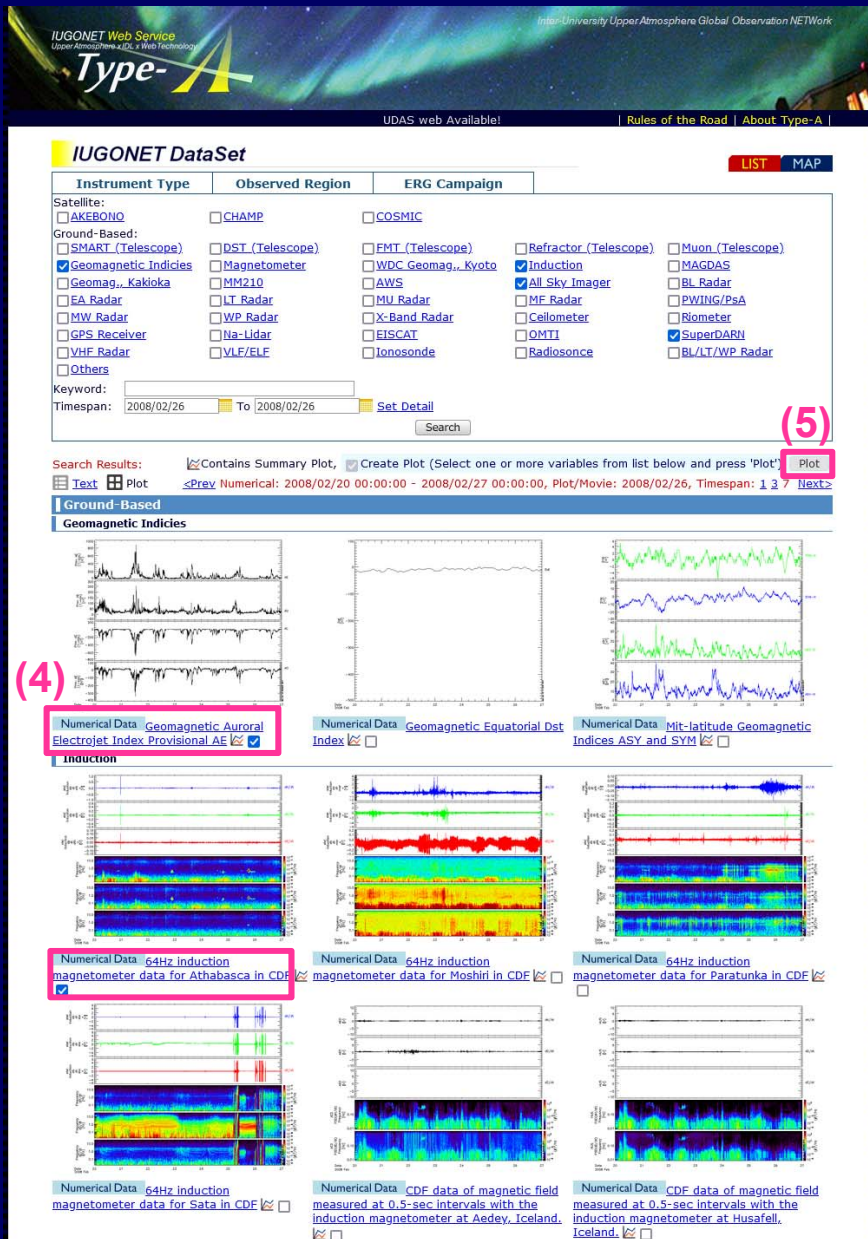
IUGONET DataSet LIST MAP

Instrument Type	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 checked="" type="checkbox"/> Geomagnetic Indices	<input type="checkbox"/> Magnetometer	<input type="checkbox"/> WDC Geomag., Kyoto
<input type="checkbox"/> Geomag., Kakioka	<input type="checkbox"/> MM210	<input type="checkbox"/> AWS
<input type="checkbox"/> EA Radar	<input type="checkbox"/> LT Radar	<input type="checkbox"/> MU Radar
<input type="checkbox"/> MW Radar	<input type="checkbox"/> WP Radar	<input type="checkbox"/> X-Band Radar
<input type="checkbox"/> GPS Receiver	<input type="checkbox"/> Na-Lidar	<input type="checkbox"/> EISCAT
<input type="checkbox"/> VHF Radar	<input type="checkbox"/> VLF/ELF	<input type="checkbox"/> Ionosonde
<input type="checkbox"/> Others		
Keyword:		
Timespan: 2008/02/26 To 2008/02/26		
<input type="button" value="Search"/>		
<input checked="" type="checkbox"/> Contains Summary Plot, <input checked="" type="checkbox"/> Create Plot (Select one or more variables from list below and press 'Plot')		
<input type="button" value="Plot"/>		
<input checked="" type="checkbox"/> Text <input type="checkbox"/> Plot		
<Prev Numerical: 2008/02/20 00:00:00 - 2008/02/27 00:00:00, Plot/Movie: 2008/02/26, Timespan: 1 3 7 Next>		
Ground-Based		

■ How to Use IUGONET Type-A (2-2)

**To make a plot
for a specified period**

- (4) Check data of interest
under the QL plots.**
- (5) Click the “plot” button.**



■ How to Use IUGONET Type-A (2-3)

To make a plot for a specified period

(6) Specify a time span.

(7) Select parameters.

(8) Click the “Plot” button to make a plot.

IUGONET Web Service
Upper Atmosphere Global Observation NETWork
Type-A

UDAS web Available!

UDAS web

To create plot, choose variables and press "Plot" button. To download ASCII files, press "Download ASCII" button.

Step.1: Set Time Span (less than 10 days)

(6) From: 2008 02 26 03 00 00
To: 2008 02 26 06 00 00

Step.2: Choose Variables to Plot

☐ Check/Clear All

Numerical Data 64Hz induction magnetometer data for Athabasca in CDF Download ASCII

☐ isee_induction_db_dt_ath_x (North-South magnetic field at Athabasca)

☐ isee_induction_db_dt_ath_y (East-West magnetic field at Athabasca)

☐ isee_induction_db_dt_ath_z (Vertical magnetic field at Athabasca)

☒ isee_induction_db_dt_ath_x_dpwrspc (Dynamic power spectrum of North-South magnetic field at Athabasca)

☐ isee_induction_db_dt_ath_y_dpwrspc (Dynamic power spectrum of East-West magnetic field at Athabasca)

☐ isee_induction_db_dt_ath_z_dpwrspc (Dynamic power spectrum of Vertical magnetic field at Athabasca)

Numerical Data Geomagnetic Auroral Electrojet Index Provisional AE

(7) ☒ wdc_mag_ae_prov_1min_0 (Geomagnetic Auroral Electrojet (AE) index ($AE = |AU - AL|$))

☒ wdc_mag_ae_prov_1min_1 (Amplitude of Upper envelope (AU))

☒ wdc_mag_ae_prov_1min_2 (Amplitude of Lower envelope (AL))

☐ wdc_mag_ae_prov_1min_3 (Average value of the AU and AL induces ($AO = (AU + AL)/2$))

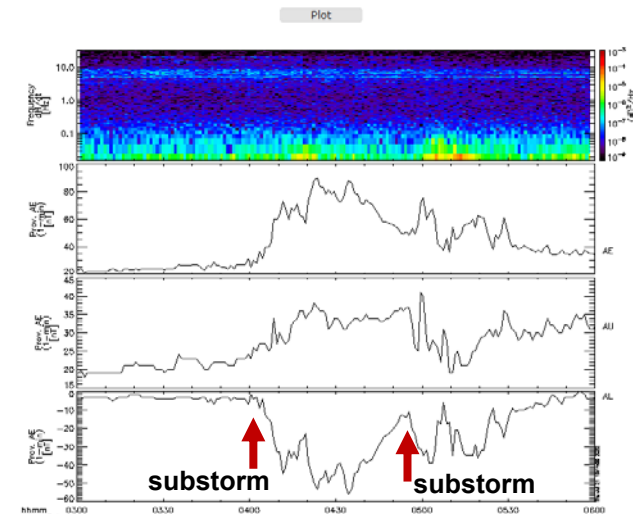
☐ wdc_mag_ae_prov_1min_4 (AX index)

Step.3: Set Options

☐ Plot as a Postscript File.

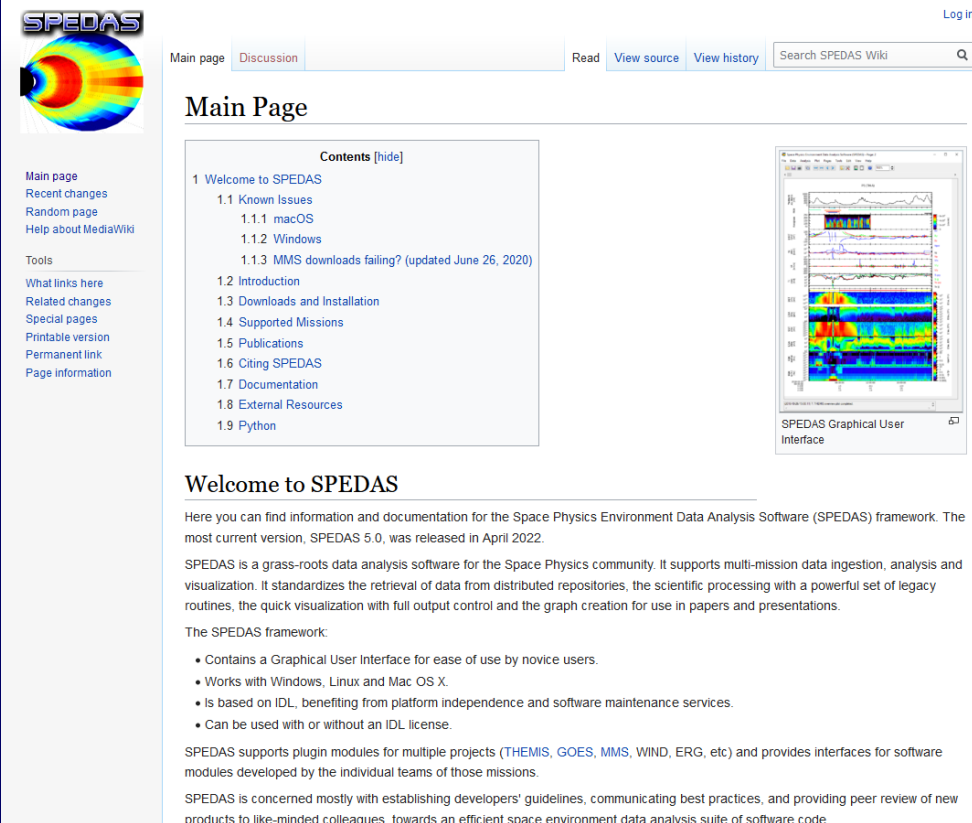
* At Least, one variable should be chosen.
* Each observation data has terms of use. Read it again before using it.

Plot (8)



■ SPEDAS

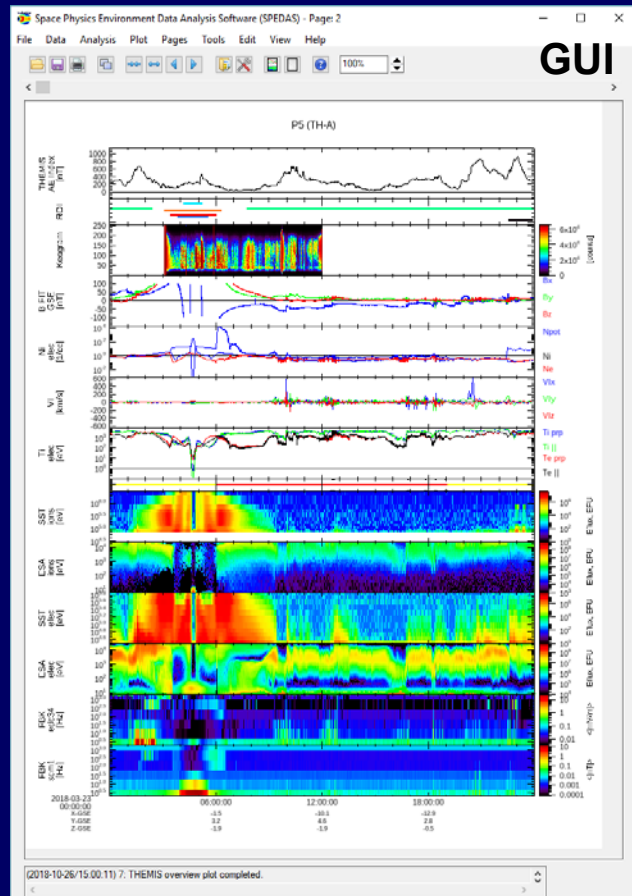
- Space Physics Environment Data Analysis Software
- <http://spedas.org/wiki>
- Angelopoulos et al. (2019, doi:10.1007/s11214-018-0576-4)
- For advanced serious analysis of various spacecraft and ground-based data
- Works with Windows, Linux and Mac OS X.
- Written in **IDL** and **Python**
 - - Customized analysis and plot
 - Incorporate your own data into SPEDAS



The screenshot displays the SPEDAS Wiki Main Page. At the top left is the SPEDAS logo, a stylized sun with a rainbow-like corona. To its right are navigation tabs for 'Main page' (selected), 'Discussion', 'Read', 'View source', and 'View history'. A search bar labeled 'Search SPEDAS Wiki' is on the far right. Below the logo is a sidebar with links: 'Main page', 'Recent changes', 'Random page', 'Help about MediaWiki', 'Tools', 'What links here', 'Related changes', 'Special pages', 'Printable version', 'Permanent link', and 'Page information'. The main content area is titled 'Main Page' and features a 'Contents [hide]' section with a list of links: '1 Welcome to SPEDAS', '1.1 Known Issues', '1.1.1 macOS', '1.1.2 Windows', '1.1.3 MMS downloads failing? (updated June 26, 2020)', '1.2 Introduction', '1.3 Downloads and Installation', '1.4 Supported Missions', '1.5 Publications', '1.6 Citing SPEDAS', '1.7 Documentation', '1.8 External Resources', and '1.9 Python'. To the right of the contents is a thumbnail image of the 'SPEDAS Graphical User Interface' showing a complex data plot with multiple panels. Below the thumbnail is the text 'SPEDAS Graphical User Interface'. The main text area begins with the heading 'Welcome to SPEDAS' followed by a paragraph: 'Here you can find information and documentation for the Space Physics Environment Data Analysis Software (SPEDAS) framework. The most current version, SPEDAS 5.0, was released in April 2022.' This is followed by a paragraph describing SPEDAS as a grass-roots data analysis software for the Space Physics community, supporting multi-mission data ingestion, analysis, and visualization. A section titled 'The SPEDAS framework:' lists four bullet points: 'Contains a Graphical User Interface for ease of use by novice users.', 'Works with Windows, Linux and Mac OS X.', 'Is based on IDL, benefiting from platform independence and software maintenance services.', and 'Can be used with or without an IDL license.' The final paragraph states: 'SPEDAS supports plugin modules for multiple projects (THEMIS, GOES, MMS, WIND, ERG, etc) and provides interfaces for software modules developed by the individual teams of those missions. SPEDAS is concerned mostly with establishing developers' guidelines, communicating best practices, and providing peer review of new products to like-minded colleagues, towards an efficient space environment data analysis suite of software code.'

■ How to Use SPEDAS

- Works in **graphical user interface** and **command line**.



GUI

MMS data analysis using SPEDAS: an introduction

This video shows a step-by-step introduction on how to use SPEDAS to make a simple plot:

<http://www.youtube.com/watch?v=390FguKn7w4>

This is the script that can be run in IDL:

```
pro test_mms1

mms_init

; Select a time range
trange = ['2015-09-01/21:15', '2015-09-01/21:25']

; Select a probe
probe = 1

; Load FGM data
mms_load_fgm, probe=probe, trange=trange,
level='12'

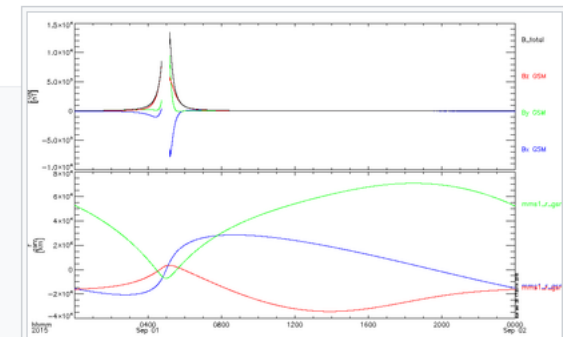
; Load position data
mms_load_mec, probe=probe, trange=trange, level='12'

; Select quantities to plot
vars = ['mms1_fgm_b_gsm_srvy_12', 'mms1_mec_r_gsm']

; Plot data
tplot, vars

end
```

Command line



Screenshot of example test_mms1

**Download and plot data
by only a few commands.**

- A lot of manuals can be found at the website and in the SPEDAS source code files.