PART C

COMMON FEATURES TO BINARY AND ALPHANUMERIC CODES

a. FM system of numbering table-driven alphanumeric codes

b. List of table-driven alphanumeric codes with their specifications and associated code tables

   ATTACHMENT: CREX template examples

c. Common code tables to binary and alphanumeric codes

   ATTACHMENT: List of alphanumeric code tables related to BUFR and CREX Table B

a. FM SYSTEM OF NUMBERING TABLE-DRIVEN ALPHANUMERIC CODES

Each table-driven code bears a number, preceded by the letters FM. This number is followed by a Roman numeral to identify the session of CBS which either approved the code as a new one or made the latest amendment to its previous version. A code approved or amended by correspondence after a session of CBS receives the number of that session.

Furthermore, an indicator term is used to designate the code colloquially and is therefore called a "code name".

N O T E on nomenclature:

Changes and augmentations to the structure of the CREX data representation shall be identified as different "CREX edition numbers". The current edition number is 1.

Changes to the content of the parameter Tables A, B, C and D shall be identified as different "tables' versions". The previous tables were Version 2; the changes described in this edition will become "Tables A, B, C and D, Version 3".

Further CREX editions and tables' versions may be generated independently of one another in the future as requirements dictate.

Important note: The CBS recommendation number defining the last amendments is added at the bottom of the pages. Side bars indicate where the last amendments affect codes, regulations or tables.

The FM system of numbering the codes, together with the corresponding code names and their reference list of CBS approved decision, is the following:

FM SYSTEM OF TABLE-DRIVEN ALPHANUMERIC CODE

FM 95–XII CREX **Character form for the representation and exchange of data**
Res. 8 (EC-LI), Rec. 8 (CBS-99), Rec. 9 (CBS-00), approved by the President of WMO, Res. 4 (EC-LIII) and Rec. 9 (CBS-01), approved by the President of WMO

b. LIST OF TABLE-DRIVEN ALPHANUMERIC CODES WITH THEIR SPECIFICATIONS AND ASSOCIATED CODE TABLES

FM 95–XII CREX **Character form for the representation and exchange of data**

C O D E F O R M :

SECTION 0		Indicator section
SECTION 1		Data description section
SECTION 2		Data section
SECTION 3	(	Optional section))
SECTION 4		End section

N O T E S :

(1) CREX is the name of a character code for the representation and exchange of meteorological and other data.

(2) CREX uses many of the principles of FM 94 BUFR.

(3) CREX may be used for the exchange of data for which there is no suitable existing WMO code form.

(4) A CREX message shall consist of one or more subsets of related meteorological data defined, described, and represented by a single CREX entity. For observational data, each subset shall correspond to one report.

(5) A CREX message consists of sections:

Section number	*Name*	*Contents*
0	Indicator section	'CREX'
1	Data description section	CREX Master table number, edition number, table version number, data category, then a collection of descriptors which define the form and content of data subsets making the data section, and an optional check digit indicator "E"
2	Data section	A set of data items defined by Section 1
3	Optional section	"SUPP" followed by additional items for local use
4	End section	'7777'

(6) It will be noted that CREX representation is suitable for the manual encoding and visual display of meteorological and other data.

R E G U L A T I O N S :

95.1 General

95.1.1 The beginning and ending of the data representation form shall be identified by the characters ‘CREX’ and ‘7777’, respectively.

95.1.2 Information within CREX shall be character coded.

95.1.3 A group is a sequence of one or more contiguous characters corresponding to a single data descriptor or data value. Groups shall be separated from each other by one or more space characters. Multiple space characters shall be used when needed to improve human readability.

95.1.4 The subset terminator shall be represented by the character string ‘+’. The subset terminator shall not be used when the subset is the last subset.

95.1.5 The section terminator shall be represented by the character string ‘++’. The section terminator shall additionally function as a subset terminator for the last subset.

95.2 Section 0 — Indicator section

Section 0 shall be four characters long consisting of the character sequence “CREX”.

95.3 Section 1 — Data description section

95.3.1 The data description section shall begin with the CREX table descriptor starting with the letter T and followed by a six-digit number (tteevv) without separator character. The first two digits (tt) shall define the CREX Master Table used (tt = 00 if the standard WMO FM 95 CREX tables are used). The next two digits (ee) shall indicate the CREX edition number used and the last two digits (vv) shall indicate the CREX table version number used.

95.3.2 Immediately following the CREX table descriptor and a space character as separator, Section 1 shall contain a three-digit reference to CREX Table A, preceded by the letter A.

95.3.3 Data description syntax for CREX:

95.3.3.1 After the CREX table descriptor and the CREX Table A descriptor, Section 1 shall have one or more data descriptor(s). Data descriptors shall be preceded by a space character as separator. Data descriptors shall occupy six characters. Each descriptor shall have three parts: F (1 letter), xx (2 digits), yyy (3 digits or – (minus sign) followed by two digits for C02yyy data description operator for negative scales – see CREX Table C).

95.3.3.2 The first part (F) of a data descriptor shall be: B, C, D or R.

95.3.3.3 If F = B, the descriptor shall function as “element descriptor”, and it shall define a single data item by reference to CREX Table B named: Bxxyyy.

95.3.3.4 If F = C, the descriptor shall function as “operator descriptor”, and it shall define an operation by reference to CREX Table C named: Cxxyyy.

95.3.3.5 If F = R, the descriptor shall function as ‘replication descriptor’. The two digits “xx” shall define the number of following descriptors to be repeated the number of times defined by the three digits “yyy”. If “yyy” equal “000”, the descriptor defines a delayed replication. Delayed replication is the replication of data values of which the number of replication is

known only in the observed report and will therefore be part of the data section (for example: number of levels in a sounding). A corresponding number of four digits in the data section shall then define the number of replications of the data values corresponding to the following xx descriptors in the data description section.

95.3.3.6 If F = D, the descriptor shall function as “sequence descriptor”, and it shall define a list of element descriptors, replication descriptors, operator descriptors and/or sequence descriptors by reference to CREX Table D and named: Dxxyyy.

95.3.4 CREX Table B shall define the element descriptors. If one entry in CREX Table B and one entry in BUFR Table B have the same table reference, the element name shall be the same in both tables. CREX Table B entries shall contain:

(*a*) The table reference (B xx yyy);

(*b*) The element name (64 characters maximum);

(*c*) The units to be used for data representation in CREX, or instead, a reference to a code table or flag table which will then define the possible data value for the element;

(*d*) The scale factor to be applied to the data value for CREX purposes; the scale defines the precision of the value. No decimal points shall be used in the data section, so a positive scale means that so many figures after the decimal point are included (e.g. scale = 2 means values coded in hundredths, e.g. height coded in centimetre). A negative scale means that so many figures before the decimal point are not included (e.g. heights in hundreds of metres would have scale = –2);

(*e*) The number of characters to be used in CREX to represent the corresponding data value (without counting the sign);

(*f*) Reference values for CREX elements are always zero and there shall be no column for this attribute in CREX tables.

NOTE: Each entry in CREX Table B defining element descriptor should correspond with entries in BUFR Table B and listed in the same table, in Part B, Binary codes, BUFR/CREX Table B.

95.3.4.1 Units shall be based on either standard international units or standard common usage units used by the data producer and the users.

95.3.4.2 An operator descriptor shall be used to define change of unit, scale, or data width. The change shall apply only to the data value of the element referenced in the following element descriptor. The “yyy” digits of the operator descriptor shall define the new unit (yyy being equal to the code figure of the new unit defined in Common Code Table C-6 listing all the possible units), the new scale or the new data width. The original Table B unit, scale or data width shall be back in force again for that element when subsequently referenced in the data description section until a new change occurs.

NOTE: Change of unit, scale or data width should be avoided; it should be only a last resort solution. These changes are not recommended in a common CREX Table D sequence. The change operators should not be used when the end user of the message would be a human reader.

95.3.4.3 CREX code tables shall have the same code figures as BUFR code tables. As CREX code tables are generally longer than corresponding BUFR code tables (for example: 99 entries rather than 63), the value corresponding to ‘Missing’ and the values over within the BUFR code table shall be declared “Not used” within the corresponding CREX table (‘63’ to ‘99’ Not used, in the example).

95.3.4.4 CREX flag tables shall be the same as BUFR flag tables. However, in CREX, flag tables shall be expressed using the octal representation in the following way: a set of three bits being represented by a figure from 0 to 7 (the leftmost bit being the first bit in the table rank), zeros being added on the left when the number of flags is not a multiple of 3:

000 = 0 (no bit set)

001 = 1 (bit 3 set)

010 = 2 (bit 2 set)

011 = 3 (bits 2 and 3 set)

100 = 4 (bit 1 set)

101 = 5 (bits 1 and 3 set)

110 = 6 (bits 1 and 2 set)

111 = 7 (all bits set).

For example, the seven flag table sequence “1100110” transformed with the addition on the left of two zeros to “001100110” would be translated to “146” in octal.

Missing value for a flag table shall be indicated by a set of solidi “/” covering the data width.

95.3.5 Element descriptors corresponding to the following classes in CREX Table B shall remain in effect until superseded by redefinition:

Class

00 Reserved

01 Identification

02 Instrumentation

03 Reserved

04 Location (time)

05 Location (horizontal-1)

06 Location (horizontal-2)

07 Location (vertical)

08 Significance qualifiers

09 Reserved

NOTE: Redefinition is effected by the occurrence of element descriptors which contradict the preceding element descriptors from these classes. If two or more elements from the same class do not contradict one another, they all apply.

95.3.5.1 The consecutive occurrence of two identical element descriptors or identical sets of element descriptors from classes 04 to 07, inclusive, shall denote a range of values bounded by the corresponding element values. This enables the definition of layers and simple time periods.

95.3.5.2 The definition of line, areas, volumes and more complex time attributes shall be accomplished using descriptors from class 04 to 07 in association with suitable descriptors from class 08.

95.3.5.3 The consecutive occurrence of two or more non-identical element descriptors from classes 04 to 07, inclusive, shall infer that all such elements remain in effect until redefined, unless such elements define an increment.

95.3.5.4 Data items defined by element descriptors in class 10 or above shall not behave as coordinates with respect to subsequent data.

95.3.5.5 Any occurrence of an element descriptor from classes 04 to 07, inclusive, which defines an increment, shall indicate that the location corresponding to that class is to be incremented by the corresponding data value.

95.3.5.6 If a CREX message is made up of more than one subset, each subset shall be treated as though it was the first subset encountered.

95.3.6 A check digit indicator is optional at the end of section 1. If present, it shall take the form of the single character “E”.

95.4 Section 2 — Data section

95.4.1 The data section shall be comprised of one or more subsets of groups. Each group shall represent one data value. The sequence of data values shall correspond in order to the list of descriptors defined by Section 1 and shall be terminated by subset terminator, or, in the case of the last subset, by the section terminator.

95.4.2 Each data value shall be coded using the number of characters defined in the CREX Table B entry of the corresponding direct element descriptor in Section 1 or of the corresponding element descriptor within a sequence of descriptors defined by a sequence descriptor in Section 1. If the data value is a number defining a delayed replication (descriptor “Rxx000” in section 1), it shall comprise four digits.

95.4.3 Each numerical data value shall include leading zeroes when the number of digits required to represent the value is smaller than the number of characters defined in the corresponding CREX Table B entry or for the delayed repetition number, to keep the number of characters representing the data value always equal to the original data width defined in CREX tables or Regulations, in order to facilitate the presentation alignment and the decoding process.

95.4.4 Positive numerical data values shall be unsigned. Negative numerical data values only shall be signed and represented with the negative sign immediately preceding the data value.

95.4.5 Each data value having a unit defined as character shall include trailing blanks when the number of characters required to represent the data value is smaller than the number of characters defined in the corresponding CREX Table B entry, to keep the number of characters representing the data value always equal to the original data width defined in CREX tables, in order to facilitate the presentation alignment and the decoding process.

95.4.6 A missing value shall be represented as a group of solidi “/” characters equal in number to the number of characters normally required to represent the value concerned.

95.4.7 If the check digit indicator “E” is present at the end of section 1, a check digit shall be added in front of each data value, immediately preceding the first character of each data value. The check digit shall take the value of the unit digit of the ordered number of the data value, counting along the data subset in which it is contained, starting from 0 (the digit increases from 0 to 9 cyclically). The check digit shall precede immediately the negative sign if the data value is negative.

95.5 Section 3 — Optional section

95.5.1 Section 3 is optional and if present, shall contain additional items as may be defined within each Centre for specific use.

95.5.2 Section 3, if present, shall start with the four character sequence “SUPP” and shall end with a section terminator.

95.6 Section 4 — End section

Section 4 shall be four characters long coded as ‘7777’. Section 4 shall not have a section terminator.

SPECIFICATIONS OF SECTIONS

N o t e s :

(1) Each section contains one or more groups of characters separated by one separator character.

(2) In the following, each group is numbered as group 1, group 2 and so on, from the beginning of the section.

Section 0 — Indicator section

Group No.	Contents	Meaning
1	CREX	CREX : Beginning of the CREX message

Section 1 — Data description section

Group No.	Contents	Meaning
1	Ttteevv	T : Indicator for CREX Tables tt : CREX Master table used (00 for WMO standard FM 95 CREX tables) ee : CREX edition number (currently 01) vv : CREX table version number (currently 03)
2	Annn	A : Indicator for CREX Table A entry nnn : Data category from CREX Table A
3 to n	Bxxyyy, Cxxyyy, Dxxyyy and/or Rxxyyy	B, C, D : Indicators for CREX Tables B, C, D entries xxyyy : 5 digits which indicate references from CREX Tables B, C and/or D R : Indicator for replication xx: number of replicated descriptors yyy: number of replications (delayed replication if yyy= 0)
(n + 1)	(E)	E : Optional check digit indicator

Section 2 — Data section

Group No.	Contents	Meaning
1 to m	(d) Data values	d : optional check digit data values: data values corresponding to section 1 descriptors

(Section 3 — Optional section)

Group No.	Contents	Meaning
1	SUPP	The four letters SUPP indicate the presence of a supplementary optional section
2 to p	Items for local use	Additional items for local use developed by generating Centre

Section 4 — End section

Group No.	Contents	Meaning
1	7777	End of CREX

CREX TABLES, CODES TABLES, FLAG TABLES AND TEMPLATE EXAMPLES

FM 95 CREX refers to three types of tables: CREX tables, code tables and flag tables.

CREX tables

Tables containing information used to describe, classify and define the contents of a CREX message are called CREX tables. Four CREX tables are defined: Tables A, B, C and D. Entry numbering shall be the same in CREX tables and BUFR tables for the same entity represented. Table B entries shall be listed in the common BUFR/CREX Table B in Part B, Binary codes. Table D common sequences shall not be defined in both CREX Table D and BUFR Table D unless otherwise a conversion between both Tables D is not simple, that is, the conversion is not completed by simple replacement of part "F" of each descriptor. If a CREX Table D sequence is not defined in BUFR Table D, it shall be assigned a number not used by any BUFR sequence. Similarly, new BUFR Table D sequences shall be assigned a number not used by any CREX Table D sequence.

Code tables and flag tables

CREX Table B defines some elements by means of code tables or flag tables. Within this general description are included code tables referenced by code figures and flag tables, where each bit is set to 0 or 1 to indicate a false or true value with respect to a specific criterion. Within CREX all code tables and flag tables refer to elements defined within CREX Table B; they are numbered according to the xx and yyy values of the corresponding Table B reference.

Code tables in CREX

CREX code tables have the same code figure as BUFR code tables and are not reproduced. Values of the CREX code, which are equal to or beyond the missing value of BUFR code figure, shall not be used. A missing value in CREX for a code table shall be indicated by a set of solidi "/" covering the data width.

Flag tables in CREX

CREX flag tables shall be the same as BUFR flag tables. However flag tables in CREX shall be expressed using octal representation in the following way: a set of three bits being represented by a figure from 0 to 7 (the leftmost bit being the first bit in the table rank), zeros being added on the left when the number of flags is not a multiple of 3:

000 = 0 (not bit set)
001 = 1 (bit 3 set)
010 = 2 (bit 2 set)
011 = 3 (bits 2 and 3 set)
100 = 4 (bit 1 set)
101 = 5 (bits 1 and 3 set)
110 = 6 (bits 1 and 2 set)
111 = 7 (all bits set).

For example, the seven flag table sequence "1100110" transformed with the addition on the left of two zeros to "001100110" would be translated to "146" in octal.

CREX flag tables are the same as BUFR flag tables and are not reproduced here.

In CREX, a missing value for a flag table shall be indicated by a set of solidi "/" covering the data width.

CREX template examples

Examples of templates of some CREX messages are listed as models in the Attachment to help users understand the CREX code.

CREX TABLE RELATIVE TO SECTION 1

CREX Table A — *Data category*

Code figure	Data type
000	Surface data — land
001	Surface data — sea
002	Vertical soundings (other than satellite)
003	Vertical soundings (satellite)
004	Single level upper-air data (other than satellite)
005	Single level upper-air data (satellite)
006	Radar data
007	Synoptic features
008	Physical/chemical constituents
009	Dispersal and transport
010	Radiological data
011	CREX tables, complete replacement or update
012	Surface data (satellite)
013–019	Reserved
020	Status information
021	Radiances (satellite measured)
022–030	Reserved
031	Oceanographic data
032–100	Reserved
101	Image data
102–239	Reserved
240–254	For experimental use
255	Indicator for local use

CREX TABLES RELATIVE TO SECTION 2

CREX Table B — *Classification of elements*

B	X	Class	Comments
B	00	CREX table entries	
B	01	Identification	Identifies origin and type of data
B	02	Instrumentation	Defines instrument types used
B	03	Reserved	
B	04	Location (time)	Defines time and time derivatives
B	05	Location (horizontal-1)	Defines geographical position, including horizontal derivatives, in association with class 06 (first dimension of horizontal space)
B	06	Location (horizontal-2)	Defines geographical position including horizontal derivatives, in association with class 05 (second dimension of horizontal space)
B	07	Location (vertical)	Defines height, altitude, pressure level including vertical derivatives of position
B	08	Significance qualifiers	Defines special character of data
B	09	Reserved	
B	10	Non-coordinate location (vertical)	Height, altitude, and derivatives observed or measured, not defined as a vertical location
B	11	Wind and turbulence	Wind speed, direction, etc.
B	12	Temperature	
B	13	Hygrographic and hydrological elements	Humidity, rainfall, snowfall, etc.
B	14	Radiation and radiance	
B	15	Physical/chemical constituents	
B	19	Synoptic features	
B	20	Observed phenomena	Defines present/past weather, special phenomena, etc.
B	21	Radar data	
B	22	Oceanographic elements	
B	23	Dispersal and transport	
B	24	Radiological elements	
B	25	Processing information	
B	26	Non-coordinate location (time)	Defines time and time derivatives that are not coordinates
B	27	Non-coordinate location (horizontal-1)	Defines geographical positions, in conjunction with class 28, that are not coordinates
B	28	Non-coordinate location (horizontal-2)	Defines geographical positions, in conjunction with class 27, that are not coordinates
B	29	Map data	
B	30	Image	
B	33	Quality information	
B	35	Data monitoring information	

(continued)

(CREX Table B — continued)

N o t e s :

(1) Where a code table or flag table is appropriate, ‘code table’ or ‘flag table’, respectively is entered in the UNITS column.

(2) The code tables and flag tables associated with Table B are numbered to correspond with the xx and yyy part of the table reference.

(3) To encode values into CREX, the data (with units as specified in the UNITS column) must be multiplied by 10 to the power SCALE.

(4) Where UNITS are given as Character, data shall be coded as character data left justified within the field width.

(5) Classes 48 to 63 are reserved for local use; all other classes are reserved for future development.

(6) Entries 192 to 255 within all classes are reserved for local use.

(7) The use of local descriptors, as defined in Notes 5 and 6, in messages intended for non-local or international exchange is strongly discouraged.

(8) First-order statistics are included in Table B only when they are produced, as such, by the observing system.

CREX Table B entries from Class 0 to Class 35 are defined in BUFR/CREX Table B in Part B, Binary codes of the *Manual*.

N o t e : Class 31 does not exist in CREX.

CREX Table C — *Data description operators*

REFERENCE	OPERAND	OPERATOR NAME	OPERATING DEFINITION
C 01 YYY	YYY	Data width replacement	YYY characters (from 0000 to 999) replace specified Table B data width
C 02 YYY	YYY	Scale factor replacement	YYY (from -99 to 999) replaces the specified Table B scale factor
C 05 YYY	YYY	Character insertion	YYY characters (from 001 to 999), including spaces, are inserted as a data field
C 07 YYY	YYY	Units replacement	Change unit to unit defined in Common table C-6 by code figure equal to YYY, for example: YYY = 040 changes unit to Celsius YYY = 741 changes unit to km h^{-1} YYY = 201 changes unit to knot YYY = 740 changes unit to km.
C 60 YYY	YYY	National letters insertion (see Note)	YYY national letters including spaces are inserted as a data field.

N o t e : Only the character from the International Telegraphic Alphabet No. 2 (ITA2) are likely to be transmitted accurately to all recipients.

CREX Table D — *List of common sequences*

D	X	CATEGORY OF SEQUENCES
D	00	CREX table entries sequences
D	01	Location and identification sequences
D	02	Meteorological sequences common to surface data
D	03	Meteorological sequences common to vertical soundings data
D	04	For satellite observations *(not to be used in CREX for transmission)*
D	05	Meteorological or hydrological sequences common to hydrological observations
D	06	Meteorological or oceanographic sequences common to oceanographic observations
D	07	Surface report sequences (land)
D	08	Surface report sequences (sea)
D	09	Vertical sounding sequences (conventional data)
D	10	Vertical sounding sequences (satellite data) *(not to be used in CREX for transmission)*
D	11	Single level report sequences (conventional data)
D	12	Single level report sequences (satellite data) (*not to be used in CREX for transmission)*
D	13	Sequences common to image data *(not to be used in CREX for transmission)*
D	14	Reserved
D	15	Oceanographic report sequences
D	16	Synoptic feature sequences
D	18	Radiological report sequences
D	21	Radar report sequences *(not to be used in CREX for transmission)*
D	35	Monitoring information

(1) From a conceptual point of view, Table D is not necessary:

(*a*) The Data description section can fully and completely describe the data using only element descriptors, operator descriptors and the rules of description;

(*b*) Such a means of defining the data would involve considerable overheads m terms of the length of the Data description section. Table D is a device to reduce these overheads;

(*c*) Each entry within Table D contains a list of descriptors. Each sequence descriptor that references to Table D may be ‘expanded’ by replacing it with the list corresponding to that entry. The process of ‘expansion’ is well defined, provided it results in a set of element descriptors and operator descriptors;

(*d*) Descriptors listed in entries to Table D may themselves refer to Table D, provided no circularity results on repeated expansion;

(*e*) The initial Table D has been limited to lists of descriptors likely to be frequently used. Every attempt has been made not to produce initial tables that are too comprehensive. Minor differences of reporting practice can be accommodated by not endeavouring to reduce each observation type to a single descriptor. Indeed, much more flexibility is retained if the Data description section is envisaged as containing three or four descriptors.

(continued)

(CREX Table D — continued)

(2) It should be noted that, initially, effort has been concentrated on the requirements for observational data. Extensions forecast data, time-series data, products, etc., follow logically and can be added at an appropriate future date.

(3) Underwater soundings are included, with some minor omissions, to illustrate the facility to describe data of slightly different contents.

(4) Categories 48 to 63 are reserved for local use; all other categories are reserved for future development.

(5) Entries 192 to 255 within all categories are reserved for local use.

Category 00 — *CREX table entries sequences*

SEQUENCE	TABLE REFERENCES			ELEMENT NAME
	F	X	Y	
D 00 010	D	00	003	Table D descriptor to be defined
	R	01	000	Delayed replication of 1 descriptor
	B	00	030	Descriptor defining sequence

Category 01 — *Location and identification sequences*

SEQUENCE			TABLE REFERENCES			ELEMENT NAME
			F	X	Y	
						(Identification)
D	01	029	B	01	018	Short station identifier
			D	02	001	Type of station
			D	01	011	Date
						(Identification — with physical location)
D	01	030	B	01	018	Short station identifier
			B	02	001	Type of station
			D	01	011	Date
			D	01	024	Latitude and longitude, height
						(Ozone instrumentation — Brewer spectrophotometer)
D	01	070	B	02	143	Ozone instrument type
			B	02	142	Ozone instrument serial number or identifier
			B	02	144	Light source type for Brewer
						(Ozone instrumentation — Dobson spectrophotometer)
D	01	074	B	02	143	Ozone instrument type
			B	02	142	Ozone instrument serial number/identification
			B	02	145	Wavelength setting for Dobson instrument
			B	02	146	Source conditions for Dobson instrument
						(Sounding identification)
D	01	075	D	01	001	WMO block number, WMO station number
			B	01	015	Station or site name
			D	01	024	Latitude, longitude, height of station
			B	08	021	18 = launch time
			D	01	011	Year, month, day
			D	01	012	Hour, minute
						(Ozone sounding instrumentation)
D	01	076	B	02	011	Radiosonde type
			B	02	143	Ozone instrument type
			B	02	142	Ozone instrument serial number or identifier

Category 02 — *Meteorological sequences common to surface data*

SEQUENCE	TABLE REFERENCES			ELEMENT NAME
	F	X	Y	
D 02 013	D	02	006	Pressure and pressure change
	D	02	003	Wind, temperature, humidity, visibility, weather
	R	01	000	Delayed replication of 1 descriptor
	D	02	005	Cloud layer information

Category 05 — *Meteorological or hydrological sequences common to hydrological observations*

SEQUENCE			TABLE REFERENCES			ELEMENT NAME
			F	X	Y	
						(SADC-HYCOS single measurement)
D	05	001	B	11	001	Wind direction
			B	11	002	Wind speed
			B	13	060	Total accumulated precipitation
			B	13	071	Upstream water level
						(SADC-HYCOS environmental measurement)
D	05	002	D	01	012	Hour, minute of environmental measurement
			B	12	001	Air temperature
			B	13	003	Relative humidity
			B	14	051	Direct solar radiation integrated over last hour
			B	13	060	Total accumulated precipitation
			B	13	072	Downstream water level
			B	13	080	pH
			B	13	081	Conductivity
			B	13	082	Water temperature
			B	13	083	Dissolved oxygen
			B	13	084	Turbidity
						(SADC-HYCOS measurement array definition)
D	05	003	D	01	012	Hour, minute of first single measurement minus increment
			B	04	065	Short time increment — time interval between measurements
			R	01	000	Delayed replication n times of next descriptor
			D	05	001	Single measurement
						(SADC-HYCOS report)
D	05	004	D	01	030	Identification
			D	05	002	Environmental measurement
			D	05	003	Measurement array
						(MEDHYCOS measurement)
D	05	006	B	13	072	Downstream water level
			B	13	082	Water temperature
			B	13	019	Precipitation last hour
			C	07	005	Next datum in kelvin
			C	01	004	Next datum over four characters
			B	12	001	Air temperature
			B	13	073	Maximum water height observed
			B	13	060	Total accumulated precipitation
						(MEDHYCOS report)
D	05	007	D	01	029	Identification
			D	01	012	Hour, minute (time of first measurement)
			B	04	065	Short time increment — time interval between measurements
			R	01	000	Delayed replication n times of next descriptor
			D	05	006	Single measurement

(continued)

(Category 05 — continued)

SEQUENCE			TABLE REFERENCES			ELEMENT NAME
			F	X	Y	
						(AOCHYCOS-Chad measurement)
D	05	008	D	05	006	Same as MEDHYCOS type measurement
			C	07	005	Next datum in kelvin
			C	01	004	Next datum over four characters
			B	12	030	Soil temperature at –50 cm
						(AOCHYCOS-Chad report)
D	05	009	D	01	029	Identification
			D	01	012	Hour, minute (time of first measurement)
			B	04	065	Short time increment — time interval between measurements
			R	01	000	Delayed replication n times of next descriptor
			D	05	008	Single measurement
						(MEDHYCOS-Measurement type 2)
D	05	010	D	05	008	Same as AOCHYCOS type measurement
			B	02	091	Sensor entry 4/20 mA (no. 1)
			B	02	091	Sensor entry 4/20 mA (no. 2)
						(MEDHYCOS report type 2)
D	05	011	D	01	029	Identification
			D	01	012	Hour, minute (time of first measurement)
			B	04	065	Short time increment — time interval between measurements
			R	01	000	Delayed replication n times of next descriptor
			D	05	010	Single measurement
						(Meteorological parameters associated with hydrological data)
D	05	016	B	14	021	Global radiation over period
			B	07	004	Atmospheric pressure
			B	13	003	Relative humidity
			B	11	002	Wind speed
			B	11	001	Wind direction
			B	11	041	Maximum wind speed (gusts)
			B	11	043	Maximum wind gust direction
						(Water quality measurement)
D	05	017	B	13	080	pH
			B	13	081	Conductivity
			B	13	083	Dissolved oxygen
			B	13	085	Oxidation reduction potential (ORP)
			B	13	084	Turbidity
						(MEDHYCOS report with meteorology and water quality data)
D	05	018	D	01	029	Identification
			D	01	012	Hour, minute (time) of first measurement
			B	04	065	Hour increment
			R	03	000	Number of replications of next three descriptors
			D	05	008	Same as AOCHYCOS type measurement
			D	05	016	Meteorological parameters associated to hydrological data
			D	05	017	Water quality measurement

Category 06 — *Meteorological or oceanographic sequences common to oceanographic observations*

SEQUENCE			TABLE REFERENCES			ELEMENT NAME
			F	X	Y	
D	06	001	B	02	032	Indicator for digitization
			R	02	000	Delayed replication of 2 descriptors
			B	07	062	Depth below sea surface
			B	22	042	Subsurface sea temperature
D	06	004	B	02	032	Indicator for digitization
			B	02	033	Method of salinity/depth measurement
			R	03	000	Delayed replication of 3 descriptors
			B	07	062	Depth below sea surface
			B	22	043	Subsurface sea temperature
			B	22	062	Salinity
D	06	005	B	02	031	Method of current measurement
			R	03	000	Delayed replication of 3 descriptors
			B	07	062	Depth below sea surface
			B	22	004	Direction of current
			B	22	031	Speed of current
						(Tide report identification, water level checks, time period or displacement, time increment)
D	06	020	B	01	075	Tide station alphanumeric identification
			D	01	011	Year, month, day
			D	01	012	Hour, minute
			B	22	042	Sea/water temperature
			B	22	120	Tide station automated water level check
			B	22	121	Tide station manual water level check
			B	04	075	Short time period or displacement
			B	04	065	Short time increment
						(Meteorological parameters in tide station)
D	06	021	B	01	075	Tide station alphanumeric identification
			D	01	011	Year, month, day
			D	01	012	Hour, minute
			B	22	122	Tide station automated meteorological data check
			B	22	123	Tide station manual meteorological data check
			B	12	001	Air temperature
			D	03	002	Pressure, wind direction, wind speed
						(Tidal elevation)
D	06	022	B	01	075	Tide station identification
			D	01	011	Year, month, day
			D	01	012	Hour, minute
			B	22	038	Tidal elevation with respect to local chart datum
			B	22	039	Meteorological residual tidal elevation (surge or offset)

(continued)

(Category 06 — continued)

SEQUENCE	TABLE REFERENCES			ELEMENT NAME
	F	X	Y	
D 06 024				(Tide elevation series)
	D	06	020	Tide report identification, water level checks, time period or displacement, time increment
	R	02	006	Replicate two descriptors six times
	B	22	038	Tidal elevation with respect to local chart datum
	B	22	039	Meteorological residual tidal elevation (surge or offset)

Category 07 — *Surface report sequences*

SEQUENCE	TABLE REFERENCES			ELEMENT NAME	
	F	X	Y		
				(Low altitude station)	
D 07 003	D	07	001	Location (high accuracy) and basic report	
	R	01	000	Delayed replication of 1 descriptor	
	D	02	005	Cloud layer information	
				(Low altitude station)	
D 07 004	D	07	002	Location (coarse accuracy) and basic report	
	R	01	000	Delayed replication of 1 descriptor	
	D	02	005	Cloud layer information	
				(D_VVVVV)	
D 07 012	R	03	000	Delayed replication of 3 descriptors (up to 3)	
	B	08	023	First order statistics	
	B	05	021	Direction of visibility observed	D_V
	B	20	001	Horizontal visibility	VVVV
				($D_RD_RV_RV_RV_RV_R$)	
D 07 013	R	06	000	Delayed replication of 6 descriptors (up to 4)	
	B	01	064	Runway designator	D_RD_R
	B	08	014	Qualification for runway visual range	
	B	20	061	Runway visual range	$V_RV_RV_RV_R$
	B	08	014	Qualification for runway visual range	
	B	20	061	Runway visual range	$V_RV_RV_RV_R$
	B	20	018	Tendency of runway visual range	i
				(w′w′)	
D 07 014	R	01	000	Delayed replication of 1 descriptor (up to 3)	
	B	20	019	Significant present weather	w′w′
				(Clouds group(s))	
D 07 015	R	01	000	Delayed replication of 1 descriptor	
	D	02	005	($N_SN_SN_S$, CC, $h_Sh_Sh_S$)	
	B	20	002	Vertical visibility	VV$h_Sh_Sh_S$
				(REw′w′)	
D 07 016	R	01	000	Delayed replication of 1 descriptor (up to 3)	
	B	20	020	Significant recent weather phenomena	REw′w′
				(Wind shear on runways(s))	
D 07 017	R	01	000	Delayed replication of 1 descriptor	
	B	11	070	Runway designator of the runway affected by wind shear (including ALL)	WS RWYD_RD_R
				(Trend-type landing forecast)	
D 07 018	B	08	016	Change qualifier of a trend-type forecast or an aerodrome forecast	TTTTT
	R	02	000	Delayed replication of 2 descriptors (up to 2)	
	B	08	017	Qualifier of the time when the forecast change is expected (FM, TL, AT)	TT
	D	01	012	GG, gg	

(continued)

(Category 07 — continued)

SEQUENCE			TABLE REFERENCES			ELEMENT NAME	
			F	X	Y		
D	07	018	R	04	000	Delayed replication of 4 descriptor (up to 1)	
(continued)			B	07	006	Height above station	
			B	11	001	Wind direction	ddd
			B	11	002	Wind speed	ff
			B	11	041	Maximum wind speed (gusts)	$f_m f_m$
			B	20	009	General weather indicator	
			R	01	000	Delayed replication of 1 descriptor (up to 1)	
			B	20	001	Horizontal visibility	VVVV
			D	07	014	w´w´	
						(Ozone data — single observation)	
D	07	030	B	15	001	Value of ozone measurement	
			B	15	002	Value of the air-mass	
						(Ozone data — averaged observations)	
D	07	031	B	08	022	Number of measurements	
			B	08	023	First order statistics = 4: mean value	
			B	15	001	Value (average) of ozone measurement	
			B	08	023	First order statistics = 9: best estimate of standard deviation	
			B	15	001	Best estimate of standard deviation of the ozone measurement	
			B	08	023	First order statistics = 11: harmonic mean	
			B	15	002	Value (harmonic mean) of the air-mass	
						(Total ozone measurement from a Brewer ground-based spectrophotometer obtained from a single observation)	
D	07	041	D	01	001	Identification	
			B	01	015	Station or site name	
			D	01	024	Latitude, longitude, height of station	
			D	01	011	Year, month, day (of ozone measurement)	
			D	01	012	Hour, minute (of ozone measurement)	
			D	01	070	Ozone instrumentation	
			D	07	030	Data (single observation)	
						(Total ozone measurement from a Brewer ground-based spectrophotometer obtained from averaged observations)	
D	07	042	D	01	01	Identification	
			B	01	015	Station or site name	
			D	01	024	Latitude, longitude, height of station	
			D	01	011	Year, month, day (of ozone measurement)	
			D	01	012	Hour, minute (of ozone measurement)	
			B	08	021	Time significance = 8 ensemble mean	
			B	04	025	Time period (minutes) for the computation of the average	
			D	01	070	Ozone instrumentation	
			D	07	031	Data (averaged observation)	

(Category 07 — continued)

SEQUENCE			TABLE REFERENCES			ELEMENT NAME
			F	X	Y	
						(Total ozone measurement from a Dobson ground-based spectrophotometer obtained from a single observation)
D	07	043	D	01	001	Identification
			B	01	015	Station or site name
			D	01	024	Latitude, longitude, height of station
			D	01	011	Year, month, day (of ozone measurement)
			D	01	012	Hour, minute (of ozone measurement)
			D	01	074	Ozone instrumentation
			D	07	030	Data (single observation)
						(Total ozone measurement from a Dobson ground-based spectrophotometer obtained from averaged observations)
D	07	044	D	01	001	Identification
			B	01	015	Station or site name
			D	01	024	Latitude, longitude, height of station
			D	01	011	Year, month, day (of ozone measurement)
			D	01	012	Hour, minute (of ozone measurement)
			B	08	021	Time significance = 8 ensemble mean
			B	04	025	Time period (minutes) for the computation of the average
			D	01	074	Ozone instrumentation
			D	07	031	Data (averaged observation)
						(Soil temperature below land surface)
D	07	060	B	07	061	Depth below land surface
			B	12	030	Soil temperature
						(Soil temperature data at number of depths not exceeding five – high accuracy position)
D	07	061	D	01	031	Identification, type, date/time, position (high accuracy), height
			R	01	005	Replicate one descriptor five times
			D	07	060	Depth below land surface, soil temperature
						(Soil temperature data at number of depths not exceeding five – coarse accuracy position)
D	07	062	D	01	032	Identification, type, date/time, position (coarse accuracy), height
			R	01	005	Replicate one descriptor five times
			D	07	060	Depth below land surface, soil temperature
						(Soil temperature with scale of 2 below land surface)
D	07	063	B	07	061	Depth below land surface
			B	12	130	Soil temperature (with scale of 2)

Category 09 — *Vertical sounding sequences (conventional data)*

SEQUENCE	TABLE REFERENCES			ELEMENT NAME
	F	X	Y	
				(Vertical wind profile)
D 09 001	D	01	037	Identification, etc. (land station, high accuracy position)
	R	01	000	Delayed replication of 1 descriptor
	D	03	011	Winds at heights
				(Vertical wind profile)
D 09 002	D	01	038	Identification, etc. (land station, coarse accuracy position)
	R	01	000	Delayed replication of 1 descriptor
	D	03	011	Winds at heights
				(Vertical wind profile)
D 09 003	D	01	037	Identification, etc. (land station, high accuracy position)
	R	01	000	Delayed replication of 1 descriptor
	D	03	012	Winds at pressure levels
				(Vertical wind profile)
D 09 004	D	01	038	Identification, etc. (land station, coarse accuracy position)
	R	01	000	Delayed replication of 1 descriptor
	D	03	012	Winds at pressure levels
				(Vertical sounding with relative humidity)
D 09 005	D	01	037	Identification, etc. (land station, high accuracy position)
	D	02	004	Significant cloud information
	R	01	000	Delayed replication of 1 descriptor
	D	03	013	Pressure, geopotential, temperature and wind data
				(Vertical sounding with relative humidity)
D 09 006	D	01	038	Identification, etc. (land station, coarse accuracy position)
	D	02	004	Significant cloud information
	R	01	000	Delayed replication of 1 descriptor
	D	03	013	Pressure, geopotential, temperature and wind data
				(Vertical sounding with dew-point data)
D 09 007	D	01	037	Identification, etc. (land station, high accuracy position)
	D	02	004	Significant cloud information
	R	01	000	Delayed replication of 1 descriptor
	D	03	014	Pressure, geopotential, temperature and wind data
				(Vertical sounding with dew-point data)
D 09 008	D	01	038	Identification, etc. (land station, coarse accuracy position)
	D	02	004	Significant cloud information
	R	01	000	Delayed replication of 1 descriptor
	D	03	014	Pressure, geopotential, temperature and wind data
				(Vertical wind profile)
D 09 011	D	01	039	Ship's identification, etc.
	R	01	000	Delayed replication of 1 descriptor
	D	03	011	Winds at heights

(continued)

(Category 09 — continued)

SEQUENCE	TABLE REFERENCES			ELEMENT NAME
	F	X	Y	
				(Vertical wind profile)
D 09 012	D	01	039	Ship's identification, etc.
	R	01	000	Delayed replication of 1 descriptor
	D	03	012	Winds at pressure levels
				(Vertical sounding with relative humidity)
D 09 013	D	01	039	Ship's identification, etc.
	D	02	004	Significant cloud information
	R	01	000	Delayed replication of 1 descriptor
	D	03	013	Pressure, geopotential, temperature and wind data
				(Vertical sounding with dew-point data)
D 09 014	D	01	039	Ship's identification, etc.
	D	02	004	Significant cloud information
	R	01	000	Delayed replication of 1 descriptor
	D	03	014	Pressure, geopotential, temperature and wind data
				(Vertical wind profile)
D 09 015	D	01	040	Ship's identification, etc.
	R	01	000	Delayed replication of 1 descriptor
	D	03	011	Winds at heights
				(Vertical wind profile)
D 09 016	D	01	040	Ship's identification, etc.
	R	01	000	Delayed replication of 1 descriptor
	D	03	012	Winds at pressure levels
				(Vertical sounding with relative humidity)
D 09 017	D	01	040	Ship's identification, etc.
	D	02	004	Significant cloud information
	R	01	000	Delayed replication of 1 descriptor
	D	03	013	Pressure, geopotential, temperature and wind data
				(Vertical sounding with dew-point data)
D 09 018	D	01	040	Ship's identification, etc.
	D	02	004	Significant cloud information
	R	01	000	Delayed replication of 1 descriptor
	D	03	014	Pressure, geopotential, temperature and wind data
				(Wind profiler — wind data sounding)
D 09 019	D	01	031	Identification, etc.
	B	02	003	Type of measuring equipment used
	R	01	000	Delayed replication of 1 descriptor
	D	03	011	Winds at heights
				(Wind profiler — Cartesian coordinates)
D 09 020	D	01	031	Identification, etc.
	B	02	003	Type of measuring equipment used
	R	04	000	Delayed replication of 4 descriptors
	B	07	003	Geopotential
	B	11	003	u-component
	B	11	004	v-component
	B	11	005	w-component

(Category 09 — continued)

SEQUENCE			TABLE REFERENCES			ELEMENT NAME
			F	X	Y	
						(Ozone sonde flight data)
D	09	030	B	15	004	Ozone sounding correction factor
			B	15	005	Ozone p
			R	04	000	Delayed replication
			B	04	015	Time increment since launch time, if needed; in minutes
			B	08	006	Ozone vertical sounding significance
			B	07	004	Pressure
			B	15	003	Measured ozone partial pressure
						(Ozone sounding not coupled to a ground-based spectrophotometer)
D	09	040	D	01	075	Identification
			D	01	076	Instrumentation
			D	09	030	Ozone flight data
						(Ozone sounding coupled to measurements from a Brewer ground-based spectrophotometer; the total ozone obtained from the Brewer is a single value)
D	09	041	D	07	041	Description of the ground-based part
			D	01	075	Identification of the ozone sounding part
			D	01	076	Instrumentation of sounding
			D	09	030	Ozone flight data
						(Ozone sounding coupled to measurements from a Brewer ground-based spectrophotometer; the total ozone obtained from the Brewer is an averaged value)
D	09	042	D	07	042	Description of the ground-based part
			D	01	075	Identification of the ozone sounding part
			D	01	076	Instrumentation of sounding
			D	09	030	Ozone flight data
						(Ozone sounding coupled to measurements from a Dobson ground-based spectrophotometer; the total ozone obtained from the Dobson is a single value)
D	09	043	D	07	043	Description of the ground-based part
			D	01	075	Identification of the ozone sounding part
			D	01	076	Instrumentation of sounding
			D	09	030	Ozone flight data
						(Ozone sounding coupled to measurements from a Dobson ground-based spectrophotometer; the total ozone obtained from the Dobson is an averaged value)
D	09	044	D	07	044	Description of the ground-based part
			D	01	075	Identification of the ozone sounding part
			D	01	076	Instrumentation of sounding
			D	09	030	Ozone flight data

Category 11 — *Single-level report sequences (conventional data)*

SEQUENCE	TABLE REFERENCES			ELEMENT NAME
	F	X	Y	
				(ACARS supplementary reported variables)
D 11 004	R	01	000	Delayed replication of 1 descriptor
	B	11	034	Vertical gust velocity
	R	01	000	Delayed replication of 1 descriptor
	B	11	035	Vertical gust acceleration
	R	01	000	Delayed replication of 1 descriptor
	B	11	075	Mean turbulence intensity (eddy dissipation rate)
	R	01	000	Delayed replication of 1 descriptor
	B	11	076	Peak turbulence intensity (eddy dissipation rate)
	R	01	000	Delayed replication of 1 descriptor
	B	33	025	ACARS interpolated values
	R	01	000	Delayed replication of 1 descriptor
	B	33	026	Mixing ratio quality

Category 16 — *Synoptic feature sequences*

SEQUENCE			TABLE REFERENCES			ELEMENT NAME
			F	X	Y	
						(Jet stream)
D	16	003	R	09	000	Delayed replication of 9 descriptors
			B	08	011	Meteorological feature (jet stream value)
			B	08	007	Dimensional significance (value for line)
			R	04	000	Delayed replication of 4 descriptors
			B	05	002	Latitude (coarse)
			B	06	002	Longitude (coarse)
			B	10	002	Flight level (altitude)
			B	11	002	Wind speed
			B	08	007	Dimensional significance (cancel)
			B	08	011	Meteorological feature (cancel/end of object)
						(Turbulence)
D	16	004	R	10	000	Delayed replication of 10 descriptors
			B	08	011	Meteorological feature (value for turbulence)
			B	08	007	Dimensional significance (value for area)
			B	07	002	Flight level (altitude) (base of layer)
			B	07	002	Flight level (altitude) (top of layer)
			R	02	000	Delayed replication of 2 descriptors
			B	05	002	Latitude (coarse)
			B	06	002	Longitude (coarse)
			B	11	031	Degree of turbulence
			B	08	007	Dimensional significance (cancel)
			B	08	011	Meteorological feature (cancel/end of object)
						(Storm)
D	16	005	R	08	000	Delayed replication of 8 descriptors
			B	08	005	Meteorological attribute significance (storm centre)
			B	08	007	Dimensional significance (value for point)
			B	05	002	Latitude (coarse)
			B	06	002	Longitude (coarse)
			B	01	026	WMO storm name (use “UNKNOWN” for a sandstorm)
			B	19	001	Synoptic features (value for type of storm)
			B	08	007	Dimensional significance (cancel)
			B	08	005	Meteorological attribute significance (cancel/end of object)
						(Cloud)
D	16	006	R	11	000	Delayed replication of 11 descriptors
			B	08	011	Meteorological feature (value for cloud)
			B	08	007	Dimensional significance (value for area)
			B	07	002	Flight level (altitude) (base of layer)
			B	07	002	Flight level (altitude) (top of layer)
			R	02	000	Delayed replication of 2 descriptors
			B	05	002	Latitude (coarse)
			B	06	002	Longitude (coarse)
			B	20	011	Cloud amount

(continued)

(Category 16 — continued)

SEQUENCE	TABLE REFERENCES			ELEMENT NAME
	F	X	Y	
D 16 006	B	20	012	Cloud type
(continued)	B	08	007	Dimensional significance (cancel)
	B	08	011	Meteorological feature (cancel/end of object)
				(Front)
D 16 007	R	09	000	Delayed replication of 9 descriptors
	B	08	011	Meteorological feature (value for type of front)
	B	08	007	Dimensional significance (value for line)
	R	04	000	Delayed replication of 4 descriptors
	B	05	002	Latitude (coarse)
	B	06	002	Longitude (coarse)
	B	19	005	Direction of feature
	B	19	006	Speed of feature
	B	08	007	Dimensional significance (cancel)
	B	08	011	Meteorological feature (cancel/end of object)
				(Tropopause)
D 16 008	R	10	000	Delayed replication of 10 descriptors
	B	08	001	Vertical significance (bit 3 set for tropopause)
	B	08	007	Dimensional significance (value for point)
	B	08	023	Statistic (type of tropopause value)
	R	03	000	Delayed replication of 3 descriptors
	B	05	002	Latitude (coarse)
	B	06	002	Longitude (coarse)
	B	10	002	Height/altitude
	B	08	023	Statistic (cancel)
	B	08	007	Dimensional significance (cancel)
	B	08	001	Vertical significance (cancel/end of object)
				(Airframe icing area)
D 16 009	R	10	000	Delayed replication of 10 descriptors
	B	08	011	Meteorological feature (value for airframe icing)
	B	08	007	Dimensional significance (value for area)
	B	07	002	Flight level (altitude) (base of layer)
	B	07	002	Flight level (altitude) (top of layer)
	R	02	000	Delayed replication of 2 descriptors
	B	05	002	Latitude (coarse)
	B	06	002	Longitude (coarse)
	B	20	041	Airframe icing (type of airframe icing)
	B	08	007	Dimensional significance (cancel)
	B	08	011	Meteorological feature (cancel/end of object)
				(Name of feature)
D 16 010	R	07	000	Delayed replication of 7 descriptors
	B	08	011	Meteorological feature
	B	08	007	Dimensional significance (value for point)
	B	01	022	Name of feature
	B	05	002	Latitude (coarse)

(Category 16 — continued)

SEQUENCE	TABLE REFERENCES			ELEMENT NAME
	F	X	Y	
D 16 010	B	06	002	Longitude (coarse)
(continued)	B	08	007	Dimensional significance (cancel)
	B	08	011	Meteorological feature (cancel/end of object)
				(Volcano erupting)
D 16 011	R	16	000	Delayed replication of 16 descriptors
	B	08	011	Meteorological feature (value for special clouds)
	B	01	022	Name of feature (volcano name)
	B	08	007	Dimensional significance (value for point)
	R	02	000	Delayed replication of 2 descriptors
	B	05	002	Latitude (coarse)
	B	06	002	Longitude (coarse)
	B	08	021	Time significance (eruption starting time)
	B	04	001	Year
	B	04	002	Month
	B	04	003	Day
	B	04	004	Hour
	B	04	005	Minute
	B	20	090	Special clouds (clouds from volcanic eruptions)
	B	08	021	Time significance (cancel)
	B	08	007	Dimensional significance (cancel)
	B	08	011	Meteorological feature (cancel/end of object)
				(Tropical storm identification)
D 16 020	B	01	033	Identification of originating/generating Centre
	B	01	025	Storm identifier
	B	01	027	WMO storm name
	D	01	011	Year, month, day
	D	01	012	Hour, minute
				(Analysis data)
D 16 021	D	01	023	Latitude (coarse accuracy), longitude (coarse accuracy)
	B	02	041	Method for estimating reports related to synoptic features
	B	19	001	Type of synoptic feature
	B	19	007	Effective radius of feature
	B	19	005	Direction of motion of feature
	B	19	006	Speed of motion of feature
	B	19	008	Vertical extent of feature
	B	08	005	Surface synoptic feature significance (value = 1 for storm centre)
	B	10	004	Pressure (of storm centre by virtue of preceding significance qualifier)
	B	08	005	Value = 2 for outer limit or edge of feature
	B	10	004	Pressure (at outer limit)
	B	19	007	Radius (of outer limit)
	B	08	005	Value = 3 for location of maximum wind
	B	08	021	Time significance (time averaged)
	B	04	075	Time period (minutes)

(continued)

(Category 16 — continued)

SEQUENCE	TABLE REFERENCES			ELEMENT NAME
	F	X	Y	
D 16 021	B	11	040	Maximum wind speed (mean wind)
(continued)	B	19	007	Radius of feature (maximum wind)
	R	05	004	(Four times replication of following five descriptors)
	B	05	021	Starting bearing or azimuth
	B	05	021	Ending bearing or azimuth
	R	02	002	(Two times replication of following two descriptors)
	B	19	003	Wind speed threshold
	B	19	004	Effective radius with respect to wind speed above threshold
				(Forecast data)
D 16 022	B	01	032	Generating application (NWP model name, etc. code table defined by originating/generating Centre)
	B	02	041	Method for estimating reports related to synoptic features
	B	19	001	Type of synoptic feature
	B	19	010	Method for tracing of the centre of synoptic feature
	R	18	000	(NN times replication of following 18 descriptors — delayed replication)
	B	08	021	Time significance (forecast)
	B	04	014	Time increment (hour)
	B	08	005	Surface synoptic feature significance
	D	01	023	Latitude (coarse accuracy), longitude (coarse accuracy)
	B	19	005	Direction of motion of feature
	B	19	006	Speed of motion of feature
	B	10	004	Pressure
	B	11	041	Maximum wind speed (gusts: e.g. used in the US)
	B	08	021	Time significance (forecast time averaged)
	B	04	075	Time period (minutes)
	B	11	040	Maximum wind speed (mean wind)
	B	19	008	Vertical extent of feature
	R	05	004	(Four times replication of following five descriptors)
	B	05	021	Starting bearing or azimuth
	B	05	021	Ending bearing or azimuth
	R	02	002	(Two times replication of following two descriptors)
	B	19	003	Wind speed threshold
	B	19	004	Effective radius with respect to wind speed above threshold
				(Tropical storm analysis information)
D 16 026	D	16	020	Tropical storm identification
	D	16	021	Analysis data
				(Tropical storm forecast information)
D 16 027	D	16	020	Tropical storm identification
	D	16	022	Forecast data

Category 35 — *Monitoring information*

SEQUENCE	TABLE REFERENCES			ELEMENT NAME
	F	X	Y	
				(Specify monitoring Station)
D 35 001	B	08	035	Type of monitoring exercise
	B	35	001	Time-frame for monitoring
	B	08	036	Type of Centre or Station performing monitoring
	D	01	001	WMO block and Station number
				(Specify monitoring Centre)
D 35 002	B	08	035	Type of monitoring exercise
	B	35	001	Time-frame for monitoring
	B	08	036	Type of Centre or Station performing monitoring
	B	01	033	Identification of originating/generating Centre
				(Specify monitoring period)
D 35 003	B	08	021	(23) Monitoring period
	B	04	001	Year
	B	04	002	Month
	B	04	003	Day
	B	04	004	Hour
	B	04	073	Short period or displacement
				(Specify report type and single Station being monitored)
D 35 004	B	08	021	(24) Agreed time-limit for report reception
	B	04	004	Hour
	B	08	021	(25) Nominal reporting time
	B	04	004	Hour
	B	35	000	FM and Regional code number
	D	01	001	(WMO Station identifier)
	B	35	011	Number of reports actually received
				(Specify report type and WMO block being monitored)
D 35 005	B	08	021	(24) Agreed time-limit for report reception
	B	04	004	Hour
	B	08	021	(25) Nominal reporting time
	B	04	004	Hour
	B	35	000	FM and Regional code number
	B	01	001	WMO block number
	B	35	011	Number of reports actually received
				(Specify report type and WMO Region being monitored)
D 35 006	B	08	021	(24) Agreed time-limit for report reception
	B	04	004	Hour
	B	08	021	(25) Nominal reporting time
	B	04	004	Hour
	B	35	000	FM and Regional code number
	B	01	003	WMO Region/geographical area
	B	35	011	Number of reports actually received

(continued)

(Category 35 — continued)

SEQUENCE	TABLE REFERENCES			ELEMENT NAME
	F	X	Y	
				(Report type and multiple Stations from one block being monitored)
D 35 007	B	08	021	(24) Agreed time-limit for report reception
	B	04	004	Hour
	B	08	021	(25) Nominal reporting time
	B	04	004	Hour
	B	35	000	FM and Regional code number
	B	01	001	WMO block number
	R	02	000	Delayed replication (two descriptors) — count of stations
	B	01	002	WMO Station number
	B	35	011	Number of reports actually received
				(Monitoring a report type from multiple Stations)
D 35 010	D	35	002	(Specify monitoring centre)
	D	35	003	(Specify monitoring period)
	D	35	007	(Specify report type and multiple Stations being monitored)

ATTACHMENT

CREX TEMPLATE EXAMPLES

PROPOSED BLOEMHOF FLOOD MONITORING CREX CODE (HYDROLOGY)

Indicator section and data description section

CREX++

T000101 A000 D05004++

Station identification

Sequence: D 01 030 consisting of

B 01 018	WMO station identifier
B 02 001	Type of station
D 01 011	Date
D 01 024	Latitude and longitude and height

Hourly environmental data

Sequence: D 05 002 consisting of

D 01 012	Time (hour, minute)
B 12 001	Air temperature
B 13 003	Relative humidity
B 14 051	Direct solar radiation during the last hour
B 13 060	Total accumulated precipitation (modulo 10 000 kg m^{-2})
B 13 072	Downstream water level
B 13 080	pH
B 13 081	Conductivity
B 13 082	Water temperature
B 13 083	Dissolved oxygen
B 13 084	Turbidity

Multiple measurement array definition

Sequence: D 05 003 consisting of

D 01 012	Time of first measurement (hour, minute) minus increment
B 04 065	Short time increment — time interval between measurements in the array (12 minutes)
R 01 000	Delayed replication of one next descriptor (D 05 001) — Number of measurements in the array (5)
D 05 001	Single measurement

Single measurement

Sequence: D 05 001 consisting of

B 11 001	Wind direction
B 11 002	Wind speed
B 13 060	Total accumulated precipitation (modulo 10 000 kg m^{-2})
B 13 071	Upstream water level

End of message

...++

7777

Thus the format of the message D 05 004 for the BLOEMHOF Flood Monitoring System will be:

Indicator section and data description section then:

D 01 030	Identification
D 05 002	Hourly instantaneous values
D 05 003	Array definition
n x D 05 001	Multiple measurements
++ 7777	End of message

Example

A CREX message transmitted at 1046 UTC would be the following:

CREX++

T000101 A000 D05004++

12345 2 1998 02 03 –2600 02800 01570

10 00 285 065 0326 03842 0683 075 2600 2805 ///// 0156

09 00 12 0005

290 0102 00012 1226

250 0250 00025 1230

245 0175 00028 1235

230 0105 00004 1241

220 0025 00001 1249++

7777

Note that the + at end of lines are not needed, only at the end of the whole report (in that case after 1249 — last line) and only if a whole message was to be repeated one or more times. The whole message from 12345 to 1249 is called a “subset” (See Regulation 95.4.1). The space before –2 600 is required for transmission purposes, but optional for display (to keep alignment). Fifth line, last group = delayed replication — 4 digits only = 0005.

Line 1: Message identification

Line 3:

Station number: 12345

Station type: 2

Date of main measurement: 3 February 1998

Position of station: 26 degrees South, 28 degrees East, 1 570 m high

Line 4:

Time of hourly measurement: 1000 UTC

Air temperature at 1000 UTC: 28.5°C

Relative humidity at 1000 UTC: 65%

Direct solar radiation integrated over the period 0900 to 1000 UTC: 326 000 J m^{-2}

Total accumulated precipitation at 1000 UTC: 0 384.2 kg m^{-2}

Downstream water level at 1000 UTC: 6.83 m

Water pH: 7.5

Conductivity at 1000 UTC: 2.6 Siemens m^{-1} = 26 mS cm^{-1}

Water temperature at 1000 UTC: 280.5 K

Dissolved oxygen at 1000 UTC: Not available

Turbidity at 1000 UTC: 156 Lumen

Line 5: Measurement array definition

First measurement minus 12 minutes at 0900 UTC

Interval between measurements is 12 minutes

Number of measurements is 5

Line 6: First set of measurements at 0912 UTC

Instantaneous wind direction at 0912 UTC: 290

Instantaneous wind speed at 0912 UTC: 10.2 m s^{-1}

Total precipitation between 0900 and 0912 UTC: 1.2 kg m^{-2}

Upstream water level at 0912 UTC: 12.26 m

Line 7: Second set of measurements at 0924 UTC

Instantaneous wind direction at 0924 UTC: 250

Instantaneous wind speed at 0924 UTC: 25.0 m s^{-1}

Total precipitation between 0912 and 0924 UTC: 2.5 kg m^{-2}

Upstream water level at 0924 UTC: 12.30 m

Line 8: Third set of measurements at 0936 UTC

Instantaneous wind direction at 0936 UTC: 245

Instantaneous wind speed at 0936 UTC: 17.5 m s^{-1}

Total precipitation between 0912 and 0936 UTC: 2.8 kg m^{-2}

Upstream water level at 0936 UTC: 12.35 m

Line 9: Fourth set of measurements at 0948 UTC

Instantaneous wind direction at 0948 UTC: 230

Instantaneous wind speed at 0948 UTC: 10.5 m s^{-1}

Total precipitation between 0912 and 0948 UTC: 0.4 kg m^{-2}

Upstream water level at 0948 UTC: 12.41 m

Line 10: Fifth set of measurements at 1000 UTC

Instantaneous wind direction at 1000 UTC: 220

Instantaneous wind speed at 1000 UTC: 2.5 m s^{-1}

Total precipitation between 0912 and 1000 UTC: 0.1 kg m^{-2}

Upstream water level at 1000 UTC: 12.49 m

Line 11: End of message identifier

TIDE GAUGE DATA EXAMPLE

CREX++

T000101 A001 D06024++

RI010 1998 01 23 15 00 2761 00 00 30 –30

01407 1225 01384 1217 01382 1221 01395 1220 01473 1262 01502 1227+

CT010 1998 01 23 15 00 2781 01 00 30 –30

02024 1757 02043 1717 02124 1728 02177 1716 ///// //// 02259 1670++

7777

Interpretation of the example:

Line	*Group*	*Meaning*
1	CREX	Indicator of a CREX message
2	T000101	CREX Master Table Number 00, Edition 01, Version 01
	A0001	Data type 001: Surface data — sea
	D 06 024	Tide elevation series
3	RI010	Tide station RI010
	1998	Year: 1998
	01	Month: January
	23	Day: 23
	15	Hour: 1500 UTC
	00	Minute: 00
	2761	Sea/water temperature: 276.1 K
	00	Tide station automated water level check: Good data
	00	Tide station manual water level check: Operational
	30	Short time period or displacement: Time is now hour 1500, minute 30
	–30	Short time increment: Increment is applied prior to each replication of two descriptors indicated by the group R 02 006, thus the time is now hour 1 500, minute 00
4	01407	Tide elevation of 1 407 mm at hour 1500, minute 00
	1225	Meteorological residual tidal elevation of 1 225 mm at hour 1500, minute 00
	01384	Tide elevation of 1 384 mm at hour 1400, minute 30

	1217	Meteorological residual tidal elevation of 1 217 mm at hour 1400, minute 30
	01382	Tide elevation of 1 382 mm at hour 1400, minute 00
	1221	Meteorological residual tidal elevation of 1 221 mm at hour 1400, minute 00
	01395	Tide elevation of 1 395 mm at hour 1300, minute 30
	1220	Meteorological residual tidal elevation of 1 220 mm at hour 1300, minute 30
	01473	Tide elevation of 1 473 mm at hour 1300, minute 30
	1262	Meteorological residual tidal elevation of 1 262 mm at hour 1300, minute 00
	01502	Tide elevation of 1 502 mm at hour 1200, minute 30
	1227	Meteorological residual tidal elevation of 1 227 mm at hour 1200, minute 30
	+	End of report for station RI010
5	CT010	Tide station CT010
	1998	Year: 1998
	01	Month: January
	23	Day: 23
	15	Hour: 1500 UTC
	00	Minute: 00
	2761	Sea/water temperature: 276.1 K
	00	Tide station automated water level check: Good data
	00	Tide station manual water level check: Operational
	30	Short time period or displacement: Time is now hour 1500, minute 30
	–30	Short time increment: Increment is applied prior to each replication of two descriptors indicated by the group R 02 006, thus the time is now hour 1500, minute 00
6	02024	Tide elevation of 2 024 mm at hour 1500, minute 00
	1715	Meteorological residual tidal elevation of 1 715 mm at hour 1500, minute 00
	02043	Tide elevation of 2 043 mm at hour 1400, minute 30
	1717	Meteorological residual tidal elevation of 1 717 mm at hour 1400, minute 30
	02124	Tide elevation of 2 124 mm at hour 1400, minute 00
	1728	Meteorological residual tidal elevation of 1 728 mm at hour 1400, minute 00
	02177	Tide elevation of 2 177 mm at hour 1300, minute 30
	1716	Meteorological residual tidal elevation of 1 716 mm at hour 1300, minute 30
	/////	Tide elevation missing at hour 1300, minute 30
	////	Meteorological residual tidal elevation missing at hour 1300, minute 00
	02259	Tide elevation of 2 259 mm at hour 1200, minute 30
	1670	Meteorological residual tidal elevation of 1 670 mm at hour 1200, minute 30
	++	End of report for station CT010; also, end of Data section
7	7777	End of CREX message

ATTACHMENT

TOTAL OZONE MEASUREMENT FROM A DOBSON GROUND-BASED SPECTROPHOTOMETER OBTAINED FROM A SINGLE OBSERVATION

CREX++

T000101 A008 D07043++

11 649 Hradec Kralove 5018 01583 00290 1998 03 09 10 03 003 74 00 00 0415 180++

7777

CREX			
T000101			
A008			
D 07 043			
	D 01 001		
	B 01 001	WMO block number	11
	B 01 002	WMO station number	649
	B 01 015	Station or site name	Hradec Kralove
	D 01 024		
	B 05002	Latitude	5018
	B 06 002	Longitude	01583
	B 07 001	Height of station	00290
	D 01 011		
	B 04 001	Year (of ozone measurement)	1998
	B 04 002	Month (of ozone measurement)	03
	B 04 003	Day (of ozone measurement)	09
	D 01 012		
	B 04 004	Hour (of ozone measurement)	10
	B 04 005	Minute (of ozone measurement)	03
	D 01 074		
	B 02 143	Ozone instrument type	003
	B 02 142	Ozone instrument serial number	74
	B 02 145	Wavelength setting for Dobson instruments	00
	B 02 146	Source conditions for Dobson instruments	00
	D 07 030		
	B 15 001	Value of ozone measurement	0415
	B 15 002	Value of the air mass	180
7777			

ATTACHMENT

EXAMPLE OF AN OZONE SOUNDING COUPLED TO A BREWER SPECTROPHOTOMETER

Note : ^ means space in the definitions below

CREX++		
T000101		
A008		
D 01 001	WMO station	71
	WMO block number	913
B 01 015	Station or site name	Churchill^^^^^^^^^^
D 01 024	Latitude	5875
	Longitude	–09400
	Elevation	00029
D 01 011	Year	1998
	Month	04
	Day	29
D 01 012	Hours	13
	Minutes	46
B 08 021	Time significance = 8 = ensemble mean	08
B 04 025	Time period (minutes)	0550
D 01 070	Ozone instrument type	001
	Ozone instrument serial number (Brewer)	26^^
	Light source type for Brewer (direct sun)	00
B 08 022	Number of measurements	00010
B 08 023	First order statistics = 4 = mean value	04
B 15 001	Value of ozone measurement	0399
B 08 023	First order statistics = 9 = best estimate of standard deviation	09
B 15 001	Best estimate of standard deviation	0010
B 08 023	First order statistics = harmonic mean	11
B 15 002	Harmonic mean of the air mass	202
D 01 001	WMO station and block number	71
		913
B 01 015	Station or site name	Churchill^^^^^^^^^^
D 01 024	Latitude	5875
	Longitude	–09400
	Elevation	00029
B 08 021	18 = launch time follows	18
D 01 011	Year	1998
	Month	04
	Day	29
D 01 012	Hours	11
	Minutes	22
B 02 011	Radiosonde type	061
B 02 143	Ozone instrument type	019
B 02 142	Ozone sonde serial number	////
D 15 004	Ozone sounding correction factor	0893
D 15 005	Ozone p	373

R 04 000	Delayed replication factor = number of levels	0093
	The next four descriptors are repeated 93 times	
B 04 015	Time increment since launch time (minutes)	see below
B 08 006	Ozone VSS	see below
B 07 004	Pressure	see below
B 15 003	Measured ozone partial pressure	see below
++		
7777	End of message	

KULA01 CWAO 051800

CREX++

T000101 A008 D09042++

71 913 CHURCHILL 5875 –09400 00029 1998 04 29 13 46

08 0550 001 26 00 00010 04 0399 09 0010 11 202

71 913 CHURCHILL 5875 –09400 00029 18 1998 04 29 11 22

061 019 //// 0893 373 0093

0000 400 10041 029 0000 200 10000 029 0000 002 09915 031

0001 002 09735 036 0001 002 09678 038 0002 002 09273 038

0003 002 09111 039 0004 200 08500 039 0009 200 07000 037

0011 002 06450 037 0012 002 06279 036 0012 002 06159 031

0014 002 05847 034 0016 002 05347 030 0016 002 05269 029

0017 002 05100 040 0018 200 05000 034 0019 002 04821 030

0023 200 04000 030 0027 002 03400 026 0029 002 03000 028

0031 002 02857 029 0031 002 02818 024 0032 002 02743 017

0034 200 02500 015 0036 002 02225 014 0038 002 02078 029

0038 002 02049 036 0039 200 02000 066 0039 002 01992 066

0039 002 01952 093 0040 002 01909 105 0040 002 01866 105

0041 002 01800 115 0042 002 01765 103 0042 002 01741 100

0043 002 01693 112 0043 002 01656 112 0044 002 01612 109

0044 002 01590 092 0044 002 01580 066 0045 002 01559 052

0045 002 01517 049 0046 002 01500 059 0046 002 01488 070

0046 002 01469 098 0047 002 01440 107 0047 002 01391 107

0048 002 01335 117 0049 002 01291 162 0050 002 01257 153

0051 002 01206 155 0051 002 01190 141 0051 002 01182 141

0052 002 01142 156 0053 002 01103 154 0054 002 01059 177

0055 002 01005 170 0056 200 01000 178 0056 002 00978 197

0057 002 00951 187 0058 002 00914 183 0058 002 00889 171

0059 002 00866 182 0059 002 00855 195 0060 002 00837 198

0061 002 00808 175 0061 002 00797 172 0064 200 00700 160

0065 002 00671 157 0067 002 00630 142 0068 002 00592 153

0068 002 00583 162 0070 002 00531 157 0072 002 00501 164
0072 200 00500 161 0073 002 00479 162 0073 002 00462 151
0075 002 00435 156 0076 002 00418 153 0078 002 00378 161
0081 002 00319 132 0082 002 00311 136 0083 200 00300 130
0086 002 00258 111 0091 200 00200 095 0097 002 00143 079
0099 002 00126 078 0103 200 00100 071 0110 200 00070 058
0115 002 00054 044 0116 200 00050 039 0120 002 00043 032++
7777

EXAMPLE OF AN OZONE SOUNDING NOT COUPLED TO A BREWER SPECTROPHOTOMETER

CREX++		
T000101		
A008		
D 01 001	WMO station and block number	71
		917
B 01 015	Station or site name	Eureka^^^^^^^^^^^^^^
D 01 024	Latitude	7598
	Longitude	–08593
	Elevation	00010
B 08 021	18 = launch time follows	18
D 01 011	Year	1998
	Month	04
	Day	29
D 01 012	Hours	23
	Minutes	18
B 02 011	Radiosonde type	061
B 02 143	Ozone instrument type	019
B 02 142	Ozone sonde serial number	////
D 15 004	Ozone sounding correction factor	////
D 15 005	Ozone p	375
R 04 000	Delayed replication factor = number of levels	0082
	The next four descriptors are repeated 82 times	
B 04 015	Time increment since launch time (minutes)	see below
B 08 006	Ozone VSS	see below
B 07 004	Pressure	see below
B 15 003	Measured ozone partial pressure	see below
++		
7777	End of message	

KULA01 CWAO 051800

CREX++

T000101 A008 D09040++

71 917 EUREKA 7598 –08593 00010 18 1998 04 29 23 18

061 019 //// //// 375 0082

0000 400 10137 030 0000 200 10000 030 0001 002 09687 037

0002 002 09366 033 0004 002 08831 037 0005 200 08500 036

0007 002 08013 043 0007 002 07881 047 0008 002 07646 037

0009 002 07442 042 0011 200 07000 031 0012 002 06849 027

0013 002 06710 036 0015 002 06291 029 0022 200 05000 028

0025 002 04557 027 0029 002 04065 024 0029 200 04000 020

0032 002 03626 025 0038 002 03000 020 0040 002 02890 021

0040 002 02829 065 0041 002 02726 105 0043 002 02576 118

0044 200 02500 135 0048 002 02218 165 0049 002 02147 161

0050 002 02104 171 0051 002 02031 153 0051 002 02010 159

0051 200 02000 171 0052 002 01941 188 0054 002 01854 198

0056 002 01744 187 0056 002 01717 194 0057 002 01683 191

0058 002 01640 161 0058 002 01623 159 0059 002 01585 168

0059 002 01576 185 0060 002 01545 197 0061 002 01500 202

0063 002 01414 221 0064 002 01370 220 0065 002 01335 230

0066 002 01269 219 0067 002 01232 227 0067 002 01226 235

0068 002 01208 241 0072 002 01055 242 0074 200 01000 236

0075 002 00960 228 0076 002 00936 192 0077 002 00912 180

0078 002 00897 187 0078 002 00883 210 0079 002 00868 221

0079 002 00850 202 0080 002 00841 199 0081 002 00815 208

0081 002 00807 189 0081 002 00803 171 0082 002 00790 152

0082 002 00777 157 0083 002 00764 172 0084 002 00741 156

0084 002 00722 156 0085 002 00715 162 0085 200 00700 188

0085 200 00700 193 0086 002 00682 203 0088 002 00639 212

0090 002 00608 206 0091 002 00588 190 0091 002 00582 192

0092 002 00570 209 0092 002 00557 215 0096 200 00500 197

0099 002 00437 171 0108 002 00316 139 0110 200 00300 128

0115 002 00242 108++

7777

ATTACHMENT

SAMPLE DATA WITH CREX SEQUENCE FOR EXCHANGE OF FORECAST RESULT ON TROPICAL CYCLONES

Descriptor	Order No.	Sample data	Corresponding meaning	Unit	Scale	Data width
B 01 033	1	034	Originating Centre = RSMC Tokyo	Code table	0	3
B 01 025	2	21W	Storm identifier	Character	0	3
B 01 027	3	ZANE	WMO storm name	Character	0	10
D 01 011			(sequence descriptor)			
B 04 001	4	1996	Year	Year	0	4
B 04 002	5	10	October	Month	0	2
B 04 003	6	01	1st	Day	0	2
D 01 012			(sequence descriptor)			
B 04 004	7	06	6 o'clock (UTC)	Hour	0	2
B 04 005	8	00	0 minute (UTC)	Minute	0	2
B 01 032	9	XXX	(to be defined)			
			Identification of NWP model	Code table	0	3
B 02 041	0	01	Based on computer analysis	Code table	0	2
B 19 001	1	02	Tropical storm	Code table	0	2
B 19 010	2	01	Minimum value of sea level pressure	Code table	0	2
R 18 000	3	0003	(***delayed replication descriptor**) Data for 3 forecast times of 18 descriptors follow	Numeric	0	4
B 08 021	4	04	Forecast data follow	Code table	0	2
B 04 014	5	0012	12 hour forecast data follow	Hour	0	4
B 08 005	6	01	Data of storm centre follow	Code table	0	2
D 01 023			(sequence descriptor)			
B 05 002	7	3010	Latitude of the storm centre is 30.1N	Degree	2	4
B 06 002	8	14200	Longitude of the storm centre is 142.0E	Degree	2	5
B 19 005	9	270	Direction of motion of storm is 270	Degree true	0	3
B 19 006	0	00500	Speed of motion of storm is 5 m s^{-1}	m s^{-1}	2	5
B 10 004	1	09750	Pressure of storm centre is 975 hPa	Pa	–1	5
B 11 041	2	0576	Gust wind speed is 57.6 m s^{-1}	m s^{-1}	1	4
B 08 021	3	06	Forecast time averaged follow	Code table	0	2
B 04 075	4	10	10 minutes mean value follow	Minute	0	2
B 11 040	5	0360	Maximum wind speed is 36.0 m s^{-1}	m s^{-1}	1	4
B 19 008	6	2	Storm depth is medium	Code table	0	1
R 05 004			***(replication descriptor) 4 times replication of following 5 descriptors			
B 05 021	7	31500	Sector 1 (from 315 degrees	Degree true	2	5
B 05 021	8	04500	to 45 degrees)	Degree true	2	5
R 02 002			***(replication descriptor) 2 times replication of following 2 descriptors			
B 19 003	9	025	Wind speed threshold is 25 m s^{-1}	m s^{-1}	0	3
B 19 004	0	1950	Effective radius is 195 km	m	–2	4

ATTACHMENT

Descriptor	Order No.	Sample data	Corresponding meaning
	1	015	Wind speed threshold is 15 m s^{-1}
	2	4000	Effective radius is 400 km
	3	04500	Sector 2 (from 45 degrees to 135 degrees)
	4	13500	
	5	025	Wind speed threshold is 25 m s^{-1}
	6	1950	Effective radius is 195 km
	7	015	Wind speed threshold is 15 m s^{-1}
	8	4300	Effective radius is 430 km
	9	13500	Sector 3 (from 135 degrees to 225 degrees)
	0	22500	
	1	025	Wind speed threshold is 25 m s^{-1}
	2	1950	Effective radius is 195 km
	3	015	Wind speed threshold is 15 m s^{-1}
	4	6090	Effective radius is 609 km
	5	22500	Sector 4 (from 225 degrees to 315 degrees)
	6	31500	
	7	025	Wind speed threshold is 25 m s^{-1}
	8	1950	Effective radius is 195 km
	9	015	Wind speed threshold is 15 m s^{-1}
	0	4700	Effective radius is 470 km
	1	04	(24- and 36-hour forecast data follow as same as
	.....		the second fourth order above) .....

CREX MESSAGE COMPOSED OF ABOVE DATA ELEMENTS:

CREX++
T000101 A007 B01033 B01025 B01027 D01011 D01012 B01032 B02041 B19001 B19010 R18000 B08021 B04014 B08005 D01023 B19005 B19006 B10004 B11041 B08021 B04075 B11040 B19008 R05004 B05021 B05021 R02002 B19003 B19004 E++
0034 121W 2ZANE 31996 410 501 606 700 8XXX 901 002 101 20003 304 40012 501 63010 714200 8270 900500 009750 10576 206 310 40360 52 631500 704500 8025 91950 0015 14000 204500 313500 4025 51950 6015 74300 813500 922500 0025 11950 2015 36090 422500 531500 6025 71950 8015 94700 004 .....++
7777
or (with big common sequence definition)
CREX++
T000101 A007 D16027E++
0034 121W 2ZANE 31996 410 501 606 700 8XXX 901 002 101 20003 304 40012 501 63010 714200 8270 900500 009750 10576 206 310 40360 52 631500 704500 8025 91950 0015 14000 204500 313500 4025 51950 6015 74300 813500 922500 0025 11950 2015 36090 422500 531500 6025 71950 8015 94700 004 .....++
7777
or without check digit:
CREX++
T000101 A007 D16027++
034 21W ZANE 1996 10 01 06 00 XXX 01 02 01 0003 04 0012 01 3010 14200 270 00500 09750 0576 06 10 0360 2 31500 04500 025 1950 015 4000 04500 13500 025 1950 015 4300 13500 22500 025 1950 015 6090 22500 31500 025 1950 015 4700 04 .....++
7777

ATTACHMENT

MONITORING INFORMATION SAMPLE MESSAGE

CREX++	(indicator section)
T000101 A020 D35010++	(description section
1 2 4 014 23 1996 10 01 00 15 24 06 25 00 012 63 0003 740 0360 894 0353	
792 0125++	(data section)
7777	(end section)

1	Regional exercise
2	Non-real time
4	RTH
014	Nairobi
23	Monitoring period follows
1996	YYYY
10	MM
01	DD
00	HH
15	Days duration
24	Data cutoff follows
06	Hours
25	Report time follows
00	Hours
012	SYNOP
63	Block number
0003	Stations
740	Nairobi
0360	Well done
894	Dar es Salam
0353	Very good
792	A station
0125	Must do better!
++	
7777	

c. COMMON CODE TABLES TO BINARY AND ALPHANUMERIC CODES

COMMON CODE TABLE C–1: *Identification of originating/generating centre*

Common code table
F_1F_2 for alphanumeric codes
$F_3F_3F_3$ for alphanumeric codes
Code table 0 in GRIB/Code table 0 01 033 in BUFR

Code figure for F_1F_2	Code figure for $F_3F_3F_3$	Octet 5 in GRIB Section 1 Octet 6 in BUFR Section 1	
00	000	00	WMO Secretariat
			01–09: WMCs
01	001	01	Melbourne
02	002	02	Melbourne
03	003	03	)
04	004	04	Moscow
05	005	05	Moscow
06	006	06	)
07	007	07	US National Weather Service, National Centres for Environmental Prediction (NCEP)
08	008	08	US National Weather Service Telecommunications Gateway (NWSTG)
09	009	09	US National Weather Service – Other
			10–25: Centres in Region I
10	010	10	Cairo (RSMC/RAFC)
11	011	11	)
12	012	12	Dakar (RSMC/RAFC)
13	013	13	)
14	014	14	Nairobi (RSMC/RAFC)
15	015	15	)
16	016	16	Reserved
17	017	17	Reserved
18	018	18	Tunis-Casablanca (RSMC)
19	019	19	)
20	020	20	Las Palmas (RAFC)
21	021	21	Algiers (RSMC)
22	022	22	Reserved
23	023	23	Reserved
24	024	24	Pretoria (RSMC)
25	025	25	La Réunion (RSMC)

(continued)

(Common Code table C–1 — continued)

Code figure for F_1F_2	Code figure for $F_3F_3F_3$	Octet 5 in GRIB Section 1 Octet 6 in BUFR Section 1	
			26–40: Centres in Region II
26	026	26	Khabarovsk (RSMC)
27	027	27	)
28	028	28	New Delhi (RSMC/RAFC)
29	029	29	)
30	030	30	Novosibirsk (RSMC)
31	031	31	)
32	032	32	Tashkent (RSMC)
33	033	33	Jeddah (RSMC)
34	034	34	Tokyo (RSMC), Japan Meteorological Agency
35	035	35	)
36	036	36	Bangkok
37	037	37	Ulan Bator
38	038	38	Beijing (RSMC)
39	039	39	)
40	040	40	Seoul
			41–50: Centres in Region III
41	041	41	Buenos Aires (RSMC/RAFC)
42	042	42	)
43	043	43	Brasilia (RSMC/RAFC)
44	044	44	)
45	045	45	Santiago
46	046	46	Brazilian Space Agency – INPE
47–50	047–050	47–50	Reserved for other centres in Region III
			51–63: Centres in Region IV
51	051	51	Miami (RSMC/RAFC)
52	052	52	Miami (RSMC), National Hurricane Centre
53	053	53	Montreal (RSMC)
54	054	54	)
55	055	55	San Francisco
56	056	56	Reserved
57	057	57	US Air Force — Air Force Global Weather Central
58	058	58	Fleet Numerical Meteorology and Oceanography Center, Monterey, CA, USA
59	059	59	The NOAA Forecast Systems Laboratory, Boulder, CO, USA
60	060	60	United States National Center for Atmospheric Research (NCAR)
61	061	061	Service ARGOS — Landover
62–63	062–063	62–63	Reserved for other centres in Region IV

(Common Code table C–1 — continued)

Code figure for F_1F_2	Code figure for $F_3F_3F_3$	Octet 5 in GRIB Section 1 Octet 6 in BUFR Section 1	
			64–73: Centres in Region V
64	064	64	Honolulu (RSMC)
65	065	65	Darwin (RSMC)
66	066	66	)
67	067	67	Melbourne (RSMC)
68	068	68	Reserved
69	069	69	Wellington (RSMC/RAFC)
70	070	70	)
71	071	71	Nadi (RSMC)
72-73	072-073	72-73	Reserved for other centres in Region V
			74–99: Centres in Region VI
74	074	74	UK Meteorological Office, Bracknell (RSMC)
75	075	75	)
76	076	76	Moscow (RSMC/RAFC)
77	077	77	Reserved
78	078	78	Offenbach (RSMC)
79	079	79	)
80	080	80	Rome (RSMC)
81	081	81	)
82	082	82	Norrköping
83	083	83	)
84	084	84	Toulouse (RSMC)
85	085	85	Toulouse (RSMC)
86	086	86	Helsinki
87	087	87	Belgrade
88	088	88	Oslo
89	089	89	Prague
90	090	90	Episkopi
91	091	91	Ankara
92	092	92	Frankfurt/Main (RAFC)
93	093	93	London (WAFC)
94	094	94	Copenhagen
95	095	95	Rota
96	096	96	Athens
97	097	97	European Space Agency (ESA)
98	098	98	European Centre for Medium Range Weather Forecasts (ECMWF) (RSMC)
99	099	99	De Bilt

(continued)

(Common Code table C–1 — continued)

Code figure for F_1F_2	Code figure for $F_3F_3F_3$	Octet 5 in GRIB Section 1 Octet 6 in BUFR Section 1	
n.a.	100-109	100-109	Reserved for centres in Region I which are not in the list above
n.a.	110	110	Hong Kong
n.a.	111 to 139	111 to 139	Reserved for centres in Region II which are not in the list above
n.a.	140 to 159	140 to 159	Reserved for centres in Region III which are not in the list above
n.a.	160	160	US NOAA/NESDIS
n.a.	161 to 199	161 to 199	Reserved for centres in Region IV which are not in the list above
n.a.	200 to 209	200 to 209	Reserved for centres in Region V which are not in the list above
n.a.	210	210	Frascati (ESA/ESRIN)
n.a.	211	211	Lanion
n.a.	212	212	Lisboa
n.a.	213	213	Reykjavik
n.a.	214	214	Madrid
n.a.	215	215	Zurich
n.a.	216	216	Service ARGOS — Toulouse
n.a.	217 to 253	217 to 253	Reserved for centres in Region VI which are not in the list above or below
n.a.	254	254	EUMETSAT Operation Centre
n.a.	255	255	Missing value
n.a.	256 to 999	n.a.	Not used

N o t e s :

(1) The closed bracket sign) indicates that the corresponding code figure is reserved for the previously named centre.

(2) n.a. means not available.

(3) With GRIB or BUFR, to indicate whether the originating/generating centre is a sub-centre or not, the following procedure should be applied:

Use in GRIB of octet 26, Section 1, or use in BUFR of octet 5, Section 1, with the following meaning:

Code figure	
0	Not a sub-centre, the originating/generating centre is the centre defined by octet 5, Section 1 of GRIB, or octet 6, Section 1 of BUFR.
1 to 254	Identifier of the sub-centre which is the originating/generating centre. The identifier of the sub-centre is allocated by the associated centre which is defined by octet 5, Section 1 of GRIB, or octet 6, Section 1 of BUFR. The sub-centre(s) identifiers should be supplied to the WMO Secretariat by the associated centre(s) for publication.

Sub-centres identifiers supplied to the WMO Secretariat

Centre		Sub-centre(s)	
Code figure	Name	Code figure	Name
74	UK Meteorological Office, Bracknell (RSMC)	01	EGxx, Shanwick Oceanic Area Control Centre

COMMON CODE TABLE C–2: *Radiosonde/sounding system used*

Common code table: Code table 3685 — $r_a r_a$ (Radiosonde/sounding system used) — for alphanumeric codes
Code table 0 02 011 (Radiosonde type) in BUFR

Code figure for $r_a r_a$ (Code table 3685)	Code figure for BUFR (Code table 0 02 011)	
00–01	0–1	Reserved
02	2	No radiosonde – passive target (e.g. reflector)
03	3	No radiosonde – active target (e.g. transponder)
04	4	No radiosonde – passive temperature-humidity profiler
05	5	No radiosonde – active temperature-humidity profiler
06	6	No radiosonde – radio-acoustic sounder
07–08	7–8	No radiosonde – . . . (reserved)
09	9	No radiosonde – system unknown or not specified
10	10	VIZ type A pressure-commutated (USA)
11	11	VIZ type B time-commutated (USA)
12	12	RS SDC (Space Data Corporation – USA)
13	13	Astor (no longer made – Australia)
14	14	VIZ MARK I MICROSONDE (USA)
15	15	EEC Company type 23 (USA)
16	16	Elin (Austria)
17	17	GRAW G. (Germany)
18	18	Reserved for allocation of radiosondes
19	19	GRAW M60 (Germany)
20	20	Indian Meteorological Service MK3 (India)
21	21	VIZ/Jin Yang MARK I MICROSONDE (South Korea)
22	22	Meisei RS2-80 (Japan)
23	23	Mesural FMO 1950A (France)
24	24	Mesural FMO 1945A (France)
25	25	Mesural MH73A (France)
26	26	Meteolabor Basora (Switzerland)
27	27	AVK-MRZ (Russian Federation)
28	28	Meteorit Marz2-1 (Russian Federation)
29	29	Meteorit Marz2-2 (Russian Federation)
30	30	Oki RS2-80 (Japan)
31	31	VIZ/Valcom type A pressure-commutated (Canada)
32	32	Shanghai Radio (China)
33	33	UK Met Office MK3 (UK)
34	34	Vinohrady (Czechoslovakia)
35	35	Vaisala RS18 (Finland)
36	36	Vaisala RS21 (Finland)
37	37	Vaisala RS80 (Finland)
38	38	VIZ LOCATE Loran-C (USA)
39	39	Sprenger E076 (Germany)
40	40	Sprenger E084 (Germany)
41	41	Sprenger E085 (Germany)
42	42	Sprenger E086 (Germany)

(Common Code table C–2 — continued)

Code figure for $r_a r_a$ (Code table 3685)	Code figure for BUFR (Code table 0 02 011)	
43	43	AIR IS – 4A – 1680 (USA)
44	44	AIR IS – 4A – 1680 X (USA)
45	45	RS MSS (USA)
46	46	Air IS – 4A – 403 (USA)
47	47	Meisei RS2-91 (Japan)
48	48	VALCOM (Canada)
49	49	VIZ MARK II (USA)
50	50	GRAW DFM-90 (Germany)
51	51	VIZ–B2 (USA)
52	52	Vaisala RS80-57H
53	53	AVK-RF95 (Russian Federation)
54	54	GRAW DFM-97 (Germany)
55–59	55–59	Reserved for allocation of radiosondes
60	60	Vaisala RS80/MicroCora (Finland)
61	61	Vaisala RS80/Loran/Digicora I, II or Marwin (Finland)
62	62	Vaisala RS80/PCCora (Finland)
63	63	Vaisala RS80/Star (Finland)
64	64	Orbital Sciences Corporation, Space Data Division, transponder radiosonde, type 909-11-XX, where XX corresponds to the model of the instrument (USA)
65	65	VIZ transponder radiosonde, model number 1499–520 (USA)
66	66	Vaisala RS80/Autosonde (Finland)
67	67	Vaisala RS80/Digicora III (Finland)
68–70	68–70	Reserved for additional automated sounding systems
71	71	Vaisala RS90/Loran/Digicora I, II or Marwin (Finland)
72	72	Vaisala RS90/PC–CORA (Finland)
73	73	Vaisala RS90/Autosonde (Finland)
74	74	Vaisala RS90/Star (Finland)
75	75	AVK-MRZ-ARMA (Russian Federation)
76	76	AVK-RF95-ARMA (Russian Federation)
77	77	GEOLINK GPSonde GL98 (France)
78	78	Vaisala RS90/Digicora III (Finland)
79–81	79–81	Reserved for additional automated sounding systems
82	82	Sippican MK2 GPS/STAR (USA)
83	83	Sippican MK2 GPS/W9000 (USA)
84–89	84–89	Reserved for additional automated sounding systems
90	90	Radiosonde not specified or unknown
91	91	Pressure-only radiosonde
92	92	Pressure-only radiosonde plus transponder
93	93	Pressure-only radiosonde plus radar-reflector

(continued)

(Common Code table C–2 — continued)

Code figure for $r_a r_a$ (Code table 3685)	Code figure for BUFR (Code table 002011)	
94	94	No-pressure radiosonde plus transponder
95	95	No-pressure radiosonde plus radar-reflector
96	96	Descending radiosonde
97–99	97–99 Reserved	Reserved for allocation of sounding systems with incomplete sondes
	100–254 Reserved	
	255 Missing value	

Notes:

(1) References to countries in brackets indicate the manufacturing location rather than the country using the instrument.

(2) Some of the radiosondes listed are no longer in use but are retained for archiving purposes.

COMMON CODE TABLE C–3: *Instrument type for water temperature profile measurement with fall rate equation coefficients*

Common code table — Code table 1770 — $I_XI_XI_X$ (Instrument type for XBT, with fall rate equation coefficients) — for alphanumeric codes
Code table 0 22 067 (Instrument type for water temperature profile measurement) in BUFR

Code figure for $I_XI_XI_X$	Code figure for BUFR (Code table 0 22 067)	Meaning		
		Instrument Make	Equation Coefficients	
			a	*b*
001	001	Sippican T-4	6.472	-2.16
002	002	Sippican T-4	6.691	-2.25
011	011	Sippican T-5	6.828	-1.82
021	021	Sippican Fast Deep	6.346	-1.82
031	031	Sippican T-6	6.472	-2.16
032	032	Sippican T-6	6.691	-2.25
041	041	Sippican T-7	6.472	-2.16
042	042	Sippican T-7	6.691	-2.25
051	051	Sippican Deep Blue	6.472	-2.16
052	052	Sippican Deep Blue	6.691	-2.25
061	061	Sippican T-10	6.301	-2.16
071	071	Sippican T-11	1.779	-0.255
201	201	TSK T-4	6.472	-2.16
202	202	TSK T-4	6.691	-2.25
211	211	TSK T-6	6.472	-2.16
212	212	TSK T-6	6.691	-2.25
221	221	TSK T-7	6.472	-2.16
222	222	TSK T-7	6.691	-2.25
231	231	TSK T-5	6.828	-1.82
241	241	TSK T-10	6.301	-2.16
251	251	TSK Deep Blue	6.472	-2.16
252	252	TSK Deep Blue	6.691	-2.25
261	261	TSK AXBT		
401	401	Sparton XBT-1	6.301	-2.16
411	411	Sparton XBT-3	5.861	-0.0904
421	421	Sparton XBT-4	6.472	-2.16
431	431	Sparton XBT-5	6.828	-1.82
441	441	Sparton XBT-5DB	6.828	-1.82
451	451	Sparton XBT-6	6.472	-2.16

(continued)

(Common Code table C–3 — continued)

Code figure for $I_XI_XI_X$	Code figure for BUFR (Code table 022067)	Meaning		
		Instrument Make	Equation Coefficients *a*	*b*
461	461	Sparton XBT-7	6.472	-2.16
462	462	Sparton XBT-7	6.705	-2.28
471	471	Sparton XBT-7DB	6.472	-2.16
481	481	Sparton XBT-10	6.301	-2.16
491	491	Sparton XBT-20	6.472	-2.16
501	501	Sparton XBT-20DB	6.472	-2.16
510	510	Sparton 536 AXBT	1.524	0
700	700	Sippican XCTD standard		
710	710	Sippican XCTD deep		
720	720	Sippican AXCTD		
730	730	Sippican SXCTD		
741	741	TSK XCTD		
751	751	TSK AXCTD		
800	800	Mechanical BT	Not applicable	
810	810	Hydrocast	Not applicable	
820	820	Thermistor Chain	Not applicable	
830	830	CTD	Not applicable	
831	831	CTD-P-ALACE float	Not applicable	
840	840	PROVOR	No conductivity sensor	
841	841	PROVOR	Seabird conductivity sensor	
842	842	PROVOR	FSI conductivity sensor	
845	845	Web Research	No conductivity sensor	
846	846	Web Research	Seabird conductivity sensor	
847	847	Web Research	FSI conductivity sensor	
850	850	SOLO	No conductivity sensor	
851	851	SOLO	Seabird conductivity sensor	
852	852	SOLO	FSI conductivity sensor	
853-999 Reserved	853-999	Reserved		
	1000-1022	Reserved		
	1023	Missing value		

N o t e s : (1) The depth is calculated from coefficients *a* and *b* and the time *t* as follows:
$z = at + 10^{-3}bt^2$

(2) All unassigned numbers are reserved for future use.

(3) The values of *a* and *b* are supplied for information only.

COMMON CODE TABLE C–4: *Water temperature profile recorder types*

Common code table: Code table 4770 — X_RX_R (Recorder type) — for alphanumeric codes
Code table 0 22 068 (Water temperature profile recorder types) in BUFR

Code figure for X_RX_R	Code figure for BUFR (Code table 022068)	Meaning
01	1	Sippican Strip Chart Recorder
02	2	Sippican MK2A/SSQ-61
03	3	Sippican MK-9
04	4	Sippican AN/BHQ-7/MK8
05	5	Sippican MK-12
06	6	Sippican MK-21
10	10	Sparton SOC BT/SV Processor Model 100
11	11	Lockheed-Sanders Model OL5005
20	20	ARGOS XBT-ST
21	21	CLS-ARGOS/Protecno XBT-ST Model-1
22	22	CLS-ARGOS/Protecno XBT-ST Model-2
30	30	BATHY Systems SA-810
31	31	Scripps Metrobyte Controller
32	32	Murayama Denki Z-60-16 III
33	33	Murayama Denki Z-60-16 II
34	34	Protecno ETSM2
35	35	Nautilus Marine Service NMS-XBT
40	40	TSK MK-2A
41	41	TSK MK-2S
42	42	TSK MK-30
43	43	TSK MK-30N
45	45	TSK MK-100
46	46	TSK MK-130 Compatible recorder for both XBT and XCTD
48	48	TSK AXBT RECEIVER MK-300
50	50	JMA ASTOS
60	60	ARGOS communications, sampling on up transit
61	61	ARGOS communications, sampling on down transit
62	62	Orbcomm communications, sampling on up transit
63	63	Orbcomm communications, sampling on down transit
99	99	Unknown
	127	Missing value

N o t e : All unassigned numbers are reserved for future use.

COMMON CODE TABLE C–5: *Satellite identifier*

Common code table $I_6I_6I_6$ for alphanumeric codes
Code table 0 01 007 in BUFR

Code figure for $I_6I_6I_6$	Code figure for BUFR (Code table 0 01 007)	
(Even deciles indicate polar-orbiting satellites and odd deciles indicate geostationary satellites)		
000	000	Reserved
		001-099: Allocated to European Union
001	001	ERS 1
002	002	ERS 2
003	003	METOP-1
004	004	METOP-2
005	005	METOP-3
020	020	SPOT 1
021	021	SPOT 2
022	022	SPOT 3
023	023	SPOT 4
050	050	METEOSAT 3
051	051	METEOSAT 4
052	052	METEOSAT 5
053	053	METEOSAT 6
054	054	METEOSAT 7
059	059	METEOSAT 2
071	071	MSG-1
072	072	MSG-2
073	073	MSG-3
		100-199: Allocated to Japan
120	120	ADEOS
150	150	GMS 3
151	151	GMS 4
152	152	GMS 5
171	171	MTSAT-1R
		200-299: Allocated to USA
200	200	NOAA 8
201	201	NOAA 9
202	202	NOAA 10
203	203	NOAA 11
204	204	NOAA 12
205	205	NOAA 14
206	206	NOAA 15
207	207	NOAA 16

(Common Code table C–5 — continued)

Code figure for $I_6I_6I_6$	Code figure for BUFR (Code table 0 01 007)	
208	208	NOAA 17
209	209	NOAA 18
220	220	LANDSAT 5
221	221	LANDSAT 4
222	222	LANDSAT 7
240	240	DMSP 7
241	241	DMSP 8
242	242	DMSP 9
243	243	DMSP 10
244	244	DMSP 11
245	245	DMSP 12
246	246	DMSP 13
247	247	DMSP 14
248	248	DMSP 15
250	250	GOES 6
251	251	GOES 7
252	252	GOES 8
253	253	GOES 9
254	254	GOES 10
255	255	GOES 11
256	256	GOES 12
281	281	QUIKSCAT
		300-399: Allocated to Russian Federation
310	310	GOMS 1
311	311	GOMS 2
320	320	METEOR 2-21
321	321	METEOR 3-5
322	322	METEOR 3M-1
323	323	METEOR 3M-2
341	341	RESURS 01-4
		400-499: Allocated to India
430	430	INSAT 1B
431	431	INSAT 1C
432	432	INSAT 1D
450	450	INSAT 2A
451	451	INSAT 2B
452	452	INSAT 2E

(continued)

(Common Code table C–5 — continued)

Code figure for $I_6I_6I_6$	Code figure for BUFR (Code table 0 01 007)	
470	470	INSAT 3A
471	471	INSAT 3D
472	472	INSAT 3E
		500-599: Allocated to China
500	500	FY–1C
501	501	FY–1D
510	510	FY–2
		600-699: Allocated to European Union
		700-799: Allocated to USA
700	700	TIROS M (ITOS 1)
701	701	NOAA 1
702	702	NOAA 2
703	703	NOAA 3
704	704	NOAA 4
705	705	NOAA 5
706	706	NOAA 6
707	707	NOAA 7
708	708	TIROS-N
710	710	GOES (SMS 1)
711	711	GOES (SMS 2)
731	731	GOES 1
732	732	GOES 2
733	733	GOES 3
734	734	GOES 4
735	735	GOES 5
763	763	NIMBUS 3
764	764	NIMBUS 4
765	765	NIMBUS 5
766	766	NIMBUS 6
767	767	NIMBUS 7
780	780	ERBS
781	781	UARS
782	782	EARTH PROBE
783	783	TERRA
800-998	800-998	Reserved
999 Missing	999-1022	Reserved
	1023	Missing value

COMMON CODE TABLE C–6: *List of international units*

Code figure	Base SI units (1)	Conventional abbreviation	Abbreviation in IA5/ASCII (5)	Abbrevation in ITA2 (5)	Definition in base units (2)
001	metre	m	m	M	
002	kilogram	kg	kg	KG	
003	second	s	s	S	
004	ampere	A	A	A	
005	kelvin	K	K	K	
006	mole	mol	mol	MOL	
007	candela	cd	cd	CD	
	Supplementary SI Units (1)				
021	radian	rad	rad	RAD	
022	steradian	sr	sr	SR	
	Derived SI Units with special names (1)				
030	hertz	Hz	Hz	HZ	s^{-1}
031	newton	N	N	N	kg m s^{-2}
032	pascal	Pa	Pa	PAL	kg m^{-1} s^{-2}
033	joule	J	J	J	kg m^2 s^{-2}
034	watt	W	W	W	kg m^2 s^{-3}
035	coulomb	C	C	C	A s
036	volt	V	V	V	kg m^2 s^{-3} A^{-1}
037	farad	F	F	F	kg^{-1} m^{-2} s^4 A^2
038	ohm	Ω	Ohm	OHM	kg m^2 s^{-3} A^{-2}
039	siemens	S	S	SIE	kg^{-1} m^{-2} s^3 A^2
040	weber	Wb	Wb	WB	kg m^2 s^{-2} A^{-1}
041	tesla	T	T	T	kg s^{-2} A^{-1}
042	henry	H	H	H	kg m^2 s^{-2} A^{-2}
060	degree Celsius	°C	Cel	CEL	K+273.15
070	lumen	lm	lm	LM	cd sr
071	lux	lx	lx	LX	cd sr m^{-2}
080	becquerel	Bq	Bq	BQ	s^{-1}
081	gray	Gy	Gy	GY	m^2 s^{-2}
082	sievert	Sv	Sv	SV	m^2 s^{-2}
	SI Unit prefixes (1) (3) (4)				
no	(yotta)	(Y)	(Y)	(Y)	
no	(zetta)	(Z)	(Z)	(Z)	
no	exa	E	E	E	
no	peta	P	P	PE	
no	tera	T	T	T	
no	giga	G	G	G	
no	mega	M	M	MA	
no	kilo	k	k	K	
no	hecto	h	h	H	
no	deca	da	da	DA	
no	deci	d	d	D	

(continued)

(Common Code table C–6 — continued)

Code figure	Base SI units (1)	Conventional abbreviation	Abbreviation in IA5/ASCII (5)	Abbrevation in ITA2 (5)	Definition in base units (2)
no	centi	c	c	C	
no	milli	m	m	M	
no	micro	µ	u	U	
no	nano	n	n	N	
no	pico	p	p	P	
no	femto	f	f	F	
no	atto	a	a	A	
no	(zepto)	(z)	(z)		
no	(yocto)	(y)	(y)		
	Other, non-SI, units recognized by CGPM (4)				
110	degree (angle)	º	deg	DEG	
111	minute (angle)	‘	‘	MNT	
112	second (angle)	"	"	SEC	
120	litre	l or L	l or L	L	
130	minute (time)	min	min	MIN	
131	hour	h	h	HR	
132	day	d	d	D	
150	tonne	t	t	TNE	
160	electron volt	eV	eV	EV	
161	atomic mass unit	u	u	U	
170	astronomic unit	AU	AU	ASU	
171	parsec	pc	pc	PRS	
	Non-SI units tolerated because of widespread use				
200	nautical mile				
201	knot	kt	kt	KT	
210	decibel (6)	dB	dB	DB	
220	hectare	ha	ha	HAR	
230	week				
231	year	a	a	ANN	
	Other units as used by WMO (7)				
300	per cent	%	%	PERCENT	
301	parts per thousand	‰	0/00	PERTHOU	
310	eighths of cloud	okta	okta	OKTA	
320	degrees true	°	deg	DEG	
321	degrees per second	degree/s	deg/s	DEG/S	
350	degrees Celsius (8)	°C	C	C	
351	degrees Celsius per metre	°C/m	C/m	C/M	
352	degrees Celsius per 100 metres	°C/100 m	C/100 m	C/100 M	
360	Dobson Unit (9)	DU	DU	DU	

(Common Code table C–6 — continued)

Code figure	Base SI units (1)	Conventional abbreviation	Abbreviation in IA5/ASCII (5)	Abbrevation in ITA2 (5)	Definition in base units (2)
430	month	mon	mon	MON	
441	per second (same as hertz)	s^{-1}	/s	/S	
442	per second squared	s^{-2}	s-2		
501	knots per 1 000 metres	kt/1000 m	kt/km	KT/KM	
510	foot	ft	ft	FT	
511	inch	in	in	IN	
520	decipascals per second (microbar per second)	dPa s^{-1}	dPa/s	DPAL/S	
521	centibars per second	cb s^{-1}	cb/s	CB/S	
522	centibars per 12 hours	cb/12 h	cb/12 h	CB/12 HR	
523	dekapascal	daPa	daPa	DAPAL	
530	hectopascal	hPa	hPa	HPAL	
531	hectopascals per second	hPa s^{-1}	hPa/s	HPAL/S	
532	hectopascals per hour	hPa h^{-1}	hPa/h	HPAL/HR	
533	hectopascals per 3 hours	hPa/3 h	hPa/3 h	HPAL/3 HR	
535	nanobar = hPa 10^{-6}	nbar	nbar	NBAR	
620	grams per kilogram	g kg^{-1}	g/kg	G/KG	
621	grams per kilogram per second	g kg^{-1} s^{-1}	g kg-1 s-1		
622	kilograms per kilogram	kg kg^{-1}	kg/kg	KG/KG	
623	kilograms per kilogram per second	kg kg^{-1} s^{-1}	kg kg-1 s-1		
624	kilograms per square metre	kg m^{-2}	kg m-2		
630	acceleration due to gravity	g	g		
631	geopotential metre	gpm	gpm		
710	millimetre	mm	mm	MM	
711	millimetres per second	mm s^{-1}	mm/s	MM/S	
712	millimetres per hour	mm h^{-1}	mm/h	MM/HR	
713	millimetres to the sixth power per cubic metre	mm^6 m^{-3}	mm6 m-3		
715	centimetre	cm	cm	CM	
716	centimetres per second	cm s^{-1}	cm/s	CM/S	
717	centimetres per hour	cm h^{-1}	cm/h	CM/HR	
720	decimetre	dm	dm	DM	
731	metres per second	m s^{-1}	m/s	M/S	
732	metres per second per metre	m s^{-1}/m	m s-1/m		
733	metres per second per 1 000 m	m s^{-1}/1000 m	m s-1/km		
734	square metres	m^2	m2	M2	
735	square metres per second	m^2 s^{-1}	m2/s	M2/S	
740	kilometre	km	km	KM	
741	kilometres per hour	km h^{-1}	km/h	KM/HR	
742	kilometres per day	km/d	km/d	KM/D	
743	per metre	m^{-1}	m-1	/M	

(continued)

(Common Code table C–6 — continued)

Code figure	Base SI units (1)	Conventional abbreviation	Abbreviation in IA5/ASCII (5)	Abbrevation in ITA2 (5)	Definition in base units (2)
750	becquerels per litre	Bq l^{-1}	Bq/l	BQ/L	
751	becquerels per square metre	Bq m^{-2}	Bq m–2	BQ/M2	
752	becquerels per cubic metre	Bq m^{-3}	Bq m–3	BQ/M3	
753	millisievert	mSv	mSv	MSV	

NOTES:

(1) The international system of units, *Système International* (SI), was established by the eleventh Conférence Générale des Poids et Mesures in 1960, and extended at the 1980 conference. There are seven base units, two dimensionless supplementary units and a set of prefixes for decimal scaling. These may be combined to give compound units. Some compound units have special names, and are called derived units.

(2) When documenting compound SI units, each symbol for each base unit has been separated from the others by a space. There is no space between the unit and any prefix or exponent. Any prefix establishes a new unit to which any exponent applies (e.g. $km^2 = (km)^2 = m^6$ not $k(m^2) = m^5$). Prefixes must be in the case specified. The full name of the unit must not start with an upper case letter. If the solidus (/) is used, there must be only one. There is no space before or after it.

(3) Prefixes beyond exa and atto have been proposed but not yet adopted. Use of the prefixes hecto, deca, deci and centi is discouraged.

(4) Prefixes generally should not be used with units having non-decimal multiples and sub-multiples, such as units of time and angle, or with knots and nautical miles.

(5) Non-WMO abbreviations with limited character sets taken from ISO 2955-1983. Other abbreviations try to be consistent with this.

(6) The decibel is one tenth of a bel, which is the decimal logarithm of a ratio of two powers. Frequently, suffixes are supplied to indicate information about one of the quantities in the ratio, such as dB(mW), dBm, dBW, dBmW, dB(uV/m). It is recommended that only dB be used, with the full meaning of the ratio explained, including reference levels.

(7) This list consists of the units not mentioned previously that occur in existing *WMO Manuals*.

(8) The abbreviation for degrees Celsius proposed for WMO use, C, could be confused with Coulombs. In this case, Amperes second should be used instead.

(9) Dobson Unit = DU. One Dobson Unit corresponds to a layer of 0.01 mm of pure ozone, if the whole column of atmosphere were compressed at P=1013 hPa and T = 0°C.

COMMON CODE TABLE C–7: *Tracking techniques/status of system used*

Common code table — Code table 3872 — $s_a s_a$ for alphanumeric code; Code table 0 02 014 in BUFR

Code figure for $s_a s_a$	Code figure for BUFR (Code table 0 02 014)	
00	0	No windfinding
01	1	Automatic with auxiliary optical direction finding
02	2	Automatic with auxiliary radio direction finding
03	3	Automatic with auxiliary ranging
04	4	Not used
05	5	Automatic with multiple VLF-Omega signals
06	6	Automatic cross chain Loran-C
07	7	Automatic with auxiliary wind profiler
08	8	Automatic satellite navigation
09-18	9-18	Reserved
19	19	Tracking technique not specified
		TRACKING TECHNIQUES/STATUS OF ASAP SYSTEM
		STATUS OF SHIP SYSTEM
20	20	Vessel stopped
21	21	Vessel diverted from original destination
22	22	Vessel's arrival delayed
23	23	Container damaged
24	24	Power failure to container
24-28	25-28	Reserved for future use
29	29	Other problems
		SOUNDING SYSTEM
30	30	Major power problems
31	31	UPS inoperative
32	32	Receiver hardware problems
33	33	Receiver software problems
34	34	Processor hardware problems
35	35	Processor software problems
36	36	NAVAID system damaged
37	37	Shortage of lifting gas
38	38	Reserved
39	39	Other problems
		LAUNCH FACILITIES
40	40	Mechanical defect
41	41	Material defect (hand launcher)
42	42	Power failure
43	43	Control failure

(continued)

(Common Code table C–7 — continued)

Code figure for $s_a s_a$	Code figure for BUFR (Code table 0 02 014)	
44	44	Pneumatic/hydraulic failure
45	45	Other problems
46	46	Compressor problems
47	47	Balloon problems
48	48	Balloon release problems
49	49	Launcher damaged
		DATA ACQUISITION SYSTEM
50	50	R/S receiver antenna defect
51	51	NAVAID antenna defect
52	52	R/S receiver cabling (antenna) defect
53	53	NAVAID antenna cabling defect
54-58	54-58	Reserved
59	59	Other problems
		COMMUNICATIONS
60	60	ASAP communications defect
61	61	Communications facility rejected data
62	62	No power at transmitting antenna
63	63	Antenna cable broken
64	64	Antenna cable defect
65	65	Message transmitted power below normal
66-68	66-68	Reserved
69	69	Other problems
70	70	All systems in normal operation
71-98	71-98	Reserved
99	99	Status of system and its components not specified
	100-126	Reserved
	127	Missing value

COMMON CODE TABLE C–8: *Satellite instruments*

Common code table Code table 0 02 019 in BUFR

Code	Agency	Type	Instrument short name	Instrument long name
10	**BNSC**	**Radiometer**	**AATSR**	**Advanced along track scanning radiometer**
11	**BNSC**	**Radiometer**	**ATSR**	**Along track scanning radiometer**
12	**BNSC**	**Radiometer**	**ATSR-2**	**Along track scanning radiometer — 2**
13	**BNSC**	**Radiometer**	**MWR**	**Microwave radiometer**
30	**CNES**	**Communications**	**ARGOS**	
40	**CNES**	**Lidar**	**Laser reflectors**	
41	**CNES**	**Lidar**	**DORIS**	**DORIS**
45	**CNES**	**Radar**	**POSEIDON**	**Positionning ocean solid Earth ice dynamics orbiting navigator**
47	**CNES**	**Radar**	**SSALT**	**Single frequency solid state radar altimeter**
52	**CNES**	**Radiometer**	**HRV**	**High-resolution visible**
53	**CNES**	**Radiometer**	**HRVIR**	**High-resolution visible and infrared**
54	**CNES**	**Radiometer**	**ScaRaB/MV2**	**Scanner for Earth's radiation budget**
55	**CNES**	**Radiometer**	**POLDER**	**POLDER**
60	**CNES**	**Spectrometer**	**VEGETATION**	**VEGETATION**
61	**CNES**	**Spectrometer**	**WINDII**	**WINDII**
80	**CSA**	**Communications**	**RADARSAT DTT**	
81	**CSA**	**Communications**	**RADARSAT TTC**	
85	**CSA**	**Radar**	**SAR (CSA)**	**Syntetic aperture radar (CSA)**
90	**CSA**	**Radiometer**	**MOPITT**	**Measurements of pollution in the troposphere**
97	**CSIRO**	**Radiometer**	**Panchromatic imager**	
101	**CSIRO**	**Spectro-radiometer**	**Imaging spectrometer**	
102	**DLR**	**Radiometer**	**CHAMP GPS sounder**	**GPS turborogue space receiver (TRSR)**
116	**DLR**	**Magnetometer**	**CHAMP gravity package (Accelerometer+GPS)**	**STAR accelerometer**
117	**DLR**	**Magnetometer**	**CHAMP magnetometry package (1 scalar+ 2 vector magnetometer)**	**Overhauser magnetometer (OVM) and fluxgate magnetometer (FGM)**
120	**ESA**	**Communications**	**ENVISAT Comms**	**Communications package on ENVISAT**
121	**ESA**	**Communications**	**ERS Comms**	**Communication package for ERS**
140	**ESA**	**Radar**	**AMI/SAR/image**	**Active microwave instrumentation image mode**
141	**ESA**	**Radar**	**AMI/SAR/wave**	**Active microwave instrumentation wave mode**
142	**ESA**	**Radar**	**AMI/scatterometer**	**Active microwave instrumentation wind mode**
143	**ESA**	**Radar**	**ASAR**	**ASAR**
147	**ESA**	**Radar**	**RA-2/MWR**	**Radar altimeter — 2**
148	**ESA**	**Radar**	**RA/MWR**	**Radar altimeter**
161	**ESA**	**Radiometer**	**MIPAS**	**Michelson interferometric passive atmosphere sounder**

(continued)

(Common Code table C–8 — continued)

Common code table Code table 0 02 019 in BUFR

Code	Agency	Type	Instrument short name	Instrument long name
172	**ESA**	**Spectrometer**	**GOMOS**	**Global ozone monitoring by occultation of stars**
174	**ESA**	**Spectrometer**	**MERIS**	**Medium resolution imaging spectrometer**
175	**ESA**	**Spectrometer**	**SCIAMACHY**	**Scanning imaging absorption spectrometer for atmospheric cartography**
181	**EUMETSAT**	**Communications**	**METEOSAT Comms**	**Communications package for METEOSAT**
200	**EUMETSAT**	**Radiometer**	**GERB**	**Geostationary Earth radiation budget**
202	**EUMETSAT**	**Radiometer**	**GRAS**	**GNSS receiver for atmospheric sounding**
203	**EUMETSAT**	**Radiometer**	**MHS**	**Microwave humidity sounder**
205	**EUMETSAT**	**Radiometer**	**MVIRI**	**METEOSAT visible and infrared imager**
207	**EUMETSAT**	**Radiometer**	**SEVIRI**	**Spinning enhanced visible and infrared imager**
220	**EUMETSAT**	**Spectrometer**	**GOME-2**	**Global ozone monitoring experiment — 2**
221	**EUMETSAT**	**Spectrometer**	**IASI**	**Infrared atmospheric sounding interferometer**
240	**INPE**	**Communications**	**DCP**	**Data-collection platform transponder**
245	**INPE**	**Radiometer**	**CCD**	**High-resolution CCD camera**
250	**INPE**	**Radiometer**	**WFI**	**Wide field imager**
255	**INPE**	**Spectrometer**	**IRMSS**	**Infrared multispectral scanner**
260	**ISRO**	**Communications**	**BSS & FSS transponders**	
261	**ISRO**	**Communications**	**DRT-S&R**	
262	**ISRO**	**Communications**	**INSAT Comms**	**Communications package for INSAT**
268	**ISRO**	**Radiometer**	**HR-PAN**	**High-resolution panchromatic camera**
269	**ISRO**	**Radiometer**	**MSMR**	**Multifrequency scanning microwave radiometer**
270	**ISRO**	**Radiometer**	**VHRR**	
271	**ISRO**	**Radiometer**	**WiFS**	**Wide field sensor**
276	**ISRO**	**Spectro-radiometer**	**LISS-I**	**Linear imaging self scanner — I**
277	**ISRO**	**Spectro-radiometer**	**LISS-II**	**Linear imaging self scanner — II**
278	**ISRO**	**Spectro-radiometer**	**LISS-III**	**Linear imaging self scanner — III**
279	**ISRO**	**Spectro-radiometer**	**LISS-IV**	**Linear imaging self scanner — IV**
284	**ISRO**	**Spectro-radiometer**	**PAN**	**Panchromatic sensor**
285	**ISRO**	**Spectrometer**	**MOS**	**Modular opto-electronic scanner**
290	**JMA**	**Communications**	**MTSAT Comms**	**Communications package for MTSAT**
295	**JMA**	**Radiometer**	**IMAGER/MTSAT**	**Imager/MTSAT**
296	**JMA**	**Radiometer**	**VISSR**	**Visible and infrared spin scan radiometer**
301	**NASA**	**Lidar**	**LRA**	**Laser retroreflector array**
302	**NASA**	**Lidar**	**MBLA**	**Multi-beam laser altimeter**

(Common Code table C–8 — continued)

Common code table Code table 0 02 019 in BUFR

Code	Agency	Type	Instrument short name	Instrument long name
312	**NASA**	**Radar**	**NSCAT**	**NASA scatterometer**
313	**NASA**	**Radar**	**SeaWinds**	**ADEOS II — NASA scatterometer**
330	**NASA**	**Radiometer**	**ACRIM**	**Active cavity radiometer irradiance monitor**
334	**NASA**	**Radiometer**	**BUV**	**Backscatter ultraviolet instrument**
336	**NASA**	**Radiometer**	**ALI**	**Advanced land imager**
347	**NASA**	**Radiometer**	**ASTER**	**Advanced spaceborne thermal emission and reflection radiometer**
348	**NASA**	**Radiometer**	**CERES-2**	**Cloud and the Earth's radiant energy system**
350	**NASA**	**Radiometer**	**ETM+**	**Enhanced thematic mapper +**
351	**NASA**	**Radiometer**	**GPSDR**	**GPS demonstration receiver**
353	**NASA**	**Radiometer**	**HiRDLS**	**High-resolution dynamics limb sounder**
354	**NASA**	**Radiometer**	**HRDI**	**High-resolution doppler imager**
356	**NASA**	**Radiometer**	**LIS**	**Lightning imaging sensor**
358	**NASA**	**Radiometer**	**PEM**	**Particle environment monitor**
359	**NASA**	**Radiometer**	**SeaWiFS**	**Sea-viewing wide field-of-view sensor**
360	**NASA**	**Radiometer**	**SUSIM (UARS)**	**Solar ultraviolet irradiance monitor**
363	**NASA**	**Radiometer**	**SBUV/1**	**Solar backscatter ultraviolet 1**
365	**NASA**	**Radiometer**	**TMI**	**TRMM microwave imager**
366	**NASA**	**Radiometer**	**JMR**	**JASON microwave radiometer**
369	**NASA**	**Radiometer**	**LIMS**	**Limb infrared monitor of the stratosphere**
370	**NASA**	**Radiometer**	**LRIR**	**Limb radiance inversion radiometer instrument**
375	**NASA**	**Radiometer**	**VIRS**	**Visible infrared scanner**
382	**NASA**	**Spectro-radiometer**	**CLAES**	**Cryogenic limb array etalon spectrometer**
383	**NASA**	**Spectro-radiometer**	**HALOE**	**Halogen occultation experiment**
384	**NASA**	**Spectro-radiometer**	**ISAMS**	**Improved stratospheric and mesospheric sounder**
385	**NASA**	**Spectro-radiometer**	**MISR**	**Multi-angle imaging spectroradiometer**
386	**NASA**	**Spectro-radiometer**	**MLS**	**Microwave limb sounder**
387	**NASA**	**Spectro-radiometer**	**MLS (EOS-CHEM)**	**Microwave limb sounder (EOS-CHEM)**
389	**NASA**	**Spectro-radiometer**	**MODIS**	**Moderate-resolution imaging spectroradiometer**
395	**NASA**	**Radiometer**	**Atmospheric corrector**	**Atmospheric corrector**
396	**NASA**	**Radiometer**	**Hyperion**	**Hyperspectral imager**
399	**NASA**	**Spectro-radiometer**	**SAGE I**	**Stratospheric aerosol and gas experiment — I**
400	**NASA**	**Spectro-radiometer**	**SAGE II**	**Stratospheric aerosol and gas experiment — II**
401	**NASA**	**Spectro-radiometer**	**SAGE III**	**Stratospheric aerosol and gas experiment — III**

(continued)

(Common Code table C–8 — continued)

Common code table Code table 0 02 019 in BUFR

Code	Agency	Type	Instrument short name	Instrument long name
402	**NASA**	**Spectro-radiometer**	**SAMS**	**Stratospheric and mesospheric sounder**
403	**NASA**	**Spectro-radiometer**	**SAM-II**	**Stratospheric aerosol measurement — II**
404	**NASA**	**Spectro-radiometer**	**IRIS**	**Infrared interferometer spectrometer**
420	**NASA**	**Spectrometer**	**AIRS**	**Atmospheric infrared sounder**
426	**NASA**	**Spectrometer**	**SOLSTICE**	**Solar stellar irradiance comparison experiment**
430	**NASA**	**Spectrometer**	**TES**	**Troposhperic emission spectrometer**
431	**NASA**	**Spectrometer**	**TOMS**	**Total ozone mapping spectrometer**
450	**NASDA**	**Communications**	**ADEOS Comms**	**Communications package for ADEOS**
451	**NASDA**	**Communications**	**DCS (NASDA)**	**Data-collection system (NASDA)**
453	**NASDA**	**Communications**	**GMS Comms**	**Communications package on GMS**
454	**NASDA**	**Communications**	**JERS-1 Comms**	**Communications package for JERS-1**
460	**NASDA**	**Lidar**	**RIS**	**Retroreflector in space**
461	**NASDA**	**Radar**	**PR**	**Precipitation radar**
462	**NASDA**	**Radar**	**SAR**	**Synthetic aperture radar**
482	**NASDA**	**Radiometer**	**AVNIR**	**Advanced visible and near infrared radiometer**
485	**NASDA**	**Radiometer**	**MESSR**	**Multispectral electronic self scanning radiometer**
486	**NASDA**	**Radiometer**	**MSR**	**Microwave scanning radiometer**
487	**NASDA**	**Radiometer**	**OCTS**	**Ocean colour and temperature scanner**
488	**NASDA**	**Radiometer**	**OPS**	**Optical sensor**
489	**NASDA**	**Radiometer**	**VISSR (GMS-5)**	**Visible and infrared spin scan radiometer (GMS-5)**
490	**NASDA**	**Radiometer**	**VTIR**	**Visible and thermal infrared radiometer**
510	**NASDA**	**Spectrometer**	**ILAS-I**	**Improved limb atmospheric spectrometer**
511	**NASDA**	**Spectrometer**	**ILAS-II**	**Improved limb atmospheric spectrometer**
512	**NASDA**	**Spectrometer**	**IMG**	**Inferometric monitor of geenhouse gases**
540	**NOAA**	**Communications**	**DCS (NOAA)**	**Data-collection system (NOAA)**
541	**NOAA**	**Communications**	**GOES Comms**	**Communications package on GOES**
542	**NOAA**	**Communications**	**LANDSAT Comms**	**Communications package for LANDSAT**
543	**NOAA**	**Communications**	**NOAA Comms**	**Communications package for NOAA**
544	**NOAA**	**Communications**	**S&R (GOES)**	**Search and rescue**
545	**NOAA**	**Communications**	**S&R (NOAA)**	**Search and rescue**
546	**NOAA**	**Communications**	**WEFAX**	**Weather facsimile**
547	**NOAA**	**Spectrometer**	**SEM (GOES)**	**Space environment monitor**

(Common Code table C–8 — continued)

Common code table Code table 0 02 019 in BUFR

Code	Agency	Type	Instrument short name	Instrument long name
560	**NOAA**	**Radiometer**	**(HIRS/2 + SBUV/2)**	**High-resolution infrared sounder/2 + solar backscatter ultraviolet instrument/2**
570	**NOAA**	**Radiometer**	**AMSU-A**	**Advanced microwave sounding unit-A**
571	**NOAA**	**Radiometer**	**AMSU-A1-1**	**Advanced microwave sounding unit-A1-1**
574	**NOAA**	**Radiometer**	**AMSU-B**	**Advanced microwave sounding unit-B**
580	**NOAA**	**Radiometer**	**ATOVS (HIRS/3 + AMSU + AVHRR/3)**	**Advanced TIROS operational vertical sounder**
590	**NOAA**	**Radiometer**	**AVHRR/2**	**Advanced very high-resolution radiometer/2**
591	**NOAA**	**Radiometer**	**AVHRR/3**	**Advanced very high-resolution radiometer/3**
592	**NOAA**	**Radiometer**	**AVHRR/4**	**Advanced very high-resolution radiometer/4**
600	**NOAA**	**Radiometer**	**ERBE**	**Earth's radiation budget experiment**
601	**NOAA**	**Radiometer**	**ETM+**	**Enhanced thematic mapper**
605	**NOAA**	**Radiometer**	**HIRS/2**	**High-resolution infrared sounder/2**
606	**NOAA**	**Radiometer**	**HIRS/3**	**High-resolution infrared sounder/3**
607	**NOAA**	**Radiometer**	**HIRS/4**	**High-resolution infrared sounder/4**
615	**NOAA**	**Radiometer**	**IMAGER**	**Imager**
620	**NOAA**	**Radiometer**	**CrIRS/NP**	**Cross-track infrared sounder/NPOESS**
622	**NOAA**	**Radiometer**	**MSS**	**Multispectral scanning system**
623	**NOAA**	**Radiometer**	**MSU**	**Microwave sounding unit**
624	**NOAA**	**Radiometer**	**SBUV/2**	**Solar backscattter ultraviolet instrument/2**
625	**NOAA**	**Radiometer**	**SBUV/3**	**Solar backscattter ultraviolet instrument/3**
626	**NOAA**	**Radiometer**	**SOUNDER**	**SOUNDER**
627	**NOAA**	**Radiometer**	**SSU**	**Stratospheric sounding unit**
628	**NOAA**	**Radiometer**	**TM**	**Thematic mapper**
629	**NOAA**	**Radiometer**	**TOVS (HIRS/2 + MSU + SSU)**	**TIROS operational vertical sounder**
630	**NOAA**	**Radiometer**	**VAS**	**VISSR atmospheric sounder**
631	**NOAA**	**Radiometer**	**SSZ**	
645	**NOAA**	**Spectrometer**	**SEM**	**Space environment monitor**
650	**NRSCC**	**Radiometer**	**MVIRSR (10 channel)**	**Multispectral visible and infrared scan radiometer**
651	**NRSCC**	**Radiometer**	**MVIRSR (3 channel)**	**Multispectral visible and infrared scan radiometer**
652	**NRSCC**	**Radiometer**	**MVIRSR (5 channel)**	**Multispectral visible and infrared scan radiometer**
670	**NSAU**	**Radar**	**RLSBO**	**Side looking microwave radar**
682	**NSAU**	**Radiometer**	**RM-08**	**Imaging microwave radiometer**
685	**NSAU**	**Radiometer**	**TRASSER**	

(continued)

(Common Code table C–8 — continued)

Common code table Code table 0 02 019 in BUFR

Code	Agency	Type	Instrument short name	Instrument long name
700	**RSA**	**Communications**	**KONDOR-2**	**Data-collection and transmission system**
701	**RSA**	**Communications**	**BRK**	
710	**RSA**	**Lidar**	**ALISSA**	**Backscatter lidar**
712	**RSA**	**Lidar**	**Balkan-2 lidar**	
715	**RSA**	**Lidar**	**MK-4**	
716	**RSA**	**Lidar**	**MK-4M**	
730	**RSA**	**Radar**	**Greben**	**Radar altimeter**
731	**RSA**	**Radar**	**SAR-10**	**Syntetic aperture radar**
732	**RSA**	**Radar**	**SAR-3**	**Syntetic aperture radar**
733	**RSA**	**Radar**	**SAR-70**	**Syntetic aperture radar**
740	**RSA**	**Radar**	**SLR-3**	**Side looking radar**
745	**RSA**	**Radar**	**Travers SAR**	
750	**RSA**	**Radiometer**	**174-K**	**Temperature and humidity profiler**
751	**RSA**	**Radiometer**	**BTVK**	**Scanning television radiometer**
752	**RSA**	**Radiometer**	**Chaika**	**Scanning infrared radiometer**
753	**RSA**	**Radiometer**	**DELTA-2**	**Multispectral microwave scanner**
755	**RSA**	**Radiometer**	**IKAR-D**	**Multispectral microwave scanner**
756	**RSA**	**Radiometer**	**IKAR-N**	**Multispectral microwave scanner**
757	**RSA**	**Radiometer**	**IKAR-P**	**Multispectral microwave scanner**
760	**RSA**	**Radiometer**	**ISP**	
761	**RSA**	**Radiometer**	**KFA-1000**	**Photographic camera**
762	**RSA**	**Radiometer**	**KFA-200**	**Photographic camera**
763	**RSA**	**Radiometer**	**KFA-3000**	**Photographic camera**
770	**RSA**	**Radiometer**	**Klimat**	**Scanning infrared radiometer**
771	**RSA**	**Radiometer**	**Klimat-2**	**Scanning infrared radiometer**
775	**RSA**	**Radiometer**	**MIRAS**	
776	**RSA**	**Radiometer**	**MIVZA**	
777	**RSA**	**Radiometer**	**MIVZA-M**	**Microwave scanning radiometer**
780	**RSA**	**Radiometer**	**MR-2000**	
781	**RSA**	**Radiometer**	**MR-2000M**	
785	**RSA**	**Radiometer**	**MR-900**	**Scanning telephotometer**
786	**RSA**	**Radiometer**	**MR-900B**	**Scanning visual band telephotometer**
790	**RSA**	**Radiometer**	**MSU-E**	**Multispectral high-resolution electronic scanner**
791	**RSA**	**Radiometer**	**MSU-E1**	**Multispectral high-resolution electronic scanner**
792	**RSA**	**Radiometer**	**MSU-E2**	**Multispectral high-resolution electronic scanner**
793	**RSA**	**Radiometer**	**MSU-M**	
794	**RSA**	**Radiometer**	**MSU-S**	**Multispectral medium-resolution scanner**
795	**RSA**	**Radiometer**	**MSU-SK**	**Multispectral medium-resolution conical scanner**
796	**RSA**	**Radiometer**	**MSU-V**	**Multispectral high-resolution conical scanner**

(Common Code table C–8 — continued)

Common code table Code table 0 02 019 in BUFR

Code	Agency	Type	Instrument short name	Instrument long name
810	**RSA**	**Radiometer**	**MTZA**	**Scanning microwave radiometer**
815	**RSA**	**Radiometer**	**MZOAS**	**Scanning microwave radiometer**
820	**RSA**	**Radiometer**	**R-225**	**Single channel microwave radiometer**
821	**RSA**	**Radiometer**	**R-400**	
822	**RSA**	**Radiometer**	**R-600**	**Single channel microwave radiometer**
830	**RSA**	**Radiometer**	**RMS**	**Radiation measurement system**
835	**RSA**	**Radiometer**	**TV camera**	
836	**RSA**	**Radiometer**	**SILVA**	
840	**RSA**	**Spectro-radiometer**	**SROSMO**	**Spectroradiometer for ocean monitoring**
850	**RSA**	**Spectrometer**	**BUFS-2**	**Backscatter spectrometer/2**
851	**RSA**	**Spectrometer**	**BUFS-4**	**Backscatter spectrometer/4**
855	**RSA**	**Spectrometer**	**ISTOK-1**	**Infrared spectrometer**
856	**RSA**	**Spectrometer**	**SFM-2**	**Spectrometer to measure direct solar radiation**
857	**RSA**	**Spectrometer**	**DOPI**	
858	**RSA**	**Spectrometer**	**KGI-4**	
859	**RSA**	**Spectrometer**	**Ozon-M**	
860	**RSA**	**Spectrometer**	**RMK-2**	
900	**NOAA**	**Radiometer**	**MAXIE**	**Magnetospheric atmospheric X-ray imaging experiment**
901	**NOAA**	**Radiometer**	**OLS**	**Operational linescan system**
905	**NOAA**	**Radiometer**	**SSM/I**	**Mission sensor microwave imager**
906	**NOAA**	**Radiometer**	**SSM/T-1**	**Mission sensor microwave temperature sounder**
907	**NOAA**	**Radiometer**	**SSM/T-2**	**Mission sensor microwave water vapour sounder**
910	**NOAA**	**Radiometer**	**SXI**	**Solar X-ray imager**
930	**NOAA**	**Spectrometer**	**EHIC**	**Energetic heavy ion composition experiment**
931	**NOAA**	**Spectrometer**	**X-ray astronomy payload**	
932–999		**Reserved**		
1000–2046		**Reserved for long-term future use**		
2047		**Missing value**		

ATTACHMENT

LIST OF ALPHANUMERIC CODE TABLES RELATED TO BUFR AND CREX TABLE B

BUFR code/flag table	Related specification/code table/regulation/code form in alphanumeric codes	Remarks
0 01 003	A_1 — Code table 0161	—
0 01 007	Common Code table C–5	—
0 01 031	Common Code table C–1	—
0 01 032	—	Defined by originating/generating centre
0 01 033	Common Code table C–1	—
0 01 034	See Common Code table C–1	—
0 01 036	—	—
0 02 001*	i_x — Code table 1860	—
0 02 002	i_u — Code table 1853	—
0 02 003	a_4 — Code table 0265	—
0 02 004	i_E — Code table 1806	—
0 02 011	$r_a r_a$ — Code table 3685 (0–89)	Defined in common Code table C–2
0 02 012	—	To be developed
0 02 013	s_r — Code table 3849	—
0 02 014	$s_a s_a$ — Code table 3872	—
0 02 015	$r_a r_a$ — Code table 3685 (91–95)	Defined in common Code table C–2
0 02 019	Common Code table C-8	—
0 02 020	—	—
0 02 021	I_3	—
0 02 022	I_4 — Code table 1765	—
0 02 023	w_i — Code table 4639	—
0 02 024	—	
0 02 025	—	—
0 02 030	k_5 — Code table 2266	—
0 02 031	k_3 — Code table 2264 k_4 — Code table 2265	—
0 02 032	k_1 — Code table 2262	Numerical variation in each table
0 02 033	k_2 — Code table 2263	—
0 02 034	—	—
0 02 036	—	—
0 02 037	—	—
0 02 038	s_s — Code table 3850	—
0 02 039	s_w — Code table 3855	—
0 02 040	k_6 — Code table 2267	—
0 02 041	—	—
0 02 044	I_m — Code table 1744	—
0 02 045	I_p — Code table 1747	—

* See note on page I.2 – Att.Co — 6.

(continued)

BUFR code/flag table	Related specification/code table/regulation/code form in alphanumeric codes	Remarks
0 02 046	—	—
0 02 048	—	—
0 02 049	—	—
0 02 050	—	—
0 02 051	i_y — Code table 1857	—
0 02 052	—	—
0 02 053	—	—
0 02 054	—	—
0 02 055	—	—
0 02 056	—	—
0 02 057	—	—
0 02 058	—	—
0 02 059	—	—
0 02 060	—	—
0 02 061	s_1 — Code table 3866	—
0 02 062	s_2 — Code table 3867	—
0 02 064	—	—
0 02 070	—	—
0 02 101	—	—
0 02 103	—	—
0 02 104	—	—
0 02 131	—	—
0 02 143	—	—
0 02 144	—	—
0 02 145	—	—
0 02 146	—	—
0 02 148	—	—
0 02 149	—	—
0 02 150	—	—
0 02 151	—	—
0 02 152	—	—
0 02 163	—	—
0 02 164	—	—
0 02 166	—	—
0 02 167	—	—
0 02 169	—	—
0 02 172	—	—
0 08 001	TEMP/TEMP SHIP — Sections 2 to 6	—
0 08 002	SYNOP/SHIP — Regulation 12.4.10.1	—
0 08 003	—	—
0 08 004	AMDAR — Regulation 42.2	—
0 08 005	—	—
0 08 006	—	—
0 08 007	—	—
0 08 008	—	—
0 08 011	F_t — Code table 1152	—
0 08 012	—	—
0 08 013	—	—
0 08 014	METAR/SPECI — Regulation 15.7.6	—
0 08 016	METAR/SPECI — Regulation 15.14	—

BUFR code/flag table	Related specification/code table/regulation/code form in alphanumeric codes		Remarks
0 08 017	METAR/SPECI — Regulation 15.14.3	—	
0 08 018	—	—	
0 08 021	—	—	
0 08 023	—	—	
0 08 024	—	—	
0 08 025	—	—	
0 08 033	—	—	I
0 08 035	—	—	
0 08 036	—	—	
0 08 051	—	—	
0 08 052	—	—	
0 08 053	—	—	
0 08 060	—	—	
0 08 070	—	—	
0 08 072	—	—	
0 08 075	—	—	I
0 10 063	a — Code table 0200	—	
0 11 031	i — Code table 1800 B_A — Code table 0302	—	
0 11 037	—	—	
0 11 038	—	—	
0 13 038	—	—	
0 13 039	—	—	
0 13 041	s_p — Code table 3847	—	
0 13 051	R_d — Code table 3534	—	
0 19 001	—	—	
0 19 008	—	—	
0 19 010	—	—	
0 20 003*	ww — Code table 4677 w_aw_a — Code table 4680 w_1w_1 — Code table 4687	—	
0 20 004	W_1 — Code table 4561 W_{a1} — Code table 4531	—	
0 20 005	W_2 — Code table 4561 W_{a2} — Code table 4531	—	
0 20 008	—	—	
0 20 009	METAR/SPECI	—	
0 20 011	N — Code table 2700	—	
0 20 012	C — Code table 0500 C_H — Code table 0509 C_M — Code table 0515 C_L — Code table 0513	—	
0 20 017	C_t — Code table 0552	—	
0 20 018	METAR/SPECI — Regulation 15.7.4.3	—	

* See note on page I.2 – Att.Co — 6.

(continued)

ATTACHMENT

BUFR code/flag table	Related specification/code table/regulation/code form in alphanumeric codes	Remarks
0 20 021	—	—
0 20 022	—	—
0 20 023	—	—
0 20 024	—	—
0 20 025	—	—
0 20 026	—	—
0 20 027	—	—
0 20 032	R_s — Code table 3551	—
0 20 033	I_s — Code table 1751	—
0 20 034	c_i — Code table 0639	—
0 20 035	b_i — Code table 0439	—
0 20 036	z_i — Code table 5239	—
0 20 037	S_i — Code table 3739	—
0 20 041	—	—
0 20 062	E — Code table 0901 E′ — Code table 0975	—
0 20 063	$S_PS_Ps_ps_p$ — Code table 3778	To be developed
0 20 071	—	—
0 20 090	C_s — Code table 0521	—
0 21 066	—	—
0 21 067	—	—
0 21 068	—	—
0 21 069	—	—
0 21 070	—	—
0 21 072	—	—
0 21 073	—	—
0 21 076	—	—
0 21 109	—	—
0 21 115	—	—
0 21 116	—	—
0 21 119	—	—
0 22 056	—	—
0 22 061	S — Code table 3700	—
0 22 067	Common Code table C–3	—
0 22 068	Common Code table C–4	
0 22 120	—	—
0 22 121	—	—
0 22 122	—	—
0 22 123	—	—
0 23 001	A_a — Code table 0131	—
0 23 002	AA — Code table 0177	—
0 23 003	B_T — Code table 0324	—
0 23 004	P_a — Code table 3131	—
0 23 005	A_c — Code table 0133	—
0 23 006	A_e — Code table 0135	—
0 23 007	E_c — Code table 0933	—
0 23 008 0 23 009	E_s — Code table 0943	—

BUFR code/flag table	Related specification/code table/regulation/code form in alphanumeric codes	Remarks
0 23 016	R_e — Code table 3535	—
0 23 018	E_e — Code table 0935	—
0 23 031	R_p — Code table 3548	—
0 23 032	I_n — Code table 1743	—
0 24 003	R_c — Code table 3533	—
0 25 004	—	—
0 25 005	—	—
0 25 006	—	—
0 25 009	—	—
0 25 010	—	—
0 25 011	—	—
0 25 012	—	—
0 25 013	—	—
0 25 015	—	—
0 25 017	—	—
0 25 020	—	—
0 25 021	—	—
0 25 030	—	—
0 25 032	—	—
0 25 033	—	—
0 25 034	—	—
0 25 036	—	—
0 25 040	—	—
0 25 041	D_s — Code table 0700	—
0 25 042	v_s — Code table 4451	—
0 25 045	—	—
0 25 046	—	—
0 25 047	—	—
0 25 048	—	—
0 25 049	—	—
0 25 051	—	—
0 25 053	—	—
0 25 086	—	—
0 25 093	—	—
0 26 010	—	—
0 29 001	$g_r g_r$ — Code table 1487	—
0 29 002	—	—
0 30 031	—	—
0 30 032	—	—
0 31 021	—	—
0 31 031	—	—
0 33 002	—	—
0 33 003	—	—
0 33 020	Q_d, Q_{d1}, Q_{d2}, Q_l, Q_t — Code table 3334	—
0 33 021	Q_P, Q_{TW} — Code tables 3315 - 3319	—
0 33 022	Q_N — Code table 3313	—
0 33 023	Q_L — Code table 3311	—
0 33 024	—	—

(continued)

ATTACHMENT

BUFR code/flag table	Related specification/code table/regulation/code form in alphanumeric codes	Remarks
0 33 025	—	—
0 33 026	—	—
0 33 027	Q_A — Code table 3302	—
0 33 030	—	—
0 33 031	—	—
0 33 032	—	—
0 33 033	—	—
0 33 035	—	—
0 33 037	—	—
0 33 041	—	—
0 35 000	—	—
0 35 001	—	—
0 35 030	—	—
0 35 031	—	—
0 35 032	—	—
0 35 033	—	—
0 35 034	—	—

N o t e : Encoding/decoding of SYNOP/SHIP i_x — Code table 1860 to/from BUFR code tables

Code figure	Type of station operation	0 02 001 Type of station	0 20 003 Present weather
1	Manned station (group 7wwW$_1$W$_2$ included)	1	00–99 (200–299)
	(but actually missing)	(1)	(510)
2	Manned station (group 7wwW$_1$W$_2$ omitted, no significant phenomenon to report)	1	508
3	Manned station (group 7wwW$_1$W$_2$ omitted, no observation, data not available)	1	509
4	Automatic station (group 7wwW$_1$W$_2$ included, using Code tables 4677 and 4561)	0	00–99 (200–299)
	(but actually missing)	(0)	(510)
5	Automatic station (group 7w$_a$w$_a$W$_{a1}$W$_{a2}$ omitted, no significant phenomenon to report)	0	508
6	Automatic station (group 7w$_a$w$_a$W$_{a1}$W$_{a2}$ omitted, no observation, data not available)	0	509
7	Automatic station (group 7w$_a$w$_a$W$_{a1}$W$_{a2}$ included, using Code tables 4680 and 4531)	0	100–199 (200–299)
	(but actually missing)	(0)	(510)