

Global Collecting Centre

Annual Report 2017



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Summary

2017 marks the 24th year of GCC operation, 24 years of successful and effective data management. 14 Contributing Members submitted 702,259 observations to the GCCs in 2017 (see Figure 1), with the majority of observations made in the last two years and the oldest records dating back to 2005.

Both GCCs have been identified as WMO Information System (WIS) Data Collection & Production Centres (DCPCs) and are able to provide 25.6 million MQCS-checked and flagged observations received by the GCCs.

All data, original and MQC-checked, are available on the German WIS Global Information System Centre (GISC) http://gisc.dwd.de/GISC_DWD/toSimpleSearch.do.

Background

The two Global Collecting Centres (GCCs) for JCOMM's Marine Climatological Summaries Scheme (MCSS) were set up in 1993 to improve the data flow and quality of delayed-mode Voluntary Observing Ship (VOS) data. Data is received regularly by the GCCs (Figure 1 and Appendix A) from the MCSS Contributing Members (CMs) (Appendix B). This is then quality ensured to the Minimum Quality Control Standard (MQCS-7) and quarterly made available to Responsible Members (RMs) via FTP. For further information about the MCSS and GCCs work, terms of reference, data format and QC standards, see WMO Manual 558 (2012 Edition) and WMO Guide 471 (2001 Edition).

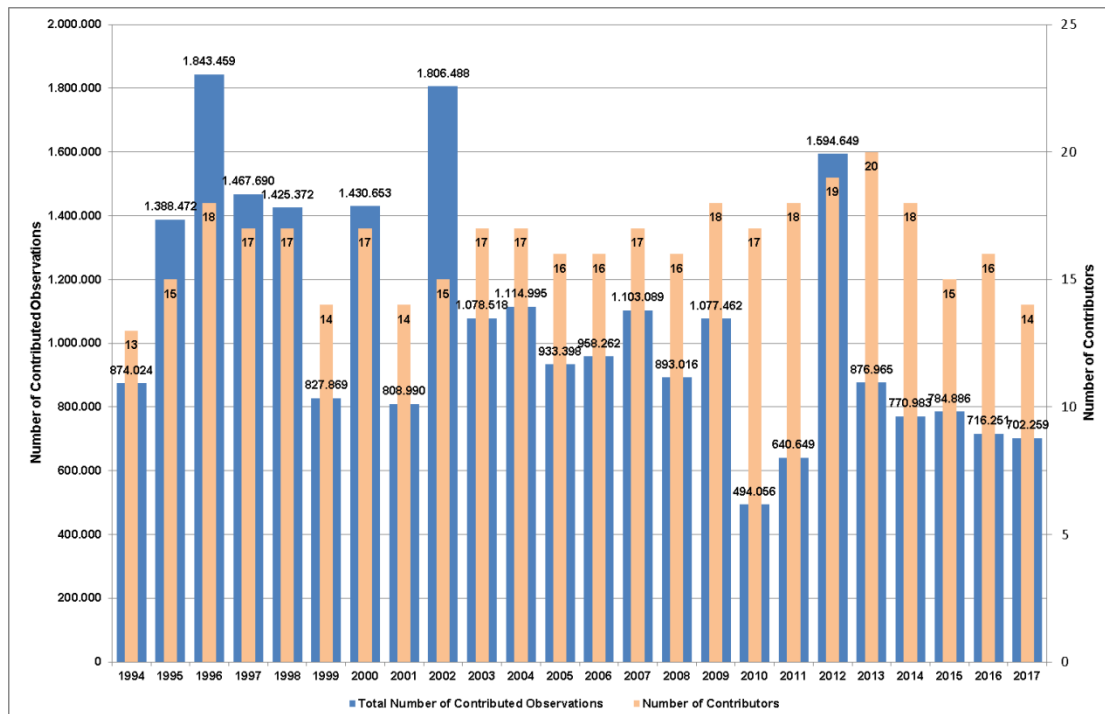


Figure 1: Numbers of contributed observations and active Contributing Members by year since GCCs began to operate

VOS Data Volumes 2017

- 702,259 observations were received and processed by the GCCs with an increasing number of observations from automated stations.
- 14 CMs contributed data out of a total of 27 registered Members/Member States (Figure 2).
- 804 Voluntary Observing Ships (VOS) made observations in 2017.
- The observation dates of the contributed data ranged from 2005 to 2017, however, 93% of the data were observed in the last two years, 2016 and 2017.
- 10% of the received observations were coded in IMMT-3 format, 63% in IMMT-4 format and 27% in the most recent IMMT-5 format.

Number of CM Observations 2017					
Country Name	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total
Argentina					0
Australia	311	322	2,481	883	3,997
Brazil					0
Canada					0
Croatia					0
France	55,686	15,602		84,936	156,224
Germany	26,265	20,421	190,726	147,636	385,048
Greece					0
Hong Kong, China	1,492	602	520	605	3,219
India					0
Ireland	322			88	410
Israel	143		175		318
Italy					0
Japan	1,583	6,569	864	1,145	10,161
Kenya					0
Malaysia					0
Netherlands				12,296	12,296
New Zealand		4,913			4,913
Nigeria					0
Norway	9,649	10,623	11,070	18,024	49,366
Poland					0
Russian Federation	3,117	2,357	2,201	2,438	10,113
Singapore					0
South Africa	443		185	352	980
Sweden					0
United Kingdom		22,685		22,667	45,352
USA	1,744	11,536	4,830	1,752	19,862
14 of 27 Contributing Countries	100,755	95,630	213,052	292,822	702,259

Figure 2: Number of observations by CMs for each quarter of 2017 (CMs without any contribution in 2017 are marked in red)

VOS Data Quality 2017

- When evaluated against the MQCS, the majority of the reported elements were again found to be of good quality. Such elements were assigned a QC Flag of '1' meaning 'element appears correct'. For example, frequently reported elements such as air pressure, air temperature, wind direction, wind speed and sea surface temperature were flagged with a '1' in over 98% of cases.
Several air temperatures observed in winter in polar regions failed the MQC check: "If latitude is greater than 45 degrees and air temperature less than -25 °C then element appears to be doubtful." They were flagged with '3' (doubtful) although they were correct. This check should be revised for future versions of the MQCS (see "recommendations" below).
- There were 85 observations (0.01%) showing on-land positions. These are plotted as red dots in Figure 3.
- The TurboWin coding problem of the previous year persists, leading to a number of IMMT-4 and -5 files being submitted with erroneous relative humidity values. These data were identified and the corrected files made available on the German WMO Information System (WIS) Global Information System Centre (GISC). Until the coding problem is resolved, the GCCs will correct the data before processing and distribution.
- No previously exchanged datasets had to be corrected in 2017.
- Quarterly analysis of the exchanged datasets identified 68 duplicate observations (0.0097%) that were rejected by the MQCS. Analysis of the yearly dataset highlighted that the number of duplicate observations rejected increased to 85 (0.012%). These observations failed MQC but were included at quarterly exchange.
Before each quarterly data exchange, duplicates arising as a result of the same observations being submitted in a previous contribution were deleted. Unfortunately, duplicate observations submitted in different quarters cannot be identified before the annual calculations.
- A small number of observations containing erroneous positions were identified, and after consultation with the appropriate CM, deleted.
- The RM USA (NOAA) supports the ICOADS (International Comprehensive Ocean-Atmosphere Data Set) by submitting the quarterly MQC-checked dataset from the GCCs.

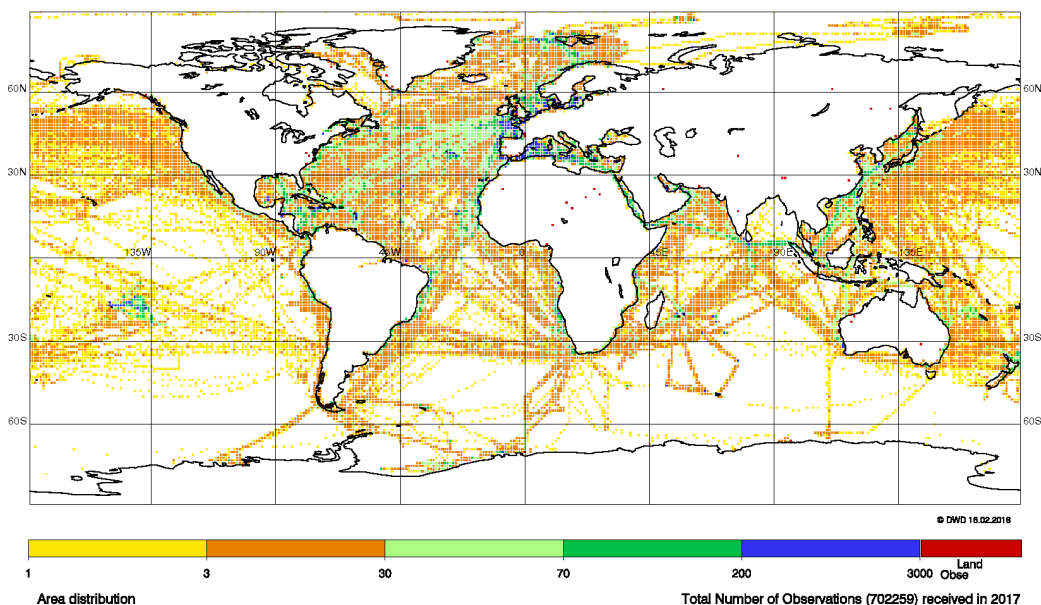


Figure 3: Distribution of observations received in 2017

VOSClm Class Data 2017

- 294,873 observations were received and processed from VOSClm registered ships.
- This represents 42% of data received by the GCCs from the VOS fleet.
- 10 of the 12 CMs with registered VOSClm ships submitted observations (Figure 4).
- The GCCs received data from over 312 listed VOSClm ships.
- 210,716 of the VOSClm observations (71%) contained the VOSClm defined additional elements.
- The CMs France, Japan, Hong Kong and USA provided nearly 100% of VOSClm elements in the VOSClm reports.

Total Number of Observations from VOSClm-Ships / Number of Observations with VOSClm-Elements from VOSClm-Ships / Number of Observations with VOSClm-Elements from not listed ships 2017															
Country Name	1st Quarter			2nd Quarter			3rd Quarter			4th Quarter			Total		
Australia	203	202	0	0	0	0	247	145	81	409	258	0	859	605	81
Canada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
France	55.686	55.686	0	15.602	15.602	0	0	0	0	69.183	69.138	15.644	140.471	140.426	15.644
Germany	10.378	8.975	198	7.628	6.711	313	8.996	2.681	102	64.643	7.862	493	91.645	26.229	1.106
Hong Kong, China	1.492	1.492	0	0	0	0	0	0	0	240	149	2	1.732	1.641	2
India	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Japan	0	0	0	3.019	3.019	0	0	0	0	0	0	0	3.019	3.019	0
Netherlands	0	0	0	0	0	0	0	0	0	11.853	6.897	318	11.853	6.897	318
New Zealand	0	0	0	1.603	0	0	0	0	0	0	0	0	1.603	0	0
South Africa	443	0	0	0	0	0	185	0	0	352	0	0	980	0	0
United Kingdom	0	0	0	20.333	13.537	322	0	0	0	17.991	14.037	990	38.324	27.574	1.312
USA	455	448	1.262	2.559	2.526	6.436	711	698	3.799	662	653	1.062	4.387	4.325	12.559
10 of 12 countries	68.657	66.803	1.460	50.744	41.395	7.071	10.139	3.524	3.982	165.333	98.994	18.509	294.873	210.716	31.022

Figure 4: VOSClm class observations submitted by CMs for each quarter of 2017

Recent Developments

Meetings and Activities

GCC meeting

The two GCCs met in Edinburgh, Scotland, in July 2017 to discuss a number of issues relating to operations, including how to encourage countries to submit their data and how to help those with automated ships to submit delayed mode data.

The current status of the GCCs and the status of the new MCDS were discussed.

Within the new MCDS, the GCCs will be transitioned to global VOS-GDACs.

It is planned to pursue an application for a CMOC by ICOADS.

Preparations were made for the representation of the GCCs at JCOMM-5 on behalf of the ETMC.

The list of contact points of CMs/DACs will be updated by contacting each service, assistance may be requested from SOT.

There are several European countries using EUCAWS. We will suggest to the DWD to write a documentation on how to convert data from the EUCAWS into IMMT to avoid issues with element specifications.

JCOMM-5 session:

From 25 to 29 October 2017 the fifth JCOMM session was held at the WMO headquarters in Geneva, Switzerland (<http://meetings.wmo.int/JCOMM-5/>). During the session several documents with relevant decisions for the future operation of the GCCs were approved.

With the acceptance of the revised versions of the WMO documents 471 and 558, the MCDS (Marine Climate Data System) replaces the, now obsolete, Marine Climatological Summaries Scheme (MCSS).

The MCDS provides a more generic scheme for marine climate data and includes data centres for oceanic as well as atmospheric data. The data flow in the MCDS is organized from the data sources via DACs (Data Acquisition Centres) and GDACs (Global Data Acquisition Centres) to CMOCs (Centres for Marine Meteorological & Oceanographic Climate Data) (see Figure 5).

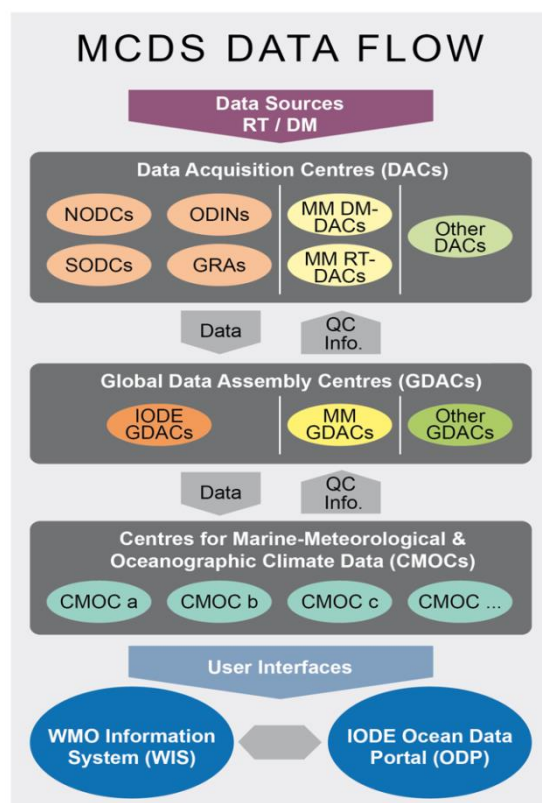


Figure 5: Data flow in the new JCOMM Marine Climate Data System (MCDS)

The operation of the CMs and GCCs will continue in the new MCDS under the new nomenclature. The GCCs will be transitioned to VOS-GDACs, while the former CMs will have the role of a DAC (Data Acquisition Centre). A formal confirmation of the new status will be sent out by WMO during the year 2018 to the current CMs and GCCs.

To complete the data flow for VOS data, it is envisaged to establish a CMOC (Centre for Marine Meteorological & Oceanographic Climate Data) that will cover the operation of International Comprehensive Ocean-Atmosphere Data Set (ICOADS) and will provide collections and products of current and historic marine-meteorological data.

Further important changes relevant to the VOS operation were approved during JCOMM-5 for the Observations Program Area:

1. Adoption of the SOT identifier (SOT-ID), which provides unique identifiers for marine platforms and instrument systems / packages on ships. JCOMMOPS will handle the assignment of the SOT-IDs and maintain the SOT-ID list. The length of the SOT-ID will be 7 characters and hence will comply with the IMMT “Ship’s call sign” element.
2. The VOS Metadata Database (WMO Pub. No. 47) will be transitioned to JCOMMOPS, where it will be maintained in the future and in line with the WIGOS (WMO Integrated Global Observing System) Metadata Standard.
3. To achieve better compliance with WIGOS metadata standards, the number of VOS classes will be reduced to three, instead of the current 8 classes:
 - a. NMHS Operated
 - b. NMHS Cooperative
 - c. Independent

The actions for implementation of these changes to VOS operation and the changes to the relevant WMO documents will be taken through SOT.

More detailed information on the decisions made during JCOMM-5 can be found in the relevant approved documents from the session:

http://meetings.wmo.int/JCOMM-5/.../JCOMM-5-d06-3-MARINE-CLIMATOLOGY-AND-CLIMATE-DATA-SYSTEM-approved_en.docx

http://meetings.wmo.int/JCOMM-5/.../JCOMM-5-d07-3-OBSERVING-BEST-PRACTICES-AND-STANDARDS-approved_en.docx

Assisting CMs

The DWD assisted Israel, New Zealand and the Netherlands in preparing their contributions in 2017.

HQC Development

New Higher Quality Control Standard (HQCS) developed by DWD is proposed to be used as the basis for a software package for automatic quality checks within the new MCDS GDACs.

Recommendations

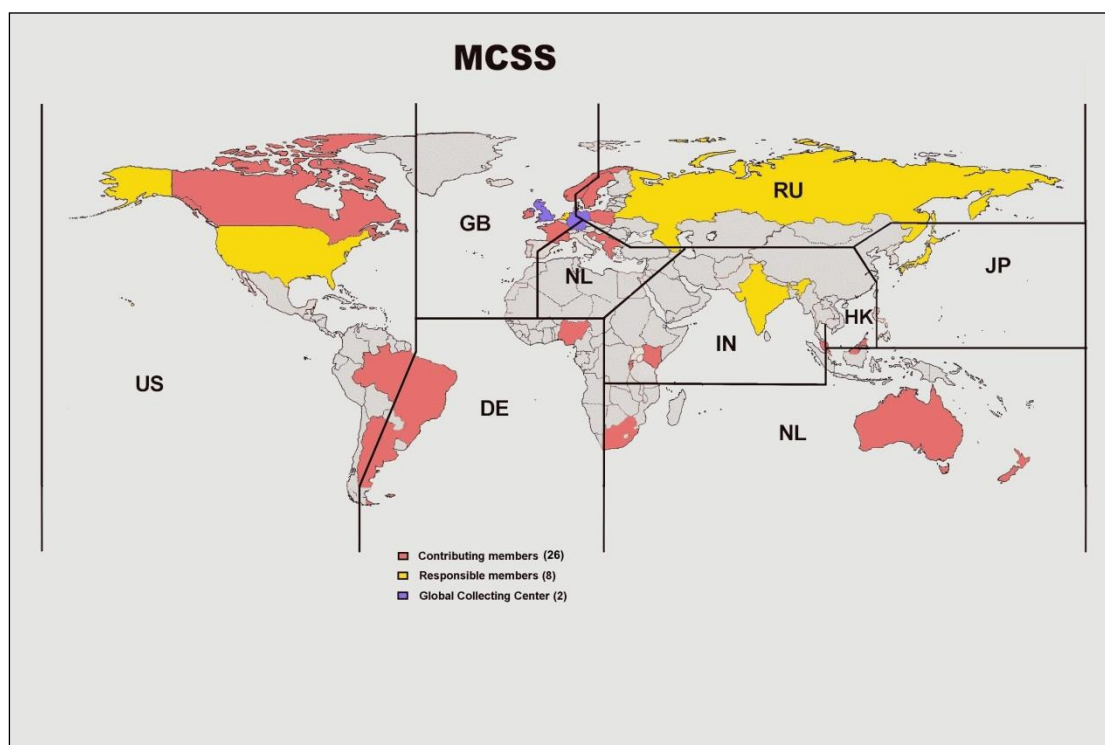
To improve data availability and quality, and in light of the recent developments, the GCCs make the following recommendations:

- CMs should submit their observations only once. If there is a requirement to resubmit data (e.g. quality improvements) then the GCCs should be made aware of this.
- CMs should submit data files in one IMMT format only – preferably now IMMT-5.
- Where problems arise that prevent a CM submitting its data e.g. when digitizing or converting into the IMMT format, GCCs should be asked for advice.
- By applying MQCS to data prior to submission, CMs can identify and solve significant problems, in particular issues within date, time and position.
- All VOSclim class ships should use the indicator for registered VOSclim ships in element 41 (observation platform), in the formats IMMT-4 and -5, with the option set to 4.
- All VOSclim class ship observations should include the additional VOSclim elements.
- CMs with Voluntary Observing Ships reporting the additional VOSclim elements should consider listing the vessels within the VOSclim program.
- If possible, convert all masked call signs (i.e. 'SHIP') back to the original ID prior to submission.
- CMs and RMs should stay up to date with MCDS developments in order to ensure they know how they might be affected in the future or how they may contribute in the present. Most recent documents and session reports are available on the JCOMM-5 website.
- Current CMs and RMs will have the role of Data Acquisition Centres (DACs) in the MCDS. The formal accreditation process for the new DACs will be started in 2018 by WMO/JCOMM.
- Where fleets contain automated ships, CMs should make every effort to ensure that delayed-mode data is submitted to the GCCs.
- MQCS should include threshold checks for element 102 (Relative humidity) and Element 103 (Relative humidity indicator) in the IMMT-4 and IMMT-5 format
- MQCS should be revised for Element 16 and 17 (sign and air temperature) in the IMMT-4 and IMMT-5 format. The check is too rigorous in particular during winter time in high latitude regions. We suggest that this issue should be put forward for consideration by JCOMM.
- The IMMT-format should be expanded to accommodate the extra resolution that BUFR provides for certain elements, for example the date/time group should include minutes and positions and temperatures should be expanded to take the resolution of one hundredth of a degree rather than one tenth.
- As Contributing Members (CMs) continually move to automate voluntary observing fleets there is a risk that data could be lost. At present a substantial volume of data produced by automatic weather systems on board VOS is not being submitted to the GCCs. In order to do this, common procedures for producing observations in the IMMT format directly from AWS, or for converting observations into the IMMT format at a later stage should be investigated.
- CM and GCCs should ensure interoperability with JCOMMOPS regarding future versions of WMO Pub. No. 47
- Adaptation of IMMT and MQCS to handle the three new VOS classes.

Appendix A: CM contribution by year since GCCs began operations in 1994

	ISO Alpha-2 code	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Number of Years with Contributions 1994 - 2017	
Argentina	AR							X	X																	7	
Australia	AU							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Brazil	BR	X	X	X	X																						4
Canada	CA																		X	X	X	X	X	X			6
Croatia	HR				X	X	X	X	X												X	X					7
France	FR	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	20
Germany	DE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	24
Greece	GR																	X	X	X							3
Hong Kong, China	HK	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	24
India	IN	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	20
Ireland	IE			X	X	X				X							X	X	X	X			X	X	X	X	12
Israel	IL		X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X						20
Italy	IT																					X					1
Japan	JP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	24
Kenya	KE																										0
Malaysia	MY	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	19
Netherlands	NL	X	X	X		X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	22
New Zealand	NZ													X	X	X	X	X	X	X			X	X	X	X	11
Nigeria	NG																										0
Norway	NO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	21
Poland	PL	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	23
Russian Federation	RU																										23
Singapore	SG		X	X	X	X					X	X	X	X							X						9
South Africa	ZA						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	19
Sweden	SE			X														X	X	X		X	X				6
United Kingdom	GB	X	X	X	X	X	X	X		X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	22
United States	US	X	X	X	X	X	X	X		X	X				X	X	X	X	X	X	X	X	X	X	X	X	20

Appendix B: Countries and regional responsibilities under the MCSS (updated 2009)



Appendix C: List of acronyms

APP	Ancillary Pilot Project
AWS	Automatic Weather Station
CM	Contributing Member
CMOC	Centre for Marine Meteorological and Oceanographic Climate Data
DAC	Data Acquisition Centre
DMCG	Data Management Coordination Group
DWD	Deutscher Wetterdienst
E-SURFMAR	EUMETNET Surface Marine Programme
ETMC	Expert Team on Marine Climatology
EUCAWS	European Common Automatic Weather Station
EUMETNET	the Network of European Meteorological Services
FTP	File Transfer Protocol
GCC	Global Collecting Centre (MCSS / JCOMM)
GDAC	Global Data Assembly Centre
GISC	Global Information System Centre (of WIS)
HQCS	Higher Quality Control Standard
ICOADS	International Comprehensive Ocean-Atmosphere Data Set (USA)
IMMT	International Maritime Meteorological Tape Format
IOC	Intergovernmental Oceanographic Commission of UNESCO
IODE	International Oceanographic Data and Information Exchange
JCOMM	Joint WMO/IOC Technical Commission for Oceanography and Marine Meteorology
JCOMMOPS	JCOMM in-situ Observing Platform Support Centre
MCDS	Marine Climate Data System
MCSS	Marine Climatological Summaries Scheme
MQCS	Minimum Quality Control Standard
NCEI	National Centers for Environmental Information
NMDIS	National Marine Data and Information Service
NMHS	National Meteorological and Hydrological Service
NOAA	National Oceanic and Atmospheric Administration (USA)
ODP	Ocean Data Portal
QC	Quality Control
RM	Responsible Member
SOA	State Oceanic Administration
SOT	Ship Observations Team
TT-MCDS	Task Team on Marine Climate Data System of ETMC
UK	United Kingdom
VOS	Voluntary Observing Ship
VOSCLim	VOS Climate (Subset for High Quality Data)
WIGOS	WMO Integrated Global Observing System
WIS	WMO Information System
WMO	World Meteorological Organization