

**1. REPORT OF THE CLICOM-DARE WORKSHOP**

**(San José, Costa Rica, 17-28 July 2000)**

**2. REPORT OF THE INTERNATIONAL DATA RESCUE MEETING**

**(Geneva, 11-13 September 2001)**

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## CLICOM/DARE WORKSHOP

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# **Report on the CLICOM-DARE Workshop San José, Costa Rica**

(17-28 July 2000)

## **Workshop Program**

CLICOM training	17 – 21 July 2000
Future CDMS in the region	24 – 25 July 2000
DARE IV project	26 – 28 July 2000

## **Participating Countries**

### From 17 to 28 July

Bahamas, Barbados, Belize, Cayman Island, Guyana, Jamaica, El Salvador, Venezuela, Costa Rica, Mexico, Trinidad and Tobago, St Lucia, Honduras, Netherlands Antilles

### From 26 to 28 July

Antigua & Barbuda, Nicaragua, Dominican Republic, Panama, Guatemala, Commonwealth of Dominica

## **Lecturers**

Luis Carrasco (Meteorological service, Chile) CLICOM training  
Lloyd Gilkes (CIMH, Barbados) CLICOM training  
Kenneth Davidson (NCDC, USA) Future CDMS and DARE IV  
Selvin Burton (CIMH, Barbados) DARE IV  
Andrej Saulesleja (Canada) DARE IV  
Eva Katai (Hungary) DARE IV

## **WMO Representatives**

Oscar Arango (WMO sub-regional office in Costa Rica)  
Hama Kontongomde (WMO Secretariat)

## Welcome Remarks

The CLICOM-DARE workshop started on 17 July 2000 by an official opening chaired by the Permanent Representative of Costa Rica with WMO Mr Eladio Zarate. He welcomed the participants and expressed his gratitude to the WMO Secretariat for making it possible to organize this workshop in Costa Rica.

## CLICOM 3.1 Training (17-21 July 2000)

Participants of 13 countries (see list of participants in Annex 1) attended the first part of the workshop consisting in an advanced training on the new CLICOM 3.1 software.

In most English speaking countries, CLICOM 3.0 is used as the main Climate Database Management System (Barbados, St Lucia, Belize, Trinidad and Tobago, Cayman Island, Netherlands Antilles and Guyana). In Jamaica, Excel is used for data entry as well as data management.

In the Spanish speaking countries, CLICOM 3.0 is generally used for data entry, but the main Database Management System is Oracle: Costa Rica, Mexico, Venezuela etc.

**Mr Luis Carrasco** from the CLICOM support Centre of Chile conducted the training for the Spanish speaking countries and **Mr Lloyd Gilkes** from the CIMH, Barbados conducted the training in English for the other countries.

The following topics were covered:

- Installation of Cosort 4.4 version
- Installation of DataEase 5.16 version
  
- Creating a CLICOM 3.1 installation set on hard disk from the distribution set
- Installation of CLICOM 3.1- Standard installation
- Installation of the Compressed Archives Sub System
- Installation of the Wind Rose Sub system
- Installation of the Key-Entry Files Merger Sub System
- Installation of the Geographic Mapping Sub System
  
- Review and discussion of the CLICOM 3.1 Migration Guide
  
- Migration of the following elements from CLICOM 3.0 to CLICOM 3.1:
  - Station Geography information (STN GEOGRAPHY)
  - Station Observation (STN OBS)
  - Station Element forms (STN ELEMENT form)
  - Element Definition (ELEMENT DEFINITION)
  - Climate data for:
    - MONTHLY DATA
    - DAILY DATA
    - SYNOPTIC DATA
    - HOURLY DATA
    - UPPER-AIR DATA

*Review of CLICOM 3.1 new features:*

- The Archive sub-system
- The Windrose sub-system
- The Merge program
- The Mapping program
- The new Key-entry features

The new features on CLICOM were viewed by the participants as a real improvement. Countries are enthusiastic to download the new version from the WMO Web site. Some countries have noted that real climate applications are still lacking. It has been made clear that CLICOM should be considered as a CDMS only. Climate applications should be done outside the CLICOM software by exporting the data into Excel and/or GIS packages for further analysis.

### **Future Climate Database Management Systems (24-25 July 2000)**

Following the presentation by the WMO Secretariat of the results of the CDMS meeting held in Geneva from 3 to 5 May 2000, there was an unanimous agreement that the WMO Secretariat has taken the right steps for the next generation of CDMSs. Participants agreed that the idea of offering more than one system will allow each country to choose the system it can afford financially and technically.

Most of the English speaking countries (except Belize which prefers the existing CLICOM project software), would prefer a small system using Microsoft ACCESS for the following reasons:

- The countries are small with very few synoptic stations (1 to 3) and a reasonable number of rainfall stations (Trinidad and Tobago, St Lucia, Cayman Island, Barbados etc.);
- They lack professional staff to manage complex systems.

On the other hand, most Spanish speaking countries have already shifted to systems using Oracle (Costa Rica, Mexico).

**The global sense however is that the new CDMS should be a change in concept from earlier CLICOM software version which emphasized preservation and storage. The next generation of WMO CDMS must emphasize climate applications and accessibility of data.**

Criteria developed during the May meeting cover the main aspects of a CDMS. Broad points such as sustainability, functionality, system growth including new applications should be taken into account. The participants emphasized the following points concerning a next generation of CDMS:

#### **Objectives**

- One of the CLICOM project objective was the transfer of technology and this is already successful. A new objective for the future CDMS should be to help countries develop climate applications.
- A second objective should be the development of an efficient climate database and the training on the use of up-to-date DBMS technology;
- A third objective should be to improve access to the Internet and the exchange and accessibility of data.

## **Sustainability**

- Downward compatibility - The new system, while evolving, should be compatible with older versions;
- Affordability within countries;
- Training should be a continual process.

## **Functionality**

- Adaptability to use CLICOM export files, ASCII, or DataEase files;
- Temporal resolution should not be a constraint - the system should be able to handle 5 minutes, hourly, daily, monthly and upper air data;
- Standardisation of elements (naming);
- Provide tools for the end-user to make queries and reports;
- Handle automatic weather station data.

## **Potential Growth**

- Adaptability for GIS to allow spatial analysis;
- Statistical capabilities;
- Climate applications developed by countries should be made available to other countries using the WMO web site.

## **Deployment of the New CDMS**

It was recommended that the WMO Secretariat (WCP/TCO) develop CDMS implementation project for RA IV once the offered CDMSs are available taking into consideration the following objectives for improved Climate Data Management Systems in RA IV:

1. To provide historical and current climate data to mitigate the effects of hurricanes and tropical storms in the region. These events have regional consequences and must have regional solutions. Climate data are required to assist policy makers and corporations to make improved decisions based on facts, not speculations;
2. Correlation of the effects of the El Niño and La Niña on the Region have become more understood in the past several years, but the experts of the RA IV meeting believe that improved and expanded climate data for these studies could dramatically improve the understanding of the effects within the Region;
3. Flooding, caused by extremely heavy rainfall, has caused great loss of life in recent years. Improved CDMSs within RA IV could greatly assist in better understanding these extreme events and in the national and regional efforts to mitigate the effects of these events.
4. Studies on climate change and sea level rise are well under way all over the world. These data and studies need to be supplemented by the use of current and historical climate data currently held within the nations. The participants of the RA IV meeting believe improved CDMSs within the national Meteorological Services will greatly assist in the current efforts to understand and mitigate the effects of climate change.

## **DARE Meeting (26-28 July 2000)**

### ***Results of the DARE IV Questionnaire***

Mr Selvin Burton from the Caribbean Institute of Meteorology and Hydrology presented the results of responses to the questionnaire on DARE IV.

The objective of questionnaire was to:

- Determine the length and state of data records of regional countries
- Identify and assess the data rescue needs of these countries

The questionnaire was circulated to 22 member countries in RA IV and to 4 non WMO members and responses were received from 12 countries (10 English speaking countries and 2 Spanish speaking countries).

### **Length and State of Archives**

Most of the meteorological services in the Region were established during the last half of the 20<sup>th</sup> Century and so the data records are generally less than 50 years in length. However, two countries, Guyana and the Bahamas, reported archives dating back to 1900, while in the Dominican Republic the archives date back to 1920.

### **Data Outside of Meteorological Services**

Many of the English-speaking countries in the Region indicated that significant amounts of data for their countries are held either in the British Meteorological Office archive or in the Colonial Archives in the United Kingdom

### **Data Rescued or Preserved**

Only two of the countries responding to the questionnaire have archived any of their records on microfilm, Colombia (60%) and the Dominican Republic (20%). On the other hand, three countries indicated that none their records are preserved on computers; these are St. Lucia, Dominica, and Grenada. As seen in Table 1, the quantity of data preserved on computer by the other countries range from 20% to as much as 80%.

### **Data Protection**

Data protection is still a problem. Only three countries (Bahamas, Barbados and the Netherlands Antilles) indicated good protection.

### **State of Organization**

Archives of most countries are well organised, generally in the range of 60% to 100% with reports of 40% in a few cases.

### **Station History (Metadata)**

Station history data is generally available for most stations from 1950. Prior to this period the data is either not available or can only be found with difficulty.

### **Document Sizes**

Document sizes vary from as small as 4 x 8 inches to as large as 15 x 24 inches, with the typical sizes being 8 x 11 inches for loose leaf documents and 12 x 15 inches for bound registers.

### **Available equipment**

None of the responding countries have microfilm equipment, while only Dominica and El Salvador indicated that computers are not available for use in the data rescue project.

### **Assignment of staff/Availability of space**

With the exception of Columbia and Grenada, all the other countries indicated that staff could be assigned to the project while, in general, responses indicate that space will be made available for data rescue activities.

### ***Pilot project on scanning Microfilming***

Mr Selvin Burton reported on the pilot project on scanning and archiving microfilms on CDROM. The first CD was received from Imagemax two days before the meeting. A sample of image files in Tiff format was presented. At this point it very difficult to draw any conclusion because a comparison of the scanned images and the original microfilms could not be done due to late arrival of the CDROM (3 days before the meeting).

Mr Burton has been requested to proceed with an in-depth analysis of the scanned images and report to the WMO Secretariat by the end of September.

### ***Software developed by Ms Eva Katai from Hungary***

The software developed by Ms Eva Katai from Hungary was presented. The purpose of the software is to allow automatic digitizing of meteorological data from strip charts using a scanner.

There are still many problems to be solved before getting a ready-to-use version of the software:

1. The procedure (painting software) used to redraw and sharpen the strip charts lines is still under development and will not be finalized before August 2001;
2. The software is difficult to use even in Windows environment;
3. Ms Rosario Alfaro from the Costa Rican Institute of Meteorology who is working with Mrs Katai on the development of the software is leaving the Institute for a 17 months training in the United States (Hurricane Mitch project).

*It was recommended that the WMO Secretariat should decide in consultation with the NMHS in Costa Rica whether to continue with the development of the software or not. Furthermore, WMO should consider a related pilot project in Costa Rica using a software developed by the company of electricity of Costa Rica*

### ***Software developed by the Company of Electricity of Costa Rica***

The Company of Electricity of Costa Rica has its own meteorological and hydrological network stations. Consequently, they have developed an important climate database system using Oracle. They have also developed a software for digitizing strip charts. This software reads the co-ordinates of the origine of the strip chart and the main points of the chart using a Calcomp digitizing tablet. The data are read and stored along with the co-ordinates of each point. The software can then reconstitute the strip chart with minor errors and data stored in ASCII format can be directly imported into the main Database.

All the participants agreed that this software is more precise and more user-friendly. The software is on DOS environment and the Costa Rican company of Electricity would like to have WMO support to convert it to a Windows environment software and share it with all Members interested in using it.

### ***DARE IV Project***

The participants to the DARE meeting requested the WMO Secretariat in consultation with the WMO RA IV Rapporteurs on Data Rescue to develop an implementation plan for the DARE project in accordance with the recommendation of the 12<sup>th</sup> Session of RA IV.

The plan should include the designation of a Co-ordinating Committee and national focal points.

Among the first actions in the implementation plan (Annex 3) should be a Pilot project in one English speaking country (Jamaica) and one Spanish speaking country (Honduras) using digital camera technology to test the possibility of using digital cameras to create usable digital climate archive on CDs.

### ***Urgent requirements***

1. Data at risk - Honduras/Guatemala. Urgent action is needed
2. All countries start key entering data in the computer before any data rescue starting from data in worst state.
3. Roving mission in the countries to assess the state of the data and the need to rescue
4. Web site in the WMO home page for DARE activities in region IV
5. WMO initiate contacts with some agencies and European countries to get copies of data of the region outside countries
6. WMO to build a database of data that need to be rescued.
7. Appropriate sections on best practices concerning DARE activities to be added to the WMO guide to climatological practices by RA IV members.

The group of experts of the DARE IV meeting urge the WMO Secretariat to develop initiatives to get funds for the DARE IV project including the pilot projects.

## **DARE IV Implementation Plan**

### **1. Implementation plan**

**DARE IV Project statement:** At a cost of between US\$ 15-25,000 per participating country, assistance in the form of equipment and training will be provided over the period 2001 through 2003, to selected countries in WMO Region IV in order to locate preserve and make available in digital form valuable climate data and related metadata that are not currently available for the purposes of climate research and applications.

### **2. Objectives**

1. Providing access to appropriate technology (e.g. microfilm, equipment, digital/optical scanners and computers) to preserve and digitize all original meteorological hydrological data and associated metadata
2. Ensure preservation of data preferably in digital form by capturing data from original forms
3. Data to be rescued should be done on a priority basis taking into consideration data to mitigate the effects of hurricanes and tropical storms in the region and data from stations critical to the national monitoring and detecting climate change;
4. Encouraging the search and rescue of historical climate data from sources outside meteorological service.

### **3. Work plan**

**Phase I - Pilot projects (to be completed by the end of 2001)**

- Develop a pilot project in two countries to capture data from original forms and Test/refine digital camera system
- Start in one English speaking country: Jamaica and one Spanish speaking country: Honduras
- Undertake roving missions to evaluate need for data rescue in the region
- Prepare a report on the pilot project to be presented to an international expert meeting on data rescue

**Phase II: Develop a full DARE IV project for the whole region by mid 2002**

**Phase III: Implement individual country data rescue projects (2002-2003)**

### **4. Resources**

- High Speed and large size Scanners in Regional Centres
- Digital Cameras and computer upgrades
- Training missions and a regional training workshop
- Staff and office space (to be provided by countries)

Funding sources:

- FINNIDA (Data rescue a major issue)
- USAID/NWS/USGS
- VCP (UK, France, Canada, US)

Approach:

- Draft US Funding Proposal by Ken Davidson (by end of August)
- PR Canada proposal by Andrej Saulesleja (by end of August)
- Mexico to translate in Spanish

**CLICOM/DARE WORKSHOP**  
**San José, Costa Rica**

(17-28 July 2000)

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**DARE IV PLANNING MEETING  
26 – 28 July 2000**

**San José, Costa Rica**

**Report on the Results of the Questionnaire on DARE IV**

Prepared by

***Selvin Burton***  
***DARE IV Rapporteur***

**Summary and Purpose of Document**

This report summarises the responses to the DARE questionnaire circulated to member countries in WMO Region IV to determine the length and state of their data records and to identify and assess the data rescue needs of these members. The report is intended for the information of participant of the DARE Planning Meeting held in Costa Rica, July 26-28, 2000.

Draft recommendations are presented for consideration.

**Report on the Results of the Questionnaire on DARE IV**

**Introduction**

The Data Rescue Project in Regional Association IV (RA IV) was initiated in 1995. The overall objective of the project is to encourage and assist member countries to locate, preserve, and make available in digital form valuable climate data and related metadata that are not currently available in durable, useful form. This objective will be achieved through the following initiatives:

1. Microfilming and/or scanning of all manuscripts of original meteorological data and associated metadata;
2. Entering selected data into digital databases.

In order to determine the length and state of the data records in each member country and to identify and assess the needs of these members, a questionnaire was prepared. The questionnaire was circulated to twenty-two member countries in RA IV. In addition, four non-WMO countries in the English-speaking Caribbean were also circulated. Twelve responses were received.

This report summarises the responses to the questionnaire and presents recommendations for the consideration of the DARE IV Planning Meeting held in Costa Rica, July 26-28, 2000.

**Results of questionnaire**

**Question 2: Overall state of original manuscript data**

Most of the meteorological services in the Region were established during the last half of the 20<sup>th</sup> Century and so the data records are generally less than 50 years in length. However, two countries, Guyana and the Bahamas, reported archives dating back to 1900, while in the Dominican Republic the archives date back to 1920.

Of the countries responding, only three – the Dominican Republic, Grenada, and Dominica – indicated that some part of their records are in a poor state. In the case of the Dominican Republic a large portion of the records (50 of 71 years) are in a poor state, while in Grenada 30 of 41 years and in Dominica 10 of 31 years of the archive are in a poor state.

Most countries reported that some portion of their records is in a marginal state.

Figure 1 shows the period and state of the records as reported by each country.

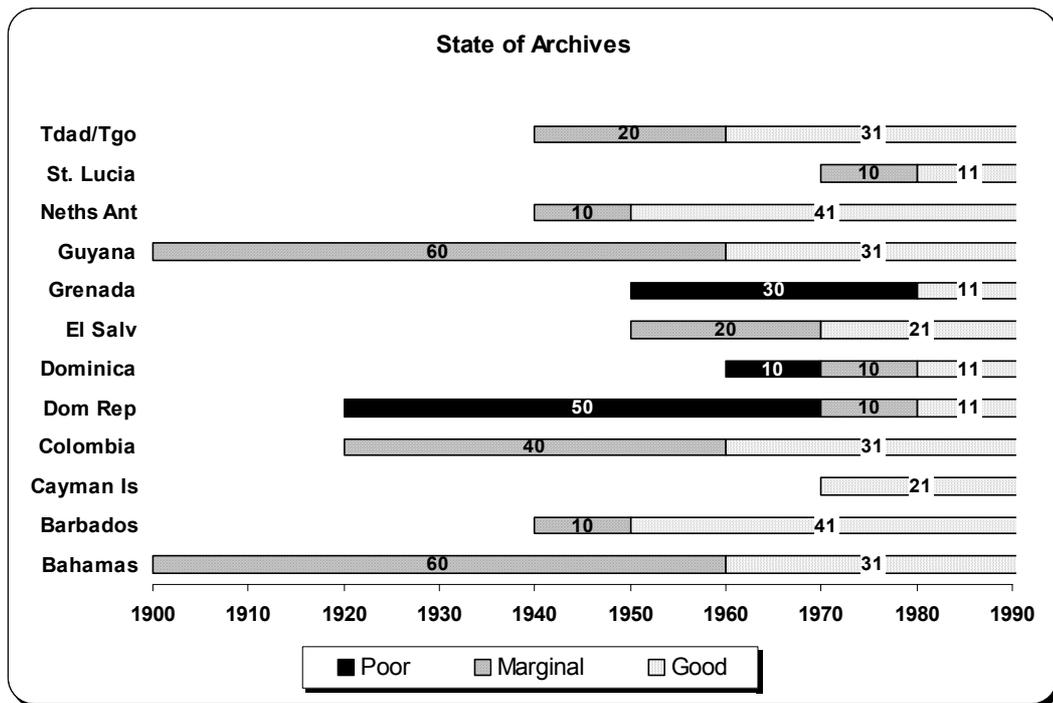


Fig. 1. Length and state of country archives

### Question 3: Other organisations holding significant amounts of data

Many of the responses to the questionnaire indicated that data for the country is held by other organisations, both within and outside of the country. Many of the English-speaking countries in the Region indicated that significant amounts of data for their countries are held either in the British Meteorological Office archive or in the Colonial Archives in the United Kingdom.

### Question 4: Data rescued or preserved

Only two of the countries responding to the questionnaire have archived any of their records on microfilm, Colombia (60%) and the Dominican Republic (20%). On the other hand, three countries indicated that none their records are preserved on computers; these are St. Lucia, Dominica, and Grenada. As seen in Table 1, the quantity of data preserved on computer by the other countries range from 20% to as much as 80%.

### Question 5: Protection of data

Three countries indicated a good level of protection of their current data archive against environmental damage. The other countries indicated either marginal or poor protection (See Table 2).

**Table 1. Percentage of data rescued or preserved**

<b>Country</b>	<b>Microfilm</b>	<b>Computer</b>
<b><i>Bahamas</i></b>		20
<b><i>Barbados</i></b>		40
<b><i>Cayman Islands</i></b>		20
<b><i>Colombia</i></b>	60	80
<b><i>Dominican Republic</i></b>	20	40
<b><i>Dominica</i></b>		
<b><i>El Salvador</i></b>		20
<b><i>Grenada</i></b>		
<b><i>Guyana</i></b>		20
<b><i>Netherlands Antilles</i></b>		40
<b><i>St. Lucia</i></b>		
<b><i>Trinidad and Tobago</i></b>		60

**Table 2. State of protection of data**

<b>Country</b>	<b>Protection</b>
<b><i>Bahamas</i></b>	Good
<b><i>Barbados</i></b>	Good
<b><i>Cayman Islands</i></b>	Marginal
<b><i>Colombia</i></b>	Marginal
<b><i>Dominican Republic</i></b>	Marginal
<b><i>Dominica</i></b>	Poor
<b><i>El Salvador</i></b>	Poor
<b><i>Grenada</i></b>	Poor
<b><i>Guyana</i></b>	Poor
<b><i>Netherlands Antilles</i></b>	Good
<b><i>St. Lucia</i></b>	
<b><i>Trinidad and Tobago</i></b>	Marginal

## Question 6: State of organisation

In general the archives of most countries are well organised, generally in the range of 60% to 100% with reports of 40% in a few cases. One country, Barbados, reported that data for the period 1950 to 1970 are not organised, while data for the period 1980 to 1990 are 80% organised (See Table 3).

**Table 3. State of organisation**

Country	% Organ
<i>Bahamas</i>	80 - 100
<i>Barbados</i>	0 - 80
<i>Cayman Islands</i>	
<i>Colombia</i>	40 - 80
<i>Dominican Republic</i>	100
<i>Dominica</i>	100
<i>El Salvador</i>	80
<i>Grenada</i>	
<i>Guyana</i>	40 - 60
<i>Netherlands Antilles</i>	100
<i>St. Lucia</i>	
<i>Trinidad and Tobago</i>	80

## Question 7: Station history data

From the responses station history data is generally available for most stations from 1950. Prior to this period station history is either not available or can only be found with difficulty as shown in Fig. 2.

### 2.7 Question 8: Document sizes

Document sizes vary from as small as 4 x 8 inches to as large as 15 x 24 inches, with the typical sizes being 8 x 11 inches for loose leaf documents and 12 x 15 inches for bound registers.

### 2.8 Question 10: Available equipment

None of the countries responding have microfilm equipment, while only Dominica and El Salvador indicated that computers are not available for use in the data rescue project.

### 2.9 Question 11/12: Assignment of staff / Availability of space

With the exception of Columbia and Grenada, all the other countries indicated that staff could be assigned to the project while, in general, responses indicate that space will be made available for data rescue activities.

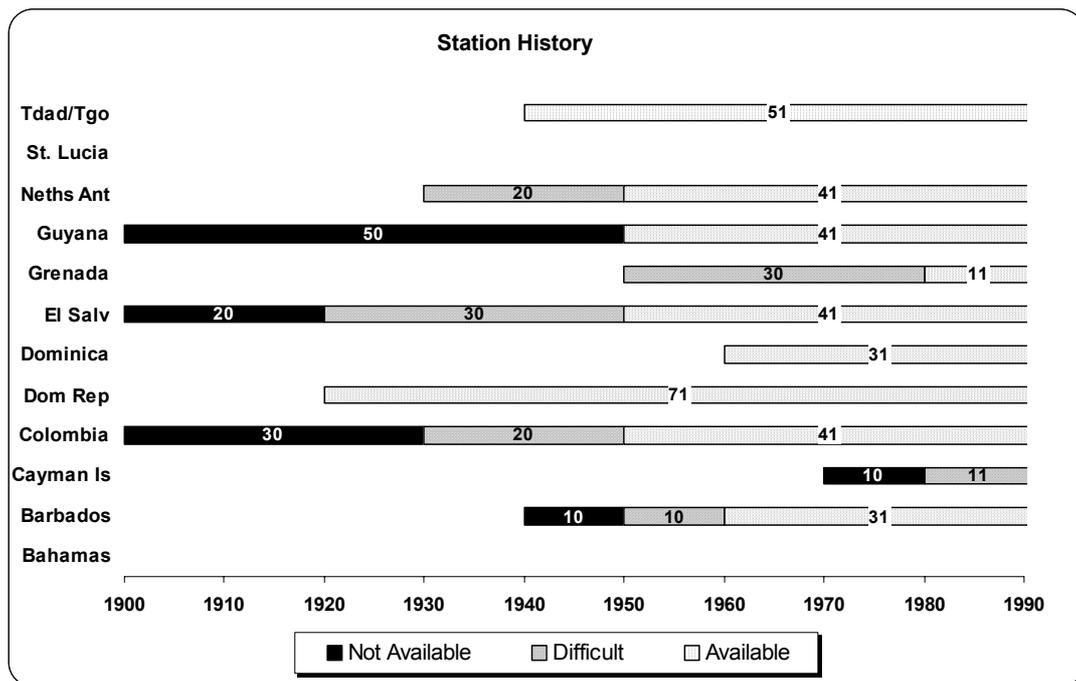


Fig. 2. Station history data

### Draft recommendations

In order to accelerate the implementation of the DARE IV project as requested by the Twelfth session of RA IV in May 1997, the following recommendations are proposed for consideration by the Planning Meeting convened in Costa Rica, July 26 to 28, 2000.

1. Member countries seek to determine the length and state of any data records held by other agencies within the country and all efforts are made to acquire copies of these data.
2. Request the WMO to establish contact with the various agencies in the United Kingdom holding data for the English-speaking Caribbean with the view of acquiring copies of these data.
3. Countries be encouraged to give priority to preserving, in digital databases, critical data that is in danger of being lost because of its poor condition. Where needed, the WMO should provide assistance for this task to be accomplished.
4. The WMO initiate microfilming projects in at least two countries where critical data is in danger of being lost.
5. The WMO purchase portable microfilm units to be used in 'roving' data rescue missions to some countries.

## INTERNATIONAL DATA RESCUE MEETING

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### ANNEXES

1. Provisional Agenda
2. Project Plan for Data Rescue of Climate and Hydrological Data
3. List of Participants
4. Data Rescue by IDCC (*G.D. Schietecat*)
5. Climate Data Rescue in Africa (*P.G. Ambenje*)
6. DARE Activities in Region II (*F. Rahimzadeh*)
7. Data Rescue Activities in Vietnam (*N. Dang Que*)
8. Meteorological Data Rescue in RA III (*R. Cruz Senna*)
9. Data Rescue - NOAA/USA/Climate Database Modernization Program (*K. Davidson*)
10. Report on DARE Pilot Projects in RA IV (*S. Burton*)
11. Report on DARE Activities in RA V (*T. Lee Seng*)
12. Report of Météo-France on DARE Activities with Data of African Countries  
(*J.-M. Moisselin*)
13. ARCHISS Report (*M. Baker*)
14. Report of the hydrological data rescue project in Africa (*M. Tawfik*)

# **Report of the International Data Rescue Meeting Geneva, Switzerland**

(11-13 September 2001)

## **Opening remarks**

On behalf of the Secretary General of WMO, Dr Michael Coughlan, Director Coordinator of Climate Activities Programmes, welcomed the participants to the meeting and stressed the importance of the conclusions of the meeting for all WMO programmes. He noted two particularly important items on the agenda for the 13<sup>th</sup> Commission for Climatology, the first being the development of a global strategy to rescue data in digital forms for all WMO Regions and the second being the guidelines of Project Development Plan for Data Rescue using new technology.

## **Election of the Chairman**

Mr Ken Davidson was elected Chairman of the meeting.

## **Adoption of the Agenda**

The provisional Agenda was reviewed and adopted after some changes were made by common agreement (see Annex 1).

## **Reports on Data Rescue activities**

### ***Region I***

Lessons learned from the WMO-Belgium DARE I project were presented by Dr G. Schietecat from the Royal Meteorological Institute of Belgium. The Belgium funded Data Rescue program assisted more than 40 African countries in preserving their data on microfiches. Copies of these microfiches are now at ACMAD and also in each country.

### **African Upper Air Data rescue project**

The goal of this NOAA/USA demonstration project is to provide the world community with a process to rescue upper air meteorological observations from developing countries and to provide those data in a secure media and an easy-to-use format. This initial effort involves the following countries: Angola, Kenya, Malawi, Mozambique, Niger, Senegal, and Zambia

Additionally, the Project will provide scanning and digitizing equipment and training to these seven African countries so that current and future data originally recorded on paper can be saved on CD-ROMs and added to the new database for use by the world hydrometeorological community. Project completion expected December 2002.

### **Archiving problems in Africa**

The problems vary from country to country but the common factor is the storage of climate data on computer media that are obsolete and not compatible with modern archiving and processing facilities. Such media include punched cards and magnetic tapes with no systems to read them. Some countries still keep volumes of data on hard copies (paper form) with the danger of being lost or deteriorating. In order to address some of these problems, the Drought Monitoring Centre, Nairobi has submitted a data rescue project proposal for the

Greater Horn of African countries. The main objective of the proposal is to assist the National Meteorological and Hydrological Services of the participating countries to retrieve climate data, which are stored in forms that are not compatible with current technologies.

### **Météo-France “African database”**

Upper-Air and climatological data of 14 African countries (Benin, Burkina Faso, Cameroon, Central African Republic, Congo, Côte d'Ivoire, Gabon, Guinea, Mali, Mauritania, Niger, Senegal, Chad and Togo) were extracted from the Météo-France archive and transformed into CLICOM format. This archive is called "African database" contains data from 142 stations daily, synoptic, upper air and wind data.

The first verification (quality control) concerns of the data 12 synoptic stations and 6 upper-air stations of Senegal: 20 synoptic parameters and 42 daily parameters.

### **Hydrology**

After a survey done in 35 countries in June 1999, a pilot project to rescue hydrological data was launched in 4 English speaking countries (Kenya, Eritrea, Gambia and Ghana) and 3 French speaking countries (Chad, Togo and Rwanda). Each country was equipped with a PC, a scanner, a printer and the software Hydata for the English speaking countries and Hydrom for the French speaking ones. Evaluation is underway and a second phase of the project is being developed and will include more countries.

### ***Region II***

The situation in Region II is quite different from country to country. In countries like Vietnam, Laos, Cambodia, etc. paper archives are in danger of being deteriorated due to climate and archiving conditions. In Vietnam for example, the Hydrometeorological Data Centre (HMDC) is using more than 30 rooms to store the climate paper archive. Attempts are made to digitize the data but equipment and software are not available. In Iran, optical scanners are used to archive and analyze strip charts and other types of climate and hydrological data.

### ***Region III***

The situation is quite similar to Region II. Some countries such as Peru, Argentina and Brazil have use scanners to digitize part of their climate and hydrological. A survey to prioritize what needs to be done will be conducted.

The ARCHISS project has done searches in some countries (Colombia, Cuba, Mexico, Ecuador, Bolivia etc.).

### ***Region IV***

Mr F. Villalpando presented the Data Rescue and Database management components of the Finnish funded project entitled “Preparedness to Climate Variability and Global Change in Small Island Developing States, Caribbean Region” and expressed the expectations of this project for the outcome of the DARE meeting.

Reports on the two pilot projects (using scanners digital cameras) and conducted in the Caribbean were presented to the participants. The objective of the first project was to convert images on microfilm to digital format using optical scanners. The quality of the digital images is directly related to the quality of the microfilm images. A good microfilm image produced a good digital image, while a poor digital image was the result of a poor microfilm

image. However, if the scanning was done directly from the paper document, the quality improves greatly.

The last DARE planning meeting in Costa Rica in July 2000 recommended that the WMO develop two pilot projects, one in an English-speaking country (Jamaica) and one in a Spanish-speaking country (Honduras), using digital camera technology to test the possibility of using digital cameras to create usable digital climate archive on CD-ROM. The project is at its initial stage. However, some test images created using the cameras were presented and the technique is promising.

### **Region V**

Instead of microfilming, most countries concentrate on digitizing climate data by key entering the data using Climate Data Management Systems. More developed countries in the region have advanced database management system (ADAM in Australia) while less developed ones use CLICOM and spreadsheets to digitize their climate data. However, the question of preserving the archives needs to be resolved.

### **Region VI**

A report was made on the need to develop a Data Rescue project for Region VI mainly in the Russian Federation given the amount of archives to be preserved. More than 50,000 magnetic tapes need to be copied onto cartridges, and 270,000 microfilms of satellite images need to be digitized.

### **Long-term Strategy**

Before developing a long-term strategy, the participants included in the definition of Data Rescue a preservation aspect and a digitizing aspect. Thus, the definition of **Data Rescue was agreed as:**

***An ongoing process of preserving all data at risk of being lost due to deterioration of the medium, and the digitization of current and past data into computer compatible form for easy access.***

This definition implies that:

1. Data should be stored as image files onto media that can be regularly renewed to prevent the deterioration of the medium (cartridges, CDs, DVDs etc.)
2. Data already in computer compatible media should be constantly migrated to storage facilities that conform to changing technologies.
3. Data should be key-entered in a form that can be used for analyses.

### **Project Development Plan**

The meeting began developing a Project Plan for data Rescue of Climate and Hydrological data (see Annex 2). This project plan will be submitted to the Commission of Climatology for comments and approval.

### **Implementation Plan**

After all the assessments are made, each Region will develop its implementation plan by first setting its priorities and suggesting its funding strategy (linking data rescue with existing projects etc.).

## **Recommendations**

The meeting recommended that:

- WMO works closely with NCDC to develop a naming convention and a standard indexing scheme to archive climate scanned images on digital media.
- WMO develops a Data Rescue brochure that should include success stories, proposals, funding etc.
- WMO keeps ARCHISS as a separate but complementary project to the Data rescue activities.