WORLD METEOROLOGICAL ORGANIZATION

COMMISSION FOR BASIC SYSTEMS
OPEN PROGRAMME AREA GROUP ON INTEGRATED OBSERVING SYSTEMS

EXPERT TEAM ON REQUIREMENTS FOR DATA FROM AUTOMATIC WEATHER STATIONS

FOURTH SESSION

GENEVA, SWITZERLAND, 20 MARCH – 24 MARCH 2006

CBS/OPAG-IOS (ET AWS-4)/Doc. 8(2)

(20.II.2006)

ITEM: 8

Original: ENGLISH ONLY

AWS BUFR representation of nominal values

Submitted by Milan Dragosavac (ECMWF)

Summary and Purpose of Document

This document is a proposal for representation of nominal values for AWS observations represented in BUFR form.

ACTION PROPOSED

The ET AWS meeting is kindly asked to consider proposal and take further actions.

1. Introduction

The CBS-Ext.(02) Commission noted with appreciation the work carried out by the expert Team on Requirements for Data from Automatic Weather Stations in developing functional specification for AWSs and accompanying BUFR/CREX descriptors. It noted that the Expert Team reviewed current AWS operational practices, reviewed and developed AWS BUFR descriptors and templates and found them suitable to facilitate the exchange of AWS data and addressed the need for AWS quality control standards and procedures.

The commission agreed that the BUFR/CREX should support the reporting of both nominal and instrument values.

2. Proposal for nominal values representation

BUFR format already contains a mechanism to represent quality control, first order statistics, departures, replaced/retained values and substituted values. The usage is defined by selection of the appropriate BUFR Table C operators. ***It has to be stressed that although CREX is very similar to BUFR, it does not support representation of those features***.

To represent any nominal value in BUFR a new descriptor in class 8 of the BUFR Table B is proposed to indicate the cause of nominal value.

Ref number	Name	Unit	Scale	Reference	Data width
008083	Nominal value indicator	flag table	0	0	15

Bit No.	Meaning
1	Adjusted with respect to representative height of sensor above local ground (or Deck of marine platform)
2	Adjusted with respect to representative height of sensor above water surface
3	Adjusted with respect to standard surface roughness
4	Adjusted with respect to wind speed
5	Adjusted with respect to temperature
6	Adjusted with respect to pressure
7	Adjusted with respect to humidity
8	Adjusted with respect to evaporation
9	Adjusted with respect to wetting losses
10-14	Reserved
All 15	Missing value

Note: The term correction is not suitable to use as all measured values are corrected first (e.g. calibration correction, etc.)

The above proposed descriptor will allow reporting of Level II data (meteorological parameters, nominal values) in addition to Level I data (instrument values) in BUFR templates for surface observation data, especially for data from Automatic Weather Stations.

The mechanism to represent any nominal value for any element in any BUFR template is by using 223000 Operator (substituted values follow).

223000	Substituted values follow
236000	Bit map follow
101000	Delayed replication operator
031001	Delayed replication
031031	Data present indicator
001033	Originating centre
001032	Originating application
008083	Nominal value indicator
101000	Delayed replication operator
031001	Delayed replication
223255	Substituted value marker operator

There may be one or more blocks similar as one above in the BUFR message. For an example the following block could follow in the case of re-using the bit map.

223000	Substituted values follow
237000	Use previously defined bit map
001033	Originating centre
001032	Originating application
008083	Nominal value indicator
101000	Delayed replication operator
031001	Delayed replication
223255	Substituted value marker operator

An example of AWS BUFR data and nominal values represented are shown in the Annex I.

ANNEX I

An example of BUFR representation of nominal values

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                                ECMWF

                BUFR DECODING SOFTWARE VERSION -  7.1
                           07 June  2005.


 Your path for bufr tables is :
 /home/ma/maa/bufr/bufr_000300/
BUFR TABLES TO BE LOADED  B0000000000089012001,D0000000000089012001

          BUFR SECTION 0

 LENGTH OF SECTION 0 (BYTES)                  8
 TOTAL LENGTH OF BUFR MESSAGE (BYTES)       346
 BUFR EDITION NUMBER                          4

         BUFR SECTION 1

 LENGTH OF SECTION 1 (BYTES)             22
 BUFR MASTER TABLE                        0
 ORIGINATING CENTRE                      89
 ORIGINATING SUB-CENTRE                   0
 UPDATE SEQUENCE NUMBER                   1
 FLAG (PRESENCE OF SECTION 2)             0
 DATA CATEGORY                            0
 DATA SUB-CATEGORY                        0
 LOCAL DATA SUB-CATEGORU                  1
 VERSION NUMBER OF MASTER TABLE          12
 VERSION NUMBER OF LOCAL TABLE            1
 YEAR                                  2005
 MONTH                                   10
 DAY                                     11
 HOUR                                     7
 MINUTE                                   0
 SECOND                                   0


          BUFR SECTION 3

 LENGTH OF SECTION 3 (BYTES)              92
 RESERVED                                  0
 NUMBER OF DATA SUBSETS                    1
 FLAG (DATA TYPE/DATA COMPRESSION)         0


        DATA DESCRIPTORS (UNEXPANDED)

    1  301090
    2  008010
    3  301091
    4  302001
    5  302072
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 6  101005
 7  307063
 8  302069
 9  007032
10  020031
11  020032
12  302078
13  302073
14  302074
15  302075
16  302071
17  302077
18  302079
19  007032
20  302080
21  302081
22  033005
23  033006

24  223000
25  236000
26  101000
27  031001
28  031031
29  001033
30  001032
31  008083
32  101000
33  031001
34  223255
35  223000
36  237000
37  001033
38  001032
39  008083
40  101000
41  031001
42  223255
```

DATA DESCRIPTORS (EXPANDED)

1	001001	WMO BLOCK NUMBER
2	001002	WMO STATION NUMBER
3	001015	STATION OR SITE NAME
4	002001	TYPE OF STATION
5	004001	YEAR
6	004002	MONTH
7	004003	DAY
8	004004	HOUR
9	004005	MINUTE
10	005001	LATITUDE (HIGH ACCURACY)
11	006001	LONGITUDE (HIGH ACCURACY)
12	007030	HEIGHT OF STATION GROUND ABOVE MEAN SEA LEVEL (SEE NOTE 3)
13	007031	HEIGHT OF BAROMETER ABOVE MEAN SEA LEVEL (SEE NOTE 4)
14	008010	SURFACE QUALIFIER (TEMPERATURE DATA)
15	002180	MAIN PRESENT WEATHER DETECTING SYSTEM
16	002181	SUPPLEMENTARY PRESENT WEATHER SENSOR

17	002182	VISIBILITY MEASUREMENT SYSTEM
18	002183	CLOUD DETECTION SYSTEM
19	002184	TYPE OF LIGHTNING DETECTION SENSOR
20	002179	TYPE OF SKY CONDITION ALGORITHM
21	002186	CAPABILITY TO DETECT PRECIPITATION PHENOMENA
22	002187	CAPABILITY TO DETECT OTHER WEATHER PHENOMENA
23	002188	CAPABILITY TO DETECT OBSCURATION
24	002189	CAPABILITY TO DISCRIMINATE LIGHTNING STRIKES
25	010004	PRESSURE
26	010051	PRESSURE REDUCED TO MEAN SEA LEVEL
27	010061	3-HOUR PRESSURE CHANGE
28	010063	CHARACTERISTIC OF PRESSURE TENDENCY
29	007032	HEIGHT OF SENSOR ABOVE LOCAL GROUND
30	007033	HEIGHT OF SENSOR ABOVE WATER SURFACE (SEE NOTE 6)
31	012101	TEMPERATURE/DRY-BULB TEMPERATURE
32	012103	DEW-POINT TEMPERATURE
33	013003	RELATIVE HUMIDITY
34	007061	DEPTH BELOW LAND SURFACE
35	012130	SOIL TEMPERATURE
36	007061	DEPTH BELOW LAND SURFACE
37	012130	SOIL TEMPERATURE
38	007061	DEPTH BELOW LAND SURFACE
39	012130	SOIL TEMPERATURE
40	007061	DEPTH BELOW LAND SURFACE
41	012130	SOIL TEMPERATURE
42	007061	DEPTH BELOW LAND SURFACE
43	012130	SOIL TEMPERATURE
44	007032	HEIGHT OF SENSOR ABOVE LOCAL GROUND
45	007033	HEIGHT OF SENSOR ABOVE WATER SURFACE (SEE NOTE 6)
46	033041	ATTRIBUTE OF FOLLOWING VALUE
47	020001	HORIZONTAL VISIBILITY
48	007032	HEIGHT OF SENSOR ABOVE LOCAL GROUND
49	020031	ICE DEPOSIT (THICKNESS)
50	020032	RATE OF ICE ACCRETION
51	002176	METHOD OF STATE OF GROUND MEASUREMENT
52	020062	STATE OF THE GROUND (WITH OR WITHOUT SNOW)
53	002177	METHOD OF SNOW DEPTH MEASUREMENT
54	013013	TOTAL SNOW DEPTH
55	020010	CLOUD COVER (TOTAL)
56	008002	VERTICAL SIGNIFICANCE (SURFACE OBSERVATIONS)
57	020011	CLOUD AMOUNT
58	020012	CLOUD TYPE
59	033041	ATTRIBUTE OF FOLLOWING VALUE
60	020013	HEIGHT OF BASE OF CLOUD
61	008002	VERTICAL SIGNIFICANCE (SURFACE OBSERVATIONS)
62	020011	CLOUD AMOUNT
63	020012	CLOUD TYPE
64	033041	ATTRIBUTE OF FOLLOWING VALUE
65	020013	HEIGHT OF BASE OF CLOUD
66	008002	VERTICAL SIGNIFICANCE (SURFACE OBSERVATIONS)
67	020011	CLOUD AMOUNT
68	020012	CLOUD TYPE
69	033041	ATTRIBUTE OF FOLLOWING VALUE
70	020013	HEIGHT OF BASE OF CLOUD
71	008002	VERTICAL SIGNIFICANCE (SURFACE OBSERVATIONS)
72	020011	CLOUD AMOUNT
73	020012	CLOUD TYPE
74	033041	ATTRIBUTE OF FOLLOWING VALUE
75	020013	HEIGHT OF BASE OF CLOUD

76	020003	PRESENT WEATHER (SEE NOTE 1)
77	004025	TIME PERIOD OR DISPLACEMENT
78	020004	PAST WEATHER (1) (SEE NOTE 2)
79	020005	PAST WEATHER (2) (SEE NOTE 2)
80	008021	TIME SIGNIFICANCE
81	004025	TIME PERIOD OR DISPLACEMENT
82	013055	INTENSITY OF PRECIPITATION
83	013058	SIZE OF PRECIPITATING ELEMENT
84	008021	TIME SIGNIFICANCE
85	007032	HEIGHT OF SENSOR ABOVE LOCAL GROUND
86	007033	HEIGHT OF SENSOR ABOVE WATER SURFACE (SEE NOTE 6)
87	008021	TIME SIGNIFICANCE
88	004025	TIME PERIOD OR DISPLACEMENT
89	011001	WIND DIRECTION
90	011002	WIND SPEED
91	008021	TIME SIGNIFICANCE
92	004025	TIME PERIOD OR DISPLACEMENT
93	011043	MAXIMUM WIND GUST DIRECTION
94	011041	MAXIMUM WIND GUST SPEED
95	004025	TIME PERIOD OR DISPLACEMENT
96	011043	MAXIMUM WIND GUST DIRECTION
97	011041	MAXIMUM WIND GUST SPEED
98	004025	TIME PERIOD OR DISPLACEMENT
99	011016	EXTREME COUNTERCLOCKWISE WIND DIRECTION OF A VARIABLE WIND
100	011017	EXTREME CLOCKWISE WIND DIRECTION OF A VARIABLE WIND
101	007032	HEIGHT OF SENSOR ABOVE LOCAL GROUND
102	007033	HEIGHT OF SENSOR ABOVE WATER SURFACE (SEE NOTE 6)
103	004025	TIME PERIOD OR DISPLACEMENT
104	012111	MAXIMUM TEMPERATURE, AT HEIGHT AND OVER PERIOD SPECIFIED
105	012112	MINIMUM TEMPERATURE, AT HEIGHT AND OVER PERIOD SPECIFIED
106	007032	HEIGHT OF SENSOR ABOVE LOCAL GROUND
107	004025	TIME PERIOD OR DISPLACEMENT
108	012112	MINIMUM TEMPERATURE, AT HEIGHT AND OVER PERIOD SPECIFIED
109	007032	HEIGHT OF SENSOR ABOVE LOCAL GROUND
110	002175	METHOD OF PRECIPITATION MEASUREMENT
111	002178	METHOD OF LIQUID CONTENT MEASUREMENT OF PRECIPITATION
112	004025	TIME PERIOD OR DISPLACEMENT
113	013011	TOTAL PRECIPITATION/TOTAL WATER EQUIVALENT
114	007032	HEIGHT OF SENSOR ABOVE LOCAL GROUND
115	002185	METHOD OF EVAPORATION MEASUREMENT
116	004025	TIME PERIOD OR DISPLACEMENT
117	013033	EVAPORATION/EVAPOTRANSPIRATION
118	004025	TIME PERIOD OR DISPLACEMENT
119	014031	TOTAL SUNSHINE
120	033005	QUALITY INFORMATION (AWS DATA)
121	033006	INTERNAL MEASUREMENT STATUS INFORMATION (AWS)
122	223000	SUBSTITUTED VALUES FOLLOW
123	236000	BACKWARD REFERENCE BIT MAP
124	031001	DELAYED DESCRIPTOR REPLICATION FACTOR
125	031031	DATA PRESENT INDICATOR
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245	031031	DATA PRESENT INDICATOR
246	001033	IDENTIFICATION OF ORIGINATING/GENERATING CENTRE (SEE NOTE 10)
247	001032	GENERATING APPLICATION
248	008083	(VAL) NOMINAL VALUE INDICATOR
249	031001	DELAYED DESCRIPTOR REPLICATION FACTOR
250	223255	TEMPERATURE/DRY-BULB TEMPERATURE
251	223255	RELATIVE HUMIDITY
252	223255	WIND SPEED

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  253  223255  MAXIMUM TEMPERATURE, AT HEIGHT AND OVER PERIOD SPECIFIED
  254  223000  SUBSTITUTED VALUES FOLLOW
  255  237000  USE PREVIOUSLY DEFINED BIT MAP
  256  001031  IDENTIFICATION OF ORIGINATING/GENERATING CENTRE (SEE NOTE 10)
  257  001032  GENERATING APPLICATION
  258  008083  (VAL) NOMINAL VALUE INDICATOR
  259  031001  DELAYED DESCRIPTOR REPLICATION FACTOR
  260  223255  TEMPERATURE/DRY-BULB TEMPERATURE
  261  223255  RELATIVE HUMIDITY
  262  223255  WIND SPEED
  263  223255  MAXIMUM TEMPERATURE, AT HEIGHT AND OVER PERIOD SPECIFIED

STARTING SUBSET TO BE PRINTED :
ENDING SUBSET TO BE PRINTED :

    1 WMO BLOCK NUMBE      .1100000000E+02 NUMERIC
    2 WMO STATION NUM      .5380000000E+03 NUMERIC
    3 STATION OR SITE      .1020000000E+04 CCITTIA5                TEMELIN
    4 TYPE OF STATION      .1000000000E+01 CODE TABLE 002001
    5 YEAR                 .2005000000E+04 YEAR
    6 MONTH                .1000000000E+02 MONTH
    7 DAY                  .1100000000E+02 DAY
    8 HOUR                 .7000000000E+01 HOUR
    9 MINUTE               .0000000000E+00 MINUTE
   10 LATITUDE (HIGH       .4919773000E+02 DEGREE
   11 LONGITUDE (HIGH      .1434204000E+02 DEGREE
   12 HEIGHT OF STATI      .5000000000E+03 M
   13 HEIGHT OF BAROM      .5080000000E+03 M
   14 SURFACE QUALIFI      .3000000000E+01 CODE TABLE 008010
   15 MAIN PRESENT WE      .1000000000E+01 CODE TABLE 002180
   16 SUPPLEMENTARY P      .1048576000E+07 FLAG TABLE 002181
   17 VISIBILITY MEAS      .0000000000E+00 CODE TABLE 002182
   18 CLOUD DETECTION      .1000000000E+01 CODE TABLE 002183
   19 TYPE OF LIGHTNI      .0000000000E+00 CODE TABLE 002184
   20 TYPE OF SKY CON      .0000000000E+00 CODE TABLE 002179
   21 CAPABILITY TO D             MISSING FLAG TABLE 002186
   22 CAPABILITY TO D             MISSING FLAG TABLE 002187
   23 CAPABILITY TO D             MISSING FLAG TABLE 002188
   24 CAPABILITY TO D      .2048000000E+04 FLAG TABLE 002189
   25 PRESSURE             .9640000000E+05 PA
   26 PRESSURE REDUCE      .1024300000E+06 PA
   27 3-HOUR PRESSURE      .2000000000E+02 PA
   28 CHARACTERISTIC       .3000000000E+01 CODE TABLE 010063
   29 HEIGHT OF SENSO      .2040000000E+01 M
   30 HEIGHT OF SENSO             MISSING M
   31 TEMPERATURE/DRY      .2835500000E+03 K
   32 DEW-POINT TEMPE      .2803500000E+03 K
   33 RELATIVE HUMIDI      .8100000000E+02 %
   34 DEPTH BELOW LAN      .5000000000E-01 M
   35 SOIL TEMPERATUR      .2829500000E+03 K
   36 DEPTH BELOW LAN      .1000000000E+00 M
   37 SOIL TEMPERATUR      .2848500000E+03 K
   38 DEPTH BELOW LAN      .2000000000E+00 M
   39 SOIL TEMPERATUR      .5840700000E+03 K
   40 DEPTH BELOW LAN      .5000000000E+00 M
   41 SOIL TEMPERATUR      .5840700000E+03 K
   42 DEPTH BELOW LAN      .1000000000E+01 M
   43 SOIL TEMPERATUR             MISSING K
   44 HEIGHT OF SENSO      .2400000000E+01 M
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 45 HEIGHT OF SENSO             MISSING M
 46 ATTRIBUTE OF FO      .0000000000E+00 CODE TABLE 033041
 47 HORIZONTAL VISI      .1246000000E+05 M
 48 HEIGHT OF SENSO             MISSING M
 49 ICE DEPOSIT (TH             MISSING M
 50 RATE OF ICE ACC             MISSING CODE TABLE 020032
 51 METHOD OF STATE      .0000000000E+00 CODE TABLE 002176
 52 STATE OF THE GR             MISSING CODE TABLE 020062
 53 METHOD OF SNOW              MISSING CODE TABLE 002177
 54 TOTAL SNOW DEPT             MISSING M
 55 CLOUD COVER (TO      .0000000000E+00 %
 56 VERTICAL SIGNIF             MISSING CODE TABLE 008002
 57 CLOUD AMOUNT                MISSING CODE TABLE 020011
 58 CLOUD TYPE                  MISSING CODE TABLE 020012
 59 ATTRIBUTE OF FO      .0000000000E+00 CODE TABLE 033041
 60 HEIGHT OF BASE              MISSING M
 61 VERTICAL SIGNIF             MISSING CODE TABLE 008002
 62 CLOUD AMOUNT                MISSING CODE TABLE 020011
 63 CLOUD TYPE                  MISSING CODE TABLE 020012
 64 ATTRIBUTE OF FO      .0000000000E+00 CODE TABLE 033041
 65 HEIGHT OF BASE              MISSING M
 66 VERTICAL SIGNIF             MISSING CODE TABLE 008002
 67 CLOUD AMOUNT                MISSING CODE TABLE 020011
 68 CLOUD TYPE                  MISSING CODE TABLE 020012
 69 ATTRIBUTE OF FO      .0000000000E+00 CODE TABLE 033041
 70 HEIGHT OF BASE              MISSING M
 71 VERTICAL SIGNIF             MISSING CODE TABLE 008002
 72 CLOUD AMOUNT                MISSING CODE TABLE 020011
 73 CLOUD TYPE                  MISSING CODE TABLE 020012
 74 ATTRIBUTE OF FO      .0000000000E+00 CODE TABLE 033041
 75 HEIGHT OF BASE              MISSING M
 76 PRESENT WEATHER      .2000000000E+01 CODE TABLE 020003
 77 TIME PERIOD OR      -.6000000000E+02 MINUTE
 78 PAST WEATHER (1      .0000000000E+00 CODE TABLE 020004
 79 PAST WEATHER (2      .0000000000E+00 CODE TABLE 020005
 80 TIME SIGNIFICAN      .2000000000E+01 CODE TABLE 008021
 81 TIME PERIOD OR      -.1000000000E+02 MINUTE
 82 INTENSITY OF PR             MISSING KG/(M**2)S
 83 SIZE OF PRECIPI             MISSING M
 84 TIME SIGNIFICAN             MISSING CODE TABLE 008021
 85 HEIGHT OF SENSO      .1390000000E+02 M
 86 HEIGHT OF SENSO             MISSING M
 87 TIME SIGNIFICAN      .2000000000E+01 CODE TABLE 008021
 88 TIME PERIOD OR      -.1000000000E+02 MINUTE
 89 WIND DIRECTION       .1170000000E+03 DEGREE TRUE
 90 WIND SPEED           .6500000000E+01 M/S
 91 TIME SIGNIFICAN             MISSING CODE TABLE 008021
 92 TIME PERIOD OR      -.1000000000E+02 MINUTE
 93 MAXIMUM WIND GU             MISSING DEGREE TRUE
 94 MAXIMUM WIND GU      .9800000000E+01 M/S
 95 TIME PERIOD OR      -.6000000000E+02 MINUTE
 96 MAXIMUM WIND GU             MISSING DEGREE TRUE
 97 MAXIMUM WIND GU      .1020000000E+02 M/S
 98 TIME PERIOD OR      -.1000000000E+02 MINUTE
 99 EXTREME COUNTER      .9700000000E+02 DEGREE TRUE
100 EXTREME CLOCKWI      .1300000000E+03 DEGREE TRUE
101 HEIGHT OF SENSO      .2040000000E+01 M
102 HEIGHT OF SENSO             MISSING M
103 TIME PERIOD OR      -.6000000000E+02 MINUTE
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104 MAXIMUM TEMPERA      .2834800000E+03 K
105 MINIMUM TEMPERA      .2819800000E+03 K
106 HEIGHT OF SENSO      .5000000000E-01 M
107 TIME PERIOD OR      -.6000000000E+02 MINUTE
108 MINIMUM TEMPERA      .2804600000E+03 K
109 HEIGHT OF SENSO      .1100000000E+01 M
110 METHOD OF PRECI      .1000000000E+01 CODE TABLE 002175
111 METHOD OF LIQUI      .0000000000E+00 CODE TABLE 002178
112 TIME PERIOD OR      -.6000000000E+02 MINUTE
113 TOTAL PRECIPITA      .0000000000E+00 KG/M**2
114 HEIGHT OF SENSO              MISSING M
115 METHOD OF EVAPO      .0000000000E+00 CODE TABLE 002185
116 TIME PERIOD OR      -.6000000000E+02 MINUTE
117 EVAPORATION/EVA              MISSING KG/M**2
118 TIME PERIOD OR      -.6000000000E+02 MINUTE
119 TOTAL SUNSHINE               MISSING MINUTE
120 QUALITY INFORMA      .5368709120E+09 FLAG TABLE 033005
121 INTERNAL MEASUR              MISSING CODE TABLE 033006
122 SUBSTITUTED VAL      .0000000000E+00
123 BACKWARD REFERE      .0000000000E+00
124 DELAYED DESCRIP      .1210000000E+03 NUMERIC
125 DATA PRESENT IN              MISSING FLAG TABLE 031031
126 DATA PRESENT IN              MISSING FLAG TABLE 031031
127 DATA PRESENT IN              MISSING FLAG TABLE 031031
128 DATA PRESENT IN              MISSING FLAG TABLE 031031
129 DATA PRESENT IN              MISSING FLAG TABLE 031031
130 DATA PRESENT IN              MISSING FLAG TABLE 031031
131 DATA PRESENT IN              MISSING FLAG TABLE 031031
132 DATA PRESENT IN              MISSING FLAG TABLE 031031
133 DATA PRESENT IN              MISSING FLAG TABLE 031031
134 DATA PRESENT IN              MISSING FLAG TABLE 031031
135 DATA PRESENT IN              MISSING FLAG TABLE 031031
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  245 DATA PRESENT IN              MISSING FLAG TABLE 031031
  246 IDENTIFICATION       .8900000000E+02 CODE TABLE 001031
  247 GENERATING APPL      .1000000000E+01 CODE TABLE 001032
  248 (VAL) NOMINAL V      .2048000000E+04 FLAG TABLE 008083
  249 DELAYED DESCRIP      .4000000000E+01 NUMERIC
  250 TEMPERATURE/DRY      .3000000000E+03 K
  251 RELATIVE HUMIDI      .8000000000E+02 %
  252 WIND SPEED                   MISSING M/S
  253 MAXIMUM TEMPERA      .3100000000E+03 K
  254 SUBSTITUTED VAL      .0000000000E+00
  255 USE PREVIOUSLY       .0000000000E+00
  256 IDENTIFICATION       .8900000000E+02 CODE TABLE 001031
  257 GENERATING APPL      .1000000000E+01 CODE TABLE 001032
  258 (VAL) NOMINAL V      .1048000000E+04 FLAG TABLE 008083
  259 DELAYED DESCRIP      .4000000000E+01 NUMERIC
  260 TEMPERATURE/DRY              MISSING K
  261 RELATIVE HUMIDI              MISSING %
  262 WIND SPEED           .7000000000E+01 M/S
  263 MAXIMUM TEMPERA              MISSING K
```

As above, but bit map resolved

```
    1 OPERATOR                          ********** 223000.0 223000.0
    2 GENERATING CENTRE( CODE TABLE 00  **********     89.0     89.0
    3 GENERATING APPLICATION (CODE TAB  **********      1.0      1.0
    4 STATISTICS (008024/008023)        **********   2048.0   1048.0
    5 INCREMENTAL UPDATE NUMBER         ********** ******** ********
    6 MINIMISATION SIMULATION NUMBER    ********** ******** ********
    7 WMO BLOCK NUMBER                        11.0 ******** ********
    8 WMO STATION NUMBER                     538.0 ******** ********
    9 STATION OR SITE NAME                  1020.0 ******** ********
   10 TYPE OF STATION                          1.0 ******** ********
   11 YEAR                                  2005.0 ******** ********
   12 MONTH                                   10.0 ******** ********
   13 DAY                                     11.0 ******** ********
```

14	HOUR	7.0	********	********
15	MINUTE	.0	********	********
16	LATITUDE (HIGH ACCURACY)	49.2	********	********
17	LONGITUDE (HIGH ACCURACY)	14.3	********	********
18	HEIGHT OF STATION GROUND ABOVE M	500.0	********	********
19	HEIGHT OF BAROMETER ABOVE MEAN S	508.0	********	********
20	SURFACE QUALIFIER (TEMPERATURE D	3.0	********	********
21	MAIN PRESENT WEATHER DETECTING S	1.0	********	********
22	SUPPLEMENTARY PRESENT WEATHER SE	1048576.0	********	********
23	VISIBILITY MEASUREMENT SYSTEM	.0	********	********
24	CLOUD DETECTION SYSTEM	1.0	********	********
25	TYPE OF LIGHTNING DETECTION SENS	.0	********	********
26	TYPE OF SKY CONDITION ALGORITHM	.0	********	********
27	CAPABILITY TO DETECT PRECIPITATI	**********	********	********
28	CAPABILITY TO DETECT OTHER WEATH	**********	********	********
29	CAPABILITY TO DETECT OBSCURATION	**********	********	********
30	CAPABILITY TO DISCRIMINATE LIGHT	2048.0	********	********
31	PRESSURE	96400.0	********	********
32	PRESSURE REDUCED TO MEAN SEA LEV	102430.0	********	********
33	3-HOUR PRESSURE CHANGE	20.0	********	********
34	CHARACTERISTIC OF PRESSURE TENDE	3.0	********	********
35	HEIGHT OF SENSOR ABOVE LOCAL GRO	2.0	********	********
36	HEIGHT OF SENSOR ABOVE WATER SUR	**********	********	********
37	TEMPERATURE/DRY-BULB TEMPERATURE	283.6	300.0	********
38	DEW-POINT TEMPERATURE	280.4	********	********
39	RELATIVE HUMIDITY	81.0	80.0	********
40	DEPTH BELOW LAND SURFACE	.1	********	********
41	SOIL TEMPERATURE	282.9	********	********
42	DEPTH BELOW LAND SURFACE	.1	********	********
43	SOIL TEMPERATURE	284.9	********	********
44	DEPTH BELOW LAND SURFACE	.2	********	********
45	SOIL TEMPERATURE	584.1	********	********
46	DEPTH BELOW LAND SURFACE	.5	********	********
47	SOIL TEMPERATURE	584.1	********	********
48	DEPTH BELOW LAND SURFACE	1.0	********	********
49	SOIL TEMPERATURE	**********	********	********
50	HEIGHT OF SENSOR ABOVE LOCAL GRO	2.4	********	********
51	HEIGHT OF SENSOR ABOVE WATER SUR	**********	********	********
52	ATTRIBUTE OF FOLLOWING VALUE	.0	********	********
53	HORIZONTAL VISIBILITY	12460.0	********	********
54	HEIGHT OF SENSOR ABOVE LOCAL GRO	**********	********	********
55	ICE DEPOSIT (THICKNESS)	**********	********	********
56	RATE OF ICE ACCRETION	**********	********	********
57	METHOD OF STATE OF GROUND MEASUR	.0	********	********
58	STATE OF THE GROUND (WITH OR WIT	**********	********	********
59	METHOD OF SNOW DEPTH MEASUREMENT	**********	********	********
60	TOTAL SNOW DEPTH	**********	********	********
61	CLOUD COVER (TOTAL)	.0	********	********
62	VERTICAL SIGNIFICANCE (SURFACE O	**********	********	********
63	CLOUD AMOUNT	**********	********	********
64	CLOUD TYPE	**********	********	********
65	ATTRIBUTE OF FOLLOWING VALUE	.0	********	********
66	HEIGHT OF BASE OF CLOUD	**********	********	********
67	VERTICAL SIGNIFICANCE (SURFACE O	**********	********	********
68	CLOUD AMOUNT	**********	********	********
69	CLOUD TYPE	**********	********	********
70	ATTRIBUTE OF FOLLOWING VALUE	.0	********	********
71	HEIGHT OF BASE OF CLOUD	**********	********	********
72	VERTICAL SIGNIFICANCE (SURFACE O	**********	********	********

73	CLOUD AMOUNT	**********	********	********
74	CLOUD TYPE	**********	********	********
75	ATTRIBUTE OF FOLLOWING VALUE	.0	********	********
76	HEIGHT OF BASE OF CLOUD	**********	********	********
77	VERTICAL SIGNIFICANCE (SURFACE O	**********	********	********
78	CLOUD AMOUNT	**********	********	********
79	CLOUD TYPE	**********	********	********
80	ATTRIBUTE OF FOLLOWING VALUE	.0	********	********
81	HEIGHT OF BASE OF CLOUD	**********	********	********
82	PRESENT WEATHER (SEE NOTE 1)	2.0	********	********
83	TIME PERIOD OR DISPLACEMENT	-60.0	********	********
84	PAST WEATHER (1) (SEE NOTE 2)	.0	********	********
85	PAST WEATHER (2) (SEE NOTE 2)	.0	********	********
86	TIME SIGNIFICANCE	2.0	********	********
87	TIME PERIOD OR DISPLACEMENT	-10.0	********	********
88	INTENSITY OF PRECIPITATION	**********	********	********
89	SIZE OF PRECIPITATING ELEMENT	**********	********	********
90	TIME SIGNIFICANCE	**********	********	********
91	HEIGHT OF SENSOR ABOVE LOCAL GRO	13.9	********	********
92	HEIGHT OF SENSOR ABOVE WATER SUR	**********	********	********
93	TIME SIGNIFICANCE	2.0	********	********
94	TIME PERIOD OR DISPLACEMENT	-10.0	********	********
95	WIND DIRECTION	117.0	********	********
96	WIND SPEED	6.5	********	7.0
97	TIME SIGNIFICANCE	**********	********	********
98	TIME PERIOD OR DISPLACEMENT	-10.0	********	********
99	MAXIMUM WIND GUST DIRECTION	**********	********	********
100	MAXIMUM WIND GUST SPEED	9.8	********	********
101	TIME PERIOD OR DISPLACEMENT	-60.0	********	********
102	MAXIMUM WIND GUST DIRECTION	**********	********	********
103	MAXIMUM WIND GUST SPEED	10.2	********	********
104	TIME PERIOD OR DISPLACEMENT	-10.0	********	********
105	EXTREME COUNTERCLOCKWISE WIND DI	97.0	********	********
106	EXTREME CLOCKWISE WIND DIRECTION	130.0	********	********
107	HEIGHT OF SENSOR ABOVE LOCAL GRO	2.0	********	********
108	HEIGHT OF SENSOR ABOVE WATER SUR	**********	********	********
109	TIME PERIOD OR DISPLACEMENT	-60.0	********	********
110	MAXIMUM TEMPERATURE, AT HEIGHT A	283.5	310.0	********
111	MINIMUM TEMPERATURE, AT HEIGHT A	282.0	********	********
112	HEIGHT OF SENSOR ABOVE LOCAL GRO	.1	********	********
113	TIME PERIOD OR DISPLACEMENT	-60.0	********	********
114	MINIMUM TEMPERATURE, AT HEIGHT A	280.5	********	********
115	HEIGHT OF SENSOR ABOVE LOCAL GRO	1.1	********	********
116	METHOD OF PRECIPITATION MEASUREM	1.0	********	********
117	METHOD OF LIQUID CONTENT MEASURE	.0	********	********
118	TIME PERIOD OR DISPLACEMENT	-60.0	********	********
119	TOTAL PRECIPITATION/TOTAL WATER	.0	********	********
120	HEIGHT OF SENSOR ABOVE LOCAL GRO	**********	********	********
121	METHOD OF EVAPORATION MEASUREMEN	.0	********	********
122	TIME PERIOD OR DISPLACEMENT	-60.0	********	********
123	EVAPORATION/EVAPOTRANSPIRATION	**********	********	********
124	TIME PERIOD OR DISPLACEMENT	-60.0	********	********
125	TOTAL SUNSHINE	**********	********	********
126	QUALITY INFORMATION (AWS DATA)	536870912.0	********	********
127	INTERNAL MEASUREMENT STATUS INFO	**********	********	********