External Space Weather Data Store (E-SWDS) Program

02/03/2009

This document contains the definition, the concept and terms of use, a letter of invitation, a user guide, and a data dictionary of the Space Weather Prediction Center's External Space Weather Data Store (E-SWDS) program.

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1. Definition. The External Space Weather Database Store (E-SWDS) is a near real-time, relational data base method of electronic communication between the Space Weather Prediction Center (SWPC) operational database and external users (See section 4 for definition of user). This method of data retrieval is in addition to services previously provided by SWPC for FTP and Web access.

1.1 E-SWDS is the name for the system providing data base capability from SWPC. E-SWDS consists of hardware and software maintained by SWPC.

2. Mission Connection. E-SWDS is used by SWPC operational personnel to exchange information with "core partners" (see definition in Appendix A). This information aids in the efficacy of local, state, regional and national emergency preparedness, response and recovery efforts, and the support of commercial mission-critical operations, thereby aligning with the agency's mission of protecting life and property.

3. Concept of Use. Using E-SWDS, information is exchanged from SWPC automated systems and personnel to external parties via an Open Database Connectivity (ODBC) interface or similar technology such as Java Database Connectivity (JDBC™). E-SWDS allows for the establishment of connections based on individual user ID's and passwords for the access of database information via predefined views or stored procedures. The database is open only for read access to a previously identified subset of operational space weather data.

"Core partners" shall continue to have access to space weather data via the previously provided web interface and FTP products.

4. Users. Core partners may have access to E-SWDS via individual accounts.

4.1 Dedicated E-SWDS Users. The Space Weather Prediction Center provides participation privileges to operational external users who meet one or more of the following criteria:

a. Member of the emergency management community. This includes public safety officials who serve as employees or contract agents of a government agency at the federal, state, local, or tribal level and are charged with protecting the public from hazards that are influenced by space weather or space weather-related events.

b. Government Partner. Government partners have missions that require close coordination with the SWPC. Government partners include, but are not limited to, the Department of Transportation, NASA, Department of Defense and other management officials.

c. Commercial Service Providers. Commercial service providers are parties, and contract agents of parties, who operate systems that routinely and rapidly relay space weather data products, watches, advisories, warnings and forecast information to consumers.

d. International Space Weather Partners. Regional Warning Centers or Government entities that provide the exchange of space weather information and forecasts.

4.2 E-SWDS Participation Request and Approval. Users are granted participation privilege by the Space Weather Prediction Center. SWPC invites potential Non-NWS personnel to request account access using the SWPC website at: http://www.swpc.noaa.gov/Services/index.html. The invitation may be in the form of email or a "Letter of Invitation to Participate" (see Appendix B). The reply decision to accept or deny participation privilege shall be completed by the SWPC within 30 days upon receipt of user account information and acceptance of the Terms of Use (see appendix D) from the invitee. If participation, or access to any data set, is denied, the office will provide justification to the requestor, either in the form of an email or in writing (see sample letter in Appendix C). Denied requests may be appealed to the National Centers for Environmental Prediction (NCEP) through Dennis Staley at Dennis.Staley@noaa.gov. NCEP will coordinate with SWPC and the requestor prior to reaching a decision. Processing of an appeal will not exceed 45 days from the date of appeal.

4.3 User Training and Terms of Use. Training will not be provided other than the issuance of a user guide, list of remote procedures, and a data dictionary. All participants are expected to be familiar with the related relational data base technology including Structured Query Language (SQL) and communication protocols necessary to meet their individual needs within the SWPC/E-SWDS configuration.

5. E-SWDS Use. SWPC is committed to keeping this tool operational with support provided on an ongoing basis, but reserves the right to perform planned and unplanned maintenance. E-SWDS is an enhanced service tool; as such, it may be temporarily suspended at the discretion of the SWPC director without prior notice.

6. E-SWDS Content and Etiquette. The goal of E-SWDS is to enhance data communications for priority and mission-critical operations between the SWPC and its core partners.

In order to meet required security requirements, individual ID and passwords ensures individual accountability by the system. Accounts deemed to be negatively impacting performance may be suspended at the discretion of SWPC.

THERE IS NO RIGHT OF PRIVACY IN THIS SYSTEM.

E-SWDS is a United States Government computer system, which may be accessed and used only for official Government business by authorized personnel. Unauthorized

access or use of this computer system may subject violators to criminal, civil, and/or administrative action.

All information on this computer system may be intercepted, recorded, read, copied, and disclosed by and to authorized personnel for official purposes, including criminal investigations. Access or use of this computer system by any person whether authorized or unauthorized, constitutes consent to these terms.

7. Naming Conventions. Access to the E-SWDS system requires a valid account on the server. All users must have individual accounts. Account usernames and passwords will be set by SWPC.

8. IT Security. The E-SWDS server is bound by all applicable DOC/NOAA/NWS rules and regulations governing appropriate and approved use of federal government IT equipment.

E-SWDS users are expected to protect individual user ID's and Passwords and must not share them with others. Account holders must immediately contact the E-SWDS administrator if an ID or password is suspected of being compromised.

Access to E-SWDS shall only be permitted from known IP addresses and must be registered with SWPC at the time an account is requested or updated when changes occur. No DHCP (Dynamic Host Configuration Protocol) addresses or subnet ranges are permitted.

9. Responsibilities for E-SWDS:

9.1 The Director of the Space Weather Prediction Center is responsible for:

- the overall E-SWDS implementation of the E-SWDS program

9.2 The SWPC Information System Security Officer (ISSO) is responsible for:

- implementation and verification of E-SWDS technical and security policies
- providing technical assistance to registered user for secure operation of the E-SWDS system.

9.3 The E-SWDS Program Manager is responsible for:

- the enforcement of policies and program management.
- initiating accounts for E-SWDS.
- working with E-SWDS users and listening to their results, reviews, and comments so that SWPC can improve, within existing resources, the E-SWDS system.

  Contact information for the E-SWDS Program Manager will be available on the SWPC website at: http://www.swpc.noaa.gov/Services/index.html

9.4 The E-SWDS Administration Team, under the direction of the SWPC Director, is responsible for:

- the E-SWDS service application, ensuring that E-SWDS related services function correctly and are updated as needed.

- communicating with core users on a scheduled forum and venue basis, such as the Space Weather Workshop, in order to review, maintain, and update core data products.
- issuing and maintaining user accounts on the E-SWDS server.

APPENDIX A - Glossary of Terms and Abbreviations

AFWA: Air Force Weather Agency
Core Partners: Government and non-government entities which are involved in the preparation, dissemination and discussions involving hazardous weather or other emergency information put out by the National Weather Service. Core partners include:

(1) Members of the Emergency Management community at all levels of government; Federal, State, Local and tribal.
(2) Other government agencies: specific government partners that require close coordination SWPC, e.g. FAA, AFWA, and NASA officials.
(3) Commercial Service Providers: parties who operate systems that routinely relay space weather information to consumers.

DHCP: Dynamic Host Configuration Protocol
E-SWDS: External Space Weather Database Store
FAA: Federal Aviation Administration
NASA : National Aeronautics and Space Administration
NCEP: National Centers for Environmental Prediction
NWS: National Weather Service
ODBC: Open Database Connectivity
JDBC: Java Database Connectivity™
RACES: Radio Amateur Civil Emergency Services
SQL: Structured Query Language
SWPC: Space Weather Prediction Center
View: a stored query accessible as a virtual table composed of the result set of a SQL query.
Stored Procedure: a subroutine available to applications accessing a relational database system.

APPENDIX B - Letter of Invitation to Participate

The following form letter will be used to invite organizations to nominate participants in E-SWDS. The letter should be sent by the E-SWDS program manager to the head of the approved organization.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Weather Service
National Centers for Environmental Prediction
Space Weather Prediction Center
325 Broadway W/NP9
Boulder, CO 80305
Telephone: (303) 497-7583

Date

Name of Organization
Title
Street Address
City, State, Zip

To whom it may concern,

The External Space Weather Database Store (E-SWDS) facilitates the transfer of near real-time space weather data between the Space Weather Prediction Center and the emergency management community, other government partners, and Commercial Service Providers. This service improves understanding of the evolving space weather conditions and aids decisions by the participants to understand these conditions. SWPC would like your organization to nominate individuals to participate in E-SWDS program.

E-SWDS will include a wide variety of types of information. Some of this information will include contents of official National Weather Service (NWS) products available through other NWS systems and thus available to the public. However, other E-SWDS content may include preliminary data which has not been screened by SWPC for accuracy or applicability; and other types of information not intended for a general audience. E-SWDS participants are expected to avoid release of information to a broader audience that might be misinterpreted or cause confusion. As an approved organization, your key responsibility is to nominate participants who have sufficient expertise to interpret these varied types of information and the ability to exercise judgment to use this information appropriately.

Each individual must provide a description of how the data will be used and the intended audience of the finished product.

Attachments include Terms of Use of E-SWDS and Standards for Organizations Participating in E-SWDS. Failure to abide by the terms of use may result in termination of privileges to participate. Each individual participant must agree to abide by the Terms of Use for E-SWDS.

Your nomination will be taken as a certification that the nominated individuals have sufficient expertise to interpret the varied types of information provided through E-SWDS and the ability to exercise judgment to use this information appropriately. Each individual must agree to abide by the Terms of Use for E-SWDS in order to obtain an account.

Organizations nominating participants in E-SWDS may withdraw their nomination at any time and are required to notify SWPC when individuals are no longer employed by the nominating organization.

E-SWDS is an enhancement to SWPC services. We look forward to your participation.

Sincerely,

Douglas Biesecker
E-SWDS Program Manager

Cc: Name of Person you are sending a copy to.

APPENDIX C - Disapproval of Application to Participate

In the event an application to participate is rejected, the E-SWDS Program Manager will send the following letter to inform the organization that they have not been approved as a participant in E-SWDS. Contact information of the E-SWDS Program Manager will be included in the disapproving email. A blind copy will be sent to the Director of the Space Weather Prediction Center. Before rejecting an application, the Program Manager should confer with appropriate SWPC officials to be certain they have interpreted the applicant's standing correctly.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Weather Service
National Centers for Environmental Prediction
Space Weather Prediction Center
325 Broadway W/NP9
Boulder, CO 80305
Telephone: (303) 497-7583

Date

Name of Organization
Title
Street Address
City, State, Zip

To whom it may concern,

The External Space Weather Database Store (E-SWDS) facilitates the transfer of near real-time space weather data between the Space Weather Prediction Center (SWPC) and the emergency management community, other government partners, and commercial service providers. This service improves understanding of the evolving space weather conditions and aids decisions by the participants to understand these conditions.

NWS limits participation in this service to organizations that meet the attached standards, and the materials you have provided do not justify including your organization as a participant. (Insert details which enumerate the standards which are not met.)

You are free to reapply, providing additional materials supporting your standing in relation to the attached standards for participants.

If you wish to appeal the decision regarding your participation in E-SWDS, please direct this appeal to Dennis Staley (Dennis.Staley@noaa.gov) at the National Centers for Environmental Prediction http://www.ncep.noaa.gov.

Thank you for your interest in SWPC services.

Sincerely yours,

Douglas Biesecker
E-SWDS Program Manager

Attachment:

Standards for Organizations Participating in National Weather Service Instant Messaging Services

APPENDIX D - Standards for Participating in E-SWDS

To be approved as a participant in the External Space Weather Database Store (E-SWDS) program, an organization must provide operational products and meet one of the following standards:

1. Be a member of the emergency management community defined as encompassing public safety officials who serve as employees or contract agents of a government agency at any level (federal, state, local, tribal, etc.) charged with protecting the public from hazards related to space weather or other events.

2. Be a government partner of a NWS office defined as encompassing specific government partners that are necessary participants in E-SWDS with that have missions that require close coordination with these partners, e.g. Department of Transportation, NASA, Department of Defense officials.

3. Be a Commercial Service Provider Commercial service providers are parties, and contract agents of parties, who operate systems that routinely and rapidly relay space weather watches, advisories, warnings and forecast information to consumers.

4. International Space Weather Partners. Regional Warning Centers or Government entities that provide the exchange of space weather information and forecasts.

APPENDIX E - E-SWDS Terms of Use

1. Acceptance of Terms

Please read these Terms carefully. The Space Weather Prediction Center (SWPC) provides the E-SWDS ("Service") subject to the following Terms of Use ("Terms"). You must accept and agree to these Terms in order to access or use the E-SWDS system. If you do not agree to the Terms, you may not use the E-SWDS service.

E-SWDS is offered as an enhancement to the services of SWPC, and may be terminated or suspended at any time, by SWPC, with or without advance notice.

You can accept these Terms by filling out the Registration Request form. You also accept the Terms whenever you actually use the E-SWDS service. SWPC will treat your use of E-SWDS as acceptance of the Terms of Use.

2. Description of E-SWDS Service

External Space Weather Database Store E-SWDS is a near real-time, relational data base method of electronic communication between the Space Weather Prediction Center (SWPC) operational database and external users (See section 4 for definition of user). This method of data retrieval is in addition to services previously provided by SWPC for FTP and Web access.

E-SWDS is used by SWPC operational personnel to exchange information with "core partners" (see definition in Appendix A). This information aids in the efficacy of local, state, regional and national emergency preparedness, response and recovery efforts, thereby aligning with the agency's mission of protecting life and property.

Using E-SWDS, information is exchanged from SWPC automated systems and personnel to external parties via an Open Database Connectivity (ODBC) interface. E-SWDS allows for the establishment of connections based on individual user ID's and passwords for the access of database information via predefined stored procedures. The database is open only for read access to a previously identified subset of operational space weather data.

"Core partners" shall continue to have access space weather data via the previously provided web interface and FTP products.

3. Registration Obligations

To be approved as a participant in the External Space Weather Database Store (E-SWDS) program, an organization must provide operational products and meet one of the following standards:

1. Be a member of the emergency management community defined as encompassing public safety officials who serve as employees or contract agents

of a government agency at any level (federal, state, local, tribal, etc.) charged with protecting the public from hazards related to space weather or other events.

2. Be a government partner of a NWS office defined as encompassing specific government partners that are necessary participants in E-SWDS with that have missions that require close coordination with these partners, e.g. Department of Transportation, NASA, Department of Defense officials.

3. Commercial Service Providers. Commercial service providers are parties, and contract agents of parties, who operate systems that routinely and rapidly relay space weather watches, advisories, warnings and forecast information to consumers.

4. International Space Weather Partners. Regional Warning Centers or Government entities who provide the exchange of space weather information and forecasts.

In order to obtain an account for E-SWDS services you will be required to provide information about yourself in the Registration form. You agree that the information provided to SWPC will be true, complete, accurate, and current. You agree to maintain and promptly update the registration data whenever changes occur so that it is true, complete, accurate and current.

You agree that you are of legal age and able to form a binding contract. You agree that you are not a person barred from receiving services under the laws of the United States.

You agree that you are familiar with relational data base technology including Structured Query Language (SQL). You agree that the computer IP address that you will be accessing E-SWDS from is static or you will notify SWPC of the new address in sufficient time so the necessary firewall updates can be implemented.

4. Account Security and Passwords

Each user must have an individual account. Upon approval of the Registration form and acceptance for use of E-SWDS, you will receive a password and other account identifying information. You agree that you are responsible for any activity that occurs under your account or user name. You agree that you are responsible for maintaining the confidentiality of any and all passwords used for access to E-SWDS. You agree that your password is for your use only and that you may not give your password to any other person or cause the password to be distributed to other person(s). NWS policy requires passwords to be 12 characters.

5. E-SWDS user conduct

The following activities are prohibited:

a. Accounts deemed to be negatively impacting performance may be suspended at the discretion of the E-SWDS administrator.
b. Any violation of these Terms

6. Privacy Policy

Registration information about you is subject to our Privacy Policy available at http://www.weather.gov/privacy.php. You understand that any queries you provide are available in logs and therefore there is no right of privacy in this system.

7. Termination of Service

You may request to terminate your account at any time. You agree that your organization may request to terminate your account, with or without your knowledge. You agree to inform NWS when you no longer meet participant criteria (for example, leave your job). You agree that the NWS may terminate your account for breaches or violations of the Terms of Service, or for extended periods of inactivity greater than 6 months at the sole discretion of NWS. E-SWDS is offered as an enhancement to the services of the National Weather Service, and may be terminated or suspended at any time, with or without advance notice, by any NWS office offering this service.

8. Service Availability

E-SWDS is designed to operate 24 hours per day; however there will be times when the service may be temporarily suspended such as software or hardware upgrades, fixes or maintenance, or unexpected technical or security issues.

9. Account Naming Convention

Access to the E-SWDS system requires a valid account on the server. All users will have individual accounts. A valid account will consist of a variation of the users' company or organization name**.**

APPENDIX F - E-SWDS User Guide

Problem statement

SWPC's customers have experienced access and data transfer delays using some of SWPC's methods for disseminating data. Non-web methods such as the DataBridge Server throttle the data and limit the number of records retrieved for a given request. And during times of high solar activity, SWPC's Web and FTP sites have become saturated and data could not be obtained. It should be noted, however, that Web and FTP services are now provided by the NOAA Web Operations Center who has addressed previous access and delay issues. Another data dissemination method, the "Information Dissemination System" or IDS is being phased out due to licensing and resource issues.

Overview

E-SWDS is a SWPC-owned Microsoft ®SQL Server ™ relational database that provides public access to space weather data and products using an ODBC (Open Database Connectivity) or similar industry standard interface. E-SWDS provides improved access times by allowing direct programmatic interfaces to the database, eliminating the application or service layer.

Getting Started:

There are 3 basic steps to becoming an E-SWDS customer.

1) Complete necessary paperwork which includes:
    a. Obtaining a copy of the E-SWDS Letter of Invitation to Participate (Appendix B.) and send to the E-SWDS Program Manager.
    b. Once approved, accepting the Terms of Use (Appendix E).
2) Install and configure client-side software which includes:
    a. An ODBC or similar Database Driver Manager for the platform and language you are using to connect to E-SWDS
3) Obtain a user name and password and login.

Step 1: Complete the necessary paperwork.

The SWPC Help Desk can assist users with questions regarding the above documents. The Help Desk can be reached by email at ***swpc.help@noaa.gov.***

Once your documents have been completed they will be submitted to the E-SWDS Program Manager for approval.

Step 2: **Install and configure client-side software**

Microsoft Open Database Connectivity (ODBC) provides a common C programming interface for applications to access data from Relational DataBase Management Systems (RDBMS). Access to databases is managed by the Microsoft ODBC Driver Manager. The driver manager provides the linkage between an ODBC application and an ODBC driver for a specific database management system. ODBC applications do not need to be re-linked or re-compiled in order to change which database management system they are accessing. Similar technologies such as Sun's Java Database Connectivity (JDBC) may be used.

Customers writing software applications that interface to E-SWDS will need a database driver manager specific to the language and platform they are communicating from. Driver managers are not provided by SWPC but many are readily available as a free download from the internet. For instance, if your application is written in JAVA you will need a JDBC driver manager. A JDBC driver can be downloaded from Microsoft's public web site. If your application is written in Python you would use the mxODBC driver manager.

To determine what drivers are available for your applications simply type a search string similar to the one below.

"Perl ODBC Driver Manager"

Please note that for languages that are not platform independent such as C++ you should add the platform type to your search query string (i.e. "C++ Windows ODBC Driver Manager")

To read more about ODBC and ODBC drivers click on the links below.

http://www.datadirect.com/developer/odbc/basics/index.ssp

http://connectionstrings.com/?carrier=sqlserver2005

ODBC driver managers – drivers for all Microsoft supported languages including JAVA, C#, Visual Basic and several others. Drivers are also available

Step 3: Requesting an E-SWDS account:

1. Each potential E-SWDS customer shall send a request for an account (section 4.2) to the E-SWDS Program Manager.

Upon approval

1. Users shall receive a username and password to the E-SWDS system
2. E-SWDS Data shall be read only.
    a. Views of the data have been constructed and are listed in the Data Dictionary (Appendix G)
3. Only public data shall be available to the customer.
4. The time span of the data selected is set from the customer query but is requested by SWPC to keep the time span selected to a minimum.
5. The data shall reside on E-SWDS only for a specified amount of time provided in the Data Dictionary.
6. If a customer violates NOAA Security Policies or the rules set in the E-SWDS Program Guide, SWPC has the right to suspend service until violations are corrected.
7. The customer has the right to terminate service with E-SWDS at any time via an email to the SWPC help desk.

Initial Connection

Once the customer receives their user name and password and has installed the necessary database drivers, data access will be done through Relational DataBase Management System (RDBMS) connections. This depends on Operating System and computer language used by the client.

Access Examples

View names will be provided via the Data Dictionary (Appendix G). All data retrieval statements will have the following format:

SELECT [column list (comma separated)] FROM [view name] WHERE [time column] BETWEEN '[start time]' AND '[end time]'

The comma-separated column list, view name, and applicable time column can be found in the Data Dictionary. Start time and End time are defined by the customer and should have the format of YYYY-MM-DD hh:mm:ss.

For example, if ACE 1-minute averaged data from GSE magnetometer are desired between the time intervals of Mar 28, 2008 1400-1500 UTC, the following view would be executed as a SQL statement from the client application:

SELECT time_tag, gse_bx, gse_by, gse_bz, FROM ace_mag_1m WHERE time_tag BETWEEN '2008-03-28 14:00:00' AND '2008-03-28 15:00:00'

The returned result set would contain this data (without the header):

Time of data	GSE Bx	GSE By	GSE Bz
2008-03-28 14:00:00.000	0.127	-3.2476666	-3.2103333

2008-03-28 14:01:00.000	1.9598334	-2.1266668	-3.3258333
2008-03-28 14:02:00.000	2.4571667	-1.7721666	-3.1041667
…	…	…	…
2008-03-28 14:59:00.000	1.6223333	-3.9235001	-1.3058333
2008-03-28 15:00:00.000	0.80133331	-4.5755	-0.49833333

Access Restrictions

Any restrictions can be found in the accompanying E-SWDS Program Guide (section 6).

Best Practices

1. Only obtain data that are needed. Use the dataset names provided in the Data Dictionary to construct the query instead of a "SELECT *" (everything) to filter the result set.

   Example: If ACE Bx magnetic field information is desired, form the following query:

   SELECT bx, FROM ace_mag_1m WHERE …

   Then only Bx is returned instead of everything offered in the ACE 1-minute view.

2. Keep the number of result set rows to a minimum.

   Example: If the latest 5 minutes of ACE magnetic field are desired, only ask for that specific time period:

   SELECT bx, by, bz FROM ace_mag_1m

   WHERE time_tag BETWEEN '[5 minutes ago]' AND '[Current time]'

3. If only a single record is desired, a query could be constructed to use "=" instead of "BETWEEN" in the WHERE clause ("DESC" sorts in descending order):

   SELECT bx, by, bz FROM ace_mag_1m

   WHERE time_tag = '[5 minutes ago]'

   or use a "TOP" and "ORDER BY" in your query to obtain the latest record:

   SELECT TOP 1 bx, by, bz FROM ace_mag_1m ORDER BY time_tag DESC

Availability

1. The E-SWDS shall be supported by SWPC On-call as a high availability operational server.

Database System

1. The E-SWDS database schema shall be identical to the operational schema for any public data it stores
2. The data in E-SWDS shall be retained for the same amount of time as the operational SWDS database. Data retention times are provided in the Data Dictionary.
3. E-SWDS shall deny access to any non-approved user.

Customer Interface

1. The E-SWDS customer interface shall support ‘read only’ operations for external customers.
2. ‘Modify’ operations shall not be supported in the E-SWDS customer interface.
3. The E-SWDS system shall provide the following information about SWPC data products
   3.1 Brief Product Description
   3.2 Data type
   3.3 Units
   3.4 Range
   3.5 Retention

Authentication

1. E-SWDS SQL Server software shall authenticate a user accessing the system with a valid (complies with NOAA Policy) user name and password.
2. SWPC shall distribute passwords to each user via telephone.

Maintenance

1. Additions of new data sets to the E-SWDS system will be communicated via to the customer as soon as possible after the approval of the new datasets by SWPC.

Appendix G - Data Dictionary

Advanced Composition Explorer (ACE) satellite

Instruments:

1. Magnetometer (MAG) – Magnetic Field Vectors

Documentation: http://www.ssg.sr.unh.edu/mag/ACE.html

1-second data:
View name: **ace_mag_1s**
Data Retention: 27 days

Column name	Description	Type	Range	Units
time_tag	Time of data [1]	Date/time	[5]	
dsflag	Data status flag [2]	1-byte int	[0,9]	
numpts	Number of data points used	bit	[0,1]	
gse_bx	Magnetic Field in X-direction GSE Cartesian coordinates	4-byte float	[-1000.,1000.]	nanoTesla
gse_by	Magnetic Field in Y-direction GSE Cartesian coordinates	4-byte float	[-1000.,1000.]	nanoTesla
gse_bz	Magnetic Field in Z-direction GSE Cartesian coordinates	4-byte float	[-1000.,1000.]	nanoTesla
gse_lat	ACE spacecraft position in GSE latitude	4-byte float	[-90.,90.]	degrees
gse_lon	ACE spacecraft position in GSE longitude	4-byte float	[0.,360.]	degrees
gsm_bx	Magnetic Field in X-direction GSM Cartesian coordinates	4-byte float	[-1000.,1000.]	nanoTesla
gsm_by	Magnetic Field in Y-direction GSM Cartesian coordinates	4-byte float	[-1000.,1000.]	nanoTesla
gsm_bz	Magnetic Field in Z-direction GSM Cartesian coordinates	4-byte float	[-1000.,1000.]	nanoTesla
gsm_lat	ACE spacecraft position in GSM latitude	4-byte float	[-90.,90.]	degrees
gsm_lon	ACE spacecraft position in GSM longitude	4-byte float	[0.,360.]	degrees
bt	ACE IMF total field from averaged components	4-byte float	[0.,1000.]	nanoTesla

16-second averaged data:
View name: **ace_mag_16s**
Data Retention: 27 days

Column name	Description	Type	Range	Units
time_tag	Time of data – tagged at beginning of 16-second time interval [1]	Date/time	[5]	
dsflag	Data status flag [2]	1-byte int	[0,9]	
numpts	Number of data points used in average	1-byte int	[0,16]	
gse_bx	Magnetic Field in X-direction GSE Cartesian coordinates	4-byte float	[-1000.,1000.]	nanoTesla
gse_by	Magnetic Field in Y-direction GSE Cartesian coordinates	4-byte float	[-1000.,1000.]	nanoTesla
gse_bz	Magnetic Field in Z-direction GSE Cartesian coordinates	4-byte float	[-1000.,1000.]	nanoTesla
gse_lat	ACE spacecraft position in GSE latitude	4-byte float	[-90.,90.]	degrees
gse_lon	ACE spacecraft position in GSE longitude	4-byte float	[0.,360.]	degrees
gsm_bx	Magnetic Field in X-direction GSM Cartesian coordinates	4-byte float	[-1000.,1000.]	nanoTesla
gsm_by	Magnetic Field in Y-direction GSM Cartesian coordinates	4-byte float	[-1000.,1000.]	nanoTesla
gsm_bz	Magnetic Field in Z-direction GSM Cartesian coordinates	4-byte float	[-1000.,1000.]	nanoTesla
gsm_lat	ACE spacecraft position in GSM latitude	4-byte float	[-90.,90.]	degrees
gsm_lon	ACE spacecraft position in GSM longitude	4-byte float	[0.,360.]	degrees
bt	ACE IMF total field from averaged components	4-byte float	[0.,1000.]	nanoTesla

1-minute averaged data:
View name: **ace_mag_1m**

Data Retention: 81 days

Column name	Description	Type	Range	Units
time_tag	Time of data – tagged at beginning of 1-minute time interval [1]	Date/time	[5]	
dsflag	Data status flag [2]	1-byte int	[0,9]	
numpts	Number of data points used in average	1-byte int	[0,60]	
gse_bx	Magnetic Field in X-direction GSE Cartesian coordinates	4-byte float	[-1000.,1000.]	nanoTesla
gse_by	Magnetic Field in Y-direction GSE Cartesian coordinates	4-byte float	[-1000.,1000.]	nanoTesla
gse_bz	Magnetic Field in Z-direction GSE Cartesian coordinates	4-byte float	[-1000.,1000.]	nanoTesla
gse_lat	ACE spacecraft position in GSE latitude	4-byte float	[-90.,90.]	degrees
gse_lon	ACE spacecraft position in GSE longitude	4-byte float	[0.,360.]	degrees
gsm_bx	Magnetic Field in X-direction GSM Cartesian coordinates	4-byte float	[-1000.,1000.]	nanoTesla
gsm_by	Magnetic Field in Y-direction GSM Cartesian coordinates	4-byte float	[-1000.,1000.]	nanoTesla
gsm_bz	Magnetic Field in Z-direction GSM Cartesian coordinates	4-byte float	[-1000.,1000.]	nanoTesla
gsm_lat	ACE spacecraft position in GSM latitude	4-byte float	[-90.,90.]	degrees
gsm_lon	ACE spacecraft position in GSM longitude	4-byte float	[0.,360.]	degrees
bt	ACE IMF total field from averaged components	4-byte float	[0.,1000.]	nanoTesla

1-hour averaged data:
View name: **ace_mag_1h**
Data Retention: 365 days

Column name	Description	Type	Range	Units
time_tag	Time of data – tagged at beginning of 1-hour time interval [1]	Date/time	[5]	
dsflag	Data status flag [2]	1-byte int	[0,9]	
numpts	Number of data points used in average	2-byte int	[0,3600]	
gse_bx	Magnetic Field in X-direction GSE Cartesian coordinates	4-byte float	[-1000.,1000.]	nanoTesla
gse_by	Magnetic Field in Y-direction GSE Cartesian coordinates	4-byte float	[-1000.,1000.]	nanoTesla

gse_bz	Magnetic Field in Z-direction GSE Cartesian coordinates	4-byte float	[-1000.,1000.]	nanoTesla
gse_lat	ACE spacecraft position in GSE latitude	4-byte float	[-90.,90.]	degrees
gse_lon	ACE spacecraft position in GSE longitude	4-byte float	[0.,360.]	degrees
gsm_bx	Magnetic Field in X-direction GSM Cartesian coordinates	4-byte float	[-1000.,1000.]	nanoTesla
gsm_by	Magnetic Field in Y-direction GSM Cartesian coordinates	4-byte float	[-1000.,1000.]	nanoTesla
gsm_bz	Magnetic Field in Z-direction GSM Cartesian coordinates	4-byte float	[-1000.,1000.]	nanoTesla
gsm_lat	ACE spacecraft position in GSM latitude	4-byte float	[-90.,90.]	degrees
gsm_lon	ACE spacecraft position in GSM longitude	4-byte float	[0.,360.]	degrees
bt	ACE IMF total field from averaged components	4-byte float	[0.,1000.]	nanoTesla

2. Solar Isotope Spectrometer (SIS) – High Energy Particle Fluxes

- Documentation: http://www.srl.caltech.edu/ACE/CRIS_SIS/sis.html

32-second data:
View name: **ace_sis_32s**
Data Retention: 27 days

Column name	Description	Type	Range	Units
time_tag	Time of data [1]	Date/time	[5]	
dsflag_p10	Data status flag for Integral Proton Flux > 10 MeV [2]	1-byte int	[0,9]	
dsflag_p30	Data status flag for Integral Proton Flux > 30 MeV [2]	1-byte int	[0,9]	
numpts_p10	Number of data points used for Integral Proton Flux > 10 MeV	1-byte int	[0,1]	
numpts_p30	Number of data points used for Integral Proton Flux > 30 MeV	1-byte int	[0,1]	
p_gt_10	Integral Proton Flux > 10 MeV	4-byte float	[1.0e-5, 1.0e+5]	particles/cm^2*s*ster *MeV
p_gt_30	Integral Proton Flux > 30 MeV	4-byte float	[1.0e-5, 1.0e+5]	particles/cm^2*s*ster *MeV

5-minute data:

View name: **ace_sis_5m**
Data Retention: 81 days

Column name	Description	Type	Range	Units
time_tag	Time of data [1]	Date/time	[5]	
dsflag_p10	Data status flag for Integral Proton Flux > 10 MeV [2]	1-byte int	[0,9]	
dsflag_p30	Data status flag for Integral Proton Flux > 30 MeV [2]	1-byte int	[0,9]	
numpts_p10	Number of data points used for Integral Proton Flux > 10 MeV	1-byte int	[0,10]	
numpts_p30	Number of data points used for Integral Proton Flux > 30 MeV	1-byte int	[0,10]	
p_gt_10	Integral Proton Flux > 10 MeV	4-byte float	[1.0e-5, 1.0e+5]	particles/cm^2*s*ster *MeV
p_gt_30	Integral Proton Flux > 30 MeV	4-byte float	[1.0e-5, 1.0e+5]	particles/cm^2*s*ster *MeV

1-hour data:
View name: **ace_sis_1h**
Data Retention: 365 days

Column name	Description	Type	Range	Units
time_tag	Time of data [1]	Date/time	[5]	
dsflag_p10	Data status flag for Integral Proton Flux > 10 MeV [2]	1-byte int	[0,9]	
dsflag_p30	Data status flag for Integral Proton Flux > 30 MeV [2]	1-byte int	[0,9]	
numpts_p10	Number of data points used for Integral Proton Flux > 10 MeV	1-byte int	[0,113]	
numpts_p30	Number of data points used for Integral Proton Flux > 30 MeV	1-byte int	[0,113]	
p_gt_10	Integral Proton Flux > 10 MeV	4-byte float	[1.0e-5, 1.0e+5]	particles/cm^2*s*ster *MeV
p_gt_30	Integral Proton Flux > 30 MeV	4-byte float	[1.0e-5, 1.0e+5]	particles/cm^2*s*ster *MeV

3. Solar Wind Electron, Proton, and Alpha Monitor (SWEPAM) – Solar Wind Ions

Documentation: http://swepam.lanl.gov/

1-minute data:
View name: **ace_swepam_1m**
Data Retention: 81 days

Column name	Description	Type	Range	Units
time_tag	Time of data [1]	Date/time	[5]	
dsflag	Data status flag [2]	1-byte int	[0,9]	
dens	Proton density	4-byte float	[1.e-5,200.]	particles/cm^3
speed	Bulk wind speed	4-byte float	[200.,2000.]	km/s
temperature	Proton temperature	4-byte float	[1.e+4,1.e+7]	Degrees K
vx	Vector Velocity X-direction in GSE	4-byte float	[-200.,200.]	km/s
vy	Vector Velocity Y-direction in GSE	4-byte float	[-200.,200.]	km/s
vz	Vector Velocity Z-direction in GSE	4-byte float	[-200.,200.]	km/s
err_count	Error count	1-byte int	[0,99]	

64-second data:
View name: **ace_swepam_64s**
Data Retention: 27 days

Column name	Description	Type	Range	Units
time_tag	Time of data [1]	Date/time	[5]	
dsflag	Data status flag [2]	1-byte int	[0,9]	
dens	Proton density	4-byte float	[1.e-5,200.]	particles/cm^3
speed	Bulk wind speed	4-byte float	[200.,2000.]	km/s
temperature	Proton temperature	4-byte float	[1.e+4,1.e+7]	Degrees K
vx	Vector Velocity X-direction in GSE	4-byte float	[-200.,200.]	km/s
vy	Vector Velocity Y-direction in GSE	4-byte float	[-200.,200.]	km/s
vz	Vector Velocity Z-direction in GSE	4-byte float	[-200.,200.]	km/s
err_count	Error count	1-byte int	[0,99]	

1-hour averaged data:
View name: **ace_swepam_1h**
Data Retention: 365 days

Column name	Description	Type	Range	Units
time_tag	Time of data [1]	Date/time	[5]	
dsflag	Data status flag [2]	1-byte int	[0,9]	
dens	Proton density	4-byte float	[1.e-5,200.]	particles/cm^3
speed	Bulk wind speed	4-byte float	[200.,2000.]	km/s
temperature	Proton temperature	4-byte float	[1.e+4,1.e+7]	Degrees K
vx	Vector Velocity X-direction in GSE	4-byte float	[-200.,200.]	km/s
vy	Vector Velocity Y-direction in GSE	4-byte float	[-200.,200.]	km/s
vz	Vector Velocity Z-direction in GSE	4-byte float	[-200.,200.]	km/s
err_count	Error count	1-byte int	[0,99]	

4. Electron, Proton, and Alpha Monitor (EPAM) – Energetic Ions and Electrons

Documentation: http://sd-www.jhuapl.edu/ACE/EPAM/

32-second averaged data:
View name: **ace_epam_32s**
Data Retention: 27 days

Column name	Description	Type	Range	Units
time_tag	Time of data [1]	Date/time	[5]	
dsflag_de1	Data status flag for de1 [2]	1-byte int	[0,9]	
dsflag_de4	Data status flag for de4 [2]	1-byte int	[0,9]	
numpts_de1	Number of data points used in average for de1	1-byte int	[0,8]	
numpts_de4	Number of data points used in average for de4	1-byte int	[0,8]	
de1	LEMS120 differential e flux (38-53 keV)	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
de4	LEMS120 differential e flux (175-315 keV)	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV

dsflag_p1	Data status flag for p1 [2]	1-byte int	[0,9]	
dsflag_p2	Data status flag for p2 [2]	1-byte int	[0,9]	
dsflag_p3	Data status flag for p3 [2]	1-byte int	[0,9]	
dsflag_p4	Data status flag for p4 [2]	1-byte int	[0,9]	
dsflag_p5	Data status flag for p5 [2]	1-byte int	[0,9]	
dsflag_p6	Data status flag for p6 [2]	1-byte int	[0,9]	
dsflag_p7	Data status flag for p7 [2]	1-byte int	[0,9]	
dsflag_p8	Data status flag for p8 [2]	1-byte int	[0,9]	
numpts_p1	Number of data points used in average for p1	1-byte int	[0,32]	
numpts_p2	Number of data points used in average for p2	1-byte int	[0,32]	
numpts_p3	Number of data points used in average for p3	1-byte int	[0,32]	
numpts_p4	Number of data points used in average for p4	1-byte int	[0,32]	
numpts_p5	Number of data points used in average for p5	1-byte int	[0,32]	
numpts_p6	Number of data points used in average for p6	1-byte int	[0,16]	
numpts_p7	Number of data points used in average for p7	1-byte int	[0,16]	
numpts_p8	Number of data points used in average for p8	1-byte int	[0,16]	
p1	LEMS120 differential p flux p1 47-68 keV	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
p2	LEMS120 differential p flux p2 68-115 keV	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
p3	LEMS120 differential p flux p3 115-195 keV	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
p4	LEMS120 differential p flux p4 195-321 keV	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
p5	LEMS120 differential p flux p5 321-587 keV	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
p6	LEMS120 differential p flux p6 587-1060 keV	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
p7	LEMS120 differential p flux p7 1.06-1.90 MeV	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
p8	LEMS120 differential p flux p8 1.90-4.80 MeV	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
dsflag_fp6p	Data status flag for fp6p [2]	1-byte int	[0,9]	
numpts_fp6p	Number of data points used in average for fp6p	1-byte int	[0,16]	
fp6p	LEMS120 differential p flux fp6p 761-1220 keV	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
fp6p_ratio	LEMS120 Anisotropy Index	4-byte float	[0,2]	
fp6ps1	LEMS120 differential p flux fp6p sector1	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
fp6ps2	LEMS120 differential p flux fp6p sector2	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
fp6ps3	LEMS120 differential p flux fp6p sector3	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
fp6ps4	LEMS120 differential p flux	4-byte float	[1.e-	particles/cm^2*s*ster*

	fp6p sector4		5,1.e+8]	MeV
fp6ps5	LEMS120 differential p flux fp6p sector5	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
fp6ps6	LEMS120 differential p flux fp6p sector6	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
fp6ps7	LEMS120 differential p flux fp6p sector7	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
fp6ps8	LEMS120 differential p flux fp6p sector8	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
dsflag_p1_30	Data status flag for p1_30 [2]	1-byte int	[0,9]	
dsflag_p2_30	Data status flag for p2_30 [2]	1-byte int	[0,9]	
dsflag_p3_30	Data status flag for p3_30 [2]	1-byte int	[0,9]	
dsflag_p4_30	Data status flag for p4_30 [2]	1-byte int	[0,9]	
dsflag_p5_30	Data status flag for p5_30 [2]	1-byte int	[0,9]	
dsflag_p6_30	Data status flag for p6_30 [2]	1-byte int	[0,9]	
dsflag_p7_30	Data status flag for p7_30 [2]	1-byte int	[0,9]	
dsflag_p8_30	Data status flag for p8_30 [2]	1-byte int	[0,9]	
numpts_p1_30	Number of data points used in average for p1_30	1-byte int	[0,8]	
numpts_p2_30	Number of data points used in average for p2_30	1-byte int	[0,8]	
numpts_p3_30	Number of data points used in average for p3_30	1-byte int	[0,8]	
numpts_p4_30	Number of data points used in average for p4_30	1-byte int	[0,8]	
numpts_p5_30	Number of data points used in average for p5_30	1-byte int	[0,4]	
numpts_p6_30	Number of data points used in average for p6_30	1-byte int	[0,4]	
numpts_p7_30	Number of data points used in average for p7_30	1-byte int	[0,4]	
numpts_p8_30	Number of data points used in average for p8_30	1-byte int	[0,4]	
p1_30	LEMS30 differential p flux p1 47-65 keV	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
p2_30	LEMS30 differential p flux p2 65-112 keV	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
p3_30	LEMS30 differential p flux p3 112-187 keV	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
p4_30	LEMS30 differential p flux p4 187-310 keV	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
p5_30	LEMS30 differential p flux p5 310-580 keV	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
p6_30	LEMS30 differential p flux p6 580-1060 keV	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
p7_30	LEMS30 differential p flux p7 1.06-1.91 MeV	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
p8_30	LEMS30 differential p flux p8 1.91-4.75 MeV	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV

5-minute averaged data:
View name: **ace_epam_5m**

Data Retention: 81 days

Column name	Description	Type	Range	Units
time_tag	Time of data [1]	Date/time	[5]	
dsflag_de1	Data status flag for de1 [2]	1-byte int	[0,9]	
dsflag_de4	Data status flag for de4 [2]	1-byte int	[0,9]	
numpts_de1	Number of data points used in average for de1	1-byte int	[0,52]	
numpts_de4	Number of data points used in average for de4	1-byte int	[0,52]	
de1	LEMS120 differential e flux (38-53 keV)	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster*MeV
de4	LEMS120 differential e flux (175-315 keV)	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster*MeV
dsflag_p1	Data status flag for p1 [2]	1-byte int	[0,9]	
dsflag_p2	Data status flag for p2 [2]	1-byte int	[0,9]	
dsflag_p3	Data status flag for p3 [2]	1-byte int	[0,9]	
dsflag_p4	Data status flag for p4 [2]	1-byte int	[0,9]	
dsflag_p5	Data status flag for p5 [2]	1-byte int	[0,9]	
dsflag_p6	Data status flag for p6 [2]	1-byte int	[0,9]	
dsflag_p7	Data status flag for p7 [2]	1-byte int	[0,9]	
dsflag_p8	Data status flag for p8 [2]	1-byte int	[0,9]	
numpts_p1	Number of data points used in average for p1	1-byte int	[0,208]	
numpts_p2	Number of data points used in average for p2	1-byte int	[0,208]	
numpts_p3	Number of data points used in average for p3	1-byte int	[0,208]	
numpts_p4	Number of data points used in average for p4	1-byte int	[0,208]	
numpts_p5	Number of data points used in average for p5	1-byte int	[0,208]	
numpts_p6	Number of data points used in average for p6	1-byte int	[0,104]	
numpts_p7	Number of data points used in average for p7	1-byte int	[0,104]	
numpts_p8	Number of data points used in average for p8	1-byte int	[0,104]	
p1	LEMS120 differential p flux p1 47-68 keV	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster*MeV
p2	LEMS120 differential p flux p2 68-115 keV	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster*MeV
p3	LEMS120 differential p flux p3 115-195 keV	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster*MeV
p4	LEMS120 differential p flux p4 195-321 keV	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster*MeV
p5	LEMS120 differential p flux p5 321-587 keV	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster*MeV
p6	LEMS120 differential p flux p6 587-1060 keV	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster*MeV
p7	LEMS120 differential p flux	4-byte float	[1.e-	particles/cm^2*s*ster*

	p7 1.06-1.90 MeV		5,1.e+8]	MeV
p8	LEMS120 differential p flux p8 1.90-4.80 MeV	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
dsflag_fp6p	Data status flag for fp6p [2]	1-byte int	[0,9]	
numpts_fp6p	Number of data points used in average for fp6p	1-byte int	[0,104]	
fp6p	LEMS120 differential p flux fp6p 761-1220 keV	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
fp6p_ratio	LEMS120 Anisotropy Index	4-byte float	[0,2]	
fp6ps1	LEMS120 differential p flux fp6p sector1	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
fp6ps2	LEMS120 differential p flux fp6p sector2	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
fp6ps3	LEMS120 differential p flux fp6p sector3	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
fp6ps4	LEMS120 differential p flux fp6p sector4	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
fp6ps5	LEMS120 differential p flux fp6p sector5	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
fp6ps6	LEMS120 differential p flux fp6p sector6	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
fp6ps7	LEMS120 differential p flux fp6p sector7	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
fp6ps8	LEMS120 differential p flux fp6p sector8	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
dsflag_p1_30	Data status flag for p1_30 [2]	1-byte int	[0,9]	
dsflag_p2_30	Data status flag for p2_30 [2]	1-byte int	[0,9]	
dsflag_p3_30	Data status flag for p3_30 [2]	1-byte int	[0,9]	
dsflag_p4_30	Data status flag for p4_30 [2]	1-byte int	[0,9]	
dsflag_p5_30	Data status flag for p5_30 [2]	1-byte int	[0,9]	
dsflag_p6_30	Data status flag for p6_30 [2]	1-byte int	[0,9]	
dsflag_p7_30	Data status flag for p7_30 [2]	1-byte int	[0,9]	
dsflag_p8_30	Data status flag for p8_30 [2]	1-byte int	[0,9]	
numpts_p1_30	Number of data points used in average for p1_30	1-byte int	[0,52]	
numpts_p2_30	Number of data points used in average for p2_30	1-byte int	[0,52]	
numpts_p3_30	Number of data points used in average for p3_30	1-byte int	[0,52]	
numpts_p4_30	Number of data points used in average for p4_30	1-byte int	[0,52]	
numpts_p5_30	Number of data points used in average for p5_30	1-byte int	[0,26]	
numpts_p6_30	Number of data points used in average for p6_30	1-byte int	[0,26]	
numpts_p7_30	Number of data points used in average for p7_30	1-byte int	[0,26]	
numpts_p8_30	Number of data points used in average for p8_30	1-byte int	[0,26]	
p1_30	LEMS30 differential p flux p1 47-65 keV	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
p2_30	LEMS30 differential p flux p2 65-112 keV	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV

p3_30	LEMS30 differential p flux p3 112-187 keV	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
p4_30	LEMS30 differential p flux p4 187-310 keV	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
p5_30	LEMS30 differential p flux p5 310-580 keV	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
p6_30	LEMS30 differential p flux p6 580-1060 keV	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
p7_30	LEMS30 differential p flux p7 1.06-1.91 MeV	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
p8_30	LEMS30 differential p flux p8 1.91-4.75 MeV	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV

1-hour averaged data:
View name: **ace_epam_1h**
Data Retention: 365 days

Column name	Description	Type	Range	Units
time_tag	Time of data [1]	Date/time	[5]	
dsflag_de1	Data status flag for de1 [2]	1-byte int	[0,9]	
dsflag_de4	Data status flag for de4 [2]	1-byte int	[0,9]	
numpts_de1	Number of data points used in average for de1	1-byte int	[0,576]	
numpts_de4	Number of data points used in average for de4	1-byte int	[0,576]	
de1	LEMS120 differential e flux (38-53 keV)	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
de4	LEMS120 differential e flux (175-315 keV)	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
dsflag_p1	Data status flag for p1 [2]	1-byte int	[0,9]	
dsflag_p2	Data status flag for p2 [2]	1-byte int	[0,9]	
dsflag_p3	Data status flag for p3 [2]	1-byte int	[0,9]	
dsflag_p4	Data status flag for p4 [2]	1-byte int	[0,9]	
dsflag_p5	Data status flag for p5 [2]	1-byte int	[0,9]	
dsflag_p6	Data status flag for p6 [2]	1-byte int	[0,9]	
dsflag_p7	Data status flag for p7 [2]	1-byte int	[0,9]	
dsflag_p8	Data status flag for p8 [2]	1-byte int	[0,9]	
numpts_p1	Number of data points used in average for p1	1-byte int	[0,2304]	
numpts_p2	Number of data points used in average for p2	1-byte int	[0,2304]	
numpts_p3	Number of data points used in average for p3	1-byte int	[0,2304]	
numpts_p4	Number of data points used in average for p4	1-byte int	[0,2304]	
numpts_p5	Number of data points used in average for p5	1-byte int	[0,2304]	
numpts_p6	Number of data points used in average for p6	1-byte int	[0,1152]	
numpts_p7	Number of data points used	1-byte int	[0,1152]	

	in average for p7			
numpts_p8	Number of data points used in average for p8	1-byte int	[0,1152]	
p1	LEMS120 differential p flux p1 47-68 keV	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
p2	LEMS120 differential p flux p2 68-115 keV	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
p3	LEMS120 differential p flux p3 115-195 keV	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
p4	LEMS120 differential p flux p4 195-321 keV	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
p5	LEMS120 differential p flux p5 321-587 keV	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
p6	LEMS120 differential p flux p6 587-1060 keV	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
p7	LEMS120 differential p flux p7 1.06-1.90 MeV	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
p8	LEMS120 differential p flux p8 1.90-4.80 MeV	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
dsflag_fp6p	Data status flag for fp6p [2]	1-byte int	[0,9]	
numpts_fp6p	Number of data points used in average for fp6p	1-byte int	[0,1152]	
fp6p	LEMS120 differential p flux fp6p 761-1220 keV	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
fp6p_ratio	LEMS120 Anisotropy Index	4-byte float	[0,2]	
fp6ps1	LEMS120 differential p flux fp6p sector1	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
fp6ps2	LEMS120 differential p flux fp6p sector2	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
fp6ps3	LEMS120 differential p flux fp6p sector3	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
fp6ps4	LEMS120 differential p flux fp6p sector4	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
fp6ps5	LEMS120 differential p flux fp6p sector5	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
fp6ps6	LEMS120 differential p flux fp6p sector6	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
fp6ps7	LEMS120 differential p flux fp6p sector7	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
fp6ps8	LEMS120 differential p flux fp6p sector8	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
dsflag_p1_30	Data status flag for p1_30 [2]	1-byte int	[0,9]	
dsflag_p2_30	Data status flag for p2_30 [2]	1-byte int	[0,9]	
dsflag_p3_30	Data status flag for p3_30 [2]	1-byte int	[0,9]	
dsflag_p4_30	Data status flag for p4_30 [2]	1-byte int	[0,9]	
dsflag_p5_30	Data status flag for p5_30 [2]	1-byte int	[0,9]	
dsflag_p6_30	Data status flag for p6_30 [2]	1-byte int	[0,9]	
dsflag_p7_30	Data status flag for p7_30 [2]	1-byte int	[0,9]	
dsflag_p8_30	Data status flag for p8_30 [2]	1-byte int	[0,9]	
numpts_p1_30	Number of data points used in average for p1_30	1-byte int	[0,572]	

numpts_p2_30	Number of data points used in average for p2_30	1-byte int	[0,572]	
numpts_p3_30	Number of data points used in average for p3_30	1-byte int	[0,572]	
numpts_p4_30	Number of data points used in average for p4_30	1-byte int	[0,572]	
numpts_p5_30	Number of data points used in average for p5_30	1-byte int	[0,284]	
numpts_p6_30	Number of data points used in average for p6_30	1-byte int	[0,284]	
numpts_p7_30	Number of data points used in average for p7_30	1-byte int	[0,284]	
numpts_p8_30	Number of data points used in average for p8_30	1-byte int	[0,284]	
p1_30	LEMS30 differential p flux p1 47-65 keV	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
p2_30	LEMS30 differential p flux p2 65-112 keV	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
p3_30	LEMS30 differential p flux p3 112-187 keV	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
p4_30	LEMS30 differential p flux p4 187-310 keV	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
p5_30	LEMS30 differential p flux p5 310-580 keV	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
p6_30	LEMS30 differential p flux p6 580-1060 keV	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
p7_30	LEMS30 differential p flux p7 1.06-1.91 MeV	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV
p8_30	LEMS30 differential p flux p8 1.91-4.75 MeV	4-byte float	[1.e-5,1.e+8]	particles/cm^2*s*ster* MeV

5. Derived/Predicted

Planetary K

Documentation: http://www.swpc.noaa.gov/rpc/costello/index.html

15-minute data:
View name: **ace_pred_15m**
Data Retention: 81 days

Column name	Description	Type	Range	Units
time_tag	Time of data [1]	Date/time	[5]	
kp	Predicted value of Kp	4-byte float	[0.,9.]	
kpq	Quality Flag for Predicted value of Kp [3]	1-byte int	[0,9]	

3-hour data:
View name: **ace_derived_3h**
Data Retention: 365 days

Column name	Description	Type	Range	Units
time_tag	Time of data [1]	Date/time	[5]	
kp	Derived 3-hour Kp	4-byte float	[0.,9.]	
kpq	Quality flag for Derived 3-hour Kp [4]	1-byte int	[0,9]	

6. Location

1-hour data:
View name**: ace_loc_1h**
Data Retention: 365 days

Column name	Description	Type	Range	Units
time_tag	Time of data [1]	Date/time	[5]	
xgse_pos	X-Position in GSE coordinates	4-byte float	[0.,300.]	earth Radii (Re)
ygse_pos	Y-Position in GSE coordinates	4-byte float	[-200.,200.]	earth Radii (Re)
zgse_pos	Z-Position in GSE coordinates	4-byte float	[-200.,200.]	earth Radii (Re)
xgci_pos	X-Position in GCI Reference coordinates	4-byte float		km
ygci_pos	Y-Position in GCI Reference coordinates	4-byte float		km
zgci_pos	Z-Position in GCI Reference coordinates	4-byte float		km

Geostationary Operational Environmental Satellites (GOES) I-M Series

Instruments:

1. Space Environment Monitor (SEM) – X-ray Sensor (XRS)

Documentation: http://rsd.gsfc.nasa.gov/goes/text/databook/section05.pdf

3-second data:
View names: **goes10_3s**, **goes11_3s**, **goes12_3s**
Data Retention: 60 days

Column name	Description	Type	Range	Units
time_tag	Time of data for GOES-10,11,12 x-ray data [1]	Date/time	[5]	
x_short	GOES-10,11,12 Short X-ray flux (0.4 - 5 angstroms)	4-byte float	$[10^{-9}, 10^{-3}]$	W/m^2
x_long	GOES-10,11,12 Long X-ray flux (1 - 8 angstroms)	4-byte float	$[10^{-9}, 10^{-3}]$	W/m^2

1-minute averaged data:
View names: **goes10_1m**, **goes11_1m**, **goes12_1m**
Data Retention: 60 days

Column name	Description	Type	Range	Units
time_tag	Time of data for GOES-10,11,12 x-ray data [1]	Date/time	[5]	
x_short	GOES-10,11,12 Short X-ray flux (0.4 - 5 angstroms)	4-byte float	$[10^{-9}, 10^{-3}]$	W/m^2
x_long	GOES-10,11,12 Long X-ray flux (1 - 8 angstroms)	4-byte float	$[10^{-9}, 10^{-3}]$	W/m^2
x_ratio	GOES-10,11,12 ratio of short/long X-ray flux	4-byte float	[0,1]	

5-minute averaged data:
View names: **goes10_5m**, **goes11_5m**, **goes12_5m**
Data Retention: 120 days

Column name	Description	Type	Range	Units
time_tag	Time of data for GOES-10,11,12 x-ray data [1]	Date/time	[5]	

x_short	GOES-10,11,12 Short X-ray flux (0.4 - 5 angstroms)	4-byte float	$[10^{-9}, 10^{-3}]$	W/m^2
x_long	GOES-10,11,12 Long X-ray flux (1 - 8 angstroms)	4-byte float	$[10^{-9}, 10^{-3}]$	W/m^2
x_ratio	GOES-10,11,12 ratio of short/long X-ray flux	4-byte float	[0,1]	

2. Space Environment Monitor (SEM) – Magnetometer

Documentation: http://rsd.gsfc.nasa.gov/goes/text/databook/section05.pdf

1-minute averaged data:
View names: **goes10_1m**, **goes11_1m**, **goes12_1m**
Data Retention: 60 days

Column name	Description	Type	Range	Units
time_tag	Time of data for GOES-10,11,12 magnetometer [1]	Date/time	[5]	
hp	GOES-10,11,12 Magnetic parallel component	4-byte float	[-1400.,1400.]	nano Tesla
he	GOES-10,11,12 Magnetic earthward component	4-byte float	[-1400.,1400.]	nano Tesla
hn	GOES-10,11,12 Magnetic normal eastward component	4-byte float	[-1400.,1400.]	nano Tesla
ht	GOES-10,11,12 Magnetic total field component	4-byte float	[-1400.,1400.]	nano Tesla

5-minute averaged data:
View names: **goes10_5m**, **goes11_5m**, **goes12_5m**
Data Retention: 120 days

Column name	Description	Type	Range	Units
time_tag	Time of data for GOES-10,11,12 magnetometer [1]	Date/time	[5]	
hp	GOES-10,11,12 Magnetic parallel component	4-byte float	[-1400.,1400.]	nano Tesla
he	GOES-10,11,12 Magnetic earthward component	4-byte float	[-1400.,1400.]	nano Tesla
hn	GOES-10,11,12 Magnetic normal eastward component	4-byte float	[-1400.,1400.]	nano Tesla
ht	GOES-10,11,12 Magnetic total field component	4-byte float	[-1400.,1400.]	nano Tesla

3. Space Environment Monitor (SEM) – Energetic Particle Sensor (EPS) and High Energy Proton and Alpha Detector (HEPAD)

Documentation: http://rsd.gsfc.nasa.gov/goes/text/databook/section05.pdf

1-minute averaged data:
View names: **goes10_1m**, **goes11_1m**, **goes12_1m**
Data Retention: 60 days

Column name	Description	Type	Range	Units
time_tag	Time of data for GOES-10,11,12 energetic particles [1]	Date/time	[5]	
e1	GOES-10,11,12 Electrons > 0.6 MeV	4-byte float	[0.,10^{15}]	#/sec
e2	GOES-10,11,12 Electrons > 2 MeV	4-byte float	[0.,10^{15}]	#/sec
e3	GOES-10,11,12 Electrons > 4 MeV	4-byte float	[0.,10^{15}]	#/sec
p1	GOES-10,11,12 Telescope Protons 0.7-4 MeV	4-byte float	[0.,10^{5}]	p/(cm^2*s*sr*MeV)
p2	GOES-10,11,12 Telescope Protons 4-9 MeV	4-byte float	[0.,10^{5}]	p/(cm^2*s*sr*MeV)
p3	GOES-10,11,12 Telescope Protons 9-15 MeV	4-byte float	[0.,10^{5}]	p/(cm^2*s*sr*MeV)
p4	GOES-10,11,12 Dome Protons 15-40 MeV	4-byte float	[0.,10^{5}]	p/(cm^2*s*sr*MeV)
p5	GOES-10,11,12 Dome Protons 38-82 MeV	4-byte float	[0.,10^{5}]	p/(cm^2*s*sr*MeV)
p6	GOES-10,11,12 Dome Protons 84-200 MeV	4-byte float	[0.,10^{5}]	p/(cm^2*s*sr*MeV)
p7	GOES-10,11,12 Dome Protons 110-900 MeV	4-byte float	[0.,10^{5}]	p/(cm^2*s*sr*MeV)

5-minute averaged data:
View names: **goes10_5m**, **goes11_5m**, **goes12_5m**
Data Retention: 120 days

Column name	Description	Type	Range	Units
time_tag	Time of data for GOES-10 energetic particles [1]	Date/time	[5]	
e1	GOES-10,11,12	4-byte	[0.,10^{15}]	#/sec

	Electrons > 0.6 MeV	float		
e2	GOES-10,11,12 Electrons > 2 MeV	4-byte float	[0.,10^{15}]	#/sec
e3	GOES-10,11,12 Electrons > 4 MeV	4-byte float	[0.,10^{15}]	#/sec
p1	GOES-10,11,12 Telescope Protons 0.7-4 MeV	4-byte float	[0.,10^{5}]	p/(cm^2*s*sr*MeV)
p2	GOES-10,11,12 Telescope Protons 4-9 MeV	4-byte float	[0.,10^{5}]	p/(cm^2*s*sr*MeV)
p3	GOES-10,11,12 Telescope Protons 9-15 MeV	4-byte float	[0.,10^{5}]	p/(cm^2*s*sr*MeV)
p4	GOES-10,11,12 Dome Protons 15-40 MeV	4-byte float	[0.,10^{5}]	p/(cm^2*s*sr*MeV)
p5	GOES-10,11,12 Dome Protons 38-82 MeV	4-byte float	[0.,10^{5}]	p/(cm^2*s*sr*MeV)
p6	GOES-10,11,12 Dome Protons 84-200 MeV	4-byte float	[0.,10^{5}]	p/(cm^2*s*sr*MeV)
p7	GOES-10,11,12 Dome Protons 110-900 MeV	4-byte float	[0.,10^{5}]	p/(cm^2*s*sr*MeV)
p8	GOES-10,11,12 High Energy Proton and Alpha Detector (HEPAD) Protons 330-420 MeV	4-byte float	[0.,10^{5}]	p/(cm^2*s*sr*MeV)
p9	GOES-10,11,12 High Energy Proton and Alpha Detector (HEPAD) Protons 420-510 MeV	4-byte float	[0.,10^{5}]	p/(cm^2*s*sr*MeV)
p10	GOES-10,11,12 High Energy Proton and Alpha Detector (HEPAD) Protons 510-700 MeV	4-byte float	[0.,10^{5}]	p/(cm^2*s*sr*MeV)
p11	GOES-10,11,12 High Energy Proton and Alpha Detector (HEPAD) Protons >700 MeV	4-byte float	[0.,10^{5}]	p/(cm^2*s*sr*MeV)
a1	GOES-10,11,12 Telescope Alpha Particles 4-10 MeV	4-byte float	[0.,10^{5}]	a/(cm^2*s*sr*MeV)
a2	GOES-10,11,12 Telescope Alpha Particles 10-21 MeV	4-byte float	[0.,10^{5}]	a/(cm^2*s*sr*MeV)
a3	GOES-10,11,12 Telescope Alpha Particles 21-61 MeV	4-byte float	[0.,10^{5}]	a/(cm^2*s*sr*MeV)
a4	GOES-10,11,12 Dome Alpha Particles 60-160	4-byte float	[0.,10^{5}]	a/(cm^2*s*sr*MeV)

	MeV			
a5	GOES-10,11,12 Dome Alpha Particles 160-260 MeV	4-byte float	[0.,10^5]	a/(cm^2*s*sr*MeV)
a6	GOES-10,11,12 Dome Alpha Particles 330-500 MeV	4-byte float	[0.,10^5]	a/(cm^2*s*sr*MeV)
a7	GOES-10,11,12 High Energy Proton and Alpha Detector (HEPAD) Alphas 2560-3400 MeV	4-byte float	[0.,10^5]	a/(cm^2*s*sr*MeV)
a8	GOES-10,11,12 High Energy Proton and Alpha Detector (HEPAD) Alphas >3400 MeV	4-byte float	[0.,10^5]	a/(cm^2*s*sr*MeV)
ce1	GOES-10,11,12 Electron Flux > 0.6 MeV	4-byte float	[0.,10^{15}]	e/(cm^2*s*sr)
ce2	GOES-10,11,12 Electron Flux > 2 MeV	4-byte float	[0.,10^{15}]	e/(cm^2*s*sr)
ce3	GOES-10,11,12 Electron Flux > 4 MeV	4-byte float	[0.,10^{15}]	e/(cm^2*s*sr)
cp1	GOES-10,11,12 Corrected Telescope Protons 0.7-4 MeV.	4-byte float	[0.,10^5]	p/(cm^2*s*sr)
cp2	GOES-10,11,12 Corrected Telescope Protons 4-9 MeV.	4-byte float	[0.,10^5]	p/(cm^2*s*sr)
cp3	GOES-10,11,12 Corrected Telescope Protons 9-15 MeV.	4-byte float	[0.,10^5]	p/(cm^2*s*sr)
cp4	GOES-10,11,12 Corrected Dome Protons 15-40 MeV.	4-byte float	[0.,10^5]	p/(cm^2*s*sr)
cp5	GOES-10,11,12 Corrected Dome Protons 38-82 MeV.	4-byte float	[0.,10^5]	p/(cm^2*s*sr)
cp6	GOES-10,11,12 Corrected Dome Protons 84-200 MeV.	4-byte float	[0.,10^5]	p/(cm^2*s*sr)
cp7	GOES-10,11,12 Corrected Dome Protons 110-900 MeV.	4-byte float	[0.,10^5]	p/(cm^2*s*sr)
cpgt1	GOES-10,11,12 Corrected Protons >1 MeV	4-byte float	[0.,10^7]	p/(cm^2*s*sr)
cpgt5	GOES-10,11,12 Corrected Protons >5 MeV	4-byte float	[0.,10^7]	p/(cm^2*s*sr)
cpgt10	GOES-10,11,12 Corrected Protons >10	4-byte float	[0.,10^7]	p/(cm^2*s*sr)

	MeV			
cpgt30	GOES-10,11,12 Corrected Protons >30 MeV	4-byte float	[0.,10^7]	p/(cm^2*s*sr)
cpgt50	GOES-10,11,12 Corrected Protons >50 MeV	4-byte float	[0.,10^7]	p/(cm^2*s*sr)
cpgt60	GOES-10,11,12 Corrected Protons >60 MeV	4-byte float	[0.,10^7]	p/(cm^2*s*sr)
cpgt100	GOES-10,11,12 Corrected Protons >100 MeV	4-byte float	[0.,10^7]	p/(cm^2*s*sr)
cpgt350	GOES-10,11,12 Corrected Protons >350 MeV	4-byte float	[0.,10^5]	p/(cm^2*s*sr*MeV)
cpgt420	GOES-10,11,12 Corrected Protons >420MeV	4-byte float	[0.,10^5]	p/(cm^2*s*sr*MeV)
cpeq5	GOES-10,11,12 Corrected Protons 5 MeV	4-byte float	[0.,10^5]	p/(cm^2*s*sr)
cpeq15	GOES-10,11,12 Corrected Protons 15 MeV	4-byte float	[0.,10^5]	p/(cm^2*s*sr)
cpeq30	GOES-10,11,12 Corrected Protons 30 MeV	4-byte float	[0.,10^5]	p/(cm^2*s*sr)
cpeq50	GOES-10,11,12 Corrected Protons 50 MeV	4-byte float	[0.,10^5]	p/(cm^2*s*sr)
cpeq60	GOES-10,11,12 Corrected Protons 60 MeV	4-byte float	[0.,10^5]	p/(cm^2*s*sr)
cpeq100	GOES-10,11,12 Corrected Protons 100 MeV	4-byte float	[0.,10^5]	p/(cm^2*s*sr)
ca1	GOES-10,11,12 Corrected Telescope Alpha Particles 4-10 MeV	4-byte float	[0.,10^5]	a/(cm^2*s*sr*MeV)
ca2	GOES-10,11,12 Corrected Telescope Alpha Particles 10-21 MeV	4-byte float	[0.,10^5]	a/(cm^2*s*sr*MeV)
ca3	GOES-10,11,12 Corrected Telescope Alpha Particles 21-61 MeV	4-byte float	[0.,10^5]	a/(cm^2*s*sr*MeV)
ca4	GOES-10,11,12 Corrected Dome Alpha Particles 60-160 MeV	4-byte float	[0.,10^5]	a/(cm^2*s*sr*MeV)
ca5	GOES-10,11,12	4-byte	[0.,10^5]	a/(cm^2*s*sr*MeV)

	Corrected Dome Alpha Particles 160-260 MeV	float		
ca6	GOES-10,11,12 Corrected Dome Alpha Particles 330-500 MeV	4-byte float	[0.,10^5]	a/(cm^2*s*sr*MeV)
cagt2560	GOES-10,11,12 Corrected Alpha Particles 2560-3400 MeV	4-byte float	[0.,10^5]	a/(cm^2*s*sr*MeV)
cagt3400	GOES-10,11,12 Corrected Alpha Particles >3400 MeV	4-byte float	[0.,10^5]	a/(cm^2*s*sr*MeV)

4. Tracking status

View name: **goesi_tracking_status**

Data Retention: no history retained. The latest status is available

Column name	Description	Type	Range	Units
Instrument	Instrument sensor on GOES I-series satellite	String	'Magnetometer' 'X-rays' 'Protons' 'Electrons'	
PrimarySat	The Primary GOES I-series satellite for a particular instrument sensor	1-byte integer	10,11,12	
SecondarySat	The Primary GOES I-series satellite for a particular instrument sensor	1-byte integer	10,11,12	
TertiarySat	The Primary GOES I-series satellite for a particular instrument sensor	1-byte integer	10,11,12	

5. Housekeeping

Documentation: ?

5-minute averaged data:
View names: **goes10_5m**, **goes11_5m**, **goes12_5m**
Data Retention: 60 days

Column name	Description	Type	Range	Units
time_tag	Time of data for GOES-10,11,12 housekeeping [1]	Date/time	[5]	
ssd_sngl1	GOES-10,11,12 (HEPAD) Solid State Detector single channel #1 count rate	4-byte float	[0.,1.0e+5]	counts/sec
ssd_sngl2	GOES-10,11,12 (HEPAD) Solid State Detector single channel #2 count rate	4-byte float	[0.,1.0e+5]	counts/sec
ssd_sngl3	GOES-10,11,12 (HEPAD) Solid State Detector single channel #3 count rate	4-byte float	[0.,1.0e+5]	counts/sec
ssd_sngl4	GOES-10,11,12 (HEPAD) Solid State Detector single channel #4 count rate	4-byte float	[0.,1.0e+5]	counts/sec
ssd_sngl5	GOES-10,11,12 (HEPAD) Solid State Detector single channel #5 count rate	4-byte float	[0.,1.0e+5]	counts/sec

6. Events

6.1. X-rays

Documentation: ?

View names: **goesi_xray_events**
Data Retention: 60 days

Column name	Description	Type	Range	Units
curr_time	Time of observation [1]	Date/time	[5]	
sat_num	GOES-10,11,12 satellite number	1-byte integer	[10,12]	

begin_time	Begin Time of event[1]	Date/time	[5]	
max_time	Time of event where maximum flux was reached[1]	Date/time	[5]	
end_time	End Time of event[1]	Date/time	[5]	
current_xrlong	Value of the long (1-8 A) x-ray flux at the Current Time	4-byte float	[1.e-1, 1.e-10]	Watts/m^2
begin_xrlong	Value of the long (1-8 A) x-ray flux at the Beginning of the flare	4-byte float	[1.e-1, 1.e-10]	Watts/m^2
max_xrlong	Value of the long (1-8 A) x-ray flux at the time when the flare reached peak flux	4-byte float	[1.e-1, 1.e-10]	Watts/m^2
end_xrlong	Value of the long (1-8 A) x-ray flux at the End of the flare	4-byte float	[1.e-1, 1.e-10]	Watts/m^2
current_xrshort	Value of the short (.5-4 A) x-ray flux at the Current Time	4-byte float	[1.e-1, 1.e-10]	Watts/m^2
begin_xrshort	Value of the short (.5-4 A) x-ray flux at the Beginning of the flare	4-byte float	[1.e-1, 1.e-10]	Watts/m^2
max_xrshort	Value of the short (.5-4 A) x-ray flux at the End of the flare	4-byte float	[1.e-1, 1.e-10]	Watts/m^2
end_xrshort	Value of the short (.5-4 A) x-ray flux at the time when the flare reached peak flux	4-byte float	[1.e-1, 1.e-10]	Watts/m^2
max_temp	Maximum Temperature of the flare in Kelvin	4-byte float	[6.,20.]	LOG_{10}(Kelvin)
max_emission_meas	Maximum Emission Measured from the flare	4-byte float	[42.,60.]	$LOG_{10}(cm^{-3})$
current_xratio	Ratio of short x-rays to long x-rays at the Current Time	4-byte float	[1.e-5, 0.999]	
begin_xratio	Ratio of short x-rays to long x-rays at the Begin Time of the flare	4-byte float	[1.e-5, 0.999]	
max_xratio	Ratio of short x-rays to long x-rays at the Time of the peak flux of the flare	4-byte float	[1.e-5, 0.999]	
end_xratio	Ratio of short x-rays to long x-rays at the End Time of the flare	4-byte float	[1.e-5, 0.999]	
integrate_long_flux	Long x-ray flux integrated over the time of the flare	4-byte float	[1.e-1, 1.e-10]	Joules/m^2
integrated_short_flux	Short x-ray flux integrated over the time of the flare	4-byte float	[1.e-1, 1.e-10]	Joules/m^2
xray_class	Class of the flare 1e-8 <= A < 1e-7 <= B < 1e-6 <= C < 1e-5 <= M < 1e-4 <= X	Variable 5-byte char	[A1.0, X1000.0]	

7. Location

Documentation: ?

View names: **goesi_satellite_locations**
Data Retention: 120 days

Column name	Description	Type	Range	Units
time_tag	Time of observation[1]	Date/time	[5]	
goes_10	GOES-10 longitude position calculated from orbital elements	1-byte integer	[0,180]	degrees west longitude
goes_11	GOES-11 longitude position calculated from orbital elements	1-byte integer	[0,180]	degrees west longitude
goes_12	GOES-12 longitude position calculated from orbital elements	1-byte integer	[0,180]	degrees west longitude

Polar Orbiting Environmental Satellites (POES) – NOAA-15,-16,-17,-18 and METOP-02

Instruments:

1. Space Environment Monitor (SEM) 2 – Total Energy Detector (TED)

   Documentation: http://poes.ngdc.noaa.gov/docs/sem2_docs/2006/SEM2v2.0.pdf

   View name: **poes_ted**
   Data Retention: all data available

Column name	Description	Type	Range	Units
time_tag	Time of data for TED data [1]	Date/time	[5]	
satnum	POES satellite number for TED record	2-byte char	[02,15,16,17,18]	
pp_num	Polar pass number for TED record	2-byte int	[0,31]	
rec	Number of records	2-byte int	[1,?]	
flux	TED Energy Flux	4-byte float	[0. ,700.]	milliwats/m^2
ss_lat	POES spacecraft latitude	4-byte float	[-90.,90.]	deg
ss_lon	POES spacecraft longitude	4-byte float	[0.,360.]	deg
fofl_lat	POES spacecraft latitude	4-byte float	[-90.,90.]	deg
fofl_lon	POES spacecraft longitude	4-byte float	[0.,360.]	deg
dipml	??	4-byte float	??	??
corml	??	4-byte float	??	??
mlt	Magnetic Local Time	4-byte float	[0.,360.]	deg
prot_pct	TED Percent Protons	2-byte int	[0,100]	
char_e_energy	TED Characteristic electron energy	8-byte int	[0,20000]	eV
char_p_energy	TED Characteristic proton energy	8-byte int	[0,20000]	eV

2. Space Environment Monitor (SEM) 2 – Total Energy Detector (TED) and Medium Energy Proton and Electron Detector (MEPED)

16-second data:

View names: **poes15_16s**, **poes16_16s**, **poes17_16s**, **poes18_16s**, **metop02_16s**
Data Retention: 27 days

Column name	Description	Type	Range	Units
time_tag	Time of data for NOAA-15 16-second data [1]	Date/time	[5]	
sc_lat	NOAA-15 spacecraft latitude	4-byte float	[-90.,90.]	deg
sc_lon	NOAA-15 spacecraft longitude	4-byte float	[0.,360.]	deg
fofl_lat	NOAA-15 spacecraft latitude	4-byte float	[-90.,90.]	deg
fofl_lon	NOAA-15 spacecraft longitude	4-byte float	[0.,360.]	deg
l_value	L-value	4-byte float	[0.93,19.99]	
mlt	Magnetic Local Time	4-byte float		deg
ns_dir	NOAA-15 Satellite North or South Bound	2-byte char	[NB,SB]	
pa0	NOAA-15 MEPED 0 deg telescope PA	4-byte float	[-180.,180.]	deg
pa90	NOAA-15 MEPED 90 deg telescope PA	4-byte float	[-180.,180.]	deg
mep_tel_e1_0	NOAA-15 >30 keV electrons (0 deg)	4-byte float	[0.,2.x10^6]	counts/s
mep_tel_e2_0	NOAA-15 >100 keV electrons (0 deg)	4-byte float	[0.,2.x10^6]	counts/s
mep_tel_e3_0	NOAA-15 >300 keV electrons (0 deg)	4-byte float	[0.,2.x10^6]	counts/s
mep_tel_p1_0	NOAA-15 30 - 80 keV protons (0 deg)	4-byte float	[0.,2.x10^6]	counts/s
mep_tel_p2_0	NOAA-15 80 - 250 keV protons (0 deg)	4-byte float	[0.,2.x10^6]	counts/s
mep_tel_p3_0	NOAA-15 250 - 800 keV protons (0 deg)	4-byte float	[0.,2.x10^6]	counts/s
mep_tel_p4_0	NOAA-15 800 - 2500 keV protons (0 deg)	4-byte float	[0.,2.x10^6]	counts/s
mep_tel_p5_0	NOAA-15 2500-6900 keV protons (0 deg)	4-byte float	[0.,2.x10^6]	counts/s
mep_tel_p6_0	NOAA-15 >6900 keV protons (0 deg)	4-byte float	[0.,2.x10^6]	counts/s
mep_tel_e1_90	NOAA-15 >30 keV	4-byte	[0.,2.x10^6]	counts/s

	electrons (90 deg)	float		
mep_tel_e2_90	NOAA-15 >100 keV electrons (90 deg)	4-byte float	[0.,2.x10^6]	counts/s
mep_tel_e3_90	NOAA-15 >300 keV electrons (90 deg)	4-byte float	[0.,2.x10^6]	counts/s
mep_tel_p1_90	NOAA-15 30 - 80 keV protons (90 deg)	4-byte float	[0.,2.x10^6]	counts/s
mep_tel_p2_90	NOAA-15 80 - 250 keV protons (90 deg)	4-byte float	[0.,2.x10^6]	counts/s
mep_tel_p3_90	NOAA-15 250 - 800 keV protons (90 deg)	4-byte float	[0.,2.x10^6]	counts/s
mep_tel_p4_90	NOAA-15 800 - 2500 keV protons (90 deg)	4-byte float	[0.,2.x10^6]	counts/s
mep_tel_p5_90	NOAA-15 2500-6900 keV protons (90 deg)	4-byte float	[0.,2.x10^6]	counts/s
mep_tel_p6_90	NOAA-15 >6900 keV protons (90 deg)	4-byte float	[0.,2.x10^6]	counts/s
mep_omni_p6	NOAA-15 16 - 70 MeV omni protons	4-byte float	[0.,5.x10^5]	counts/s
mep_omni_p7	NOAA-15 37 - 70 MeV omni protons	4-byte float	[0.,5.x10^5]	counts/s
mep_omni_p8	NOAA-15 70 - 235 MeV omni protons	4-byte float	[0.,5.x10^5]	counts/s
mep_omni_p9	??	4-byte float	[0.,5.x10^5]	counts/s
ted_flux	NOAA-15 TED Energy Flux	4-byte float	[0.,700]	milliwatts/m^2
ted_char_e_energy	NOAA-15 TED Characteristic electron energy	8-byte int	[0,20000]	eV
ted_char_p_energy	NOAA-15 TED Characteristic proton energy	8-byte int	[0,20000]	eV
pct_e_contrib	NOAA-15 Percent electron contribution	4-byte float	[0.,100.]	

3. Polar Pass

Documentation: http://poes.ngdc.noaa.gov/docs/sem2_docs/2006/SEM2v2.0.pdf

View name: **poes_polar_pass**
Data Retention: all data available

Column name	Description	Type	Range	Units
time_tag	Time of data for Polar Pass [1]	Date/time	[5]	

satnum	POES satellite number	2-byte char	[02,15,16,17,18]	
pp_num	Polar pass number	2-byte int	[0,31]	
inclin	Inclination			
nrec	Number of records			
power	Estimated Hemispheric Power	4-byte real	[0.,1000.]	GigaWatts
activity	Auroral Activity Index	2-byte int	[1,10]	
bnorm	Normalizing Factor	4-byte real	[0.,10.]	
hemisphere	Hemisphere of Satellite	1-byte char	[N,S]	
ns_dir	Satellite North or South Bound	2-byte char	[NB,SB]	
center_time				

4. Hemispheric Power Information

Documentation: http://poes.ngdc.noaa.gov/docs/sem2_docs/2006/SEM2v2.0.pdf
View name: **poes_hemispheric_pwr**
Data Retention: all data available

Column name	Description	Type	Range	Units
time_tag	Time of data for Hemispheric Power [1]	Date/time	[5]	
satnum	POES satellite number	2-byte char	[02,15,16,17,18]	
hemisphere	Hemisphere of Satellite	1-byte char	[N,S]	
power	Estimated Hemispheric Power	4-byte real	[0.,1000.]	GigaWatts
activity	Auroral Activity Index	2-byte int	[1,10]	
bnorm	Normalizing Factor	4-byte real	[0.,10.]	

[1] Format depends on the client software. Could return e.g. 1/12/2008 1:05:00 AM, 2008-01-12 01:05:00.000 or several other options. The time is stored as a 16-byte integer of milliseconds since 1900 AD on SQL Server and the time format upon retrieval is usually set in the ODBC driver configuration.

[2] Data Status Flag : 0 = nominal data, 1 to 8 = bad data record, 9 = no data

[3] Quality Flag for Predicted 15-minute Kp:
0 = nominal solar wind input data, 1 to 5 = incomplete input data, but model output available, >5 = incomplete input data, no model output

[4] Quality Flag for Derived 3-hour Kp :

[5] Time range of data are defined by the client but are asked to be kept to reasonable lengths. See “Best Practices” in the E-SWDS User Guide.