5.   DATA QUALITY AND EXCHANGE (agenda item 5)

5.1   Review of quality control procedures for marine climatological data (agenda item 5.1)

5.1.1   The subgroup recalled that at CMM-XII (Havana, Cuba, 1997) the Global Collecting Centres (GCCs) proposed some revisions and clarifications to the set of minimum quality control standards (MQCS), to be applied by contributing Members prior to data submission, and which were given in the Manual on Marine Meteorological Services.   Dr V. Wagner (Germany) had now proposed to the subgroup, on behalf of both GCCs, some additional minor revisions to the MQCS.   The subgroup thanked Dr V. Wagner, for his revision of the standards and agreed both with the changes presented, mostly of an editorial nature, and with the proposal to put into use this new standard as soon as possible.   The modified Annex 3.E to the Guide to Marine Meteorological Services is given in Annex V, where all corrections and modifications are indicated.

5.1.2   The subgroup also considered that the lack of a version identification for the MQCS, could have a negative effect in the data being archived, as well as in the metadata database and therefore approved the proposal that, as is done with the IMMT code, the MQCS carry an identification number, as indicated in the following table:

MQCS-I = Original version
MQCS-II = Version 2, May 1996
MQCS-III = Version 3, May 2000 (corrected Annex 3.E to the Guide to MMS)

MINIMUM QUALITY CONTROL STANDARDS
MQCS - III (Version 3, May 2000)

NOTE   See specification for quality control Indicators Q_1 to Q_{20} at the end of this appendix
        Δ = space (ASCII 32)

Element	Error	Action
1	$i_T \neq$ ~~0-5~~ 3-5	Correct manually, otherwise Δ
2	AAAA $\neq$ valid year	Correct manually otherwise reject
3	MM $\neq$ 01 - 12	Correct manually otherwise reject
4	YY $\neq$ valid day of month	Correct manually otherwise reject
5	G $\neq$ 00 - 23	Correct manually otherwise reject
6	Q $\neq$ 1, 3, 5, 7	Correct manually and $Q_{20} = 5$, otherwise $Q_{20} = 4$
	Q $= \Delta$	$Q_{20} = 2$
7	$L_aL_aL_a \neq$ 000-900	Correct manually and $Q_{20} = 5$, otherwise $Q_{20} = 4$
	$L_aL_aL_a = \Delta\Delta\Delta$	$Q_{20} = 2$
8	$L_oL_oL_oL_o \neq$ 0000-1800	Correct manually and $Q_{20} = 5$, otherwise $Q_{20} = 4$
	$L_oL_oL_oL_o = \Delta\Delta\Delta\Delta$	$Q_{20} = 2$
But	$L_aL_aL_a = L_oL_oL_oL_o = \Delta\Delta\Delta(\Delta)$	Correct manually otherwise reject

Time sequence checks

	Error	Action
	Change in latitude > 0.7^o /hr	Correct manually otherwise $Q_{20} = 3$
	Change in longitude > 0.7^o /hr when lat. 00-39.9	Correct manually otherwise $Q_{20} = 3$
	Change in longitude > 1.0^o /hr when lat. 40-49.9	Correct manually otherwise $Q_{20} = 3$
	Change in longitude > 1.4^o /hr when lat. 50-59.9	Correct manually otherwise $Q_{20} = 3$
	Change in longitude > 2.0^o /hr when lat. 60-69.9	Correct manually otherwise $Q_{20} = 3$
	Change in longitude > 2.7^o /hr when lat. 70-79.9	Correct manually otherwise $Q_{20} = 3$
9		No checking
10	h $\neq$ 0-9, Δ	Correct manually and $Q_1 = 5$, otherwise $Q_1 = 4$
	h $= \Delta$	$Q_1 = 9$
11	VV $\neq$ 90-99, $\Delta\Delta$	Correct manually and $Q_2 = 5$, otherwise $Q_2 = 4$
	VV $= \Delta\Delta$	$Q_2 = 9$
12	N $\neq$ 0-9, Δ, /	Correct manually and $Q_3 = 5$, otherwise $Q_3 = 4$
	N < Nh	Correct manually and $Q_3 = 5$, otherwise $Q_3 = 2$
13	dd $\neq$ 00-36, 99, $\Delta\Delta$	Correct manually and $Q_4 = 5$, otherwise $Q_4 = 4$
	dd $= \Delta\Delta$, //	$Q_4 = 9$
	<u>dd versus ff</u>	
	dd = 00, ff $\neq$ 00	Correct manually and Q_4 or $Q_5 = 5$ otherwise $Q_4 = Q_5 = 2$
	dd $\neq$ 00, ff = 00	Correct manually and Q_4 or $Q_5 = 5$ otherwise $Q_4 = Q_5 = 2$
14	$i_w \neq$ 0, 1, 3, 4	Correct manually, otherwise $Q_5 = 4$
15	ff > 80 knots	Correct manually and $Q_5 = 5$, otherwise $Q_5 = 3$
	ff $= \Delta\Delta$, //	$Q_5 = 9$
16	~~S~~$S_n \neq$ 0, 1	Correct manually, otherwise $Q_6 = 4$
17	TTT $= \Delta\Delta\Delta$, ///	$Q_6 = 9$
	If -25 > TTT >40 then	
	when Lat. < 45.0	
	TTT < -25	$Q_6 = 4$
	TTT > 40	$Q_6 = 3$
	when Lat. >= 45.0	
	TTT < -25	$Q_6 = 3$
	TTT > 40	$Q_6 = 4$
Element	**Error**	**Action**

TTT versus humidity parameters

Element	Error	Action
	TTT < WB (wet bulb)	Correct manually and $Q_6 = 5$, otherwise $Q_6 = Q_{19} = 2$
	TTT < DP (dew point)	Correct manually and $Q_6 = Q_7 = 5$, otherwise $Q_6 = Q_7 = 2$
18	~~s_n~~ s_r $\neq$ 0, 1, 2, 5, 6, 7~~, 9~~	Correct manually, otherwise $Q_7 = 4$
19	DP > WB	Correct manually and $Q_7 = 5$, otherwise $Q_7 = Q_{19} = 2$
	DP > TTT	Correct manually and $Q_7 = 5$, otherwise $Q_7 = Q_6 = 2$
	WB = DP = $\Delta\Delta$	$Q_7 = 9$
20	930 > PPPP > 1050 hPa	Correct manually and $Q_8 = $ ~~51, 3 and, if corrected~~, otherwise $Q_8 = $ ~~5~~3
	870 > PPPP > 1070 hPa	Correct manually and $Q_8 = 5$, otherwise $Q_8 = 4$
	PPPP = $\Delta\Delta\Delta\Delta$	$Q_8 = 9$
21	ww = 22-24, 26, 36-39, 48, 49, 56, 57, 66-79, 83-88, 93, 94 and latitude <20°	Correct manually and $Q_9 = 5$, otherwise $Q_9 = 4$
	ww = $\Delta\Delta$, //	$Q_9 = 9$
22, 23	$W_1 = W_2 = 7$ and latitude <20°	Correct manually and $Q_9 = 5$, otherwise $Q_9 = 4$
	$W_1 < W_2$	Correct manually and $Q_9 = 5$, otherwise $Q_9 = 4$
	$W_1 = W_2 = \Delta$, /	$Q_9 = 9$
24,25, 26,27	N = 0, Δ, 9 and $N_h C_L C_M C_H \neq \Delta$	Correct manually and $Q_3 = 5$, otherwise $Q_3 = 4$
28	~~s_n~~ $s_s \neq$ 0, 1	Correct manually otherwise $Q_{10} = 4$
29	$T_w T_w T_w = \Delta\Delta\Delta$, ///	$Q_{10} = 9$
	if -2.0 > $T_w T_w T_w$ > 37.0 then when Lat. < 45.0	
	$T_w T_w T_w$ < -2.0	Control manually and $Q_{10} = 5$, otherwise $Q_{10} = 4$
	$T_w T_w T_w$ > 37.0	Control manually and $Q_{10} = 5$, otherwise $Q_{10} = 3$
	when Lat. >= 45.0	
	$T_w T_w T_w$ < -2.0	Control manually and $Q_{10} = 5$, otherwise $Q_{10} = 3$
	$T_w T_w T_w$ > 37.0	Control manually and $Q_{10} = 5$, otherwise $Q_{10} = 4$
30	Indicator $\neq$ 0-7, Δ	Correct manually, make it Δ if not correctable
31	Indicator $\neq$ 0-9, Δ	Correct manually, make it Δ if not correctable
32	20 < $P_w P_w$ < 30	$Q_{11} = 3$
	$P_w P_w$ >$\geq$ 30 and $\neq$ 99	$Q_{11} = 4$
	$P_w P_w = \Delta\Delta$, //	$Q_{11} = 9$
33	35< $H_w H_w$ < 50	$Q_{12} = 3$
	$H_w H_w$ > = 50	$Q_{12} = 4$
	$H_w H_w = \Delta\Delta$, //	$Q_{12} = 9$
34	$d_{w1} d_{w1} \neq$ 00-36, 99, $\Delta\Delta$	Correct manually and $Q_{13} = 5$, otherwise $Q_{13} = 4$
	swell$_1$ = swell$_2$ = Δ	$Q_{13} = 9$
35	25 < $P_{w1} P_{w1}$ < 30	$Q_{13} = 3$
	$P_{w1} P_{w1}$ >$\geq$ 30 and $\neq$ 99	$Q_{13} = 4$
36	35 < $H_{w1} H_{w1}$ < 50	$Q_{13} = 3$
	$H_{w1} H_{w1}$ ->= 50	$Q_{13} = 4$
37	$I_s \neq$ 1-5, Δ	Correct manually, otherwise Δ
38	$E_s E_s \neq$ 00-99, $\Delta\Delta$	Correct manually, otherwise $\Delta\Delta$
39	$R_s \neq$ 0-4, Δ	Correct manually, otherwise Δ
40	Source $\neq$ 0-6	Correct manually, otherwise Δ
41	Platform $\neq$ 0-9	Correct manually, otherwise Δ
42	No call sign	Insert manually, otherwise reject
43	No country code	Insert manually
44		No Quality Control
45	Q $\neq$ 0-6, 9	Correct manually, otherwise Δ
46	$i_x \neq$ 1-7	Correct manually, otherwise Δ
47	i_R = 0-2 and RRR = 000, ///, $\Delta\Delta\Delta$	Correct manually, otherwise $Q_{14} = 4$
	i_R = 3 and RRR $\neq$ 000, ///, $\Delta\Delta\Delta$	Correct manually, otherwise $Q_{14} = 2$
	i_R =4 and RRR $\neq$ ///, $\Delta\Delta\Delta$	Correct manually, otherwise $Q_{14} = 2$
	$i_R \neq$ 0 - 4	Correct manually, ortherwise $Q_{14} = 4$
Element	**Error**	**Action**

48	$RRR \neq 001 - 999$ and $i_R = 1, 2$	Correct manually and $Q_{14} = 5$, otherwise $Q_{14} = 2$
49	t_R 0-9	Correct manually and $Q_{14} = 5$, otherwise $Q_{14} = 4$
50	~~s_n~~ $s_w \neq 0, 1, 2, 5, 6, 7, 9$	Correct manually, otherwise $Q_{19} = 4$
51	$WB < DP$	Correct manually and $Q_{19} = 5$, otherwise $Q_{19} = Q_7 = 2$
	$WB = ///, \Delta\Delta$	$Q_{19} = 9$
	$WB > TTT$	Correct manually and $Q_{19} = 5$, otherwise $Q_{19} = Q_6 = 2$
52	$a \neq 0\text{-}8, \Delta$	Correct manually and $Q_{15} = 5$, otherwise $Q_{15} = 4$
	$a = 4$ and $ppp \neq 000$	Correct manually and $Q_{15} = 5$, otherwise $Q_{15} = Q_{16} = 2$
	$a = \Delta$	$Q_{15} = 9$
53	~~$ppp > 150$~~ $< ppp \leq 250$	Correct manually and $Q_{16} =$ ~~5~~ 1, ~~3 and if corrected~~ otherwise $Q_{16} =$ ~~5~~ 3
	$ppp > 250$	Correct manually and $Q_{16} = 5$ otherwise $Q_{16} = 4$
	$ppp = \Delta\Delta\Delta$	$Q_{16} = 9$
54	$D_s \neq 0\text{-}9, \Delta$	Correct manually and $Q_{17} = 5$, otherwise $Q_{17} = 4$
	$D_s = \Delta, /$	$Q_{17} = 9$
55	$V_s \neq 0\text{-}9, \Delta$	Correct manually and $Q_{18} = 5$, otherwise $Q_{18} = 4$
	$V_s = \Delta, /$	$Q_{18} = 9$
56	$d_{w2}d_{w2} \neq 00\text{-}36, 99$	Correct manually and $Q_{13} = 5$, otherwise $Q_{13} = 4$
57	$25 < P_{w2}P_{w2} < 30$	$Q_{13} = 3$
	$P_{w2}P_{w2}$ ~~>~~ ≥ 30 and $\neq 99$	$Q_{13} = 4$
58	$35 < H_{w2}H_{w2} < 50$	$Q_{13} = 3$
	$H_{w2}H_{w2} >= 50$	$Q_{13} = 4$
59	$c_i \neq 0\text{-}9, \Delta$	Correct manually, otherwise Δ
60	$s_i \neq 0\text{-}9, \Delta$	Correct manually, otherwise Δ
61	$b_i \neq 0\text{-}9, \Delta$	Correct manually, otherwise Δ
62	$D_i \neq 0\text{-}9, \Delta$	Correct manually, otherwise Δ
63	$z_i \neq 0\text{-}9, \Delta$	Correct manually, otherwise Δ

Specifications for quality control Indicators Q_1 to Q_{20}

0	No quality control (QC) has been performed on this element
1	QC has been performed; element appears to be correct
2	QC has been performed; element appears to be inconsistent with other elements
3	QC has been performed; element appears to be doubtful
4	QC has been performed; element appears to be erroneous
5	The value has been changed as a result of QC
6, 7	Reserved for GCCs
~~6~~ 8	Reserve
9	The value of the element is missing

Use of flag 6:

The GCCs wil set the flag to 6 if the flag has been set to 1 by the Contributing member and the GCCs find it not in accordance with the MQCS

Use of flag 7:
The GCCs wil set the flag to 7 if the flag had been set to 5 by the Contributing member andnthe GCCs find it no in accordance with the MQCS

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