

## APPENDIX F

### ARCHIVING

**F.1 Introduction.** There are many critical non-real-time users of rawinsonde observations in climatology and research. In order to make rawinsonde observations available to retrospective users, observations *shall* be sent to major data centers in compliance with the standards defined in this chapter. Three data centers maintain historical rawinsonde data: NOAA's NCDC, OL-A of the AFCCC, and the U.S. Navy's Fleet Numerical Meteorology and Oceanography Detachment (FNMOC). All three centers are collocated in Asheville, NC.

**F.2 Data Centers.** NCDC is a designated Department of Commerce Agency Records Center operating under the federal regulations issued by the National Archives and Records Administration. NCDC is the official repository for meteorological records collected by NOAA observing systems and for other agencies where there is an agreement between NOAA and the agency(s). NCDC currently has such an agreement with the U.S. Navy and the U.S. Marine Corps. NCDC also serves as the archive for data collected from the GTS by the NCEP. Navy's FNMOC Asheville processes and stores rawinsonde data from Navy ships and upper reporting stations as received by FNMOC Monterey, CA. Following quality control, these observations are submitted to NCDC. Information about NCDC may be obtained from:

Data Administrator  
National Climatic Data Center  
151 Patton Avenue  
Asheville, NC 28801-5001  
704-271-4384

AFCCC processes and stores rawinsonde observations from worldwide locations as received by the AFGWC. AFCCC also receives original records from U.S. Air Force and U.S. Army sites and submits these records to NCDC for archiving. Information about AFCCC may be obtained from:

Data Administration  
OL-A, AFCCC  
151 Patton Avenue  
Asheville, NC 28801-5002  
DSN 266-3100  
704-271-4299

**F.3 Data Transfer to the Data Centers.** NCDC, AFCCC, and FNMOC Asheville all receive and archive data from the GTS system as collected by NCEP, AFGWC, and FNMOC. In addition, agencies *shall* submit the highest resolution upper-air data directly to NCDC, AFCCC, or FNMOC Asheville. In order for the data to be processed at NCDC, the observation *shall* be sent in the NCDC Standard Nonreal-Time Transfer Format. The format contains two types of records; an identification record and data records. Each balloon flight must contain one identification record which contains fields for the location and time of the observation along with metadata information. The data records contain the actual data and are unlimited in number. Archival requirements changes to accept BUFR code, position information for GPS flights, and fields for corrected and uncorrected data will require format revision or a new format. If the current format does not

provide fields for required information contained from flights or is anticipated to not meet next-generation system requirements, contact NCDC, AFCCC, or FNMOD Asheville for guidance. The format and the field descriptions follow:

Identification Record

FIELD	1	2	3	4	5	6	7	8
ELEMENT	STN IND	STN NUM	LAT	LONG	ELEV	YEAR	MONTH	DAY
#CHARS.	X	X..X	XXXXA	XXXXXA	XXXX	XXXX	XX	XX
REC POS	1	2-9	10-14	15-20	21-24	25-28	29-30	31-32

FIELD	9	10	11	12	13	14	15	16
ELEMENT	HOUR	REL TIME	ASCN NUM	OBSVR INIT	DATA RDC	SONDE MAN	SONDE TYPE	SON/BAR IND
#CHARS.	XX	XXXX	XXXX	XXXX	XXX	XXX	XXX	X
REC POS	33-34	35-38	39-42	43-46	47-49	50-52	53-55	56

FIELD	17	18	19	20	21	22	23	24
ELEMENT	SON/BAR NUMBER	HUM TYPE	TEMP TYPE	PRESS TYPE	TRACK TYPE	TRNSP	BAL MAN	BAL WGT
#CHARS	X....X	XXX	XXX	XXX	XXX	X	XX	XXXX
REC POS	57-76	77-79	80-82	83-85	86-88	89	90-92	93-96

FIELD	25	26	27	28	29	30	31	32
ELEMENT	BAL AGE	TRN REG	PBL LGT	PBL TYPE	REASON TERM	NUM RCP	CLOUDS AND WX	SFCWND DIR
#CHARS	XX	X	X	X	XX	X	XXXXXXXXXX	XXX
REC POS	97-98	99	100	101	102-103	104	105-113	114-116

FIELD	33	34	35	36	37
ELEMENT	SFCWND SPD	WND AVE INT	TYPE OFCORRECTION P Z T H TD W	SOFTWARE VERSION	RESERVE FIELD
#CHARS	XXX	XXX	XX XX XX XX XX XX	X...X	X...X
REC POS	117-119	120-122	123-134	135-144	145-160

Data Record

FIELD	1	2	3	4	5	6	7	8	9
ELEMENT	ASC NUM	ELP TME	PRESS	HGT	TEMP	REL HUM	DPDP	WND DIR	WND SPD
#CHARS	X.X	X.X	X...X	XXXXX	XXXX	XXXX	XXX	XXX	X..X
REC POS	1-4	5-9	10-15	16-20	21-24	25-28	29-31	32-34	35-38

FIELD	10	11	12	13
ELEMENT	TYPE LVL	SIGNAL QUALITY QP QT QU QD	ELEMENT QUALITY ET P H T U D WD WS	RES FLD
#CHARS	XX	XXX XXX XXX XXX	XX XX XX XX XX XX XX XX	X..X
REC POS	39-40	41-52	53-68	69-80

Identification Record

<u>RECORD POSITION</u>	<u>ELEMENT NAME</u>	<u>CODE DEFINITIONS AND REMARKS</u>
1	STN IND	STATION NUMBER INDICATOR -- This field contains an indicator specifying the type of station number in the next field: 0 = WBAN NUMBER 1 = WMO NUMBER 2 = AIR FORCE AUGMENTED WMO NUMBER 3 = SHIP CALL SIGN 4 = MOBILE UNIT CALL SIGN
2-9	STN NUM	STATION NUMBER -- The number assigned to the station according to the numbering system specified in record position 1. Numbers <i>should</i> be right-justified with leading blanks, ship CALL signs left justified with trailing blanks. NWS stations must enter WBAN number. If the number is missing, enter "00000000".
10-14	LAT	LATITUDE -- The station latitude in degrees and minutes. The last character is "N" or "S" as appropriate. When unknown, this field contains "9999N".
15-20	LONG	LONGITUDE -- The station longitude in degrees and minutes. The last character is "E" or "W" as appropriate. When unknown, this field contains "99999E".
21-24	ELEV	ELEVATION -- The height of the launch site in whole meters.

Identification Record

<u>RECORD POSITION</u>	<u>ELEMENT NAME</u>	<u>CODE DEFINITIONS AND REMARKS</u>
25-28	YEAR	YEAR -- The 4-digit year expressed at the hour of observation (UTC).
29-30	MONTH	MONTH -- The numeric month expressed at the hour of observation (UTC).
31-32	DAY	DAY -- The numeric day expressed at the hour of observation (UTC).
33-34	HOUR	HOUR -- The hour (24-hour clock) of observation (UTC). The hour of observation will be the nearest whole hour, H-30 to H+29 (e.g. the hour is entered as 10 when release is 0930 to 1029 UTC).
35-38	REL TIME	TIME OF ACTUAL RELEASE -- The hour and minute UTC (24-hour clock) of the actual release time.
39-42	ASCN NUM	ASCENSION NUMBER -- The ascension number for the year. The first release on or after Jan 1 will be numbered 0001. Ascension numbers are right-justified with leading zeros.
43-46	OBSVR INIT	OBSERVER INITIALS -- The initials of the first and last name of the observer.
47-49	DATA RDC	DATA REDUCTION SYSTEM -- The type of data reduction system used at the site.

001 = MANUAL  
002 = TIME-SHARE  
003 = NOVA MINI COMPUTER  
004 = MINI-ART  
005 = MICRO-ART  
007 = MARWIN, MRS  
008 = MSS  
009 = LAM  
010 = ASAP  
011 = MV 7800  
012 = AIR MET RESEARCH RAWIN SYSTEM  
013 = VIZ WO-9000  
Meteorological Processing System

Identification Record

<u>RECORD POSITION</u>	<u>ELEMENT NAME</u>	<u>CODE DEFINITIONS AND REMARKS</u>
50-52	SONDE MAN	SONDE MANUFACTURER -- The manufacturer of the Sonde in use.  001 = VIZ 002 = VAISALA 003 = SPACEDATA 004 = AIR 005 = ATEAR
53-55	SONDE TYP	SONDE TYPE -- The type of Sonde used at the station.  001 = VIZ J031 002 = VIZ ACCU-LOC 003 = VIZ A 004 = VIZ B 005 = VIZ MSS 006 = SPACEDATA-TRANSPONDER 007 = SPACEDATA-ARTSONDE 008 = SPACEDATA-MSS 009 = VAISALA 010 = VIZ B - TRANSPONDER 011 = AIR INTELLISONDE 012 = VIZ Mark II MICROSONDE
56	SON/BAR IND	SONDE/BAROSWITCH NUMBER INDICATOR -- An indicator specifying the type of number in the next field.  0 = SONDE SERIAL NUMBER 1 = BAROSWITCH NUMBER
57-76	SON/BAR NUM	SONDE/BAROSWITCH -- The Sonde serial number or the Baroswitch number right-justified in the field, with leading blanks. This "number" probably will include non-numeric characters.

Identification Record

<u>RECORD POSITION</u>	<u>ELEMENT NAME</u>	<u>CODE DEFINITIONS AND REMARKS</u>
77-79	HUM TYPE	<p>HUMIDITY TYPE -- Type of humidity element used in the system.</p> <p>001 = Lithium Chloride Hygristor            002 = 1960's Carbon Hygristor            003 = 1980's Carbon Hygristor            004 = Humicap            005 = H-Humicap            006 = VIZ Mark II carbon                  hygristor</p>
80-82	TEMP TYPE	<p>TEMPERATURE TYPE -- Type of temperature element used in the system.</p> <p>001 = Rod Thermistor            002 = Bead Thermistor            003 = Chip Thermistor            004 = Capacitive Bead</p>
83-85	PRESS TYPE	<p>PRESSURE TYPE -- Type of pressure element used in the system.</p> <p>001 = Baroswitch            002 = Transducer - oven controlled            003 = Transducer - non-oven controlled            004 = Derived (Transponder)            005 = Capacitive aneriod</p>
86-88	TRACK TYPE	<p>TRACKING TYPE -- The type of tracking system.</p> <p>001 = 72-2                   009 = OMEGA            002 = SCR-658   010 = LORAN            003 = WBRT-57       011 = ART-1            004 = WBRT-60       012 = ART-1R            005 = GMD-1           013 = ART-2            006 = GMD-1A         014 = ART-2R            007 = GMD-1B         015 = MDS            008 = GMD-5           016 = MSS RANGING                                      017 = RADIO THEODOLITE</p>
89	TRNSP	<p>TRANSPONDER -- Is a transponder used?</p> <p>0 = No            1 = Yes</p>

Identification Record

<u>RECORD POSITION</u>	<u>ELEMENT NAME</u>	<u>CODE DEFINITIONS AND REMARKS</u>
90-92	BAL MAN	BALLOON MANUFACTURER -- The manufacturer of the balloon.  001 = KAYSAM 002 = WEATHERTRONICS
93-96	BAL WGT	BALLOON WEIGHT -- Nominal weight of the balloon in grams.
97-98	BAL AGE	BALLOON AGE -- Age of the balloon in months.
99	TRN REG 4	TRAIN REGULATOR -- Was a train regulator used N = No Y = Yes
100	PBL LGT	PIBAL LIGHT -- Was a PIBAL light used N = No Y = Yes
101	PBL TYPE	PIBAL TYPE -- PIBAL wind equipment type according to WMO Code Table 0265.  0 = Pressure instrument associated with wind-measuring equipment 1 = Optical Theodolite 2 = Radio Theodolite 3 = Radar
102-103	REASON TERM	REASON FOR TERMINATION of the flight:  01 = Balloon burst 02 = Balloon forced down by icing 03 = Leaking or floating balloon 04 = Weak or fading signal 05 = Battery failure 06 = Ground equipment failure 07 = Switching failure 08 = Radiosonde failure 09 = Other
104	NUM RCP	RECOMPUTES -- The number of times this flight has been recomputed.

Identification Record

<u>RECORD POSITION</u>	<u>ELEMENT NAME</u>	<u>CODE DEFINITIONS AND REMARKS</u>
105-113	CLOUDS AND WX	<p>CLOUDS AND WEATHER -- The observation of the clouds and weather at the time of release. The field is of the form NhCLhCMCHWWWW, where:</p> <p>Nh=The amount of low or mid-level clouds present according to WMO Code Table 2700. See Appendix E.</p> <p>0 = 0 okta (tenths)            1 = 1 okta (1/10) or less, but not zero            2 = 2 oktas (2/10-3/10)            3 = 3 oktas (4/10)            4 = 4 oktas (5/10)            5 = 5 oktas (6/10)            6 = 6 oktas (7/10-8/10)            7 = 7 oktas (9/10) or more, but not overcast            8 = 8 oktas (10/10)            9 = Sky is obscured by fog and/or other meteorological phenomena            - = Cloud cover is indiscernible for reason other than "9" or observation not made. The WMO code figure "/" must be converted to "-".</p> <p>CL,CM,CH = The cloud type according to WMO Code Tables 0509, 0513, and 0515. Code figure "/" must be converted to "-".</p> <p>H = WMO Code Table 1600 for the height above ground of the base of the lowest cloud seen. Code figure "/" must be converted to "-".</p> <p>WW = Present weather according to WMO Code Table 4677. Up to two types of present weather or obscurations <i>may</i> be entered. If present weather is not observed, enter "////" in this field (WWWW). See Appendix E.</p>
114-116	SFCWND DIR	SURFACE WIND DIRECTION -- The direction of the surface wind at time of release in whole degrees.
117-119	SFCWND SPD	SURFACE WIND SPEED -- The speed of the surface wind at time of release in meters per second to the nearest 0.1 meter per second. Do not enter the decimal point; 12.3 meters per second = 123.

Identification Record

<u>RECORD POSITION</u>	<u>ELEMENT NAME</u>	<u>CODE DEFINITIONS AND REMARKS</u>
120-122	WIND AVE INT	<p>WIND AVERAGING INTERVAL -- The interval of time or height over which the wind is derived.</p> <p>000 = None (instantaneous)            001 = Two mins. to 14km (MSL),                  four mins. above 14km (MSL).            (Pre-1990 FMH Standard, NWS)            002 = Post-1989 FMH Standard            003 = 20 seconds to 15K ft., 60 seconds above 15K ft.            004 = 30 seconds up to 2500m AGL,                  45 seconds up to 5000m AGL,                  60 seconds up to 7500m AGL,                  75 seconds up to 10 km AGL,                  90 seconds up to 15 km AGL,                  105 seconds up to 20 km AGL,                  120 seconds above 20 km AGL.            005 = Four mins. for the entire flight</p>
123-134	CORTYP	<p>TYPE OF CORRECTION -- The type of correction applied to individual data elements by automated systems or observers.</p>
<i>123-124</i>	<i>CORTYP-P</i>	<p><i>PRESSURE CORRECTIONS</i></p> <p>00 = No correction applied            01 = NASA temperature correction            02 = ECMWF temperature correction            .            .            .            99 = Unknown</p>
<i>125-126</i>	<i>CORTYP-Z</i>	<p><i>HEIGHT CORRECTIONS</i></p> <p>00 = No correction applied            01 = Local gravity correction            02 = Standard gravity correction            .            .            .            99 = Unknown</p>

Identification Record

<u>RECORD POSITION</u>	<u>ELEMENT NAME</u>	<u>CODE DEFINITIONS AND REMARKS</u>
127-128	CORTYP-T	<p style="text-align: center;"><i>TEMPERATURE CORRECTIONS</i></p> 00 = No correction applied 01 = NASA radiation correction 02 = ECMWF radiation correction 03 = NCEP radiation correction 04 = Vaisala RSN-93 solar and infrared radiation correction . . . 11 = NASA lag correction 12 = ECMWF lag correction 13 = NMC lag correction . . . 21 = NASA radiation and lag correction 22 = ECMWF radiation and lag correction 23 = NMC radiation and lag correction . . . 99 = Unknown
129-130	CORTYP-H	<p style="text-align: center;"><i>HUMIDITY CORRECTIONS</i></p> 00 = No corrections applied 01 = NASA lag correction 02 = ECMWF lag correction 03 = NMC lag correction . . . 99 = Unknown
131-132	CORTYP-TD	<p style="text-align: center;"><i>DEW POINT CORRECTIONS</i></p> 00 = No corrections applied 01 = NASA lag correction 02 = ECMWF lag correction 03 = NMC lag correction . . . 99 = Unknown

Identification Record

<u>RECORD POSITION</u>	<u>ELEMENT NAME</u>	<u>CODE DEFINITIONS AND REMARKS</u>
<i>133-134</i>	<i>CORTYP-W</i>	<i>WIND CORRECTIONS</i>  00 = No corrections applied 01 = Elevation angle correction 02 = Ranging correction . . . 99 = Unknown
135-144	SOFT VER	SOFTWARE VERSION -- The version of software in use with the specified recording system. Enter the software version left-justified with trailing blanks.
145-160	RES FLD	RESERVED FIELD -- Leave blank

Data Record

<u>RECORD POSITION</u>	<u>ELEMENT NAME</u>	<u>CODE DEFINITIONS AND REMARKS</u>
1-4	ASCN NUM	ASCENSION NUMBER -- The ascension number for the year. The first release on or after Jan 1 will be numbered 0001.
5-9	ELPSD TIME	ELAPSED TIME -- The time in minutes and seconds (mmmss) since the actual release time.
10-15	PRESS	PRESSURE -- Atmospheric pressure at the current level in hundredths of hectopascals (0.01 millibars).
16-20	HGT	HEIGHT -- Geopotential height of the pressure level in whole geopotential meters (MSL).
21-24	TEMP	TEMPERATURE -- Dry-bulb temperature to the nearest 0.1 Celsius degree.
25-28	REL HUM	RELATIVE HUMIDITY -- The relative humidity to the nearest 0.1 percent.
29-31	DPDP	DEW POINT DEPRESSION -- The dew point depression to the nearest 0.1 Celsius degree.
32-34	WIND DIR	WIND DIRECTION -- The wind direction to the nearest whole degree.
35-38	WND SPD	WIND SPEED -- Wind speed to the nearest 0.1 meter per second.

Data Record

<u>RECORD POSITION</u>	<u>ELEMENT NAME</u>	<u>CODE DEFINITIONS AND REMARKS</u>
39-40	TYPE LVL	TYPE OF LEVEL -- The reason for selection of the level: 00 = High resolution data sample 01 = Within 20 hectopascals (mb) of the surface 02 = Pressure less than 10 hectopascals (mb) 03 = Base pressure level for stability index 04 = Begin doubtful temperature, altitude data 05 = Begin missing data (all elements) 06 = Begin missing relative humidity data 07 = Begin missing temperature data 08 = Highest level reached before balloon descent because of icing or turbulence. 09 = End doubtful temperature, altitude data 10 = End missing data (all elements) 11 = End missing relative humidity data 12 = End missing temperature data 13 = Zero degree crossing for the RADAT 14 = Mandatory pressure level 15 = Operator added level 16 = Operator deleted level 17 = Balloon re-ascended beyond previous highest level 18 = Significant relative humidity level 19 = Relative humidity level selection terminated 20 = Surface level 21 = Significant temperature level 22 = Mandatory temperature level 23 = Flight termination level 24 = Tropopause 25 = Aircraft report 26 = Interpolated (generated) level 27 = Mandatory wind level 28 = Significant wind level 29 = Maximum wind level 30 = Incremental wind level (e.g., 1-minute, fixed regional) 31 = Incremental height level (generated) 40 = Significant thermo level (reason for selection unknown)

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Data Record

<u>RECORD POSITION</u>	<u>ELEMENT NAME</u>	<u>CODE DEFINITIONS AND REMARKS</u>
41-43	SQP (Pressure)	SIGNAL QUALITY -- Signal quality for the element expressed as a percentage of individual samples accepted
44-46	SQT (Temperature)	
47-49	SQU (Humidity)	
50-52	SQD (Dew point temperature)	
53-54	EQET	ELEMENT QUALITY FLAGS -- These fields contain the results (Elapsed Time) of any quality control procedures for identifying suspect and doubtful individual elements:
55-56	EQP (Pressure/Ranging)	00 = Element is correct
		01 = Element is suspect
57-58	EQH (Height)	02 = Element is doubtful
		03 = Element failed QC checks
59-60	EQT (Temperature)	04 = Replacement value (correction)
		05 = Estimated value
		06 = Observer edited value
		09 = Element not checked
61-62	EQU (Humidity)	
63-64	EQD (Dew point depression)	
65-66	EQWD (Wind direction)	
67-68	EQWS (Wind speed)	
69-80	RES FLD	RESERVED FIELD Leave Blank

The data records are repeated as many times as necessary to record all levels of the flight.

All fields must be right-justified (least significant digit in the rightmost position) unless specified otherwise.

All missing fields must be 9 filled unless specified otherwise.

Do not enter decimal points. The decimal point is implied by the field position.

**F.4 Station Information.** Station information contains details about the operational status of rawinsonde observing stations to include observational site characteristics, the type of equipment in use, and the date of a station's establishment, re-establishment, or closure. Station information *shall* be forwarded to NCDC, AFCCC, or FNMOD Asheville for placement in the station's Information File. Also, any changes involving the site or the equipment at the site *shall* be submitted to NCDC, AFCCC, or FNMOD Asheville. The information *shall* include the item changed and the date of the change. The following are items that *shall* be contained in a Station Information File.

Physical Characteristics

Station Name  
Type of Station  
Airport Name  
Description of Significant Topography  
Station Identifier/Ship Call Sign  
WMO or WBAN Index Number  
Time Zone  
Latitude/Longitude (release site)  
Release Elevation (release site)  
Date of establishment, re-establishment, closure

Observation Schedule

Types of Observations  
Schedule for Observations

Observation Program

Processing Algorithms  
Corrections Made to Data

Sensor Data

Type/Model of Sonde  
Type of Sensors  
Receiving Equipment  
Length of Train  
Balloon Make/Model Number/Size  
Wind Finding Method

