Reading Delta-T logger data files with IDL

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Introduction

Delta-T produce a very popular line of loggers including the DL2e data logger. The data stored on these devices can be downloaded from the logger in a binary format using software provided by Delta-T. This data can then be converted into an ASCII text format using the Data File Viewer supplied by Delta-T. However, the only format to which this data file can be converted is Excel 97, and this requires that Excel is installed on the same computer that the Delta-T software is installed on. This is not always the case, as the computer on which the Delta-T software is installed on is likely to be a laptop dedicated to obtaining data from loggers in the field.

This document describes an IDL routine called `READ_DELTA_T_FILE` which will read data from this file and allow it to be manipulated in IDL. The rest of this document will explain how to use this routine.

Usage

To use this routine, call it in the following manner:

```
READ_DELTA_T_FILE, filename, year, header=header,
ch_header=ch_header, datetimes=datetimes, data=data
```

The year parameter allows the year of the data collection to be specified. The Delta-T logger does not record the year as part of its timestamps, so to get a proper date the year has to be manually specified when reading the data.

The routine will run silently, and will only output messages if an error occurs. Once the routine has finished running, the `header` and `ch_header` structures will contain header information from the file, and the `datetimes` and `data` variables will contain the data. In the tables below *NC* stands for the number of channels and *NR* stands for the number of readings.

The `header` structure contains the following fields:

Field	Description	Type
`device_string`	The type of device collecting the data. Normally "DELTA-T LOGGER"	String
`program_name`	The name of the program which was running on the logger when this data was collected	String
`start_date`	The starting date of the data (stored in Julian datetime format)	Double
`end_date`	The ending date of the data (stored in Julian datetime format)	Double
`mode`	The mode the logger was operating in when the data was collected	String

The `ch_header` structure contains details about the independent variables as follows:

Field	Description	Type
`channel_numbers`	The numbers of each of the channels used	Integer[NC]
`sensor_codes`	The sensor code for each of the channels	String[NC]
`labels`	The label given to each of the channels	String[NC]
`units`	The units given to each of the channels	String[NC]
`min_values`	The minimum value of each of the channels	Double[NC]
`max_values`	The maximum value of each of the channels	Double[NC]

The variables which are returned are listed below:

Variable	Description	Type
`datetimes`	The datetime of each reading (stored in Julian datetime format)	Double[NR]
`data`	The data for each channel and each reading	Double[NR, NC]