University of Calgary

eDEx User Manual

e-POP Data Explorer

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Introduction

The e-POP Data Explorer (eDEx) was developed in order to help sort through data files from the e-POP science mission. Please visit http://epop.phys.ucalgary.ca for more information aout the CASSIOPE / e-POP mission.

A need was identified to have an ability to correlate e-POP data files between different instruments, spacecraft parameters, and geophysical parameters.

The eDEx software is an interface to a database which collects information from the e-POP science files, CASSIOPE ephemeris files, and geophysical parameters.

The design of this tool has been guided by the principles of allowing much flexibility and power while still allowing users to interact with it without a lot of training or education.

Software Overview

Every day the eDEx Database is updated with geophysical parameters collected from the OMNI2 data set, science data from e-POP, and ephemeris data from the CASSIOPE spacecraft. The CASSIOPE / e-POP data is processed up to one week in arrears in order to ensure the data has settled, and allow processing to complete before adding the information to the database.

Software Requirements

The eDEx software is a standalone Java application, designed to be executed on a personal computer and provide controlled interaction with the database. Versions are released for Windows 32-bit, Windows 64-bit, Mac OSx, Linux 32-bit, Linux 64-bit. The software requirements are summarized below:

- eDEx Software Program (http://epop.phys.ucalgary.ca/data.html)
- Java 1.8
- FTP connection available over port 21 to epop-cssdp.phys.ucalgary.ca
- SQL connection available over port 3306 to epop-cssdp.phys.ucalgary.ca

eDEx software is made available for 32 and 64 bit windows, mac osX, and 32 and 64 bit Linux.

Running eDEx Software

Command Line Option

Ground Targets may be defined in a file (More information in Target Files). Target files may be loaded at execution time by adding the command line option –t "Path/to/File.txt" "Path/to/file2.txt"

Windows

The windows jar file may be executed by double clicking the jar file. It may also be executed from a command line, similar to the Linux option listed below.

Mac OSx

The eDEx program may be executed from a terminal:

```
java -XstartOnFirstThread -jar eDEx_v1_00_macosx.jar
```

Or

```
java -XstartOnFirstThread -jar eDEx_v1_00_macosx.jar –t "Path/to/TargetFile.txt"
```

Linux

The eDEx program may be executed from the terminal:

```
java -jar eDEx_v1_00_macosx.jar –t "Path/to/TargetFile.txt"
```
Interface Overview

Upon startup the software does a check to ensure that it is the latest version. If a newer version is available a dialog window is displayed (Figure 1).
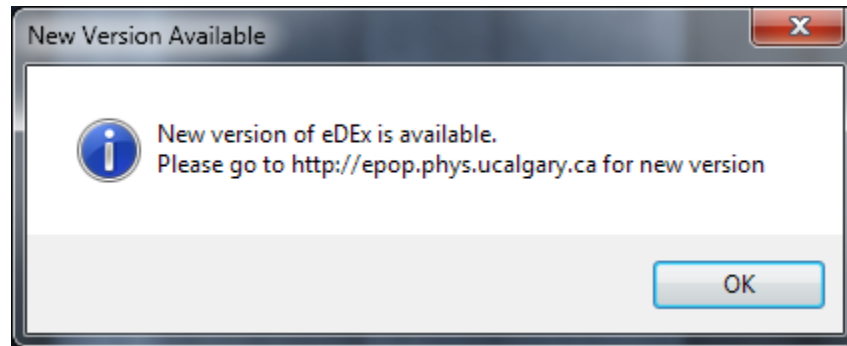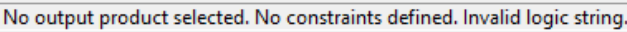

FIGURE 1 – NEW VERSION AVAILABLE

FIGURE 2 – E-POP DATA EXPLORER

Figure 2 shows the starting window of the eDEx interface.

Output Product Selection

FIGURE 3 - OUTPUT PRODUCT SELECTION

The top section of the window with the title "Output Product Selection" is used to define desired resulting files. Possible output products are listed on the two boxes on the left sorted by instrument group. At least one product must be selected for a data result.

The product selection subset box allows for multiple selection. Currently selected products are listed on the right hand side of the section. The buttons between the two sets of boxes modify the currently selected product list.

- "Add to results" adds the currently selected products to the showing what products will be returned.
- "Remove from results" removes the currently selected products from the list of products that will be returned.
- "Remove All" removes all of the selected output products.

Date Range Constraint

FIGURE 4 – DATE RANGE CONSTRAINT

Figure 4 shows the entry fields for a date range constraint. A start date and end date is specified, in any of the following year-month-day formats: 160718, 16-07-18, 16-JUL-18, 16/07/18, 16/JUL/18, 16\07\18, 16\JUL\18, 16.07.18, 16.JUL.18, 20160718, 2016-07-18, 2016-JUL-18, 2016/07/18, 2016/JUL/18, 2016\07\18, 2016\JUL\18, 2016.07.18, 2016.JUL.18

The earliest date allowed is the first date of CASSIOPE data. Any entry that is earlier than that will be replaced with the launch date of 2013-09-30. If the end date is equal to the start date, the date range will be only that one day. The end date needs to be chronologically after than the start day.

There are two buttons with the date boxes.

- "Add Constraint" adds the date range constraint to list of active constraints. (Explained in Active Constraints)

- "Update Constraint" updates the selected constraint with the entered date information (Explained in Update Constraints)
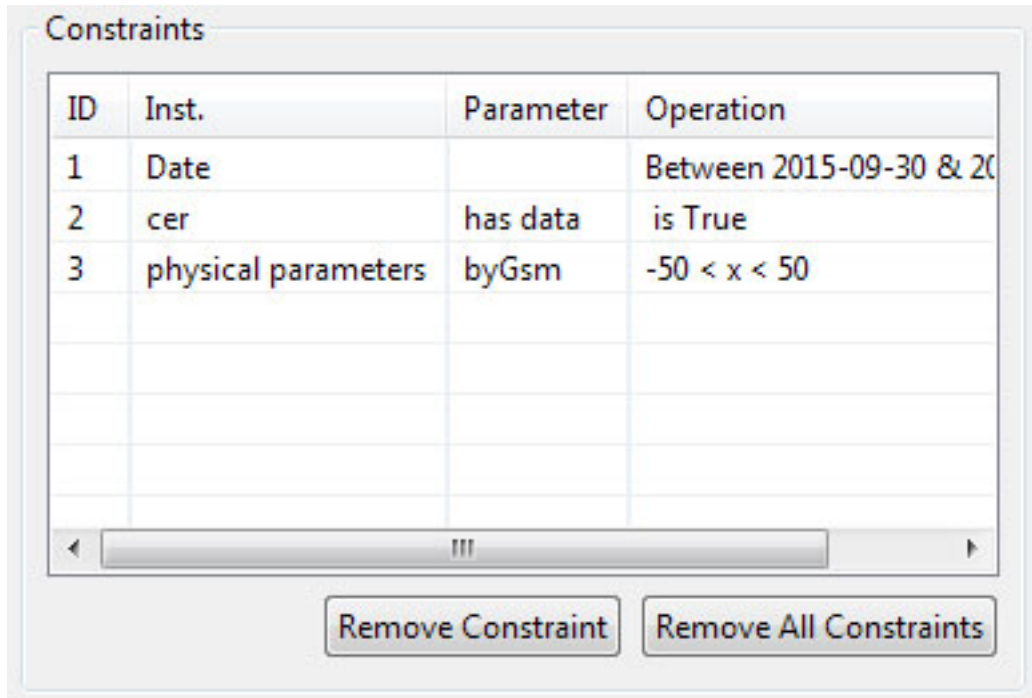
Other Constraints

FIGURE 5 - INSTRUMENT CONSTRAINTS

Figure 5 shows a sample of the parameters that may be used for a constraint. The leftmost column is a list of e-POP instruments, including a list of physical parameters (as shown in Figure 5), e-POP ephemeris data (listed in "spacecraft parameters"), and possibility lists of targets (More information in Target Files). Once an instrument is selected, a list of possible parameters is provided in the middle column. After selecting a parameter, the rightmost column shows either a list of discrete options or a list of operations available to be executed against values. Depending on the operator selection, the lower and upper range boxes will be activated as needed.

There are three buttons associated with this input group:

- "Load Target File" opens a dialog for loading a target file into the instrument list.
- "Add Constraint" adds the constraint to the list of active constraints. (Explained in Active Constraints)
- "Update Constraint" updates the selected constraint with the entered constraint information. (Explained in Update Constraints)

Active Constraints

FIGURE 6 - ACTIVE CONSTRAINTS

As constraints are added, they are added to the constraint list as shown in Figure 6. Each item in the list is selectable and selecting any constraint starts the update constraint process (Update Constraints) as well as the "Remove Constraint" process.
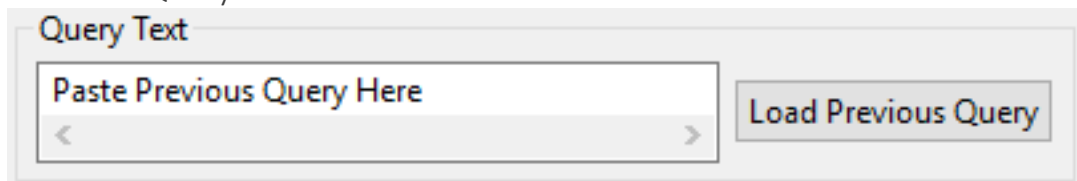
There are two buttons associated with the active constraints group:

- "Remove Constraint" once a constraint is selected from the table, the remove constraint button is active. This removes the constraint from the table.
- "Remove All Constraints" will remove all constraints from the table.

Update Constraints

Selecting a constraint from the list of active constraints populates the fields in the constraint entry fields with the values defined in the constraint. This allows for the adjustment of the constraint. Changes may be made by modifying the range values, or by replacing the constraint with something else entirely. Once the new constraint is defined, the "Update Constraint" button will replace the selected Active Constraint with the new values.

Load Previous Query

FIGURE 7 - LOAD PREVIOUS QUERY

Each time a database query is run, this text field is updated with a query text. The query text starts with "FETCH" and includes a "WHERE" clause. This same query text is included in the report file included with each result file archive or when the result file list is saved locally. If a previous query is pasted in the text field and the "Load Previous Query" button is pressed, the previous query will be loaded into the interface. This will overwrite the selected products, constraints, and custom query logic with the pasted values.
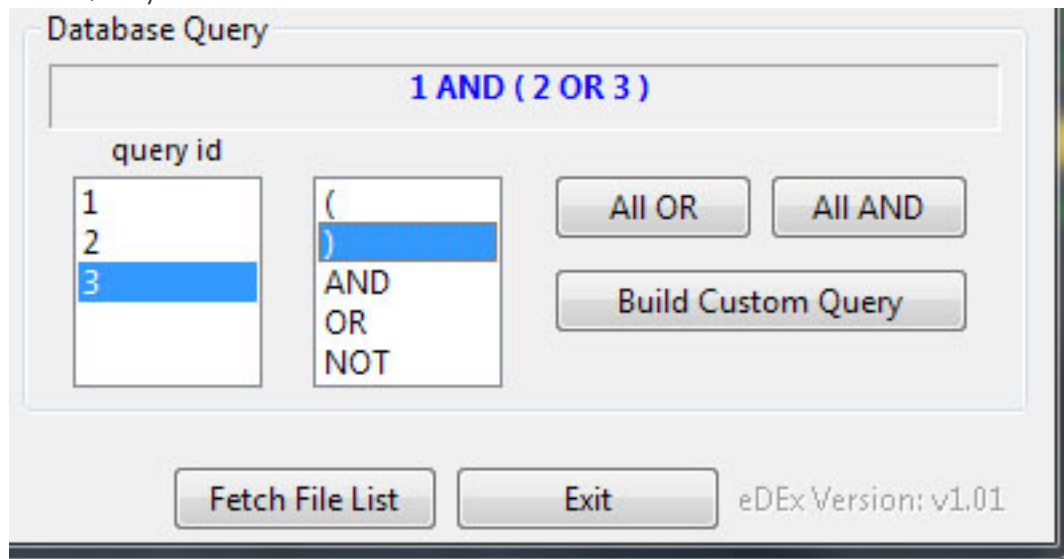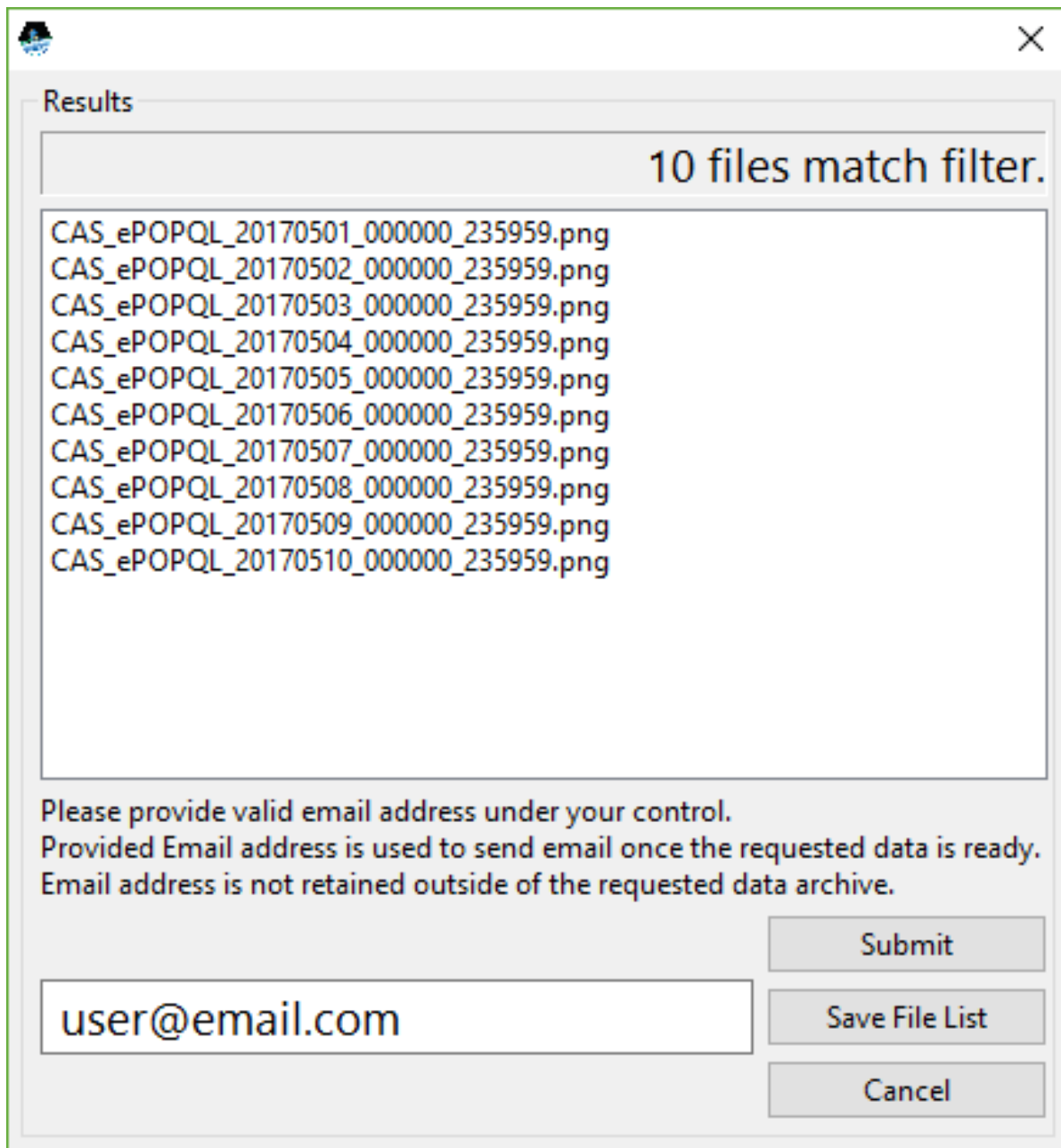
Database Query

FIGURE 8 - DATABASE QUERY

Figure 7 shows the lower right section of the interface. This section of the interface uses the active constraints and Boolean operators and logic to put together the database query. As constraints are added, the query text will reflect the new constraint added.

The buttons shown in Figure 7 are described below:

- "All OR" will rebuild the query to be all the constraints joined by OR statements. (i.e. 1 OR 2 OR 3)
- "All AND" will rebuild the query to be all the constraints joined by AND statements. (i.e. 1 AND 2 AND 3)
- "Build Custom Query" activates the two list boxes. The left box has the constraint ids corresponding to the active constraints, the right box has the Boolean logic operators to build a query. An example of a custom query is shown in Figure 7: 1 AND (2 OR 3)
- "Fetch File List" once output products, constraints, and database query have been defined, this will trigger the results dialog (explained further in Results Window)
- "Exit". This button closes the program.

Results Window

FIGURE 9 - RESULTS WINDOW

Once result products, constraints, and a query are defined; the "Fetch File List" button may be used to submit the query to the database hosted at the University of Calgary. After a short period of time, typically a few seconds, the results window will be displayed, similar to Figure 8.

Should it be desired, the file list can be saved to the local computer without submitting the query for retrieval.

This window allows a first look at the filenames which match the defined constraints. In order to receive the files, an email address must be provided. An email will be generated from the data server host with retrieval

instructions. Emails will be sent from [esoc@phys.ucalgary.ca.](mailto:esoc@phys.ucalgary.ca) This is a live email address which can accept responses.

Target Files

Target files may be created to name latitude, longitude, and altitude ranges. The name of the file will be the group name of the targets listed in the interface. Any lines which start with a '#' are treated as comments and are not processed. Target lines are space separated, and are of one of the two following formats.

No altitude constraint

- TARGET_NAME (no spaces)
- MinLatitude
- MaxLatitude
- MinLongitude
- MaxLongitude

With an altitude constraint

- TARGET_NAME (no spaces)
- MinLatitude
- MaxLatitude
- MinLongitude
- MaxLongitude
- MinAltitude
- MaxAltiude

Example File Segment

 # Default Targets File
 # Comment lines start with '#'
#
 # Latitude and Longitude are geographic
 # Altitude range is optional.
 # Target name must not include spaces
#
 # TARGET_NAME MinLatitude MaxLatitude MinLongitude MaxLongitude <MinAltitude> <MaxAltitude>
 # ---------- ---------- ---------- ----------- ----------- ------------ ------------
SSK_Beam7   65   75   -86   -76   940   990
Arecibo   13   23   -71   -61
Churchill   53   63   -99   -89