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Read and Write Data

Some common text formats (at CEDA)

What is a good text format?

A good text format should:

- be well-described following a clear format specification
- contain appropriate metadata to enable:
  - scientific understanding
  - Interpretation and usage

Text formats at CEDA

At CEDA we have adopted two such formats over the years:

1. NASA Ames
   - A set of well-described sub-formats to handle 1-dimensional to 4-dimensional data

2. BADC-CSV
   - A simple comma-separated format aimed at facilitating data preparation, submission and usage.

NASA Ames format: Overview

An ASCII (text) format developed in late 1980s to **facilitate the data exchange** between the participants and allow **shared use of a minimised amount of software** to analyse and display different datasets.

Developed with the requirements:

- **portable** - readable on any machine by any language;
- **self-describing** - the data had to include a header containing all the information needed to read, understand and interpret;
- **readable by humans** - to retain the benefit of its self-description.

NASA Ames is well suited to field campaigns involving several teams that need to share their observations.

Example NASA Ames file

```
36  1001
De Rudder, Anne
Rutherford Appleton Laboratory, Chilton OX11 0QX, UK - Tel.: +44 (0) 1235 445837
US Standard Atmosphere 1976
NERC Data Grid (NDG) project
1  13
1976 01 01  2002 10 30
0
Pressure (hPa)
2
1.E+12       1
1.E+08       1000
Total concentration (cm-3)
Temperature (degrees K)
8
Example of FFI 1001 (a).
This example illustrating NASA Ames file format index 1001 is based on the US Standard
Atmosphere 1976 as quoted in G. Brasseur and S. Solomon, Aeronomy of the Middle
Atmosphere, Reidel, 1984 (p. 46). It provides typical values of middle latitude averaged air
concentration and temperature as a function of height (expressed here as the pressure
level). The first date on line 7 (1st of January 1976) is fictitious since the parameters are
yearly averages. We have inserted 3 additional lines into the original table near the tropo-
pause and stratopause levels, to illustrate the use of the "missing value" flags (see line 12).
12
The files included in this data set illustrate each of the 9 NASA Ames file format indices
(FFI). A detailed description of the NASA Ames format can be found on the Web site of the
British Atmospheric Data Centre at http://www.badc.rl.ac.uk/help/formats/NASA-Ames/
E-mail contact: badc@rl.ac.uk
Reference: S. E. Gaines and R. S. Hipskind, Format Specification for Data Exchange,
Version 1.3, 1998. This work can be found at
http://cloud1.arc.nasa.gov/solve/archiv/archive.tutorial.html and a copy of it at
http://www.badc.rl.ac.uk/help/formats/NASA-Ames/G-and-H-June-1998.html

  Pressure    Concentration Temperature
    (mb)         (cm-3)          (K)

   1.0133E+03     2.55E+07          288
   5.4050E+02     1.53E+07          256
   2.6500E+02     8.61E+06          223
   1.2110E+02     4.04E+06          217
   8.0000E+01     1.00E+08         1000
   5.5300E+01     1.85E+06          217
   2.5500E+01     8.33E+05          222
   1.2000E+01     3.83E+05          227
   5.7000E+00     1.74E+05          237
   2.3000E+00     6.67E+04          250
   1.5000E+00     4.12E+04          264
   1.0000E+00     1.00E+08         1000
```

Header section

Data section

BADC-CSV format: Overview

- Developed as a simplified alternative to NASA-Ames.
- A record-based format (multiple records allowed).
- Each record has a short simple header and a data section.
- Format is very simple to read/write/interpret.

```
1  Conventions,G,BADC-CSV,1
2  title,G,My data file
3  creator,G,Prof W E Ather,Reading
4  contributor,G,Sam Pepler,BADC
5  creator,G, A. Pdra
6  long_name,1,time, days since 2007-03-14
7  long_name,2,air temperature
8  creator,3,unknown,Met Office
9  coordinate_variable,1,x
10 location_name,G,Rutherford Appleton Lab
11 data
12 1,2,3
13 0.8,2.4
14 1.1,3.4
```

More info

NASA Ames Specification:

http://cedadocs.badc.rl.ac.uk/73/3/G-and-H-June-1998.html

NASA Ames Overview:

http://badc.nerc.ac.uk/help/formats/NASA-Ames/

BADC-CSV Format:

http://www.ceda.ac.uk/help/users-guide/file-formats/badc-csv/