Status of worldwide implementation and use of Climate Data Management Systems (CDMS) in NMHSs

-Analysis of a CCl questionnaire (as of 2012)-

Background

The questionnaire (http://www.wmo.int/pages/prog/wcp/wcdmp/CDM_3.php) was initiated in the frame of the action plan 2006-2009 of the WMO CCl OPAG ET 1.1 (Climate Data Management including Metadata). The respective responses have been analysed by the current CCl OPACE 1 ET on Climate Data Base Management Systems (established for the CCl intersessional period 2010-2014). While the initial deadline for responses was May 2010, the response rate was only 43% by June 2011. Further promotion measures resulted in an increased response rate of 72% (137 responding NMHSs) by August 2012. Consequently, the situation in individual responding countries might have changed by the time of the issuance of this analysis and hence the specific numbers reflected in the analysis might not necessarily be consistent with the current situation. Specifically, the recent implementations of CliDE CDMS in the Pacific region as well as the expansion of CLIMSOFT mainly in Africa are not properly reflected. While the information collected through the survey is very valuable for the work of the CCl ET CDMS as well as for specific WMO CDMS-related activities including resource mobilisation, it has been decided, however, to abstain from a publication of the full questionnaire analysis for reasons mentioned above. WMO Members interested in specific details are invited to contact the Secretariat at wcdmp@wmo.int. The information provided hereunder represents a generalized summary of the survey analysis.

Motivation

After the successful climate data management project CLICOM (initiated in the mid 1980's), WMO launched a Climate Database Management System (CDMS) initiative in the late 1990s to meet the growing needs for improved data management capabilities and data services. Accordingly a number of CDMSs including improved software and hardware technology have been developed by Members and installed in various countries through WMO VCP, bilateral collaboration, project initiatives or based on countries' own initiatives.

The Executive Council in its sixty-first session (2009) welcomed the joint effort of the Secretariat and CCl to monitor CDMS implementation and operation in NMHSs and to identify the status of operational migration from CLICOM. It urged all Members to provide full support to the success of these efforts. To this effect CCl developed a questionnaire for submission to the NMHSs of the Members.

Key outcome of the questionnaire

Note: The questionnaire did not use a common definition of what a CDMS is. Accordingly, the survey responses reflect systems that are called CDMS, without reference to the functionality that they contain. A WMO CDMS Specification Document, which is currently in preparation, will provide a functionality-based approach to climate data management and its systems.

i) 134 out of the 137 responding NMHSs use computer to store and manage their climatological data.

ii) Around 75% of the responding NMHSs run Relational Database Management Systems (RDBMS) with ORACLE being used in approximately every second case.

iii) Around 40 NMHSs do not yet run a RDBMS to manage their climate data. Out of these 40 NMHSs, approximately 30 use EXCEL spreadsheets and about 10 use flat files.

iv) Approximately 45% of the responding NMHSs developed their own CDMS.

v) CLIDATA, CLICOM, CLIMSOFT, CliDE and CLISYS are among the most popular CDMSs in terms of number of installations. CLICOM, which is outdated and no longer maintained by WMO, is still used by 24 of the responding NMHS. 10 out of these 24 NMHS run CLICOM along with a more modern CDMS.

vi) Almost 40% of the responding NMHSs indicated that their CDMS is either not fully operational or not operational at all. This number includes more than 25 out of nearly 50 NMHS with modern CDMS installations (CLIDATA, CLIMSOFT, CliDE and CLISYS). Main reasons are software problems (in more than 50% of the cases) followed by hardware problems, training deficits and infrastructure issues.

vii) The following topics were highlighted by responding NMHSs regarding difficulties faced w.r.t. climate data management: lack of budget, lack of human resources, lack of climatological expertise, lack of statistical expertise and lack of computer science expertise. The latter two topics have been stressed particularly in many responses.

viii) About half of the responding NMHSs would like to improve or even replace their current CDMS. In this respect, ‘system architecture’, ‘data products’ and ‘data control’ were reported to be among the main topics for improvement.

ix) Approximately 50% of the responding NMHSs reported that their CLIMAT message generation still requires manual intervention and is not fully automated. Around two-thirds of the responding NMHSs claim that they are not yet ready to code CLIMAT messages in TDCF.

x) Combining the numbers given under iii) with the number of CLICOM users as presented under v) adds to a total of 50-65 NMHS, which are not having a proper CDMS in place. Another 25 NMHS report, that their modern CDMS is only partially operational or not operational at all. It should be mentioned here that these numbers might even be higher as responses from about 50 NMHSs are missing.

Suggested key recommendations

Recommendation 1: The survey outcome suggests concerted efforts to assist those NMHS, which either do not have any operational CDMS in place (including those which still run outdated CLICOM versions) or which CDMS is largely out of order.

Recommendation 2: The survey outcome further suggests efforts to fully operationalise modern CDMS installations in many NMHSs. Moreover, concepts and measures are needed to ensure sustainability of modern CDMS operations in NMHSs over time.

Recommendation 3: Another key recommendation aims at enabling NMHSs to apply TDCF for CLIMAT message coding.

Conclusion

The survey outcome provides a wealth of very valuable technical information for CCl groups involved in climate data management issues including OPACE 1 and particularly its Expert Team on CDMS, but also the Secretariat. Specifically, it provides advice on requirements for technical guidance as well as for project initiation and co-ordination. Moreover, the survey outcome helps identifying infrastructural gaps in Member's (climate) data base management and provides reason for targeted resource mobilization and capacity building including training.

While there is no doubt about the usefulness of the survey in order to better assist Members in CDMS implementation and operation, it has to be emphasized that it took more than two years to collect survey responses – a timeline where rapid developments might occur due to technological advances or project implementation activities. Accordingly, numbers and statistics derived from the survey might be outdated and might not provide a consistent picture by the time of the survey analysis. Moreover, around 50 NMHS responses are missing. More innovative approaches need to be explored to update such information in a timely and consistent manner.