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# **Caribbean Meteorological Institute**

## **HYDATA v4.0 Training Course**

**Barbados  
19-23 October 1998**

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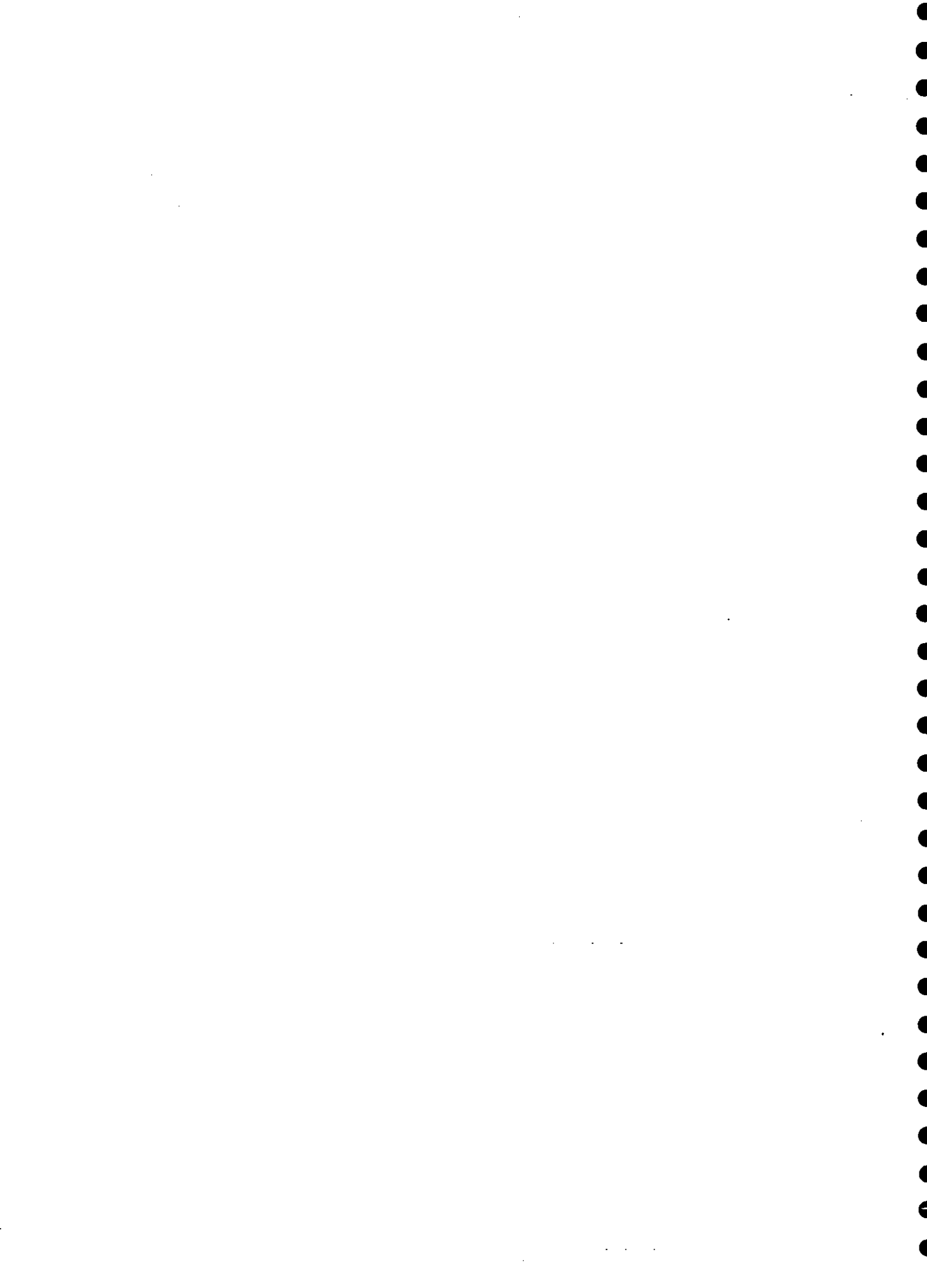
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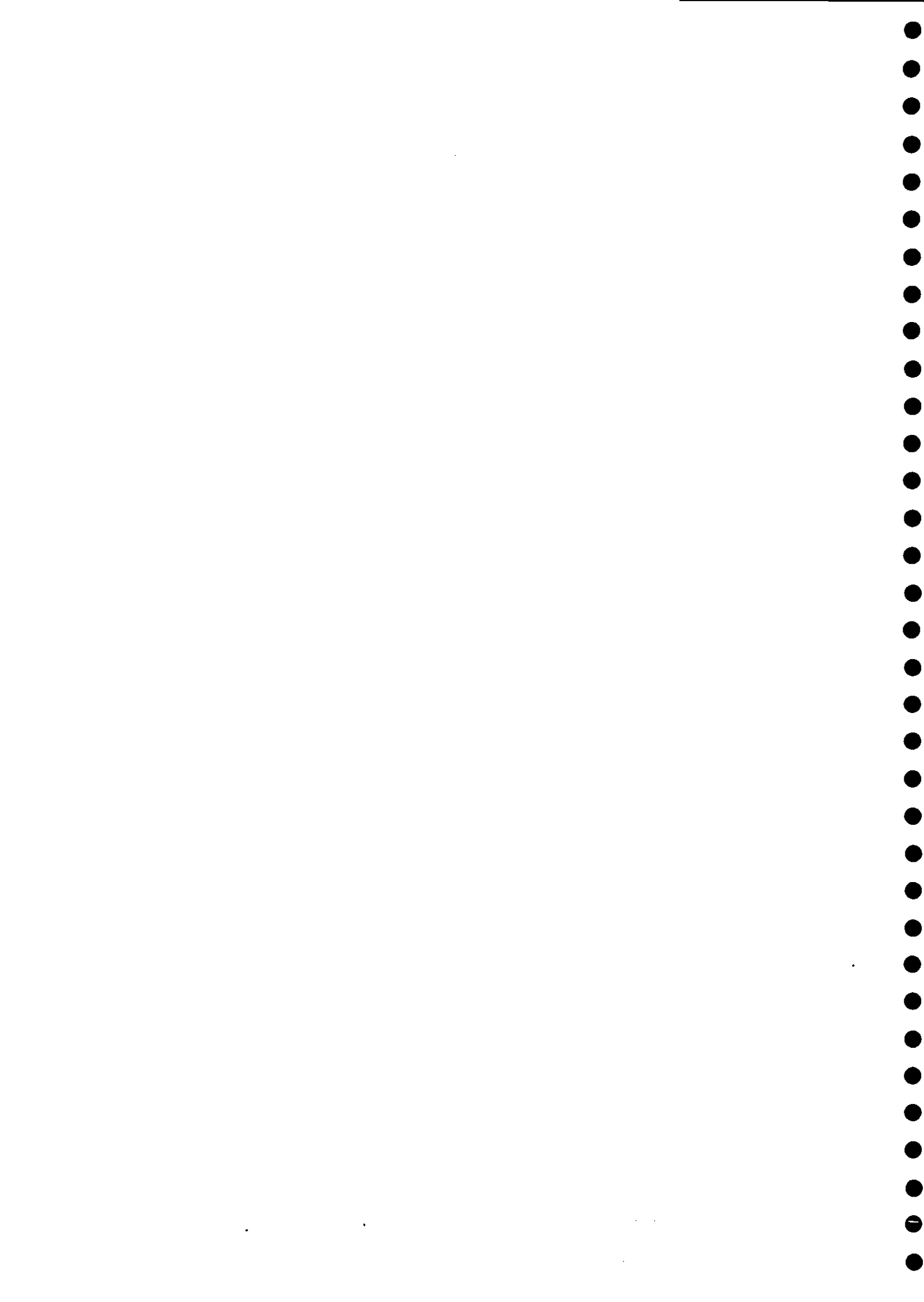
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IH/DFID report 99/01  
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# 1. Introduction

Hydrometeorological data are essential for the planning and operation of water-related schemes. Some typical uses of hydrometeorological data within the Caribbean include: design and operation of irrigation schemes; flood warning and post-event analyses of the impact of tropical storms and floods; low flow analyses particularly in relation to river intakes for water supply; investigations of soil loss and sediment runoff to the sea; design of river training works; and catchment and regional scale water resources planning and operational studies.

The Institute of Hydrology's HYDATA system is a purpose-made database for processing such data. The first version was produced in the mid-1980s and was based on the mainframe database system in use at the time for the UK's national surface water archive. HYDATA has since been used in more than 50 countries worldwide, and is the national database system for surface water data in more than 20 countries. HYDATA meets the need for a modern computer-based data archiving and retrieval system which can be used by staff with little experience of computers, and yet is powerful enough to use for archiving national records and for advanced hydrological analysis work. The latest Windows version (v4.0) provides several major improvements over the original DOS-based system (versions up to v3.21), as well as offering a multi-user, network facility (see Appendix E).

HYDATA was first used in the Caribbean in the mid-1980s, notably on specific projects in Honduras and Grenada. Following a request from WMO, an early DOS-based version of HYDATA was supplied in October 1988 to the following organisations under UNDP/WMO Technical Aid Project RLA/87/008:

Caribbean Meteorological Institute, Barbados  
National Water and Sewerage Authority, Grenada  
Ministry of Agriculture and Hydrometeorological Services, Guyana  
Underground Water Authority, Jamaica  
Ministry of Agriculture, St Lucia  
Water and Sewerage Authority, Trinidad and Tobago

The Institute supported the software provision by supplying a bulk order at a very much reduced price, and by sending a database expert to a workshop at the Caribbean Meteorological Institute to train representatives from each country in use of the software. Since that time, the Institute has endeavoured to respond to requests for assistance, such as problems caused by failure of hardware and resulting difficulties with reinstalling the software, infection of computers by viruses, or loss of part of the software and security system. However, in the absence of any formal support and maintenance arrangement, this support had to be fitted in around other work when possible.

In late 1996, the Institute proposed to WMO that a second workshop should be held to train the appropriate staff in use of the latest Windows version of HYDATA and to establish a more satisfactory way of providing long term support. The venue was again proposed to be the Caribbean Meteorological Institute (CMI) in Barbados, who are a regional WMO centre with responsibilities for both hydrometeorological data processing and training hydrologists and meteorologists in the Caribbean. Until 1994, CMI had also been including HYDATA training courses in their hydrology courses.

The timing of the workshop was to be dependent on progress with development of the Windows version of HYDATA. Evaluation copies of this version were first released in 1998 to selected users (including CMI), and it was agreed to hold the workshop in late 1998 once the Windows version was close to general release. DFID (Caribbean) also agreed to fund participation of Institute of Hydrology staff in the workshop and provision of the upgrades to HYDATA with support and maintenance for the first 3 years of operation. Also, as an interim measure, the Ministry of Agriculture in St Lucia was provided with the latest upgrade to HYDATA, and a one week training and troubleshooting visit was held during 1997, as part of the St Lucia Watershed and Environmental Management Project, jointly supported by the Government of St Lucia, the World Bank and DFID.



## 2. The HYDATA training visit

### 2.1 HYDATA V4.0 TRAINING

The workshop was held in the week 19-23 October 1998 at a conference room in a hotel near to Bridgetown. These dates, and the venue, were chosen to follow on from a workshop on remote sensing for meteorology held in the previous two weeks. This meant that the required computers were all in place saving considerable time on preparation for the workshop. Five modern Pentium computers were available for week, together with a laptop computer and printer brought from the UK by Institute of Hydrology staff.

Appendix A gives the names of the participants. The participants were well chosen, in the main being responsible for HYDATA operations in their own country, and/or working on the national hydrological data archives. Two people attended from each country, and another four people (2 students, 2 staff) attended from the Caribbean Meteorological Institute, who hosted the workshop (Appendix B). For reasons described later, there were no participants from Grenada, as originally expected.

The main aims of the training were to give participants as much practical experience as possible in using HYDATA v4.0, and to discuss transfer of data from HYDATA v3.21 and from input devices such as chart digitisers and data loggers. The programme followed is shown in Appendix C. The training was based round a set of 18 prepared exercises covering all aspects of the software, with emphasis on the areas perceived as most important to operations in the Caribbean. In the invitations to the course, participants were requested to bring examples of data from their own countries, and backups of their existing HYDATA databases, and so were also able to try each exercise using their own data, as well as the demonstration dataset provided.

Training typically comprised a short lecture on each topic, and a demonstration of each exercise, followed by practical exercises on the computers. Participants were provided with a set of paper copies of the overhead transparencies (e.g. Figure 1), as well as copies of the course exercises and draft versions of the manuals for the latest Windows version of HYDATA. A short revision project was also performed on the final day of the workshop simulating some of operations which are likely to be required on returning home and transferring from the DOS-based to the Windows-based versions of HYDATA i.e.

- Install the software and connect to a blank database
- Import the DOS database to the blank database
- Customise the database e.g. set up passwords, organisation names etc
- Check the details for all stations are correct and take the opportunity to rationalise names etc
- Import some new data from a chart digitiser
- Import some new data from an automatic data logger
- Develop a rating curve
- Convert records in Imperial units to SI units

The topics of system management, computer viruses and the importance of regular data back-ups were also discussed. Also, it was emphasised that the conversion to the Windows version of HYDATA will provide a good opportunity to tidy up and rationalise existing databases and some suggestions were made on what might be done (e.g. deleting unwanted stations, making station naming and numbering systems more consistent, changing from Imperial units to SI).

## 2.2 OTHER ISSUES

The workshop also provided a good opportunity to review current uses of HYDATA in the Caribbean, and to discuss any problems or questions which had arisen since the original installations. A visit was also made to the offices of CMI's Hydrology group for an inspection of their existing HYDATA system.

### Current use of HYDATA in the Caribbean

Discussions with the participants suggested that the original workshop (back in 1988), and the subsequent establishment of databases, had gone well, with the WMO project at that time providing each country with the assistance, additional equipment (e.g. chart digitisers) and training needed to operate the systems. Problems since that time were largely perceived to be due to lack of any formal support or maintenance arrangement, either with the Institute of Hydrology or the Caribbean Meteorological Institute. However, of the 5 countries represented at this second workshop, three (Trinidad and Tobago, Jamaica, Guyana) had operated their databases successfully for the full period 1988-98 with only some minor problems. St Lucia had occasional problems, largely resolved during the 1997 visit, whilst only Barbados were no longer using HYDATA operationally due to a succession of minor problems related to moving the software between computers.

Table 1 summarises the current data holdings on each country's database and Appendix D gives more background on how the HYDATA systems are used in each country.

**Table 1**      *Summary of number of stations on current HYDATA databases (October 1998)*

No. stations	Barbados	Guyana	Jamaica	St Lucia	Trinidad
Levels	1	51	1	6	37
Discharge measurements	0	20	7	14	158
Daily flows	0	38	92	3	41
Daily general	0	123	0	2	1
Daily rainfall	83	31	0	34	5
Daily storage	0	1	0	0	6

In the original proposal for the workshop, it was envisaged that Grenada would also be represented. However, due to current staffing shortages in Grenada, this was not possible, although, during the visit to CMI during the week of the workshop, it was found that the CMI's backup of the Grenada database was intact, and will provide a good basis for resuming operations in Grenada once facilities have been restored. CMI will probably take an active role in assisting the hydrometeorological authorities in Grenada in re-establishing the database and training local staff to use it.

During the week, the following issues were also raised relating to current and future uses of HYDATA.

### Support and maintenance

As part of the funding for the workshop and upgrades to HYDATA, each country will be provided with 3 years of support and maintenance from the time the software is provided. The standard HYDATA maintenance agreement provides for advice on solving computer-related problems (e.g. problems encountered on moving software between computers), some limited hydrological advice, upgrades and, if necessary, bug fixing. All such support is provided by fax, email, phone or letter and additional funding would be required for site visits, if these were to prove necessary.

In the past, the poor reliability of the phones and the postal services in the region has caused problems but the recent development of the internet, and email, has helped enormously. Of the 5 countries represented at the workshop, 4 have email addresses, and 1 (Jamaica), has a website. It was generally agreed that email should be the main way of communicating in future. The Institute of Hydrology is also planning to establish a HYDATA website, giving news and advice, and allowing users to download upgrades and patches as required. CMI will also be a useful first point of contact for some types of problem solving.

One other component of the maintenance agreement is access to the HYDATA data disaster recovery service. Under this scheme, backups of HYDATA databases can be sent to the Institute for storage in case of future problems (e.g. computer failures or damage by fire, flood or hurricanes). Formerly, the backups were kept on floppy disk but are now kept on the Wallingford site server, which is backed up routinely every week itself. Copies of the DOS databases for Trinidad and Tobago, St Lucia and Jamaica were placed into this archive following the workshop. For Guyana, although a full DOS back up was available, a floppy disk failure prevented the database being restored, so a new set of disks will be sent to Wallingford at a later date. The various HYDATA databases operated by CMI (see Appendix D) could also be stored in this way once HYDATA is reestablished and backups can be made.

The point was made that, with the new Windows version of HYDATA, this service will operate in a slightly different way, since users are now free to select the database engine they use. Backups will therefore consist of copying the database files using Windows utilities, rather than making direct backups from within HYDATA. However, for the Caribbean countries, most are likely to select Microsoft's ACCESS database format, so making back ups should just consist of copying the relevant ACCESS datafile (\*.mdb) to tape or a zip disk.

### Future plans

During the week, participants were invited to comment on the useability of this latest version of HYDATA and on any problems encountered. A few bugs were found which will be fixed and the software will then be formally released in early 1999. Representatives of each country were given a set of distribution disks for the version used at the workshop to install on returning home (Appendix C). A final version of the software will be sent to each organisation early in 1999.

Compared to the existing DOS version of HYDATA, benefits of the new version in the Caribbean are likely to be:

- the option to store data in Imperial Units, and convert between Imperial and SI
- the option to use alphanumeric identifiers for stations, rather than the numerical identifiers at present
- full Year 2000 compliance
- the much improved methods provided for fitting rating curves

- all the standard Windows options of control over fonts, printers etc, and the option to preview all output on the screen before printing
- the options to copy and paste data and other information between packages
- the option to define new datatypes and units, allowing a wider range of data to be stored on the database e.g. more types of meteorological data, and some types of water quality data

It is also became apparent that it would be desirable to upgrade the current 16-bit version to 32-bit before release, since memory restrictions under 16-bit prevented some types of analysis being performed during the workshop e.g. analyses requiring more than about 22 years of daily data.

For the future, one of the key improvements requested by the participants was a more powerful, modern looking map interface. One particular option would be to plot raingauge locations, rainfall statistics, and to generate isohyetal maps for monthly and annual values or long term means. Also, specialised reports, customised for each country, will probably be required, and a short demonstration was given during the workshop of how the HYDATA data access library (DLL file) could be used to do this (the example chosen was for a national summary of all rainfall values in a month, currently used by St Lucia as part of their standard hydrometeorological reports). As such utilities are developed, these could be made available via the HYDATA website, and/or through CMI, so that they are available to other Caribbean countries. One particular need identified was to develop a simple utility to convert the output from chart digitisers into the format required by the new version of HYDATA. This work could be performed locally since it only requires development of a simple FORTRAN or BASIC program, and the skills are already available in the region to write this type of software.

### 3. Conclusions

HYDATA has been the main national hydrological database system in several Caribbean countries since the late 1980s. The new Windows version provided at the workshop provides a long awaited upgrade to a modern Windows interface, and the extra functionality available will be of immediate benefit to all countries. During the workshop, at least 2 key staff from each of the countries represented were trained in operation of the software, and all made good progress in learning to use it. Samples of river level, discharge, flow and rainfall data from the Caribbean were used during the training. Key benefits perceived in the new version include more flexibility in units, data types, and reporting options than in the previous version, as well as all the standard functionality of a Windows package for controlling fonts, printers etc. All participants were provided with copies of the lecture overheads and exercises, and CMI were given a master copy to allow future training courses to be provided by CMI themselves.

General discussions during the week showed that, due to lack of any formal maintenance agreement in the past, some problems had been encountered, although 3 of the 5 countries represented had succeeded in operating the system almost unaided for more than 10 years. The 3 year maintenance agreement provided with the new version should help to overcome this problem. It is recommended that a review workshop is organised some 12 to 18 months before this agreement expires in order to discuss progress, provide additional training, and discuss future needs for support and maintenance. Participants were also encouraged to make use of the data disaster recovery service to help guard against possible future losses of data. It was also agreed that the availability of email facilities to most users, and the forthcoming HYDATA website, will greatly facilitate future provision of support.

All participants were given a copy of the software used at the workshop to install at their own offices. The copy of HYDATA used at the workshop was a pre-release version and some minor software bugs were found during the week. These are currently being fixed and final versions will be sent in early 1999. In the meantime, it was emphasised that the software should only be used for training and analysis work, not for primary data processing. The participants were able to provide several ideas for enhancements to future versions for use in the Caribbean.

## **Postscript (October 1998 to September 1999)**

Following the workshop, the comments received from the participants were combined with those received from other users evaluating a pre-release copy of the software (in the UK, Malaysia, and elsewhere), and from participants at two previous workshops in mid-1998 (in Pretoria, South Africa and St Petersburg, Russia). Work then started immediately on making the various minor changes identified as necessary in the HYDATA software. It was also decided to take this opportunity to upgrade the system from 16 bit to 32 bit giving considerable improvements in speed and stability. Also, in response to many requests, some improvements were made to the map interface to the software.

By early 1999, good progress had been made in making these changes, although it was recognised that testing the revised software would take more time than expected, meaning a delay in issuing the final version to each of the countries represented at the workshop. CMI and the other countries were informed of this delay, and also of the need to upgrade current DOS versions of the software to the latest version available (Version 3.21) before converting to the new Windows version. The national hydrological services in Jamaica and Guyana were assisted via email in making these upgrades.

The improvements to the software were completed in May 1999 and work then started on changing the user manual, and on-line help pages, to reflect the changes made. The software was formally released in August 1999 and distributed to each of the Caribbean countries concerned in October 1999. This marks the end of this phase of the project. The 3 year support and maintenance arrangements were activated from this time (i.e. from Oct 1999 to Sept 2002). As mentioned earlier, it is recommended that a second workshop is held some 12 to 18 months into this period to discuss progress, provide additional training, and discuss future needs for support and maintenance.

Regarding future development of the software, a number of improvements are planned or underway. The first such change is work on a new module to store more detailed descriptive information than is currently possible; for example, on sites, operators, equipment, hydrological characteristics. Work has also started on a general data loading module, allowing data to be imported and extracted in a wider range of formats than is currently possible. Longer terms aims are to produce a greatly improved map interface to the software, based around another GIS-based application currently under development, and to improve the gauging and rating editor. CMI will be kept informed of these developments, and these changes will also be posted on a HYDATA website which has recently been established (see user manual for details).

## **Appendix A      Programme of visit**

# **Caribbean Meteorological Institute, Barbados**

## **Windows HYDATA training course 19-23 Oct, 1998**

### Monday 19 October

Introduction

General principles of operation

Plotting and editing data

### Tuesday 20 October

Validate and interpolate missing level data

Develop rating curves and converting levels to flows

Techniques for developing complex rating curves

Discussion of data validation and infilling techniques

### Wednesday 21 October

Introduction to data transfer

Data input from charts and automatic data loggers

Data output to spreadsheets and other software

Data dissemination and publication (including UK practice)

### Thursday 22 October

Introduction to analysis options

Calculate flow duration curve

Introduction to system management and data backups/restore

### Friday 23 October

System management continued/troubleshooting software problems

Discussion of data disaster recovery service

Review



## **Appendix B      List of staff trained**

### **1.      BARBADOS**

Kalias Narayan - Hydrologist  
Judy Humphrey - Technical Assistant in Hydrology  
Lloyd Gilkes - Technical Officer (computing)

Caribbean Operational Hydrology Institute  
Caribbean Meteorological Institute  
Husbands, St. James  
Barbados

Tel: 425 1365, Fax: 424 4733, Email: lsgilkes@inaccs.com.bb (and k.narayan)

### **2.      GUYANA**

Joylyn Jafferally - Specialist Hydrologist  
Timothy Inniss - Hydrological Technician  
Lennox Andrews - Hydrological Officer

Hydrometeorological Service  
Ministry of Agriculture  
18 Brickdam , Stabrock  
Georgetown

Tel: 592 2 60341, Fax: 592 2 61460, Email: jaffhym@guyana.net.gy

### **3.      JAMAICA**

Michael Gabbidon - Senior Hydrological Technician in Hydrology  
Clyde Blake - Assistant Hydrogeologist  
Deran Murray - Technical Assistant I (Hydrology)

Water Resources Authority  
PO Box 91  
Hope Gardens  
Kingston 7

Tel: 876 9270077, Fax: 876 977 0179, Email: wrajac@colis.com (www.wra-ja.org)

**4. ST LUCIA**

Bernadine Joseph - Agricultural Assistant III

Agricultural Engineering Services  
Ministry of Agriculture  
Government Buildings  
Castries

Tel: 758 450 2337 ext 200-6

**5. TRINIDAD AND TOBAGO**

Carl Santana - Hydrological Assistant I  
Wayne Clement - Hydrological Assistant III

Water Resources Agency  
PO Box 145  
Wrightson Road  
Port of Spain

Tel: 662 2810, 645 4466, Fax: 662 2810, Email: [wra@trinidad.net](mailto:wra@trinidad.net)

**Appendix C      Receipt for HYDATA v4.0 software**

## HYDATA 4.0 Caribbean Workshop

### Confirmation of receipt of HYDATA software package

HYDATA LICENSE NUMBER	ORGANISATION	NAME	SIGNATURE	DATE
1016	Caribbean Met. Institute, Barbados	Tudy Humphrey	Tudy Humphrey	98.10.23
1013	Hydrometeorological Service, Guyana	Joylyn Jafferaly	Jafferaly	98/10/23
1017	Water Resources Agency, Jamaica	CLYDE BAKER	C. Baker	23/10/98
1015	Agricultural Engineering Services, St Lucia	Bernadine JOSEPH	B. Joseph	23/10/98
1014	Water Resources Agency, Trinidad and Tobago	Wayne Clement	W. Clement	28/10/23

## Appendix D      Usage of HYDATA in the Caribbean

The following notes are based on discussions with the workshop participants during the visit.

### Caribbean Meteorological Institute, Barbados

Until about 1995, HYDATA was used intensively to process chart-based hydrological data for several Caribbean islands, and to process rainfall data for Barbados. The islands selected did not have the expertise or the facilities to perform this processing themselves, and included Grenada, St. Vincent, St. Kitts-Nevis, Dominica, and Montserrat. HYDATA was accessed through an easy to use menu of choices covering many data processing activities (e.g. to produce reports, digitise charts) set up by a UNDP volunteer in the early 1990s. Data were published in the form of annual yearbooks listing daily summaries of flows and rainfall, monthly graphs and summary statistics.

HYDATA operations were suspended following a problem with reinstalling the software onto a new machine when upgrading from Version 3.01 to 3.20. However, at about this time, data returns from the islands decreased dramatically following extensive hurricane damage to measurement sites, reducing the need to use HYDATA. An inspection of this machine showed the databases to be intact, and the CDIG software and Summagraphics chart digitising table to be operational. It is planned to upgrade the computer to a modern Pentium machine soon so as to operate the Windows version of HYDATA, and to reestablish a regional hydrological data processing facility (at present, most data processing is performed for rainfall data for Barbados alone using a locally written Microsoft ACCESS application).

### Ministry of Agriculture and Hydrometeorological Services, Guyana

HYDATA was first obtained in 1989 and version 3.01 is currently used. The database is installed on a 1989 IBM-clone which will soon require replacing. River levels are recorded by charts which are digitised using a Summagraphics digitiser and the CDIG package. Cassella loggers are used at some rainfall stations. The database is operational although a problem occurs on backup preventing printout of a full summary of the database. There are presently 13 primary river level sites, although many more are stored on the database.

### Underground Water Authority, Jamaica

HYDATA was obtained following the 1988 workshop and Version 3.01 is used. Data are entered manually primarily for gaugings and flows. Units are imperial (e.g. cubic feet per second). There are approximately 50 chart recorders for river levels (USGS instruments) and some rainfall data from the Jamaican Met. Office's CLICOM system or hand written records. The department has a server with approximately 20 Pentium machines connected. Some limited use is made of mapping and drawing software such as ARC/INFO and Autocad. A website has been established.

### Ministry of Agriculture, St Lucia

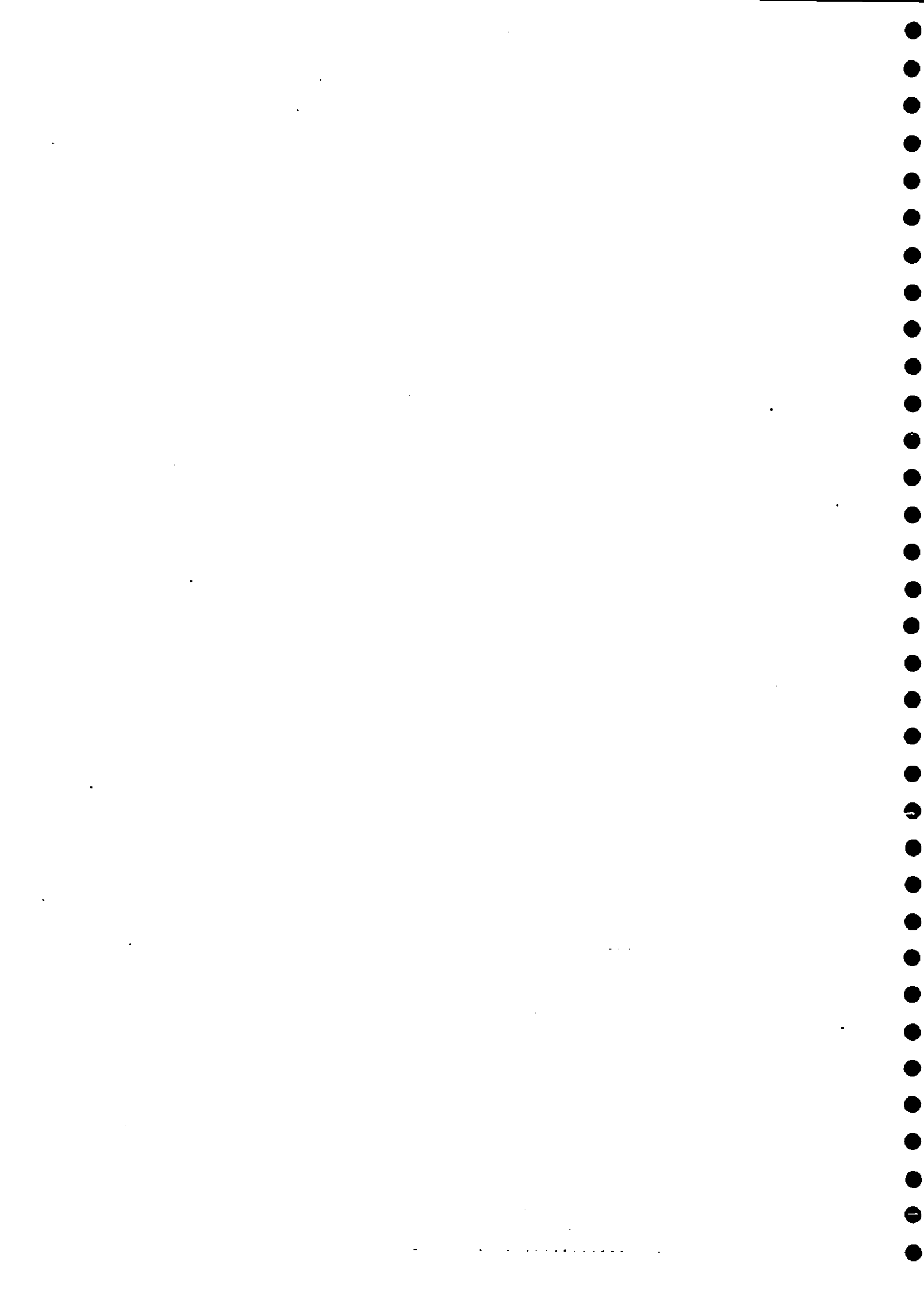
The department obtained the latest version of HYDATA in 1997 during a one-week training and advisory visit organised as part of the St Lucia Watershed and Environmental Management project, which was established to help perform various remedial works on rivers following the damage caused by Tropical Storm Debbie in 1994. The funding provided for this visit included

an upgrade to the Windows version of HYDATA when available. Several purpose-made programs were also written during the visit for importing data from loggers, and producing national rainfall data summaries in the formats currently produced by hand. The database is used primarily for processing river level, discharge and rainfall data. Some 27 Casella automatic data loggers were obtained in 1996 and are being installed.

Water and Sewerage Authority, Trinidad and Tobago

The department obtained HYDATA in 1988 and are currently using Version 3.01. Data backups currently require 14 diskettes and are made on a routine basis, keeping master copies at a different site to the database computer. The database is used primarily for river level, discharge and reservoir level data. Most levels are recorded using charts which are digitised at intervals of 48 or 96 per day using the CDIG package. River level loggers are planned for the near future and Cassella/Campbell rainfall loggers are already in use. A particular requirement for the database is to perform rainfall-intensity analyses over arbitrary averaging periods e.g. 5 minute, 10 minute. There is great interest in an improved map-based interface, with linkages from the database to ARC/INFO and Arcview (both used), and to be able to import map files into HYDATA. There may in future be a requirement to receive telemetred data, since a radio-based telemetry system for key sites is currently being installed.

## **Appendix E      Further information on HYDATA**

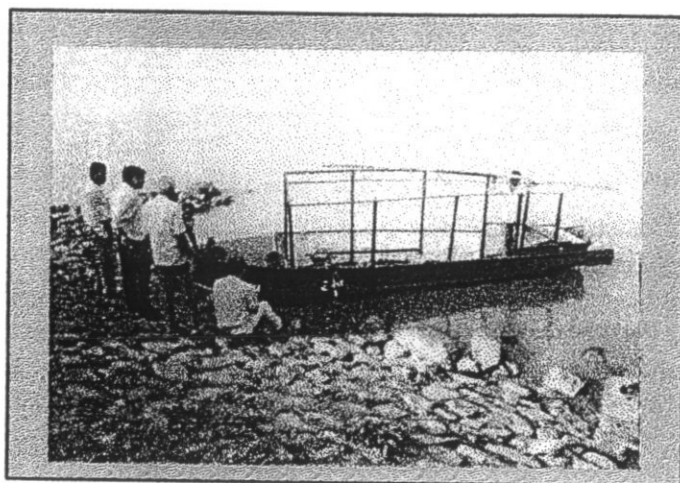
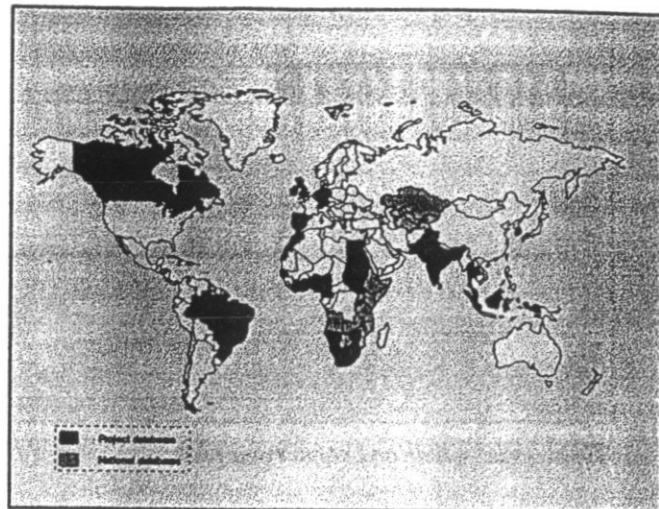






## HYDATA Version 4 for WINDOWS

Since the first version was released in the mid-1980s, the Institute of Hydrology's HYDATA system has been used in more than 50 countries and is used as the national hydrological database system in more than 20 of these. HYDATA is designed to handle the types of data most often encountered in hydrological studies, with facilities for developing rating curves, for storing, editing and graphing data, and for obtaining data output in the form of specialised 'yearbook' tabulations or exported to text files.



Data types currently supported include daily, sub-daily (e.g. 15 minute) and monthly river levels, river flows, rainfall data, and reservoir and lake levels and storage. Analysis routines are also included for annual minimum frequency analysis, low flow statistics and flow duration curves, with in-built facilities for data transfer to other Institute of Hydrology software; for example, to WINFAP (a Windows based flood frequency analysis system) and HYRRM (a conceptual rainfall runoff model).

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HYDATA Version 4.0 is Windows-based and is scheduled for release in early 1998. This note describes the new technical features of this latest version, and in particular those changes relevant to users of the current DOS-based version (V3.21).

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### New features

The first release will include most of the functionality of the current DOS-based version and will have the following completely new features:

— **Complete flexibility in data types, intervals and units**, allowing users to define types of data, the intervals at which they are measured and the units in which they are stored and displayed. The units used for storage and output need not be the same (if required) and data may be stored at irregular intervals (including event-based data). Data types include certain types of meteorological, water quality and groundwater data as well as hydrological data.

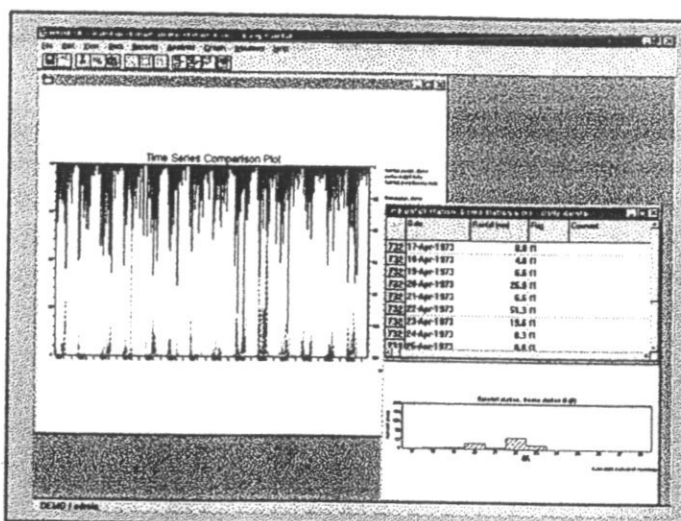
— **Map-based access to the data**. Users will be able to edit data either by selecting the required station

from a list (as at present), or clicking on the station location on a map. Maps will be vector-based, opening the way to map-based analysis tools in later versions (for example, automatic estimation of stream frequencies, or catchment average rainfall).

— **An improved rating editor**, using a novel fitting procedure in which the approximate positions of rating curves are first 'drawn' on the screen using the computer's mouse, before calculating the optimum parameter values following ISO procedures. As before, multi-part and shifting ratings are supported. The option to select power law or polynomial curves is a new feature.

— **Improved reporting facilities**, with full control over fonts and character sizes. A screen-preview option is also standard for all types of output.

Many minor improvements have also been incorporated based on suggestions from existing users of the DOS-based system.



Times series editor and comparison plot

## System design

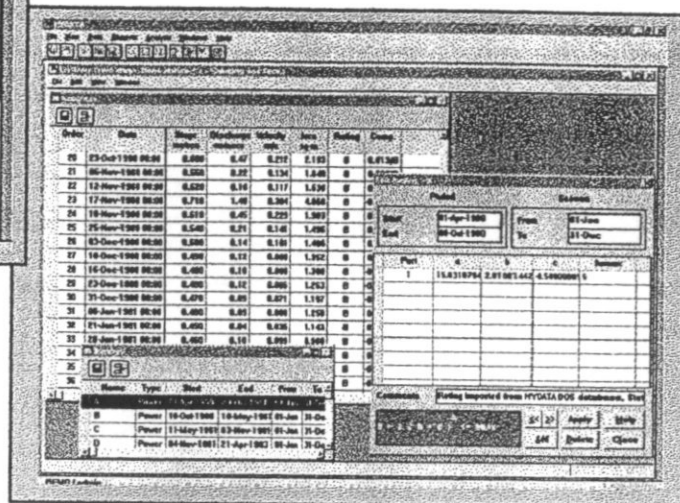
The DOS-based version of HYDATA uses an in-house database design, which was initially developed for operating the United Kingdom's national surface water archive on a mainframe computer. This database was optimised for data access speeds and data storage efficiency. Several recent technical developments mean that a wider range of database formats can now be supported. These developments have included:

- Dramatic improvements in the speed and storage capacity of personal computers
- Widespread adoption of the ODBC standard (Open Database Connectivity), allowing software to interact with a wide range of commercial database systems
- Major reductions in the price of commercially available relational databases.

HYDATA V4.0 is designed to access data from most ODBC compliant relational databases (e.g. ACCESS, ORACLE). Automatic import facilities are provided to allow existing users to convert DOS-based HYDATA databases to the new standard. Full network and multi-user support will be provided, so that users may access a database over a local area network or stored on a database server. (However, stand-alone systems, with a single user working on a personal computer, will still be supported). Minimum hardware requirement will be a Pentium 100Mhz processor with 32Mb of memory running under the Windows 3.11, Windows 95 or Windows NT operating systems.

## Training and support

Training and support will continue at a similar level to that provided for the current version. A Regional Training Centre is currently established in Kenya with plans for a new centre in the Caribbean. Over the past three years, purpose made training courses have also been provided in more than 20 countries and this facility will also be available for the new version. All new users will benefit from one year of free technical support, which includes a technical helpline accessible by letter, phone, fax or e-mail.



Gauging data edit screen

## Further development

New versions will continue to be produced on a regular basis. French, Spanish and Portuguese language versions are also planned (as with the DOS-based version).

## More information

For further information on HYDATA V4.0, contact,

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HYDATA

## HYDATA V 4 compared with HYDATA V3

- Windows based



- Map display with list or map-based access to data

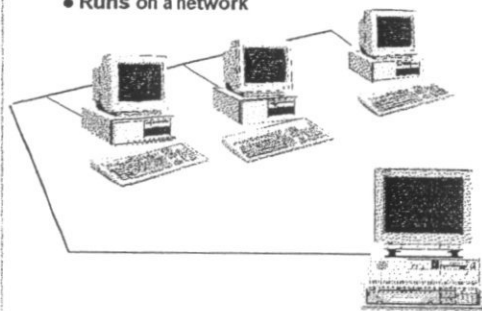


HYDATA

## DATABASE

- Uses and ODBC compliant database

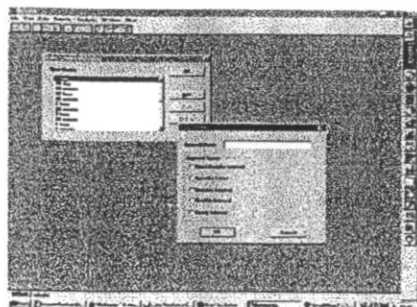
- Runs on a network



HYDATA

## DATA TYPES

- Standard units are SI but can be user defined
- Standard set of time series types (e.g. daily mean flow) but can be user defined
- Standard set of station types (e.g. rainfall station) but can be user defined
- Standard set of data intervals (e.g. 15 minutes) but can be user defined



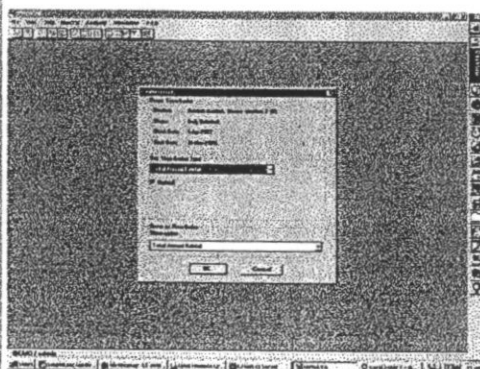
- Irregular (event) data now supported



HYDATA

## CONVERSION BETWEEN DATA TYPES

- Standard set of conversions defined (e.g. total, max, min, mean in interval)
- 'Levels to flow' and 'daily to monthly' supported
- User can define new conversion types

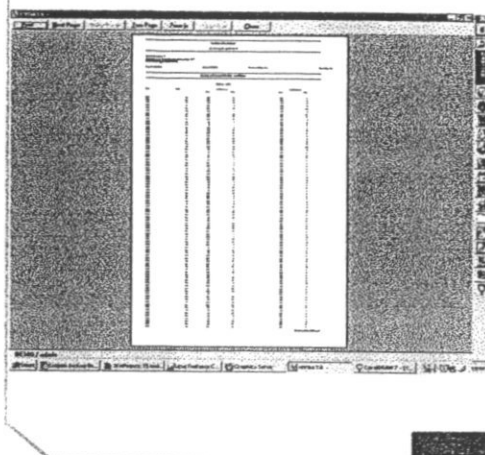




- Option for power law or polynomial ratings now included
- Ratings fitted interactively on the computer screen
- (hydraulic structures to be included in later versions)



- Much improved flexibility in report and graph formats
- Screen preview now standard



- Additional option for validation plots



- Can Import part or complete HYDATA V3 databases
- HYTRAN format and simple column inputs supported
- Cut and paste supported to other Windows packages

