WORLD METEOROLOGICAL ORGANIZATION

JOINT WMO/IOC TECHNICAL COMMISSION FOR OCEANOGRAPHY AND MARINE METEOROLOGY (JCOMM)
EXPERT TEAM ON SEA ICE – FOURTH SESSION

STEERING GROUP FOR THE PROJECT GLOBAL DIGITAL SEA ICE DATA BANK (GDSIDB) – TWELFTH SESSION

ST PETERSBURG, RUSSIAN FEDERATION
1 TO 5 MARCH 2010

INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION (OF UNESCO)

ETSI-IV GDSIDB-XI/Doc. 3.2 Rev 1
(25.II.2010)

ITEM 3.2

Original: ENGLISH

REPORT BY THE EXPERT TEAM ON MARINE CLIMATOLOGY (ETMC) CHAIRPERSON

(Submitted by Scott Woodruff)

Summary and Purpose of Document

This document contains a report by the Chairperson of the ETMC, providing brief background information on the Team, an update of recent intersessional activities, and discussion of selected future work priorities as agreed by the Third Session of JCOMM (Marrakech, Morocco, 4-11 November 2009). Among those future priorities, one area of particular interest to ETSI is discussed in sec. 3.3: *Continue to explore: making products more readily discoverable and accessible; and the integration of oceanographic and sea-ice climatologies together with marine meteorological information*.

ACTION PROPOSED

The Expert Team on Sea Ice (ETSI) is invited to review the information contained in this report, and comment and make decisions or recommendations as appropriate.

Appendix: Executive Summary from: *Third Session of the JCOMM Expert Team on Marine Climatology, Melbourne Australian, 8-12 February 2010* Draft Final Report

DISCUSSION

1. Team Background

1.1. The Expert Team on Marine Climatology[1] (ETMC) is the successor group to the former Commission on Marine Meteorology's (CMM) Subgroup on Marine Climatology (JCOMM 2000). ETMC was originally established by the First Session of JCOMM (WMO 2001), and re-established by JCOMM-II (JCOMM 2005) and most recently by JCOMM-III (Marrakech, Morocco, 4-11 November 2009).

1.2. The Team's First Session (ETMC-I) was held in Gdynia, Poland (JCOMM 2004), its Second Session (ETMC-II) in Geneva, Switzerland (JCOMM 2007b), and its Third Session (ETMC-III) recently (8-12 February 2010) in Melbourne, Australia (JCOMM 2010). Extensive background documentation for ETMC-III, plus presentations from the accompanying scientific and technical works, are available at the meeting website2, and the Appendix provides the Executive Summary from JCOMM (2010). ETMC falls within the JCOMM Data Management Programme Area (DMPA), with its work programme over the preceding JCOMM intersessional period (i.e. 2005-09) therefore guided in part by the Data Management Coordination Group (DMCG) (JCOMM 2007a, 2008a).

1.3. As resolved by JCOMM-III, the Terms of Reference (ToR) of ETMC were left essentially unchanged. Furthermore, while the Team's membership was reduced from 12 to (up to) eight regular members, four additional representatives have now been added: one each from the two Global Collecting Centres (GCCs), in Germany and the UK, and one each from the JCOMM Services and Forecasting Systems Programme Area's (SFSPA) Expert Teams on Wind Waves and Storm Surges (ETWS) and on Sea Ice (ETSI).

1.4. Since 2005, a website for the Team3 has been hosted by the US National Oceanic and Atmospheric Administration (NOAA) under the International Comprehensive Ocean-Atmosphere Data Set (ICOADS) web-portal. However, appropriate portions of that website are planned for migration in due course to reside under official JCOMM web hosting.

2. Intersessional Activities

2.1. As a major thrust of the intersessional work, ETMC and DMCG initiated modernization of the Marine Climatology Summaries Scheme (MCSS) (established in 1963) via two new task teams: on Delayed-mode Voluntary Observing Ship (VOS) data (TT-DMVOS), and on Marine-meteorological and Oceanographic Climatological Summaries (TT-MOCS).

2.2. TT-DMVOS4 started its operations as from April 2007 with membership from both the JCOMM Observations Programme Area (OPA) and DMPA, focusing primarily on modernizing the management and quality control (QC) of delayed-mode VOS data, while exploring possible connections with Global Telecommunication System (GTS) and other ship-based data.

2.3. TT-MOCS5 is still at an early stage of development, but has discussed options for modernizing the content, format and dissemination methods for MCSS data and products to include respectively, satellite data, Geographical Information System (GIS) compatibility, and Internet-based web services.

2.4. A joint TT-DMVOS/TT-MOCS planning meeting was held in Gdynia, Poland, 10 May 2008; and a follow-up TT-DMVOS meeting was held in Venice, Italy, 22 September 2009 (in conjunction with the OceanObs'09 conference). For TT-DMVOS, a number of detailed new proposals are being

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[1] : http://www.jcomm.info/etmc-tor
[2] : http://www.jcomm.info/etmc3
[3] : http://icoads.noaa.gov/etmc/
[4] : http://www.jcomm.info/tt-dmvos
[5] : http://www.jcomm.info/tt-mocs

developed for enhancing data flow, including refining and optimizing the roles of the GCCs (see Woodruff et al. 2010 for a brief summary, and the JCOMM website[6] for additional details). For TT-MOCS, it was agreed that the limited near-term focus would be on climatologies, and some preliminary work was done to engage science partners.

2.5. In conjunction with the MCSS modernization, a fairly extensive set of modifications and extensions (including extensive work to upgrade the documentation) was proposed for the International Maritime Meteorological Tape (IMMT) format, together with a smaller set of modifications for the Minimum Quality Control Standard (MQCS). The IMMT changes included clarifying the coding procedure for source of observation (elem. 40) and observation platform (elem. 41), and including space for an International Maritime Organization (IMO) number (unique for most VOS) at the end of each record. MQCS changes included increasing the limit of the maximum height of deck cargo above summer maximum load line (elem. 90) to 40 metres in order to allow for the latest generation of larger cargo vessels being built. Subsequently, these changes were adopted by JCOMM-III (Rec. 12/1), such that the new versions (IMMT-IV and MQCS-VI) are to be implemented generally for all data collected as from 1 January 2011.

2.6. As an important consideration related to the TT-DMVOS component of the MCSS modernization, ICOADS has implemented the widely used International Maritime Meteorological Archive (IMMA) format (Woodruff 2007). Similarly, related to the TT-MOCS component, ICOADS already maintains a variety of extensive monthly summary products (plus some QC climatologies), which furthermore are proposed to feed into the WMO Integrated Observing System (WIGOS) Pilot Project for JCOMM. The second TT-DMVOS meeting (22 Sept. 2009) discussed possibilities for convergence with ICOADS as part of the modernization, including greater interoperability in terms of formats (e.g. initially to introduce quarterly output by the GCCs of IMMA as a format option, in addition to IMMT), and in the development of a proposed Higher Quality Control Standard (HQCS).

2.7. ETMC lead organization of the Third JCOMM Workshop on Advances in Marine Climatology (CLIMAR-III, Gdynia, Poland, May 2008), with 69 participants from 19 countries representing all but one WMO Regional Association (JCOMM 2008b, Charpentier et al. 2008). That workshop recommended continuing two alternating workshop series: (1) “Advances in the Use of Historical Marine Climate Data” (Kent et al. 2007a), with a third such “MARCDAT” workshop around 2010; and (2) a fourth CLIMAR in that separate workshop series around 2012. In 2007, the CLIMAR-II special issue (Gulev 2005) was finalized as a revised (from WMO 2003) Dynamic Part of WMO (1994), and the *International Journal of Climatology* (of the Royal Meteorological Society) is publishing a second revision based on CLIMAR-III papers.

2.8. With support from the NOAA Climate Database Modernization Program (CDMP), imaging and digitization of VOS platform and instrumental metadata (WMO 1955, Pub. 47) was completed back to 1955, together with imaging of 1973-93 volumes (Kent et al. 2007b). In view of ongoing delays, WMO has been urged to allocate sufficient resources to the development and maintenance of Pub. 47.

2.9. The Ocean Data Acquisition System (ODAS) Metadata Service (ODASMS), operated by Chinese National Marine Data and Information Service (NMDIS), continued to develop its meta-database and website. ETMC-II recommended (with subsequent approval by JCOMM-III) that Service take over metadata formerly managed in the *On-line Information Service Bulletin on Non-drifting ODAS* operated by Integrated Science Data Management (formerly MEDS) of Canada.

2.10. Noting longstanding unresolved metadata issues, ETMC-II further recommended that for “rigs and platforms, manual observing systems should be treated as a ‘ship’ and their metadata included in Pub. 47; automated systems onboard rigs and platforms should be treated as a ‘buoy’ and their metadata included in the ODASMS.” While the Ship Observations Team (SOT) later suggested excluding non-ship data types from Pub. 47, a coordinated strategy still needs to be devised for the preservation and archival of metadata associated with ocean rigs and platforms,

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[6] : http://www.jcomm.info/MCSS-mod

and to determine the appropriate roles in this regard of WMO-No. 47 versus ODASMS (as well as other emerging international metadata activities, including JCOMMOPS and the "Meta-T" project).

2.11. ETMC-II recommended, and DMCG-III endorsed with a few caveats, both the general recommendation that work be undertaken to carefully validate the Binary Universal Form for the Representation of meteorological data (BUFR) and other Table Driven Codes (TDCs), so as to ensure that originally reported data are completely and accurately preserved; and a set of more detailed suggested requirements for continuing consideration (JCOMM 2007b). Since then, DMPA established a cross-cutting task team (TT-TDC[7]) to coordinate the development and evolution of the use of TDCs within JCOMM, and their implementation with the WMO Commission on Basic Systems (CBS).

2.12. ETMC-II discussed differences among VOS (and buoy) data sent on the GTS from different operational centres, apparently because of QC, storage, or archival decisions. To help improve and validate the data collection process, ETMC-II recommended a detailed intercomparison, which has been entirely focused on December 2007 ship data (available results to be discussed at this meeting).

2.13. DMCG-III requested an overview report on marine QC issues, focused on surface data reported by VOS and Research Vessels (R/Vs), to help initiate the process of standardizing QC (DMPA 2008). Possible broadened involvement has since been explored, but more work is needed to finalize the report for proposed submission to the IODE-JCOMM Standards process[8].

2.14. ETMC, DMPA, and ETWS cooperated to define and initiate an extreme wave events archive, which the US National Oceanographic Data Center (NODC) recently agreed to host. Work continues to identify events and provide initial data, and wider participation will be sought. Also, the potential for calculation of wave monthly summaries for the ICOADS remains under continuing discussion with ETWS.

2.15. ETMC and ETWS worked with the WMO Commission for Climatology (CCl) and the Climate Variability and Predictability (CLIVAR) program, through the CCl/CLIVAR/JCOMM Expert Team on Climate Change Detection and Indices. Potential new links with CCl were initially discussed at ETMC-II, where it was anticipated that TT-MOCS would form a useful point of interaction. An informal discussion during CLIMAR-III explored potential new links with CCl and future directions for marine climatology in the context of the WMO Strategic Plan. It was agreed that stronger links should eventually be established between JCOMM and CCl and synergies further developed. These could also include WIGOS, discovery and platform/instrument metadata, extreme events, integrated products, and capacity building.

2.16. ETMC-II discussed the status of historical data rescue, including the "RECovery of Logbooks And International Marine data" (RECLAIM[9]) project (Wilkinson et al. 2010; see also e.g. Brohan et al. 2009). ETMC continued work on other data and metadata archaeology activities, including documenting the history of marine ship codes (e.g., WMO–No. 306, *Manual on Codes*). ETMC-II endorsed the decision to make available the Deutscher Wetterdienst (DWD) historical marine archive, in accordance with a recommendation from the GCOS AOPC/OOPC Working Group on Surface Pressure. High priority selections from the DWD archive were subsequently made available and blended into ICOADS Release 2.5 (Worley et al. 2010; Woodruff et al. 2010).

3. Discussion of Future Selected Priorities from JCOMM-III (ref. ETMC-III/Doc 2)

3.1. *Review the issue of reporting accuracy of GPS positions in coded reports and climate records (with SOT and TT-TDC)*: For "coded" data, this has a bearing on the development of improved BUFR templates for VOS and other data, as well as future improvements in the formats

[7] : http://www.jcomm.info/tdc
[8] : http://www.oceandatastandards.org/
[9] : http://icoads.noaa.gov/reclaim/

(IMMT and IMMA) used for VOS and other climate records. This also relates to a larger DMPA priority: *Endorse the upgrading of present BUFR encoding for marine variables to include instrument/platform metadata*.

3.2. *Continue to actively plan and implement the modernization of the MCSS (TT-DMVOS and TT-MOCS)*: These important modernization efforts are expected to continue to be a primary focus for ETMC. As part of the work, useful opportunities for interoperability, such as via the IMMA format and with ICOADS, should be fully explored in order to help achieve the goals of the modernization as quickly and efficiently as possible. As another important upcoming priority in the area of climatological product development and dissemination, the membership and work plans of TT-MOCS need to be updated and advanced as quickly as feasible.

3.3. *Continue to explore: making products more readily discoverable and accessible; and the integration of oceanographic and sea-ice climatologies together with marine meteorological information (TT-DMVOS and TT-MOCS)*: Improvements in product discoverability and accessibility will likely to rely on technological advances in the use of metadata (e.g. Snowden et al. 2010). Previously, JCOMM-II had also recommended that ETMC explore how oceanographic and ice climatologies could be coordinated with the marine meteorological data, so that the results could be viewed as an integrated product. That earlier guidance was considered in development of the ToR of TT-MOCS (however, as noted above the work of that task team now needs to be renewed).

3.4. *Devise a coordinated strategy for the preservation and archival of metadata associated with ocean rigs and platforms (with SOT, JCOMMOPS, and other interested groups)*: These offshore installations can provide high values of quality data; presently, however, they are not managed by JCOMM as an independent network. Other complications include how these metadata should be collected (e.g. E-SURFMAR currently acts as a temporary repository for Pub. 47 metadata); and that some mobile drilling rigs are ship-shaped and lend themselves more to the Pub. 47 format, whereas that format may be unsuitable for fixed platforms. JCOMM-III requested, since this issue was related other metadata activities that have also been under consideration by ETMC (e.g. Meta-T, ODASMS), that ETMC resolve discussion with the above-mentioned groups.

3.5. *Continue to contribute towards development of the extreme wave archive, and to evaluate the potential for calculation of wave monthly summaries for ICOADS (with ETWS and US NODC)*: While the initial concept for the extreme wave archive has been successfully established, together with its hosting at US NODC, much more work is needed to help populate the archive and eventually make products available. Moreover, preliminary comparisons of moored buoy for this purpose detected some US archive differences that will need to be resolved so as to identify genuine extreme events (and which will also be indirectly beneficial to NOAA in harmonizing its permanent archives of the historical buoy data). The potential for calculating wave summaries for ICOADS has been under consideration for several years, but resource limitations and questions about the impacts of code changes within the historical VOS and other wave records have thus far slowed progress.

3.6. *Continuation of both successful workshop series with a MARCDAT-III around 2010-12, followed as appropriate in approximately two years by a CLIMAR-IV*: These two workshop series have proved to be a very successful focus for ETMC, with widely available published outcomes for example currently produced from CLIMAR via the *International Journal of Climatology* special issues. A variety of potential venues, and scheduling possibilities, for MARCDAT-III have already been discussed, but the timing of that next workshop may depend e.g. partly on the scheduling of JCOMM-IV.

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EXECUTIVE SUMMARY FROM: *THIRD SESSION OF THE JCOMM EXPERT TEAM ON MARINE CLIMATOLOGY, MELBOURNE AUSTRALIAN, 8-12 FEBRUARY 2010* DRAFT FINAL REPORT

The third meeting of the JCOMM Expert Team on Marine Climatology was held at the headquarters of the Australian Bureau of Meteorology (BOM), from 8 to 12 February 2010.

The main goals of the meeting were to review the status of the modernization of the Marine Climatological Summaries Scheme (MCSS), address guidance from the third session of JCOMM, Marrakech, Morocco, 4-11 November 2009, and advance the team work programme until the fourth session of JCOMM in 2012.

A scientific and technical workshop was organized during the first day and the morning of the second day of the session, and twenty-nine presentations made covering JCOMM aspects, contributions and requirements of the World Climate Research Programme (WCRP) and other climate related programmes, data and metadata issues including operational data flow and archaeology and archival aspects, marine meteorological and oceanographic climatological summaries, and data quality and exchange.

The meeting achieved consensus, and permitted to make substantial progress regarding a number of issues including in particular:

- A proposal to establish a pilot project to develop approaches for dissemination of bias adjustments and corrections alongside marine climate observations, and using presently available corrections to prove concept;
- A proposal to establish a pilot project on wave climate summaries;
- Thanks to the work of the cross cutting ETMC/SOT Task Team on Delayed Mode VOS Data (TT-DMVOS); substantial progress was made with regard to the definition of the data flow part of the modernization of the MCSS, including higher level quality control, and the use of co-located first guess field data from Numerical Weather Prediction (NWP), as well as satellite data;
- A strategy was proposed for addressing data preservability particularly in relation to the use of table driven codes;
- A proposal for the encoding of ship's identification for addressing the ship security issue in such a way as the marine climatology requirements are better addressed;
- A proposal to initiate a pilot study to investigate the current content of the Ocean Data Acquisition Systems (ODAS) Metadata Service (ODASMS) and the Water Temperature Metadata (META-T) servers in terms of metadata available from operational observing platforms;
- Solutions proposed for the management of rigs and platforms, and associated metadata;
- A proposal for establishing a network of mirrored WMO-IOC Centres for Marine-meteorological and Ocean Climatological Data (CMOC) where the International Comprehensive Ocean-Atmosphere Data Set (ICOADS) would be integrated;
- Proposed submission of a standard for the Quality Control of surface marine data to the JCOMM/IODE[10] standards process;
- Development of a template for documenting the requirements for long-term marine surface physical observations;

[10] : IODE : International Oceanographic Data and Information Exchange (of IOC)

- Strengthening the links with the WMO Commission for Climatology (CCl) in particular regarding interoperability issues, marine indices and the monitoring of extremes events, data preservability, and data rescue, and contributions to the Global Framework for Climate Services (GFCS);
- Strengthening the cooperation with the satellite community, in particular for seeking the creation of match up satellite database;
- Compilation of catalogue of data available from Research Vessels;
- Strategy for improving the extreme wave database, and considerations for climatologies of storm surges, and sea-ice;
- Plans for the modernization of the Marine Climatological Summaries (MCS) part of the MCSS through the work of the ETMC Task Team on Marine Meteorological and Oceanographic Climatological Summaries (TT-MOCS);
- Plans for organizing a third International Workshop on Advances in the Use of Historical Marine Climate Data (MARCDAT) tentatively in Italy in the end of 2010 or early 2011 and in close relationship with the satellite community;

Plans for organizing a fourth JCOMM Workshop on Advances in Marine

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