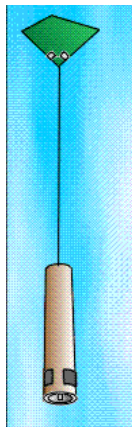


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Transmitted Dropwindsonde Observations in HRD Spline Analysis (HSA) Format

[[Explanation of HSA Format](#) | [Example](#)]

HRD has established a standardized ASCII format for observations used as input to the nested HRD Spline Analysis* and several other numerical/graphics routines. Each line in an HSA file contains the meteorological observations for a specified data source at a nominal date, time, geographical position, and pressure level. Records in HSA format are created for all mandatory, significant, additional, tropopause, and maximum wind levels reported in the dropsonde transmitted messages during a mission. The data are decoded from [TEMP DROP](#) format.

* For details about the nested HRD Spline Analysis, please consult:

- **Franklin, J. L., S. E. Feuer, J. Kaplan, and S. D. Aberson**, 1996: Tropical cyclone motion and surrounding flow relationships: Searching for Beta-gyres in Omega dropwindsonde datasets. *Mon. Wea. Rev.*, 124, 64-84.
- **Franklin, J. L., S. J. Lord, S. E. Feuer, and F. D. Marks, Jr.**, 1993: The kinematic structure of Hurricane Gloria (1985) determined from nested analyses of dropwindsonde and doppler radar data. *Mon. Wea. Rev.*, 121, 2433-2451.

EXPLANATION OF HSA FORMAT

Each ASCII record in an HSA file has a length of 78 characters. The standard format is:

II DDDDD. HHHH XXX.XXXYYYY.YYY PPPP.P TTTT.T RRRR.R ZZZZZ.Z UUUU.U VVVV.V FFFF

Field	Value**	Description
II	2 Digit Integer	HSA Data Source Index (this is set to 1 for dropwindsondes)
DDDDDD.	7 Digit Real	Date of Observation in yymmdd, in which yy is the last two digits of the year, MM is the month, and DD is the day of the month
HHHH	4 Digit Integer	Time of Observation in hhmm, in which hh is the hour (UTC) and mm is the minutes
XXX.XXX	7 Digit Real	Latitude of Observation (°N positive)
YYYY.YYY	8 Digit Real	Longitude of Observation (°W positive)
PPPP.P	6 Digit Real	Pressure Level of Observation (mb or hPa) -- 1070.0 indicates the surface (see ZZZZZ.Z for actual pressure value)
TTTT.T	6 Digit Real	Temperature (°C)***
RRRR.R	6 Digit Real	Relative Humidity (%)***
ZZZZZ.Z	7 Digit Real	Geopotential Height (m)*** -- this is surface pressure (mb) if PPPP.P = 1070.0
UUUU.U	6 Digit Real	U (Zonal) Wind Component (m s ⁻¹)***
VVVV.V	6 Digit Real	V (Meridional) Wind Component (m s ⁻¹)***
FFFF	4 Character	Data Flags (these indicate level type for operational dropwindsonde data): MANL - mandatory SIGL - significant

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ADDL - additional (extrapolated)
TROP - tropopause
MAXW - maximum wind

**Decimal Points are included in the number of Real variable digits.

*** Missing values of T, RH, Z, U, and V are assigned -99.0.

To read a record from an HSA file in a FORTRAN program, use the following variable masks for the fields in the Format statement:

I2,X,F7.0,X,I4,X,F7.3,F8.3,X,3(F6.1,X),F7.1,2(F6.1,X),A4

EXAMPLE

The following example shows how an operational dropsonde transmitted message is decoded into HSA format. The message contains the actual sounding observations of a sonde released from the NOAA G-IV aircraft during a Hurricane Floyd synoptic surveillance mission on 13 September 1999.

Original Encoded Message Format

```
Sonde # 990838036 1843 UTC 13 Sep 99
UZNT13 KWBC 131915

XXAA 63192 99280 70740 08084 99007 278// 05535 00060 27445 05537
92745 21604 07543 85477 18248 09048 70122 10042 07543 50584 05156
07549 40756 15533 08543 30967 29549 07025 25095 38750 10524 20244
511// 13531 88999 77999

51515 10167 02018
61616 NOAA9 1708A FLOYD OB 04
62626 SPL 2799N07416W MBL WND 06037=

XXBB 63198 99280 70740 08084 00007 278// 11005 27845 22958 23608
33935 22002 44779 15657 55649 05635 66642 05227 77634 04857 88616
03429 99609 03456 11571 00658 22546 01731 33510 04156 44478 07739
55443 10757 66414 14531 77380 18127 88332 24533 99255 37549 11224
44959 22199 513// 33179 58109

21212 00007 05535 11918 07542 22892 09052 33672 07539 44511 07548
55449 09047 66289 06524 77238 12018 88195 14031 99179 12552

31313 09608 81843
51515 10167 02018
61616 NOAA9 1708A FLOYD OB 04
62626 SPL 2799N07416W MBL WND 06037=
```

Decoded HSA Format

```
1 990913. 1843 27.990 74.160 1070.0 27.8 -99.0 1007.0 -14.7 -10.3 MANL
1 990913. 1843 27.990 74.160 1000.0 27.4 75.3 60.0 -15.6 -10.9 MANL
1 990913. 1843 27.990 74.160 925.0 21.6 97.5 745.0 -21.4 -5.7 MANL
1 990913. 1843 27.990 74.160 850.0 18.2 72.7 1477.0 -24.7 .0 MANL
1 990913. 1843 27.990 74.160 700.0 10.0 74.6 3122.0 -21.4 -5.7 MANL
1 990913. 1843 27.990 74.160 500.0 -5.1 62.8 5840.0 -24.3 -6.5 MANL
1 990913. 1843 27.990 74.160 400.0 -15.5 76.0 7560.0 -22.0 -1.9 MANL
1 990913. 1843 27.990 74.160 300.0 -29.5 63.3 9670.0 -12.1 -4.4 MANL
1 990913. 1843 27.990 74.160 250.0 -38.7 60.4 10950.0 -11.9 3.2 MANL
1 990913. 1843 27.990 74.160 200.0 -51.1 -99.0 12440.0 -11.3 11.3 MANL

1 990913. 1843 27.990 74.160 1007.0 27.8 -99.0 -99.0 -99.0 -99.0 SIGL
1 990913. 1843 27.990 74.160 1005.0 27.8 75.4 -99.0 -99.0 -99.0 SIGL
1 990913. 1843 27.990 74.160 958.0 23.6 95.0 -99.0 -99.0 -99.0 SIGL
1 990913. 1843 27.990 74.160 935.0 22.0 98.7 -99.0 -99.0 -99.0 SIGL
1 990913. 1843 27.990 74.160 779.0 15.6 62.2 -99.0 -99.0 -99.0 SIGL
1 990913. 1843 27.990 74.160 649.0 5.6 77.9 -99.0 -99.0 -99.0 SIGL
1 990913. 1843 27.990 74.160 642.0 5.2 82.4 -99.0 -99.0 -99.0 SIGL
1 990913. 1843 27.990 74.160 634.0 4.8 60.1 -99.0 -99.0 -99.0 SIGL
```

1	990913.	1843	27.990	74.160	616.0	3.4	81.1	-99.0	-99.0	-99.0	SIGL
1	990913.	1843	27.990	74.160	609.0	3.4	64.5	-99.0	-99.0	-99.0	SIGL
1	990913.	1843	27.990	74.160	571.0	.6	54.8	-99.0	-99.0	-99.0	SIGL
1	990913.	1843	27.990	74.160	546.0	-1.7	79.2	-99.0	-99.0	-99.0	SIGL
1	990913.	1843	27.990	74.160	510.0	-4.1	63.0	-99.0	-99.0	-99.0	SIGL
1	990913.	1843	27.990	74.160	478.0	-7.7	73.6	-99.0	-99.0	-99.0	SIGL
1	990913.	1843	27.990	74.160	443.0	-10.7	56.6	-99.0	-99.0	-99.0	SIGL
1	990913.	1843	27.990	74.160	414.0	-14.5	77.5	-99.0	-99.0	-99.0	SIGL
1	990913.	1843	27.990	74.160	380.0	-18.1	79.6	-99.0	-99.0	-99.0	SIGL
1	990913.	1843	27.990	74.160	332.0	-24.5	74.5	-99.0	-99.0	-99.0	SIGL
1	990913.	1843	27.990	74.160	255.0	-37.5	61.3	-99.0	-99.0	-99.0	SIGL
1	990913.	1843	27.990	74.160	224.0	-44.9	37.7	-99.0	-99.0	-99.0	SIGL
1	990913.	1843	27.990	74.160	199.0	-51.3	-99.0	-99.0	-99.0	-99.0	SIGL
1	990913.	1843	27.990	74.160	179.0	-58.1	90.0	-99.0	-99.0	-99.0	SIGL
1	990913.	1843	27.990	74.160	918.0	-99.0	-99.0	-99.0	-20.9	-5.6	SIGL
1	990913.	1843	27.990	74.160	892.0	-99.0	-99.0	-99.0	-26.8	.0	SIGL
1	990913.	1843	27.990	74.160	672.0	-99.0	-99.0	-99.0	-19.4	-5.2	SIGL
1	990913.	1843	27.990	74.160	511.0	-99.0	-99.0	-99.0	-23.9	-6.4	SIGL
1	990913.	1843	27.990	74.160	449.0	-99.0	-99.0	-99.0	-24.2	.0	SIGL
1	990913.	1843	27.990	74.160	289.0	-99.0	-99.0	-99.0	-11.2	-5.2	SIGL
1	990913.	1843	27.990	74.160	238.0	-99.0	-99.0	-99.0	-8.0	4.6	SIGL
1	990913.	1843	27.990	74.160	195.0	-99.0	-99.0	-99.0	-10.3	12.2	SIGL
1	990913.	1843	27.990	74.160	179.0	-99.0	-99.0	-99.0	-21.9	15.3	SIGL

KEY:

Mandatory Level Observations Significant T & RH Level Observations Significant Wind Level Observations

NOTES ABOUT DECODING

1. The observational date and time of the HSA records are those from when the sonde was launched. The day of the month is extracted from the second group of Section 1 of TEMP DROP code Parts A and B in the transmitted message. The launch time is retrieved from the third group of Section 7 of TEMP DROP code Part B. If no Section 7 line is present, the time to the nearest hour is assigned instead to the HSA records. The hour is also extracted from the second group of Section 1 of TEMP DROP code Parts A and B. The month and year match those in the special HRD header line at the top of the dropsonde transmitted message.
2. The geographical position in the HSA records is the location where the sonde splashed. This information is retrieved from the "SPL" remarks in the "62626" lines that appear in Section 10 of TEMP DROP code Parts A and B in the transmitted message. If no SPL group appears in the message, the launch position is instead assigned to the HSA records. This information is extracted from the third and fourth groups of Section 1 of TEMP DROP code Parts A and B in the transmitted message.
3. If additional level observations are present, only those containing extrapolated altitude data are decoded into HSA records. These are retrieved from the group following a "10190" indicator in Section 9 of TEMP DROP code Part B.
4. The observations in the transmitted message are converted into HSA format sequentially. Mandatory level observations in Sections 1-4 of Part A of the TEMP DROP code in the transmitted message are decoded first, followed by the tropopause level observations (if present) in Section 3 of Part A, maximum wind level observations (if present) in Section 4 of Part A, significant temperature and relative humidity level observations in Section 5 of Part B, significant wind level observations in Section 6 of Part B, and finally additional level observations (if present) in Section 9 of Part B.

Please contact [Sim Aberson](#) if you have any questions about HSA format.

Last modified: 14 March 2000.

Please report any problems to the [HRD webmaster](#).