

REPORT OF THE EVALUATION COMMITTEE CONCERNING THE APPLICATION OF CHINA TO ESTABLISH A CMOC AT NMDIS IN TIANJIN, CHINA

(Submitted by the chair of the evaluation committee, Sissy Iona, 7 July 2014)

1. Introduction

1.1. JCOMM-4 (Yeosu, Republic of Korea, May 2012) adopted Recommendation 2 (JCOMM-4) on the Marine Climate Data System (MCDS), which particularly established a network of Centres for Marine-Meteorological and Oceanographic Climate Data (CMOCs) building on existing facilities as appropriate. The Terms of Reference of CMOCs together with their capabilities and corresponding functions are provided in Annex 2 of the Recommendation. The mechanism for formal designation and withdrawal of CMOCs by WMO and IOC is detailed in Annex 3 of the Recommendation. Through this Recommendation, JCOMM-4 also agreed that the National Marine Data and Information Service (NMDIS) of the China State Oceanic Administration (SOA) and the Deutscher Wetterdienst (DWD) could each undertake the functions of a CMOC on a trial basis and should report on the results to JCOMM through the Management Committee. Both China and Germany had submitted applications in 2012 for establishing CMOCs in Tianjin, and Hamburg respectively.

1.2. JCOMM-4 also requested the Expert Team on Marine Climatology (ETMC), in close cooperation with IODE and other appropriate partners such as the ICSU World Data System, to develop, review and update the MCDS strategy, implementation plan, designation criteria and performance indicators of CMOCs in the next two years for achieving the Vision for a new MCDS, based upon the results of the Workshop for a new Marine Climate Data System (MCDS1, 28 Nov.-2 Dec. 2011, Hamburg, Germany) and Ocean Data Portal technologies development.

1.3. Based on JCOMM-4 recommendations, an evaluation process, including evaluation criteria, for CMOC applications was proposed by the ETMC and the DMCG, and approved by the Twenty-second Session of the IOC Committee on International Oceanographic Data and Information Exchange (IODE) (Ensenada, Mexico, 11-15 March 2013). See the final report of IODE-22 for the details of the evaluation process, evaluation criteria, and the terms of reference of the evaluation committee. The criteria are presented in the form of questions, for which a simple "criterion met" or "criterion not met" is possible. Generally, if there is uncertainty in achieving a "criterion met" response, the criterion should be judged as unmet.

1.4. According to this agreed evaluation process, an evaluation committee was established by the DMCG in consultation with the IODE, and included the following individuals:

- Sissy Iona, JCOMM/DMPA co-ordinator, and chair of the evaluation committee
- Arial Troisi, as IODE Representative
- Scott Woodruff, JCOMM Representative (WMO side)

1.5 This document provides for the evaluation and recommendations of the committee above regarding the application of China for establishing a CMOC in Tianjin at the NMDIS.

2. Evaluation of the CMOC application of China

2.1 The CMOC function was initially designed around ICOADS (and the World Ocean Database would seem to be another longstanding activity with great potential to be formalized in due course as a CMOC). Both ICOADS and WOD have long track records of reliability and experience in integrating wide ranges of data/metadata, and making them widely available to the scientific community.

2.2 Therefore, with appropriate re-focusing China could make a very important contribution with similar resources etc. as they have outlined. The Committee therefore requests China to develop a focused and appropriate near-term CMOC project plan, with the proposed functions to be coordinated in advance by WMO-IOC and the community, including with the ICOADS and WOD projects. The project plan should explain in detail how the CMOC of China will complement existing functions such as the ICOADS, and the WOD, and collaborate with other appropriate MCDS centres such as the current GCCs to become MCDS GDACs. One example is historical data/metadata rescue, which China did highlight to some degree in their application, and made some very important contributions of digitizing historical ship records for ICOADS several years ago.

2.3 A first evaluation of the statement of compliance and commitment submitted by China in 2012 was conducted by the committee in 2013 and early 2014. However, it was difficult to evaluate the proposal because the evaluation criteria had not been defined at the time when China submitted its proposal. This first evaluation presented to, and discussed at the fifth Session of the DMCG (Geneva, 29-31 January 2014). While thanking China for its efforts to develop the CMOC, and recognizing the potential of the future centre to provide the required products and services, DMCG-5 agreed that China should provide additional information regarding its proposal in order to complete the evaluation. In particular, focus and details should be provided on the kind of added value products (i.e. beyond those normally provided by an NODC) the CMOC will deliver (e.g. higher level QC, bias correction, re-analysis of data, statistical products and climate summaries, data rescue), as well as on the kind of support that will be provided to the region (e.g. data rescue for specific data sets, capacity building, etc.).

2.4 China therefore performed a self evaluation against the agreed upon criteria, provided additional information requested by the DMCG-5, and submitted its report to the committee on 27 March 2014.

2.5 Below is the result of the evaluation by the committee against all criteria of the application of China to establish a CMOC taking into account the further feedback received from China.

Criterion 1: Does the scope of activities (rescuing, collecting, controlling quality, calibration and bias correction, processing, archiving, sharing, distributing and mirroring data, metadata and information, products and services) have any unnecessary overlaps with existing activities of an agency operating within the JCOMM data system, with activities of an IODE NODC, with the High Quality Global Data Management System for Climate, with an existing World Data System centre, or with some other well established data management activity? If so, is the added value of the overlap activity well explained and does it warrant the establishment of the CMOC?

In the initial statement of compliance and commitment submitted by China, the list of data processing and quality control (Table 2) included activities which seemed to overlap with preexisting activities. The proposal at this point was far too broad in terms of the types of data, metadata, products, etc. planned for

processing, stewardship, access, etc. (e.g. as detailed in Table 2). Unfortunately, probably this issue arises partly because of the also very broad way that the required functions of CMOCs were originally specified in the now formally approved documentation. The committee invited China to re-focus its application, while the latter could still provide a very important contribution to JCOMM with similar resources.

China has clarified the scope of its application for a CMOC, stressing on the following added value and complementarity with existing JCOMM and IODE functions:

- Collecting marine meteorological data from MCDS GDACs, and other relevant centres to perform the required integration, and undertaking of the combined management of global oceanographic and marine meteorological data, including high level quality control on integrated data (including duplicate elimination and man - computer interactive check, etc.), bias correction, and developing the R&D of statistical products and reanalysis products (regional and global scale) of different spatial and temporal resolutions.
- Integration of the ODAS Metadata Service (ODASMS)
- Contribution to the ICSU/WDS system (former WDC - D for oceanography) through more and higher quality data and integrated products contributed to ICSU/WDS
- Production of specialized dataset for basic ECVs, serial statistical products and reanalysis datasets.

Conclusion for criterion 1: criterion met. The Committee recommends that China clarifies, in liaison with the TT-MCDS, how the activities they propose will complement existing activities such as the ICOADS, and the WOD, and not duplicate with them. For example, the CMOC/China may wish to limit the collection of certain types of data or from a certain region, and offer data rescue for regional or agreed upon global data-sets. Reanalysis efforts will have to be concerted with overall JCOMM efforts in this regard (appropriate Technical Regulations to be proposed by the ETMC for the MCDS at a later stage).

Criterion 2: If the scope of activities is regional, is there evidence of support from Member/Member States from the region (e.g. expressions of support)?

The initial evaluation requested clarification of the geographical scope of the application. China replied that the scope is essentially global. However, NMDIS is also actively promoting cooperation programs/projects on marine data and information in the Western Pacific Region. For instance, as the national coordinator of NEAR-GOOS, NMDIS has been undertaking data exchange management and service for China NEAR-GOOS Delayed Mode Database (CDMDB); as the host center of IODE/ODINWESTPAC, NMDIS actively promotes the development and cooperation of the project.

Also, DMCG-5 recognized that strong support has been expressed by JCOMM members during JCOMM-4 since the JCOMM Session agreed to have China operate a CMOC on a trial basis. DMCG-5 therefore considered that this criteria was met.

Conclusion for criterion 2: criterion met. The Committee is inviting China to consider to provide a regional focus for its CMOC.

Criterion 3: Does the proposal for the CMOC explain clearly how its activities will be coordinated with other relevant, existing systems (such as with well described procedures, letters of cooperation, expressions of support from major data providers)?

In the initial statement of compliance and commitment, there was no clear explanation on this item. However the plan for cooperation (and coordination) with other CMOCs was mentioned. In its self evaluation, China clarified coordination with DBCP, Argo, GTSP, ICOADS, and the US NODC and its World Ocean Database on related data management systems.

Conclusion for criterion 3: criterion met.

Criterion 4: Is the proposed CMOC activity well defined, scientifically sound (e.g. supported by a publication record), and does it fill a clearly articulated and real gap in formal WMO or IOC data management activities?

The initial Statement of Compliance and Commitment from China was not specific enough in this regard. The committee noted that it could turn out to be a real benefit to WMO-IOC if the extensive resources and commitment that China is bringing forward could be re-focused appropriately. In its self evaluation, China provided sufficient evidence that the proposed activities of CMOC China are well defined and scientifically sound. A list of relevant scientific publications was provided. Through the CMOC development China is committed to (i) improve its operational services to achieve direct access to all global marine-meteorological and oceanographic climate data, metadata, and related products via the CMOC network, (ii) actively undertaking the integration, standardization, high level quality control, including elimination of duplicate MCDS data; (iii) actively participating in the research and development of oceanographic and marine-meteorological products of different spatial and temporal resolutions, and their related services, and (iv) providing technical training, and carrying out capacity building activities for the Western Pacific region.

Essential gaps addressed: Marine meteorological and ocean data rescue, higher quality data made available to end users in the Asia Pacific region, and new integrated met-ocean products.

Conclusion for criterion 4: criterion met.

Criterion 5: Are the variables to be treated not GCOS ECVs? If they are ECVs, is the added value that the proposal brings to management of these variables sufficient to warrant the overlap and the creation of a CMOC?

CMOC China will conduct Higher Level Quality Control for ECVs data, and integrate the data for producing required specialized datasets, including statistical products, and reanalysis products. The added value (see also criterion 1 above) of the data management for these variables is sufficient to warrant possible overlap with other existing data-sets.

Conclusion for criterion 5: criterion met.

Criterion 6: Are the processes for assessing and assigning quality indicators well documented and is this documentation easily available?

Documentation has been produced in the framework of quality management standards in China. National quality standards have been proposed by NMDIS and adopted in China. These will be translated in English, and shared with JCOMM.

More specific to CMOC, China will follow the standards and best practices proposed under the MCDS as they develop, in particular with regard to quality indicators for data, related metadata, and integrated products. China will also seek accreditation according to the new IODE Quality Management Framework (QMF).

All relevant documentation about procedures and processes will be made available by China.

Conclusion for criterion 6: criterion met.

Criterion 7: Will the proposed procedures ensure that the quality within all of the CMOC data sets are internally consistent?

CMOC China will follow the uniform procedures and standards of MCDS for CMOCs, closely cooperate with other MCDS centres, and enhance the internal quality management to ensure the internal consistency of dataset quality.

Conclusion for criterion 7: criterion met.

Criterion 8: Are there any restrictions on access to the data, metadata and information served by the proposed CMOC? If so, do these go against the spirit of free and unrestricted access?

There will be no restrictions on the access to the data, metadata and information served by CMOC China

Conclusion for criterion 8: criterion met.

Criterion 9: Are the infrastructure, experience, financial resources and assigned staff for the proposed CMOC sufficient to meet the planned operations?

The infrastructure and resources outlined are sizable. China is committed to allocate sufficient resources for realizing the development of the CMOC.

Conclusion for criterion 9: criterion met.

Criterion 10: Interoperability means the data, metadata and information are widely visible and available through the WIS and/or ODP. Will this interoperability function be met by the proposed CMOC?

In its CMOC application, China is committed to actively carry out the interoperability with WIS and ODP to achieve the data and metadata collected and processed by CMOC China available for the extensive inquiries and access by WIS and ODP. CMOC China will send technical personnel to communicate and collaborate with WIS and ODP on specific technical details.

Conclusion for criterion 10: criterion met.

Criterion 11: Does the CMOC proposal clearly describe the data domains of its

operations in type(s) of data, geographic, and temporal coverage?

The initial statement of compliance and commitment was overly broad and too unfocused. China therefore clarified the scope and provided details on the data types to be considered, data processing options, as well as geographic and temporal scope.

In terms of data assembly, CMOC/China will maximize the collection of the existing global oceanographic and marine meteorological data, ensuring the full range of global data. Some activities such as data rescue, and integrated products will be focusing on the Asia Pacific region. In a first stage, only historical, delayed mode and real-time observational data will be collected from Argo, GTSP, GLOSS, NEAR-GOOS, DBCP, GTS (marine-meteorological and oceanographic climatological data transmitted through GTS), VOS, and SOOP.

Conclusion for criterion 11: criterion met. The committee encourages China to limit the scope of its CMOC, e.g. to bring a focus on the Asia Pacific region, and establish collaborative arrangements with the ICOADS and WOD for specific data-sets.

Criterion 12: Are there any domain specific procedures to be applied by the proposed CMOC? If so, is their purpose (such as enhancing interoperability, ensuring data quality and consistency, improving access, improving coordination, or other functions) well described, useful and is documentation of these procedures easily available?

The current application covers many domains (marine meteorological, oceanographic, ECVs, global, regional). Regional ocean reanalysis product for the Northwest Pacific and global ocean has been developed, and coupled reanalysis will be conducted in the near future. With the gradual development of CMOC China, free access to detailed description of domain specific procedures to be applied by CMOC China will be provided to the users.

The following types of data-sets will be provided to the end users:

- Integrated ocean dataset
- Specialized data sets for ECVs
- Metadata-sets

For integrating the multi-source marine-meteorological and oceanographic data of different processing levels, CMOC/China will start by studying the integration methods for standardizing the various data types. The required integration practices and procedures such as data adjustment, calibration, classification, feature extraction, and grid data interpolation etc., will be studied by CMOC/China to lay down the technical foundation of this task. Integrated datasets with standardized format and uniform spatial and temporal standards for different instrument/platform and variables will be developed by following the MCDS standards to be developed.

Higher level quality control will apply to data source planning, data integration processing, duplicate removal, specific quality control tests, and the development of integrated datasets, specialized datasets, and metadata sets.

Conclusion for criterion 12: criterion met although the different domains will have to be listed, and corresponding documentation will have to be produced. It is

recommended for China to proceed, developing and releasing a first generation of products using relatively simple or published techniques quite quickly. The development of new techniques could then proceed in parallel to this work

Criterion 13: Are the proposed choices for procedures, standards and best practices to be followed suitable and adequate for data quality and management? Where applicable do they use procedures of the Ocean Data Standards and Best Practices Catalogue? If not, will they propose a new standard or best practice for consideration?

CMOC/China is committed to follow the relevant JCOMM and IODE procedures, standards and best practices for data quality and management. Through cooperation with other CMOCs, DACs and GDACs in the MCDS framework, CMOC/China will be in a position to assist JCOMM and the IODE for improving or updating existing standards relevant to the MCDS, or for proposing new ones.

Conclusion for criterion 13: criterion met.

Criterion 14: Is there a clear description of what the CMOC will undertake to “mirror” their processes, data and metadata? Is there evidence (e.g. a letter of agreement) of a cooperative arrangement with an existing CMOC or another established and ongoing data management system for this mirroring?

Not yet applicable as there are no other relevant CMOCs, presently.

Conclusion for criterion 14: not applicable (criterion regarded as met for the purpose of the evaluation).

Criterion 15: Is the mirroring process sufficiently robust to be reliable and timely?

Not yet applicable. CMOC/China is committed to meet the criterion when more than one CMOC will be in place, and mirroring needed.

Conclusion for criterion 15: not applicable (criterion regarded as met for the purpose of the evaluation).

Criterion 16: Are the proposed methods of version control for data sufficient so that identical copies of data may be distinguished from near identical copies?

The plan for stringent version control is indicated on p. 6, but not described in detail.

CMOC/China is committed to implement the metadata and data process version control methods listed in Criterion # 17 and 18. CMOC/China will also identify and integrate oceanographic and marine meteorological data collected from multiple sources, and eliminate the duplicates (method detailed in the proposal), providing the new datasets together with their associated processing log and information files to the users.

Conclusion for criterion 16: criterion met.

Criterion 17: Are the proposed methods of version control for metadata sufficient to distinguish different versions of metadata?

CMOC/China is committed to implement version control for metadata to distinguish different versions of metadata and data files. Metadata processing lineage will reflect the idea of version control. Data filename will consist of compulsory item, selective item, and postfix (extension). CMOC China has established the first Chinese version of Metadata Processing Procedure, and it will be translated into English in the future for public access by users. The first edition in Chinese will be updated based on more practical experiences. CMOC China will submit the English version to the ETDMP for review in due course. China will also cooperate with JCOMM and IODE to apply recommended procedures, and contribute to their elaboration.

Specific naming instruction for this Procedure is briefly given in the proposal.

Conclusion for criterion 17: criterion met. The Committee recommends that China provide details about when the relevant documents will be made available in English.

Criterion 18: Are the proposed methods of version control for processes sufficient so that data users can be certain about the processing steps through which data have passed?

CMOC/China is planning to implement version control for data processing. The Oceanographic Data Quality Control Methods (first edition only in Chinese) will also be implemented. The procedure will be routinely updated in order to meet the needs of developing technology and variation of user requirements. Each version of this procedure will be published with the data and products produced by CMOC China.

Conclusion for criterion 18: criterion met. The Committee recommends that China provide details about when the relevant documents will be made available in English.

3. Summary recommendation of the evaluation committee:

To conclude, the committee considers that the criteria for establishing CMOC/China have all been met, and we recommend that JCOMM proceed according to the final CMOC establishment process detailed in Recommendation 2 (JCOMM-4) provided that China develop a short (~5 page) near-term (~2 year?) implementation plan areas addressing the following points:

- Consideration of limiting the scope of the CMOC/China, and bring regional focus e.g. for the Asia Pacific region;
- It is recommended for China to proceed, developing and releasing a first generation of products using relatively simple or published techniques quite quickly. The development of new techniques could then proceed in parallel to this work ;
- Clarification of how specifically CMOC/China will complement existing activities such as the ICOADS and the WOD, collaborate with them (e.g. for specific data-sets to be defined), and not duplicate with them. Developments should be coordinated with those projects, including in liaison with the TT-MCDS;
- Reanalysis efforts will have to be concerted with overall JCOMM efforts in this regard (appropriate Technical Regulations to be proposed by the ETMC for the MCDS at a later stage);

- The different domains will have to be listed, and corresponding documentation will have to be produced;
 - High visibility should be given by CMOC/China to data/metadata rescue, production and delivery of integrated products focused on the Asia Pacific region, and higher level quality control, including bias correction. Historical data/metadata rescue (e.g. GODAR in the oceanography domain) remains critically important to sustain for scientific research (e.g. historical global climate change);
 - To provide details about when the Chinese version of Metadata Processing Procedure will be made available in English to the ETDMP;
 - To provide details about when the Oceanographic Data Quality Control Methods will be made available in English to the ETDMP.
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