RAMS Standard Input Formats for Pressure Coordinate and Observational Data

RALPH dataset formats, Version 2 (revision 3 – 05 October 2000)

Gridded Data File

Following is a listing of the first few lines of a sample gridded level data file.

```
999999   2
1979   4   9  1200 1800  12 145  73
1    2.50    2.50   .00  -90.00    90.0      0.0   45.0    -45.0   45.0
1  1000   850   700   500   400   300   250   200   150   100    70    50
     -.117     -.071     -.024      .023      .070      .116      .162      .208
      .254      .299      .343      .387      .430      .473      .514      .555
      .594      .632      .669      .705      .740      .773      .804      .834
      .863      .890      .914      .938      .959      .980      .997     1.013
     1.028     1.039     1.050     1.058     1.064     1.068     1.071     1.071
```

Record	Field	Name	Description
1	1	999999	marker to start a new file or new section of a file
	2	version	integer - dataset version number (this version is 2)
2	1	year	integer - 4 digit year
	2	month	integer - 2 digit month
	3	date	integer - 2 digit date
	4	time	integer - 4 digit UTC data time
	5	valid time increment	integer - time past data time when data is valid (see below).
	6	# levels	integer - number of vertical levels
	7	x-points	integer - number of points in x-direction
	8	y-points	integer - number of points in y-direction
3	1	projection	integer - projection flag 1 - latitude/longitude (LL) 2 – Lambert-Conformal (LC) 3 – True polar-stereographic (PS) (currently assumes valid at 60N)
	2	x-spacing	real - grid spacing in x-direction. Units dependent on projection. • LL – degrees

			• LC - meters • PS – meters (currently at 60N)
	3	y-spacing	real - grid spacing in y-direction. Units dependent on projection. • LL – degrees • LC - meters • PS – meters (currently at 60N)
	4	projection parameter	real – projection-dependent parameter. • LL, LC, PS – SW latitude of grid (degrees)
	5	projection parameter	real – projection-dependent parameter. • LL, LC, PS – SW longitude of grid (degrees)
	6	projection parameter	real – projection-dependent parameter. • LL – unused • LC – NE latitude of grid (degrees) • PS – NE latitude of grid (degrees)
	7	projection parameter	real – projection-dependent parameter. • LL – unused • LC - NE longitude of grid (degrees) • PS - NE longitude of grid (degrees)
	8	projection parameter	real – projection-dependent parameter. • LL – unused • LC – Intersection/tangency latitude of projection(degrees) • PS – Tangency latitude of projection(degrees) (Set to 90.; only N hemisphere currently)
	9	projection parameter	real – projection-dependent parameter. • LL – unused • LC – Center longitude

			(degrees) • PS – Center longitude (degrees)
	10	projection parameter	real – projection-dependent parameter. • LL – unused • LC – Second intersection latitude(degrees). If projection is tangent, set to field 8. (not currently working; must be set to field 8) • PS - unused
4	1	level flag	integer - flag denoting vertical coordinate type. 1 - pressure (in millibars)
	2+	levels	integer - level coordinates. Units dependent on vertical coordinate type flag. Must have as many values as rec 2:field 6.

Notes:

- All data is space-delimited so that FORTRAN can do a free-format, list-directed read. C can also read it without a specific format specification.

- The time field is the data time of the gridded data or when a particular forecast was started. The valid time increment is the amount of time past the data time when a forecast data is applicable. The increment is formatted in an hhhmm (h-hours,m-minutes) format. As an example, consider the case of a 36 hour RAMS forecast starting at 1200 UTC. The initial field will have a data time of 1200 and the increment will be 0. The 12-hour forecast will have a data time of 1200 and an increment of 1200. The 36-hour forecast will have a data time of 1200 and an increment of 3600. All dates refer to the data time.

After the header information, the data is written as follows. Each variable at each level is written at a time. In FORTRAN, it is:

```
write(unit, format) ((data(i,j),i=1,num_x),j=1,num_y)
```

Each record then starts in the southwest corner (lower left) and proceeds row-wise.

Concerning the order of the data, first the lowest coordinate level is written with each variable following in the following order and units:

- east-west (u) velocity component (m/s)
- north-south (v) velocity component (m/s)
- temperature (K)
- geopotential height (m)
- relative humidity (fraction)

This set of variables is then written for each coordinate level up to the top of the data.

After the upper air data is written, five surface fields follow written in the same way as the upper level fields. These are:

- sea-level pressure (mb)
- surface pressure (mb)
- temperature (K)
- snow cover (m)
- water surface temperature (K)

NOTES:

RAMS/ISAN currently assumes that the wind components are earth-relative for the lat-lon grid and grid-relative for the Lambert-Conformal and true polar-stereographic projections.

RAMS/ISAN currently does not use the surface fields. They do not need to be on the file.

RAMS/ISAN currently ignores the time increment. Set date/time to the actual valid time and set time increment to zero.

Upper air observations file

Following is a sample of the upper air observations file:

```
999999   2
1993 09 01  0000   DRH     36  41    50.68000  -127.37000
17.00000
   99200.000  000    58.000    000    -25.46  000     .6890  000
   83000.000  000    1379.000  000    -19.26  000     .3680  000
   70000.000  000    2646.000  000    -22.26  000     .3944  000
```

```
   50000.000  000    5060.000  000    -35.86  000     .1728  000
   40000.000  000    6570.000  000    -47.06  000     .1383  000
   30000.000  000    8430.000  000    -55.46  000     .2694  000
   25000.000  000    9610.000  000    -51.46  000     .0812  000
   20000.000  000   11080.000  000    -45.86  000     .0160  000
   15000.000  000   12980.000  000    -46.06  000     .0082  000
   10000.000  000   15670.000  000    -47.06  000     .0078  000
    9100.000  000   16561.000  000    -44.66  000     .0089  000
   11080.000  000      9.20  000    235.00  000
   12980.000  000     11.80  000    235.00  000
   15670.000  000     15.90  000    250.00  000
   18030.000  000     14.40  000    250.00  000
   19200.000  000     16.40  000    275.00  000
   20230.000  000     15.90  000    265.00  000
   23520.000  000     28.30  000    290.00  000
   27000.000  000     36.50  000    290.00  000
   30490.000  000     44.30  000    300.00  000
1993 09 01  0000   YAK     36  41    50.68000  -127.37000
17.00000
  100400.000  000      40.000  000     -2.46  000     .5392  000
  100000.000  000      71.000  000     -1.46  000     .4619  000
   98800.000  000     168.000  000      -.66  000     .3353  000
   92500.000  000     692.000  000     -4.66  000     .3515  000
```

The file starts again with:

Record	Field	Name	Description
1	1	999999	marker to start a new file or new section of a file
	2	version	integer - dataset version number (this version is 2)

After this, there is a section for each observation:

Section	Field	Name	Description
header	1	year	integer - 4 digit year
	2	month	integer - 2 digit month
	3	date	integer - 2 digit date
	4	time	integer - 4 digit UTC data time
	5	station ID	character - up to 8 characters
	6	# P levels	integer - number of pressure levels where thermodynamic information is reported
	7	# Z levels	integer - number of height levels where wind data is reported
	8	station latitude	real - station latitude (degrees)
	9	station longitude	real - station longitude (degrees)

	10	station elevation	real - station elevation (meters)
pressure data	1	pressure	real - pressure (Pa)
	2	pressure flags	integer - 3 digit “quality” flag (see below)
	3	geopotential height	real - geopotential height (m)
	4	geopotential height flags	integer - 3 digit “quality” flag
	5	temperature	real - temperature (Celsius)
	6	temperature flags	integer - 3 digit “quality” flag
	7	relative humidity	real - relative humidity (fraction)
	8	relative humidity flags	integer - 3 digit “quality” flag
height data	1	height	real - height above sea level(m)
	2	height flags	integer - 3 digit “quality” flag
	3	wind speed	real - wind speed (m/s)
	4	wind speed flags	integer - 3 digit “quality” flag
	5	wind direction	real - wind direction (degrees)
	6	wind direction flags	integer - 3 digit “quality” flag

Notes:

- Quality flags are a 3 digit code denoting what stages of quality control have been performed during the 3 stages of QC. Some of the values are:
  - 0 - not checked
  - 9 - missing
  - 5 - passed, good data
  - 1 – checked, flagged as bad data

- Rawindsondes will generally have both the pressure and height level data reported. Wind profilers will only have the height levels, so these will have a 0 for the number of pressure levels.

- A new section (starting with the 999999 line) may start at any place in the file. Therefore, multiple files can be

concatenated for input to the application. ***(not yet implemented)***

Surface observations file

Following is a sample of the surface observations file:

```
999999 2
9
WINDSPEED  m/s
WIND_DIRECTION  deg
TEMPERATURE  C
DEWPOINT  C
STN_PRES  Pa
SLP  Pa
6-HR_PCP  mm
24-HR_PCP  mm
CLOUD_COVER  fraction
1993 09 01  0000 71066    58.620 -117.170  338.  000   2.57 000
350.\ 000   16.8 000   11.5 000  96710.0 000 100770.0  000 -999.0
000   .0\ 000 .80  000
1993 09 01  0000 71068    56.620 -115.170  340.   2.57 000  350.
000\   16.8 000   11.5 000  96710.0 000 100770.0  000 -999.0  000
.0     \ 000 .80  000
```

**** Note that each observation line is actually all one record and is just broken up here for documentation purposes.

The file starts with header information:

Record	Field	Name	Description
1	1	999999	marker to start a new file or new section of a file
	2	version	integer - dataset version number (this version is 2)
2	1	# of values	integer - number of values in each surface observation
3+	1	variable name	character - specific variable name
	2	variable units	character - variable units

After this, there is a line for each observation:

Section	Field	Name	Description
surface	1	year	integer - 4 digit year
	2	month	integer - 2 digit month
	3	date	integer - 2 digit date
	4	time	integer - 4 digit UTC data time

	5	station ID	character - up to 8 characters
	6	station latitude	real - station latitude (degrees)
	7	station longitude	real - station longitude (degrees)
	8	station elevation	real - station elevation (meters)
	9+	value/flag pairs	real/integer - pairs of values and their quality flags. See below.

Notes:

- There must be as many value/flag pairs as specified in the header. Values are in the order specified in the header and are of the specified units in the header. ***This is a future capability; for now there only must be the first 5 variables in the units stated in the example above. All additional variables will currently be ignored.***

- A new section (starting with the 999999 line) may start at any place in the file. Therefore, multiple files can be concatenated for input to the application. ***(not yet implemented)***