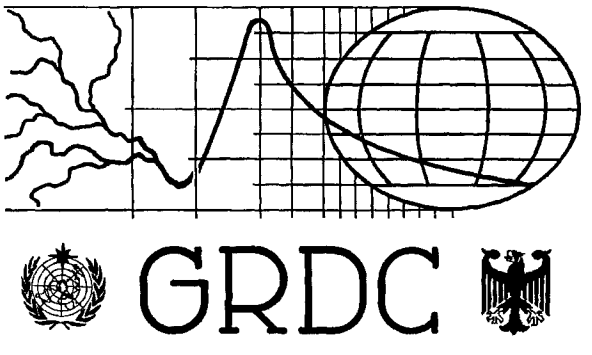
Weltdatenzentrum Abfluß
Bundesanstalt für Gewässerkunde
Koblenz, Deutschland

Global Runoff Data Centre
Federal Institute of Hydrology
Koblenz, Germany

Report No. 11

GRDC - Status Report 1995



April 1996

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Content

1. General

The GRDC, established at the Federal Institute of Hydrology in Koblenz, Germany in 1988, operates under the auspices of WMO for the benefit of WMO member countries and the international scientific community. Operating under WMO gives the GRDC an identity with regard to the UN system which is essential in establishing co-operative arrangements with UN agencies and various international programmes and in compliance with programmes of many individual countries.

The operation of the GRDC together with the supply of manpower and other support for the databank is under maintenance of the Government of the Federal Republic of Germany and the Bundesanstalt für Gewässerkunde (Federal Institute of Hydrology) in Koblenz, Germany, where the GRDC is administratively established.

2. Rational for data collection

The hydrological cycle is a sensitive indicator of consequences of climate change and information about the expected change of runoff is therefore required to calibrate and validate output of climate models. Likewise, the knowledge of streamflow is the basic information for the assessment of water resources potential and availability. The global, regional and catchment scale monitoring of runoff is therefore indispensible for water resources planning and management on all scale levels.

The present criteria for data collection are (re-iterated at the 2. GRDC Steering Committee Meeting, see 6.1):

* Rivers with mean annual discharge greater than 100 m^3/sec.
* Rivers of catchments comprised of a basin area greater than 1.000.000 km^2.
* Rivers with basins containing more than 1.000.000 inhabitants.

The documented use of GRDC-data covers mainly the following areas: Coupling of meteorological and hydrological models, water balance studies, investigation of trends in long-term hydrological time series, flux of fresh water and matter into the oceans and the coupling of river runoff with water quality data. There is also an observed trend in comparitive research with regard to the sensitivity of runoff in different climate regions.
The data stored within the Centre´s database are obtained mainly by direct bilateral contacts between data providers and the GRDC as well as through data sent by the WMO Secretariat.

Therefore past experiences indicate clearly, that close contacts between the GRDC and the relevant national hydrological services are indispensable for the future common exchange of data and information.

Operating under Terms of Reference acknowledged by WMO and a well-defined data acquisition and dissemination policy, the operations of the GRDC are fully transparent to both, data providers and users (see GRDC-"Policy Guideline for the Dissemination of Data and Costing of Services", 6.1 and Annex 2).

Figure 1 depicts the global distribution of WMO-regions, Figure 2 shows the areal distribution of GRDC stream gauges.

BORDERS OF WMO REGIONS

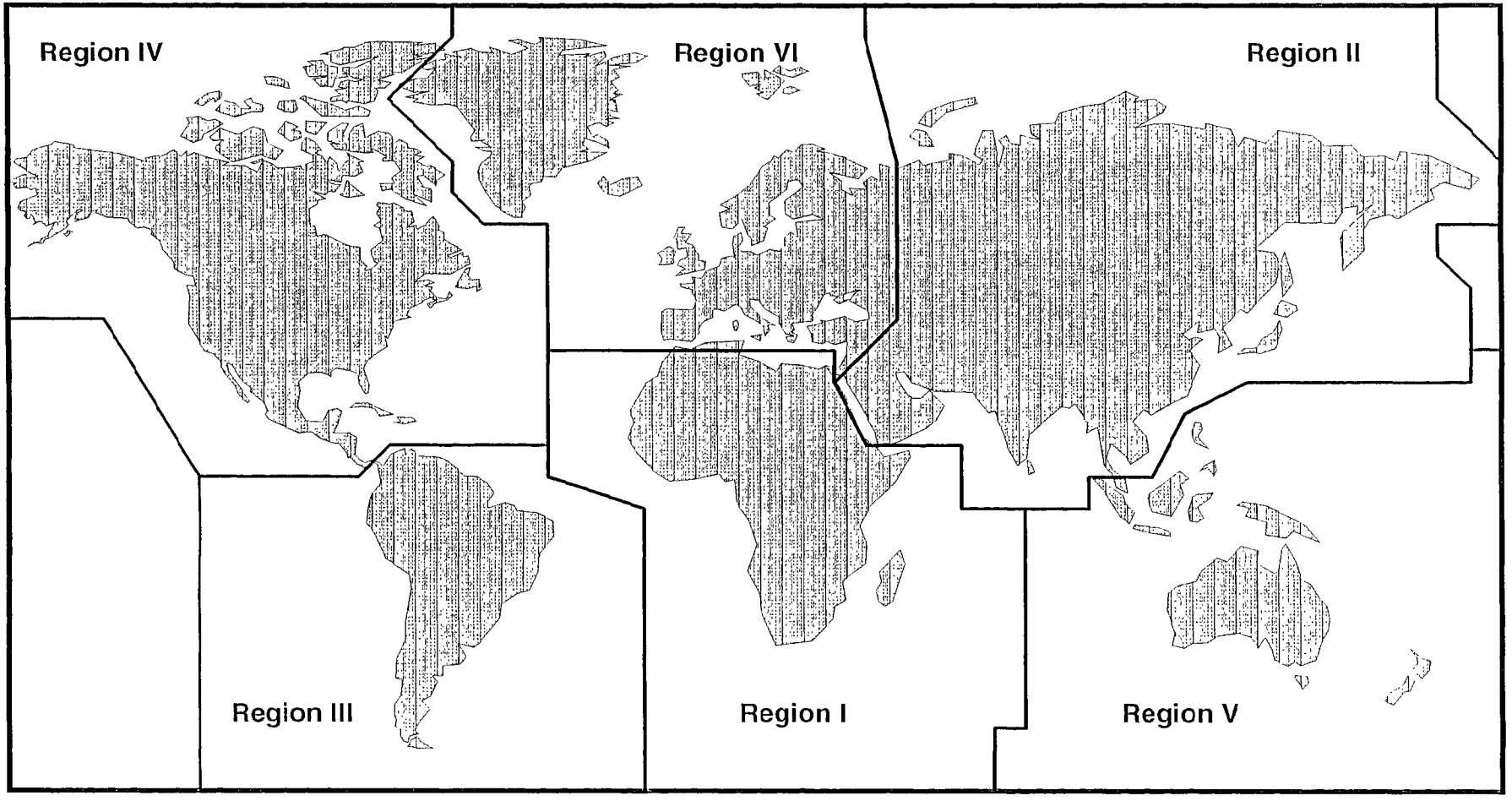


Figure 1

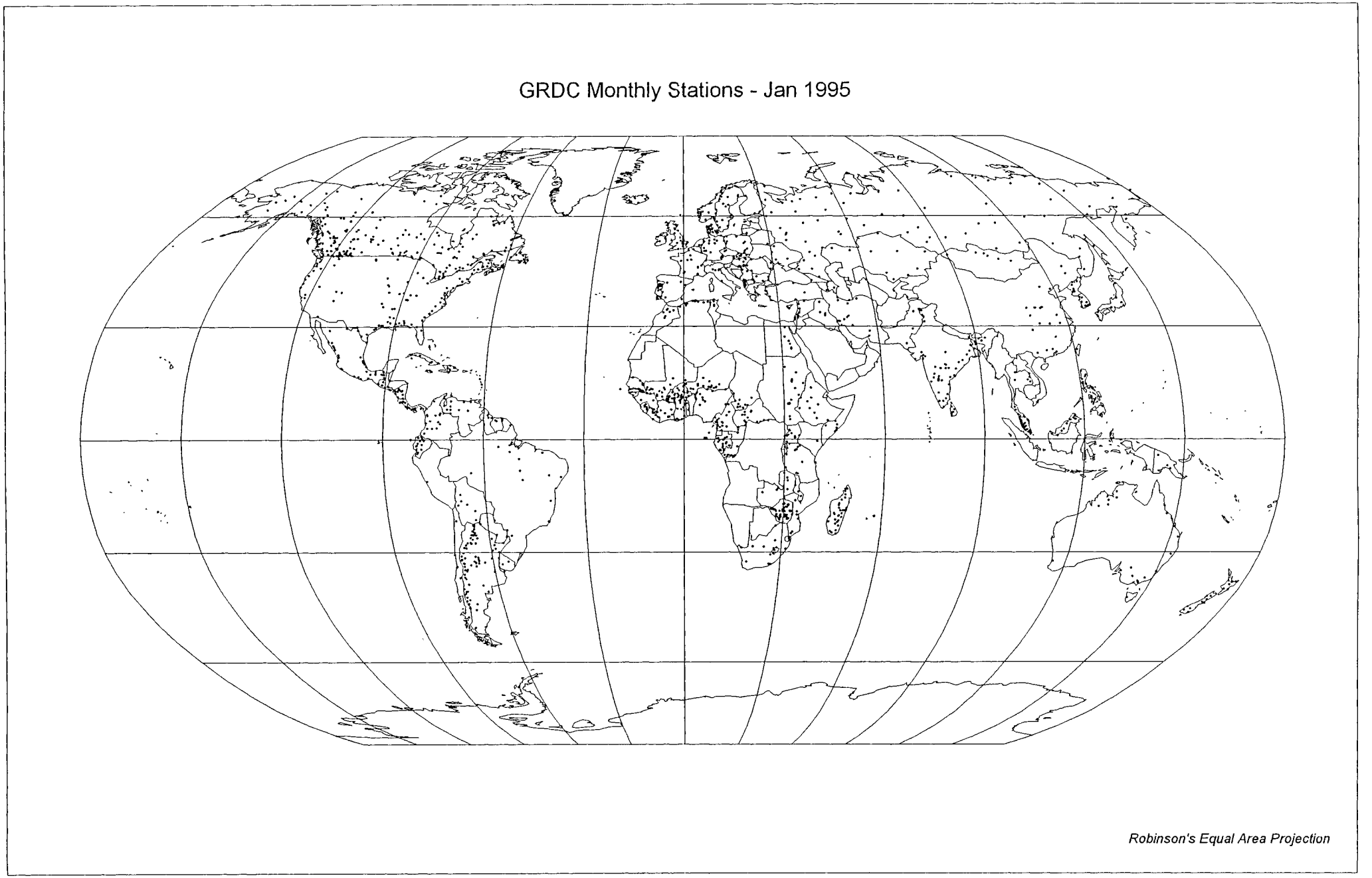

GRDC Monthly Stations - Jan 1995
Robinson's Equal Area Projection

Figure 2

3. Development of the Global Runoff Data Centre

3.1 Present status of the Data Centre

The GRDC operates on the basis of an advanced database and processing facility. With this data management system, requests for data can be answered quickly and incoming data evaluated promptly.

The GRDC database is continuously updated with contributions of data from over 140 countries. More than 3200 gauging stations in over 2900 river basins currently contribute to this data base.

The GRDC data base is implemented on the relational model using INFORMIX-ONLINE 5.01 on a SCO-UNIX platform. Depending on highest data security level the INFORMIX -ONLINE database resides on a special file system in the UNIX system.
As a query language INFORMIX-SQL is used. The user program is written in ROSI-SQL. This program allows to fulfill all standard tasks as importing, searching, updating, altering, deleting or exporting data or meta-data.

The concept of the network of the GRDC database system can be seen from Figure 3.

A catalogue of the existing database together with a query tool is sent to interested clients or institutions on request. The GRDC also informs in its series and reports the hydrological community about its ongoing operation. These reports are also sent to interested persons and institutions on request.

Scientists and decision-makers from all over the world are invited to use the information services of the GRDC and to cooperate with the GRDC in research and operational issues and the development of its database.

CONCEPTION OF THE GRDC-NET

Status: 02.09.1995

GRDC

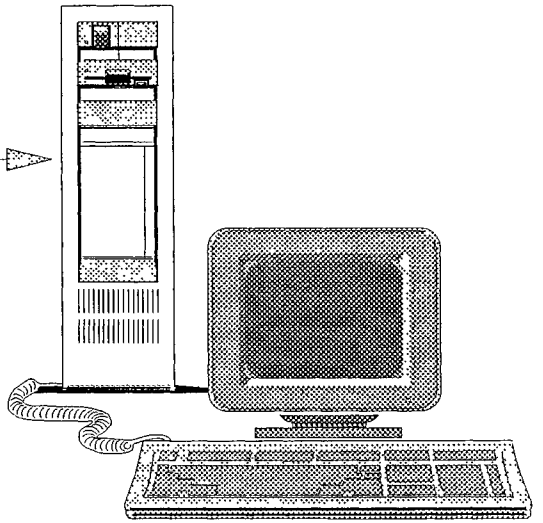
GRDC DATABASE SERVER

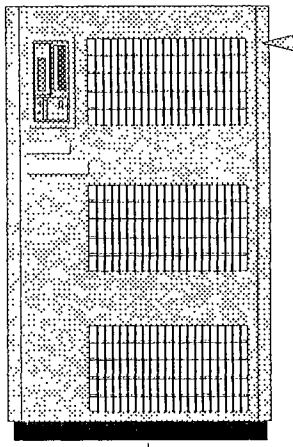
UNIX-Partition (900 MB)

- GRDC-Database
- e-mail
- administration
- Database Updates

DOS-Partition (100 MB)

- Database Updates
- large Data Export
- special tasks

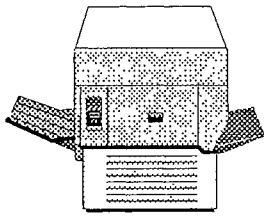




FIH LAN Server

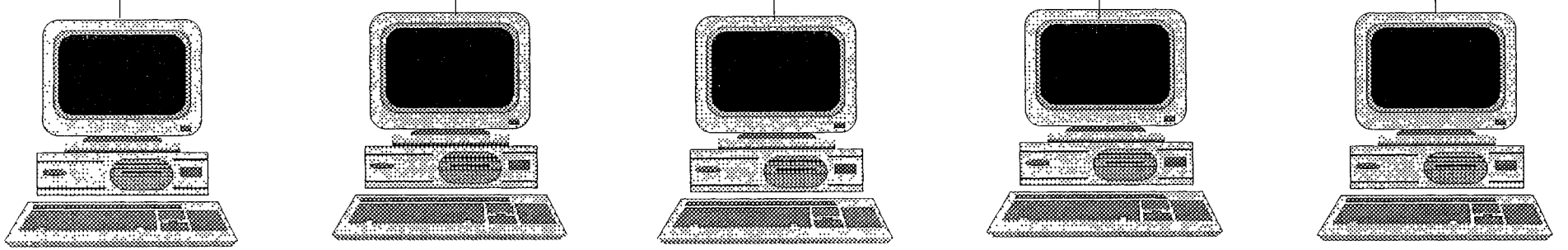
Novell NetWare 3.11:

- Standard Software
- Printer, Plotter, Scanner



GRDC Net-Printer

SQL-Server-Architecture



- GRDC-Administration
- Product Development
- Program planning and implementation

- GRDC Monitoring
- GIS (SPANS)
- Quality Control
- Statistical Analysis

- Scientific Data Processing
- Statistical Analysis
- Quality Control

- Data Requests
- Product Generation
- Quality Control
- RAISON

- Data Requests
- Product Generation
- Update Generation

Operating Sytems: MS-DOS / MS-WINDOWS, OS/2

Figure 3

3.2 Consolidation of the Global Runoff Data Centre

The Twelfth World Meteorological Congress was held in Geneva in June 1995 where some 175 Members determined the general policies of the World Meteorological Organization, WMO for the period 1995 to 1999.

All programmes of the WMO were reviewed by the Congress, one of which was the Hydrology and Water Resources Programme (HWRP). Congress noted that the emphasis and direction of the HWRP had been changed to respond to the concerns of recent major conferences, in particular UNCED (United Nations Conference on Environment and Development).

The Twelfth Congress adopted Resolution 40 (Cg-XII) and thus committed itself, as a fundamental principal "to broadening and enhancing the free and unrestricted international exchange of meteorological and related data and products". In this context "free and unrestricted" means non-discriminatory and without charge, the latter with the meaning "at no more than the cost of reproduction and delivery, without charge for the data and products themselves". With regard to the Global Runoff Data Centre, Congress also adopted Resolution 21 (Cg-XII) which encourages Members to "support the GRDC through the provision of the hydrological data and related information that it needs".

Congress also supported the development of a World Hydrological Observing System (WHYCOS) in collaboration with the World Bank and other agencies.

In this context, Congress recognized the importance of the Global Runoff Data Centre as the principal source of global river flow data.

Part of the discussion was devoted to a document presented by WMO´s Commission for Hydrology (CHy) calling for an enhanced role for WMO in the resolution of global water issues.

3.3 Progress in data acquisition and handling

In 1995, preference of the GRDC was addressed to the update of the Centre´s data sets as well as the quality control of data.
The update of the data sets was a major task in the preceeding year. Altogether more than 200 data sets of 13 different countries were updated. Additional data sets of Syr-Darya, Amu-Darya, and the Mekong river basins were updated.

A complete list of updated data sets can be seen from Annex 4 titled "Update of GRDC Database in 1995".

The quality of hydrological data is a key issue for all applications. As all measured hydrological data contain errors (operation and functioning errors, random errors, constant systematic errors and variable systematic errors) it is important to consider the magnitude of the respective error.
Therefore the GRDC has developed a programme tool to check the plausibility of streamflow data. As a result presently a computerized data plausibility control tool has been established into operation in order to check the quality and reliability of incoming data. The tool "Plausibility Check" allows a rapid check of incoming as well as resident data sets mainly in a graphical way where obvious data errors can be detected and statistically rectified. Any questionable data can be flagged to inform users about the data quality.
Nevertheless, the responsibility for the quality of data lies within the national hydrological services as it is not possible for the GRDC to make comprehensive quality control in a meaningful way without having important background information of such details as condition of gauging station, instrumentation facility, validity of rating curves, river morphology, etc.

Parallel, an expert group was identified to assist the Centre in this matter and to give future advice in regards to data quality assessment issues. First steps for active work of this expert group is expected to commerce in 1996.

4. Science and research programmes in 1995

4.1 Guest Scientists

In the preceeding year several scientists and other interested groups visited the GRDC as guests of the Centre. In the following some of the visiting scientists are named:

* Delegation of the State Hydrological Institute, St. Petersburg, Russian Federation, n behalf of the organisation for the ACSYS project, Arctic Climate System Study (see also 5. Database Advancement).

* Delegation of the Foundation of River & Basin Integrated Communications (FRICS), Japan. The group was interested to learn about water resources database management.

* Dr. Norm Miller, Lawrence Livermore National Laboratory, Global Climate Research (GCR) Division, Livermore, California, USA.
  As an outcome of the meeting a "Memorandum of Understanding for Scientific Collaboration between the GRDC and LLNL" has been assigned.

* Research Scientists, Korean Institute of Construction Technology, Seoul, Korea.
  The group wanted to comprehend the details about data base establishment and management of the GRDC.

* Dr. O.R. Bajrachrya, Head of Section Snow and Glacier Hydrology, Department of Hydrology and Meteorology has received a week-long training in management of hydrological data about the GRDC.

The GRDC/Federal Institute of Hydrology also supported a scholarship under the supervision of the DAAD (Deutscher Akademischer Austauschdienst/Federal German Academical Exchange Service), granted to Mr. D.P. Saxena, School of Environmental Sciences, Nehru University, New Delhi, India.
Several other poposed visits of scientists have been arranged and prepared which are planned for the year 1996.

4.2 Cooperation with Research Institutes and Programmes

An agreement between the GRDC and RIVM (National Institute of Public Health and Environmental Protection), The Netherlands, about formal collaboration has been established. The representative of RIVM, Dr. J. van Woerden, signed a draft of a memorandum of understanding to facilitate the closer cooperation between both institutions.

The GRDC has also reached an agreement together with FRIEND, Flow Regimes from International Experimental and Network Data, regarding future operational links including data exchange and acquisition. As a result a memorandum of understanding has been confirmed between the representative of FRIEND, A. Gustard, and W. Grabs, Head of the GRDC (see 7. Involvement and Participation of the GRDC in International Projects and Programmes and Annex 3).

A "Memorandum of Understanding for Scientific Collaboration between the GRDC and LLNL" has been assigned by Dr. Norm Miller, Lawrence Livermore National Laboratory, Global Climate Research (GCR) Division, Livermore, California, USA.
Such a collaboration could work towards providing the enhanced geographic information systems and improved statistical approaches toward data quality.

A contract has been reached together with ICIMOD, International Centre for Integrated Mountain Development, in the context of the establishment of the hydrological database for eight countries of the Hindukush-Himalaya region.

5. Database Advancement

5.1 Arctic Climate System Study (ACSYS)

Priorities were assigned to substantive operation for GEWEX in the context of the ICSU/WMO project "Arctic Climate System Study", ACSYS. Within the GRDC Report No. 8 titled "First Interim Report on the Arctic River Database for the Arctic Climate System Study (ACSYS)" main directives and outlines of this study are described.
The specific objectives of the ACSYS hydrological programme are:

* Determination of the elements of the fresh water cycle in the Arctic region and their variability in time and space.
* Quantification of the role of the atmosphere, hydrological and land surface processes and their interactions.
* Provision of an observational basis for the assessment of possible long-term trends of the components of the fresh water balance in the Arctic region under changing climatic conditions.
* Development of mathematical models of the hydrological cycle under the specific Arctic climate conditions.

As an international and multidisciplinary program, ACSYS also has the responsibility to assure that the data are made available to the arctic climate community on a timely basis. As a result the GRDC compiled the Arctic River Database (ARDB) which forms the principal database for the macro-scale hydrological modelling in the Arctic region. The ARDB has been compiled using the state-of-the-art relational database-systems of the GRDC using the search-and query capabilities of the INFORMIX databank system implemented under SCO-UNIX.

Looking forward, the study has vigorous new measurement programs in the fields of oceanography, ice thickness monitoring, sea-ice atmosphere interaction studies, and other significant hydrological investigations.

5.2 Water Resources Database for Africa

The need for a comprehensive data base for Africa relating to hydrology, water quality issues, and integrated river basin planning has been outlined in a World Bank Strategic Paper in December 1994. Parallel, an action item resulting from the African Conference on Water Resources: Policy and Assessment (Addis Abeba, March 20-25, 1995) stated, that initiatives should be promoted and implemented *"which aim at providing incentives to national and regional concerted programmes in water resources monitoring and assessment such as the Hydrological Climate Observing System (HYCOS), Global Environment Monitoring System-Water (GEMS-Water), Flow Regimes from International and Experimental Network Data (FRIEND) and the Global Runoff Data Centre (GRDC)"*.

As a result the GRDC published a Report in 1995 titled "Feasibility of Water Resources Database for Africa" which was prepared for the fourth annual meeting of the Interagency Group for Water in Africa (IGWA), November 1995.

5.3 Freshwater Fluxes from Continents into the World Oceans

The basis of a study was started in 1995 which looks at the freshwater runoff from continents into the oceans. This kind of study is of major interest in research concerned with global monitoring of freshwater resources, the flux of matter into coastal areas and the open sea, and the influence of freshwater fluxes for climate circulation patterns on regional or global scales. The study is based upon the Global Runoff Data Centre´s data sources and the results of this study will be published as a GRDC-Report termed "Freshwater Fluxes from Continents into the World Oceans based on Data of the Global Runoff Data Base".

The report has been prepared in response to the request of the Global Energy and Water Cycle Experiment (GEWEX) of the World Climate Research Programme (WCRP) of WMO and the International Council of Scientific Unions (ICSU).

Relevant target groups for the report are thought to be:

* Research groups involved in climate modelling, ocean-atmosphere interactions and hydrological research of the global hydrological cycle.

* Research groups involved in the assessment of fluxes of matter including pollutants from continents into the world oceans.

As one outcome of the study it was demonstrated that in order to analyze the global freshwater runoff from continents into the oceans a subset of about 150 gauging stations of all GRDC stations are required.

6. Organizational Tasks and Issues

6.1 Second GRDC-Steering Committee Meeting

In 1995 the GRDC held its second meeting of the International Steering Committee on June 27 and 28, 1995, at the headquarters of the Bundesanstalt of Gewässerkunde (BfG), Federal Institute of Hydrology in Koblenz, Germany.
The meeting was attended by 16 participants representing 10 international organisations. The outcome of the meeting was published as GRDC-Report No. 9 titled "Report of the Second Meeting of the GRDC Steering Committee, Koblenz, Germany, 27-28 June 1995".

As one major result a "Policy Guideline for the Dissemination of Data and Costing of Services" has been established and accepted. A copy of the Policy Guideline can be examined within Appendix 2.

An abridged version of the report containing the relevant results and conclusions can also be found within Appendix 1.

7. Involvement and Participation of the GRDC in International Projects and Programmes

Global Energy and Water Cycle Experiment, GEWEX

* Seventh Session of the GEWEX Scientific Steering Group, Melbourne, Australia, January 30 - February 3, 1995

* IAHS/WMO Working Group for GEWEX, Boulder, Colorado, USA, July 10, 1995

* First Session of the GEWEX Hydrometeorological Panel (GHP), Visby, Sweden, August 31 - September 3, 1995

Global Climate Observing System, GCOS

* GCOS Data Centre Implementation/Coordination Meeting, June 27-29, Offenbach, Germany.

International Hydrological Programme, IHP and Operational Hydrology Programme,OHP

* GRDC enlarged its link functions between IHP of UNESCO and OHP of WMO and contributed to both programmes.

World Hydrological and Climatology Observing System, WHYCOS

* The GRDC participated in WHYCOS activities concentrating on international basins (Aral Sea, and Zambesi).

Global Freshwater Assessment

* The GRDC participates actively in the Global Freshwater Assessment which is carried out inter alia by WMO upon the request of the International Commission of Sustainable Development.

Also cooperation and communication has been extended with the following research institutes:

* Global Precipitation Climatology Centre, GPCC.

* Centre for the Global Environment Monitoring System - Water, GEMS-Water of UNEP.

* Data Centre of Flow Regimes from International Experimental and Network Data, FRIEND.
  Based upon a meeting on January 25, 1995, "Common views of the representatives of FRIEND and the GRDC on the relationship between FRIEND and GRDC" have been delineated, a reprint is documented in the Annex 3.

8. Other business

In order to raise the Centres attraction and to emphasize its role within the global water resources databank-systems, GRDC has developed a coloured PR brochure informing about its main activities and objectives.

The brochure helps to facilitate and optimize the information exchange in surface water hydrology worldwide and will inform that the GRDC provides decision-makers with relevant data and information needed to resolve hydrological problems.

The information brochure will be distributed all relevant national hydrological agencies as well as to other international agencies and research institutions.

ANNEX

Content

Annex 1

Abridged version of the "Report of the Second Meeting of the GRDC Steering Committee, Koblenz, Germany, 27 - 28 June, 1995"

Weltdatenbank Abfluß
Bundesanstalt für Gewässerkunde
Koblenz, Deutschland

Global Runoff Data Centre
Federal Institute of Hydrology
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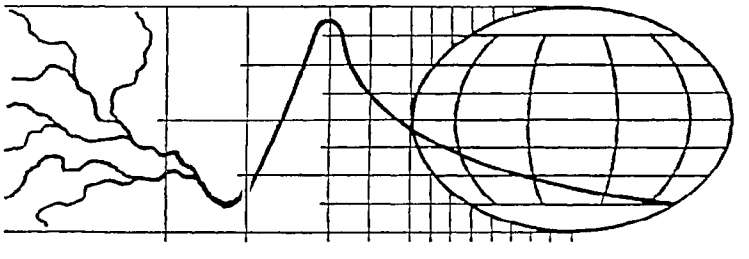
REPORT No. 9

Report of the Second Meeting of the GRDC Steering Committee, Koblenz, Germany 27 - 28 June 1995



GRDC

August 1995

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CONTENTS

Annexes to the Report

4. Comments on the World Climate Research Programme (WCRP) of WMO

4.1 The Director of the WCRP, Professor Graßl, informed the participants of the view of the WCRP with regard to the GRDC-activities. He outlined the principal interest of the climate research community in quality-controlled hydrological data sets with maximum possible global coverage to model, forecast and assess impacts of climate change. For the validation of climate models, hydrological data are indispensible. In this respect, river flows from the continents into the oceans are of prime interest as the freshwater flux into the oceans contributes significantly to the ocean-atmosphere energy transport and thus has a powerful impact on the formation of climate patterns and changes of climate.

4.2 Professor Graßl and Professor Raschke welcomed the contribution of the GRDC to various projects of the Global Energy and Water Cycle Experiment (GEWEX).

5. Presentation of the draft GRDC Status Report 1994

5.1 The Head of the GRDC, Dr. Grabs explained the principal activities of the Centre in 1994. Priorities were assigned to substantive works for GEWEX in the context of the Arctic Climate System Study (ACSYS), the assembly of a database of gauging stations close to the mouths of rivers and support for the Global Environment Monitoring System - Water (GEMS/WATER) of UNEP. The database was substantially updated and new software products included to enhance the updating capacity of the GRDC. The GRDC has been keen to strengthen its ties with national hydrological services and other data providers such as the Mekong Secretariat and the Zambesi River Basin Development Authority in close collaboration with WMO, UNEP/WHO and the World Bank. The participants acknowledged and expressed their satisfaction with the work concluded. The report was duly adopted and is separately attached as Annex 6 to this report.

6. Strategy and activities of the GRDC in co-operation with the Global Freshwater Assessment (WMO), WHYCOS (WMO/World Bank) GEMS/Water (UNEP/WHO/UNESCO/WMO), and FRIEND

6.1 Global Freshwater Assessment

The GRDC is prepared to participate actively in the global freshwater assement which is being undertaken at the request of the United Nations Commission for Sustainable Development (CSD), especially with regard to chapter 2 of the planned report: Assessment of the resource itself. On a global scale, the GRDC has already computed the continental runoff of rivers into the oceans and compared it with continental runoff estimates of various researchers. The specific tasks of the GRDC will be defined during a meeting in Geneva in July 1995.

6.2 GEMS/Water

The representative for GEMS/Water, Dr. Helmer explained that the GRDC has entered a contract agreement with GEMS/Water under which the GRDC links country missions with GEMS/Water missions and delivers data support to the GEMS/Water Collaborating Centre for Water Quality in Burlington, Canada. The GRDC participates in the Freshwater Programme of UNEP and contributes to the implementation of regional freshwater programmes of UNEP. Operating funds are allocated to the GRDC, dedicated mainly for country missions, data acquisition and production of primary data products. This respect, GRDC and GEMS/Water join forces in country missions to strengthen water quantity and quality data exchange arrangements and exchange information about planned and current activities.

6.2.1 The database of continental runoff into the oceans is of particular interest with regard to the Global Register of Rivers (GLORI) project of GEMS/Water. The GEMS/Water Steering Committee recommended during its session on 23rd June, that the two databases should liaise closely in future and necessary actions should be initiated. Dr. Ongley, Director of the GEMS/WATER Collaborating Centre for Water Quality, outlined the cooperation between the Centre and the GRDC and the common use of the RAISON software for visualization and graphical interpretation of both quantity and quality data.

6.3 WHYCOS

Resolution 3.5/3 (Cg-XII) - World Hydrological Cycle Observing System (WHYCOS) outlines the role of the GRDC in this important joint project of WMO and the World Bank. The World Bank expressed its view that the collaboration will facilitate the implementation of the Bank's Water Resources Management policy and the CSD's Global Freshwater Assessment. The GRDC is in a position to react in short-term to anticipated requests for receiving and processing of near real-time hydrological data. WMO is actively publicising the capacity and potential of the GRDC to play a vital role in the further development of WHYCOS.

6.4 FRIEND

The representative of UNESCO, Dr. Habib Zebidi, explained the aims and objectives of this important UNESCO project under IHP-IV and IHP-V and emphasized the common links between the WMO and UNESCO with regard to the development of both the FRIEND project and the GRDC.

6.4.1 The representative of FRIEND - Northern Europe, Dr. Gustard, outlined the strategy of FRIEND, especially that to increase the number of FRIEND projects in different regions. In his view, there is no prospect of a competition between FRIEND and the GRDC. In his response, Dr. Grabs informed the participants of a Memorandum of Understanding between the GRDC and FRIEND (Annex 7), in which ways of cooperation between FRIEND and the GRDC are outlined. He expressed his concern for possible competition and confusion in those cases where FRIEND and GRDC are seeking the same set of data. These cases occur especially in developing countries where there are no small experimental basins and FRIEND will incorporate data from the regular hydrological network of the respective country.

6.4.2 As the FRIEND data policy is more restrictive than the data policy of the GRDC (see item 11) this issue must be solved. First steps in this direction are the mututal invitations to the Steering Committee meetings of FRIEND and GRDC.

6.4.3 The SC recommended that the GRDC and FRIEND should collaborate in the field of quality control of data.

7. Cooperation of the GRDC with regard to GEWEX, GCOS, GPCC

7.1 GEWEX

Professor Raschke informed the SC of the outcome of the Seventh Session of the GEWEX Scientific Steering Group in Melbourne, January 1995 with regard to the GRDC (Annex 8). While the efforts and results of the GRDC are highly acclaimed, the principal request for a quality controlled set of hydrological data remains the first priority for GEWEX. Dr. Raschke invited the GRDC to participate in the meeting of the Working Group on Hydrometeorology in Visby (August 31 and September 1, 1995. He explained to the SC that this group brings together the Regional Projects of GEWEX.

7.1.1 Dr. Grabs presented the following outputs produced in 1994 relevant to the interests of GEWEX:

- Provision of the Arctic River Data Base for ACSYS
- Provision of all GRDC-station close to mouth of rivers for the estimation of freshwater flows from continents to the oceans
- Report on the database of the 20 largest rivers of the world.

With regard to the acquisition and exchange of hydrological data, the GRDC welcomes a closer cooperation with planned and on-going GEWEX projects such as BALTEX, GAME and LAMBADA, especially regarding a better feed-back from regional projects to the GRDC.

7.1.2 Prof. Graßl recommended that trend stations for further work on WCP-Water Project A.2 - "Long-Term Analysis of Hydrological Time Series" should be identified in conjunction with GCOS.

7.2 GCOS

The SC acknowledged the contacts between the GRDC and GCOS. There are no operational tasks for the GRDC at present to serve the data and information requirements of GCOS. The SC recommended that the GRDC continues to monitor developments concerning GCOS.

7.3 GPCC

The cooperation between the GRDC and the GPCC is expected to bear results in the contribution of the GRDC to the WCP-Water Project B.7. Due to the resignation of the responsible scientist at the FIH, however, further progress of the project will slow down considerably. The GRDC and the GPCC are extending the common time series where runoff and precipitation data are available. The Head of the GPCC, Mr. Rudolf, expressed his view that by autumn 1995 data sets of seven years (1986-1992) and by mid-1996 time series going back to 1980 will be available.

7.3.1 Mr. Rudolf then presented the work of the GPCC, especially with regard to the compilation of global time-series of precipitation and the quality control of precipitation data.

8. Scope and priorities for data acquisition of the GRDC

8.1 The SC re-iterated the present criteria for data collection, namely: Data should be collected for rivers with mean annual discharge greater than 100 m^3/s, from rivers with catchment areas greater than 1.000.000 km^2 and from river basins with more than 1.000.000 inhabitants. It should be expanded if a catchment size of 100.000 km^2 would be more appropriate.

8.2 The SC recommended that, as a general policy, the aim should be to collect daily discharge data. Data suppliers should therefore be requested to supply daily data. However, the SC is aware of the fact that many data suppliers at present supply only mean monthly discharge data to the GRDC.

8.3 The SC felt that the GRDC should be selective in what data it requests and accepts from programmes such as GEWEX and WHYCOS so that the received data are matching with the actual data requirements for the tasks of the GRDC. Dr. Helmer pointed out that the GRDC has to follow a definite data acquisition policy in order to develop an institutional profile of its own. Some members noted that the GRDC should not put too strict conditions on the data acquisition and also collect data from rivers even if the discharge is less than $100m^3/s$, if these rivers have an important role regionally.

8.4. The representative of the Government of Japan, Dr. Kinosita, noted that in no case estimated or interpolated data should be stored in the GRDC. Where data have been interpolated, they must be flagged to distinguish these data from the original data in the GRDC. The SC made it clear that the GRDC should stick to its present practice to collect only gauge observed data which are not statistically altered. Any missing data that have been filled in the database should be identified as such so as to allow users always to distinguish between originally observed and derived data.

8.5 In compliance with major data programmes such as GEWEX, additional requirements to be met include:

- Collection of discharge data from closed basins and from continents to oceans.

- Information to verify the runoff produced by coupled models in areas of 10^3 - 10^5 km^2.

8.6 For GEMS/Water, the GRDC-stations should as much as possible be linked with GEMS/Water "Trend-stations". For GEWEX and GEMS, discharge information from river stations close to the mouth and draining into the oceans bear special importance.

8.7 Selected data generated through the WHYCOS project data will also be incorporated in the GRDC database.

8.8 In general, the GRDC should take the lead for data collection programmes for regionally important rivers (e.g. within the WHYCOS project) and the global coverage of runoff; the GRDC should cooperate in data collection programmes of programmes such as GEMS/Water, GEWEX, FRIEND, etc.

8.9 Dr. Askew offered that the WMO Secretariat would write directly to data providers in those cases where necessary data are not accessible to the GRDC.

8.10 The SC felt that the GRDC should start to compile a meta-data catalog on hydrological databases. In this context, Dr. Zebidi informed the SC that UNESCO had recently published technical information on hydrological databases. The establishment of a modest library at the GRDC which contains inter alia hydrological yearbooks, river basin reports and relevant research papers is a first step.

10. Considerations for quality control of GRDC data

10.1 The quality of hydrological data is a key issue for all applications, the solution of this issue can only be approximated. The GRDC will use a specially programmed plausibility tool to check the plausibility of data. In-depth quality control can only be undertaken for selected cases with the active collaboration with the data providers. In the case of governmental or parastatal agencies, the final responsibility for the correctness of the data rests solely with these agencies. If the plausibility check shows errors or the data seem doubtful, the providing agency should be contacted for correction of the data. Where possible, the data quality assurance procedures from data providers should be communicated to the GRDC.

10.2 Additional data screening software should be adapted from existing software, including software in HOMS, research groups and international river basin authorities.

10.3 Dr. Gustard mentioned that FRIEND has data quality problems similar to those of the GRDC and proposed the extension of cooperation between FRIEND and the GRDC in the field of quality control.

10.4 The participants also suggested that the Centre should look for Ph.D students to do studies on quality control to supplement the manpower resources of the GRDC.

10.5 The participants acknowledged that quality control in hydrology is more complex and difficult to accomplish than for many meteorological parameters. One factor for this is the different set of instruments in meteorology and hydrology which make it difficult for the GRDC to use the same quality control procedures used in meteorology.

10.6 To find practical solutions to the data quality issue, the participants agreed that a small group of scientists should be established to advise and develop a quality control programme for GRDC data. In this respect, the offer for collaboration with FRIEND (item 10.3 above) and the recommendation of the SC to cooperate with FRIEND (item 6.4.2) was noted.

11. GRDC Policy Guidelines for the Dissemination of Data and Costing of Services

11.1 Following a recommendation of the SC in 1994, the GRDC prepared a draft: "Policy guidelines for the dissemination of Data and costing of services" in close cooperation with the WMO secretariat. Dr. Askew pointed out the necessity to harmonize the GRDC policy with the mainstream developments in WMO with regard to data transfer and dissemination. Dr. Kinosita remarked that the military use of discharge data must be prevented. The SC confimed that repeated misuse of the GRDC database or non-compliance with the data policy should result in the data user concerned being denied GRDC services.

11.2 After thorough deliberations, the members of the SC adopted the Policy Guidelines that are contained in Annex 9 to this report. The SC noted that the Policy Guidelines are subject to review at future meetings of the Steering Committee in the light of experience with its use and any developments in the WMO policy.

12. Allocation of resources to the GRDC; status and requirements

12.1 The SC welcomed the efforts of the Federal Republic of Germany, and in particular the Federal Institute of Hydrology, to augment the personal resources of the GRDC to the current number of five members (Annex 3).

12.2 The SC expressed its satisfaction that WMO and UNEP allocated operating funds for the GRDC, these being dedicated mainly for country missions, data acquisition and production of primary data products. The SC expressed clearly, that these funds were to be used to supplement the budget which the Federal Republic of Germany allocates to the Centre, especially for those activities where the allocated budget is insufficient to carry out the necessary activities of the GRDC.

12.3 Together with funds provided by WMO and by UNEP through its GEMS/Water programme, the SC noted that the GRDC is now in a good position to expand its activities.

14. Research issues of the GRDC in collaboration with existing and planned programmes of WMO and other organizations, including the possible establishment of a Science Team

14.1 A poster presentation of two nationally funded projects was given by Dr. T. Lüllwitz (FIH): Transformation of measured flow data to grid points and R. Winnegge (FIH): Comparison study of areal mean monthly precipitation and streamflow for selected basins: The Niger River. These projects are contributions to the WCP-projects WCP-Water Project B.3 "Development of grid related estimates of hydrological variables" and WCP-Water Project B.7 "Comparison study of time series of areal mean monthly precipitation and streamflow of selected catchment areas".

14.2 The progress of both projects was acknowledged by the SC. The contribution of the B.3 project will likely end at the end of 1995. Since the principal researcher for the B.7 project has left the FIH, further progress will be slowed down significantly.

14.3 With regard to WCP-Water Project A.9 "Monitoring changes in the characteristics of extreme hydrological events (floods and droughts)", the recommendation of the SC from June 1994 to publish the highest and lowest recorded discharges from GRDC files as a contribution to this project had to be deferred into 1996 due to a shift of the working priorities of the Centre. Dr. Zebidi informed the SC that the IHP project H-2-3 on "Extraordinary rainfall and snowmelt floods in rivers of the world" was not implemented due to a lack of funds.

14.4 Prof. Graßl remarked that every effort should be made to make scientific use of the GRDC database. In this respect, the GRDC should intensify its efforts to cooperate with research institutions to conduct research. He pointed out that high quality research would also facilitate funding from national and international sources.

14.5 The WMO Rapporteur on Hydrological Data for Observing Climate and Environmental Change, Prof. Kaczmarek, encouraged the GRDC to follow current research developments and to review the results with a view to the strategic planning of GRDC activities.

14.6 The GRDC is prepared to invite/accept guest researchers to work with

Annex 2

Policy Guideline for the Dissemination of Data and Costing of Services

Global Runoff Data Centre
Federal Institute of Hydrology
Bundesanstalt für Gewässerkunde
Kaiserin-Augusta-Anlagen 15-17
56068 Koblenz
Federal Republic of Germany

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Telefax +49 261 1306280

GRDC operates with the support of the Federal Republic of Germany under the auspices of WMO

POLICY GUIDELINES FOR THE DISSEMINATION OF DATA AND COSTING OF SERVICES

Preamble

The Global Runoff Data Centre (GRDC) operates under the auspices of the World Meteorological Organization (WMO) on the advice of its international Steering Committee and in cooperation with organizations such as UNESCO, UNEP, WHO and ICSU. This Guideline regulates the acquisition and dissemination of hydrological data and costing of services in the Global Runoff Data Centre under the Terms of Reference stipulated during the First Session of the Steering Committee of the GRDC and the committments of WMO at its Twelfth Congress in 1995.

The Guideline does not infringe on the ownership rights on the data transmitted to the GRDC by data providers. In particular, the GRDC does not usually provide value-added and costed services to data users which fall in the domain of national hydrological services.

At its Twelfth Congress in 1995, the World Meteorological Organisation (WMO) adopted Resolution 40 (Cg-XII) and thus committed itself, as a fundamental principal, "to broadening and enhancing the free and unrestricted international exchange of meteorological and related data and products." In this context, "free and unrestricted" means non-discriminatory and without charge, the latter with the meaning "at no more than the cost of reproduction and delivery, without charge for the data and products themselves." With regard to the Global Runoff Data Centre, Congress also adopted Resolution 21 (Cg-XII) which encourages Members "to support the GRDC through the provision of the hydrological data and related information that it needs".

WMO Congress also adopted the practice that countries "should provide to the research and education communities, for their non-commercial activities, free and unrestricted access to all data and products exchanged under the auspices of WMO "with the understanding that the commercial use of these data may be subject to conditions."

1. Principles of data acquisition and access

1.1 The GRDC operates on the WMO principal mentioned above with the aim of encouraging the widespread use of the data for national, regional and global studies.

1.2 Contributing countries are encouraged to transfer unrestricted, quality controlled, selected hydrological data together with station history information to the GRDC. The transfer of daily discharge data is preferred.

1.3 When requested by a contributing agency, the GRDC also accepts and stores restricted data. In such cases, the agency concerned specifies the relevant restrictions and the GRDC flags the restricted data and uses them under the conditions specified by the contributing agency.

2. Dissemination of GRDC-Data

2.1 GRDC data are available to users under the conditions specified in 2.2. to 2.6 below.

2.2 Requests for data must reach the GRDC in written form: letter, facsimile, telex or email. A proforma is attached for use in this respect (annex 1).

2.3 The data user agrees in writing that the data received are not transferred to third parties without the written consent of the GRDC (proforma in annex 2).

2.4 GRDC data shall not be used for commercial purposes without the prior consent of the national hydrological service(s) and/or other contributors of the data to the GRDC. The GRDC will request such consent on behalf of a potential user.

2.5 The data user agrees that the GRDC may inform the national hydrological service(s) supplying the data about the use to which their data have been put and will transfer the name and address of the data user to the hydrological service(s) concerned.

2.6 The GRDC makes available subsets of the GRDC database on request, as stated above. Requests for the entire database or substantial parts of it cannot be entertained.

3. Cost of services

3.1 Information about the GRDC, including the yearly status reports and the database contents (catalogue), are provided free of charge upon request.

3.2 To enhance the services of the GRDC, the GRDC charges data users on a non-profit base for the time used for carrying out services and for costs of material, handling and mailing.

3.3 Standard GRDC services (annex 3) are free for agencies and institutions which contribute data to the GRDC, as well as for the Secretariats of international organizations which are the principal clients of the GRDC, such as WMO, UNESCO, UNEP and WHO.

3.4 For all other users, the cost for databank queries, diskettes, mail and all other overheads is based on the current price for services charged by the Federal Institute of Hydrology, Koblenz staff time being based on a per hour rate which in June 1995 was set at DM 75,--.

3.5 Services for projects which require extensive work at the GRDC or the establishment of an own database are agreed upon in a Memorandum of Unterstanding (MoU) between the project partners. In these cases, the financial contribution for the services of the GRDC are costed and incorporated in the MoU.

3.6 To give an indication of the approximate costs of databank services, the following can serve as a guide:

a) Simple queries, such as a search for all stations of three major rivers and the extraction of mean daily discharge data:

Estimated time for completion:	1.5 hours
Approximate cost (June 1995) :	DM 112,50

b) Complex queries, such as the selection of daily discharge time series of at least 20 years for 20 stations from three major rivers, with maximum overlap of time series:

Estimated time for completion:	5 hours
Approximate cost (June 1995) :	DM 375,--

For complex tasks where data products (statistical evaluations, graphics etc.) are also requested, a cost estimate is made and agreed upon in advance.

3.7 Payment for services is by bank transfer to the credit of the GRDC:

BUNDESKASSE KOBLENZ, LANDESZENTRALBANK KOBLENZ
BLZ: 570 000 00, ACCOUNT: 570 010 01, credit: 1207/11902 GRDC

Cheques sent by registered mail are also acceptable.

4. Disclaimer

4.1 While the GRDC makes every effort to eliminate errors from the data base, there may be errors in the data unknown to the GRDC. Neither the GRDC nor its sponsors can be held responsible for the consequences of the use of GRDC data, error free or otherwise.

Format for Data Request from GRDC

Any request for data should provide the following information:

a) Origin of the request including name, postal, e-mail address, phone and fax number of the individual person or institute making the request; where an institute, the name and the position of the responsible officer should also be provided.

b) Specification of request (e.g. which rivers, stations or regions, monthly or mean daily data, time series).

c) Rational for the data request.

d) Detailed description of the use to be made of the data. A summary of the research or study project should be added to the request.

e) Signature of the person or responsible officer referred to in a) above.

Declaration of the Data User

The undersigned declares that he/she is responsible for the use of the data provided by the GRDC and agrees to use the data under the following conditions:

1. The GRDC data are not transferred either in part or total to third parties or to the general public (e.g. by electronic media), without the written consent of the GRDC.

2. The data will not be used for commercial purposes without the written consent of the GRDC. The GRDC itself will obtain clearance from the respective national hydrological service(s) and/or other data contributors.

3. The dataset will be not accessible to unauthorized persons and after completion of the specified studies, the dataset will be kept seperate from the general data processing facilities on diskette, tape or CD.

4. After completion of the studies and parts thereof, two copies of the results will be made available for the GRDC, as well as publications arising from the use of the data set or parts thereof.

5. In all publications, the source of the data will be fully cited as: "The Global Runoff Data Centre, D - 56068 Koblenz, Germany".

6. The GRDC operates on a non-profit basis. In certain cases, however, the GRDC may charge the data user a nominal amount for data queries and handling or an amount which has been agreed upon between the requesting agency and the GRDC prior to data delivery. The undersigned confirms his/her capacity to pay bills presented by the GRDC for services.

7. Disclaimer

While the GRDC makes every effort to eliminate errors from the data base, there may be errors in the data unknown to the GRDC. Neither the GRDC nor its sponsors can be held responsible for the consequences of the use of GRDC data, error free or otherwise.

I, as principal researcher/representative of the requesting organization agree to the conditions stated above.

Place and date :_____

Signature :_____

Annex 3

Copy of the "Common views of the representative of FRIEND and the GRDC on the relationship between FRIEND and GRDC"

Common views of the representative of FRIEND and the GRDC on the relationship between FRIEND and GRDC

Results of a meeting at the Federal Institute of Hydrology
Koblenz, 25 January 1995

Participants:

A. Gustard, represenative FRIEND
K. Hofius, President of CHy
H. Liebscher, Chairman, GRDC Steering Committee
W. Grabs, Head of GRDC
U. Schröder, IHP/OHP Secretariat
T. Lüllwitz, Federal Institute of Hydrology

Results

The group agreed on the following points:

1. To prepare a draft brochure to outline the objectives and present and future activities of FRIEND and the GRDC and ways of co-operation between FRIEND and GRDC primarily in the fields of data

   - acquisition
   - archiving
   - processing
   - dissemination

2. To develop operational links between the GRDC and FRIEND on the basis of the GRDC Steering Committee and the individual Steering Committees of FRIEND.

3. To exchange meta-data between GRDC and FRIEND with regular up-dates

4. During country missions, representatives of FRIEND and GRDC should inform the data providing agencies about the different programmes and activities of GRDC and FRIEND and ask for active contributions to each other's programme.

5. In regions, where FRIEND is established, FRIEND could act as an agent for GRDC in order to implement previous agreements between the relevant partners.

6. In new FRIEND regions, GRDC could act as an agent for FRIEND with respect to time-series database development.

7. UNESCO should inform WMO prior to the establishment of new FRIEND activities.

8. It is recommended, that participation by WMO in FRIEND activities should be strenghtened and that UNESCO should continue to support activities of GRDC.

9. Define the roles of GRDC and FRIEND in the respective programmes of WMO and UNESCO more clearly.

10. To invite Mr. Alan Gustard as FRIEND representative to the next Steering Comittee meeting of the GRDC (Koblenz, June 27-28, 1995).

11. To invite Mr. W. Grabs of the GRDC to the regional Steering Committee meetings of FRIEND.

Annex 4

Update of GRDC Database in 1995

GLOBAL RUNOFF DATA CENTRE (GRDC)
DATABASE UPDATE 1995

GERMANY

Date of Import	GRDC-No.	River	Station	Update from-to	Daily/Monthly Data	Station New/Update
17.02.95	6335100	RHEIN	KAUB	1931-1994	D	U
17.02.95	6336050	MOSEL	COCHEM	1935-1994	D	U
17.02.95	6337100	WESER	VLOTHO	1820-1992	D	U
13.04.95	6337250	ALLER	RETHEM	1940-1993	D	N
17.02.95	6337400	WESER	HANN.-MUENDEN	1831-1992	D	U
17.02.95	6338100	EMS	VERSEN	1941-1992	D	U
13.04.95	6357500	ODRA	EISENHUETTENSTADT	1940-1988	D	N

CANADA

Date of Import	GRDC-No.	River	Station	Update from-to	Daily/Monthly Data	Station New/Update
09.03.95	4208020	MACKENZIE RIVER	INUVIK	1972-1992	D	N
09.03.95	4208025	MACKENZIE RIVER	ARCTIC RED RIVER	1972-1992	D	N
09.03.95	4209050	BABBAGE RIVER	BELOW CARIBOU CREEK	1990-1992	D	U
09.03.95	4209100	TRAIL VALLEY CREEK	NEAR INUVIK	1977-1992	D	N
09.03.95	4209400	COPPERMINE RIVER	POINT LAKE OUTLET	1965-1992	D	N
09.03.95	4209450	BIG RIVER	ABOVE EGG RIVER	1975-1988	D	N
09.03.95	4209500	TREE RIVER	NEAR THE MOUTH	1991-1992	D	U
09.03.95	4209550	BURNSIDE RIVER	NEAR THE MOUTH	1976-1992	D	U
09.03.95	4209580	GORDON RIVER	NEAR THE MOUTH	1977-1992	D	N
09.03.95	4209600	ELLICE RIVER	NEAR THE MOUTH	1971-1992	D	N
09.03.95	4209650	FRESHWATER CREEK	NEAR CAMBRIDGE BAY	1970-1992	D	N

FINLAND

Date of Import	GRDC-No.	River	Station	Update from-to	Daily/Monthly Data	Station New/Update
14.03.95	6830100	PAATSJOKI	LAKE INARI OUTLET	1949-1992	D	N
14.03.95	6830510	UTSJOKI	UTSJOKI	1959-1992	D	N
14.03.95	6854100	KOKEMJENJOKI	KALSINKOSI	1931-1992	D	N
14.03.95	6854200	LAPNANJOKI	ALAHAERMAE	1931-1992	D	N
14.03.95	6854400	KIIMINGINJOKI	HAUKIPUDAS	1911-1992	D	N
14.03.95	6854500	OULUJOKI	NEAR THE MOUTH	1950-1992	D	N
14.03.95	6854590	OULUJOKI	LAKE LENFAD OUTLET	1911-1992	D	N
14.03.95	6854600	SIURNANJOKI	NEAR THE MOUTH	1911-1992	D	N
14.03.95	6854700	KENIJOKI	NEAR THE MOUTH	1949-1992	D	N
14.03.95	6854800	KALAJOKI	NEAR THE MOUTH	1911-1992	D	N
14.03.95	6854900	KYRONJOKI	NEAR THE MOUTH	1911-1992	D	N
14.03.95	6855100	VANTAANJOKI	NEAR THE MOUTH	1937-1992	D	N
14.03.95	6855200	KYMIJOKI	NAJALA	1938-1992	D	N
14.03.95	6855270	NILAKKA	NEAR VESANTO	1896-1992	D	N
14.03.95	6855280	KIVIJARVI	ABOVE LAKE KEITELE	1910-1992	D	N
14.03.95	6855300	PORVOONJOKI	NEAR THE MOUTH	1963-1992	D	N
14.03.95	6855400	VUOKSI	TAINIONKOSKI	1847-1992	D	N

GLOBAL RUNOFF DATA CENTRE (GRDC)
DATABASE UPDATE 1995

GREAT BRITAIN

Date of Import	GRDC-No.	River	Station	Update from-to	Daily/Monthly Data	Station New/Update
12.04.95	6603100	CAMOWEN	CAMOWEN TARRACE	1972-1992	D	N
12.04.95	6603300	LOWER BANN	MOVANAGHER	1980-1990	D	N
12.04.95	6604150	CARRON	NEW KELSO	1979-1993	D	N
12.04.95	6604200	CLYDE	DALDOWIE	1963-1993	D	N
12.04.95	6604820	DEE	PARK	1972-1992	D	N
12.04.95	6605100	RIBBLE	SAMLESBURY	1960-1992	D	N
12.04.95	6605300	TYNE	BYWELL	1956-1993	D	N
12.04.95	6605520	GRETA	RUTHERFORD BRIDGE	1960-1993	D	N
12.04.95	6606100	LUD	LOUTH	1968-1992	D	N
12.04.95	6606200	STRINGSIDE	WHITE BRIDGE	1965-1993	D	N
12.04.95	6606250	LITTLE OUSE	ABBEY HEATH	1968-1992	D	N
12.04.95	6606950	COLNE	LEXDEN	1959-1992	D	N
12.04.95	6607100	DART	AUSTINS BRIDGE	1958-1993	D	N
12.04.95	6607550	ITCHEN	HIGHBRIDGE-ALLBROOK	1958-1993	D	N
12.04.95	6607650	THAMES	KINGSTON	1883-1993	D	N
12.04.95	6607950	GREAT STOUR	HORTON	1964-1993	D	N
12.04.95	6608100	DEE	MANLEY HALL	1937-1992	D	N
12.04.95	6608200	TEIFI	GLAN TEIFI	1959-1966	D	N
12.04.95	6608600	CYNON	ABERCYNON	1957-1992	D	N
12.04.95	6609400	AVON	EVESHAM	1936-1993	D	N

SUISSE

Date of Import	GRDC-No.	River	Station	Update from-to	Daily/Monthly Data	Station New/Update
13.04.95	6935020	AARE	BERN-SCHOENAU	1961-1993	D	U
13.04.95	6935050	RHEIN	BASEL(ST.ALBAN)	1961-1993	D	U
13.04.95	6935145	RHEIN	DOMAT/EMS	1961-1993	D	U
13.04.95	6935300	RHEIN	UNTERSIGGENTHAL	1961-1993	D	N
13.04.95	6935500	RHEIN	DIEPOLDSAU	1961-1993	D	N
13.04.95	6939050	RHONE	CHANCY	1961-1993	D	U
13.04.95	6939200	RHONE	PORTE DU SCEX	1961-1993	D	N
13.04.95	6943100	INN	MARTINSBRUCK	1961-1993	D	N
13.04.95	6948100	TICINO	BELLINZONA	1961-1993	D	N

GLOBAL RUNOFF DATA CENTRE (GRDC)
DATABASE UPDATE 1995

AUSTRALIA

table: 1

Date of Import	GRDC-No.	River	Station	Update from-to	Daily/Monthly Data	Station New/Update
30.05.1995	5101020	PASCOE RIVER	GARRAWAY CREEK JUNC.	1970-1994	D	U
30.05.1995	5101040	STEWART RIVER	TELEGRAPH ROAD	1970-1993	D	U
30.05.1995	5101050	HANN RIVER	SANDY CREEK	1958-1991	D	U
30.05.1995	5101060	JEANNIE RIVER	WAKOOKA ROAD	1970-1988	D	U
30.05.1995	5101080	DAINTREE RIVER	BAIRDS	1968-1992	D	U
30.05.1995	5101100	BARRON RIVER	MYOLA	1915-1994	D	U
30.05.1995	5101110	MULGRAVE RIVER	PEETS BRIDGE	1972-1993	D	U
30.05.1995	5101115	RUSSEL RIVER	POWERLINE CROSSING	1966-1989	D	U
30.05.1995	5101118	SOUTH JOHNSTONE RIVER	CENTRAL MILL	1916-1994	D	U
30.05.1995	5101130	TULLY RIVER	EURAMO	1975-1994	D	U
30.05.1995	5101160	HERBERT RIVER	ABERGOWRIE	1969-1993	D	U
30.05.1995	5101170	BLACK RIVER	BRUCE HIGHWAY	1973-1994	D	U
30.05.1995	5101180	ALLIGATOR CREEK	ALLENDALE	1974-1994	D	U
30.05.1995	5101190	HAUGHTON RIVER	MOUNT PICCANINNI	1971-1994	D	U
30.05.1995	5101200	BURDEKIN	CLARE	1950-1994	D	U
30.05.1995	5101203	BOGIE RIVER	STRATHBOGIE	1967-1990	D	U
30.05.1995	5101205	BROKEN RIVER	URANNAH	1962-1994	D	U
30.05.1995	5101208	MISTAKE CREEK	CHARLTON	1968-1993	D	U
30.05.1995	5101250	PIONEER RIVER	PLEYSTOWE RECORDER	1916-1982	D	U
30.05.1995	5101290	WATERPARK CREEK	BYFIELD	1974-1993	D	U
30.05.1995	5101300	FITZROY	YAAMBA	1914-1973	D	U
30.05.1995	5101301	FITZROY	THE GAP	1964-1994	D	U
30.05.1995	5101303	MIMOSA CREEK	REDCLIFFE	1957-1994	D	U
30.05.1995	5101305	DAWSON RIVER	UTOPIA DOWNS	1966-1994	D	U
30.05.1995	5101307	BLACKWATER CREEK	CURRUGH	1972-1990	D	U
30.05.1995	5101308	BROWN RIVER	LAKE BROWN	1966-1994	D	U
30.05.1995	5101320	CALLIOPE RIVER	CASTLEHOPE	1938-1994	D	U
30.05.1995	5101360	BARKER CREEK	WYALLA	1909-1988	D	U
30.05.1995	5101365	CADARGA CREEK	BROVINIA STATION	1965-1994	D	U
30.05.1995	5101380	MARY RIVER	DAGUN POCKET	1972-1993	D	U
30.05.1995	5101385	WIDE BAY CREEK	BROOYAR	1909-1994	D	U
30.05.1995	5101420	SOUTH PINE RIVER	DRAPERS CROSSING	1965-1993	D	U
30.05.1995	5101430	BREMER RIVER	WALLOON	1961-1994	D	U
30.05.1995	5101450	LOGAN RIVER	ROUND MOUNTAIN	1957-1994	D	U
30.05.1995	5101460	TALLEBUDGERA CREEK	TALLEBUDGERA CK RD	1970-1991	D	U
30.05.1995	5104160	BRACKER CREEK	TERRAINE	1966-1994	D	U
30.05.1995	5104220	DOGWOOD CREEK	GILWEIR	1949-1994	D	U
30.05.1995	5104223	YULEBA CREEK	FORESTRY STATION	1972-1994	D	U
30.05.1995	5104225	BRIGALOW CREEK	MEANDARRA	1972-1992	D	U
30.05.1995	5104228	CANAL CREEK	LEYBURN	1972-1994	D	U
30.05.1995	5104230	WARREGO RIVER	AUGATHELLA	1967-1994	D	U
30.05.1995	5104240	PAROO RIVER	YARRANVALE	1967-1988	D	U
30.05.1995	5104245	PAROO RIVER	CAIWARRO	1967-1994	D	U
30.05.1995	5109120	ELIZABETH CREEK	MINING CAMP	1974-1988	D	U
30.05.1995	5109130	PAROO CREEK	DAMSITE	1968-1988	D	U
30.05.1995	5109150	FLINDERS RIVER	GLENDOWER	1972-1990	D	U
30.05.1995	5109160	NORMAN RIVER	STRATHPARK	1969-1988	D	U
30.05.1995	5109250	WENLOCK RIVER	WENLOCK	1969-1991	D	U
30.05.1995	5110010	GEORGINA RIVER	CAMOOWEAL	1968-1988	D	U
30.05.1995	5110030	DARR RIVER	DARR	1969-1994	D	U
30.05.1995	5202010	OXLEY RIVER	EUNGELLA	1947-1994	D	U
30.05.1995	5202040	NIMBOIDA RIVER	NYMBOIDA	1909-1994	D	U
30.05.1995	5202043	CLARENCE RIVER	TABULAM	1912-1994	D	U
30.05.1995	5202045	LITTLE MURRAY RIVER	NORTH DORRIGO	1947-1983	D	U
30.05.1995	5202048	BIELSDOWN CREEK	DORRIGO #2	1947-1994	D	U
30.05.1995	5202050	TAYLORS ARM	GRAYS CROSSING	1970-1988	D	U
30.05.1995	5202055	NAMBUCCA RIVER	BOWRAVILLE	1959-1993	D	U
30.05.1995	5202060	TIA RIVER	TIA	1927-1994	D	U
30.05.1995	5202065	STYX RIVER	JEOGLA	1918-1994	D	U
30.05.1995	5202090	MAMMY JOHNSONS RIVER	PIKES CROSSING	1968-1994	D	U
30.05.1995	5202100	HUNTER RIVER	MOONAN DAMSITE	1940-1994	D	U
30.05.1995	5202115	JIGADEE CREEK	AVONDALE	1990-1994	D	U
30.05.1995	5202110	JILLIBY CREEK	UPSTREAM WYONG RIVER	1973-1991	D	U

GLOBAL RUNOFF DATA CENTRE (GRDC)
DATABASE UPDATE 1995

AUSTRALIA

table: 2

Date of Import	GRDC-No.	River	Station	Update from-to	Daily/Monthly Data	Station New/Update
30.05.1995	5202120	CAPERTEE RIVER	GLEN DAVIS	1970-1994	D	U
30.05.1995	5202130	SOUTH CREEK	MULGOA ROAD	1970-1994	D	U
30.05.1995	5202150	SHOALHAVEN RIVER	WARRI	1914-1994	D	U
30.05.1995	5202155	CORANG RIVER	HOCKEYS	1924-1994	D	U
30.05.1995	5202160	CLYDE RIVER	BROOMAN	1960-1994	D	U
30.05.1995	5202185	TUROSS RIVER	TUROSSVALE	1994-1994	D	U
30.05.1995	5202180	TUROSS RIVER	D/S WADBILLIGA RIVER JUNC	1964-1994	D	U
30.05.1995	5202200	TOWAMBA RIVER	TOWMBA	1970-1994	D	U
30.05.1995	5202225	DELEGATE RIVER	QUIDONG	1951-1994	D	U
30.05.1995	5202227	SUGGAN BUGGAN RIVER	SUGGAN BUGGAN	1957-1994	D	N
30.05.1995	5202228	SNOWY RIVER	ABV ISLAND BEND PONDAGE	1964-1982	D	U
30.05.1995	5204010	BOWNA CREEK	YAMBLA	1974-1992	D	U
30.05.1995	5204013	JINGELLIC CREEK	JINGELLIC	1965-1994	D	U
30.05.1995	5204015	SWAMPY PLAIN RIVER	KHANCOBAN	1927-1982	D	U
30.05.1995	5204018	MURRAY RIVER	BIGGARA	1948-1994	D	U
30.05.1995	5204100	MUTTAMA CREEK	COOLAC	1938-1994	D	U
30.05.1995	5204105	MURRUMBIDGEE RIVER	MITTAGANG CROSSING	1926-1994	D	U
30.05.1995	5204108	NUMERALLA RIVER	NUMERALLA SCHOOL	1947-1994	D	U
30.05.1995	5204120	ABERCROMBIE RIVER	HADLEY #2	1960-1993	D	U
30.05.1995	5204125	ROCKY BRIDGE CREEK	NEAR NEVILLE	1968-1993	D	U
30.05.1995	5204180	GWYDIR RIVER	BUNDARRA	1937-1994	D	U
30.05.1995	5204185	COPES CREEK	TINGHA	1967-1989	D	U
30.05.1995	5204190	PEEL RIVER	CHAFFEY DAM	1969-1994	D	U
30.05.1995	5204195	COCKBURN RIVER	MULLA CROSSING	1937-1994	D	U
30.05.1995	5204210	BELL RIVER	NEWREA	1939-1993	D	U
30.05.1995	5204215	GREEN VALLEY CREEK	HILL END	1966-1994	D	U
30.05.1995	5204250	DARLING RIVER	LOUTH	1954-1993	D	U
30.05.1995	5204255	DARLING RIVER	BOURKE TOWN	1943-1994	D	U
30.05.1995	5204258	BOX CREEK	COBAR	1974-1992	D	U
30.05.1995	5302220	DEDDICK RIVER	DEDDICK (CASEYS)	1978-1988	D	U
30.05.1995	5302245	WONNANGATTA RIVER	WATERFORD	1922-1994	D	U
30.05.1995	5302250	THOMPSON RIVER	COOPERS CREEK	1929-1994	D	U
30.05.1995	5302265	LOCH RIVER	NOOJEE	1957-1988	D	N
30.05.1995	5302270	TARWIN RIVER	MENNIYAN	1955-1994	D	U
30.05.1995	5302280	BUNYIP RIVER	HEADWORKS	1948-1994	D	U
30.05.1995	5302290	LITTLE YARRA RIVER	YARRA JUNCTION	1963-1994	D	U
30.05.1995	5302300	MARIBYRNONG RIVER	KEILOR	1908-1994	D	U
30.05.1995	5302320	MOORABOOL RIVER	BATESFORD	1908-1994	D	U
30.05.1995	5302350	GELLIBRAND RIVER	CARLISLE	1964-1991	D	U
30.05.1995	5302351	ARKINS CK WEST BR	WYELANGTA	1958-1994	D	N
30.05.1995	5302360	MERRI RIVER	WOODFORD	1948-1994	D	U
30.05.1995	5302365	HOPKINS RIVER	HOPKINS FALLS	1955-1994	D	U
30.05.1995	5302380	WANNON RIVER	DUNKELD	1920-1994	D	U
30.05.1995	5304019	MITTA MITTA RIVER	HINNOMUNJIE	1925-1994	D	U
30.05.1995	5304025	NARIEL CREEK	UPPER NARIEL	1954-1994	D	N
30.05.1995	5304030	BUCKLAND RIVER	HARRIS LANE	1972-1994	D	U
30.05.1995	5304035	DANDONGADALE RIVER	MATONG NORTH	1962-1994	D	N
30.05.1995	5304060	CAMPASPE RIVER	LAKE EPPALOCK (H GAUGE)	1963-1994	D	U
30.05.1995	5304062	CAMPASPE RIVER	ASHBOURNE	1933-1994	D	N
30.05.1995	5304063	CAMPASPE RIVER	LAKE EPPALOCK COMBINED	1972-1994	D	N
30.05.1995	5304065	CAMPASPE RIVER	BARNADOWN	1977-1994	D	U
30.05.1995	5304069	CRESWICK CREEK	CLUNES	1943-1994	D	N
30.05.1995	5304070	LODDON RIVER	NEWSTEAD	1967-1994	D	U
30.05.1995	5304080	AVOCA RIVER	COONOOER	1889-1994	D	U
30.05.1995	5304081	AVOCA RIVER	AMPHITHEATRE	1966-1994	D	N
30.05.1995	5304140	MURRAY RIVER	BELOW WAKOOL JUNC	1929-1994	D	U
30.05.1995	5304150	AVON RIVER	WIMMERA HIGHWAY	1978-1988	D	U
30.05.1995	5402390	MOSQUITO CREEK	STRUAN	1971-1994	D	U
30.05.1995	5404265	BURRA CREEK	WORLDS END	1974-1994	D	U
30.05.1995	5405035	SCOTT CREEK	SCOTT BOTTOM	1969-1994	D	U
30.05.1995	5405051	NORTH PARA RIVER	PENRICE	1977-1994	D	U
30.05.1995	5405070	HILL RIVER	NEAR ANDREWS	1969-1994	D	U
30.05.1995	5405095	KANYAKA CREEK	OLD KANYAKA	1973-1994	D	U
30.05.1995	5405130	ROCKY RIVER	GORGE FALLS	1970-1994	D	U
30.05.1995	5410100	COOPER CREEK	CALLAMURRA	1973-1994	D	N

GLOBAL RUNOFF DATA CENTRE (GRDC)
DATABASE UPDATE 1995

RUSSIA

Date of Import	GRDC-No.	River	Station	Update from-to	Daily/Monthly Data	Station New/Update
18.07.95	2916900	AMUR	KOMSOMOLSK	1980-1990	D	U
18.07.95	6976450	BELAYA	UFA	1980-1990	D	U
18.07.95	6978250	DON	RAZDORSKAYA	1980-1990	D	U
18.07.95	6970250	NORTHERN DVINA	UST-PINEGA	1978-1990	D	U
18.07.95	2909750	DZHIDA	DZHIDA	1980-1991	D	N
18.07.95	2911100	IRTISH	OMSK	1980-1990	D	N
18.07.95	2998501	KOLYMA	EMTEGEI	1980-1990	D	N
18.07.95	6983355	KUBAN	KRASNODSR	1980-1990	D	N
18.07.95	2903420	LENA	KUSUR	1978-1990	D	U
18.07.95	6970500	MEZEN	MALONISOGORSK	1978-1990	D	U
18.07.95	6972430	NEVA	NOVOSARATOVSKAYA	1980-1988	D	U
18.07.95	2906880	NEMILEN	NEMILEN	1980-1990	D	N
18.07.95	2912600	OB	SALEKHARD	1978-1990	D	U
18.07.95	6970650	PECHORA	UST-TSILMA	1980-1990	D	U
18.07.95	2907400	SELENGA	MOSTOVOY	1980-1991	D	N
18.07.95	2910300	TOM	TOMSK	1980-1990	D	U
18.07.95	6977100	VOLGA	VOLGOGRAD POWER PLANT	1980-1990	D	U
18.07.95	2909150	YENISEI	IGARKA	1978-1990	D	U
15.11.95	6970100	ONEGA	POROG	1978-1988	D	U
15.11.95	2998400	INDIGIRKA	VORONTSOVO	1978-1988	D	U
15.11.95	2903150	ANABAR	SASKYLAKH	1978-1987	D	U
15.11.95	6971080	URA	URA-GUBA	1979-1988	D	U
15.11.95	6971100	KOLA	OKTIBRSKY RAILWAY	1979-1988	D	U
15.11.95	6971150	UMBA	PAIALKA	1979-1988	D	U
15.11.95	2999500	PUR	SAMBURG	1978-1988	D	U
15.11.95	2998500	KOLYMA	SREDNE-KOLYMSK	1978-1988	D	U
17.11.95	6970150	VONGUDA	VONGUDA	1981-1988	D	N
17.11.95	6972900	PONGOMA	PONGOMA	1978-1988	D	N
17.11.95	6972815	PUETA	KEM	1978-1988	D	N
17.11.95	6972810	KEM	PUTINSKAYA GES	1978-1988	D	N
17.11.95	6972820	SHUYA	SHUERETSKAYA	1978-1988	D	N
17.11.95	6972750	SUMA	SUMSKIY POSAD	1978-1988	D	N
17.11.95	6972100	NUHCHA	NUHCHA	1978-1988	D	N
17.11.95	6972150	MALOSHUIKA	MALOSHUIKA	1978-1988	D	N
17.11.95	2998510	KOLYMA	KOLYMSKAYA	1978-1988	D	N
17.11.95	2998110	YANA	UBILENAYA	1978-1988	D	N
17.11.95	2998450	ALAZEJA	ANDRUSHKINO	1978-1988	D	N
17.11.95	6970710	PECHORA	OKSINO	1980-1988	D	N
17.11.95	6971200	PECHENGA	PECHENGA	1979-1988	D	N
17.11.95	6971250	NAMA-JOKI	LUOSTARI	1980-1988	D	N
17.11.95	6971300	TITOVKA	KM 15,5	1979-1987	D	N
17.11.95	6971350	ROSTA	NEAR THE MOUTH	1979-1987	D	N
17.11.95	6971400	SUSNOVKA	SUSNOVKA	1979-1988	D	N
17.11.95	6971500	CHAPOMA	CHAPOMA	1979-1988	D	N
17.11.95	6971550	CHAVANGA	CHAVANGA	1979-1988	D	N
17.11.95	6971600	VARZUGA	VARZUGA	1979-1988	D	N
17.11.95	6971700	OLENICA	OLENICA	1979-1988	D	N
17.11.95	6971650	KUZREKA	KUZREKA	1979-1988	D	N
17.11.95	6971710	KOLVIZA	KOLVIZA	1979-1988	D	N
17.11.95	6971750	NENOKSA	NENOKSA	1980-1988	D	N
17.11.95	6970550	KULOY	KULOY	1978-1988	D	N
17.11.95	6970560	PEZA	IGUMNOVO	1978-1988	D	N
17.11.95	6970630	PESHA	VOLOKOVAYA	1978-1988	D	N
17.11.95	2999200	NADYM	NADYM	1978-1987	D	N
17.11.95	2999250	TAZ	SIDOROVSK	1978-1988	D	N
17.11.95	2903430	LENA	STOLB	1978-1988	D	N
17.11.95	2999850	KHATANGA	KHATANGA	1982-1988	D	N
17.11.95	2999920	OLENEK	SUKHANA	1978-1988	D	N
17.11.95	2998150	OMOLOY	NAMU	1979-1987	D	N
17.11.95	2998600	PALJAVAAM	PALJAVAAM	1978-1988	D	N

GLOBAL RUNOFF DATA CENTRE (GRDC)
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THAILAND

Date of Import	GRDC-No.	River	Station	Update from-to	Daily/Monthly Data	Station New/Update
28.07.95	2964100	CHAO PHRAYA	NAKHON SAWAN	1978-1994	D	U
28.07.95	2964120	CHAO PHRAYA	BAN BANG KAEO	1978-1994	D	N
28.07.95	2964130	CHAO PHRAYA	BAN RE RAI	1978-1994	D	N

BANGLADESH

Date of Import	GRDC-No.	River	Station	Update from-to	Daily/Monthly Data	Station New/Update
28.07.95	2651080	TISTA	KAUNIA	1985-1992	D	U
28.07.95	2651100	BRAHMAPUTRA	BAHADURABAD	1985-1992	D	U
01.08.95	2646200	GANGES	HARDINGE BRIDGE	1985-1992	D	N

NORTH-WEST AMERICAN ARCTIC ZONE (ALASKA)

Date of Import	GRDC-No.	River	Station	Update from-to	Daily/Monthly Data	Station New/Update
07.11.95	4204050	STIKINE	ABOVE BUTTERFLY CR	1971-1986	D	U
07.11.95	4204100	STIKINE	TELEGRAPH CREEK	1976-1993	D	U
07.11.95	4204900	STIKINE	NEAR WRANGELL	1954-1986	D	N
07.11.95	4102050	ALSEK	NEAR YKUTAT	1991-1993	D	N
07.11.95	4102700	COPPER	NEAR CHITINA	1950-1990	D	U
07.11.95	4102710	COPPER	NEAR CORDOVA	1989-1993	D	N
07.11.95	4102810	SUSITNA	SUNSHINE	1981-1986	D	N
07.11.95	4102800	SUSITNA	SUSITNA STATION	1974-1993	D	N
07.11.95	4102110	KUSKOWIM	MCGRATH	1963-1973	D	N
07.11.95	4102100	KUSKOWIM	CROOKED CREEK	1951-1993	D	U
07.11.95	4203900	YUKON	ABOVE FRANK CREEK	1953-1986	D	N
07.11.95	4203760	TESLIN	NEAR WHITEHORSE	1955-1973	D	N
07.11.95	4203250	YUKON	ABOVE WHITE RIVER	1956-1986	D	N
07.11.95	4203160	STEWART	ABOVE FRASER FALLS	1980-1986	D	N
07.11.95	4203150	STEWART	MAYO	1949-1964	D	N
07.11.95	4203800	YUKON	EAGLE	1950-1993	D	N
07.11.95	4103710	PORCUPINE	NEAR INTERNATIONAL B.	1987-1993	D	N
07.11.95	4103700	PORCUPINE	NEAR FORT YUKON	1964-1979	D	U
07.11.95	4103550	YUKON	STEVENS VILLAGE	1976-1993	D	N
07.11.95	4103520	YUKON	RAMPART	1954-1967	D	N
07.11.95	4103610	TANANA	BIG DELTA	1948-1957	D	N
07.11.95	4103600	TANANA	NENANA	1962-1993	D	U
07.11.95	4103450	YUKON	RUBY	1956-1978	D	U
07.11.95	4103500	KOYUKUK	HUGHES	1960-1982	D	U
07.11.95	4103300	YUKON	KALTAG	1956-1966	D	U
07.11.95	4103200	YUKON	PILOT STATION	1975-1993	D	N
07.11.95	4101800	NOATAK	NOATAK	1965-1971	D	N
07.11.95	4101500	COLVILLE	NUIQSUT	1977-1977	D	N

GLOBAL RUNOFF DATA CENTRE (GRDC)
DATABASE UPDATE 1995

MEKONG RIVER BASIN

Date of Import	GRDC-No.	River	Station	Update from-to	Daily/Monthly Data	Station New/Update
10.11.95	2969029	NAM MAE LAO	BAN THA SAI	1991-1991	D	U
10.11.95	2969124	NAM MUN	RASI SALAI	1991-1991	D	U
10.11.95	2469120	SE BANG HIENG	BANG KENG DONE	1991-1991	D	U
10.11.95	2969200	NAM MUN	UBON	1991-1991	D	U
10.11.95	2469095	SE BANG FAI	MAHAXAI	1991-1991	D	U
10.11.95	2469110	SE CHAMPHONE	KENKOK	1991-1991	D	U
10.11.95	2469300	SE KONG	ATTOPEU	1991-1991	D	U
10.11.95	2969220	NAM MUN	KAENG SAPHU TAI	1991-1991	D	U
10.11.95	2469265	SE DONE	SOUVANNA KHILI	1991-1991	D	U
10.11.95	2469060	NAM OU	MUONG NGOY	1991-1991	D	U
10.11.95	2469038	NAM NGUM	BAN-PAK KANHOUNG	1991-1991	D	U
10.11.95	2969076	NAM PONG	SI CHOMPHU	1991-1991	D	U
10.11.95	2969115	NAM YANG	BAN NA THOM	1991-1991	D	U
10.11.95	2469111	NAM THEUN	BAN-SIGNO	1991-1991	D	U
10.11.95	2969010	MEKONG	CHIANG SAEN	1991-1991	D	U
10.11.95	2969210	LAM DOM YAI	BAN FANG PHE	1991-1991	D	U
10.11.95	2469260	MEKONG	PAKSE	1991-1991	D	U
10.11.95	2469050	MEKONG	LUANG PRABANG	1991-1991	D	U
10.11.95	2969100	MEKONG	MUKDAHAN	1991-1991	D	U
10.11.95	2369900	EA KRONG	CAU-14	1991-1991	D	U
10.11.95	2369800	DAK BLA	KONTUM	1991-1991	D	U
10.11.95	2969116	HUAI KHAYUNG	BAN HUAI KHAYUNG	1991-1991	D	U
10.11.95	2969080	LAM CHOEN	BAN THA DUA	1991-1991	D	U
10.11.95	2969081	HUAI RAI	BAN NONG KIANG	1991-1991	D	U
10.11.95	2969096	NAM KAM	NA-KAE	1991-1991	D	U
10.11.95	2969069	NAM HEUNG	BAN PAK HUAI	1991-1991	D	U
10.11.95	2969030	NAM MAE ING	THOENG	1991-1991	D	U
10.11.95	2969090	MEKONG	NONG KHAI	1991-1991	D	U
10.11.95	2469072	MEKONG	VIENTIANE	1991-1991	D	U
10.11.95	2969095	MEKONG	NAKHON PHANOM	1991-1991	D	U
10.11.95	2969150	NAM CHI	YASOTHON	1991-1991	D	U
10.11.95	2969082	NAM CHI	BAN CHOT	1991-1991	D	U

MALI

Date of Import	GRDC-No.	River	Station	Update from-to	Daily/Monthly Data	Station New/Update
10.11.95	1134220	BAGOE	PANKOUROU	1992-1992	D	U
10.11.95	1134450	BANI	BENENY-KEGNY	1992-1992	D	U
10.11.95	1134300	BANI	DOUNA	1992-1992	D	U
10.11.95	1134150	BANIFING	KOLONDIEBA	1992-1992	D	U
10.11.95	1134080	BAOULE	MADINA DIASSA	1992-1992	D	U
10.11.95	1134110	BAOULE	BOUGOUNI	1992-1992	D	U
10.11.95	1134200	BAOULE	DIOILA	1992-1992	D	U
10.11.95	1134650	BARA-ISSA	SARAFERE	1992-1992	D	U
10.11.95	1134700	NIGER	DIRE	1992-1992	D	U
10.11.95	1134900	NIGER	ANSONGO	1992-1992	D	U
10.11.95	1134850	NIGER	TOSSAYE	1992-1992	D	U
10.11.95	1134100	NIGER	KOULIKORO	1992-1992	D	U
10.11.95	1134730	NIGER	KORYOUME	1992-1992	D	U
10.11.95	1134460	NIGER	TILEMBEYA	1992-1992	D	U
10.11.95	1134250	NIGER	KIRANO AVAL	1992-1992	D	U
10.11.95	1134400	NIGER	KE-MACINA	1992-1992	D	U
10.11.95	1134030	NIGER	BANANKORO	1992-1992	D	U
10.11.95	1134630	NIGER(ISSA-BER)	TONKA	1992-1992	D	U
10.11.95	1134050	SANKARANI	SELINGUE	1992-1992	D	U

GLOBAL RUNOFF DATA CENTRE (GRDC)
DATABASE UPDATE 1995

ECUADOR

Date of Import	GRDC-No.	River	Station	Update from-to	Daily/Monthly Data	Station New/Update
10.11.95	3819150	COCA	SAN RAFAEL	1978-1982	D	U
10.11.95	3822500	PAUTE	D.J.PALMIRA	1970-1979	D	U
10.11.95	3843100	MIRA	D.J.LITA	1970-1988	D	U
10.11.95	3843500	AMBI	D.J.CARIYACU	1970-1988	D	U
10.11.95	3844100	ESMERALDAS	D.J.SADE	1973-1986	D	U
10.11.95	3844150	GRANOBLES	A.J.GUACHALA	1975-1988	D	U
10.11.95	3844200	TOACHI	A.J.PILATON	1970-1988	D	U
10.11.95	3844300	QUEVEDO	QUEVEDO	1969-1988	D	U
10.11.95	3844400	DAULE	LA CAPILLA	1970-1988	D	U
10.11.95	3844450	VINCES	VINCES	1969-1988	D	U
10.11.95	3844800	JUBONES	D.J.SAN FRABCISCO	1970-1985	D	U
10.11.95	3846500	CALERA	A.J.AMARILLO	1969-1988	D	U

CENTRAL AFRICAN REPUBLIC

Date of Import	GRDC-No.	River	Station	Update from-to	Daily/Monthly Data	Station New/Update
09.11.95	1737080	OUHAM	BAC-BEA	1990-1993	D	U
09.11.95	1737150	OUHAM	BOSSANGOA	1990-1992	D	U
09.11.95	1737200	FAFA	BOUCA	1990-1994	D	U
09.11.95	1737210	OUHAM	BATANGAFO	1990-1994	D	U
09.11.95	1737280	KOUKOUROU	KOUKOUROU	1990-1994	D	U
09.11.95	1737300	BAMINGUI	BAMINGUI	1990-1994	D	U
09.11.95	1748500	SANGHA	SALO	1990-1994	D	U
09.11.95	1749050	LOBAYE	M'BATA	1990-1994	D	U
09.11.95	1749080	M'POKO	BOSSELE-BALI	1990-1994	D	U
09.11.95	1749100	OUBANGUI	BANGUI	1990-1994	D	U
09.11.95	1749200	TOMI	SIBUT	1990-1992	D	U
09.11.95	1749400	BANGUI-KETTE	ALINDAO	1990-1994	D	U
09.11.95	1749500	M'BOMOU	BANGASSOU	1990-1994	D	U
09.11.95	1749510	M'BARI	LOUNGOUMBA	1990-1994	D	U
09.11.95	1749600	M'BOMOU	ZEMIO	1990-1994	D	U
09.11.95	1749800	M'BOKOU	OBO	1990-1994	D	U

GLOBAL RUNOFF DATA CENTRE (GRDC)
DATABASE UPDATE 1995

SYR-DARYA BASIN

Date of Import	GRDC-No.	River	Station	Update from-to	Daily/Monthly Data	Station New/Update
14.12.95	2916740	AFLATUN	AFLATUN	1933-1980	M	N
14.12.95	2916550	CHIRCHIK	HODJIKENT	1935-1985	M	N
14.12.95	2916590	ISFARA	TASH-KURGAN	1933-1991	M	N
14.12.95	2916650	SOKH	SARYKANDA	1933-1991	M	U
14.12.95	2916660	AKSU	DAZGON	1948-1991	M	N
14.12.95	2916665	HODGABAKIRGAN	ANDARHAN	1945-1991	M	N
14.12.95	2916670	SHAHIMARDAN	PAULGAN	1910-1975	M	N
14.12.95	2916680	ISFAYRAMSAY	UCH-KORGON	1933-1991	M	U
14.12.95	2916690	KUGART	MICHAILOVSKOE	1933-1980	M	N
14.12.95	2916700	KARADARYA	UCH-TEREK	1933-1990	M	N
14.12.95	2916710	KARAKULDGA	AKTASH	1938-1980	M	N
14.12.95	2916720	JASSY	SALAMALIK	1933-1980	M	N
14.12.95	2916730	KURSHAB	GULCHA	1937-1980	M	N
14.12.95	2916750	KEKEMEREN	UST. DJUMGOL	1933-1980	M	N
14.12.95	2916760	TAR	CHALMA	1938-1980	M	N
14.12.95	2916770	TENTJAK	CHARVAK	1933-1991	M	N
14.12.95	2916780	CHANGET	CHANGET	1933-1980	M	N
14.12.95	2916800	AKBURA	TULEKEN	1938-1980	M	N
14.12.95	2916810	ARAVAN	UST. KARAKOL	1933-1980	M	N
14.12.95	2916840	MAILISU	UST. KAIRAGACH	1933-1991	M	N
14.12.95	2916850	NARYN	UCH-KURGAN	1933-1990	M	N
14.12.95	2916860	NARYN	UST. KEKIRIM	1934-1980	M	N
14.12.95	2916870	NARYN	TOKTOGUL RES.	1951-1995	M	N
14.12.95	2916880	DONGUZTAU	DONGUZTAY	1933-1980	M	N
14.12.95	2916890	NARYN	NARYN	1933-1980	M	N
14.12.95	2916900	PADSHAATA	UST. TOSTU	1934-1991	M	N

AMU-DARYA BASIN

Date of Import	GRDC-No.	River	Station	Update from-to	Daily/Monthly Data	Station New/Update
14.12.95	2917110	AMU-DARYA	KERKI	1932-1989	M	N
14.12.95	2917300	KASHKADARYA	CHIRAKCHI	1932-1989	M	N
14.12.95	2917310	KASHKADARYA	VARGANZA	1932-1995	M	N
14.12.95	2917400	SURKHANDARYA	MANGUZAR	1932-1989	M	N
14.12.95	2917410	SANGARDAK	KING GUZAR	1932-1989	M	N
14.12.95	2917420	TANHIZDARYA	KATTAGAN	1951-1989	M	N
14.12.95	2917450	ZARAVCHAN	DUPULI	1932-1995	M	U
14.12.95	2917460	AKDARYA	KHAZARNOVA	1932-1989	M	N
14.12.95	2917470	KHANAKA	ALIBEGI	1933-1986	M	N
14.12.95	2917480	MAGIANDARYA	SUDGINA	1932-1989	M	N
14.12.95	2917550	VARZOB	DAGANA-ATA	1930-1985	M	U
14.12.95	2917600	KAFIRNIGAN	CHINOR	1932-1986	M	U
14.12.95	2917610	KAFIRNIGAN	TARTKI	1932-1992	M	N
14.12.95	2917630	TUPALANG	OBIZARANG	1932-1989	M	N
14.12.95	2917635	TUPALANG	ZARCHOB	1932-1989	M	N
14.12.95	2917700	GUNT	KHOROG	1940-1985	M	U
14.12.95	2917710	SHAHDARA	KHABOST	1938-1985	M	N
14.12.95	2917750	MUKSU	DAVSEAR	1961-1985	M	N
14.12.95	2917760	OBIHINGOU	TAVILDARA	1958-1985	M	N
14.12.95	2917810	BARTANG	NUSUR	1969-1985	M	N
14.12.95	2917820	BARTANG	BARCHADIV	1940-1985	M	N
14.12.95	2917830	BARTANG	MURGAB	1933-1985	M	N
14.12.95	2917840	KUDARA	USTIE	1942-1978	M	N
14.12.95	2917850	JAZGULEM	MOTRAVN	1938-1984	M	N
14.12.95	2917900	VAKHSH	TUTKAUL	1932-1967	M	N
14.12.95	2917910	VAKHSH	KOMSOMOLABAD	1949-1989	M	N
14.12.95	2917920	VAKHSH	GARM	1933-1990	M	N
14.12.95	2917940	KIZILSU	DOMBRACHI	1961-1985	M	N
14.12.95	2917950	PJANDGE	NIZ. PJANDGE	1965-1989	M	N

Annex 5

Summary of Data Requests in 1995

(Acronyms are explained on last page of this annex)

Request made by (Name, country)	**Country or river for which data were requested**	**Purpose of data use**
Aarup, Th. Cambridge, U.S.A	German Rivers: Elbe, Weser, Ems	Complementary information for image interpretation of North Sea
Amano, K. Nat. Inst. for Environment Studies Onogawa, Japan	Yangtse, Yellow river	General information
Amram, O. Centre D´Etude Spatiale De La Biosphere, Toulouse, France	Selected river stations of Niger (46)	Tri-dimensional modelling of hydrological fluxes using satellite data
Andah, K. WARREDOC, Universitá per Stranieri die Perugia Colombella Alta, Italy	Awash and Blue Nile Basins	Training course on management in drought prone areas
Borgman, C. Brando Quilici Produzioni Roma, Italy	GRDC information	Project information for film project about the global water cycle
Butzin, M. Institut für Umweltphysik, Universität Bremen, Germany	Amazone, Orinoco, Rio de La Plata, Kongo. GRDC - catalogue	Tritium fluxes into the S-Atlantic through major rivers
Braithwaite, D. Dept. of Hydrology and Water Resources Building University of Arizona, Tucson, U.S.A.	GRDC - catalogue	Global runoff data base study for GIS applications in the Earth observation study (EOS) of NASA
Braun, G. Deutsche Forschungsanstalt für Luft- und Raumfahrt e.V. (DLR) Köln, Germany	GRDC - Report No. 9	General information
Conway, D. Climatic Research Unit University of East Anglia Norwich, U.K.	GRDC - catalogue	Catalogue information only

Request made by (Name, country)	Country or river for which data were requested	Purpose of data use
Costa, M.H. Dept. of Atmospheric and Oceanic Sciences Madison, U.S.A.	Data from the Amazon basin. GRDC - catalogue	Study about the effects of the global warming in the Amazon river basin
Dokoubou, J.R. Foyer 2 Institute of Hydrometeorology St. Petersburg, Russia	Data of Chad basins	Studies on flow regime of the Chari- and Logone-basins and the Lake Chad
Dracup, J.A. School of Engineering and Applied Science University of California Los Angeles, U.S.A.	GRDC - catalogue, GRDC - Report No. 5 together with data of 20 rivers	Investigations of the influence of ENSO on Pacific Rim regional hydrology
Ducharne, A. CNRS, Ecole Normale Superieure Paris, France	Data of 26 river basins GRDC - catalogue, GRDC - Report No. 5	GCM-Studies
Dunne, K. US Geological Survey, Geophysical Laboratory, Princeton, U.S.A.	Discharge data for the major rivers of the world GRDC - catalogue	Research on monthly and annual river discharges for the major rivers of the world
Ekstrand, O. HEDESELSKABET Environment and Energy Division, Department for Landscape and Aquatic Environment Roskilde, Denmark	Data for rivers of the West Bank and Gaza GRDC - catalogue, GRDC-Information	Catalogue information only
Eltahir, E. Massachuttetts Institute of Technology Dept. of Civil and Envrionmental Egineering Ralph M. Parson Lab. Cambridge, U.S.A.	Data for selected rivers: Amazon, Congo and Mississippi	Catalogue information only

Request made by (Name, country)	Country or river for which data were requested	Purpose of data use
Entekhabi, D. Massachuttetts Institute of Technology Dept. of Civil and Envrionmental Egineering Ralph M. Parson Lab. Cambridge, U.S.A.	GRDC information and GRDC reports	General information
Flachs, F. Friedrich-Alexander-Universität Institut für Geographie Erlangen-Nürnberg, Germany	Discharge data for selected rivers: Senegal, Kongo/ Zaire, Nile, Mekong, Parana	Studies on physical geography of humid tropical areas
Foucher, C. Institute DÉconomie Industrielle Université des Sciences Sociales Toulouse Cedex, France	GRDC - Information, GRDC - Report No. 6 and No.7	Assessment and management of global water resources
Gajewski, K. Department of Geographie University of Ottawa Ottawa, Canada	GRDC - catalogue, GRDC - Report No. 5	General information
Gonzalo, R.H. Russian State Hydrometeorol. Institute St. Petersburg, Russian Federation	Runoff data for 20 stations of the Basin Magdalena-Cauca, Colombia	Maximum flow estimation for the river basin Magdalena-Cauca, Republic of Colombia
Goosse, H. Institut d´Astronomie et Géophysicque G. Lemaitre Louvain-la-Neuve, Belgium	GRDC Report No. 5	Sensivity of a global ice-ocean model to the Bering Strait throughflow
Graham, St. University of Texas at Austin Dept. of Geological Sciences Austin, U.S.A.	All stations on rivers with output to the oceans above 50 degrees latitude. GRDC - catalogue	Global water resources study

Request made by (Name, country)	Country or river for which data were requested	Purpose of data use
Green, B. Environmental Eng. and Health Sciences Lab. University of California Berkley, U.S.A.	Data for Varanasi, India GRDC - catalogue	Climatological project study within the Ganges river basin
Guitteaud, E. MARS & Co. San Francisco, U.S.A.	All countries of the world, except African continent and Japan, GRDC - catalogue	Studies on water supply and waste management
Heine, G. Kreditanstalt für Wiederaufbau Frankfurt, Germany	GRDC - catalogue	General information
Heyen, H. Max-Planck-Institut für Meteorologie Hamburg, Germany	Discharge data of the rivers: Seine, Somme, Maas, Rhein, Ems, Weser, Elbe, Themse, Trent and Loire	Regionalisation of climate model data in the Northern sea area
Hofman, P. Library Technician World Data Center A for Glaciology CIRES; University of Colorado Boulder, U.S.A.	GRDC Report No. 8	ACSYS - Study
Hoinka, K.P. Deutsche Forschungs-anstalt für Luft- und Raumfahrt e.V. (DLR) Oberpfaffenhofen, Germany	Discharge data of rivers of the alpine area. GRDC - catalogue, GRDC - Information	Mesoscale alpine programme (MAP)
K. Ichiyanagi Nat. Research Inst. for Earth Science and Disaster Prevention, Tsukuba, Ibaraki, Japan	Runoff data for the major rivers of the world, GRDC - Information, GRDC - catalogue, GRDC - Reports (6)	Collection of runoff data in major rivers of the world for runoff analysis and to perform simulation coupled with GCM-studies
Ide, S. The University of Shiga Prefecture Department of Environmental Planning Shiga, Japan	GRDC - Information, GRDC - Reports	Completion of Data Book computerization project on RAISON

Request made by (Name, country)	Country or river for which data were requested	Purpose of data use
Isemer, H.-J. GKSS Forschungszentrum Max-Planck-Institut Geesthacht, Germany	GRDC - catalogue	General information
James, R. Hydrology Section Bureau of Meteorology Melbourne, Australia	Catalogue of Australien data	General information
Kheng, L.Ch Department of Civil and Environmental Engineering Ralph M. Parsons Laboratory Massachusetts Institute of Technology Cambridge, U.S.A.	Data of Pa Sak river basin	Studies on flood control in Thailand
Klepper, O. National Institute of Public Health and Environmental Protection (RIVM), Bilthoven, The Neherlands	GRDC-catalogue	Study of effects of climate and landcover changes on water availability and -demand
Kochendorfer, J. Colorado State University Department of Civil Engineering Fort Collins, Colorado U.S.A.	Rivers of Mongolia, Selenga River and tributaries in south-central Siberia	General information
Kourafalou, V. Instituto Per Lo Studio Delle Meteorologie Geofisiche Ambientali Modena, Italy	Runoff data of rivers around the Adriatic Sea. GRDC - catalogue and Information	Catalogue information only
Landwehr, I. United States Geological Survey (USGS) Reston, U.S.A.	GRDC - catalogue	General information
Maidment, D.R. Center for Research in water Resources The Universitiy of Texas Austin, U.S.A.	Runoff data data for the Niger River Basin	Comparison of river basins

Request made by (Name, country)	Country or river for which data were requested	Purpose of data use
Maruyama, M. Nagoya University Forest Resource Utilization Laboratory Nagoya, Japan	Discharge data of the Amazon River	Catalogue information only
Matsuyama, H. Tokyo Metropolitan University Dept. of Geography Tokyo, Japan	GRDC - catalogue, GRDC-Reports 1-5	Update of indicated data
McKinney, D.C. Center for Research in Water Resources University of Texas Austin, U.S.A.	Discharge data from rivers of the Aral Sea Basin	UNESCO/IHP - project: Construction of a geographic information system based on description of the global water resources
McMahon, T.A. Department of Civil and Environmental Engineering University of Melbourne, Australia	GRDC - catalogue, dates of selected rivers of the world	Ph.D. project: Annual runoff variability in a global context. Pacific Rim project
Meigh, J Institute of Hydrology Wallingford Oxfordshire, U.K.	Monthly flow series of rivers from several South African countries	Assessment of global water resources (surface- and ground water)
Miller, S. State of Israel Hydrological Service Water Commission Ministy of Agriculture Jerusalem, Israel	GRDC - Report No. 5	Completion of the library
Mirza, M.Z. Centre for Environmental and Resource Studies (CEARS) University of Waikato Hamilton, New Zealand	Discharge data of the Ganges-Brahmaputra-Meghna-Basins	Impact of climate change on water resources in the Ganges-Brahmaputra-Meghna Basins

Request made by (Name, country)	**Country or river for which data were requested**	**Purpose of data use**
Mitosek, H.T. Institute of Geophysics Polish Acadmy of Siences Warsaw, Poland	Discharge data of the rivers: Wesel/Vlotho, Germany and Raneal/Miemisel, Sweden. GRDC - catalogue, GRDC - Report No. 7	Transformation of measured flow data to grid points
Molnar, G. University of Tokyo Institut of Industrial Science,Tokyo, Japan	Data of selected rivers: Irrawaddy, Sittang, Salween, Chao Phraya, Mekong	Validation of regional water balance model
Morley, J. University College London Dept. of Photogrammetry and Surveying London, U.K.	GRDC - catalogue; Discharge data for Niger-river in Mali	Terrestrial initiative in global environmental Research. Incorporation of land hydrology into global climate models
Naden, P. Institute of Hydrology Wallingford Oxfordshire, U.K.	Discharge data of the Mississippi- and Amazon-rivers GRDC - catalogue	Incorporation of river routing models within coupled land-ocean atmospheric models as part of the TIGER project
Piechota,Th. UCLA, Civil and Environmental Eng. Dep. Los Angeles, U.S.A.	Discharge data of various river stations (77) for the Asian and Pacific region, GRDC - catalogue, GRDC Report No. 5	Research in the Pacific Rim countries
Portis, D. Department of Atmospheric Sciences University of Illionois Urbana, U.S.A.	Data of (40) rivers flowing into the Arctic Sea	ACSYS - project
Shibasaki, R. University of Tokyo Institute of Industriel Science Department of Civil Engineering Tokyo, Japan	Data of selected rivers: Irrawaddy, Sittang, Slaween, Chao Phraya, Mekong	Validation of a regional scale water balance and transport model. Estimation of the quantitative and qualitative changes of water and land resources in Southeast Asia

Request made by (Name, country)	Country or river for which data were requested	Purpose of data use
Sierek, H. Offenbach, Germany	Data of rivers in South America (4), South Africa (4) and Asia (8)	Comparison-study on reservoir systems in South America, Africa and Asia
Smith, F.M. College of Natural Resources Department of Earth Resources Colorado State University Fort Collins, U.S.A.	GRDC - catalogue	General information
Swain, A. Uppsala University Dept. of Peace and Conflict Research, Uppsala, Sweden	Data for selected rivers: Rhine, Colorado, Rio de la Plata, Nile and Ganges-Brahmaputra	Analyses of conflict related to world water resources
Schloß, A. Institute for the Study of Earth, Oceans and Space University of New Hampshire Morse Hall Durham, New Hampshire U.S.A.	GRDC - catalogue	Global water cycle modelling
Schmidt, U. Naturhistorisches Museum Mainz, Germany	River basins data of Ruanda, GRDC - catalogue	Research on the Ruanda river systems on the bases of bilateral cooporation
Steiger, M.J. Centre d´Ecologie des Système Fluviaux Toulouse CEDEX, France	GRDC information about German and French river basins	Comparison of French and German river basins
Strzepek, K.M Dept. of Civil, Environ. and Architectural Eng. University of Colorado Boulder, U.S.A.	GRDC - catalogue and data of Nile river basin (31)	Project on climate change impacts on water resources

Request made by (Name, country)	Country or river for which data were requested	Purpose of data use
Uvo, C. Dept. of Water Resources Engineering Lund University of Technology, Lund, Sweden	Data for Amazon river basin	Study of the influence of the climate variability on water resources for Amazon and Northeast Brazil
Volkert, H. Deutsche Forschungsanstalt für luft- und Raumfahrt (DLR) Oberpfaffenhofen, Germany	Data of selected river basins: Rhone, Rhine, Danube, Etch, Po	Heavy precipitaton in the Alpine region
Vörösmarty, Ch,. University of New Hampshire New Hampshire, U.S.A.	GRDC - catalogue and GRDC - Report No. 3	Assessment of global water balances
Walsh, J. University Urbana Champaign Dept.of Atmospheric Sciences Urbana, Ill. U.S.A.	GRDC - Report No. 8	ACSYS - project
Wijs, K.de DHW Consultants BV Amersfoort, Netherlands	Ethiopian and Sudan river flow data	Regional water resources study in Ethiopia
Zhuravin, S. A. International Cooperation Department State Hydrological Institute St. Petersburg, Russia	Data of selected river basins	(WMO Freshwater Assessment) Comprehensive Assessment of the freshwater resources of the world

ACSYS	Arctic Climate System Study
CEDEX	Centro de Estudios y Experimentación de Obras Públicas
NASA	National Aeronautics and Space Administration
RAISON	RAISON/GEMS geographical data analysis system
TIGER	Terrestrial Initiative in Global Environmental Research
UNESCO/IHP	International Hydrological Programme of the United Nations Educational, Scientific and Cultural Organization

Reference of GRDC Reports

Report No. 1 (May 1993)	Second Workshop on the Global Runoff Data Centre, Koblenz, Germany, 15 - 17 June, 1992.
Report No. 2 (May 1993)	Dokumentation bestehender Algorithmen zur Übertragung von Abflußwerten auf Gitternetze. (Incl. abtract in English by the GRDC: Documentation of existing algorithms for transformation of runoff data to grid cells) by G.C. Wollenweber.
Report No. 3 (June 1993)	GRDC - Status Report 1992.
Report No. 4 (June 1994)	GRDC - Status Report 1993.
Report No. 5 (November 1994)	Hydrological Regimes of the Largest Rivers in the World - A Compilation of the GRDC Database.
Report No. 6 (December 1994)	Report of the First Meeting of the GRDC Steering Committee, Koblenz, Germany, June 20 - 21, 1994.
Report No. 7 (June 1995)	GRDC - Status Report 1994.
Report No. 8 (July 1995)	First Interim Report on the Arctic River Database for the Arctic Climate System Study (ACSYS).
Report No. 9 (August 1995)	Report of the Second Meeting of the GRDC Steering Committee, Koblenz, Germany, June 27 - 28.

Reference of GRDC Reports

Report No. 10 (March 1996)	Freshwater Fluxes from Continents into the World Oceans based on Data of the Global Runoff Data Base.