

**CODE TABLES AND FLAG TABLES ASSOCIATED WITH BUFR/CREX TABLE B**

Note: In developing code tables associated with BUFR/CREX Table B to specify units of elements, the following principles should be applied:

- (a) Code tables specifying the units for an element which is defined, in the *Manual on Codes*, by a single symbolic letter shall be compatible with the relevant existing WMO code tables;
- (b) Code tables combining two or more existing WMO code tables to specify the units for an element which is defined, in the *Manual on Codes*, by a group of symbolic letters shall be compatible with the combined code figures of the relevant group of symbolic letters;
- (c) Code tables combining two or more existing WMO code tables to specify the units for an element which is defined, in the *Manual on Codes*, by different symbolic letters shall be compatible with the code figures of the relevant symbolic letters, with successive tens or hundreds values added, as appropriate;
- (d) Code tables and flag tables should only be used for reporting qualitative information. Quantitative information should be reported as observed using entries in Table B. "Data description operators" from Table C should be applied when a "scale change" or "data width change" is required;
- (e) Reference to existing specification(s) and code table(s) in the *Manual on Codes*, with explanation of possible deviations, shall be given in an additional table annexed to the code tables associated with BUFR/CREX Table B.



**0 01 003****WMO Region number/geographical area**

Code figure	
0	Antarctica
1	Region I
2	Region II
3	Region III
4	Region IV
5	Region V
6	Region VI
7	Missing value

**0 01 007****Satellite identifier***(See common Code table C-5 Part C/c.)***0 01 024****Wind speed source**

Code figure	
0	No wind speed data available
1	AMSR-E data
2	TMI data
3	NWP: ECMWF
4	NWP: UK Met Office
5	NWP: NCEP
6	Reference climatology
7	ERS_Scatterometer
8-30	Reserved for future use
31	Missing value

**0 01 028****Aerosol optical depth (AOD) source**

Code figure	
0	No AOD data available
1	NESDIS
2	NAVOCEANO
3	NAAPS
4	MERIS
5	AATSR
6-30	Reserved for future use
31	Missing value

**0 01 029****SSI\* source**

Code figure	
0	No SSI data available
1	MSG_SEVIRI
2	GOES East
3	GOES West
4	ECMWF
5	NCEP
6	UK Met Office
7–30	Reserved for future use
31	Missing value

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\* Surface solar irradiance

**0 01 031****Identification of originating/generating centre**

(See common Code table C–1 in Part C/c.)

**0 01 033****Identification of originating/generating centre**

(See common Code table C–1 in Part C/c.)

**0 01 034****Identification of originating/generating sub-centre**

(To be defined by centres themselves –  
See common Code table C–12 in Part C/c.)

**0 01 036****Agency in charge of operating the observing platform**

(The first three digits represent the ISO country code)

Code figure	
0–36000	Reserved
36001	Australia, Bureau of Meteorology (BoM)
36002	Australia, Joint Australian Facility for Ocean Observing Systems (JAFOOS)
36003	Australia, the Commonwealth Scientific and Industrial Research Organization (CSIRO)
36004–124000	Reserved
124001	Canada, Marine Environmental Data Service (MEDS)
124002	Canada, Institute of Ocean Sciences (IOS)
124003–124172	Reserved
124173	Canada, Environment Canada
124174	Canada, Department of National Defence

(continued)

*(Code table 0 01 036 – continued)*

Code figure	
124175	Canada, Nav Canada
124176–156000	Reserved
156001	China, The State Oceanic Administration
156002	China, Second Institute of Oceanography, State Oceanic Administration
156003	China, Institute of Ocean Technology
156004–250000	Reserved
250001	France, Institut de Recherche pour le Développement (IRD)
250002	France, Institut Français de Recherche pour l'Exploitation de la mer (IFREMER)
250003–276000	Reserved
276001	Germany, Bundesamt fuer Seeschifffahrt und Hydrographie (BSH)
276002	Germany, Institut fuer Meereskunde, Kiel
276003–356000	Reserved
356001	India, National Institute of Oceanography (NIO)
356002	India, National Institute for Ocean Technology (NIOT)
356003	India, National Centre for Ocean Information Service
356004–392000	Reserved
392001	Japan, Japan Meteorological Agency (JMA)
392002	Japan, Frontier Observational Research System for Global Change
392003	Japan, Japan Marine Science and Technology Centre (JAMSTEC)
392004–410000	Reserved
410001	Republic of Korea, Seoul National University
410002	Republic of Korea, Korea Ocean Research and Development Institute (KORDI)
410003	Republic of Korea, Meteorological Research Institute
410004–540000	Reserved
540001	New Caledonia, Institut de Recherche pour le Développement (IRD)
540002–554000	Reserved
554001	New Zealand, National Institute of Water and Atmospheric Research (NIWA)
554002–643000	Reserved
643001	Russian Federation, State Oceanographic Institute of Roshydromet
643002	Russian Federation, Federal Service for Hydrometeorology and Environmental Monitoring
643003–724000	Reserved
724001	Spain, Instituto Español de Oceanografía
724002–826000	Reserved
826001	United Kingdom, Hydrographic Office
826002	United Kingdom, Southampton Oceanography Centre (SOC)
826003–840000	Reserved
840001	USA, NOAA Atlantic Oceanographic and Meteorological Laboratories (AOML)
840002	USA, NOAA Pacific Marine Environmental Laboratories (PMEL)
840003	USA, Scripps Institution of Oceanography (SIO)
840004	USA, Woods Hole Oceanographic Institution (WHOI)
840005	USA, University of Washington
840006	USA, Naval Oceanographic Office
840007–1048574	Reserved
1048575	Missing value

**0 01 038*****Source of sea ice fraction***

Code figure	
0	No sea ice set
1	NSIDC SSM/I Cavalieri et al (1992)
2	AMSR-E
3	ECMWF
4	CMS (France) cloud mask used by Medspiration
5	EUMETSAT OSI-SAF
6–30	Reserved for future use
31	Missing value

**0 01 052*****Platform transmitter ID***

Code figure	
0	Primary
1	Secondary
2	Reserved
3	Missing value

**0 01 090*****Technique for making up initial perturbations***

Code figure	
0	Lagged-average forecasting (LAF)
1	Breeding
2	Singular vectors
3	Multiple analysis cycles
4–191	Reserved
192–254	Reserved for local use
255	Missing value

**0 01 092*****Type of ensemble forecast***

Code figure	
0	Unperturbed high-resolution control forecast
1	Unperturbed low-resolution control forecast
2	Negatively perturbed forecast
3	Positively perturbed forecast
4–191	Reserved
192–254	Reserved for local use
255	Missing value

**0 01 101*****State identifier***

Code figure	
0–99	Reserved
100	Algeria
101	Angola
102	Benin
103	Botswana
104	Burkina Faso
105	Burundi
106	Cameroon
107	Cabo Verde
108	Central African Republic
109	Chad
110	Comoros
111	Congo
112	Côte d'Ivoire
113	Democratic Republic of the Congo
114	Djibouti
115	Egypt
116	Eritrea
117	Ethiopia
118	France (RA I)
119	Gabon
120	Gambia
121	Ghana
122	Guinea
123	Guinea-Bissau
124	Kenya
125	Lesotho
126	Liberia
127	Libya
128	Madagascar
129	Malawi
130	Mali
131	Mauritania
132	Mauritius
133	Morocco
134	Mozambique
135	Namibia
136	Niger
137	Nigeria
138	Portugal (RA I)
139	Rwanda
140	Sao Tome and Principe

*(continued)*

*(Code table 0 01 101 – continued)*

Code figure	
141	Senegal
142	Seychelles
143	Sierra Leone
144	Somalia
145	South Africa
146	Spain (RA I)
147	Sudan
148	Swaziland
149	Togo
150	Tunisia
151	Uganda
152	United Kingdom of Great Britain and Northern Ireland (RA I)
153	United Republic of Tanzania
154	Zambia
155	Zimbabwe
156–199	Reserved for Region I (Africa)
200	Afghanistan
201	Bahrain
202	Bangladesh
203	Bhutan
204	Cambodia
205	China
206	Democratic People's Republic of Korea
207	Hong Kong, China
208	India
209	Iran, Islamic Republic of
210	Iraq
211	Japan
212	Kazakhstan
213	Kuwait
214	Kyrgyzstan
215	Lao People's Democratic Republic
216	Macao, China
217	Maldives
218	Mongolia
219	Myanmar
220	Nepal
221	Oman
222	Pakistan
223	Qatar
224	Republic of Korea
225	Yemen
226	Russian Federation (RA II)
227	Saudi Arabia
228	Sri Lanka

*(continued)*



*(Code table 0 01 101 – continued)*

Code figure	
229	Tajikistan
230	Thailand
231	Turkmenistan
232	United Arab Emirates
233	Uzbekistan
234	Viet Nam
235–299	Reserved for Region II (Asia)
300	Argentina
301	Bolivia (Plurinational State of)
302	Brazil
303	Chile
304	Colombia
305	Ecuador
306	France (RA III)
307	Guyana
308	Paraguay
309	Peru
310	Suriname
311	Uruguay
312	Venezuela (Bolivarian Republic of)
313–399	Reserved for Region III (South America)
400	Antigua and Barbuda
401	Bahamas
402	Barbados
403	Belize
404	British Caribbean Territories
405	Canada
406	Colombia
407	Costa Rica
408	Cuba
409	Dominica
410	Dominican Republic
411	El Salvador
412	France (RA IV)
413	Guatemala
414	Haiti
415	Honduras
416	Jamaica
417	Mexico
418	Curaçao and Sint Maarten
419	Nicaragua
420	Panama
421	Saint Lucia
422	Trinidad and Tobago

*(continued)*

*(Code table 0 01 101 – continued)*

Code figure	
423	United Kingdom of Great Britain and Northern Ireland (RA IV)
424	United States of America (RA IV)
425	Venezuela (Bolivarian Republic of)
426–499	Reserved for Region IV (North America, Central America and the Caribbean)
500	Australia
501	Brunei Darussalam
502	Cook Islands
503	Fiji
504	French Polynesia
505	Indonesia
506	Kiribati
507	Malaysia
508	Micronesia, Federated States of
509	New Caledonia
510	New Zealand
511	Niue
512	Papua New Guinea
513	Philippines
514	Samoa
515	Singapore
516	Solomon Islands
517	Tonga
518	United Kingdom of Great Britain and Northern Ireland (RA V)
519	United States of America (RA V)
520	Vanuatu
521–599	Reserved for Region V (South-West Pacific)
600	Albania
601	Armenia
602	Austria
603	Azerbaijan
604	Belarus
605	Belgium
606	Bosnia and Herzegovina
607	Bulgaria
608	Croatia
609	Cyprus
610	Czechia
611	Denmark
612	Estonia
613	Finland
614	France (RA VI)
615	Georgia
616	Germany
617	Greece

*(continued)*

*(Code table 0 01 101 – continued)*

Code figure	
618	Hungary
619	Iceland
620	Ireland
621	Israel
622	Italy
623	Jordan
624	Kazakhstan
625	Latvia
626	Lebanon
627	Lithuania
628	Luxembourg
629	Malta
630	Monaco
631	Montenegro
632	Netherlands
633	Norway
634	Poland
635	Portugal (RA VI)
636	Republic of Moldova
637	Romania
638	Russian Federation (RA VI)
639	Serbia
640	Slovakia
641	Slovenia
642	Spain (RA VI)
643	Sweden
644	Switzerland
645	Syrian Arab Republic
646	The former Yugoslav Republic of Macedonia
647	Turkey
648	Ukraine
649	United Kingdom of Great Britain and Northern Ireland (RA VI)
650–699	Reserved for Region VI (Europe)
700–999	Reserved
1000–1022	Not used
1023	Missing value

**0 01 150*****Coordinate reference system***

## Code figure

0	WGS84, as used by ICAO since 1998
1	ETRS89, as defined by EPSG:4258
2	NAD83, as defined by EPSG:4269
3	DHDN, as defined by EPSG:4314
4	Ellipsoidal datum using the International Reference Meridian and the International Reference Pole as the prime meridian and prime pole, respectively, and the origin of the International Terrestrial Reference System (ITRS) (see Note 2). The International Reference Meridian, International Reference Pole and ITRS are maintained by the International Earth Rotation and Reference Systems Service (IERS)
5–65534	Reserved
65535	Missing value

## Notes:

- (1) EPSG is a dataset of coordinate system and coordinate system transformations, originally produced and maintained by the European Petroleum Survey Group. It is now maintained by the Geodesy Subcommittee of the International Association of Oil and Gas Producers Geomatics Committee.
- (2) When Code figure 4 is used to specify a custom coordinate reference system, the ellipsoidal datum shall be an oblate ellipsoid of revolution, where the major axis is uniplanar with the equatorial plane and the minor axis traverses the prime meridian towards the prime pole. North corresponds to the direction from the Equator to the prime pole. East corresponds to the counterclockwise direction from the prime meridian as viewed from above the North Pole. In this case, the semi-major and semi-minor axes must be specified (e.g. by descriptors 0 01 152 and 0 01 153).

**0 01 151*****Fixed mean sea-level reference datum***

## Code figure

0	Earth Gravitational Model 1996
1	Baltic height system 1977
2–4094	Reserved
4095	Missing value

**0 02 001*****Type of station***

Code figure

0	Automatic
1	Manned
2	Hybrid: both manned and automatic
3	Missing value

**0 02 002*****Type of instrumentation for wind measurement***

Bit No.            Type of Instrumentation and original units for wind measurement  
(measured in  $\text{m s}^{-1}$  unless otherwise indicated)

1	Certified instruments
2	Originally measured in knots
3	Originally measured in $\text{km h}^{-1}$
All 4	Missing value

**0 02 003*****Type of measuring equipment used***

Code figure

0	Pressure instrument associated with wind measuring equipment
1	Optical theodolite
2	Radio theodolite
3	Radar
4	VLF-Omega
5	Loran C
6	Wind profiler
7	Satellite navigation
8	Radio-acoustic Sounding System (RASS)
9	Sodar
10	Lidar
11–13	Reserved
14	Pressure instrument associated with wind measuring equipment but pressure element failed during ascent
15	Missing value

**0 02 004*****Type of instrumentation for evaporation measurement or type of crop for which evapotranspiration is reported***

Code figure	Instrumentation or crop type	Type of data
0	USA open pan evaporimeter (without cover)	Evaporation
1	USA open pan evaporimeter (mesh covered)	
2	GGI-3000 evaporimeter (sunken)	
3	20 m <sup>2</sup> tank	
4	Others	
5	Rice	Evapotranspiration
6	Wheat	
7	Maize	
8	Sorghum	
9	Other crops	
10–14	Reserved	
15	Missing value	

**0 02 007*****Type of sensor for water level measuring instrument***

Code figure	
0	Reserved
1	Shaft encoder float system
2	Ultrasonic
3	Radar
4	Pressure (single transducer)
5	Pressure (multiple transducer)
6	Pressure (in stilling well)
7	Bubbler pressure
8	Acoustic (with sounding tube)
9	Acoustic (in open air)
10–62	Reserved
63	Missing value

**0 02 008*****Type of offshore platform***

Code figure	
0	Fixed platform
1	Mobile offshore drill ship
2	Jack-up rig
3	Semi-submersible platform
4	Floating production storage and offloading (FPSO) unit
5	Light vessel
6–14	Reserved
15	Missing value

**0 02 011**

***Radiosonde type***

*(See common Code table C-2 in Part C/c.)*

**0 02 012**

***Radiosonde computational method***

*(To be developed)*

**0 02 013**

***Solar and infrared radiation correction***

Code figure

0	No correction
1	CIMO solar corrected and CIMO infrared corrected
2	CIMO solar corrected and infrared corrected
3	CIMO solar corrected only
4	Solar and infrared corrected automatically by radiosonde system
5	Solar corrected automatically by radiosonde system
6	Solar and infrared corrected as specified by country
7	Solar corrected as specified by country
8	Solar and infrared corrected as specified by GRUAN*
9	Solar corrected as specified by GRUAN
10-14	Reserved
15	Missing value

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\* GRUAN = GCOS Reference Upper-Air Network

**0 02 014**

***Tracking technique/status of system used***

*(See common Code table C-7 in Part C/c.)*

**0 02 015**

***Radiosonde completeness***

Code figure

0	Reserved
1	Pressure only radiosonde
2	Pressure only radiosonde plus transponder
3	Pressure only radiosonde plus radar reflector
4	No-pressure radiosonde plus transponder
5	No-pressure radiosonde plus radar reflector
6-14	Reserved
15	Missing value

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**0 02 016**

***Radiosonde configuration***

Bit No.	
1	Train regulator
2	Light unit
3	Parachute
4	Rooftop release
All 5	Missing value



**0 02 017*****Correction algorithms for humidity measurements***

## Code figure

0	No corrections
1	Time lag correction provided by the manufacturer
2	Solar radiation correction provided by the manufacturer
3	Solar radiation and time lag correction provided by the manufacturer
4–6	Reserved
7	GRUAN solar radiation and time lag correction
8–30	Reserved
31	Missing value

**0 02 019*****Satellite instruments****(See common Code table C–8 in Part C/c.)***0 02 020*****Satellite classification***

## Code figure

0	Nimbus
1	VTPR
2	Tiros 1 (Tiros, NOAA-6 to NOAA-13)
3	Tiros 2 (NOAA-14 onwards)
10	EOS
20	GPM-core
31	DMSP
61	EUMETSAT Polar System (EPS)
91	ERS
92	Sentinel-3
121	ADEOS
122	GCOM
241	GOES
261	JASON
271	GMS
272	MTSAT
273	Himawari
281	COMS
301	INSAT
331	METEOSAT Operational Programme (MOP)
332	METEOSAT Transitional Programme (MTP)
333	METEOSAT Second Generation Programme (MSG)
351	GOMS
380	FY-1

*(continued)*

*(Code table 0 02 020 – continued)*

Code figure	
381	FY-2
382	FY-3
383	FY-4
384–400	Reserved
401	GPS
402	GLONASS
403	GALILEO
404	BDS (BeiDou navigation satellite system)
405–510	Reserved
511	Missing value

**0 02 021*****Satellite instrument data used in processing***

Bit No.	
1	High-resolution infrared sounder (HIRS)
2	Microwave sounding unit (MSU)
3	Stratospheric sounding unit (SSU)
4	AMI (advanced microwave instrument) wind mode
5	AMI (advanced microwave instrument) wave mode
6	AMI (advanced microwave instrument) image mode
7	Radar altimeter
8	ATSR (along-track scanning radiometer)
All 9	Missing value

**0 02 022*****Satellite data-processing technique used***

Bit flags denoting the elements included in processing sounding data.

Bit No.	
1	Processing technique not defined
2	Automated statistical regression
3	Clear path
4	Partly cloudy path
5	Cloudy path
6–7	Reserved
All 8	Missing value

## Notes:

- (1) Clear path means the sounding has been generated from clear radiances derived from actual clear spot measurements. Tropospheric and stratospheric HIRS data, as well as MSU and SSU data, have been used.
- (2) Partly cloudy path means the sounding has been generated from clear radiances which have been calculated from partly cloudy spots. Tropospheric and stratospheric HIRS data, as well as MSU and SSU data, have been used.
- (3) Cloudy path means the sounding has been generated only from stratospheric HIRS data, MSU data and SSU data. Tropospheric HIRS data have not been used because of cloudy conditions.

**0 02 023*****Satellite-derived wind computation method***

Code figure

0	Reserved
1	Wind derived from cloud motion observed in the infrared channel
2	Wind derived from cloud motion observed in the visible channel
3	Wind derived from cloud motion observed in the water vapour channel
4	Wind derived from motion observed in a combination of spectral channels
5	Wind derived from motion observed in the water vapour channel in clear air
6	Wind derived from motion observed in the ozone channel
7	Wind derived from motion observed in water vapour channel (cloud or clear air not specified)
8–12	Reserved
13	Root-mean-square
14	Reserved
15	Missing value

**0 02 024*****Integrated mean humidity computational method***

Code figure

0	Reserved
1	Table with full range of humidity variation in layer
2	Regression technique on 2 humidity values in layer
3–14	Reserved
15	Missing value

**0 02 025*****Satellite channel(s) used in computation***

Bit flags denoting the instrument and/or channels used in obtaining various physical parameters. If, in any grouping of parameters, all bits = 0, then no retrieval was made for that parameter or set of parameters.

Bit No.	Instrument (channels)
1	Reserved <i>Group 1</i> – Layer precipitable water for the layers: surface to 700 hPa, 700 to 500 hPa, and 500 to 300 hPa
2	HIRS
3	MSU
4–5	Reserved <i>Group 2</i> – Tropopause temperature and pressure
6	HIRS
7	MSU
8–9	Reserved <i>Group 3</i> – Total ozone
10	HIRS (1, 2, 3, 8, 9, 16, 17)

*(continued)*

(Flag table 0 02 025 – continued)

Bit No.	Instrument (channels)
11	HIRS (1, 2, 3, 9, 17)
12	MSU
13–14	Reserved
	<i>Group 4</i> – Mean temperature for the layers: surface to 850 hPa, 850 to 700 hPa, 700 to 500 hPa, 500 to 400 hPa, 400 to 300 hPa, 300 to 200 hPa, and 200 to 100 hPa
15	HIRS
16	HIRS*
17	MSU
18	SKINTK (ocean only)
19–20	Reserved
	<i>Group 5</i> – Channel combinations used to obtain mean temperatures for the layers 100 to 70 hPa, 70 to 50 hPa, 50 to 30 hPa, 30 to 10 hPa, 10 to 5 hPa, 5 to 2 hPa, 2 to 1 hPa, 1 to 0.4 hPa
21	HIRS*
22	SSU
23	MSU (3, 4)
24	Reserved
All 25	Missing value

Note: HIRS\* is equivalent to: HIRS channels

1	(669 cm <sup>-1</sup> )
2	(679 cm <sup>-1</sup> )
3	(690 cm <sup>-1</sup> )
4	(2358 cm <sup>-1</sup> )

**0 02 030*****Method of current measurement***

Code figure

0	Reserved
1*	ADCP (Acoustic Doppler Current Profiler)
2	GEK (Geomagnetic ElectroKinetograph)
3	Ship's set and drift determined by fixes 3–6 hours apart
4	Ship's set and drift determined by fixes more than 6 hours but less than 12 hours apart
5	Drift of buoy
6	ADCP (Acoustic Doppler Current Profiler)
7	Missing value

\* Value deprecated. Code figure 6 should be used instead.

**0 02 031**

***Duration and time of current measurement***

Code figure		
0	Reserved	
1	Instantaneous	} between H – 1 and H
2	Averaged over 3 minutes or less	
3	Averaged over more than 3 minutes, but 6 at the most	
4	Averaged over more than 6 minutes, but 12 at the most	
5	Instantaneous	} between H – 2 and H – 1
6	Averaged over 3 minutes or less	
7	Averaged over more than 3 minutes, but 6 at the most	
8	Averaged over more than 6 minutes, but 12 at the most	
9	Vector or Doppler current profiling method not used	
10	Reserved	
11	1 hour or less	
12	More than 1 hour but 2 at the most	
13	More than 2 hours but 4 at the most	
14	More than 4 hours but 8 at the most	
15	More than 8 hours but 12 at the most	
16	More than 12 hours but 18 at the most	
17	More than 18 hours but 24 at the most	
18	Reserved	
19	Drift method not used	
20–30	Reserved	
31	Missing value	

Notes:

- (1) Code figures 1–9: Duration and time of current measurement (vector or Doppler current profiling method).
- (2) Code figures 11–19: Period of current measurement (drift method).
- (3) H = Time of observation.

**0 02 032**

***Indicator for digitization***

Code figure	
0	Values at selected depths (data points fixed by the instrument or selected by any other method)
1	Values at selected depths (data points taken from traces at significant depths)
2	Reserved
3	Missing value

**0 02 033*****Method of salinity/depth measurement***

Code figure	
0	No salinity measured
1	In situ sensor, accuracy better than 0.02 ‰
2	In situ sensor, accuracy less than 0.02 ‰
3	Sample analysis
4–6	Reserved
7	Missing value

**0 02 034*****Drogue type***

Code figure	
0	Unspecified drogue
1	Holey sock
2	TRISTAR
3	Window shade
4	Parachute
5	Non-Lagrangian sea anchor
6–30	Reserved (to be developed)
31	Missing value

**0 02 036*****Buoy type***

Code figure	
0	Drifting buoy
1	Fixed buoy
2	Subsurface float (moving)
3	Missing value

**0 02 037*****Method of tidal observation***

Code figure	
0	Reserved
1	Manual reading from vertical tide staff
2	Manual reading from single automatic recorder at station
3	Manual reading from multiple automatic recorders at station
4	Automatic reading from single automatic recorder at station without level reference check
5	Automatic reading from single automatic recorder at station with level reference check, or from multiple automatic recorders
6	Reserved
7	Missing value

**0 02 038*****Method of water temperature and/or salinity measurement***

Code figure	
0	Ship intake
1	Bucket
2	Hull contact sensor
3	Reversing thermometer
4	STD/CTD sensor
5	Mechanical BT
6	Expendable BT
7	Digital BT
8	Thermistor chain
9	Infrared scanner
10	Microwave scanner
11	Infrared radiometer
12	In-line thermosalinograph
13	Towed body
14	Other
15	Missing value

**0 02 039*****Method of wet-bulb temperature measurement***

Code figure	
0	Measured wet-bulb temperature
1	Iced bulb measured wet-bulb temperature
2	Computed wet-bulb temperature
3	Iced bulb computed wet-bulb temperature
4–6	Reserved
7	Missing value

**0 02 040*****Method of removing velocity and motion of platform from current***

Code figure		
0	Ship's motion removed by averaging	} Ship's velocity removed by bottom tracking
1	Ship's motion removed by motion compensation	
2	Ship's motion not removed	
3	Ship's motion removed by averaging	} Ship's velocity removed by navigation
4	Ship's motion removed by motion compensation	
5	Ship's motion not removed	
6	Doppler current profiling method not used	
7–14	Reserved	
15	Missing value	

**0 02 041*****Method for estimating reports related to synoptic features***

Code figure	
0	Information based on manual analysis
1	Information based on computer analysis
2	Information based on data assimilation
3	Information based on computer analysis or data assimilation manually modified
4–9	Reserved
10	Information based on the numerical weather prediction
11–62	Reserved for future use
63	Missing value

**0 02 042*****Indicator for sea-surface current speed***

Code figure	
0	Value originally reported in m/s
1	Value originally reported in knots
2	No sea current data available
3	Missing value

**0 02 044*****Indicator for method of calculating spectral wave data***

Code figure	
0	Reserved for future use
1	Longuet-Higgins (1964)
2	Longuet-Higgins (F3 method)
3	Maximum likelihood method
4	Maximum entropy method
5–14	Reserved
15	Missing value

**0 02 045*****Indicator for type of platform***

Code figure	
0	Sea station
1	Automatic data buoy
2	Aircraft
3	Satellite
4–14	Reserved
15	Missing value



**0 02 046*****Wave measurement instrumentation***

Code figure	
0	Reserved for future use
1	Heave sensor
2	Slope sensor
3–14	Reserved
15	Missing value

**0 02 047*****Deep-ocean tsunameter type***

Code figure	
0	Reserved
1	DART II (PMEL)
2	DART ETD
3	SAIC Tsunami Buoy (STB)
4	GFZ – Potsdam
5	INCOIS (India)
6	InaBuoy (Indonesia)
7	Envirtech
8–99	Reserved
100–126	Not used
127	Missing value

**0 02 048*****Satellite sensor indicator***

Code figure	
0	HIRS
1	MSU
2	SSU
3	AMSU-A
4	AMSU-B
5	AVHRR
6	SSM/I
7	NSCAT
8	SEAWINDS
9	POSEIDON altimeter
10	JMR (JASON Microwave Radiometer)
11	MHS
12	ASCAT
13–14	Reserved
15	Missing value

**0 02 049*****Geostationary satellite data-processing technique used***

Bit No.	
1	Processing technique not defined
2	Simultaneous physical retrieval
3	Clear sounding
4	Cloudy sounding
5–7	Reserved for future use
All 8	Missing value

## Notes:

- (1) Clear sounding indicates the sounding has been generated from a set of clear radiances using all available sounder radiances.
- (2) Cloudy sounding indicates that sufficient clear radiances could not be identified in the sounding area. The sounding is calculated from the cloud top (cloud pressure greater than or equal to 780 hPa) upwards.

**0 02 050*****Geostationary sounder satellite channels used***

Bit No.	Channel	Central wavelength (micrometers)
1	1	14.71
2	2	14.37
3	3	14.06
4	4	13.64
5	5	13.37
6	6	12.66
7	7	12.02
8	8	11.03
9	9	9.71
10	10	7.43
11	11	7.02
12	12	6.51
13	13	4.57
14	14	4.52
15	15	4.45
16	16	4.13
17	17	3.98
18	18	3.74
19	19	0.969
All 20	Missing value	

Note: Beginning with the first bit position (high order bit), if the bit position is set to one, then the channel is used. If the bit position is set to zero, then the channel is not used.

**0 02 051*****Indicator to specify observing method for extreme temperatures***

Code figure

0	Reserved
1	Maximum/minimum thermometers
2	Automated instruments
3	Thermograph
4–14	Reserved
15	Missing value

**0 02 052*****Geostationary imager satellite channels used***

Bit No.	Channel	Central wavelength (micrometers)
1	1	0.55 – 0.75
2	2	3.9
3	3	6.7
4	4	10.7
5	5	12.0
All 6	Missing value	

Note: Beginning with the first bit position (high order bit), if the bit position is set to one, then the channel is used. If the bit position is set to zero, then the channel is not used.

**0 02 053*****GOES-I/M brightness temperature characteristics***

Code figure

0	Observed brightness temperature
1	Brightness temperature with bias correction applied
2	Brightness temperature calculated from first guess
3	Brightness temperature calculated from sounding
4–14	Reserved
15	Missing value

**0 02 054*****GOES-I/M soundings parameter characteristics***

Code figure

0	Parameter derived using observed sounder brightness temperatures
1	Parameter derived using observed imager brightness temperatures
2	Parameter derived using first guess information
3	Parameter derived using NMC analysis information
4	Parameter derived using radiosonde information
5–14	Reserved
15	Missing value

**0 02 055*****Geostationary soundings statistical parameters***

Code figure	
0	Statistics generated comparing retrieval versus radiosonde
1	Statistics generated comparing retrieval versus first guess
2	Statistics generated comparing radiosonde versus first guess
3	Statistics generated comparing observed versus retrieval
4	Statistics generated comparing observed versus first guess
5	Statistics generated comparing radiosonde versus imager
6	Statistics generated comparing radiosonde versus sounder
7	Statistics generated for radiosonde
8	Statistics generated for first guess
9–14	Reserved
15	Missing value

**0 02 056*****Geostationary soundings accuracy statistics***

Code figure	
0	Sums of differences
1	Sums of squared differences
2	Sample size
3	Minimum difference
4	Maximum difference
5–14	Reserved
15	Missing value

**0 02 057*****Origin of first-guess information for GOES-I/M soundings***

Code figure	
0	Nested Grid Model (NGM)
1	Aviation Model (AVN)
2	Medium Range Forecast (MRF) Model
3	Global Data Assimilation System (GDAS) Forecast Model
4	Prior soundings (within 3 hours of current time)
5	Climatology
6–14	Reserved
15	Missing value

**0 02 058*****Valid times of first-guess information for GOES-I/M soundings***

Code figure	
0	12 hour and 18 hour
1	18 hour and 24 hour
2	6 hour and 12 hour
3	Greater than 24 hours
4–14	Reserved
15	Missing value

**0 02 059*****Origin of analysis information for GOES-I/M soundings***

Code figure	
0	NCEP Nested Grid Model (NGM) Analysis
1	NCEP Aviation Model (AVN) Analysis
2	NCEP Medium Range Forecast (MRF) Model Analysis
3	NCEP Global Data Assimilation System (GDAS) Forecast Model Analysis
4–14	Reserved
15	Missing value

**0 02 060*****Origin of surface information for GOES-I/M soundings***

Code figure	
0	Current surface hourly reports
1	Current ship reports
2	Current buoy reports
3	One hour old surface hourly reports
4	One hour old ship reports
5	One hour old buoy reports
6–14	Reserved
15	Missing value

**0 02 061*****Aircraft navigational system***

Code figure	
0	Inertial navigation system
1	OMEGA
2–6	Reserved
7	Missing value

**0 02 062*****Type of aircraft data relay system***

Code figure	
0	ASDAR
1	ASDAR (ACARS also available but not operative)
2	ASDAR (ACARS also available and operative)
3	ACARS
4	ACARS (ASDAR also available but not operative)
5	ACARS (ASDAR also available and operative)
6–14	Reserved
15	Missing value

**0 02 064*****Aircraft roll angle quality***

Code figure	Meaning
0	Good
1	Bad
2	Reserved
3	Missing value

Note: Bad is currently defined as a roll angle > 5 degrees from vertical.

**0 02 066*****Radiosonde ground receiving system***

Code figure	
0	InterMet IMS 2000
1	InterMet IMS 1500C
2	Shanghai GTC1
3	Nanjing GTC2
4	Nanjing GFE(L)1
5	MARL-A radar
6	VEKTOR-M radar
7–61	Reserved
62	Other
63	Missing value

**0 02 070*****Original specification of latitude/longitude***

Code figure	
0	Actual location in seconds
1	Actual location in minutes
2	Actual location in degrees
3	Actual location in decidegrees
4	Actual location in centidegrees
5	Referenced to checkpoint in seconds
6	Referenced to checkpoint in minutes
7	Referenced to checkpoint in degrees
8	Referenced to checkpoint in decidegrees
9	Referenced to checkpoint in centidegrees
10	Actual location in tenths of a minute
11	Referenced to checkpoint in tenths of a minute
12–14	Reserved
15	Missing value

**0 02 080*****Balloon manufacturer***

Code figure	
0	Kaysam
1	Totex
2	KKS
3	Guangzhou Shuangyi (China)
4	ChemChina Zhuzhou (China)
5–61	Reserved
62	Other
63	Missing value

**0 02 081*****Type of balloon***

Code figure	
0	GP26
1	GP28
2	GP30
3	HM26
4	HM28
5	HM30
6	SV16
7	Totex TA type balloons
8	Totex TX type balloons
9–29	Reserved
30	Other
31	Missing value

**0 02 083*****Type of balloon shelter***

Code figure	
0	High bay
1	Low bay
2	Balloon-inflated launch system (BILS)
3	Roof-top BILS
4	Automated unmanned sounding system
5–13	Reserved
14	Other
15	Missing value

**0 02 084*****Type of gas used in balloon***

Code figure	
0	Hydrogen
1	Helium
2	Natural gas
3–13	Reserved
14	Other
15	Missing value



**0 02 095*****Type of pressure sensor***

Code figure	
0	Capacitance aneroid
1	Derived from GPS
2	Resistive strain gauge
3	Silicon capacitor
4	Derived from radar height
5–29	Reserved
30	Other
31	Missing value

**0 02 096*****Type of temperature sensor***

Code figure	
0	Rod thermistor
1	Bead thermistor
2	Capacitance bead
3	Capacitance wire
4	Resistive sensor
5	Chip thermistor
6	Mercury
7	Alcohol/glycol
8–30	Reserved for future use
31	Missing value

**0 02 097*****Type of humidity sensor***

Code figure	
0	VIZ Mark II carbon hygistor
1	VIZ B2 hygistor
2	Vaisala A-Humicap
3	Vaisala H-Humicap
4	Capacitance sensor
5	Vaisala RS90
6	Sippican Mark IIA carbon hygistor
7	Twin alternatively heated Humicap capacitance sensor
8	Humicap capacitance sensor with active de-icing method
9	Carbon hygistor
10	Psychrometer
11	Capacitive (polymer)
12	Capacitive (ceramic, including metal oxide)
13	Resistive (generic)

*(continued)*

*(Code table 0 02 097 – continued)*

Code figure	
14	Resistive (salt polymer)
15	Resistive (conductive polymer)
16	Thermal conductivity
17	Gravimetric
18	Paper-metal coil
19	Ordinary human hair
20	Rolled hair (torsion)
21	Goldbeater's skin
22	Chilled mirror hygrometer
23	Dew cell
24	Optical absorption sensor
25–30	Reserved for future use
31	Missing value

**0 02 099*****Polarization***

Code figure	
0	HH polarization
1	VV polarization
2	HV polarization real valued component
3	HV polarization imaginary valued component
4–6	Reserved
7	Missing value

**0 02 101*****Type of antenna***

Code figure	
0	Centre front-fed paraboloid
1	Offset front-fed paraboloid
2	Centre Cassegrain paraboloid
3	Offset Cassegrain paraboloid
4	Planar array
5	Coaxial-collinear array
6	Yagi elements array
7	Microstrip
8–13	Reserved
14	Other
15	Missing value

**0 02 103*****Radome***

Bit No.	
1	Radar antenna is protected by a radome
All 2	Missing value

**0 02 104*****Antenna polarization***

Code figure	
0	Horizontal polarization
1	Vertical polarization
2	Right circular polarization
3	Left circular polarization
4	Horizontal and vertical polarization
5	Right and left circular polarization
6	Quasi-horizontal polarization
7	Quasi-vertical polarization
8–14	Reserved
15	Missing value

**0 02 115*****Type of surface observing equipment***

Code figure	
0	PDB
1	RSOIS
2	ASOS
3	Psychrometer
4	F420
5–29	Reserved
30	Other
31	Missing value

**0 02 119*****RA-2 instrument operations***

Code figure	
0	Intermediate frequency calibration mode (IF CAL)
1	Built-in test equipment digital (BITE DGT)
2	Built-in test equipment radio frequency (BITE RF)
3	Preset tracking (PSET TRK)
4	Preset LOOP OUT
5	ACQUISITION
6	TRACKING
7	Missing value

**0 02 131*****Sensitivity time control (STC)***

Bit No.	
1	STC operational
All 2	Missing values

**0 02 137*****Radar dual PRF ratio***

Code figure	
1	3:2
2	4:3
3	5:4
4–14	Reserved
15	Missing value

**0 02 138*****Antenna rotation direction***

Code figure	
1	Clockwise rotation
2	Counterclockwise rotation
3	Missing value

**0 02 139*****SIRAL instrument configuration***

Code figure	
0	SIRAL nominal
1	SIRAL redundant
2	Missing value

**0 02 143*****Ozone instrument type***

Code figure	
0	Reserved
1	Brewer spectrophotometer
2	Caver Teichert
3	Dobson
4	Dobson (Japan)
5	Ehmet
6	Fecker telescope
7	Hoelper
8	Jodmeter

(continued)

*(Code table 0 02 143 – continued)*

Code figure	
9	Filter Ozonometer M-83
10	Mast
11	Oxford
12	Paetzold
13	Regener
14	Reserved for future use
15	Vassy filter ozonometer
16	Carbon iodide
17	Surface ozone bubbler
18	Filter ozonometer M-124
19	ECC sonde
20–126	Reserved
127	Missing value

**0 02 144*****Light source type for Brewer spectrophotometer***

Code figure	
0	Direct sun
1	Direct sun, attenuator #1
2	Direct sun, attenuator #2
3	Focused moon
4	Focused sun
5	Focused sun corrected with adjacent sky measurements
6	Zenith sky
7–14	Reserved
15	Missing value

Note: Entries 1 and 2 should not be used.

**0 02 145*****Wavelength setting for Dobson instruments***

Code figure	
0	Wavelengths AD ordinary setting
1	Wavelengths BD ordinary setting
2	Wavelengths CD ordinary setting
3	Wavelengths CC' ordinary setting
4	Wavelengths AD focused image
5	Wavelengths BD focused image
6	Wavelengths CD focused image
7	Wavelengths CC' focused image
8–14	Reserved
15	Missing value

**0 02 146*****Source conditions for Dobson instruments***

Code figure	
0	On direct sun
1	On direct moon
2	On blue zenith sky
3	On zenith cloud (uniform stratified layer of small opacity)
4	On zenith cloud (uniform or moderately variable layer of medium opacity)
5	On zenith cloud (uniform or moderately variable layer of large opacity)
6	On zenith cloud (highly variable opacity, with or without precipitation)
7	On zenith cloud (fog)
8	On zenith haze
9	On direct sun through thin cloud, fog or haze
10–14	Reserved
15	Missing value

**0 02 147*****Method of transmission to collection centre***

Code figure	
0	Reserved
1	Direct leased circuit
2	Dialled up connection
3	Internet ISP
4	DCP via satellite (MTSAT, METEOSAT, etc.)
5	VSAT
6	GAN,* BGAN**
7	Thiss terminal
8	Iridium satellites
9	Mobile telephony
10–62	Reserved
63	Missing value

---

\* Global Area Network.

\*\* Broadband Global Area Network

**0 02 148*****Data collection and/or location system***

Code figure	
0	Reserved
1	Argos
2	GPS
3	GOES DCP
4	METEOSAT DCP
5	ORBCOMM

(continued)

*(Code table 0 02 148– continued)*

Code figure	
6	INMARSAT
7	Iridium
8	Iridium and GPS
9	Argos-3
10	Argos-4
11–30	Reserved
31	Missing value

**0 02 149*****Type of data buoy***

Code figure	
0	Unspecified drifting buoy
1	Standard Lagrangian drifter (Global Drifter Programme)
2	Standard FGGE type drifting buoy (non-Lagrangian meteorological drifting buoy)
3	Wind measuring FGGE type drifting buoy (non-Lagrangian meteorological drifting buoy)
4	Ice drifter
5	SVPG Standard Lagrangian drifter with GPS
6	SVP-HR drifter with high-resolution temperature or thermistor string
7	Reserved
8	Unspecified subsurface float
9	SOFAR
10	ALACE
11	MARVOR
12	RAFOS
13	PROVOR
14	SOLO
15	APEX
16	Unspecified moored buoy
17	Nomad
18	3-metre discus
19	10-12-metre discus
20	ODAS 30 series
21	ATLAS (e.g. TAO area)
22	TRITON buoy
23	FLEX mooring (e.g. TIP area)
24	Omnidirectional waverider
25	Directional waverider
26	Subsurface ARGO float
27	PALACE
28	NEMO
29	NINJA

*(continued)*

*(Code table 0 02 149– continued)*

Code figure	
30	Ice buoy/float (POPS or ITP)
31–33	Reserved
34	Mooring oceanographic
35	Mooring meteorological
36	Mooring multidisciplinary (OceanSITES)
37	Mooring tide gauge or tsunami buoy
38	Ice beacon
39	Ice mass balance buoy
40–62	Reserved
63	Missing value

**0 02 150*****TOVS/ATOVs/AVHRR instrumentation channel number***

Code figure	
0	Reserved
1	HIRS 1
2	HIRS 2
3	HIRS 3
4	HIRS 4
5	HIRS 5
6	HIRS 6
7	HIRS 7
8	HIRS 8
9	HIRS 9
10	HIRS 10
11	HIRS 11
12	HIRS 12
13	HIRS 13
14	HIRS 14
15	HIRS 15
16	HIRS 16
17	HIRS 17
18	HIRS 18
19	HIRS 19
20	HIRS 20
21	MSU 1
22	MSU 2
23	MSU 3
24	MSU 4
25	SSU 1
26	SSU 2
27	SSU 3

*(continued)*



*(Code table 0 02 150 – continued)*

Code figure	
28	AMSU-A 1
29	AMSU-A 2
30	AMSU-A 3
31	AMSU-A 4
32	AMSU-A 5
33	AMSU-A 6
34	AMSU-A 7
35	AMSU-A 8
36	AMSU-A 9
37	AMSU-A 10
38	AMSU-A 11
39	AMSU-A 12
40	AMSU-A 13
41	AMSU-A 14
42	AMSU-A 15
43	AMSU-B 1 / MHS 1
44	AMSU-B 2 / MHS 2
45	AMSU-B 3 / MHS 3
46	AMSU-B 4 / MHS 4
47	AMSU-B 5 / MHS 5
48	AVHRR 1
49	AVHRR 2
50	AVHRR 3a
51	AVHRR 3b
52	AVHRR 4
53	AVHRR 5
54–62	Reserved
63	Missing value

**0 02 151*****Radiometer identifier***

Code figure	
0	HIRS
1	MSU
2	SSU
3	AMSU-A1-1
4	AMSU-A1-2
5	AMSU-A2
6	AMSU-B
7	AVHRR
8	Reserved
9	MHS
10–2046	Reserved
2047	Missing value

**0 02 152*****Satellite instrument used in data processing***

Bit No.	
1	High-resolution infrared sounder (HIRS)
2	Microwave sounding unit (MSU)
3	Stratospheric sounding unit (SSU)
4	AMI wind mode
5	AMI wave mode
6	AMI image mode
7	RADAR altimeter
8	ATSR
9	Geostationary imager
10	Geostationary sounder
11	Geostationary Earth radiation (GERB)
12	Multi-channel scanning radiometer
13	Polar-orbiting imager
14–30	Reserved
All 31	Missing value

**0 02 158*****RA-2 instrument***

Bit No.	
1	Mismatch in RED VEC HPA
2	Mismatch in RED VEC RFSS
3	PTR calibration band 320 MHz (Ku)
4	PTR calibration band 80 MHz (Ku)
5	PTR calibration band 20 MHz (Ku)
6	PTR calibration band 160 MHz (S)
7	Ku flight calibration parameters available
8	S flight calibration parameters available
All 9	Missing value

Note: PTR = Pulse target response  
 HPA = High power amplifier  
 RFSS = Radio frequency subsystem  
 RED = Redundancy

**0 02 159*****MWR instrument***

Bit No.	
1	Temperature inconsistency
2	Data is missing
3	Redundancy channel
4	Power bus protection
5	Overvoltage/Overload protection
6	Reserved
7	Reserved
All 8	Missing value

Note: MWR = Microwave radiometer

**0 02 160*****Wave length of the radar***

Code figure	
0	Reserved
1	10 to less than 20 mm
2	Reserved
3	20 to less than 40 mm
4	Reserved
5	40 to less than 60 mm
6	Reserved
7	60 to less than 90 mm
8	90 to less than 110 mm
9	110 mm and greater
10–14	Not used
15	Missing value

**0 02 161*****Wind processing method***

Bit No.	
1–10	Reserved
11	Wind height calculated from median cloud-top pressure of target
12	Target is cloudy
13	Low-level inversion
14	Cross correlation contribution (CCC) method
15	Nested tracking
All 16	Missing value

**0 02 162*****Extended height assignment method***

Code figure	
0	Auto editor
1	IRW* height assignment
2	WV** height assignment
3	H <sub>2</sub> O intercept height assignment
4	CO <sub>2</sub> slicing height assignment
5	Low pixel max gradient
6	Higher pixel max gradient
7	Primary height assignment

---

\* Infrared window

\*\* Water vapour

(continued)

*(Code table 0 02 162 – continued)*

Code figure	
8	Layer thickness assignment
9	Cumulative contribution function – 10 per cent height
10	Cumulative contribution function – 50 per cent height
11	Cumulative contribution function – 90 per cent height
12	Cumulative contribution function – height of maximum gradient
13	IR/two WV channel rationing method
14	Composite height assignment
15	Optimal estimation
16	Inversion correction
17	Geometric height assignment
18–62	Reserved
63	Missing value

**0 02 163*****Height assignment method***

Code figure	
0	Auto editor
1	IRW height assignment
2	WV height assignment
3	H <sub>2</sub> O intercept height assignment
4	CO <sub>2</sub> slicing height assignment
5	Low pixel max gradient
6	Higher pixel max gradient
7	Primary height assignment
8	Layer thickness assignment
9	Cumulative contribution function – 10 per cent height
10	Cumulative contribution function – 50 per cent height
11	Cumulative contribution function – 90 per cent height
12	Cumulative contribution function – height of maximum gradient
13	IR / two WV channel ratioing method
14	Composite height assignment
15	Missing value

**0 02 164*****Tracer correlation method***

Code figure	
0	LP – Norms least square minimum
1	EN – Euclidean norm with radiance correlation
2	CC – Cross correlation
3	Stereo matching
4–6	Reserved
7	Missing value

**0 02 165*****Radiance type flags***

Bit No.	
1	Clear path
2	Partly cloudy path
3	Cloudy path
4	Apodized
5	Unapodized
6	Reconstructed
7	Cloud cleared
8–14	Reserved
All 15	Missing value

**0 02 166*****Radiance type***

Code figure	
0	Type not defined
1	Automated statistical regression
2	Clear path
3	Partly cloudy path
4	Cloudy path
5–14	Reserved
15	Missing value

**0 02 167*****Radiance computational method***

Code figure	
0	Method not defined
1	1b raw radiance
2	Processed radiance
3–14	Reserved
15	Missing value

**0 02 169*****Anemometer type***

Code figure	
0	Cup rotor
1	Propeller rotor
2	Wind Observation Through Ambient Noise (WOTAN)
3	Sonic
4–14	Reserved
15	Missing value

**0 02 170*****Aircraft humidity sensors***

Code figure	Sensor type
0	SpectraSensors WVSS-II, Version 1
1	SpectraSensors WVSS-II, Version 2
2	SpectraSensors WVSS-II, Version 3
3–61	Reserved
62	Other
63	Missing value

**0 02 172*****Product type for retrieved atmospheric gases***

Code figure	
0	Reserved
1	Retrieval from a nadir sounding
2	Retrieval from a limb sounding
3–254	Reserved
255	Missing value

**0 02 175*****Method of precipitation measurement***

Code figure	
0	Manual measurement
1	Tipping bucket method
2	Weighing method
3	Optical method
4	Pressure method
5	Float method
6	Drop counter method
7–13	Reserved
14	Others
15	Missing value

**0 02 176*****Method of state of ground measurement***

Code figure	
0	Manual observation
1	Video camera method
2	Infrared method
3	Laser method
4–13	Reserved
14	Others
15	Missing value

**0 02 177*****Method of snow depth measurement***

Code figure	
0	Manual observation
1	Ultrasonic method
2	Video camera method
3	Laser method
4–13	Reserved
14	Others
15	Missing value

**0 02 178*****Method of liquid content measurement of precipitation***

Code figure	
0	Manual observation
1	Optical method
2	Capacitive method
3–13	Reserved
14	Others
15	Missing value

**0 02 179*****Type of sky condition algorithm***

Code figure	
0	Manual observation
1	VAISALA algorithm
2	ASOS (FAA) algorithm
3	AWOS (Canada) algorithm
4–13	Reserved
14	Others
15	Missing value

**0 02 180*****Main present weather detecting system***

Code figure	
0	Manual observation
1	Optical scatter system combined with precipitation occurrence sensing system
2	Forward and/or backscatter system of visible light
3	Forward and/or backscatter system of infrared light
4	Infrared light emitting diode (IRED) system
5	Doppler radar system
6–13	Reserved
14	Others
15	Missing value

**0 02 181*****Supplementary present weather sensor***

Bit No.	
1	Rain detector
2	Freezing rain sensor
3	Ice detection sensor
4	Hail and ice pellet sensor
5–19	Reserved
20	Others
All 21	Missing value

**0 02 182*****Visibility measurement system***

Code figure	
0	Manual measurement
1	Transmissometer system (base > 25 m)
2	Transmissometer system (base < 25 m)
3	Forward scatter system
4	Backscatter system
5–13	Reserved
14	Others
15	Missing value

**0 02 183*****Cloud detection system***

Code figure	
0	Manual observation
1	Ceilometer system
2	Infrared camera system
3	Microwave visual camera system
4	Sky imager system
5	Video time-lapsed camera system
6	Micropulse lidar (MPL) system
7–13	Reserved
14	Others
15	Missing value



**0 02 184*****Type of lightning detection sensor***

Code figure	
0	Manual observation
1	Lightning imaging sensor
2	Electrical storm identification sensor
3	Magnetic finder sensor
4	Lightning strike sensor
5	Flash counter
6	ATDnet VLF waveform correlated sensor
7–13	Reserved
14	Others
15	Missing value

**0 02 185*****Method of evaporation measurement***

Code figure	
0	Manual measurement
1	Balanced floating method
2	Pressure method
3	Ultrasonic method
4	Hydraulic method
5–13	Reserved
14	Others
15	Missing value

**0 02 186*****Capability to detect precipitation phenomena***

Bit No.	
1	Precipitation-unknown type
2	Liquid precipitation not freezing
3	Liquid freezing precipitation
4	Drizzle
5	Rain
6	Solid precipitation
7	Snow
8	Snow grains
9	Snow pellets
10	Ice pellets
11	Ice crystals
12	Diamond dust
13	Small hail
14	Hail

*(continued)*

*(Flag table 0 02 186 – continued)*

Bit No.	
15	Glaze
16	Rime
17	Soft rime
18	Hard rime
19	Clear ice
20	Wet snow
21	Hoar frost
22	Dew
23	White dew
24	Convective precipitation
25–29	Reserved
All 30	Missing value

**0 02 187*****Capability to detect other weather phenomena***

Bit No.	
1	Dust/sand whirl
2	Squalls
3	Sand storm
4	Dust storm
5	Lightning – cloud to surface
6	Lightning – cloud to cloud
7	Lightning – distant
8	Thunderstorm
9	Funnel cloud not touching surface
10	Funnel cloud touching surface
11	Spray
12–17	Reserved
All 18	Missing value

**0 02 188*****Capability to detect obscuration***

Bit No.	
1	Fog
2	Ice fog
3	Steam fog
4–6	Reserved
7	Mist
8	Haze
9	Smoke
10	Volcanic ash
11	Dust
12	Sand
13	Snow
14–20	Reserved
All 21	Missing value

**0 02 189*****Capability to discriminate lightning strikes***

Bit No.	
1	Manual observation
2	All lightning strikes without discrimination
3	Lightning strikes cloud to ground only
4	All lightning strikes with discrimination between cloud to ground and cloud to cloud
5–11	Reserved
All 12	Missing value

**0 02 191*****Geopotential height calculation***

Code figure	
0	Geopotential height calculated from pressure
1	Geopotential height calculated from GPS height
2	Geopotential height calculated from radar height
3–14	Reserved
15	Missing value



**0 03 001*****Surface station type***

Code figure	
0	Land station (synoptic network)
1	Shallow water station (fixed to sea/lake floor)
2	Ship
3	Rig/platform
4	Moored buoy
5	Drifting buoy (or drifter)
6	Ice buoy
7	Land station (local network)
8	Land vehicle
9	Autonomous marine vehicle
10–30	Reserved for future use
31	Missing value

**0 03 003*****Thermometer/hygrometer housing***

Code figure	
0	Screen
1	Sling/whirling
2	Unscreened
3	Radiation shield
4	Aspirated (e.g. Assmann)
5	Other shelter
6	Handheld
7–14	Reserved for future use
15	Missing value

**0 03 004*****Type of screen/shelter/radiation shield***

Code figure	
0	Stevenson screen
1	Marine Stevenson screen
2	Cylindrical section plate shield
3	Concentric tube
4	Rectangular section shield
5	Square section shield
6	Triangular section shield
7	Open covered lean-to
8	Open covered inverted V roof
9	Integrated (e.g. chilled mirror)
10–14	Reserved for future use
15	Missing value

**0 03 008*****Artificially ventilated screen or shield***

## Code figure

0	Natural ventilation in use
1	Artificial aspiration in use: constant flow at time of reading
2	Artificial aspiration in use: variable flow at time of reading
3–6	Reserved
7	Missing value

**0 03 010*****Method of sea/water current measurement***

## Code figure

0	Reserved
1*	ADCP**
2	GEK (Geomagnetic ElectroKinetograph)
3	Ship's set and drift determined by fixes 3–6 hours apart
4	Ship's set and drift determined by fixes more than 6 hours but less than 12 hours apart
5	Drift of buoy
6	ADCP
7	ADCP bottom tracking mode
8	Electromagnetic sensor
9	Rotor and vane
10	Lowered ADCP
11–14	Reserved
15	Missing value

\* Value deprecated. Code figure 6 should be used instead.

\*\* Acoustic Doppler Current Profiler

**0 03 011*****Method of depth calculation***

## Code figure

0	Depth calculated using fall rate equation
1	Depth calculated from water pressure/equation of state
2	Reserved
3	Missing value

**0 03 012*****Instrument type/sensor for dissolved oxygen measurement***

## Code figure

0	Anderraa Oxygen optode
1	Winkler bottle
2–14	Reserved
15	Missing value

**0 03 016*****Position of road sensors***

Code figure	
0	Fast lane between the wheel tracks
1	Fast lane between the wheel tracks in the opposite direction
2	Fast lane in the wheel tracks
3	Fast lane in the wheel tracks in the opposite direction
4	Slow lane between the wheel tracks
5	Slow lane between the wheel tracks in the opposite direction
6	Slow lane in the wheel tracks
7	Slow lane in the wheel tracks in the opposite direction
8–14	Reserved
15	Missing value

**0 03 017*****Extended type of station***

Bit No.	
1	Automatic
2	Manned
3	Event triggered
4	Longer time period than the standard
5	Reserved
All 6	Missing value

**0 03 018*****Type of road***

Code figure	
0	Free track without further information
1	Free track, embankment
2	Free track, flat relative to surroundings
3	Free track, water basin(s) in vicinity
4	Free track, forest
5	Free track, cleft
6	Free track, on hilltop
7	Free track, on hilltop, forest
8	Free track, in valley
9	Free track, in valley, forest
10	Free track, north inclination
11	Free track, north inclination, forest
12	Free track, south inclination
13	Free track, south inclination, forest
14–19	Reserved
20	Bridge without further information
21	Bridge across a valley in an urban area

*(continued)*

*(Code table 0 03 018 – continued)*

Code figure	
22	Bridge across a valley with forest/meadows/fields
23	Bridge across street/track
24	Bridge across big river/canal
25	Bridge across river/canal of medium size
26	Bridge across a small stream/loading canal
27–30	Reserved
31	Missing value

**0 03 019*****Type of construction***

Code figure	
0	Asphalt
1	Concrete
2	Concrete construction
3	Steel-girder construction
4	Box girder bridge
5	Orthotropic slab
6	Drain asphalt
7–14	Reserved
15	Missing value

**0 03 020*****Material for thermometer/hygrometer housing***

Code figure	
0	Wood
1	Metal alloy
2	Plastic/GRP*
3	Reed/grass/leaf
4–6	Reserved for future use
7	Missing value

---

\* GRP = Glass-reinforced plastic

**0 03 021*****Hygrometer heating***

Code figure	
0	Unheated
1	Heated
2	Not applicable
3	Missing value



**0 03 022*****Instrument owner***

## Code figure

0	National hydrometeorological/weather service
1	Other
2	Standards institute
3–6	Reserved for future use
7	Missing value

**0 03 023*****Configuration of louvers for thermometer/hygrometer screen***

## Code figure

0	Single v-section louvers
1	Overlapping louvers
2	Double v-section louvers
3	Non-overlapping louvers
4	Vented, non-louvered
5	Not applicable
6	Reserved for future use
7	Missing value

**0 03 027*****Type of flight rig***

## Code figures

0	Solo (single radiosonde)
1	Block
2	Bar
3	Cross
4	T-rig
5	Double T-rig
6	Complex
7–14	Reserved
15	Missing value



**0 04 059*****Times of observation used to compute the reported mean values***

Bit No.	
1	0000 UTC
2	0600 UTC
3	1200 UTC
4	1800 UTC
5	Other hours
All 6	Missing value

**0 04 080*****Averaging period for following value***

Code figure	
0	Spot values
1	Less than 15 minutes
2	From 15 to 45 minutes
3	More than 45 minutes
4–8	Reserved
9	Data not available
10–14	Not used
15	Missing value



FM 94 BUFR

**0 05 069**

***Receiver channel***

Code figure

0	Mie
1	Rayleigh
2	Reserved
3	Missing value



**0 08 001*****Vertical sounding significance***

Bit No.	
1	Surface
2	Standard level
3	Tropopause level
4	Maximum wind level
5	Significant level, temperature and/or relative humidity
6	Significant level, wind
All 7	Missing value

**0 08 002*****Vertical significance (surface observations)***

Code figure	
0	Observing rules for base of lowest cloud and cloud types of FM 12 SYNOP and FM 13 SHIP apply
1	First non-Cumulonimbus significant layer
2	Second non-Cumulonimbus significant layer
3	Third non-Cumulonimbus significant layer
4	Cumulonimbus layer
5	Ceiling
6	Clouds not detected below the following height(s)
7	Low cloud
8	Middle cloud
9	High cloud
10	Cloud layer with base below and top above the station
11	Cloud layer with base and top below the station level
12–19	Reserved
20	No clouds detected by the cloud detection system
21	First instrument detected cloud layer
22	Second instrument detected cloud layer
23	Third instrument detected cloud layer
24	Fourth instrument detected cloud layer
25–61	Reserved
62	Value not applicable
63	Missing value

**0 08 003*****Vertical significance (satellite observations)***

Code figure	
0	Surface
1	Base of satellite sounding
2	Cloud top
3	Tropopause
4	Precipitable water
5	Sounding radiances
6	Mean temperatures
7	Ozone
8	Low cloud
9	Med cloud
10	High cloud
11–62	Reserved
63	Missing value

**0 08 004*****Phase of aircraft flight***

Code figure	
0–1	Reserved
2	Unsteady (UNS)
3	Level flight, routine observation (LVR)
4	Level flight, highest wind encountered (LVW)
5	Ascending (ASC)
6	Descending (DES)
7	Missing value

**0 08 005*****Meteorological attribute significance***

Code figure	
0	Reserved
1	Storm centre
2	Outer limit or edge of storm
3	Location of maximum wind
4	Location of the storm in the perturbed analysis
5	Location of the storm in the analysis
6–14	Reserved
15	Missing value



**0 08 006*****Ozone vertical sounding significance***

Bit No.	
1	Surface
2	Standard level
3	Tropopause level
4	Prominent maximum level
5	Prominent minimum level
6	Minimum pressure level
7	Reserved
8	Level of undetermined significance
All 9	Missing value

**0 08 007*****Dimensional significance***

Code figure	
0	Point
1	Line
2	Area
3	Volume
4–14	Reserved
15	Missing value

Note: A consecutive sequence of 2 or more of location coordinates, such as latitude and longitude pairs, defines a line or polygon. Points shall be joined in the order given in the message. Any area described will fall left of the drawn boundary in the direction established by the order of the points given in the message. This definition is for simple non-intersecting polygons without holes.

**0 08 008*****Radiation vertical sounding significance***

Bit No.	
1	Surface
2	Standard level
3	Tropopause level
4	Level of beta radiation maximum
5	Level of gamma radiation maximum
6	Minimum pressure level
7	Reserved
8	Level of undetermined significance
All 9	Missing value

**0 08 009*****Detailed phase of flight***

## Code figure

0	Level flight, routine observation, unsteady
1	Level flight, highest wind encountered, unsteady
2	Unsteady (UNS)
3	Level flight, routine observation (LVR)
4	Level flight, highest wind encountered (LVW)
5	Ascending (ASC)
6	Descending (DES)
7	Ascending, observation intervals selected by time increments
8	Ascending, observation intervals selected by time increments, unsteady
9	Ascending, observation intervals selected by pressure increments
10	Ascending, observation intervals selected by pressure increments, unsteady
11	Descending, observation intervals selected by time increments
12	Descending, observation intervals selected by time increments, unsteady
13	Descending, observation intervals selected by pressure increments
14	Descending, observation intervals selected by pressure increments, unsteady
15	Missing value

**0 08 010*****Surface qualifier (for temperature data)***

## Code figure

0	Reserved
1	Bare soil
2	Bare rock
3	Land grass cover
4	Water (lake, sea)
5	Flood water underneath
6	Snow
7	Ice
8	Runway or road
9	Ship or platform deck in steel
10	Ship or platform deck in wood
11	Ship or platform deck partly covered with rubber mat
12	Building roof
13–30	Reserved
31	Missing value

**0 08 011*****Meteorological feature***

## Code figure

0	Quasi-stationary front at the surface
1	Quasi-stationary front above the surface
2	Warm front at the surface
3	Warm front above the surface
4	Cold front at the surface
5	Cold front above the surface
6	Occlusion
7	Instability line
8	Intertropical front
9	Convergence line
10	Jet stream
11	Cloud clear
12	Cloud
13	Turbulence
14	Storm
15	Airframe icing
16	Phenomenon
17	Volcano
18	Atmospherics
19	Reserved
20	Special clouds
21	Thunderstorm
22	Tropical cyclone
23	Mountain wave
24	Duststorm
25	Sandstorm
26–62	Reserved
63	Missing value

**0 08 012*****Land/sea qualifier***

## Code figure

0	Land
1	Sea
2	Coast
3	Missing value

**0 08 013*****Day/night qualifier***

Code figure	
0	Night
1	Day
2	Twilight
3	Missing value

**0 08 014*****Qualifier for runway visual range***

Code figure	
0	10-minute mean value – normal value
1	10-minute mean value – above the upper limit for assessments of RVR (P)
2	10-minute mean value – below the lower limit for assessments of RVR (M)
3	one-minute minimum value – normal value
4	one-minute minimum value – above the upper limit for assessments of RVR (P)
5	one-minute minimum value – below the lower limit for assessments of RVR (M)
6	one-minute maximum value – normal value
7	one-minute maximum value – above the upper limit for assessments of RVR (P)
8	one-minute maximum value – below the lower limit for assessments of RVR (M)
9–14	Reserved
15	Missing value

**0 08 015*****Significant qualifier for sensor***

Code figure	
0	Single sensor
1	Primary sensor
2	Secondary sensor (Backup)
3–6	Reserved
7	Missing value

**0 08 016*****Change qualifier of a trend-type forecast or an aerodrome forecast***

Code figure	
0	NOSIG
1	BECMG
2	TEMPO
3	FM
4–6	Reserved
7	Missing value

**0 08 017*****Qualifier of the time when the forecast change is expected***

Code figure

0	FM
1	TL
2	AT
3	Missing value

**0 08 018*****SEAWINDS land/ice surface type***

Bit No.

1	Land is present
2	Surface ice map indicates ice is present
3–10	Reserved
11	Ice map data not available
12	Attenuation map data not available
13–16	Reserved
All 17	Missing value

**0 08 019*****Qualifier for following centre identifier***

Code figure

0	Reserved
1	ATS (Air Traffic Service) unit serving FIR (Flight Information Region)
2	FIR (Flight Information Region)
3	UIR (Upper Flight Information Region)
4	CTA (Control Area)
5	VAAC (Volcanic Ash Advisory Centre)
6	MWO (Meteorological Watch Office) issuing SIGMET
7–14	Reserved
15	Missing value

**0 08 021*****Time significance***

## Code figure

0	Reserved
1	Time series
2	Time averaged (see Note 1)
3	Accumulated
4	Forecast
5	Forecast time series
6	Forecast time averaged
7	Forecast accumulated
8	Ensemble mean (see Note 2)
9	Ensemble mean time series
10	Ensemble mean time averaged
11	Ensemble mean accumulated
12	Ensemble mean forecast
13	Ensemble mean forecast time series
14	Ensemble mean forecast time averaged
15	Ensemble mean forecast accumulated
16	Analysis
17	Start of phenomenon
18	Radiosonde launch time
19	Start of orbit
20	End of orbit
21	Time of ascending node
22	Time of occurrence of wind shift
23	Monitoring period
24	Agreed time limit for report reception
25	Nominal reporting time
26	Time of last known position
27	First guess
28	Start of scan
29	End of scan or time of ending
30	Time of occurrence
31	Missing value

## Notes:

- (1) "Time averaged" indicates that values are continuously averaged over a period of time.
- (2) "Ensemble mean" indicates that a number of distinct values corresponding to a set of time locations are averaged.
- (3) Time significance must be qualified by appropriate time periods being specified.

**0 08 023*****First-order statistics\****

## Code figure

0–1	Reserved
2	Maximum value
3	Minimum value
4	Mean value
5	Median value
6	Modal value
7	Mean absolute error
8	Reserved
9	Best estimate of standard deviation (N–1)
10	Standard deviation (N)
11	Harmonic mean
12	Root-mean-square vector error
13	Root-mean-square
14–31	Reserved
32	Vector mean
33–62	Reserved for local use
63	Missing value

---

\* All first-order statistics are in the units defined by the original data descriptors.

**0 08 024*****Difference statistics\****

Code figure	
0–1	Reserved
2	Observed minus maximum
3	Observed minus minimum
4	Observed minus mean
5	Observed minus median
6	Observed minus mode
7–10	Reserved
11	Observed minus climatology (anomaly)
12	Observed minus analysed value
13	Observed minus initialized analysed value
14	Observed minus forecast value **
15–20	Reserved
21	Observed minus interpolated value
22	Observed minus hydrostatically calculated value
23–31	Reserved
32–62	Reserved for local use
63	Missing value

\* Difference statistics are difference values; they have dimensions the same as the corresponding reported values with respect to units, but assume a range centred on zero (e.g., the difference between reported and analysed values, the difference between reported and forecast values).

\*\* Where observed minus forecast values are represented, the period of the forecast shall be indicated by an appropriate descriptor from Class 04.

**0 08 025*****Time difference qualifier***

Code figure	
0	Universal Time Coordinated (UTC) minus Local Standard Time (LST)
1	Local Standard Time
2	Universal Time Coordinated (UTC) minus Satellite clock
3–4	Reserved
5	Time difference from edge of processing segment
6–14	Reserved
15	Missing value



**0 08 026*****Matrix significance***

Code figure	
0	Averaging kernel matrix
1	Correlation matrix (C)
2	Lower triangular correlation matrix square root (L from $C=LL^T$ )
3	Inverse of lower triangular correlation matrix square root ( $L^{-1}$ )
4–42	Reserved
43–62	Reserved for local use
63	Missing or undefined significance

**0 08 029*****Surface type***

Code figure	
0	Open ocean or semi-enclosed sea
1	Enclosed sea or lake
2	Continental ice
3	Land
4	Low inland (below sea level)
5	Mix of land and water
6	Mix of land and low inland
7–10	Reserved
11	River
12	Lake
13	Sea
14	Glacier
15	Urban land
16	Rural land
17	Suburban land
18	Sea ice
19–254	Reserved
255	Missing value

**0 08 032*****Status of operation***

Code figure	
0	Routine operation
1	Event triggered by storm surge
2	Event triggered by tsunami
3	Event triggered manually
4	Installation testing
5	Maintenance testing
6–14	Reserved
15	Missing value

**0 08 033*****Method of derivation of percentage confidence***

Code figure	
0	Reserved
1	Percentage confidence calculated using cloud fraction
2	Percentage confidence calculated using standard deviation of temperature
3	Percentage confidence calculated using probability of cloud contamination
4	Percentage confidence calculated using normality of distribution
5–126	Reserved
127	Missing value

**0 08 034*****Temperature/salinity measurement qualifier***

Code figure	
0	Secondary sampling: averaged
1	Secondary sampling: discrete
2	Secondary sampling: mixed
3	Near-surface sampling: averaged, pumped
4	Near-surface sampling: averaged, unpumped
5	Near-surface sampling: discrete, pumped
6	Near-surface sampling: discrete, unpumped
7	Near-surface sampling: mixed, pumped
8	Near-surface sampling: mixed, unpumped
9–14	Reserved
15	Missing value

**0 08 035*****Type of monitoring exercise***

Code figure	
0	Global
1	Regional
2	National
3	Special
4	Bilateral
5	Reserved
6	Reserved
7	Missing value

**0 08 036*****Type of centre or station performing monitoring***

Code figure	
0	WMO Secretariat
1	WMO
2	RSMC
3	NMC
4	RTH
5	Observing site
6	Other
7	Missing value

**0 08 037*****Baseline check significance***

Code figure	
0	Manufacturer's baseline check unit
1	Weather screen
2	GRUAN standard humidity chamber
3–30	Reserved
31	Missing value

**0 08 038*****Instrument data significance***

Code figure	
0	Verified instrument reading
1	Reference instrument reading
2–254	Reserved
255	Missing value

**0 08 039*****Time significance (Aviation forecast)***

Code figure	
0	Issue time of forecast
1	Time of commencement of period of the forecast
2	Time of ending of period of the forecast
3	Forecast time of maximum temperature
4	Forecast time of minimum temperature
5	Time of beginning of the forecast change
6	Time of ending of the forecast change
7–62	Reserved
63	Missing value

**0 08 040*****Flight level significance***

Code figure	
0	High-resolution data sample
1	Within 20 hPa of surface
2	Pressure less than 10 hPa (i.e., 9, 8, 7, etc.) when no other reason applies
3	Base pressure level for stability index
4	Begin doubtful temperature, height data
5	Begin missing data (all elements)
6	Begin missing relative humidity data
7	Begin missing temperature data
8	Highest level reached before balloon descent because of icing or turbulence
9	End doubtful temperature, height data
10	End missing data (all elements)
11	End missing relative humidity data
12	End missing temperature data
13	Zero degrees Celsius crossing(s) for RADAT
14	Standard pressure level
15	Operator-added level
16	Operator-deleted level
17	Balloon re-ascended beyond previous highest ascent level
18	Significant relative humidity level
19	Relative humidity level selection terminated
20	Surface level
21	Significant temperature level
22	Mandatory temperature level
23	Flight termination level
24	Tropopause(s)
25	Aircraft report
26	Interpolated (generated) level
27	Mandatory wind level
28	Significant wind level
29	Maximum wind level
30	Incremental wind level (fixed regional)
31	Incremental height level (generated)
32	Wind termination level
33	Pressure 100 to 110 hPa, when no other reason applies
34	Freezing level base
35	Freezing level top
36	Flight level base
37	Flight level top
38	Top of wind sounding
39	Bottom of wind sounding
40	Significant thermodynamic level (inversion)
41	Significant relative humidity level (according to NCDC criteria)
42	Significant temperature level (according to NCDC)
43	Begin missing wind data
44	End missing wind data
45–59	Reserved
60	Level of 80-knot isotach above jet

*(continued)*

*(Code table 0 08 040 – continued)*

Code figure	
61	Level of 80-knot isotach below jet
62	Other
63	Missing value

**0 08 041*****Data significance***

Code figure	
0	Parent site
1	Observation site
2	Balloon manufacture date
3	Balloon launch point
4	Surface observation
5	Surface observation displacement from launch point
6	Flight level observation
7	Flight level termination point
8	IFR ceiling and visibility
9	Mountain obscuration
10	Strong surface wind
11	Freezing level
12	Multiple freezing level
13	Instrument manufacture date
14–30	Reserved
31	Missing value

**0 08 042*****Extended vertical sounding significance***

Bit No.	
1	Surface
2	Standard level
3	Tropopause level
4	Maximum wind level
5	Significant temperature level
6	Significant humidity level
7	Significant wind level
8	Beginning of missing temperature data
9	End of missing temperature data
10	Beginning of missing humidity data
11	End of missing humidity data
12	Beginning of missing wind data
13	End of missing wind data
14	Top of wind sounding

*(continued)*

(Flag table 0 08 042 – continued)

Bit No.	
15	Level determined by regional decision
16	Freezing level
17	Pressure level originally indicated by height as the vertical coordinate
All 18	Missing value

Note:

- (1) Freezing level is the level at which temperature first decreases to 0 °C. The criteria for the selection of freezing level in upper-air observations are:
  - (a) If the surface temperature is not lower than 0 °C when the radiosonde is released, then the lowest level at which the temperature first decreases to 0 °C will be selected as the freezing level.
  - (b) If the surface temperature is equal to 0 °C, then the surface level will be the freezing level.
  - (c) If during observation there is no level at which the temperature equals 0 °C, then the closest two levels between which the temperature crosses from a positive to a negative value should be used to interpolate the freezing-level temperature equal to 0 °C.
  - (d) The following elements will be calculated for the freezing level: time, elevation, pressure, humidity, dewpoint temperature, dewpoint depression, and deviation of longitude and latitude.

**0 08 043*****Atmospheric chemical or physical constituent type***

Note: The last column in the table contains the associated registry number from the Chemical Abstracts Service (CAS) of the American Chemical Society.

Code figure	Name	Formula	CAS number (if applicable)
0	Ozone	O <sub>3</sub>	10028-15-6
1	Water vapour	H <sub>2</sub> O	7732-18-5
2	Methane	CH <sub>4</sub>	74-82-8
3	Carbon dioxide	CO <sub>2</sub>	124-38-9
4	Carbon monoxide	CO	630-08-0
5	Nitrogen dioxide	NO <sub>2</sub>	10102-44-0
6	Nitrous oxide	N <sub>2</sub> O	10024-97-2
7	Formaldehyde	HCHO	50-00-0
8	Sulphur dioxide	SO <sub>2</sub>	7446-09-5
9–24	Reserved		
25	Particulate matter < 1.0 microns		
26	Particulate matter < 2.5 microns		
27	Particulate matter < 10 microns		
28	Aerosols (generic)		
29	Smoke (generic)		
30	Crustal material (generic dust)		
31	Volcanic ash		
32–200	Reserved		
201–254	Reserved for local use		
255	Missing value		

**0 08 050*****Qualifier for number of missing values in calculation of statistic***

Code figure	
0	Reserved
1	Pressure
2	Temperature
3	Extreme temperature
4	Vapour pressure
5	Precipitation
6	Sunshine duration
7	Maximum temperature
8	Minimum temperature
9	Wind
10–14	Reserved
15	Missing value

**0 08 051*****Qualifier for number of missing values in calculation of statistic***

Code figure	
1	Pressure
2	Temperature
3	Extreme temperature
4	Vapour pressure
5	Precipitation
6	Sunshine duration
7	Missing value

**0 08 052*****Condition for which number of days of occurrence follows***

Code figure	
0	Mean wind speed over a 10-minute period observed or recorded equal to or more than $10 \text{ m s}^{-1}$ or 20 knots
1	Mean wind speed over a 10-minute period observed or recorded equal to or more than $20 \text{ m s}^{-1}$ or 40 knots
2	Mean wind speed over a 10-minute period observed or recorded equal to or more than $30 \text{ m s}^{-1}$ or 60 knots
3	Maximum temperature less than 273.15 K
4	Maximum temperature equal to or more than 298.15 K
5	Maximum temperature equal to or more than 303.15 K
6	Maximum temperature equal to or more than 308.15 K
7	Maximum temperature equal to or more than 313.15 K
8	Minimum temperature less than 273.15 K
9	Maximum temperature equal to or more than 273.15 K
10	Precipitation equal to or more than $1.0 \text{ kg m}^{-2}$
11	Precipitation equal to or more than $5.0 \text{ kg m}^{-2}$
12	Precipitation equal to or more than $10.0 \text{ kg m}^{-2}$
13	Precipitation equal to or more than $50.0 \text{ kg m}^{-2}$
14	Precipitation equal to or more than $100.0 \text{ kg m}^{-2}$
15	Precipitation equal to or more than $150.0 \text{ kg m}^{-2}$
16	Snow depth more than 0.00 m
17	Snow depth more than 0.01 m
18	Snow depth more than 0.10 m
19	Snow depth more than 0.50 m
20	Horizontal visibility less than 50 m
21	Horizontal visibility less than 100 m
22	Horizontal visibility less than 1000 m
23	Hail
24	Thunderstorm
25–30	Reserved
31	Missing value



**0 08 053*****Day of occurrence qualifier***

## Code figure

0	Value occurred on only one day in the month
1	Value occurred on more than one day in the month
2	Reserved
3	Missing value

**0 08 054*****Qualifier for wind speed or wind gusts***

## Code figure

0	Wind speed or gust is as reported
1	Wind speed is greater than that reported (P in METAR/TAF/SPECI)
2–6	Reserved
7	Missing value

**0 08 060*****Sample scanning mode significance***

## Code figure

0	Reserved
1	Range
2	Azimuth
3	Horizontal
4	Vertical
5	North/South
6	East/West
7–14	Reserved
15	Missing value

**0 08 065*****Sun-glint indicator***

## Code figure

0	No sun-glnt
1	Sun-glnt
2	Reserved
3	Missing value

**0 08 066*****Semi-transparency indicator***

Code figure	
0	Opaque
1	Semi-transparent
2	Reserved
3	Missing value

**0 08 070*****Vertical sounding product qualifier***

Code figure	
0	Reserved
1	Reserved
2	Earth located instrument counts, calibration coefficients and housekeeping (level 1b)
3	Earth located calibrated radiances (level 1c)
4	Mapped to a common footprint, Earth located calibrated radiances (level 1d)
5–14	Reserved
15	Missing value

**0 08 072*****Pixel(s) type***

Code figure	
0	Mixed
1	Clear
2	Cloudy
3	Probably clear
4	Probably cloudy
5–6	Reserved
7	Missing value

**0 08 074*****Altimeter echo type***

Code figure	
0	Open ocean or semi-enclosed sea
1	Non-ocean like
2	Reserved
3	Missing value

**0 08 075*****Ascending/descending orbit qualifier***

Code figure	
0	Ascending orbit
1	Descending orbit
2	Reserved
3	Missing value

**0 08 076*****Type of band***

Code figure	
0	Ku
1	C
2	Long-wave infrared
3	Medium-wave infrared
4	Short-wave infrared
5	M
6	I
7	Day/night
8–62	Reserved
63	Missing value

**0 08 077*****Radiometer sensed surface type***

Code figure	
0	Land
1	Sea
2	Coastal
3	Open ocean or semi-enclosed sea
4	Enclosed sea or lake
5	Continental ice
6–126	Reserved
127	Missing value

**0 08 079*****Product status***

Code figure	
0	Normal issue
1	Correction to a previously issued product (COR)
2	Amendment to a previously issued product (AMD)
3	Correction to a previously issued amended product (COR AMD)
4	Cancellation of a previously issued product (CNL)
5	No product available (NIL)
6	Special report (SPECI)
7	Corrected special report (SPECI COR)
8–14	Reserved
15	Missing or not applicable

**0 08 080*****Qualifier for GTSP\* quality flag***

Code figure	
0	Total water pressure profile
1	Total water temperature profile
2	Total water salinity profile
3	Total water conductivity profile
4	Total water depth
5–9	Reserved
10	Water pressure at a level
11	Water temperature at a level
12	Salinity at a level
13	Water depth at a level
14	Sea/water current speed at a level
15	Sea/water current direction at a level
16	Dissolved oxygen at a level
17–19	Reserved
20	Position
21–62	Reserved
63	Missing value

\* GTSP = Global Temperature Salinity Profile Programme

**0 08 081*****Type of equipment***

Code figure	
0	Sensor
1	Transmitter
2	Receiver
3	Observing platform
4–62	Reserved
63	Missing value

**0 08 082*****Modification of sensor height to another value***

Code figure	
0	Sensor height is not modified
1	Sensor height is modified to standard level*
2–6	Reserved
7	Missing value

\* If 0 08 082 = 1, the standard level is indicated by the Class 07 descriptor, which immediately follows. It is possible to indicate the real height of the sensor by preceding the descriptor by the relevant Class 07 descriptor.

**0 08 083*****Nominal value indicator***

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

**0 08 085*****Beam identifier***

Code figure	
0	Fore beam
1	Mid beam
2	Aft beam
3–6	Reserved
7	Missing value

**0 08 086*****Vertical significance for NWP***

Bit No.	
1	Model "ground" surface
2	Standard level
3	Tropopause level
4	Maximum wind level
5	Significant temperature level
6	Significant humidity level
7	Significant wind level
8	Vertically interpolated level (This should be set to 1 for points on the vertical profile that fall between the model's native vertical levels.)
9	Virtual station height
10	Level of best fit
11	Reserved
All 12	Missing value

**0 08 087*****Corner position of observation***

Code figure	
0	Upper left
1	Upper right
2	Lower right
3	Lower left
4–6	Reserved
7	Missing value

**0 08 088*****Map significance***

Code figure	
0	Top view (geographical longitude on x-axis and latitude on y-axis)
1	North–South view (transect with geographical longitude on x-axis and vertical height on y-axis)
2	East–West view (transect with geographical latitude on x-axis and vertical height on y-axis)
3–62	Reserved
63	Missing

**0 08 091*****Coordinates significance***

Code figure	
0	Satellite coordinates
1	Observation coordinates
2	Start of observation
3	End of observation
4	Horizontal centre of gravity of the observation
5	Vertical centre of gravity of the observation
6	Top of the observation
7	Bottom of the observation
8	Projection origin
9	Coordinates of true scale
10–254	Reserved
255	Missing value

**0 08 092*****Measurement uncertainty expression***

Code figure	
0	Standard uncertainty
1–30	Reserved
31	Missing value

**0 08 093**

***Measurement uncertainty significance***

Code figure

0	Total uncertainty
1	Systematic component of uncertainty
2	Random component of uncertainty
3–30	Reserved
31	Missing value





**0 10 063*****Characteristic of pressure tendency***

## Code figure

0	Increasing, then decreasing; atmospheric pressure the same or higher than three hours ago	
1	Increasing, then steady; or increasing, then increasing more slowly	} Atmospheric pressure now higher than three hours ago
2	Increasing (steadily or unsteadily)	
3	Decreasing or steady, then increasing; or increasing, then increasing more rapidly	
4	Steady; atmospheric pressure the same as three hours ago	
5	Decreasing, then increasing; atmospheric pressure the same or lower than three hours ago	
6	Decreasing, then steady; or decreasing, then decreasing more slowly	} Atmospheric pressure now lower than three hours ago
7	Decreasing (steadily or unsteadily)	
8	Steady or increasing, then decreasing; or decreasing, then decreasing more rapidly	
9–14	Reserved	
15	Missing value	

## Notes:

- (1) In reports from automatic stations, code figure 2 shall be used when tendency is positive, 7 when negative, and 4 when pressure is the same as three hours before.
- (2) In reports from tropical stations reporting 24-hour pressure changes, code figure 2 shall be used when tendency is positive, 7 when negative, and 4 when pressure is the same as 24 hours before.

**0 10 064*****SIGMET cruising level***

## Code figure

0	Subsonic
1	Transonic
2	Supersonic
3–6	Reserved
7	Missing value



**0 11 030**

***Extended degree of turbulence***

Code figure			
0	Nil	}	in cloud
1	Light		
2	Moderate		
3	Severe		
4	Nil	}	in clear air
5	Light		
6	Moderate		
7	Severe		
8	Nil	}	cloud/clear air not specified
9	Light		
10	Moderate		
11	Severe		
12	Extreme, in clear air		
13	Extreme, in cloud		
14	Extreme, cloud/clear air not specified		
15	Light, isolated moderate		
16	Light, occasional moderate		
17	Light, frequently moderate		
18	Moderate, isolated severe		
19	Moderate, occasional severe		
20	Moderate, frequently severe		
21	Severe, isolated extreme		
22	Severe, occasional extreme		
23	Severe, frequently extreme		
24–62	Reserved		
63	Missing value		

**0 11 031**

***Degree of turbulence***

Code figure			
0	Nil	}	in cloud
1	Light		
2	Moderate		
3	Severe		
4	Nil	}	in clear air
5	Light		
6	Moderate		
7	Severe		
8	Nil	}	cloud/clear air not specified
9	Light		
10	Moderate		
11	Severe		

(continued)

(Code table 0 11 031 – continued)

## Code figure

12	Extreme, in clear air
13	Extreme, in cloud
14	Extreme, cloud/clear air not specified
15	Missing value

**0 11 037*****Turbulence index***

Code figure	Average value of eddy dissipation rate (ave) ( $\text{m}^{2/3} \text{s}^{-1}$ )	Peak value of eddy dissipation rate (peak) ( $\text{m}^{2/3} \text{s}^{-1}$ )
0	ave < 0.1	peak < 0.1
1	ave < 0.1	$0.1 \leq \text{peak} < 0.2$
2	$0.1 \leq \text{ave} < 0.2$	$0.1 \leq \text{peak} < 0.2$
3	ave < 0.1	$0.2 \leq \text{peak} < 0.3$
4	$0.1 \leq \text{ave} < 0.2$	$0.2 \leq \text{peak} < 0.3$
5	$0.2 \leq \text{ave} < 0.3$	$0.2 \leq \text{peak} < 0.3$
6	ave < 0.1	$0.3 \leq \text{peak} < 0.4$
7	$0.1 \leq \text{ave} < 0.2$	$0.3 \leq \text{peak} < 0.4$
8	$0.2 \leq \text{ave} < 0.3$	$0.3 \leq \text{peak} < 0.4$
9	$0.3 \leq \text{ave} < 0.4$	$0.3 \leq \text{peak} < 0.4$
10	ave < 0.1	$0.4 \leq \text{peak} < 0.5$
11	$0.1 \leq \text{ave} < 0.2$	$0.4 \leq \text{peak} < 0.5$
12	$0.2 \leq \text{ave} < 0.3$	$0.4 \leq \text{peak} < 0.5$
13	$0.3 \leq \text{ave} < 0.4$	$0.4 \leq \text{peak} < 0.5$
14	$0.4 \leq \text{ave} < 0.5$	$0.4 \leq \text{peak} < 0.5$
15	ave < 0.1	$0.5 \leq \text{peak} < 0.8$
16	$0.1 \leq \text{ave} < 0.2$	$0.5 \leq \text{peak} < 0.8$
17	$0.2 \leq \text{ave} < 0.3$	$0.5 \leq \text{peak} < 0.8$
18	$0.3 \leq \text{ave} < 0.4$	$0.5 \leq \text{peak} < 0.8$
19	$0.4 \leq \text{ave} < 0.5$	$0.5 \leq \text{peak} < 0.8$
20	$0.5 \leq \text{ave} < 0.8$	$0.5 \leq \text{peak} < 0.8$
21	ave < 0.1	$0.8 \leq \text{peak}$
22	$0.1 \leq \text{ave} < 0.2$	$0.8 \leq \text{peak}$
23	$0.2 \leq \text{ave} < 0.3$	$0.8 \leq \text{peak}$
24	$0.3 \leq \text{ave} < 0.4$	$0.8 \leq \text{peak}$
25	$0.4 \leq \text{ave} < 0.5$	$0.8 \leq \text{peak}$
26	$0.5 \leq \text{ave} < 0.8$	$0.8 \leq \text{peak}$
27	$0.8 \leq \text{ave}$	$0.8 \leq \text{peak}$
28	Nil	Nil
29–62	Reserved	Reserved
63	Missing value	Missing value

**0 11 038*****Time of occurrence of peak eddy dissipation rate***

Code figure	Minutes prior to observation time (min)
0	min < 1
1	1 ≤ min < 2
2	2 ≤ min < 3
3	3 ≤ min < 4
4	4 ≤ min < 5
5	5 ≤ min < 6
6	6 ≤ min < 7
7	7 ≤ min < 8
8	8 ≤ min < 9
9	9 ≤ min < 10
10	10 ≤ min < 11
11	11 ≤ min < 12
12	12 ≤ min < 13
13	13 ≤ min < 14
14	14 ≤ min < 15
15	No timing information available
16–30	Reserved
31	Missing value

**0 11 039*****Extended time of occurrence of peak eddy dissipation rate***

Code figure	Minutes prior to observation time (min)
0	min < 1
1	1 ≤ min < 2
2	2 ≤ min < 3
3	3 ≤ min < 4
4	4 ≤ min < 5
5	5 ≤ min < 6
6	6 ≤ min < 7
7	7 ≤ min < 8
8	8 ≤ min < 9
9	9 ≤ min < 10
10	10 ≤ min < 11
11	11 ≤ min < 12
12	12 ≤ min < 13
13	13 ≤ min < 14
14	14 ≤ min < 15
15–59	As above to 59 ≤ min < 60
60	No timing information available
61–62	Reserved
63	Missing value



**0 13 038*****Superadiabatic indicator***

## Code figure

0	Not superadiabatic
1	Superadiabatic
2	Reserved
3	Missing value

**0 13 039*****Terrain type (ice/snow)***

## Code figure

0	Sea ice
1	Snow on land
2–6	Reserved
7	Missing value

**0 13 040*****Surface flag***

## Code figure

0	Land
1	Reserved
2	Near coast
3	Ice
4	Possible ice
5	Ocean
6	Coast
7	Inland water*
8	Snow cover
9	Sea ice
10	Standing water
11	Snow
12–14	Reserved
15	Missing value

---

\* Inland water includes rivers, lakes, wetlands and swamps.

**0 13 041*****Pasquill-Gifford stability category***

Code figure	
1	A
2	A – B
3	B
4	B – C
5	C
6	D
7	E
8	F
9	G
10–14	Reserved
15	Missing value

**0 13 051*****Frequency group, precipitation***

Code figure	
0	Smaller than any value in the 30-year period
1	In the first quintile
2	In the second quintile
3	In the third quintile
4	In the fourth quintile
5	In the fifth quintile
6	Greater than any value in the 30-year period
7–14	Reserved
15	Missing value

**0 13 056*****Character and intensity of precipitation***

Code figure	
0	No precipitation
1	Light intermittent
2	Moderate intermittent
3	Heavy intermittent
4	Very heavy intermittent
5	Light continuous
6	Moderate continuous
7	Heavy continuous
8	Very heavy continuous
9	Variable – alternatively light and heavy
10–14	Reserved
15	Missing value



**0 13 057*****Time of beginning or end of precipitation***

## Code figure

0	No precipitation
1	Within the last hour
2	1 to 2 hours ago
3	2 to 3 hours ago
4	3 to 4 hours ago
5	4 to 5 hours ago
6	5 to 6 hours ago
7	6 to 8 hours ago
8	8 to 10 hours ago
9	More than 10 hours ago
10–14	Reserved
15	Missing value



**0 15 025**

***Type of pollutant***

Code figure

0	Ozone
1–10	Reserved
11	Fine particulate matter (diameter < 2.5 microns)
12	Fine particulate matter (diameter < 10 microns)
13–14	Reserved
15	Missing value



**0 19 001*****Type of synoptic feature***

Code figure	
0	Depression or low (extratropical)
1	Tropical depression
2	Tropical storm
3	Severe tropical storm
4	Typhoon
5–9	Reserved
10	Dust/sandstorm
11–62	Reserved
63	Missing value

Note: New local names for storm of various strengths shall be added as necessary.

**0 19 008*****Vertical extent of circulation***

Code figure	
0	Reserved
1	Shallow (top of circulation below 700-hPa level)
2	Medium (top between 700-hPa and 400-hPa level)
3	Deep (top above 400-hPa level)
4–6	Reserved
7	Missing value

**0 19 010*****Method for tracking the centre of synoptic feature***

Code figure	
1	Minimum value of sea level pressure
2	Maximum value of 850 hPa relative vorticity
3–14	Reserved
15	Missing value

**0 19 100*****Time interval to calculate the movement of the tropical cyclone***

Code figure	
0–2	Not used
3	During the preceding 15 minutes
4	During the preceding 30 minutes
5	During the preceding 1 hour
6	During the preceding 2 hours
7	During the preceding 3 hours
8	During the preceding 6 hours
9	During a period of more than 6 hours
10	Undetermined
11–14	Not used
15	Missing value

**0 19 101*****Accuracy of the position of the centre of the tropical cyclone***

Code figure	
0	Reserved
1	Eye visible on radar scope, accuracy good (within 10 km)
2	Eye visible on radar scope, accuracy fair (within 30 km)
3	Eye visible on radar scope, accuracy poor (within 50 km)
4	Position of the centre within the area covered by the radar scope, determination by means of the spiral-band overlay, accuracy good (within 10 km)
5	Position of the centre within the area covered by the radar scope, determination by means of the spiral-band overlay, accuracy fair (within 30 km)
6	Position of the centre within the area covered by the radar scope, determination by means of the spiral-band overlay, accuracy poor (within 50 km)
7	Position of the centre outside the area covered by the radar scope, extrapolation by means of the spiral-band overlay
8–9	Reserved
10	Accuracy undetermined
11–14	Not used
15	Missing value

**0 19 102*****Shape and definition of the eye of the tropical cyclone***

Code figure

0	Circular	
1	Elliptical – the minor axis is at least 3/4 the length of the major axis	} well defined
2	Elliptical – the minor axis is less than 3/4 the length of the major axis	
3	Apparent double eye	
4	Other shape	
5	Ill defined	
6	Undetermined	
7	Missing value	

**0 19 103*****Diameter of major axis of the eye of the tropical cyclone***

Code figure

0	Less than 5 km
1	5 to less than 10 km
2	10 to less than 15 km
3	15 to less than 20 km
4	20 to less than 25 km
5	25 to less than 30 km
6	30 to less than 35 km
7	35 to less than 40 km
8	40 to less than 50 km
9	50 km and greater
10	Undetermined
11–14	Not used
15	Missing value

**0 19 104*****Change in character of the eye during the 30 minutes***

## Code figure

0	Eye has first become visible during the past 30 minutes
1	No significant change in the characteristics or size of the eye
2	Eye has become smaller with no other significant change in characteristics
3	Eye has become larger with no other significant change in characteristics
4	Eye has become less distinct with no significant change in size
5	Eye has become less distinct and decreased in size
6	Eye has become less distinct and increased in size
7	Eye has become more distinct with no significant change in size
8	Eye has become more distinct and decreased in size
9	Eye has become more distinct and increased in size
10	Change in character and size of eye cannot be determined
11–14	Not used
15	Missing value

**0 19 105*****Distance between the end of spiral band and the centre***

## Code figure

0	0 to less than 100 km
1	100 to less than 200 km
2	200 to less than 300 km
3	300 to less than 400 km
4	400 to less than 500 km
5	500 to less than 600 km
6	600 to less than 800 km
7	800 km or more
8–9	Reserved
10	Doubtful or undetermined
11–14	Not used
15	Missing value



**0 19 107*****Time interval over which the movement of the tropical cyclone has been calculated***

## Code figure

0	Less than 1 hour
1	1 to less than 2 hours
2	2 to less than 3 hours
3	3 to less than 6 hours
4	6 to less than 9 hours
5	9 to less than 12 hours
6	12 to less than 15 hours
7	15 to less than 18 hours
8	18 to less than 21 hours
9	21 to less than 30 hours
10–14	Not used
15	Missing value

**0 19 108*****Accuracy of geographical position of the tropical cyclone***

## Code figure

0	Cyclone centre within 10 km of the transmitted position
1	Cyclone centre within 20 km of the transmitted position
2	Cyclone centre within 50 km of the transmitted position
3	Cyclone centre within 100 km of the transmitted position
4	Cyclone centre within 200 km of the transmitted position
5	Cyclone centre within 300 km of the transmitted position
6	Cyclone centre undetermined
7	Missing value

**0 19 109*****Mean diameter of the overcast cloud of the tropical cyclone***

## Code figure

0	Less than 1° of latitude
1	1° to less than 2° of latitude
2	2° to less than 3° of latitude
3	3° to less than 4° of latitude
4	4° to less than 5° of latitude
5	5° to less than 6° of latitude
6	6° to less than 7° of latitude
7	7° to less than 8° of latitude
8	8° to less than 9° of latitude
9	9° of latitude or more
10	Undetermined
11–14	Not used
15	Missing value

**0 19 110*****Apparent 24-hour change in intensity of the tropical cyclone***

## Code figure

0	Much weakening
1	Weakening
2	No change
3	Intensification
4	Strong Intensification
5–8	Reserved
9	Not observed previously
10	Undetermined
11–14	Not used
15	Missing value

**0 19 113*****Cloud pattern type of the DT-number***

Code figure	Type
1	Curved Band
2	Shear
3	Eye
4	Banding Eye
5	Central Dense Overcast (CDO)
6	Embedded Centre
7	Centre Cold Cover (CCC)
8–14	Reserved
15	Missing value

**0 19 117*****Cloud picture type of the PT-number***

Code figure	Type
1	A (Curved Band)
2	B (CDO)
3	C (Shear)
4–6	Reserved
7	Missing value

**0 19 119*****Type of the final T-number***

Code figure	Type
1	DT-number
2	PT-number
3	MET-number
4–6	Reserved
7	Missing value



**0 20 003*****Present weather***

Code figure		
00–49	<i>No precipitation at the station at the time of observation</i>	
00–19	No precipitation, fog, ice fog (except for 11 and 12), duststorm, sandstorm, drifting or blowing snow at the station* at the time of observation or, except for 09 and 17, during the preceding hour	
00–03	No meteors except photometeors	
00	Cloud development not observed or not observable	} Characteristic change of the state of sky during the past hour
01	Clouds generally dissolving or becoming less developed	
02	State of sky on the whole unchanged	
03	Clouds generally forming or developing	
04–09	Haze, dust, sand or smoke	
04	Visibility reduced by smoke, e.g. veldt or forest fires, industrial smoke or volcanic ashes	
05	Haze	
06	Widespread dust in suspension in the air, not raised by wind at or near the station at the time of observation	
07	Dust or sand raised by wind at or near the station at the time of observation, but no well-developed dust whirl(s) or sand whirl(s), and no duststorm or sandstorm seen; or, in the case of sea stations and coastal stations, blowing spray at the station	
08	Well-developed dust whirl(s) or sand whirl(s) seen at or near the station during the preceding hour or at the same time of observation, but no duststorm or sandstorm	
09	Duststorm or sandstorm within sight at the time of observation, or at the station during the preceding hour	
10	Mist	
11	Patches	} shallow fog or ice fog at the station, whether on land or sea, not deeper than about 2 metres on land or 10 metres at sea
12	More or less continuous	
13	Lightning visible, no thunder heard	
14	Precipitation within sight, not reaching the ground or the surface of the sea	
15	Precipitation within sight, reaching the ground or the surface of the sea, but distant, i.e. estimated to be more than 5 km from the station	
16	Precipitation within sight, reaching the ground or the surface of the sea, near to, but not at the station	
17	Thunderstorm, but no precipitation at the time of observation	
18	Squalls	} at or within sight of the station during the preceding hour or at the time of observation
19	Funnel cloud(s)**	
20–29	Precipitation, fog, ice fog or thunderstorm at the station during the preceding hour but not at the time of observation	
20	Drizzle (not freezing) or snow grains	} not falling as shower(s)
21	Rain (not freezing)	
22	Snow	
23	Rain and snow or ice pellets	
24	Freezing drizzle or freezing rain	
25	Shower(s) of rain	

\* The expression "at the station" refers to a land station or a ship.

\*\* Tornado cloud or waterspout.

(continued)

(Code table 0 20 003 – continued)

Code figure		
26	Shower(s) of snow, or of rain and snow	
27	Shower(s) of hail*, or of rain and hail*	
28	Fog or ice fog	
29	Thunderstorm (with or without precipitation)	
<hr/>		
30–39	Duststorm, sandstorm, drifting or blowing snow	
<hr/>		
30	Slight or moderate duststorm or sandstorm	<ul style="list-style-type: none"> <li>– has decreased during the preceding hour</li> <li>– no appreciable change during the preceding hour</li> <li>– has begun or has increased during the preceding hour</li> </ul>
31		
32		
33	Severe duststorm or sandstorm	<ul style="list-style-type: none"> <li>– has decreased during the preceding hour</li> <li>– no appreciable change during the preceding hour</li> <li>– has begun or has increased during the preceding hour</li> </ul>
34		
35		
36	Slight or moderate drifting snow	generally low (below eye level)
37	Heavy drifting snow	
38	Slight or moderate blowing snow	generally high (above eye level)
39	Heavy blowing snow	
<hr/>		
40–49	Fog or ice fog at the time of observation	
<hr/>		
40	Fog or ice fog at a distance at the time of observation, but not at the station during the preceding hour, the fog or ice fog extending to a level above that of the observer	
41	Fog or ice fog in patches	
42	Fog or ice fog, sky visible	has become thinner during the preceding hour
43	Fog or ice fog, sky invisible	
44	Fog or ice fog, sky visible	no appreciable change during the preceding hour
45	Fog or ice fog, sky invisible	
46	Fog or ice fog, sky visible	has begun or has become thicker during the preceding hour
47	Fog or ice fog, sky invisible	
48	Fog, depositing rime, sky visible	
49	Fog, depositing rime, sky invisible	
<hr/>		
50–99	<i>Precipitation at the station at the time of observation</i>	
<hr/>		
50–59	Drizzle	
<hr/>		
50	Drizzle, not freezing, intermittent	slight at time of observation
51	Drizzle, not freezing, continuous	
52	Drizzle, not freezing, intermittent	moderate at time of observation
53	Drizzle, not freezing, continuous	
54	Drizzle, not freezing, intermittent	heavy (dense) at time of observation
55	Drizzle, not freezing, continuous	
56	Drizzle, freezing, slight	

\* Hail, small hail, snow pellets.

(continued)

(Code table 0 20 003 – continued)

Code figure	
57	Drizzle, freezing, moderate or heavy (dense)
58	Drizzle and rain, slight
59	Drizzle and rain, moderate or heavy
<hr/>	
60–69	Rain
<hr/>	
60	Rain, not freezing, intermittent
61	Rain, not freezing, continuous
62	Rain, not freezing, intermittent
63	Rain, not freezing, continuous
64	Rain, not freezing, intermittent
65	Rain, not freezing, continuous
66	Rain, freezing, slight
67	Rain, freezing, moderate or heavy
68	Rain or drizzle and snow, slight
69	Rain or drizzle and snow, moderate or heavy
<hr/>	
70–79	Solid precipitation not in showers
<hr/>	
70	Intermittent fall of snowflakes
71	Continuous fall of snowflakes
72	Intermittent fall of snowflakes
73	Continuous fall of snowflakes
74	Intermittent fall of snowflakes
75	Continuous fall of snowflakes
76	Diamond dust (with or without fog)
77	Snow grains (with or without fog)
78	Isolated star-like snow crystals (with or without fog)
79	Ice pellets
<hr/>	
80–99	Showery precipitation, or precipitation with current or recent thunderstorm
<hr/>	
80	Rain shower(s), slight
81	Rain shower(s), moderate or heavy
82	Rain shower(s), violent
83	Shower(s) of rain and snow mixed, slight
84	Shower(s) of rain and snow mixed, moderate or heavy
85	Snow shower(s), slight
86	Snow shower(s), moderate or heavy
87	Shower(s) of snow pellets or small hail, with or without rain or rain and snow mixed
88	Shower(s) of snow pellets or small hail, with or without rain or rain and snow mixed
89	Shower(s) of hail, with or without rain or rain and snow mixed, not associated with thunder
90	Shower(s) of hail, with or without rain or rain and snow mixed, not associated with thunder
91	Slight rain at time of observation
92	Moderate or heavy rain at time of observation
93	Slight snow, or rain and snow mixed or hail* at time of observation
94	Moderate or heavy snow, or rain and snow mixed or hail* at time of observation

\* Hail, small hail, snow pellets.

(continued)

(Code table 0 20 003 – continued)

Code figure		
95	Thunderstorm, slight or moderate, without hail*, but with rain and/or snow at time of observation	Thunderstorm at time of observation
96	Thunderstorm, slight or moderate, with hail* at time of observation	
97	Thunderstorm, heavy, without hail*, but with rain and/or snow at time of observation	
98	Thunderstorm combined with duststorm or sandstorm at time of observation	
99	Thunderstorm, heavy, with hail* at time of observation	
Present weather reported from an automatic weather station		
100	No significant weather observed	
101	Clouds generally dissolving or becoming less developed during the past hour	
102	State of sky on the whole unchanged during the past hour	
103	Clouds generally forming or developing during the past hour	
104	Haze or smoke, or dust in suspension in the air, visibility equal to, or greater than, 1 km	
105	Haze or smoke, or dust in suspension in the air, visibility less than 1 km	
106–109	Reserved	
110	Mist	
111	Diamond dust	
112	Distant lightning	
113–117	Reserved	
118	Squalls	
119	Reserved	
Code figures 120–126 are used to report precipitation, fog (or ice fog) or thunderstorm at the station during the preceding hour but not at the time of observation		
120	Fog	
121	PRECIPITATION	
122	Drizzle (not freezing) or snow grains	
123	Rain (not freezing)	
124	Snow	
125	Freezing drizzle or freezing rain	
126	Thunderstorm (with or without precipitation)	
127	BLOWING OR DRIFTING SNOW OR SAND	
128	Blowing or drifting snow or sand, visibility equal to, or greater than, 1 km	
129	Blowing or drifting snow or sand, visibility less than 1 km	
130	FOG	
131	Fog or ice fog in patches	
132	Fog or ice fog, has become thinner during the past hour	
133	Fog or ice fog, no appreciable change during the past hour	
134	Fog or ice fog, has begun or become thicker during the past hour	
135	Fog, depositing rime	
136–139	Reserved	

\*Hail, small hail, snow pellets.

(continued)



*(Code table 0 20 003 – continued)*

Code figure	
140	PRECIPITATION
141	Precipitation, slight or moderate
142	Precipitation, heavy
143	Liquid precipitation, slight or moderate
144	Liquid precipitation, heavy
145	Solid precipitation, slight or moderate
146	Solid precipitation, heavy
147	Freezing precipitation, slight or moderate
148	Freezing precipitation, heavy
149	Reserved
150	DRIZZLE
151	Drizzle, not freezing, slight
152	Drizzle, not freezing, moderate
153	Drizzle, not freezing, heavy
154	Drizzle, freezing, slight
155	Drizzle, freezing, moderate
156	Drizzle, freezing, heavy
157	Drizzle and rain, slight
158	Drizzle and rain, moderate or heavy
159	Reserved
160	RAIN
161	Rain, not freezing, slight
162	Rain, not freezing, moderate
163	Rain, not freezing, heavy
164	Rain, freezing, slight
165	Rain, freezing, moderate
166	Rain, freezing, heavy
167	Rain (or drizzle) and snow, slight
168	Rain (or drizzle) and snow, moderate or heavy
169	Reserved
170	SNOW
171	Snow, slight
172	Snow, moderate
173	Snow, heavy
174	Ice pellets, slight
175	Ice pellets, moderate
176	Ice pellets, heavy
177	Snow grains
178	Ice crystals
179	Reserved
180	SHOWER(S) OR INTERMITTENT PRECIPITATION
181	Rain shower(s) or intermittent rain, slight
182	Rain shower(s) or intermittent rain, moderate
183	Rain shower(s) or intermittent rain, heavy

*(continued)*

*(Code table 0 20 003 – continued)*

## Code figure

184	Rain shower(s) or intermittent rain, violent
185	Snow shower(s) or intermittent snow, slight
186	Snow shower(s) or intermittent snow, moderate
187	Snow shower(s) or intermittent snow, heavy
188	Reserved
189	Hail
190	THUNDERSTORM
191	Thunderstorm, slight or moderate, with no precipitation
192	Thunderstorm, slight or moderate, with rain showers and/or snow showers
193	Thunderstorm, slight or moderate, with hail
194	Thunderstorm, heavy, with no precipitation
195	Thunderstorm, heavy, with rain showers and/or snow showers
196	Thunderstorm, heavy, with hail
197–198	Reserved
199	Tornado

---

Present weather (in addition to present weather report from either a manned or an automatic station)

---

## Deciles 200–209

200–203	Not used
204	Volcanic ash suspended in the air aloft
205	Not used
206	Thick dust haze, visibility less than 1 km
207	Blowing spray at the station
208	Drifting dust (sand)
209	Wall of dust or sand in distance (like haboob)

## Deciles 210–219

210	Snow haze
211	Whiteout
212	Not used
213	Lightning, cloud to surface
214–216	Not used
217	Dry thunderstorm
218	Not used
219	Tornado cloud (destructive) at or within sight of the station during preceding hour or at the time of observation

## Deciles 220–229

220	Deposition of volcanic ash
221	Deposition of dust or sand
222	Deposition of dew
223	Deposition of wet snow
224	Deposition of soft rime
225	Deposition of hard rime

*(continued)*

(Code table 0 20 003 – continued)

Code figure

226	Deposition of hoar frost
227	Deposition of glaze
228	Deposition of ice crust (ice slick)
229	Not used

Deciles 230–239

230	Duststorm or sandstorm with temperature below 0 °C
231–238	Not used
239	Blowing snow, impossible to determine whether snow is falling or not

Deciles 240–249

240	Not used
241	Fog on sea
242	Fog in valleys
243	Arctic or Antarctic sea smoke
244	Steam fog (sea, lake or river)
245	Steam log (land)
246	Fog over ice or snow cover
247	Dense fog, visibility 60–90 m
248	Dense fog, visibility 30–60 m
249	Dense fog, visibility less than 30 m

Deciles 250–259

250	Drizzle, rate of fall	$\left\{ \begin{array}{l} \text{less than } 0.10 \text{ mm h}^{-1} \\ 0.10\text{--}0.19 \text{ mm h}^{-1} \\ 0.20\text{--}0.39 \text{ mm h}^{-1} \\ 0.40\text{--}0.79 \text{ mm h}^{-1} \\ 0.80\text{--}1.59 \text{ mm h}^{-1} \\ 1.60\text{--}3.19 \text{ mm h}^{-1} \\ 3.20\text{--}6.39 \text{ mm h}^{-1} \\ 6.4 \text{ mm h}^{-1} \text{ or more} \end{array} \right.$
251		
252		
253		
254		
255		
256		
257		
258	Not used	
259	Drizzle and snow	

Deciles 260–269

260	Rain, rate of fall	$\left\{ \begin{array}{l} \text{less than } 1.0 \text{ mm h}^{-1} \\ 1.0\text{--}1.9 \text{ mm h}^{-1} \\ 2.0\text{--} 3.9 \text{ mm h}^{-1} \\ 4.0\text{--} 7.9 \text{ mm h}^{-1} \\ 8.0\text{--}15.9 \text{ mm h}^{-1} \\ 16.0\text{--}31.9 \text{ mm h}^{-1} \\ 32.0\text{--}63.9 \text{ mm h}^{-1} \\ 64.0 \text{ mm h}^{-1} \text{ or more} \end{array} \right.$
261		
262		
263		
264		
265		
266		
267		
268–269	Not used	

(continued)

(Code table 0 20 003 – continued)

Code figure

## Deciles 270–279

270	Snow, rate of fall	less than 1.0 cm h <sup>-1</sup>
271		1.0–1.9 cm h <sup>-1</sup>
272		2.0–3.9 cm h <sup>-1</sup>
273		4.0–7.9 cm h <sup>-1</sup>
274		8.0–15.9 cm h <sup>-1</sup>
275		16.0–31.9 cm h <sup>-1</sup>
276		32.0–63.9 cm h <sup>-1</sup>
277	64.0 cm h <sup>-1</sup> or more	
278	Snow or ice crystal precipitation from a clear sky	
279	Wet snow, freezing on contact	

## Deciles 280–299

280	Precipitation of rain
281	Precipitation of rain, freezing
282	Precipitation of rain and snow mixed
283	Precipitation of snow
284	Precipitation of snow pellets or small hail
285	Precipitation of snow pellets or small hail, with rain
286	Precipitation of snow pellets or small hail, with rain and snow mixed
287	Precipitation of snow pellets or small hail, with snow
288	Precipitation of hail
289	Precipitation of hail, with rain
290	Precipitation of hail, with rain and snow mixed
291	Precipitation of hail, with snow
292	Shower(s) or thunderstorm over sea
293	Shower(s) or thunderstorm over mountains
294–299	Not used
300–507	Reserved
508	No significant phenomenon to report, present and past weather omitted
509	No observation, data not available, present and past weather omitted
510	Present and past weather missing, but expected
511	Missing value

Notes:

- (1) The middle portion of this code table (code figures 100–199) includes terms on several levels to cover simple and increasingly complex automatic stations.
- (2) Generic terms for weather (e.g. fog, drizzle) are intended for use at automatic stations capable of determining types of weather but no other information. Generic terms are included in the code table using all capital letters.
- (3) Code figures for generic precipitation (code figures 140–148) are arranged in order of increasing complexity. For example, a very simple station that can sense only the presence or absence of precipitation would use code figure 140 (precipitation). At the next level, an automatic station capable of sensing amount but not type would use code figure 141 or 142. An automatic station capable of sensing gross type (liquid, solid, freezing) and amount would use code figures 143–148. An automatic station capable of reporting actual types of precipitation (e.g. drizzle rain), but not the amount, would use the appropriate whole decile number (e.g. 150 for generic drizzle, 160 for generic rain).

**0 20 004/0 20 005**

***Past weather (1) and (2)***

Code figure	
0	Cloud covering 1/2 or less of the sky throughout the appropriate period
1	Cloud covering more than 1/2 of the sky during part of the appropriate period and covering 1/2 or less during part of the period
2	Cloud covering more than 1/2 of the sky throughout the appropriate period
3	Sandstorm, duststorm or blowing snow
4	Fog or ice fog or thick haze
5	Drizzle
6	Rain
7	Snow, or rain and snow mixed
8	Shower(s)
9	Thunderstorm(s) with or without precipitation
10	No significant weather observed
11	VISIBILITY REDUCED (see Note)
12	Blowing phenomena, visibility reduced
13	FOG (see Note)
14	PRECIPITATION (see Note)
15	Drizzle
16	Rain
17	Snow or ice pellets
18	Showers or intermittent precipitation
19	Thunderstorm
20–30	Reserved
31	Missing value

Note: The weather descriptions in code figures 10 to 19 are progressively complex, to accommodate the different levels of weather discrimination capability of various automatic stations. Stations having only basic sensing capability may use the lower code figures and basic generic descriptions (shown in capital letters). Stations with progressively higher discrimination capability shall use the more detailed descriptions (higher codes).

**0 20 006**

***Flight rules***

Code figure	
0	Low instrument flight rules – Ceiling < 500 feet and/or visibility < 1 mile
1	Instrument flight rules – Ceiling < 1000 feet and/or visibility < 3 miles
2	Marginal visual flight rules – 1000 feet ≤ Ceiling < 3000 feet and/or 3 miles ≤ visibility < 5 miles
3	Visual flight rules – Ceiling ≥ 3000 feet and/or visibility ≥ 5 miles
4–6	Reserved
7	Missing value

**0 20 008*****Cloud distribution for aviation***

Code figure		
0	Sky clear	
1	Few	
2	Scattered	
3	Broken	
4	Overcast	
5	Reserved	
6	Scattered/broken	(Many forecasts use scattered/broken or broken/overcast
7	Broken/overcast	followed by cloud type(s))
8	Isolated	(Used on aviation charts to describe the cloud type Cb)
9	Isolated embedded	(Used on aviation charts to describe the cloud type Cb)
10	Occasional	(Used on aviation charts to describe the cloud type Cb)
11	Occasional embedded	(Used on aviation charts to describe the cloud type Cb)
12	Frequent	(Used on aviation charts to describe the cloud type Cb)
13	Dense	(Used on aviation charts to describe cloud that would cause sudden changes in visibility (less than 1 000 m))
14	Layers	
15	Obscured (OBSC)	
16	Embedded (EMBD)	
17	Frequent embedded	
18–30	Reserved	
31	Missing value	

**0 20 009*****General weather indicator (TAF/METAR)***

Code figure	
0	Reserved
1	NSC Nil Significant Cloud
2	CAVOK
3	SKC Sky Clear
4	NSW Nil Significant Weather
5–14	Reserved
15	Missing value

**0 20 011*****Cloud amount***

Code figure		
0	0	0
1	1 okta or less, but not zero	1/10 or less, but not zero
2	2 oktas	2/10 – 3/10
3	3 oktas	4/10
4	4 oktas	5/10

*(continued)*

(Code table 0 20 011 – continued)

Code figure		
5	5 oktas	6/10
6	6 oktas	7/10 – 8/10
7	7 oktas or more, but not 8 oktas	9/10 or more, but not 10/10
8	8 oktas	10/10
9	Sky obscured by fog and/or other meteorological phenomena	
10	Sky partially obscured by fog and/or other meteorological phenomena	
11	Scattered	
12	Broken	
13	Few	
14	Reserved	
15	Cloud cover is indiscernible for reasons other than fog or other meteorological phenomena, or observation is not made	

Notes:

- (1) For use of code figure 15, see Regulation 12.1.4.
- (2) "Clear" and "overcast" are coded by 0 and 8, respectively.

**0 20 012*****Cloud type***

Code figure	
0	Cirrus (Ci)
1	Cirrocumulus (Cc)
2	Cirrostratus (Cs)
3	Alto cumulus (Ac)
4	Altostratus (As)
5	Nimbostratus (Ns)
6	Stratocumulus (Sc)
7	Stratus (St)
8	Cumulus (Cu)
9	Cumulonimbus (Cb)
10	No C <sub>H</sub> clouds
11	Cirrus fibratus, sometimes uncinus, not progressively invading the sky
12	Cirrus spissatus, in patches or entangled sheaves, which usually do not increase and sometimes seem to be the remains of the upper part of a Cumulonimbus; or Cirrus castellanus or floccus
13	Cirrus spissatus cumulonimbogenitus
14	Cirrus uncinus or fibratus, or both, progressively invading the sky; they generally thicken as a whole
15	Cirrus (often in bands) and Cirrostratus, or Cirrostratus alone, progressively invading the sky; they generally thicken as a whole, but the continuous veil does not reach 45 degrees above the horizon
16	Cirrus (often in bands) and Cirrostratus, or Cirrostratus alone, progressively Invading the sky; they generally thicken as a whole; the continuous veil extends more than 45 degrees above the horizon, without the sky being totally covered
17	Cirrostratus covering the whole sky

(continued)

*(Code table 0 20 012 – continued)*

Code figure	
18	Cirrostratus not progressively invading the sky and not entirely covering it
19	Cirrocumulus alone, or Cirrocumulus predominant among the C <sub>H</sub> clouds
20	No C <sub>M</sub> clouds
21	Altostratus translucidus
22	Altostratus opacus or Nimbostratus
23	Alto cumulus translucidus at a single level
24	Patches (often lenticular) of Alto cumulus translucidus, continually changing and occurring at one or more levels
25	Alto cumulus translucidus in bands, or one or more layers of Alto cumulus translucidus or opacus, progressively invading the sky; these Alto cumulus clouds generally thicken as a whole
26	Alto cumulus cumulogenitus (or cumulonimbogenitus)
27	Alto cumulus translucidus or opacus in two or more layers, or Alto cumulus opacus in a single layer, not progressively invading the sky, or Alto cumulus with Altostratus or Nimbostratus
28	Alto cumulus castellanus or floccus
29	Alto cumulus of a chaotic sky, generally at several levels
30	No C <sub>L</sub> clouds
31	Cumulus humilis or Cumulus fractus other than of bad weather,* or both
32	Cumulus mediocris or congestus, Towering cumulus (TCU), with or without Cumulus of species fractus or humilis or Stratocumulus, all having their bases at the same level
33	Cumulonimbus calvus, with or without Cumulus, Stratocumulus or Stratus
34	Stratocumulus cumulogenitus
35	Stratocumulus other than Stratocumulus cumulogenitus
36	Stratus nebulosus or Stratus fractus other than of bad weather,* or both
37	Stratus fractus or Cumulus fractus of bad weather,* or both (pannus), usually below Altostratus or Nimbostratus
38	Cumulus and Stratocumulus other than Stratocumulus cumulogenitus, with bases at different levels
39	Cumulonimbus capillatus (often with an anvil), with or without Cumulonimbus calvus, Cumulus, Stratocumulus, Stratus or pannus
40	C <sub>H</sub>
41	C <sub>M</sub>
42	C <sub>L</sub>
43	Clear
44	Liquid water
45	Supercooled liquid water
46	Mixed phase
47	Optically thick ice
48	Optically thin ice
49	Multilayered ice
50–58	Reserved
59	Cloud not visible owing to darkness, fog, duststorm, sandstorm, or other analogous phenomena
60	C <sub>H</sub> clouds invisible owing to darkness, fog, blowing dust or sand, or other similar phenomena, or because of a continuous layer of lower clouds

*(continued)*



(Code table 0 20 012 – continued)

Code figure

61	C <sub>M</sub> clouds invisible owing to darkness, fog, blowing dust or sand, or other similar phenomena, or because of continuous layer of lower clouds
62	C <sub>L</sub> clouds invisible owing to darkness, fog, blowing dust or sand, or other similar phenomena
63	Missing value

\* “Bad weather” denotes the conditions which generally exist during precipitation and a short time before and after.

**0 20 017**

***Cloud top description***

Code figure

0	Isolated cloud fragments of clouds	
1	Continuous cloud	} flat tops
2	Broken cloud – small breaks	
3	Broken cloud – large breaks	
4	Continuous cloud	} undulating tops
5	Broken cloud – small breaks	
6	Broken cloud – large breaks	
7	Continuous or almost continuous waves with towering clouds above the top of the layer	
8	Groups of waves with towering clouds above the top of the layer	
9	Two or more layers at different levels	
10–14	Reserved	
15	Missing value	

**0 20 018**

***Tendency of runway visual range***

Code figure

0	Increasing (U)
1	Decreasing (D)
2	No distinct change (N)
3	Missing value

**0 20 021*****Type of precipitation***

Bit No.	
1	Precipitation – unknown type
2	Liquid precipitation not freezing
3	Liquid freezing precipitation
4	Drizzle
5	Rain
6	Solid precipitation
7	Snow
8	Snow grains
9	Snow pellets
10	Ice pellets
11	Ice crystals
12	Diamond dust
13	Small hail
14	Hail
15	Glaze
16	Rime
17	Soft rime
18	Hard rime
19	Clear ice
20	Wet snow
21	Hoar frost
22	Dew
23	White dew
24–29	Reserved
All 30	Missing value

Note: Mixed precipitation is indicated by setting to one the bits of all the observed single types of precipitation.

**0 20 022*****Character of precipitation***

Code figure	
0	No precipitation
1	Continuous
2	Intermittent
3	Shower
4	Not reaching ground
5	Deposition
6–14	Reserved
15	Missing value

**0 20 023*****Other weather phenomena***

Bit No.	
1	Dust/sand whirl
2	Squalls
3	Sandstorm
4	Duststorm
5	Lightning – cloud to surface
6	Lightning – cloud to cloud
7	Lightning – distant
8	Thunderstorm
9	Funnel cloud not touching surface
10	Funnel cloud touching surface
11	Spray
12	Waterspout
13	Wind shear
14	Dust devils
15–17	Reserved
All 18	Missing value

**0 20 024*****Intensity of phenomena***

Code figure	
0	No phenomena
1	Light
2	Moderate
3	Heavy
4	Violent
5	Severe
6	Very severe
7	Missing value

**0 20 025*****Obscuration***

Bit No.	
1	Fog
2	Ice fog
3	Steam fog
4–6	Reserved
7	Mist
8	Haze
9	Smoke
10	Volcanic ash
11	Dust
12	Sand
13	Snow
14	Cloud
15	Precipitation
16	Impossible to determine whether snow is falling or not
17–20	Reserved
All 21	Missing value

**0 20 026*****Character of obscuration***

Code figure	
0	No change
1	Shallow
2	Patches
3	Partial
4	Freezing
5	Low drifting
6	Blowing
7	Increasing
8	Decreasing
9	In suspension in the air
10	Wall
11	Dense
12	Whiteout
13	Drifting and blowing
14	Reserved
15	Missing value

**0 20 027*****Phenomena\* occurrence***

Bit No.	
1	At time of observation
2	In past hour
3	In time period for past weather $W_1W_2$
4	In time period specified
5	Reserved
6	Below station level
7	At the station (see Note 1)
8	In the vicinity (see Note 2)
All 9	Missing value

\* Phenomenon in this flag table means any phenomenon, including precipitation and obscuration.

## Notes:

- (1) In conjunction with the observation of waterspouts or funnel clouds, i.e., within 3 km of the station.
- (2) In conjunction with the observation of waterspouts or funnel clouds, i.e., more than 3 km from the station.

**0 20 028*****Expected change in intensity***

Code figure	
0	No change (NC)
1	Forecast to weaken (WKN)
2	Forecast to intensify (INTSF)
3–6	Reserved
7	Missing value

**0 20 029*****Rain flag***

Code figure	
0	No rain
1	Rain
2	Reserved
3	Missing value

**0 20 032*****Rate of ice accretion (estimated)***

Code figure	
0	Ice not building up
1	Ice building up slowly
2	Ice building up rapidly
3	Ice melting or breaking up slowly
4	Ice melting or breaking up rapidly
5–6	Reserved
7	Missing value

**0 20 033*****Cause of ice accretion***

Bit No.	
1	Icing from ocean spray
2	Icing from fog
3	Icing from rain
All 4	Missing value

**0 20 034**

***Sea ice concentration***

Code figure			
0	No sea ice in sight		
1	Ship in open lead more than 1.0 nautical mile wide, or ship in fast ice with boundary beyond limit of visibility		
2	Sea ice present in concentrations less than 3/10 (3/8), open water or very open pack ice	} Sea ice concentration is uniform in the observation area	} Ship in ice or within 0.5 nautical mile of ice edge
3	4/10 to 6/10 (3/8 to less than 6/8), open pack ice		
4	7/10 to 8/10 (6/8 to less than 7/8), close pack ice		
5	9/10 or more, but not 10/10 (7/8 to less than 8/8), very close pack ice	} Sea ice concentration is not uniform in the observation area	
6	Strips and patches of pack ice with open water between		
7	Strips and patches of close or very close pack ice with areas of lesser concentration between		
8	Fast ice with open water, very open or open pack ice to seaward of the ice boundary		
9	Fast ice with close or very close pack ice to seaward of the boundary		
10–13	Reserved		
14	Unable to report, because of darkness, lack of visibility, or because ship is more than 0.5 nautical mile away from ice edge		
15–30	Reserved		
31	Missing value		

**0 20 035**

***Amount and type of ice***

Code figure	
0	No ice of land origin
1	1–5 icebergs, no growlers or bergy bits
2	6–10 icebergs, no growlers or bergy bits
3	11–20 icebergs, no growlers or bergy bits
4	Up to and including 10 growlers and bergy bits – no icebergs
5	More than 10 growlers and bergy bits – no icebergs
6	1–5 icebergs, with growlers and bergy bits
7	6–10 icebergs, with growlers and bergy bits
8	11–20 icebergs, with growlers and bergy bits
9	More than 20 icebergs, with growlers and bergy bits – a major hazard to navigation
10–13	Reserved
14	Unable to report, because of darkness, lack of visibility or because only sea ice is visible
15	Missing value

**0 20 036*****Ice situation***

## Code figure

0	Ship in open water with floating ice in sight
1	Ship in easily penetrable ice; conditions improving
2	Ship in easily penetrable ice; conditions not changing
3	Ship in easily penetrable ice; conditions worsening
4	Ship in ice difficult to penetrate; conditions improving
5	Ship in ice difficult to penetrate; conditions not changing
6	Ship in ice difficult to penetrate and conditions worsening. Ice forming and floes freezing together
7	Ship in ice difficult to penetrate and conditions worsening. Ice under slight pressure
8	Ship in ice difficult to penetrate and conditions worsening. Ice under moderate or severe pressure
9	Ship in ice difficult to penetrate and conditions worsening. Ship beset
10–29	Reserved
30	Unable to report, because of darkness or lack of visibility
31	Missing value

**0 20 037*****Ice development***

## Code figure

0	New ice only (frazil ice, grease ice, slush, shuga)
1	Nilas or ice rind, less than 10 cm thick
2	Young ice (grey ice, grey-white ice), 10–30 cm thick
3	Predominantly new and/or young ice with some first-year ice
4	Predominantly thin first-year ice with some new and/or young ice
5	All thin first-year ice (30–70 cm thick)
6	Predominantly medium first-year ice (70–120 cm thick) and thick first-year ice (>120 cm thick) with some thinner (younger) first-year ice
7	All medium and thick first-year ice
8	Predominantly medium and thick first-year ice with some old ice (usually more than 2 metres thick)
9	Predominantly old ice
10–29	Reserved
30	Unable to report, because of darkness, lack of visibility or because only ice of land origin is visible or because ship is more than 0.5 nautical mile away from ice edge
31	Missing value



**0 20 040*****Evolution of drift snow***

Code figure	
0	Drift snow ended before the hour of observation
1	Intensity diminishing
2	No change
3	Intensity increasing
4	Continues, apart from interruption lasting less than 30 minutes
5	General drift snow has become drift snow near the ground
6	Drift snow near the ground has become general drift snow
7	Drift snow has started again after an interruption of more than 30 minutes
8–14	Reserved
15	Missing value

**0 20 041*****Airframe icing***

Code figure	
0	No icing
1	Light icing
2	Light icing in cloud
3	Light icing in precipitation
4	Moderate icing
5	Moderate icing in cloud
6	Moderate icing in precipitation
7	Severe icing
8	Severe icing in cloud
9	Severe icing in precipitation
10	Trace of icing
11	Trace of icing in cloud
12	Trace of icing in precipitation
13–14	Reserved
15	Missing value

**0 20 042*****Airframe icing present***

Code figure	
0	No icing
1	Icing present
2	Reserved
3	Missing value

**0 20 045*****Supercooled large droplet (SLD) conditions***

Code figure	
0	No SLD conditions present
1	SLD conditions present
2	Reserved
3	Missing value

**0 20 048*****Evolution of feature***

Code figure	
0	Stability
1	Diminution
2	Intensification
3	Unknown
4–14	Reserved
15	Missing value

**0 20 050*****Cloud index***

Code figure	
0	Reserved
1	1st low cloud
2	2nd low cloud
3	3rd low cloud
4	1st medium cloud
5	2nd medium cloud
6	3rd medium cloud
7	1st high cloud
8	2nd high cloud
9–254	Reserved
255	Missing value

**0 20 055*****State of sky in the tropics***

Code figure	
0	Cumulus, if any, are quite small; generally less than 2/8 coverage, except on windward slopes of elevated terrain; average width of cloud is at least as great as its vertical thickness
1	Cumulus of intermediate size with cloud cover less than 5/8; average cloud width is more than its vertical thickness; towers are vertical with little or no evidence of precipitation, except along slopes of elevated terrain; a general absence of middle and upper clouds
2	Swelling Cumulus with rapidly growing tall turrets which decrease in size with height and whose tops tend to separate from the longer cloud body and evaporate within minutes of the separation
3	Swelling Cumulus with towers having a pronounced tilt in a downwind direction; vertical cloud thickness is more than one and a half times that of its average width
4	Swelling Cumulus with towers having a pronounced tilt in an upwind direction; vertical cloud thickness is more than one and a half times that of its average width
5	Tall Cumulus congestus with vertical thickness more than twice the average width; not organized in clusters or lines; one or more layers of clouds extend out from the cloud towers, although no continuous cloud layers exist (see Note)
6	Isolated Cumulonimbus or large clusters of Cumulus turrets separated by wide areas in which clouds are absent; cloud bases are generally dark with showers observed in most cells; some scattered middle and upper clouds may be present; individual Cumulus cells are one to two times higher than they are wide
7	Numerous Cumulus extending through the middle troposphere with broken to overcast sheets of middle clouds and/or Cirrostratus; Cumulus towers do not decrease generally in size with height; ragged dark cloud bases with some showers present
8	Continuous dense middle clouds and/or Cirrostratus cloud sheets with some large isolated Cumulonimbus or Cumulus congestus clouds penetrating these sheets; light rain occasionally observed from the Altostratus; Cumulonimbus bases ragged and dark with showers visible (see Note)
9	Continuous sheets of middle clouds and/or Cirrostratus with Cumulonimbus and Cumulus congestus in organized lines or cloud bands; rain is generally observed from Altostratus sheets and heavy showers from Cumulonimbus; wind has a squally character
10	State of sky unknown or not described by any of the above
11–14	Reserved
15	Missing value

Note: In the event of obscuration of clouds due to heavy rain, the observer should use code 5 or 8. Code 5 should be used if the rain is localized or is brief in duration; Code 8 should be used if the rain is widespread or lasts for longer periods of time.

**0 20 056*****Cloud phase***

Code figure	
0	Unknown
1	Water
2	Ice
3	Mixed
4	Clear
5	Supercooled liquid water
6	Reserved
7	Missing value

**0 20 062**

***State of the ground (with or without snow)***

Code figure		
0	Surface of ground dry (without cracks and no appreciable amount of dust or loose sand)	} without snow or measurable ice cover
1	Surface of ground moist	
2	Surface of ground wet (standing water in small or large pools on surface)	
3	Flooded	
4	Surface of ground frozen	
5	Glaze on ground	
6	Loose dry dust or sand not covering ground completely	
7	Thin cover of loose dry dust or sand covering ground completely	
8	Moderate or thick cover of loose dry dust or sand covering ground completely	
9	Extremely dry with cracks	} with snow or measurable ice cover
10	Ground predominantly covered by ice	
11	Compact or wet snow (with or without ice) covering less than one half of the ground	
12	Compact or wet snow (with or without ice) covering at least one half of the ground but ground not completely covered	
13	Even layer of compact or wet snow covering ground completely	
14	Uneven layer of compact or wet snow covering ground completely	
15	Loose dry snow covering less than one half of the ground	
16	Loose dry snow covering at least one half of the ground but ground not completely covered	
17	Even layer of loose dry snow covering ground completely	
18	Uneven layer of loose dry snow covering ground completely	
19	Snow covering ground completely; deep drifts	
20–30	Reserved	
31	Missing value	

Notes:

- (1) The definitions in code numbers 0 to 2 and 4 apply to representative bare ground and numbers 3, 5 to 9 and 10 to 19 to an open representative area.
- (2) In all instances the highest code figures applicable are to be reported.
- (3) In the above code table, whenever reference is made to ice, it also includes solid precipitation other than snow.

**0 20 063*****Special phenomena***

Code figure	
0	Reserved
1	Highest wind speed gusts greater than 11.5 m/s
2	Highest mean wind speed greater than 17.5 m/s
3–6	Reserved
7	Visibility greater than 100 000 m
8–9	Reserved
	<i>10–19 Mirage</i>
10	Mirage – No specification
11	Mirage – Image of distant object raised (looming)
12	Mirage – Image of distant object raised clear above the horizon
13	Mirage – Inverted image of distant object
14	Mirage – Complex, multiple images of distant object (images not inverted)
15	Mirage – Complex, multiple images of distant object (some images being inverted)
16	Mirage – Sun or moon seen appreciably distorted
17	Mirage – Sun visible, although astronomically below the horizon
18	Mirage – Moon visible, although astronomically below the horizon
19	Reserved
	<i>20–22 Day darkness, worst in direction specified</i>
20	Day darkness, bad, worst in direction specified
21	Day darkness, very bad, worst in direction specified
22	Day darkness, black, worst in direction specified
23–30	Reserved
	<i>31–39 Coloration and/or convergence of clouds associated with a tropical disturbance</i>
31	Slight coloration of clouds at sunrise associated with a tropical disturbance
32	Deep-red coloration of clouds at sunrise associated with a tropical disturbance
33	Slight coloration of clouds at sunset associated with a tropical disturbance
34	Deep-red coloration of clouds at sunset associated with a tropical disturbance
35	Convergence of C <sub>H</sub> clouds at a point below 45° forming or increasing and associated with a tropical disturbance
36	Convergence of C <sub>H</sub> clouds at a point above 45° associated with a tropical disturbance
37	Convergence of C <sub>H</sub> clouds at a point below 45° dissolving or diminishing and associated with a tropical disturbance
38	Convergence of C <sub>H</sub> clouds at a point above 45° associated with a tropical disturbance
39	Reserved
	<i>40–43 Hoar frost or coloured precipitation</i>
40	Hoar frost on horizontal surfaces
41	Hoar frost on horizontal and vertical surfaces
42	Precipitation containing sand or desert dust
43	Precipitation containing volcanic ash
44–49	Reserved

*(continued)*

(Code table 0 20 063 – continued)

Code figure

	<i>50–59 Nature and/or type of squall</i>
50	Calm or light wind followed by a squall
51	Calm or light wind followed by a succession of squalls
52	Gusty weather followed by a squall
53	Gusty weather followed by a succession of squalls
54	Squall followed by gusty weather
55	General gusty weather with squall at intervals
56	Squall approaching station
57	Line squall
58	Squall with drifting or blowing dust or sand
59	Line squall with drifting or blowing dust or sand
	<i>60–69 Variation of temperature during the period specified, associated with glaze or rime</i>
60	Temperature steady
61	Temperature falling, without going below 0 °C
62	Temperature rising, without going above 0 °C
63	Temperature falling to a value below 0 °C
64	Temperature rising to a value above 0 °C
65	Irregular variation, oscillations of temperature passing through 0 °C
66	Irregular variation, oscillations of temperature not passing through 0 °C
67	Variation of temperature not observed
68	Not allocated
69	Variation of temperature unknown owing to lack of thermograph
	<i>70–79 Variation of visibility during the period specified</i>
70	Visibility has not varied (sun* visible) towards direction specified
71	Visibility has not varied (sun* invisible) towards direction specified
72	Visibility has increased (sun* visible) towards direction specified
73	Visibility has increased (sun* invisible) towards direction specified
74	Visibility has decreased (sun* visible) towards direction specified
75	Visibility has decreased (sun* invisible) towards direction specified
76	Fog coming from direction specified
77	Fog has lifted, without dissipating
78	Fog has dispersed without regard to direction
79	Moving patches or banks of fog
	<i>80–89 Optical phenomena</i>
80	Brocken spectre
81	Rainbow
82	Solar or lunar halo
83	Parhelia or anthelia
84	Sun pillar
85	Corona
86	Twilight glow
87	Twilight glow on the mountains (Alpenglügen)
88	Mirage
89	Zodiacal light
90	St Elmo's fire
91–1022	Reserved
1023	Missing value

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\* Or sky (if sun is low), or moon or stars at night.

**0 20 071*****Accuracy of fix and rate of atmospherics***

Code figure	Accuracy of fix (estimated error)	Repetition rate
0	No assessment	No assessment
1	Less than 50 km	Less than 1 per second
2	Between 50 and 200 km	Less than 1 per second
3	More than 200 km	Less than 1 per second
4	Less than 50 km	1 or more per second
5	Between 50 and 200 km	1 or more per second
6	More than 200 km	1 or more per second
7	Less than 50 km	Rate so rapid number cannot be counted
8	Between 50 and 200 km	Rate so rapid number cannot be counted
9	More than 200 km	Rate so rapid number cannot be counted
10–14	Reserved	
15	Missing value	

**0 20 085*****General condition of runway***

Code figure	
0	Cleared (CLRD//)
1	All runways closed (SNOCLO)
2–14	Reserved
15	Missing value

**0 20 086*****Runway deposits***

Code figure	
0	Clear and dry
1	Damp
2	Wet with water patches
3	Rime and frost covered (depth normally less than 1 mm)
4	Dry snow
5	Wet snow
6	Slush
7	Ice
8	Compacted or rolled snow
9	Frozen ruts or ridges
10–14	Reserved
15	Missing or not reported (e.g. due to runway clearance in progress)

**0 20 087*****Runway contamination***

Code figure	
0	Reserved
1	Less than 10% of runway covered
2	11% to 25% of runway covered
3–4	Reserved
5	26% to 50% of runway covered
6–8	Reserved
9	51% to 100% of runway covered
10–14	Reserved
15	Missing or not reported (e.g. due to runway clearance in progress)

**0 20 089*****Runway friction coefficient***

Code figure	
0	0.00
1	0.01
2–88	0.02...0.88
89	0.89
90	0.90
91	Braking action poor
92	Braking action medium to poor
93	Braking action medium
94	Braking action medium to good
95	Braking action good
96–98	Reserved
99	Unreliable
100–126	Reserved
127	Missing, not reported and/or runway not operational

**0 20 090*****Special clouds***

Code figure	
0	Reserved
1	Nacreous clouds
2	Noctilucent clouds
3	Clouds from waterfalls
4	Clouds from fires
5	Clouds from volcanic eruptions
6–14	Reserved
15	Missing value



**0 20 101*****Locust (acridian) name***

Code figure	
0	Reserved
1	Schistocerca gregaria
2	Locusta migratoria
3	Nomadacris septemfasciata
4	Oedaleus senegalensis
5	Anracridium spp
6	Other locusts
7	Other grasshoppers
8	Other crickets
9	Spodoptera exempta
10–14	Reserved
15	Missing value

**0 20 102*****Locust (maturity) colour***

Code figure	
0	Green
1	Green or black
2	Black
3	Yellow and black
4	Straw/grey
5	Pink
6	Dark red/brown
7	Mixed red and yellow
8	Yellow
9	Other
10–14	Reserved
15	Missing value

**0 20 103*****Stage of development of locusts***

Code figure	
0	Hoppers (nymphs, larvae), stage 1
1	Hoppers (nymphs, larvae), stage 2 or mixed 1, 2 instars (stages)
2	Hoppers (nymphs, larvae), stage 3 or mixed 2, 3 instars
3	Hoppers (nymphs, larvae), stage 4 or mixed 3, 4 instars
4	Hoppers (nymphs, larvae), stage 5 or mixed 4, 5 instars
5	Hoppers (nymphs, larvae), stage mixed, all or many instars
6	Fledglings (wings too soft for sustained flight)
7	Immature adults
8	Mixed maturity adults
9	Mature adults
10–14	Reserved
15	Missing value

**0 20 104*****Organization state of swarm or band of locusts***

Code figure

0	Hoppers only, mainly in bands or clusters
1	Winged adults in the vicinity more than 10 kilometres from point of observation
2	Locusts in flight, a few seen at the station
3	Locusts at the station, most of them on the ground
4	Locusts, some on ground and others in flight at a height less than 10 metres
5	Locusts, some on ground and others in flight at a height greater than 10 metres
6	Locusts, most in flight at a height less than 10 metres
7	Locusts, most in flight at a height greater than 10 metres
8	Locusts, all over inflicting severe damage to vegetation, no extermination operation
9	Locusts, all over inflicting severe damage to vegetation, extermination operation in progress
10–14	Reserved
15	Missing value

**0 20 105*****Size of swarm or band of locusts and duration of passage of swarm***

Code figure

When 0 20 104 (Organization state of swarm or band of locusts) = 0

0	Reserved
1	Area covered by isolated bands < 10 m <sup>2</sup>
2	Area covered by isolated bands 10 – 100 m <sup>2</sup>
3	Area covered by isolated bands 100 – 1000 m <sup>2</sup>
4	Area covered by isolated bands 1 000 – 10000 m <sup>2</sup>
5	Area covered by isolated bands 1 – 10 ha
6	Area covered by isolated bands > 10 ha
7	Area covered by dispersed bands < 100 km <sup>2</sup>
8	Area covered by dispersed bands 100 – 1000 km <sup>2</sup>
9	Area covered by dispersed bands > 1000 km <sup>2</sup>
10–14	Reserved
15	Missing value

When 0 20 104 (Organization state of swarm or band of locusts) = 1 to 9

0	Small swarm less than 1 km <sup>2</sup> or adults in ground, tens or hundreds of individuals visible simultaneously, duration of passage less than 1 hour ago
1	Small swarm less than 1 km <sup>2</sup> or adults in ground, tens or hundreds of individuals visible simultaneously, duration of passage 1 to 6 hours ago
2	Small swarm less than 1 km <sup>2</sup> or adults in ground, tens or hundreds of individuals visible simultaneously, duration of passage over 6 hours ago
3	Medium swarm or scattered adults, several visible simultaneously, duration of passage less than 1 hour ago
4	Medium swarm or scattered adults, several visible simultaneously, duration of passage 1 to 6 hours ago

*(continued)*

*(Code table 0 20 105 – continued)*

Code figure	
5	Medium swarm or scattered adults, several visible simultaneously, duration of passage over 6 hours ago
6	Large swarm or isolated adults, seen singly, duration of passage less than 1 hour ago
7	Large swarm or isolated adults, seen singly, duration of passage 1 to 6 hours ago
8	Large swarm or isolated adults, seen singly, duration of passage over 6 hours ago
9	More than one swarm of locusts
10	Size of swarm and/or duration of passage not determined owing to darkness or similar phenomena
11–14	Reserved
15	Missing value

**0 20 106*****Locust population density***

Code figure	
0	Reserved
1	Thin density swarm (swarm visible only when near enough for individual locusts to be discerned)
2	Medium density swarm
3	Dense swarm (obscuring nearby features, e.g. trees)
4	Isolated hoppers seen singly
5	Scattered hoppers, several visible simultaneously
6–14	Reserved
15	Missing value

**0 20 107*****Direction of movements of locust swarm***

Code figure	
0	Reserved
1	Generally in the direction NE
2	Generally in the direction E
3	Generally in the direction SE
4	Generally in the direction S
5	Generally in the direction SW
6	Generally in the direction W
7	Generally in the direction NW
8	Generally in the direction N
9	Specific direction indeterminable
10–14	Reserved
15	Missing value

**0 20 108**

***Extent of vegetation***

Code figure	
0	Bare ground
1	Dry, presence of few and isolated shrubs
2	Sparse vegetation (sprouting)
3	Dense vegetation (sprouting)
4	Sparse vegetation (growing)
5	Dense vegetation (growing)
6	Sparse vegetation in flower
7	Dense vegetation in flower
8–14	Reserved
15	Missing value

**0 20 119**

***Lightning discharge polarity***

Code figure	
0	Not defined
1	Positive
2	Negative
3	Missing value

**0 20 124**

***Lightning stroke or flash***

Code figure	
0	Not defined
1	Lightning stroke
2	Lightning flash, by manual observation, or if equipment insensitive to stroke resolution
3	Missing value

**0 20 136**

***Supplementary cloud type***

Code figure		
	<i>0–7 Nature of clouds of vertical development (C<sub>a</sub> – Code table 0531)</i>	
0	Isolated cumulus humilis and/or cumulus mediocris	} of vertical development
1	Numerous cumulus humilis and/or cumulus mediocris	
2	Isolated cumulus congestus	
3	Numerous cumulus congestus	
4	Isolated cumulonimbus	
5	Numerous cumulonimbus	
6	Isolated cumulus and cumulonimbus	
7	Numerous cumulus and cumulonimbus	

(continued)

(Code table 0 20 136 – continued)

Code figure		
8–9	Reserved	
	<i>10–19 Orographic clouds (<math>C_0</math> – Code table 0561)</i>	
10	Reserved	
11	Isolated orographic clouds, pileus, incus, forming	
12	Isolated orographic clouds, pileus, incus, not changing	
13	Isolated orographic clouds, pileus, incus, dissolving	
14	Irregular banks of orographic cloud, föhn bank, etc., forming	
15	Irregular banks of orographic cloud, föhn bank, etc., not changing	
16	Irregular banks of orographic cloud, föhn bank, etc., dissolving	
17	Compact layer of orographic cloud, föhn bank, etc., forming	
18	Compact layer of orographic cloud, föhn bank, etc., not changing	
19	Compact layer of orographic cloud, föhn bank, etc., dissolving	
	<i>20–29 Cloud conditions over mountains and passes (<math>N_m</math> – Code table 2745)</i>	
20	All mountains open, only small amounts of cloud present	
21	Mountains partly covered with detached clouds (not more than half the peaks can be seen)	
22	All mountain slopes covered, peaks and passes free	
23	Mountains open on observer's side (only small amounts of cloud present), but a continuous wall of cloud on the other side	
24	Clouds low above the mountains, but all slopes and mountains open (only small amounts of cloud on the slopes)	
25	Clouds low above the mountains, peaks partly covered by precipitation trails or clouds	
26	All peaks covered but passes open, slopes either open or covered	
27	Mountains generally covered but some peaks free, slopes wholly or partially covered	
28	All peaks, passes and slopes covered	
29	Mountains cannot be seen owing to darkness, fog, snowstorm, precipitation, etc.	
30–34	Reserved	
	<i>35–39 Condensation trails (<math>N_t</math> – Code table 2752)</i>	
35	Non-persistent condensation trails	
36	Persistent condensation trails covering less than 1/8 of the sky	
37	Persistent condensation trails covering 1/8 of the sky	
38	Persistent condensation trails covering 2/8 of the sky	
39	Persistent condensation trails covering 3/8 or more of the sky	
	<i>40–49 Cloud conditions observed from a higher level (<math>N_v</math> – Code table 2754)</i>	
40	No cloud or mist	} observed from a higher level
41	Mist, clear above	
42	Fog patches	
43	Layer of slight fog	
44	Layer of thick fog	
45	Some isolated clouds	
46	Isolated clouds and fog below	
47	Many isolated clouds	
48	Sea of clouds	
49	Bad visibility obscuring the downward view	
50–510	Reserved	
511	Missing value	

**0 20 137*****Evolution of clouds***

## Code figure

0	No change
1	Cumulification
2	Slow elevation
3	Rapid elevation
4	Elevation and stratification
5	Slow lowering
6	Rapid lowering
7	Stratification
8	Stratification and lowering
9	Rapid change
10–14	Reserved
15	Missing value

**0 20 138*****Road surface condition***

## Code figure

0	Dry
1	Moist
2	Wet
3	Rime
4	Snow
5	Ice
6	Glaze
7	Not dry
8–14	Reserved
15	Missing value

**0 21 066*****Wave scatterometer product confidence data***

Bit No.	
1	Processing equipment not working
2	Equipment failed
3	PRF code changed during image generation
4	Sampling window changed during image generation
5	Gain changed during image generation
6	Chirp replica exceeds specified value
7	Input data mean and standard deviation of in-phase and quadrature out of range
8	Doppler centroid confidence > MMCC value
9	Doppler centroid absolute value > PRF/2
10	Doppler ambiguity confidence < MMCC value
11	Output data mean and standard deviation $\leq$ MMCC value
All 12	Missing value

## Notes:

- (1) MMCC is Mission Management Control Centre.
- (2) PRF is Pulse Repetition Frequency.

**0 21 067*****Wind product confidence data***

Bit No.	
1	No forebeam calculation
2	No midbeam calculation
3	No aftbeam calculation
4	Forebeam arcing detected
5	Midbeam arcing detected
6	Aftbeam arcing detected
7	Any beam noise content above or equal to threshold
8	Land (any land in cell footprint)
9	Autonomous ambiguity removal not used
10	Meteorological background not used
11	Minimum residual exceeded threshold
12	Frame checksum error detected
All 13	Missing value

**0 21 068*****Radar altimeter product confidence data***

Bit No.	
1	Standard deviation of wind speed outside MMCC limit
2	Standard deviation of significant wave height outside MMCC limit
3	Standard deviation of altitude outside MMCC limit
4	Mean peakiness outside MMCC limit
5	Frame checksum error detected
6	Height-time loop time constant correction not performed
7	Not enough measurements (N < 10)
All 8	Missing value

Note: MMCC is Mission Management Control Centre.

**0 21 069*****SST product confidence data***

Bit No.	
1	12.0 $\mu\text{m}$ channel present in source data
2	11.0 $\mu\text{m}$ channel present in source data
3	3.7 $\mu\text{m}$ channel present in source data
4	1.6 $\mu\text{m}$ channel present in source data
5	Cloud identification used 1.6 $\mu\text{m}$ histogram reflectance cloud test
6	1.6 $\mu\text{m}$ histogram reflectance cloud test used dynamic threshold
7	Sun glint detected by 1.6 $\mu\text{m}$ reflectance cloud test
8	3.7 $\mu\text{m}$ channel used in sea-surface temperature retrieval
9	Sea-surface temperature derivation used daytime data (night-time if zero)
All 10	Missing value

**0 21 070*****SST product confidence data (SADIST-2)***

Bit No.	
	<i>1–9 Nadir-only view SST retrieval used 3.7 micron channel (one bit per 10-arcmin cell)</i>
1	Cell 1: nadir-only view SST used 3.7 micron channel
2	Cell 2: nadir-only view SST used 3.7 micron channel
3	Cell 3: nadir-only view SST used 3.7 micron channel
4	Cell 4: nadir-only view SST used 3.7 micron channel
5	Cell 5: nadir-only view SST used 3.7 micron channel
6	Cell 6: nadir-only view SST used 3.7 micron channel
7	Cell 7: nadir-only view SST used 3.7 micron channel
8	Cell 8: nadir-only view SST used 3.7 micron channel
9	Cell 9: nadir-only view SST used 3.7 micron channel

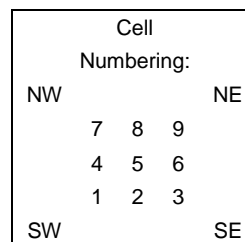
Cell Numbering:		
NW		NE
	7 8 9	
	4 5 6	
	1 2 3	
SW		SE

(continued)



(Flag table 0 21 070 – continued)

Bit No.		
		<i>10–18 Dual view SST retrieval used 3.7 micron channel (one bit per 10-arcmin cell)</i>
10	Cell 1: dual view SST used 3.7 micron channel	
11	Cell 2: dual view SST used 3.7 micron channel	
12	Cell 3: dual view SST used 3.7 micron channel	
13	Cell 4: dual view SST used 3.7 micron channel	
14	Cell 5: dual view SST used 3.7 micron channel	
15	Cell 6: dual view SST used 3.7 micron channel	
16	Cell 7: dual view SST used 3.7 micron channel	
17	Cell 8: dual view SST used 3.7 micron channel	
18	Cell 9: dual view SST used 3.7 micron channel	
19	Nadir view contains day-time data (night if zero)	
20	Forward view contains day-time data (night if zero)	
21	Record contains contributions from instrument scans acquired when ERS platform not in yaw-steering mode	
22	Record contains contributions from instrument scans for which product confidence data show quality is poor or unknown	
All 23	Missing value	



**0 21 072**

***Satellite altimeter calibration status***

Bit No.	
1	Height error correction applied instead of open loop calibration
2	Microwave sounder used for troposphere correction
3	AGC output correction applied instead of open loop calibration
All 4	Missing value

**0 21 073**

***Satellite altimeter instrument mode***

Bit No.	
1	Blank data record
2	Test
3	Calibration (closed loop)
4	BITE
5	Acquisition on ice
6	Acquisition on ocean
7	Tracking on ice
8	Tracking on ocean
All 9	Missing value

**0 21 076*****Representation of intensities***

Code figure	
0	Linear
1	Logarithmic (base e)
2	Logarithmic (base 10)
3–6	Reserved
7	Missing value

**0 21 109*****SEAWINDS wind vector cell quality***

Bit No.	
1	Not enough good sigma-0 available for wind retrieval
2	Poor azimuth diversity among sigma-0 for wind retrieval
3–7	Reserved
8	Some portion of wind vector cell is over land
9	Some portion of wind vector cell is over ice
10	Wind retrieval not performed for wind vector cell
11	Reported wind speed is greater than 30 m s <sup>-1</sup>
12	Reported wind speed is less than or equal to 3 m s <sup>-1</sup>
13–16	Reserved
All 17	Missing value

**0 21 115*****SEAWINDS sigma-0 quality***

Bit No.	
1	Sigma-0 measurement is not usable
2	Signal to noise ratio is low
3	Sigma-0 is negative
4	Sigma-0 is outside of acceptable range
5	Scatterometer pulse quality is not acceptable
6	Sigma-0 cell location algorithm does not converge
7	Frequency shift lies beyond the range of the x factor table
8	Spacecraft temperature is beyond calibration coefficient range
9	No applicable altitude records were found for this sigma-0
10	Interpolated ephemeris data are not acceptable for this sigma-0
11–16	Reserved
All 17	Missing value

**0 21 116*****SEAWINDS sigma-0 mode***

Bit No.	
1	Calibration/measurement pulse flag (1)
2	Calibration/measurement pulse flag (2)
3	Outer antenna beam
4	Sigma-0 cell is aft of spacecraft
5	Current mode (1)
6	Current mode (2)
7	Effective gate width – slice resolution (1)
8	Effective gate width – slice resolution (2)
9	Effective gate width – slice resolution (3)
10	Low resolution mode – whole pulse data
11	Scatterometer electronic subsystem B
12	Alternate spin rate – 19.8 rpm
13	Receiver protection on
14	Slices per composite flag (1)
15	Slices per composite flag (2)
16	Slices per composite flag (3)
All 17	Missing value

**0 21 119*****Wind scatterometer geophysical model function***

Code figure	
0	Reserved
1	SASS
2	SASS2
3	NSCAT0
4	NSCAT1
5	NSCAT2
6	QSCAT0
7	QSCAT1
8–30	Reserved
31	CMOD1
32	CMOD2
33	CMOD3
34	CMOD4
35	CMOD5
36–62	Reserved
63	Missing value

**0 21 144*****Altimeter rain flag***

Bit No.	
1	Rain
All 2	Missing value

**0 21 148*****Trailing edge variation flag***

Bit No.	
1	Non short scale variation
2	Short scale variation
3–8	Reserved
All 9	Missing value

**0 21 150*****Beam co-location***

Code figure	
0	Data from single ground station (no co-location)
1	Data from multiple ground station (co-located data)
2	Reserved
3	Missing value

**0 21 155*****Wind vector cell quality***

Bit No.	
1	Not enough good sigma-0 available for wind retrieval
2	Poor azimuth diversity among sigma-0 for wind retrieval
3	Any beam noise content above threshold
4	Product monitoring not used
5	Product monitoring flag
6	KNMI quality control fails
7	Variational quality control fails
8	Some portion of wind vector cell is over land
9	Some portion of wind vector cell is over ice
10	Wind retrieval not performed for wind vector cell
11	Reported wind speed is greater than 30 m/s
12	Reported wind speed is less than or equal to 3 m/s
13	Rain flag for the wind vector cell is not usable
14	Rain flag algorithm detects rain
15	No meteorological background used
16	Data are redundant
17–23	Reserved
All 24	Missing value

**0 21 158**

***ASCAT Kp estimate quality***

Code figure

0	Acceptable
1	Not acceptable
2	Reserved
3	Missing value

**0 21 159**

***ASCAT sigma-0 usability***

Code figure

0	Good
1	Usable
2	Bad
3	Missing value

**0 21 169**

***Ice presence indicator***

Code figure

0	No ice present
1	Ice present
2	Reserved
3	Missing value



**0 22 056*****Direction of profile***

## Code figure

0	Upwards profile
1	Downwards profile
2	Horizontal
3	Missing value

**0 22 060*****Lagrangian drifter drogue status***

## Code figure

0	Drogue is detached
1	Drogue is attached
2	Drogue status unknown
3–6	Reserved
7	Missing value

**0 22 061*****State of the sea***

## Code figure

## Height in metres

0	Calm (glassy)	0
1	Calm (rippled)	0 – 0.1
2	Smooth (wavelets)	0.1 – 0.5
3	Slight	0.5 – 1.25
4	Moderate	1.25 – 2.5
5	Rough	2.5 – 4
6	Very rough	4 – 6
7	High	6 – 9
8	Very high	9 – 14
9	Phenomenal	Over 14
10–14	Reserved	
15	Missing value	

## Notes:

- (1) These values refer to well-developed wind waves of the open sea. While priority shall be given to the descriptive terms, these height values may be used for guidance by the observer when reporting the total state of agitation of the sea resulting from various factors such as wind, swell, currents, angle between swell and wind, etc.
- (2) The exact bounding height shall be assigned for the lower code figure; e.g., a height of 4 m is coded as 5.

**0 22 067**

***Instrument type for water temperature/salinity profile measurement***

*(See common Code table C-3)*

**0 22 068**

***Water temperature profile recorder types***

*(See common Code table C-4)*

**0 22 120**

***Tide station automated water level check***

Code figure

0	Good data
1	Maximum (high) water level limit exceeded
2	Minimum (low) water level limit exceeded
3	Rate of change limit for water level exceeded
4	Flat limit for water level exceeded
5	Observed minus predicted water level value limit exceeded
6	Observed value from primary water level sensor minus backup water level sensor
7	Value exceeded specified tolerance from expected value
8	Water level QA parameter (sigmas and/or outliers) limits exceeded
9	Sea temperature outside of expected range
10	Multiple QC checks (above) failed
11	No automated water level checks performed
12-30	Reserved
31	Missing value



**0 22 121*****Tide station manual water level check***

## Code figure

0	Operational
1	Possible clogging problem or otherwise degraded water level data
2	Possible datum shift
3	Unknown status of water level sensor
4	Suspected or known sea temperature sensor problem
5	Multiple possible problems (above)
6	Bad data – DO NOT DISSEMINATE!
7	No manual water level checks performed
8–30	Reserved
31	Missing value

**0 22 122*****Tide station automated meteorological data check***

## Code figure

0	Good data from all sensors
1	Wind direction outside of allowable range
2	Wind speed outside of expected range
3	Barometric pressure outside of expected range
4	Air temperature outside of expected range
5	Multiple sensors failed QC checks
6	No automated meteorological data checks performed
7–30	Reserved
31	Missing value

**0 22 123*****Tide station manual meteorological data check***

## Code figure

0	Operational
1	Suspected or known problem with wind sensor
2	Suspected or known problem with barometric pressure sensor
3	Suspected or known problem with air temperature sensor
4	Unknown status of all sensors
5	Suspected or known problems with multiple sensors
6	Bad data – DO NOT DISSEMINATE!
7	No manual meteorological data checks performed
8–30	Reserved
31	Missing value

**0 22 178*****XBT/XCTD launcher type***

Code figure

0	Unknown
1	LM-2A Deck-mounted
2	LM-3A Hand-Held
3	LM-4A Thru-Hull
4–9	Reserved
10	AL-12 TSK Autolauncher (up to 12 probes)
11–19	Reserved
20	SIO XBT Autolauncher (up to 6 probes)
21–29	Reserved
30	AOML XBT V6 Autolauncher (up to 6 Deep Blue probes)
31	AOML XBT V8.0 Autolauncher (up to 8 Deep Blue probes)
32	AOML XBT V8.1 Autolauncher (up to 8 Deep Blue and Fast Deep probes)
33–89	Reserved
90	CSIRO Devil Autolauncher
91–99	Reserved
100	MFSTEP Autolauncher (Mediterranean)
101–254	Reserved
255	Missing value

**0 23 001*****Accident early notification – article applicable***

## Code figure

0	Reserved
1	Articles 1 and 2
2	Article 3
3	Article 5.2
4–6	Reserved
7	Missing value

**0 23 002*****Activity or facility involved in incident***

## Code figure

0	Reserved
1	Nuclear reactor on ground
2	Nuclear reactor at sea
3	Nuclear reactor in space
4	Nuclear fuel facility
5	Radioactive waste management facility
6	Transport of nuclear fuel or radioactive waste
7	Storage of nuclear fuel or radioactive waste
8	Manufacture of radio-isotopes
9	Use of radio-isotopes
10	Storage of radio-isotopes
11	Disposal of radio-isotopes
12	Transport of radio-isotopes
13	Use of radio-isotopes for power generation
14–29	Reserved
30	Other
31	Missing value

**0 23 003*****Type of release***

## Code figure

0	No release
1	Release to atmosphere
2	Release to water
3	Release to both atmosphere and water
4	Expected release to atmosphere
5	Expected release to water
6	Expected release to both atmosphere and water
7	Missing value

**0 23 004*****Countermeasures taken near border***

## Code figure

0	No countermeasures
1	Evacuation
2	Sheltering
3	Prophylaxis
4	Water
5–6	Reserved
7	Missing value

**0 23 005*****Cause of incident***

## Code figure

0	Incident State does not understand what happened
1	Incident State knows the cause of the incident
2	Reserved
3	Missing value

**0 23 006*****Incident situation***

## Code figure

0	No improvement
1	Unstable
2	No deterioration
3	Improving
4	Stable
5	Deteriorating
6	Reserved
7	Missing value

**0 23 007**

***Characteristics of release***

Code figure	
0	No release
1	Release has stopped
2	Release
3	Release is continuing
4–6	Reserved
7	Missing value

**0 23 008/0 23 009**

***State of current or expected release***

Code figure	
0	Gaseous
1	Particulate
2	Mixture of gaseous and particulate
3	Missing value

**0 23 016**

***Possibility of significant chemical toxic health effect***

Code figure	
0	No significant chemical toxic health effect
1	Significant chemical toxic health effect possible
2	Reserved
3	Missing value

**0 23 018**

***Release behaviour over time***

Code figure

0	Release no longer occurring
1	Release still occurring
2	Release expected to increase in next six hours
3	Release expected to remain constant in next six hours
4	Release expected to decrease in next six hours
5–6	Reserved
7	Missing value

**0 23 031**

***Possibility that plume will encounter precipitation  
in State in which incident occurred***

Code figure

0	Plume will not encounter rain in incident State
1	Plume will encounter rain in incident State
2	Reserved
3	Missing value

**0 23 032**

***Plume will encounter change in wind direction and/or speed flag***

Code figure

0	No significant change expected within the next six hours
1	Anticipated significant change expected within the next six hours
2	Reserved
3	Missing value

**0 24 003**

***Composition of release***

Code figure

0	Noble gases
1	Iodines
2	Caesiums
3	Transuranics
4–30	Reserved
31	Missing value





**0 25 004*****Echo processing***

Code figure	
0	Incoherent
1	Coherent (Doppler)
2	Reserved
3	Missing value

**0 25 005*****Echo integration***

Code figure	
0	Logarithm – 2.5 dB
1	Linear
2	Special
3	Missing value

**0 25 006*****Z to R conversion***

Code figure	
0	ZH to R conversion
1	(ZH, ZDR) to (NO, DO) to R
2	(Z (F1), Z (F2)) to attenuation to R
3–5	Reserved
6	Other
7	Missing value

**0 25 009*****Calibration method***

Bit No.	
1	None
2	Calibration target or signal
3	Against raingauges
4	Against other Instruments (disdrometer – attenuation)
All 4	Missing value

**0 25 010*****Clutter treatment***

Code figure	
0	None
1	Map
2	Insertion of higher elevation data and map
3	Analysis of the fluctuating logarithm signal (clutter detection)
4	Extraction of the fluctuating part of linear signal (clutter suppression)
5	Clutter suppression – Doppler
6	Multiparameter analysis
7–14	Reserved
15	Missing value

**0 25 011*****Ground occultation correction (screening)***

Code figure	
0	None
1	Map of correction factors
2	Interpolation (azimuth or elevation)
3	Missing value

**0 25 012*****Range attenuation correction***

Code figure	
0	Hardware
1	Software
2	Hardware and software
3	Missing value

**0 25 013*****Bright-band correction***

Bit No.	
1	Bright-band correction
All 2	Missing value

**0 25 015*****Radome attenuation correction***

Bit No.	
1	Radome attenuation correction
All 2	Missing value

**0 25 017*****Precipitation attenuation correction***

Bit No.	
1	Precipitation attenuation correction
All 2	Missing value

**0 25 020*****Mean speed estimation***

Code figure	
0	FFT (fast Fourier transform)
1	PPP (pulse-pair processing)
2	VPC (vector-phase change)
3	Missing value

**0 25 021*****Wind computation enhancement***

Bit No.	
1	Simple average
2	Consensus average
3	Median check
4	Vertical consistency check
5	Other
6–7	Reserved
All 8	Missing value

**0 25 022*****GHRSSST\* rejection flag***

Bit No.	
1	Unprocessed
2	Land suspected
3	Wind speed too large
4	Ice detected
5	Rain detected (Microwave retrievals only)
6	Cloudy detected (Infra-red retrievals only)
7	Cosmetic value
8	SST out of range
All 9	Missing value

---

\* GHRSSST = GODAE high-resolution sea-surface temperature

**0 25 023*****GHRSSST confidence flag***

Bit No.	
1	Default confidence value has been used
2	Default bias and standard deviation have been used
3	Sun glint suspected
4	Sea ice retrieval for microwave data
5	High wind speed retrieval
6	Inaccurate SST due to low SST (< 285K) (Only applies to the TMI instrument)
7	Relaxed rain contamination suspected
8	Potential side lobe contamination
All 9	Missing value

**0 25 024*****GHRSSST data quality***

Code figure	
0	Unprocessed infrared retrieval
1	Cloudy retrievals
2	Bad: Data that are probably contaminated by cloud
3	Suspect data
4	Acceptable data
5	Excellent data
6	Cool skin suspected
7–9	Reserved
10	Unprocessed microwave retrieval
11	Questionable microwave retrieval that may be contaminated
12	Acceptable microwave retrieval
13	High probability of diurnal variability
14	Reserved
15	Missing value

**0 25 029*****Calibration method***

Bit No.	
1	Reserved
2	Calibration target or signal
3	Against raingauges
4	Against other instruments (disdrometer – attenuation)
5	Reserved
All 6	Missing value

**0 25 030*****Running mean sea-surface temperature usage***

Code figure	Meaning
0	Running mean sea-surface temperature not used because usage criteria not met
1	Running mean sea-surface temperature not used because data not available
2	Running mean sea-surface temperature used as predictor
3	Missing value

**0 25 031*****NWP-generated vertical profile thinning method***

Code figure	Meaning
0	Reserved
1	No thinning applied (all native model levels are included from base to top of pseudo-sounding)
2	Native model levels are present only if they are significant levels as per regulations B/C 25 for conventional TEMP soundings
3	A predefined subset of native model levels is present
4	No native model levels are present. All profile levels are interpolated to a predefined set of pressure coordinate levels
5–6	Reserved
7	Missing value

Note: None of the code figures exclude the addition of interpolated levels at the discretion of the generating centre.

**0 25 032*****Wind profiler mode information***

Code figure	Meaning
0	Reserved
1	Data from low mode
2	Data from high mode
3	Missing value

**0 25 033*****Wind profiler submode information***

Code figure	Meaning
0	Wind profiler operating in submode A
1	Wind profiler operating in submode B
2	Reserved
3	Missing value

**0 25 034*****Wind profiler quality control test results***

Bit No.	Meaning (1 = true, 0 = false)
1	Test A performed and failed
2	Test B performed and failed
3	Test results inconclusive
All 4	Missing value

**0 25 035*****Decision method for polarity***

Code figure	
0	Not defined
1	Individual voltage deflection
2	Current based, above a threshold
3	Voltage based, above a threshold
4	Consensus of sensors, current above a threshold
5	Consensus of sensors, voltage above a threshold
6	Reserved
7	Missing value

**0 25 036*****Atmospherics location method***

Code figure	
0	Network of several direction-finders operating on the same individual atmospherics
1	Network of several arrival-time stations operating on the same individual atmospherics
2–5	Reserved
6	Single station range bearing technique
7–14	Reserved
15	Missing value

**0 25 040*****CO<sub>2</sub> wind product derivation***

Code figure	
0	Non-specific mode
1	First guess data
2	Cloud data
3	Average vector data
4	Primary data
5	Guess data
6	Vector data
7	Tracer data; this image
8	Tracer data to next image
9–14	Reserved
15	Missing value

**0 25 041*****Moving platform direction reporting method***

## Code figure

0	Direction originally reported in true degrees
1	Direction originally reported using Code table 0700, FM 13
2	Reserved
3	Missing value

Note: Where the original reporting method is as indicated by code figure 1, the following conversion is recommended to obtain a suitable data value corresponding to descriptor 0 01 012:

Reported value	Data value
0	0
1	45
2	90
3	135
4	180
5	225
6	270
7	315
8	360
9	511

**0 25 042*****Moving platform speed reporting method***

## Code figure

0	Speed originally reported in metres per second
1	Speed originally reported using Code table 4451, FM 13
2	Reserved
3	Missing value

Note: Where the original reporting method is as indicated by code figure 1, the following conversion is recommended to obtain a suitable data value corresponding to descriptor 0 01 013:

Reported value	Data value
0	0
1	1
2	4
3	7
4	9
5	12
6	14
7	17
8	19
9	21
/	1023

**0 25 045**

***HIRS channel combination***

Bit No.	
1–20	Beginning with first bit position (high order bit), if bit position is set to 1, then channel is present, if bit position is set to 0, then channel is not present
All 21	Missing value

**0 25 046**

***MSU channel combination***

Bit No.	
1–4	Beginning with first bit position (high order bit), if bit position is set to 1, then channel is present, if bit position is set to 0, then channel is not present
All 5	Missing value

**0 25 047**

***SSU channel combination***

Bit No.	
1–3	Beginning with first bit position (high order bit), if bit position is set to 1, then channel is present; if bit position is set to 0, then channel is not present
All 4	Missing value

**0 25 048**

***AMSU-A channel combination***

Bit No.	
1–15	Beginning with first bit position (high order bit), if bit position is set to 1, then channel is present, if bit position is set to 0, then channel is not present
All 16	Missing value

**0 25 049**

***AMSU-B channel combination***

Bit No.	
1–5	Beginning with first bit position (high order bit), if bit position is set to 1, then channel is present, if bit position is set to 0, then channel is not present
All 6	Missing value



**0 25 051*****AVHRR channel combination***

Bit No.	
1–6	Beginning with first bit position (high order bit), if bit position is set to 1, then channel is present, if bit position is set to 0, then channel is not present
All 7	Missing value

**0 25 053*****Observation quality***

Bit No.	
1	Good
2	Redundant
3	Questionable
4	Bad
5	Experimental
6	Precipitating
7–11	Reserved
All 12	Missing value

**0 25 063*****Central processor or system identifier***

Code figure	
0	Not defined
1	Main processor
2	Backup processor
3–254	Reserved
255	Missing value

**0 25 069*****Flight level pressure corrections***

Bit No.	
1	Smoothed
2	Baseline adjusted
3	Normalized time interval
4	Outlier checked
5	Plausibility checked
6	Consistency checked
7	Interpolated
All 8	Missing value

**0 25 086*****Depth correction indicator***

Code figure	
0	Depths are not corrected
1	Depths are corrected
2	Reserved
3	Missing value

**0 25 090*****Orbit state flag***

Code figure	
0	Orbit computed during a manoeuvre
1	Adjusted mission operations orbit
2	Extrapolated mission operations orbit
3	Adjusted (preliminary/precise) orbit
4	(Preliminary/precise) orbit is estimated during a manoeuvre period
5	(Preliminary/precise) orbit is interpolated over a tracking data gap
6	(Preliminary/precise) orbit is extrapolated for a duration less than 1 day
7	(Preliminary/precise) orbit is extrapolated for a duration that ranges from 1 day to 2 days
8	(Preliminary/precise) orbit is extrapolated for a duration larger than 2 days, or that the orbit is extrapolated just after a manoeuvre
9	DORIS* DIODE** navigator orbit
10–14	Reserved
15	Missing value

\* DORIS stands for “Doppler Orbitography and Radio-positioning Integrated by Satellite”.

\*\* DIODE means *Détermination Immédiate d’Orbite par DORIS Embarqué* or immediate onboard orbit determination by DORIS. It is part of the DORIS instrument, which calculates the satellite’s position and velocity.

**0 25 093*****RASS computation correction***

Bit No.	
1	No correction
2	Vertical velocity correction
3–6	Reserved
7	All corrections
All 8	Missing value

**0 25 095*****Altimeter state flag***

Bit No.	
1	Altimeter operating (0 if nominal, 1 if backup)
All 2	Missing value

**0 25 096*****Radiometer state flag***

Bit No.	
1	Mode indicator (0 if mode 2, 1 if mode 1)
2	Mode 1 calibration sequence indicator (0 if normal data taking either mode 1 or 2, 1 if mode 1 calibration sequence)
	Bits 3 and 4 indicate active 23.8 GHz channel(s):
3	Channel 2 (0 if on, 1 if off)
4	Channel 3 (0 if on, 1 if off)
All 5	Missing value

**0 25 097*****Three-dimensional error estimate of the navigator orbit***

Code figure	
0	Ranges between 0 and 30 cm
1	Ranges between 30 and 60 cm
2	Ranges between 60 and 90 cm
3	Ranges between 90 and 120 cm
4	Ranges between 120 and 150 cm
5	Ranges between 150 and 180 cm
6	Ranges between 180 and 210 cm
7	Ranges between 210 and 240 cm
8	Ranges between 240 and 270 cm
9	Ranges larger than 270 cm
10–14	Reserved
15	Missing value

**0 25 098*****Altimeter data quality flag***

Bit No.	(0 is good, 1 is bad)
1	Ku band range
2	C band range
3	Ku band SWH*
4	C band SWH*
5	Ku band backscatter coefficient
6	C band backscatter coefficient
7	Off nadir angle from Ku band waveform parameters
8	Off nadir angle from platform
All 9	Missing value

\* SWH = Significant wave height

**0 25 099*****Altimeter correction quality flag***

Bit No.	(0 is good, 1 is bad)
1	Ku band range instrumental correction
2	C band range instrumental correction
3	Ku band SWH* instrumental correction
4	C band SWH* instrumental correction
5	Ku band backscatter coefficient instrumental correction
6	C band backscatter coefficient instrumental correction
7–8	Reserved
All 9	Missing value

\* SWH = Significant wave height

**0 25 110*****Image processing summary***

Bit No.	
1	Raw data analysis used for raw data correction. Correction done using default parameters
2	Raw data analysis used for raw data correction. Correction done using raw data analysis results
3	Antenna elevation pattern correction applied
4	Nominal chirp replica used
5	Reconstructed chirp used
6	Slant range to ground range conversion applied
7–9	Reserved
All 10	Missing value

**0 25 112*****Band specific altimeter data quality flag***

Bit No.	(0 is good, 1 is bad)
1	Band specific range
2	Band specific significant wave height
3	Band specific backscatter coefficient
4	Off nadir angle from band specific waveform parameters
5	Off nadir angle from platform
6–8	Reserved
All 9	Missing value

**0 25 113*****Band specific altimeter correction quality flag***

Bit No.	(0 is good, 1 is bad)
1	Band specific range instrumental correction
2	Band specific significant wave height instrumental correction
3	Band specific backscatter coefficient instrumental correction
4–8	Reserved
All 9	Missing value

**0 25 120*****RA2-L2-processing flag***

Code figure	
0	Percentage of DSRs* free of processing errors during Level 2 processing is greater than the acceptable threshold
1	Percentage of DSRs free of processing errors during Level 2 processing is less than the acceptable threshold
2	Reserved
3	Missing value

---

\* DSR = Data set record

**0 25 122*****Hardware configuration for RF\****

Code figure	
0	Hardware configuration for RF is A
1	Hardware configuration for RF is B
2	Reserved
3	Missing value

---

\* RF = Radio frequency

**0 25 123*****Hardware configuration for HPA\****

Code figure	
0	Hardware configuration for HPA is A
1	Hardware configuration for HPA is B
2	Reserved
3	Missing value

---

\* HPA = High power amplifier

**0 25 124*****MWR\*-L2-processing flag***

Code figure

0	Percentage of DSRs** free of processing errors during Level 2 processing is greater than the acceptable threshold
1	Percentage of DSRs** free of processing errors during Level 2 processing is less than the acceptable threshold
2	Reserved
3	Missing value

\* MWR = Microwave radiometer

\*\* DSR = Data set record

**0 25 150*****Method of tropical cyclone intensity analysis using satellite data***

Code figure

1	The Dvorak's VIS (VISual imagery) intensity analysis
2	The Dvorak's EIR (Enhanced InfraRed imagery) intensity analysis
3–14	Reserved
15	Missing value

**0 25 174*****SMOS information flag***

Bit No.	Meaning
1	Pixel is affected by RFI effects
2	Pixel is located in the hexagonal Alias direction centred on Sun alias
3	Pixel is close to the border delimiting the extended Alias free zone
4	Pixel is inside the extended Alias free zone
5	Pixel is inside the exclusive of Alias free zone
6	Pixel is located in a zone where a Moon Alias was reconstructed
7	Pixel is located in a zone where Sun reflection has been detected
8	Pixel is located in a zone where Sun Alias was reconstructed
9	Flat target transformation has been performed during image reconstruction of this pixel
10	Scene has been combined with an adjustment scene in opposite polarization during image reconstruction to account for cross-polarization leakage
11	Direct Moon correction has been performed during image reconstruction of this pixel
12	Reflected Sun correction has been performed during image reconstruction of this pixel
13	Direct Sun correction has been performed during image reconstruction of this image
All 14	Missing value

**0 25 181*****L2 processing flag***

Code figure	Meaning
0	OK
1	Percentage of L2b records free of processing errors is less than acceptable threshold
2	Missing value

**0 25 182*****L1 processing flag***

Code figure	Meaning
0	OK
1	Percentage of L1b records free of processing errors is less than acceptable threshold
2	Missing value

**0 25 184*****L2 product status***

Code figure	Meaning
0	OK
1	Product as a duration shorter than the input product
2	Missing value

**0 25 185*****Encryption method***

Code figure	Meaning
0	AES 256
1–254	Reserved
255	Missing value

**0 25 187*****Confidence flag***

Code figure	Meaning
0	Valid
1	Invalid
2–14	Reserved
15	Missing value

**0 25 188*****Method for reducing pressure report to sea level***

Code figure

0	Pressure adjusted to mean sea level following WMO-No. 8* for low level (< 50 m) stations
1	Pressure adjusted to mean sea level following WMO-No. 8 for stations below 750 m
2	Pressure adjusted to sea level following national practice
3	Pressure adjusted to local water level following national practice
4	Pressure not corrected for height
5–14	Reserved
15	Missing value

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\* *Guide to Meteorological Instruments and Methods of Observation*



**0 26 010*****Hours included***

Bit No.	
1	0100 included
2	0200 included
3	0300 included
4	0400 included
5	0500 included
6	0600 included
7	0700 included
8	0800 included
9	0900 included
10	1000 included
11	1100 included
12	1200 included
13	1300 included
14	1400 included
15	1500 included
16	1600 included
17	1700 included
18	1800 included
19	1900 included
20	2000 included
21	2100 included
22	2200 included
23	2300 included
24	2400 included
25	Unknown mixture of hours
All 26	Missing value



**0 29 001*****Projection type***

## Code figure

0	Gnomonic projection
1	Polar stereographic projection
2	Lambert's conformal conic projection
3	Mercator's projection
4	Scanning Cone (radar)*
5	Reserved
6	No projection
7	Missing value

\* Projection type 4 indicates a Cartesian grid placed directly on the scanning cone defined by the azimuthal sweep of the radar.

**0 29 002*****Coordinate grid type***

## Code figure

0	Cartesian
1	Polar
2	Other
3–6	Reserved
7	Missing value



**0 30 031*****Picture type***

Code figure	
0	PPI
1	Composite
2	CAPPI
3	Vertical section
4	Alphanumeric data
5	Map of subject clutter
6	Map
7	Test picture
8	Comments
9	Map of ground occultation
10	Map of radar beam height
11–13	Reserved
14	Other
15	Missing value

**0 30 032*****Combination with other data***

Bit No.	
1	Map
2	Satellite IR
3	Satellite VIS
4	Satellite WV
5	Satellite multispectral
6	Synoptic observations
7	Forecast parameters
8	Lightning data
9–14	Reserved
15	Other data
All 16	Missing value



**0 31 021*****Associated field significance***

Code figure		
0	Reserved	
1	1-bit indicator of quality	0 = good 1 = suspect or bad
2	2-bit indicator of quality	0 = good 1 = slightly suspect 2 = highly suspect 3 = bad
3–5	Reserved	
6	4-bit indicator of quality control class according to GTSP	0 = Unqualified 1 = Correct value (all checks passed) 2 = Probably good but value inconsistent with statistics (differ from climatology) 3 = Probably bad (spike, gradient, ... if other tests passed) 4 = Bad value, impossible value (out of scale, vertical instability, constant profile) 5 = Value modified during quality control 6–7 = Not used (reserved) 8 = Interpolated value 9 = Missing value
7	Percentage confidence	
8		0 = Not suspected 1 = Suspected 2 = Reserved 3 = Information not required
9–20	Reserved	
21	1-bit indicator of correction (see Note 2)	0 = original value 1 = substituted/corrected value
22–62	Reserved for local use	
63	Missing value	

**Notes:**

- (1) Associated field significance shall be used initially in conjunction with the quality of observed data.
- (2) The code figure 21 may be used within corrected messages with the substituted/corrected values identified.
- (3) Further applications may be developed.

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**0 31 031**

***Data present indicator***

Bit No.	Value	
1	0	Data present
	1	Data not present



**0 33 002*****Quality information***

Code figure	
0	Data not suspect
1	Data suspect
2	Reserved
3	Quality information not given

**0 33 003*****Quality information***

Code figure	
0	Data not suspect
1	Data slightly suspect
2	Data highly suspect
3	Data considered unfit for use
4–6	Reserved
7	Quality information not given

**0 33 005*****Quality information (AWS data)***

Bit No.	
1	No automated meteorological data checks performed
2	Pressure data suspect
3	Wind data suspect
4	Air temperature data suspect
5	Wet-bulb temperature data suspect
6	Humidity data suspect
7	Ground temperature data suspect
8	Soil temperature (depth 1) data suspect
9	Soil temperature (depth 2) data suspect
10	Soil temperature (depth 3) data suspect
11	Soil temperature (depth 4) data suspect
12	Soil temperature (depth 5) data suspect
13	Cloud data suspect
14	Visibility data suspect
15	Present weather data suspect
16	Lightning data suspect
17	Ice deposit data suspect
18	Precipitation data suspect
19	State of ground data suspect
20	Snow data suspect
21	Water content data suspect
22	Evaporation/evapotranspiration data suspect
23	Sunshine data suspect
24–29	Reserved
All 30	Missing value

**0 33 006*****Internal measurement status information (AWS)***

Code figure	
0	Self-check OK
1	At least one warning active, no alarms
2	At least one alarm active
3	Sensor failure
4–6	Reserved
7	Missing value

**0 33 015*****Data quality-check indicator***

Code figure	
0	Passed all checks
1	Missing data check
2	Descending/reascending balloon check
3	Data plausibility check (above limits)
4	Data plausibility check (below limits)
5	Superadiabatic lapse rate check
6	Limiting angles check
7	Ascension rate check
8	Excessive change from previous flight
9	Balloon overhead check
10	Wind speed check
11	Wind direction check
12	Dependency check
13	Data valid but modified
14	Data outlier check
15–62	Reserved
63	Missing value

**0 33 020*****Quality control indication of following value***

Code figure	
0	Good
1	Inconsistent
2	Doubtful
3	Wrong
4	Not checked
5	Has been changed
6	Estimated
7	Missing value

**0 33 021*****Quality of following value***

Code figure	
0	Within limits
1	Outside limits
2	Reserved
3	Missing value

**0 33 022*****Quality of buoy satellite transmission***

Code figure	
0	Good (several identical reports have been received)
1	Dubious (no identical reports have been received)
2	Reserved
3	Missing value

**0 33 023*****Quality of buoy location***

Code figure	
0	Reliable (location was made over two satellite passes)
1	Latest known (no location over the corresponding pass)
2	Dubious (location made over one pass only; a second solution is possible in 5 per cent of the cases)
3	Missing value

**0 33 024*****Station elevation quality mark (for mobile stations)***

Code figure	
0	Reserved
1	Excellent – within 3 metres
2	Good – within 10 metres
3	Fair – within 20 metres
4	Poor – more than 20 metres
5	Excellent – within 10 feet
6	Good – within 30 feet
7	Fair – within 60 feet
8	Poor – more than 60 feet
9–14	Reserved
15	Missing value

**0 33 025*****ACARS interpolated values indicator***

Code figure	
0	Time interpolated, latitude and longitude reported
1	Time reported, latitude and longitude interpolated
2	Time, latitude, and longitude interpolated
3	Time, latitude, and longitude reported
4–6	Reserved
7	Missing value

**0 33 026*****Moisture quality***

Code figure	
0	Normal operations – measurement mode
1	Normal operations – non-measurement mode
2	Small RH
3	Humidity element is wet
4	Humidity element contaminated
5	Heater fail
6	Heater fail and wet/contaminated humidity element
7	At least one of the input parameters used in the calculation of mixing ratio is invalid
8	Numeric error
9	Sensor not installed
10	Calculated RH > 100%
11	Input laser power too low
12	Probe WV temperature out of range
13	Probe WV pressure out of range
14	Spectral line out of range
15	No laser output
16–62	Reserved
63	Missing value

**0 33 027*****Location quality class (range of radius of 66% confidence)***

Code figure	
0	Radius $\geq$ 1500 m
1	500 m $\leq$ Radius < 1500 m
2	250 m $\leq$ Radius < 500 m
3	Radius < 250 m
4	$\leq$ 100 m
5–6	Reserved
7	Missing value

**0 33 028*****Snapshot overall quality***

Code figure

1	Nominal
2	Degraded by SW error; any error reported by the algorithms
3	Degraded by instrument error
4	Degraded by corrupted /missing ADF
5–6	Reserved
7	Missing value

**0 33 030*****Scan line status flags for ATOVS***

Bit No.

1	Do not use scan for product generation
2	Time sequence error detected with this scan
3	Data gap precedes this scan
4	No calibration
5	No Earth location
6	First good time following a clock update
7	Instrument status changed with this scan
8–23	Reserved
All 24	Missing value

Note: If bit is set to 1 then statement is true.

**0 33 031*****Scan line quality flags for ATOVS***

Bit No.

1	Time field is bad but can probably be inferred from the previous good time
2	Time field is bad and cannot be inferred from the previous good time
3	This record starts a sequence that is inconsistent with previous times (i.e. there is a time discontinuity). This may or may not be associated with a spacecraft clock update (see scan line status flags for ATOVS)
4	Start of a sequence that apparently repeats scan times that have been previously accepted
5	Scan line was not calibrated because of bad time
6	Scan line was calibrated using fewer than the preferred number of scan lines because of proximity to start or end of data or to a data gap
7	Scan line was not calibrated because of bad or insufficient PRT data
8	Scan line was calibrated but with marginal PRT data
9	Some uncalibrated channels on this scan
10	Uncalibrated due to instrument mode

*(continued)*

*(Flag table 0 33 031 – continued)*

Bit No.	
11	Questionable calibration because of antenna position error of space view
12	Questionable calibration because of antenna position error of black body
13	Not Earth located because of bad time
14	Earth location questionable because of questionable time code (see time problem code bits)
15	Earth location questionable – only marginal agreement with reasonableness check
16	Earth location questionable – fails reasonableness check
17	Earth location questionable because of antenna position check
18	Scan line calibration cold black body
19	Scan line calibration warm black body
20	Scan line calibration space view
21	Earth view
22–23	Reserved
All 24	Missing value

Notes:

- (1) If bit is set to 1 then statement is true.
- (2) Bits 1–4 represent time problem code. All bits off implies the scan time is as expected.
- (3) Bits 5–10 represent calibration problem code. All bits set to zero indicated normal calibration. Where any of bits 5, 7, 10 are set, secondary calibration coefficients have been used.
- (4) Bits 11–17 represent Earth location problem code. All bits set to zero implies the Earth location was normal.

**0 33 032*****Channel quality flags for ATOVS***

Bit No.	
1	No good blackbody counts for scan line
2	No good space view counts for this line
3	No good PRTs for this line
4	Some bad blackbody view counts for this line
5	Some bad space view counts for this line
6	Some bad PRT temps on this line
7	Quality for this scan is reduced
8–23	Reserved (bits set to zero)
All 24	Missing value

Note: All bits off implies a good calibration.

**0 33 033*****Field of view quality flags for ATOVS***

Bit No.	
1	Set if secondary calibration used
2–21	Bit n set to 1 if brightness temperature in channel n–1 is physically unreasonable or has not been calculated due to calibration problems
22	Set if all the channels are missing
23	Suspect
All 24	Missing value

## Notes:

- (1) All bits off implies a good calibration.  
 (2) Bits 2–21 used for HIRS, but only bits 2–16 used for AMSU-A and only bits 2–6 used for AMSU-B.

**0 33 035*****Manual/automatic quality control***

Code figure	
0	Automatic quality control passed and not manually checked
1	Automatic quality control passed and manually checked and passed
2	Automatic quality control passed and manually checked and deleted
3	Automatic quality control failed and manually not checked
4	Automatic quality control failed and manually checked and failed
5	Automatic quality control failed and manually checked and re-inserted
6	Automatic quality control flagged data as questionable and not manually checked
7	Automatic quality control flagged data as questionable and manually checked and failed
8	Manually checked and failed
9–14	Reserved
15	Missing value

**0 33 037*****Wind correlation error***

Bit No.	
1	u departure from guess
2	v departure from guess
3	u and v departure from guess
4	u acceleration
5	v acceleration
6	u and v acceleration
7	Possible land feature
8	u acceleration and possible land feature
9	v acceleration and possible land feature
10	u and v acceleration and possible land feature

(continued)

*(Flag table 0 33 037 – continued)*

Bit No.	
11	Bad wind guess
12	Correlation failure
13	Search box off edge of area
14	Target box off edge of area
15	Pixel brightness out of bounds (noisy line)
16	Target outside of latitude/longitude box
17	Target outside of pressure minimum/maximum
18	Autoeditor flagged slow vector
19	Autoeditor flagged vectors
All 20	Missing value

**0 33 038*****Quality flags for ground-based GNSS\* data***

Bit No.	
1	Total zenith delay quality is considered poor
2	GALILEO satellites used
3	GLONASS satellites used
4	GPS satellites used
5	Meteorological data applied
6	Atmospheric loading correction applied
7	Ocean tide loading applied
8	Climate quality data processing
9	Near-real time data processing
All 10	Missing value

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\* GNSS = Global Navigation Satellite Systems

**0 33 039*****Quality flags for radio occultation data***

Bit No.	
1	Non-nominal quality
2	Offline product
3	Ascending occultation flag
4	Excess phase processing non-nominal
5	Bending angle processing non-nominal
6	Refractivity processing non-nominal
7	Meteorological processing non-nominal
8–13	Reserved
14	Background profile non-nominal
15	Background (i.e. not retrieved) profile present
All 16	Missing value



**0 33 041*****Attribute of following value***

## Code figure

0	The following value is the true value
1	The following value is higher than the true value (the measurement hit the lower limit of the instrument)
2	The following value is lower than the true value (the measurement hit the higher limit of the instrument)
3	Missing value

Note: This descriptor will be associated with visibility data or height of clouds data to specify if the value is bounded. If the reported data is the true value, the code figure is 0. However, the measurement can hit the limit of the instrument measurement capability. If the reported value is higher than the true value, the code figure is 1; if the reported value is lower than the true value, the code figure is 2.

**0 33 042*****Type of limit represented by following value***

## Code figure

0	Exclusive lower limit ( $>$ )
1	Inclusive lower limit ( $\geq$ )
2	Exclusive upper limit ( $<$ )
3	Inclusive upper limit ( $\leq$ )
4–6	Reserved
7	Missing value

**0 33 043*****AST confidence***

## Bit No.

1	Sea MDS. Nadir only SST retrieval used 3.7 micron channel. Land MDS reserved
2	Sea MDS. Dual view SST retrieval used 3.7 micron channel. Land MDS reserved
3	Nadir view contains day time data
4	Forward view contains day time data
5–7	Reserved
All 8	Missing value

**0 33 044*****ASAR quality information***

## Bit No.

1	Input data mean outside nominal range flag
2	Input data standard deviation outside nominal range flag
3	Number of input data gaps > threshold value

(continued)

*(Flag table 0 33 044 – continued)*

Bit No.	
4	Percentage of missing lines > threshold value
5	Doppler centroid uncertain. Confidence measure < specific value
6	Doppler ambiguity estimate uncertain. Confidence measure < specific value
7	Output data mean outside nominal range flag
8	Output data standard deviation outside nominal range flag
9	Chirp reconstruction failed or is of low quality flag
10	Data set missing
11	Invalid downlink parameters
12	Azimuth cut-off iteration count. The azimuth cut-off fit did not converge within a minimum number of iterations
13	Azimuth cut-off fit did not converge within a minimum number of iterations
14	Phase information confidence measure. The imaginary spectral peak is less than a minimum threshold, or the zero lag shift is greater than a minimum threshold
All 15	Missing value

**0 33 047*****Measurement confidence data***

Bit No.	
1	Error detected and attempts to recover made
2	Anomaly in on-board data handling (OBDH) value detected
3	Anomaly in ultra stable oscillator processing (USOP) value detected
4	Errors detected by on-board computer
5	Automatic gain control (AGC) out of range
6	Reception (Rx) delay fault. Rx distance out of range
7	Wave form samples fault identifier. Error
8	S band anomaly/error detected
9–11	Reserved
12	Brightness temperature (channel 1) out of range
13	Brightness temperature (channel 2) out of range
14	Reserved
15	Ku band ocean retracking error
16	S band ocean retracking error
17	Ku band ice 1 retracking error
18	S band ice 1 retracking error
19	Ku band ice 2 retracking error
20	S band ice 2 retracking error
21	Ku band sea ice retracking error
22	Arithmetic fault error
23	Meteo data state. No map
24	Meteo data state. 1 map
25	Meteo data state. 2 maps degraded
26	Meteo data state. 2 maps nominal
27	Orbit propagator status for propagation mode, several errors
28	Orbit propagator status for propagation mode, warning detected
29	Orbit propagator status for initialization mode, several errors
30	Orbit propagator status for initialization mode, warning detected
All 31	Missing value

**0 33 048*****Confidence measure of SAR\* inversion***

Code figure	
0	Inversion successful
1	Inversion not successful
2	Reserved
3	Missing value

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\* SAR = Synthetic aperture radar

**0 33 049*****Confidence measure of wind retrieval***

Code figure	
0	External wind direction used during inversion
1	External wind direction not used during inversion
2	Reserved
3	Missing value

**0 33 050*****Global GTSP quality flag***

Code figure	
0	Unqualified
1	Correct value (all checks passed)
2	Probably good but value inconsistent with statistics (differ from climatology)
3	Probably bad (spike, gradient, etc., if other tests passed)
4	Bad value, impossible value (out of scale, vertical instability, constant profile)
5	Value modified during quality control
6–7	Reserved
8	Interpolated value
9	Good for operational use; Caution; check literature for other uses
10–14	Reserved
15	Missing value

**0 33 052*****S band ocean retracking quality***

Bit No.	
1–20	First 20 least significant bits correspond to the 20 values (one per data block containing: 0 = valid measurement, 1 = invalid). Bit 1 applies to the 20th data block
All 21	Missing value

**0 33 053*****Ku band ocean retracking quality***

Bit No.	
1–20	First 20 least significant bits correspond to the 20 values (one per data block containing: 0 = valid measurement, 1 = invalid). Bit 1 applies to the 20th data block
All 21	Missing value

**0 33 060*****GqisFlagQual – individual IASI-System quality flag***

Code figure	
0	Good
1	Bad
2	Reserved
3	Missing value

**0 33 066*****AMV\* quality flag***

Bit No.	
1–21	Reserved
22	Correlation surface constraint fails
23	Reserved
All 24	Missing value

\* Atmospheric Motion Vectors

**0 33 070*****Total ozone quality***

Code figure	
0	Good retrieval
1	Bad aerosol information flag or NOAA-16 radiance anomaly
2	Solar zenith angle greater than 84 degrees
3	380 nm residue greater than limit
4	Ozone inconsistency
5	Difference between profile ozone and step 3 total ozone exceeds threshold (set to 25 DU)
6	Step 1 ozone iteration did not converge
7	Any channel residue greater than 16 or bad radiance
8	Insufficient pixels – not processed
9	First guess good – ozone forecast data used
10	High cloud in pixel – not processed
11	Successful ozone retrieval
12	Unsuccessful ozone retrieval
13–14	Reserved
15	Missing value

**0 33 071*****Profile ozone quality***

Code figure	
0	Good retrieval
1	Solar zenith angle greater than 84 degrees
2	Difference between step 3 and profile total ozone greater than limit (25 DU)
3	Average final residue for wavelengths used in retrieval greater than threshold
4	Final residue greater than 3 times a priori error
5	Difference between retrieved and a priori greater than 3 times a priori error
6	Non-convergent solution
7	Upper level profile anomaly or stray light anomaly
8	Initial residue greater than 18.0 N-value units
9–14	Reserved
15	Missing value

**0 33 072*****Ozone error***

Code figure	
0	Good retrieval
1	Reflectivity out of range
2	Larger pixels (Number of cross-track pixels less than 32) or backward scans error
3	Solar zenith angle greater than 88 degrees
4	Latitude/longitude out of range
5	Viewing zenith angle or solar zenith angle out of range
6	Step-one process failed in general
7	First guess ozone out of range
8	Too many iterations (exceed 8)
9	Step-one residue calculation failed
10	Step-two process failed in general
11	First guess ozone profile out of range
12	Step-two ozone value out of range
13	Step-two residue calculation failed
14	Step-three process failed in general
15	Polarization correction accuracy alert
16	Radiance or irradiance less or equal to zero
17–30	Reserved
31	Missing value

**0 33 075*****Scan-level quality flags***

Bit No.	
1	Gap in Raw Data Record (RDR) data detected (i.e., missing scan(s) preceding the current scan)
2	Recorded time is not in sequence (i.e., the scan start time is out of sequence)
3	Lambda monitored calculation cannot be updated (see Note 1)
4	The measured temperatures of any instrument components (e.g., beam-splitter, scan mirror, scan baffle) are outside the allowable ranges (see Note 2)
5	At least one of the monitored instrument temperatures has drifted more than a specified tolerance value
6–12	Reserved
All 13	Missing value

**Notes:**

- (1) Set to 1 if laser wavelength calculation is invalid due to laser diode bias current and/or laser diode temperature measurements being outside the predetermined allowable ranges. These ranges are tunable. In this case Lambda monitored calculation shall have 1 bit per scan.
- (2) These temperatures are used to compute the “environmental” contribution to the Internal Calibration Target (ICT) radiances. When this bit is set to 1, the invalid temperatures shall be replaced with the validated temperature values of the ICT.

**0 33 076*****Calibration quality flags***

Bit No.	
1	Lunar intrusion on first deep space view (see Note)
2	Lunar intrusion on second deep space view (see Note)
3–8	Reserved
All 9	Missing value

**Note:** Set to 1 if at least one spectrum in the deep space moving average was invalidated due to a lunar intrusion.

**0 33 077*****Field-of-view quality flags***

Bit No.	
1	Degraded SDR* quality
2	Invalid SDR* quality (see Note 1)
3	Invalid SDR* geolocation information
4	Degraded radiometric calibration
5	Invalid radiometric calibration (see Note 2)
6	Degraded spectral calibration
7	Invalid spectral calibration (see Note 3)
8	Fringe count error detected and corrected (see Note 4)
9	Day/night indicator (see Note 5)
10	Invalid RDR** data (see Note 6)
11	Significant fringe count error detected (see Note 7)
12	Bit trim failed
13–18	Reserved
All 19	Missing value

\* SDR = Sensor data record

\*\* RDR = Raw data record

## Notes:

- (1) SDR quality is invalid if bit trim failed (see bit 12), or fringe count error detected (see bit 11), or invalid raw data record (RDR) data (see bit 10), or invalid radiometric calibration (see bit 5), or invalid spectral calibration (see bit 7).
- (2) Radiometric calibration is invalid if radiometric calibration is not performed, or if it is performed with invalid calibration data (e.g., deep space window size = 0).
- (3) Spectral calibration is invalid if fringe count error detected and corrected (see bit 8), or if neon calibration is suspect and Lambda monitored calculation cannot be updated (see “Scan-level quality flags” (0 33 075) – bit 3).
- (4) Set to 0 if no fringe count error was detected (see bit 11), or a fringe count error was detected but it was not corrected.
- (5) Set to 0 if day (solar zenith angle < 90°). Set to 1 if night (solar zenith angle ≥ 90°).
- (6) This flag indicates the instrument exhibited operational errors and the associated interferogram(s) is/are excluded from SDR processing.
- (7) This flag indicates that a significant number of fringes have been missed, shifting the interferogram ZPD outside of a window monitored by the instrument, and the interferogram is excluded from SDR processing.

**0 33 078*****Geolocation quality***

Code figure	
0	Nominal – altitude and ephemeris data available
1	Missing at most a small gap of altitude and ephemeris data
2	Missing more than a small gap of altitude and ephemeris data, but no more than a granule boundary
3	Missing more than a granule boundary of altitude and ephemeris data
4–14	Reserved
15	Missing value

**0 33 079*****Granule level quality flags***

Bit No.	
1–5	Reserved
6	The No. 1–No.7 health checks failed
7	The No. 8–No.15 health checks failed
8	The No. 16–No.23 health checks failed
9	The No. 24–No.31 health checks failed
10	The No. 32–No.39 health checks failed
11	The No. 40–No.47 health checks failed
12	The No. 48–No.55 health checks failed
13	The No. 56–No.63 health checks failed
14	The No. 64–No.70 health checks failed
15	Quadratic correction applied to the radiometric transfer function for non-linearity correction
All 16	Missing value

**0 33 080*****Scan level quality flags***

Bit No.	
1–6	Reserved
7	Divide-by-zero condition or computation loop failed to converge in the K/Ka and V (KAV) band PRT *
8	Divide-by-zero condition or computation loop failed to converge in the WG band PRT
9	Divide-by-zero condition or computation loop failed to converge in the K/Ka, V, W, G band receiver shelf PRT K temperature computation
10	Out of range condition for the K/Ka and V band PRT
11	Out of range condition for the WG band PRT
12	KAV PRT temperature inconsistency
13	WG PRT temperature inconsistency
14	Time sequence error
15	Data gap – missing scan(s) preceding the current scan
16	KAV PRT sufficiency – insufficient KAV PRT data are available
17	WG PRT sufficiency – insufficient WG PRT data are available
18	Space view antenna position error
19	Blackbody antenna position error
All 20	Missing value

\* PRT = Platinum Resistance Temperature



**0 33 081*****Channel data quality flags***

Bit No.	
1–2	Reserved
3	Moon in space view
4	Gain error – the lowest blackbody count is smaller than or equal to the highest space view count in a scan
5	Calibration with fewer than preferred samples
6	Space view data sufficiency check – insufficient space view samples are available
7	Blackbody view data sufficiency check – insufficient blackbody view samples are available
8	Out of range condition for the space view
9	Out of range condition for the blackbody view
10	Space view inconsistency
11	Blackbody view inconsistency
All 12	Missing value

**0 33 082*****Geolocation quality flags***

Bit No.	
1–5	Reserved
6	Within south Atlantic anomaly
7	Invalid input data (indicates that any of the spacecraft ephemeris or attitude data are invalid)
8	Bad pointing (indicates that the sensor LOS does not intersect the geoid, is near the limb, has invalid sensor angles or other similar condition)
9	Bad terrain (indicates that the algorithm could not obtain a valid terrain value)
10	Invalid solar angles
11	Missing at most a small gap of altitude and ephemeris data
12	Missing more than a small gap of altitude and ephemeris data, but no more than a granule boundary
13	Missing more than a granule boundary of altitude and ephemeris data
14	The number of encoder pulse values per delta time is not as expected
15	Solar eclipse during Earth view scan
All 16	Missing value

**0 33 083*****Radiance data quality flags***

Bit No.	
1–5	Reserved
6	Pixel is affected by radio-frequency interference
7	Poor calibration quality due to bad space view offsets, OBC * view offsets, etc. or use of a previous calibration view
8	Saturated pixel
9	Missing data – data required for calibration processing are not available for processing
10	Calibrated pixel radiance out of range
11	Calibrated pixel reflectance or EBBT out of range
12	The moon has corrupted the space view
13	Scan data is not present (no valid data)
14	Quality for this scan-line is reduced. The value is determined by the combined number of steps required to find a replacement for thermistor or calibration source data
15	Bad detector
All 16	Missing value

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\* OBC = on-board calibration

**0 33 084*****Pixel level quality flags***

Bit No.	
1–5	Reserved
6	Bulk SST outside of validation range
7	Skin SST outside of validation range
8	Sensor zenith angle > 40 degrees (pixel is not within 40 degrees of nadir and therefore is not of high quality)
9	Degradation – horizontal cell size (HCS) > 1.3 km (HCS > 1.3 km, swath width > 1 700 km, sensor zenith angle > 50.3 degrees)
10	Exclusion: no ocean in pixel
11	Degradation: aerosol optical thickness (AOT) > 0.6 (AOT in horizontal cell > 0.6 on the slant path (AOT @550 nm))
12	Exclusion: AOT > 1.0 (AOT in horizontal cell > 1.0 on the slant path (AOT @550 nm))
13	Sun glint present in pixel
14	Ice concentration threshold exceeded (SST not retrieved due to ice concentration exceeding threshold in system spec)
15	Thin cirrus detected in pixel
All 16	Missing value

**0 33 085*****Aerosol optical thickness quality flags***

Bit No.	
1–3	Reserved
4	Angstrom exponent is outside of the system specification range
5	Excluded, Angstrom exponent for AOT* at 550 nm < 0.15
6	Bright surface in cell (if over land), or shallow or turbid water in cell (if over ocean)
7	Low sun, excluded, Solar Zenith Angle > 80 degrees
8	Low sun, degraded, 65 degrees < Solar Zenith Angle ≤ 80 degrees
9	Fire detected in cell
10	Snow/Ice in cell
11	Cloud shadow in cell
12	Sun glint in cell
13	Bad SDR** data present in horizontal cell (quality of AOT/APSP*** degraded or AOT/APSP not retrieved due to bad SDR data in horizontal cell)
14	Cirrus contamination in cell
15	Cloud adjacent to cell
16	Cloud contamination in cell
17	AOT is outside of the system specification range
All 18	Missing value

\* AOT = Aerosol optical thickness

\*\* SDR = Sensor data record

\*\*\* APSP = Aerosol particle size parameter

**0 33 086*****Quality of pixel level retrieval***

Code figure	
0	Not retrieved
1	Excluded
2	Degraded
3	High quality
4–6	Reserved
7	Missing value

**0 33 087*****Extent of satellite within South Atlantic anomaly (based on climatological data)***

Code figure

0	Less than or equal to 10%
1	Greater than 10% but less than or equal to 20%
2	Greater than 20% but less than or equal to 30%
3	Greater than 30% but less than or equal to 40%
4	Greater than 40% but less than or equal to 50%
5	Greater than 50% but less than or equal to 60%
6	Greater than 60% but less than or equal to 70%
7	Greater than 70% but less than or equal to 80%
8	Greater than 80%
9–14	Reserved
15	Missing value

**0 33 088*****Ozone total column quality flag***

Bit No.

1–5	Reserved
6	Surface reflectivity out of range
7	Residual too large
8	Aerosol index limit exceeded
9	Solar eclipse present (all or part of the IFOV* is affected by a solar eclipse, umbra or penumbra viewing)
10	Sun glint present within IFOV
11	Snow or ice surface is within the IFOV
12	Solar zenith angle in excluded (night) condition (solar zenith angle $\geq 88$ degrees)
13	Solar zenith angle in degraded condition (80 degrees $\leq$ solar zenith angle $< 88$ degrees)
14	SO <sub>2</sub> index $> 6$ DU (degraded condition)
15	Residues are not consistent (indicates whether the residues from the 22 wavelengths are consistent)
16	O <sub>3</sub> triplet selection is not consistent within retrieval (ozone triplet consistency)
17	Input data quality is not good
All 18	Missing value

\* IFOV = Instantaneous field of view

**0 35 000*****FM and Regional Code number***

Code figure	
000–099	International FM Codes
100–199	RA I Codes
200–299	RA II Codes
300–399	RA III Codes
400–499	RA IV Codes
500–599	RA V Codes
600–699	RA VI Codes
700–799	Antarctic Codes
800–999	Reserved
1000–1022	Not used
1023	Missing value

**0 35 001*****Time frame for monitoring***

Code figure	
0	Real time
1	Near-real time
2	Non-real time
3–6	Reserved
7	Missing value

**0 35 030*****Discrepancies in the availability of expected data***

Code figure	
0	No discrepancies
1	Non-compliance with standard and recommended practices and procedures including those of monitoring
2	Catalogues of meteorological bulletins not updated in a timely manner
3	Incorrect routing directories
4	Lack of flexibility in the routing arrangements
5	Deficiencies in the operation of GTS centres and circuits
6	Loss of data or delays in relaying data on the GTS
7	Routing of data different from the routing provided in the plan
8	Various malpractices
9–14	Reserved
15	Missing value

**0 35 031*****Qualifier on monitoring results***

Code figure	
1	Sufficient and all of acceptable quality
2	Sufficient but partly of acceptable quality
3	Insufficient but all of acceptable quality
4	Insufficient and of unacceptable quality
5	Some messages not complete
6	Suspect or wrongly coded groups could not be interpreted confidently
7	Gross coding errors
8	Transmission sequential order not observed
9	Report completely garbled and thus discarded
10	Deficiencies identified and rectified
11	Deficiencies identified but not rectified
12	Deficiencies not identified
13	Measuring errors
14	Mutual inconsistency
15	Temporal inconsistency
16	Forecast error
17	Bias
18	Improve system of quality control
19	Expand training programmes
20–98	Reserved
99–126	Not used
127	Missing value

**0 35 032*****Cause of missing data***

Code figure	
1	Data groups missing due to radio fading
2	Data groups missing due to outage of centre
3	Data groups missing due to outage of circuit
4	Non-implementation or maintenance of required RBSN density
5	Shortage of qualified staff to man stations
6	Lack of consumables
7	Instrument failure
8	Non-adherence to telecommunication procedures
9	Some observing programmes ceased
10–14	Not used
15	Missing value

**0 35 033*****Observation and collection deficiencies***

Code figure	
1	No deficiency
2	Observations not made regularly
3	Observations not made at right time
4	Observations made but not disseminated
5	Observations made and sent to incorrect users
6	Collection not received
7	Collection transmitted late
8	Collection not transmitted
9	Difficulties in HF propagation and selection of suitable frequency
10	Difficulties in maintenance of communication equipment at remote stations
11	No alternative arrangement for routing meteorological observation
12–99	Reserved
100–122	Not used
123	Missing value

**0 35 034*****Statistical trends for availability of data (during the survey period(s))***

Code figure	
1	Slight improvement
2	Significant improvement
3	Most significant improvement
4	Steady
5	Decreasing
6	Efforts required to improve night-time observations
7	Missing value

**0 35 035*****Reason for termination***

Code figure	
0	Reserved
1	Balloon burst
2	Balloon forced down by icing
3	Leaking or floating balloon

*(continued)*

(Code table 0 35 035 – continued)

## Code figure

4	Weak or fading signal
5	Battery failure
6	Ground equipment failure
7	Signal interference
8	Radiosonde failure
9	Excessive missing data frames
10	Reserved
11	Excessive missing temperature
12	Excessive missing pressure
13	User terminated
14	Sudden loss of signal
15	Tracking lost
16	Increasing pressure
17	Invalid and/or missed data time limits exceeded
18–29	Reserved
30	Other
31	Missing value



**0 40 005*****Soil moisture correction flag***

Bit No.	
1	Soil moisture between –20% and 0%
2	Soil moisture between 100% and 120%
3	Correction of wet backscatter reference
4	Correction of dry backscatter reference
5	Correction of volume scattering in sand
6–7	Reserved
All 8	Missing value

Note: The nominal range for the surface soil moisture is 0% – 100%. In extreme cases, the extrapolated backscatter at 40 degrees incidence angle may exceed the dry or the wet backscatter reference. In these cases, the value provided by the measurement process of surface soil moisture is, respectively, less than 0% or more than 100%.

**0 40 006*****Soil moisture processing flag***

Bit No.	
1	Not soil
2	Sensitivity to soil moisture below limit
3	Azimuthal noise above limit
4	Backscatter Fore-Aft beam out of range
5	Slope Mid-Fore beam out of range
6	Slope Mid-Aft beam out of range
7	Soil moisture below –20%
8	Soil moisture above 120%
9–15	Reserved
All 16	Missing value

Note: See Note under Flag table 0 40 005.

**0 40 011*****Interpolation flag***

Bit No.	
1	Mean sea-surface (MSS) interpolation flag
2	Ocean tide solution 1 interpolation flag (0 = 4 points over ocean, 1 = less than 4 points)
3	Ocean tide solution 2 interpolation flag (0 = 4 points over ocean, 1 = less than 4 points)
4	Meteorological data interpolation flag (0 = 4 points over ocean, 1 = less than 4 points)
5–7	Reserved
All 8	Missing value

**0 40 012*****Radiometer data quality flag***

Bit No.	(0 is good, 1 is bad)
1	18.7 GHz brightness temperature
2	23.8 GHz brightness temperature
3	34 GHz brightness temperature
4–7	Reserved
All 8	Missing value

**0 40 013*****Radiometer brightness temperature interpretation flag***

Code figure	
0	Interpolation with no gap between JMR* data
1	Interpolation with gaps between JMR* data
2	Extrapolation of JMR* data
3	Failure of extrapolation and interpolation
4–6	Reserved
7	Missing value

\* JMR = JASON-1 Microwave Radiometer

**0 40 020*****GqisFlagQualDetailed – quality flag for the system***

Bit No.	
1	NZPD and complex calibration error
2	Band 3 affected by spike
3	Band 3 affected by saturation
4	Band 2 affected by spike
5	Band 1 affected by spike
6	Overflow/under flow
7	On-board processing error
8	Spectral calibration error
9	Radiometric calibration error
10	Missing AVHRR data
11	Missing IIS data
12	Missing sounder data
13	GqisFlagQual summary flag for all bands
14	On-ground processing error
15	Inter-calibration error IASI/AVHRR
16	Spare
All 17	Missing value

**0 40 023*****Auxiliary altimeter state flags***

Bit No.	
1	Band sequence (0 = 3Ku_1C_3Ku, 1 = 2Ku_1C_2Ku)
2	C band frequency (0 = 320 MHz, 1 = 100 MHz)
3	C band status (0 = On, 1 = Off)
4	Ku band status (0 = On, 1 = Off)
All 5	Missing value

**0 40 024*****Meteorological map availability***

Code figure	
0	2 maps available (6 hours apart)
1	2 maps available (> 6 hours apart)
2	1 map available; data extrapolated
3	No maps used
4–6	Reserved
7	Missing value

**0 40 025*****Interpolation flag for mean diurnal tide***

Code figure	
0	Good
1	Bad
2	Reserved
3	Missing value

**0 40 028*****GMI quality flag***

Code figure	
0	Good data
1	Possible sun glint
2	Possible radio-frequency interference
3	Degraded geolocation data
4	Data corrected for warm load intrusion
5	Scan blanking on
6	Data is missing from file or unreadable
7	Unphysical brightness temperature
8	Error in geolocation data
9	Data missing in one channel
10	Data missing in multiple channels

*(continued)*

(Code table 0 40 028 – continued)

Code figure

11	Lat/lon values are out of range
12	Non-normal status modes
13	Distance to corresponding low frequency pixel > 7 km
14	Reserved
15	Missing value (no quality information available)

### **0 40 036**

#### ***Lidar L2b classification type***

Code figure

0	Clear
1	Cloud
2–14	Reserved
15	Missing value

**0 42 004**

***Confidence of inversion for each partition of swell wave spectra***

Code figure

0	Wave direction resolved
1	180-degree ambiguity not resolved
2–14	Reserved
15	Missing

