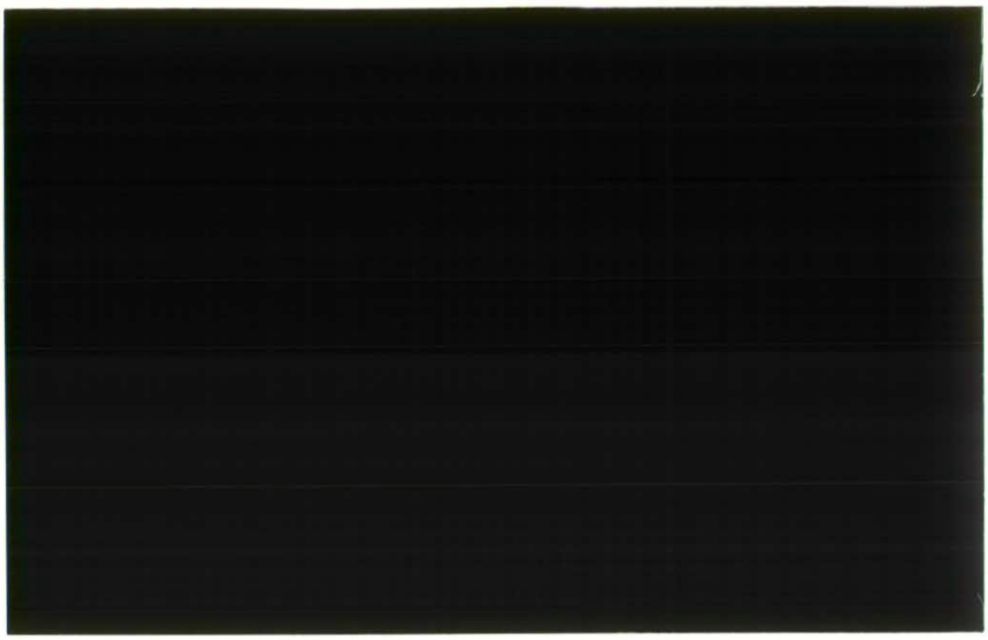
Institute of Hydrology



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Institute of Terrestrial Ecology
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INTAS REF: 94-4451

The Establishment of a Regional Data Centre of the European Water Archive for the European Territory of the former Soviet Union

INTAS PERIODIC REPORT NO. 2

1 October, 1996 - 30 September, 1997

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October 1997

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1. Project details

Title:	The Establishment of a Regional Data Centre of the European Water Archive for the European Territory of the Former Soviet Union (FSU)
INTAS Reference:	94-4451
Project start date:	1 October 1995
Duration of project:	36 months
Reporting period:	1 October 1996 to 30 September 1997
Project Coordinator:	Institute of Hydrology, UK
Project Participants:	State Hydrological Institute, St Petersburg, Russia State Department for Hydrometeorology, Belarus Ukranian State Committee for Hydrometeorology Global Runoff Data Centre, Koblenz, Germany

2. Objectives

To establish a Regional Data Centre of the European Water Archive at the State Hydrological Institute in St Petersburg, Russia in order to extend the Flow Regimes from International Experimental and Network Data (FRIEND) hydrological data network in the European Territory of the New Independent States, NIS (namely Russia, Ukraine, Belarus) and to facilitate the increased participation of NIS scientists within the research programmes of the FRIEND project.

BACKGROUND

The FRIEND project, established in 1985, is now a major collaborative study in regional hydrology. It currently involves the participation of over 50 research institutions and organisations from 22 countries in Northern Europe. Its primary aim is to improve understanding of the spatial and temporal variability of hydrological extremes in order to advance hydrological science and to provide robust and internationally consistent design methods.

FRIEND is a major component of the fifth UNESCO International Hydrological Programme, featuring as Project 1.1 of IHP-V. Such has been the success of the project that other FRIEND initiatives have been set up worldwide, in Southern Africa, the Mediterranean and Alpine region (AMHY), and Central and West Africa. Other regional studies are currently planned in the Himalayan/Hindu Kush region, South America and South East Asia.

The European Water Archive is at the core of the FRIEND project in Northern Europe. The Archive is one of the most comprehensive hydrological data sets in Europe, comprising time series and spatial data for over 5000 catchments across Europe. The Coordination Centre for the Archive is at the Institute of Hydrology. Data is supplied to the archive from four Regional Data Centres located in Norway, Germany, France and the Netherlands. The current project will establish an additional centre in St Petersburg. This centre will initially be responsible for collating hydrological data from the European part of Russia, Belarus and Ukraine and the subsequent transfer of data to the Institute of Hydrology for inclusion in the European Water Archive.

3. Research Activities

3.1 DESCRIPTION OF RESEARCH ACTIVITIES

This has been another busy year for the project. As much of the organisation and installation of computer hardware for the Regional Data Centre in St Petersburg was established in the first year of the project, it has been possible in this second year to concentrate on the acquisition, preparation and archiving of hydrological data. Activities have primarily focused on the preparation of catchment and flow data by the partner organisations in Russia, the Ukraine and Belarus and subsequent transfer of this data to the Regional Data Centre in St Petersburg and then to the European Water Archive at the Institute of Hydrology. The SHI has played a central coordinating role in these activities and has demonstrated the real advantages of having a regional coordination centre which is located within the same geographic area with no language barriers. In particular, the SHI has been instrumental in developing software for the database so that meteorological as well as hydrological data can be archived. The software for hydrological data processing, quality control and graphical display of data have also been improved.

During the reporting period, much effort has been put into the collation and verification of time series of gauged daily flow data. Nearly all stations have in excess of 15 years of record and most average 30 years. The data undergoes various checking procedures before being archived. Other data collated includes the main catchment details such as area, mean altitude, % forest and % lake. Lack of recent rainfall data in Russia has delayed calculation of catchment mean annual average rainfall. SHI have been instrumental in ensuring that data is in a format compatible with the European Water Archive. FRIEND station numbers have also been assigned to all catchments selected for the study and catchment boundaries outlined on topographic maps. MAPINFO software for automatic digitising of these boundaries is available at SHI in St Petersburg and the staff there are trained in its use. Similar software is not yet available at either ABH in Belarus or HSUA in the Ukraine and the coordinates for some catchment boundaries have been calculated manually. This is obviously a time consuming process and less accurate than the automatic procedures. It has therefore been decided that to prevent delay to the work schedule, the remaining catchments will be digitised by SHI. It is hoped that during the course of the project MAPINFO software can be transferred to both ABH and HSUA.

Data has been successfully transferred between contractors using the e-mail links established during the first year of the project. It is hoped that ftp facilities will be installed at the Regional Data Centre in St Petersburg in the near future, which will further aid the transfer of large volumes of data to the Institute of Hydrology.

Collaborative links between partner organisations have strengthened further during the year and there have been several opportunities, including the annual progress meeting, for scientists on the project to meet formally. Other opportunities to collaborate with scientists in other countries have also arisen.

3.2 RESULTS

The specific achievements during the reporting period in point form are as follows:

- All FSU contractors have completed the purchase of essential computer equipment.
- The database at SHI has been developed to enable meteorological and hydrological data to be archived.
- Software at the Regional Data Centre for hydrological data processing, quality control and graphical displays has been further developed.
- FRIEND station numbers have been assigned to all selected catchments.
- The collation of the main catchment details for selected catchments is complete.
- Catchment boundaries for selected catchments have been outlined on topographic maps.
- MAPINFO software has been installed and tested at SHI and automatic digitising of catchment boundaries is underway.
- In Belarus and the Ukraine, some catchments boundaries have been digitised manually.
- All hydrometric areas have been digitised
- Time series of gauged daily flow data for about 50% of selected catchments have been collated. Most stations have on average 30-40 years of data.
- A preliminary digital map of meteorological and gauging stations in Russia has been prepared.
- Technical advice has been given to FSU contractors in establishing hydrological databases.
- Catchment details and/or time series data for a total of 247 stations have been successfully transferred to the European Water Archive.
- Collaboration between partners has continued and strengthened, aided by the use of electronic mail.
- A successful progress meeting was held at HSUA, Kiev in June 1997 attended by all contractors.

4. Management and Financial Information

4.1 PROJECT MANAGEMENT

4.1.1 Co-operation with reference to each partner

4.1.1.1 Research activities

State Hydrological Institute (SHI), St Petersburg, Russia

In accordance with the work programme and project objectives, the SHI has been engaged in the following five main activities during the reporting period:

1. **Further development of the Regional Database**

   In the past year the Delphi database has expanded considerably. The software for quality control and data analysis has been developed further and a structure for storing meteorological data in addition to hydrometric data has been established. Meteorological data, including a complete list of meteorological stations within the European part of Russia, station locations and historical time series of mean monthly temperature and precipitation, have been loaded on to the database. As shown in Figure 4.1, the entity structure of the data base has been altered to accommodate this data.

   The software for data processing has also been developed further, such that it is now possible to produce a combined graphical representation of meteorological characteristics at several stations. For example, Figure 4.2 compares the time series of monthly precipitation at four sites, while Figure 4.3 plots monthly average temperature for selected years at one site. Similarly, it is now also possible to produce a combined graph showing the runoff for several rivers (see Figure 4.4). These developments enable the hydrometeorological situation to be analysed and unreliable data to be identified. Software for statistical analysis has also been created. Figure 4.5 shows the fit of a three parameter gamma distribution to annual river runoff.

   In addition, a digital map of meteorological and hydrometric stations in European Russia is currently being prepared and a preliminary version is shown in Figure 4.6. This map will enable the location of sites and station networks over any part of the territory to be previewed, which will help in station selection.

2. **Updating the database**

   In the last year, the SHI has collated and transferred time series data for a total of 50 basins to IH. These include stations in Russia, Belarus and the Ukraine, and include rivers in hydrometric regions 27 (Dougara), 29 (Neva), 30 (Onega), 32 (Noth Dvina), 33 (Pechola) and some rivers in region 31 (Kolsky) and 35 (Terek). A map of hydrometric regions is shown in Figure 4.7. For Russian stations this is predominantly gauged daily flow data, from the start of record to 1988; if this is absent gauged monthly flows are used. Data is currently being collated for the

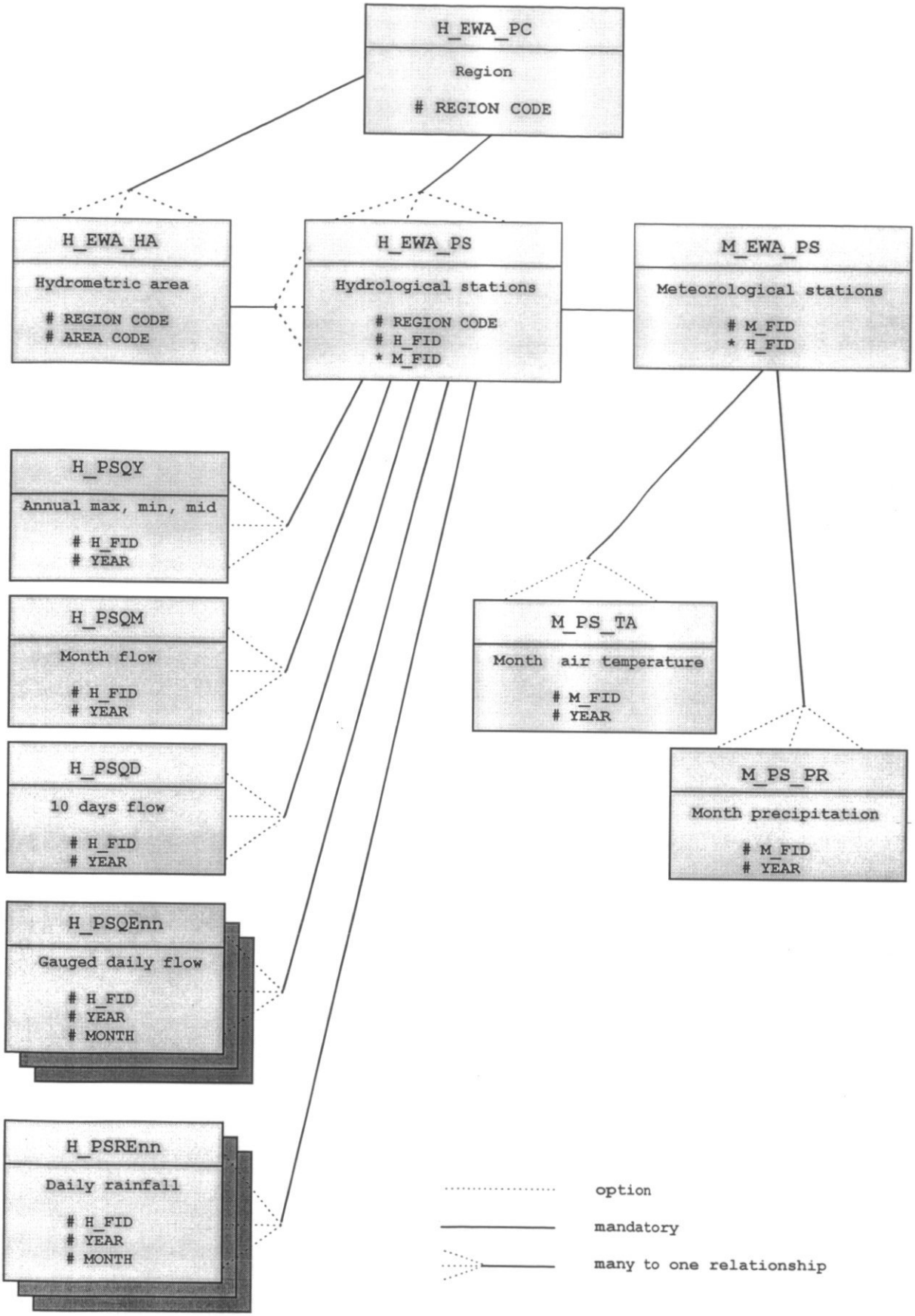

Figure 4.1 *Improved entity structure of the data base at SHI*

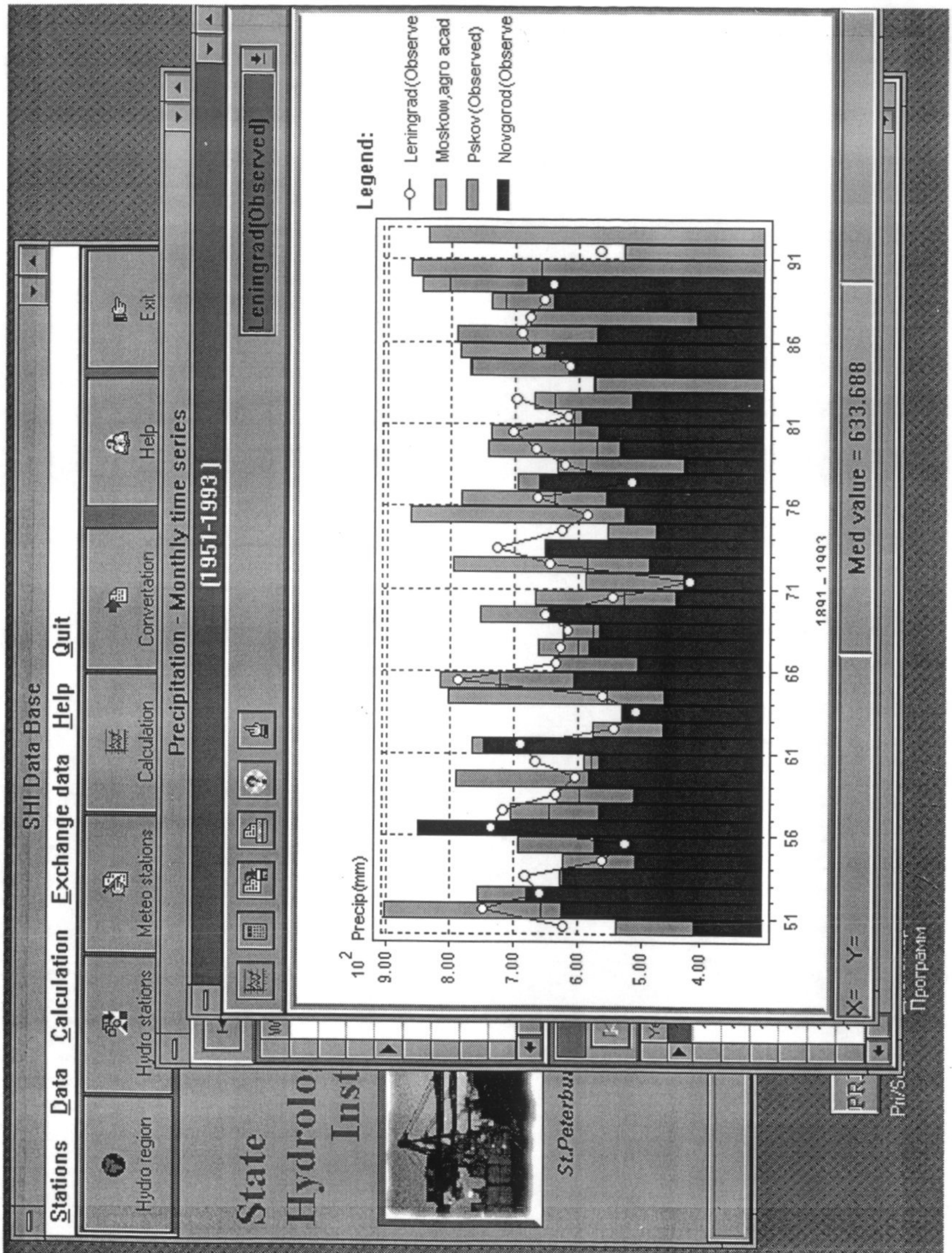

Figure 4.2 *Combined interannual variations of precipitation for selected stations*

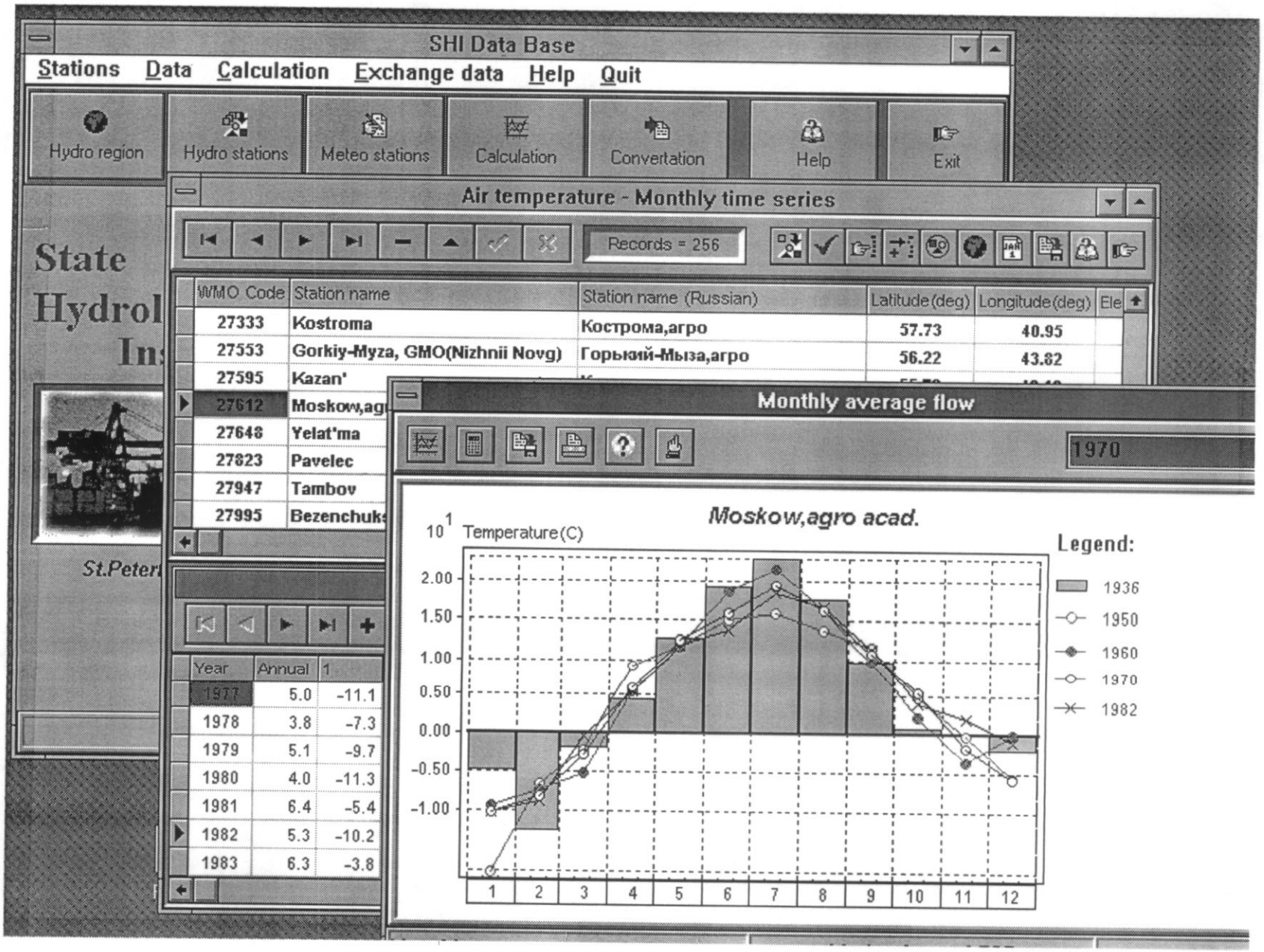

Figure 4.3 Combined annual temperature cycle for selected years

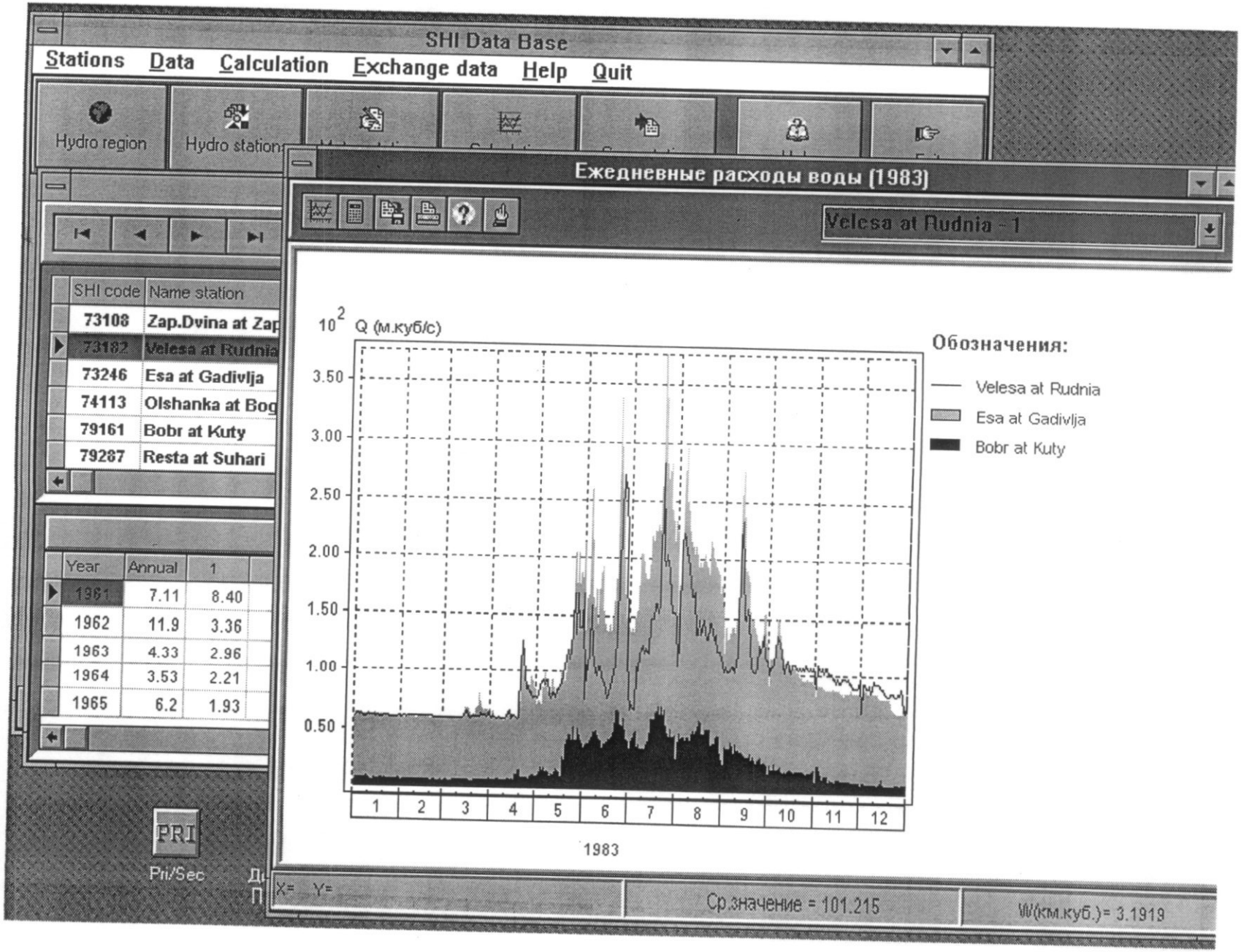

Figure 4.4 Combined runoff hydrographs for the selected rivers

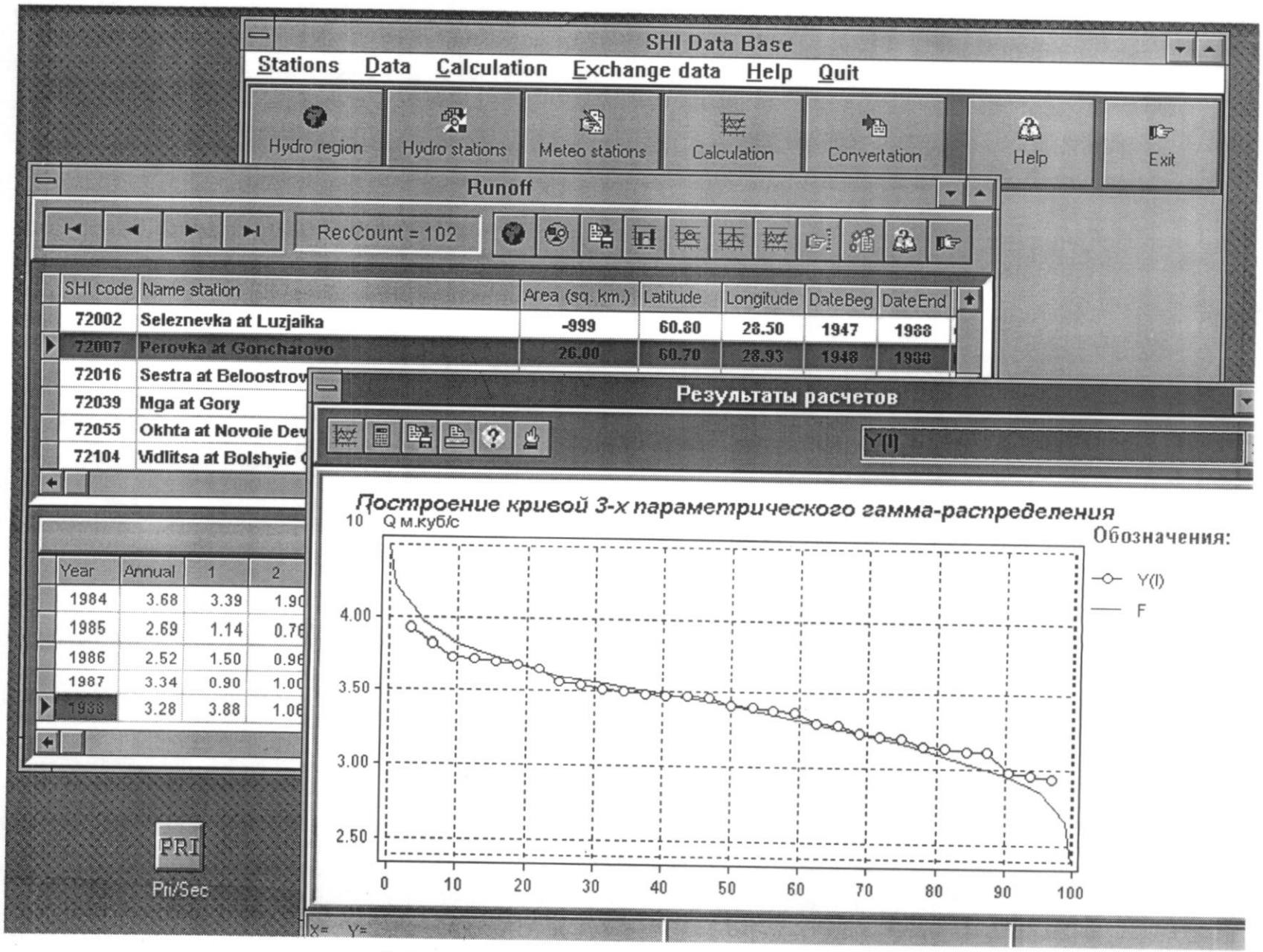

Figure 4.5 Three -parametric gamma distribution of annual river runoff

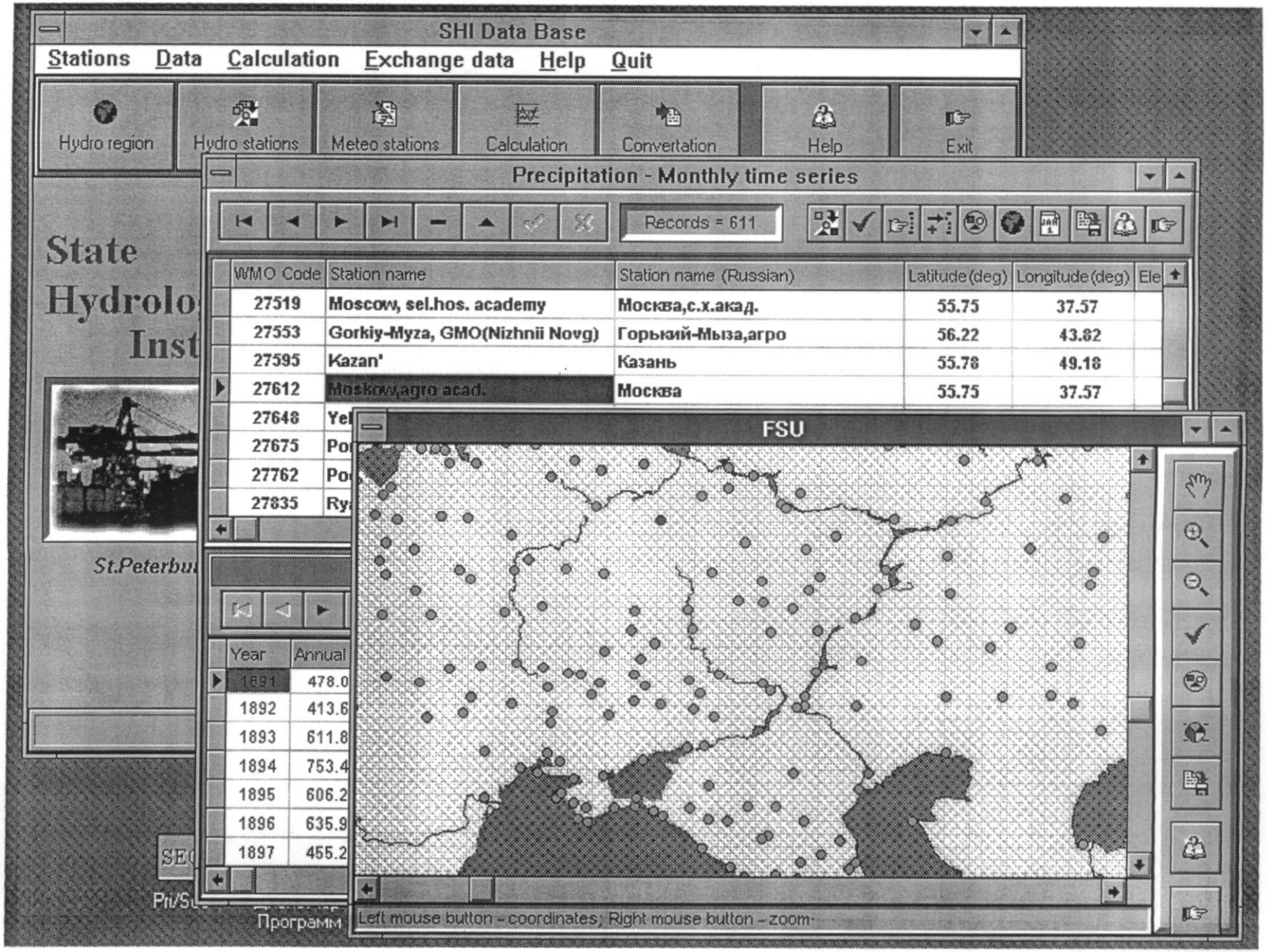

Figure 4.6 *Scheme of the meteorological network in European Russia*

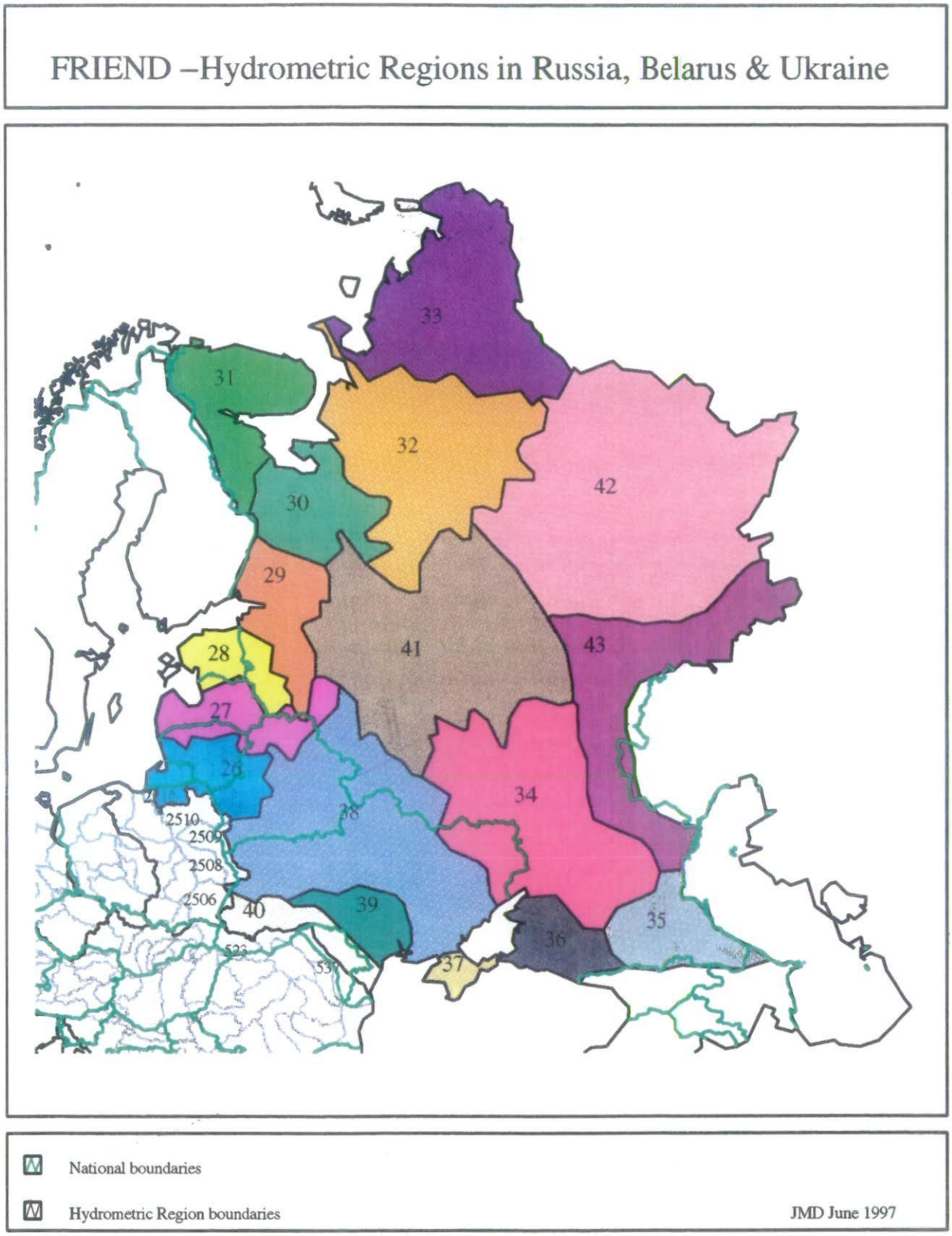

Figure 4.7 *Map of Hydrometric regions in Russia, Belarus and the Ukraine*

remaining stations from the start of record to 1977. In due course all stations will be updated to 1992 (1993) and the data transferred to IH as it becomes available.

The main basin characteristics for all the selected Russian stations have been collated and transferred to IH. Mean annual precipitation data still requires correction and has therefore so far not been included.

3. Preparation of digitised basin boundaries

MAPINFO software for digitising catchment boundaries has been installed and tested by staff at SHI. Catchment boundaries for 50 basins in hydrometric regions 29 and 31 (Neva and Kolsky) have been prepared, and are currently being digitised using the Gaussian map reference system accepted in Russia, Ukraine and Belarus. The coordinates will then be transformed into the UTM system before transfer to the European Water Archive at IH. SHI has received boundaries for 49 catchments in the Ukraine, and a number in Belarus and these will also be digitised during October 1997.

4. Coordination activities

The SHI currently coordinates the INTAS activities of ABH in Belarus and HSUA in the Ukraine. In particular, SHI has provided FSU partners with recommendations for preparing data and a 'model format' for basin characteristics. SHI are also coordinating the digitising of catchment boundaries. They have undertaken to digitise some catchments in Ukraine and Belarus as these organisations currently do not have access to digitising software.

5. Participation in international meetings

Two representatives from SHI (Prof. V. Vuglinsky and Dr S. Zhuravin) attended the annual INTAS project meeting in Kiev from 16-17 June 1997 and also the Third International FRIEND conference and concurrent meetings of the FRIEND Database Group and the Northern European FRIEND Steering Committee in Postojna, Slovenia from 30 September to 4 October 1997.

State Department for Hydrometeorology of the Republic of Belarus (ABH), Minsk, Belarus

Progress during the reporting period has been good and in accordance with the work plan. Some of the main achievements have been as follows:

1. A working group of 10-15 persons, all experts in their field, has been formed. Other engineers and technical experts will contribute as required.

2. The selection of 40 catchments for inclusion in the survey has been completed. In common with other FSU partners, difficulties were experienced in finding sufficient catchments with minimal artificial influences.

3. Catchment characteristic data for all 40 catchments has been collated.

4. Gauged daily flow data for 75% of selected stations has been collated. Time series data for 9 stations, from the start of record to 1994 has been successfully transferred to IH via SHI.

5. Catchment boundaries for 75% of the selected stations have been marked on maps. In the absence of digitising software, the boundaries have been digitised manually at an accuracy of 15" to 30". The remaining catchment boundaries will be digitised by the SHI.

6. Dr Chekan from ABH attended the FRIEND Steering Committee meeting in Paris from 17-18 October 1996 and also the INTAS Project meeting in Kiev in June 1997.

Ukrainian State Committee of Hydrometeorology (HSUA), Kiev, Ukraine

Significant progress has been made during the reporting period, despite continued problems with the dissemination of INTAS funds. A team of seven participants has been formed to work on the project, comprising research scientists and technicians from the Hydrometeorological Institute and senior HSUA administration officers.

Some of the main achievements during the reporting period are as follows:

1. On receipt of the first instalment of INTAS funds in September 1996, the following items of computer equipment were purchased in October 1996.

   - IBM PC Pentium 133 MHz, RAM 16 MB, HDD 1, 6 Gb, CD-ROM, SVGA 14";
   - EPSON FX-1170 dot matrix printer;
   - Digitiser;
   - Diskettes 3" (40), printer cartridges (10 ps).

   In addition software for processing hydrological data has been acquired and all computer equipment and software successfully tested.

2. A reliable communication system based on e-mail has been established between HSUA and SHI and this has been used to transfer data.

3. Catchment characteristics, namely catchment area, mean altitude and average annual rainfall have been collated for the 70 selected catchments and transferred to the SHI. Some reformatting will be necessary before these can be included in the European Water Archive.

4. Mean daily flow data for 35 out of the 70 selected stations, has been collated, verified and transferred to the SHI by e-mail. This data for the river basins Tysa, Prut, Bug, Dnister and Dnipro spans the period from 1960 to 1990. Data for 20 of these stations has been successfully transferred to IH and loaded on the European Water Archive; the remainder is expected shortly.

5. Hydrometric areas in the Ukraine have been identified and digitised. Problems were experienced in finding maps at a sufficiently high resolution for digitising; 1:1000000 scale maps were used for hydrometric areas and 1:200,000 scale maps, which were

publicly available, were used for catchment boundaries. These had no co-ordinate system defined and reference had to be made to other maps for this information. HSUA currently do not have access to suitable digitising software and as an interim measure, 15 catchments located within the Tysa, Prut, Siret and Dnister basins have been digitised manually at an accuracy of 10". The SHI have recently agreed to digitise the remaining catchment boundaries to prevent delays to the work schedule.

6. HSUA organised and hosted the second annual INTAS Project meeting in Kiev from 16-17 June 1997.

A major problem for the Ukraine continues to be the long delays associated with the payment of INTAS funds. In January 1997 IH was advised to suspend payments to the designated bank in the Ukraine. Payment was finally made direct to HSUA officials in travellers cheques in June 1997 when Mr Gwyn Rees, from the Institute of Hydrology, attended the Annual Progress meeting in Kiev. These delays inevitably have a negative impact on the project and make it difficult to maintain progress at a constant pace.

Global Runoff Data Centre (GRDC), Koblenz, Germany

The main tasks for the GRDC in the project are the acquisition of data, incorporation of data into the existing GRDC database, provision and dissemination of data to users and participation in project meetings. The approach adopted to achieve these objectives has been to maintain direct contact with the Hydrological Agencies in the FSU countries, provide consultancy services including information and training and provide limited financial assistance.

The main activities during the project period were as follows:

1. The GRDC database has been updated with data for Russia. The location of stations in Russia and the Independent States is shown in Figure 4.8 and a catalogue of the present data holding included as Appendix 1. Twenty-three stations in Russia have been updated (U) and one station (Kodina) has been added for the first time.

2. FSU project participants have been supplied with a technical report by the GRDC, containing suggestions to build-up and implement platform-independent relational databases for hydrological variables. This is expected to be especially useful for the Ukrainian Hydrological Service, in their desire to create their own hydrological database.

3. GRDC have entered negotiations to get surface water discharge data digitised and are assisting the FSU participants in this task. In return, selected discharge data from these countries will be entered in the GRDC database for the benefit of global users. It can be accessed only according to GRDC policy guidelines for the acquisition and dissemination of data.

4. Dr Grabs from GRDC participated in the second INTAS Progress meeting in Kiev in June. GRDC consider that one of the most important points under discussion at this meeting is the use and accessibility of data collected in this project to FRIEND and GRDC. The INTAS project has adopted the respective resolutions of WMO and

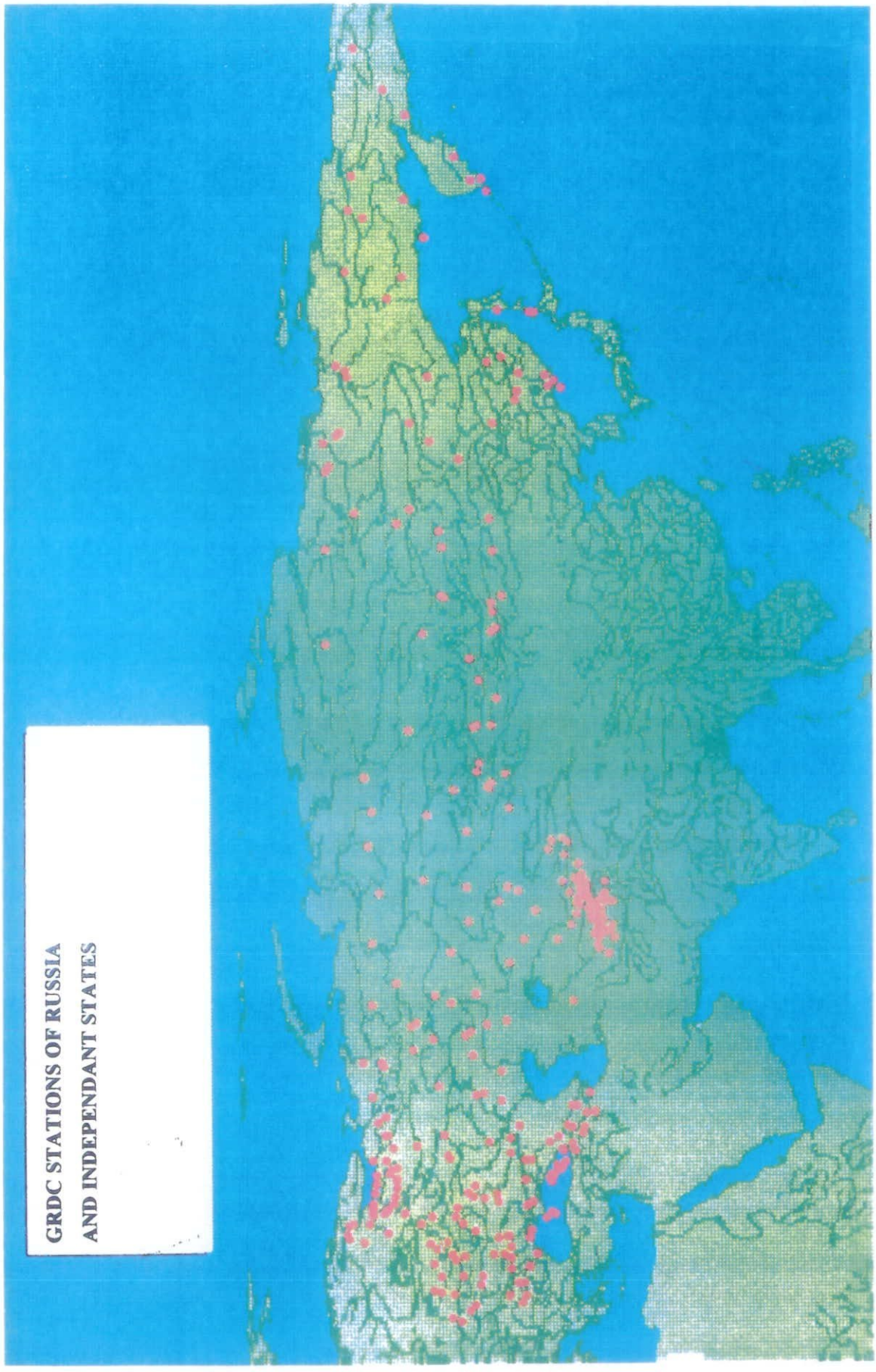

Figure 4.8 *GRDC stations in Russia and the Independent States*

UNESCO which call for free and unrestricted access to hydrological data and related information for non-commercial purposes. It was agreed at the meeting that data made available under the framework of the INTAS project should also be available to GRDC.

The principal deliverables during the reporting period therefore have been:

1. Enlargement of the GRDC database

2. Direct liaison with Hydrological Services on a basis which will reach beyond the lifetime of the project

3. Technical assistance to individual countries to enable them to build up digital hydrological databases

4. Initiation of a process to define data exchange policies and mechanisms to enable the Hydrological Services concerned to enter the global mainstream for the exchange of hydrological information.

Hydrological data compiled during this project can in the future be used to create a combined catalogue and data access platform. The Regional Data Centre would then be able to respond to user requests for data and basic data products.

The future work of the GRDC in the INTAS project should be in the following areas:

1. Obtain updates of current data holdings and the definition and establishment of a basic reporting network of stations in the participating countries

2. Assist the Hydrological services, especially in Belarus and the Ukraine to digitise their data holdings and establish hydrological databanks with communication links to the Regional Data Centre.

3. Assist participating countries to define and create useful data products from the compiled data.

Institute of Hydrology, Wallingford, UK (IH)

IH has had another busy year as project co-ordinator. IH has been in regular informal contact with SHI and other contractors over the transfer of data, arrangements for the INTAS progress meeting in Kiev and other administrative issues. The problems of disseminating INTAS funds particularly to the Ukraine, continue to take up a disproportionate amount of time.

A major part of IH's activities during the reporting period has been in the receipt of data from SHI, and subsequent quality control, verification and archiving on the European Water Archive. Table 4.1 summarises the data currently held on the archive and highlights that supplied by INTAS contractors. A fuller inventory of data on the European Water Archive from Russia, Belarus and the Ukraine is given in Appendix 2. It can be seen that catchment characteristic data (area, altitude, % lake, % forest) is currently available for all Russian catchments, but not for catchments in the Ukraine and Belarus. Data on % urban and mean annual precipitation data will be transferred later.

Table 4.1 *FRIEND European Water Archive data summary*

Country	Stations	Range (yrs)		Length of Record (yrs)	
		Earliest	Latest	Average	Maximum
AUSTRIA	82	1951	1990	31	40
BELARUS	9	1952	1994	30	43
BELGIUM	80	1929	1992	11	54
BULGARIA	3	1978	1986	9	9
CZECH REP	34	1887	1993	54	104
DENMARK	44	1917	1994	57	78
FINLAND	71	1847	1991	50	144
FRANCE	1476	1863	1992	22	128
GERMANY	717	1908	1994	31	83
GREECE	2	1978	1980	3	3
ICELAND	8	1932	1994	48	61
IRELAND	123	1940	1996	23	56
ITALY	252	1925	1990	16	66
NETHERLANDS	30	1901	1994	23	93
NORWAY	203	1871	1995	35	114
POLAND	61	1955	1992	26	36
ROMANIA	35	1838	1990	35	153
RUSSIA	218	1932	1988	40	57
SLOVAKIA	23	1930	1992	63	63
SLOVENIA	12	1945	1990	25	45
SPAIN	240	1912	1989	14	74
SWEDEN	71	1907	1992	39	85
SWITZERLAND	132	1904	1992	37	82
TURKEY	7	1975	1987	11	12
UK	1112	1879	1997	28	118
UKRAINE	20	1960	1990	31	31
YUGOSLAVIA	5	1978	1990	13	13
summary	5072	1838	1997	22	153

Figure 4.9 provides a summary of the distribution of gauged daily flow data supplied by the three countries. As Figure 4.10 indicates long record lengths are normal with all but two stations having in excess of 15 years of gauged flow record. All Ukrainian stations have 30 years record. In both the Ukraine and Belarus the average record length is 30 years; in Russia the average is 40 years, with a maximum record length of 57 years.

4.1.1.2 Participants

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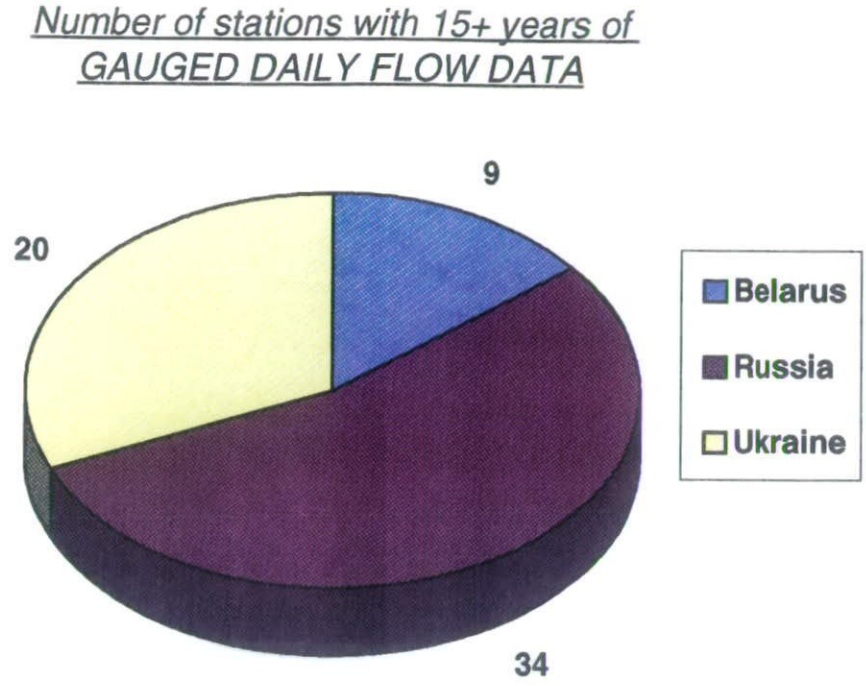

Figure 4.9 *Distribution of gauged daily flow on the European Water Archive data*

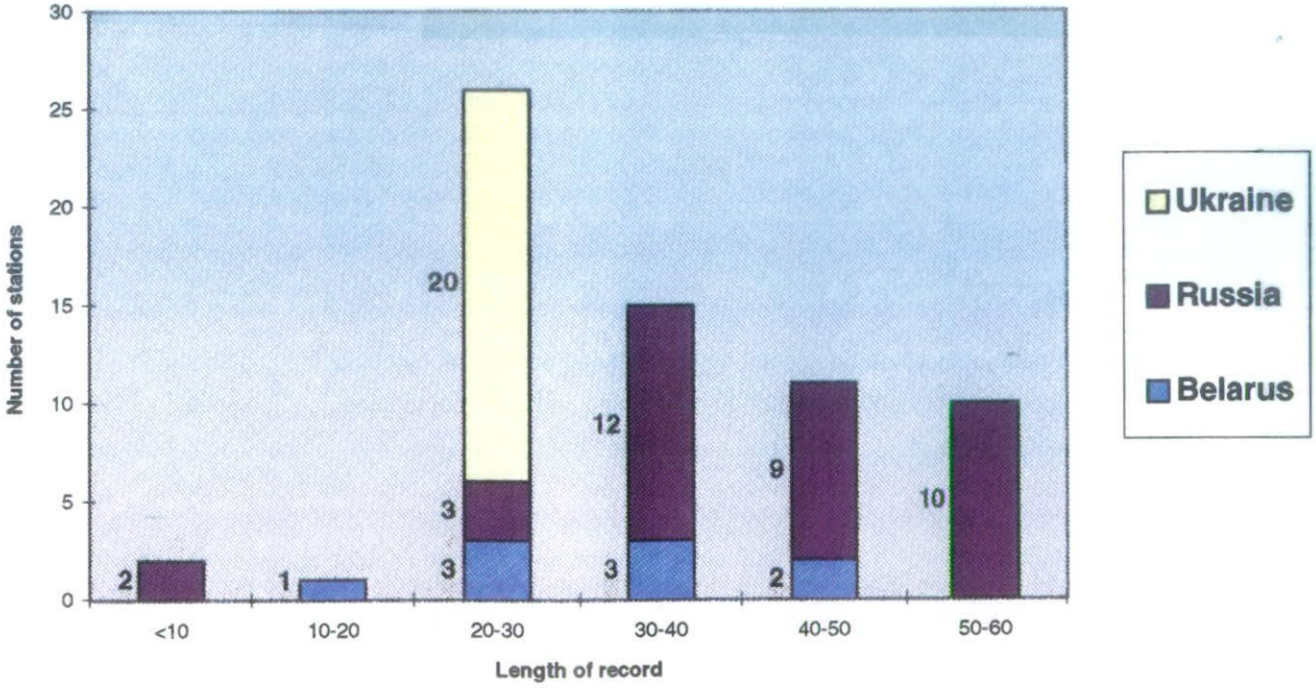

Figure 4.10 *Distribution of record lengths for gauged daily flow data on the European Water Archive*

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4.1.1.3 Meetings

17-18 October, 1996 FRIEND Steering Committee Meeting held in Paris. As a direct result of INTAS funding representatives from the Ukraine (2 persons), Russia and Belarus were able to attend the meeting. It provided a further opportunity for researchers from FSU countries to become more actively involved in FRIEND research and establish a wider network of contacts.

16-17 June, 1997 Second Annual INTAS Progress Meeting hosted by the State Hydrological Committee of the Ukraine in Kiev. All INTAS contractors were represented at this meeting which provided an opportunity to review progress, discuss issues and plan future work. The minutes are included as Appendix 3.

30 September - 4 October, 1997 International Conference on FRIEND '97 - Regional Hydrology: Concepts and Models for Sustainable Water Resource Management need in Postojna, Slovenia. Several INTAS participants attended the conference and Dr V Manukalo (HSUA) presented a poster entitled "Spatial and temporal variability of the factors of spring flood formation for the rivers in different landscape zones in the Ukraine using observed data from experimental catchments". The results of this third phase of FRIEND research have been published as Conference Proceedings in IAHS Publication No. 246 (Gustard *et al.*, 1997) and the Third FRIEND Report: 1994-1997 (Oberlin & Desbos, 1997).

3-4 October, 1997 FRIEND Steering Committee Meeting in Postojna, Slovenia. All INTAS contractors were represented at this meeting.

Photograph 1 *Participants at Second Annual INTAS Progress Meeting, Kiev, June 1997. From left: Dr G. Chekan (ABH), Dr S Zhuravin (SHI), Prof. V Vuglinsky (SHI), Mr Y. Pokumeiko (ABH), Interpreter, Mr V. Gromovyi (HSUA), Mr G. Rees (IH), Dr W. Grabs (GRDC), Dr V. Manukalo (HSUA).*

Photograph 2 *Mr G. Rees (IH) giving a presentation on the European Water Archive at the Second Annual INTAS Progress Meeting, Kiev, June 1997.*

4.1.1.4 Cooperation between contractors

During the reporting period, e-mail has proved invaluable as a quick and easy means of contact between contractors. All contractors have been in frequent informal contact with each other and particularly with the Regional Data Centre at SHI. The SHI has coordinated transfers of data to SHI, and subsequent transfer to IH and ensures that all data supplied is in a format compatible with the European Water Archive. In addition the SHI has been in close liaison with scientists in ABH and HSUA over digitising of catchment boundaries.

A tangible benefit of the INTAS project has been in the transfer of technological expertise to FSU contractors by both IH and GRDC. GRDC have recently circulated a report to all FSU project participants with suggestions for setting up a hydrological database. This is of direct relevance to HSUA in the Ukraine. In addition GRDC has been assisting the hydrological agencies in the Ukraine and Belarus in the digitising of surface water discharge data. IH have revised the Metadata Catalogue containing details of all 5000 + gauging stations in the FRIEND Archive, and have made this available to the Regional Data Centre at SHI. This provides the definitive list of FRIEND station numbers, and will help contractors in the numbering of stations.

4.1.1.5 Cooperation with external organisations

The INTAS project has encouraged all FSU contractors to develop collaborative links with external organisations and several opportunities for this have arisen during the last year. For instance, SHI, HSUA and ABH all participated in a BALTEX Conference in Riga in December 1996 and 15 Ukrainian scientists participated in the eighteenth conference of Danubian countries in Graz. FSU contractors attended a CIS Conference on meteorology, convened under the auspices of the Interstate Committee for Meteorology. At this meeting there were many presentations from Belarus, Ukraine and Russia on climate, hydrology and the development of hydrometry. ABH also hope to re-establish links with WMO which have lapsed since 1987 due to lack of funding.

In addition there have been discussions between all INTAS contractors and Prof. V. Semyanov of the All Russian Research Institute of Hydrometeorlogical Information at the World Data Centre Obninsk, Russia, on the possible involvement of this organisation in the FRIEND and INTAS projects. In particular, discussions have centred on the possibility of the Russian Research Institute supplying data to the Regional Data Centre in St Petersburg and providing ABH with suitable software for digitising and hydrological data processing.

GRDC have links with the Arctic Climate System Study (ACSYS), and as a result have access to additional daily and monthly flow data for Russia up to 1994, and for the Ukraine and Belarus up to 1997, although the time series are incomplete. This data is available to both the INTAS and FRIEND project on request.

4.1.2 Planning

Most activities planned for this reporting period are well underway or completed, and despite some delays with the collation of gauged daily flow data in Russia, and with the digitising of catchment boundaries, all contractors remain confident that all the project objectives can be met during the time scale of the contract. A continuing problem in planning work has been the late arrival of INTAS funds (especially in the Ukraine) to countries with limited financial

resources. Although progress over the year has not been hampered, it has made it more difficult for work to progress at a steady pace.

A revised work schedule, showing progress with planned tasks is shown in Figure 4.11. Catchment details from Belarus and the Ukraine are currently being reformatted by SHI, and transfer to IH is expected soon. Many of the problems with digitising boundaries are now being overcome and it is planned that SHI will complete the digitising for Belarus and Ukraine to ensure that this task is completed as soon as possible.

The main outstanding tasks for the future are to complete the digitising of catchment boundaries and collation of gauged daily flow data, and to begin the collation of annual instantaneous maxima.

4.1.3 Problems encountered

Many of the problems encountered during the second year of the project have already been noted in the individual reports of contractors. Most are associated with the use and transfer of new technology and are to be expected when applying new methods to real data. Added to this are the general difficulties of conducting research in the FSU, most notably in the transfer of funds, a problem which is likely to be common to other research projects in that geographical area.

The main problems encountered were as follows:

1. Funding: see section 4.2.1

2. Catchment selection: All FSU contractors experienced difficulties in finding sufficient catchments of less than 500 km^2 in area, with minimal artificial influences. In all FSU countries there tend to be few gauging stations on small rivers, especially in sparsely populated areas, and this necessitated some relaxation of the constraint on catchment area.

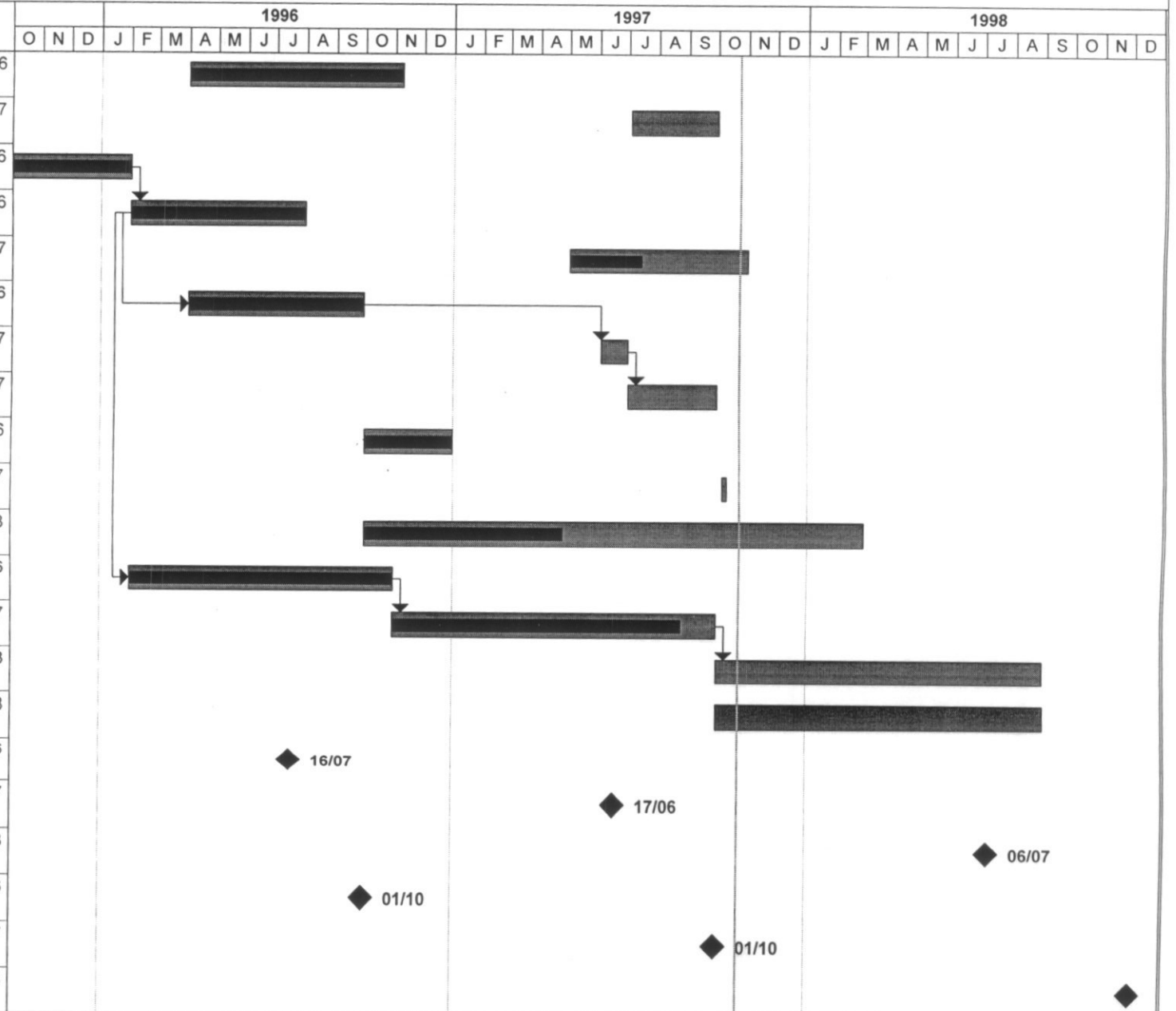
3. Digitising software: Software for digitising catchment boundaries is not currently available at ABH or HSUA, and as a result boundaries were digitised manually by these organisations to prevent further delays to the work schedule. Manual digitising is inevitably less accurate than automatic digitising.

   In the long term, the necessary MAPINFO software for digitising could be transferred from SHI, but this would cost each organisation approximately 300 US$ and involve investment in staff training time. This extra training time is not available within the current work schedule and in order to maintain progress SHI intend to complete the digitising for ABH and HSUA, and check the manual boundaries.

4. Hydrometry: A continuing constraint on hydrological research in FSU countries is the lack of long term investment required to maintain a stable hydrometric network supplying good quality data. In addition, the budgetary problems of FSU contractors make it difficult for them to provide timely payments and facilities to staff and station observers, to ensure that stations are maintained properly. Other constraints exist in digital data processing. The lack of recent rainfall data in Russia has delayed the calculation of long term annual average rainfall for catchments.

Figure 4.11 Revised Work Plan

ID	Task Name	Start	Finish
1	Arrange purchase of computer equipment	01/04/96	08/11/96
2	Arrange purchase of additional computer	03/07/97	30/09/97
3	Guide for station selection	02/10/95	01/02/96
4	Station selection	01/02/96	31/07/96
5	Develop programme to convert from Gaussian to	01/05/97	31/10/97
6	Collate station/catchment details	01/04/96	30/09/96
7	Station details into electronic format	03/06/97	01/07/97
8	Transfer catchment information to IH	01/07/97	30/09/97
9	Digitise hydrometric areas in BY,UA,RUS	01/10/96	31/12/96
10	Transfer hydrometric areas to IH	06/10/97	10/10/97
11	Digitise catchment boundaries (100%)	01/10/96	27/02/98
12	Collation of gauged daily flow data (20%)	01/02/96	31/10/96
13	Collation of gauged daily flow data (40%)	31/10/96	30/09/97
14	Collation of gauged daily flow data (40%)	01/10/97	31/08/98
15	Collate annual instantaneous maxima	01/10/97	31/08/98
16	Annual meeting at SHI, St Petersburg	16/07/96	16/07/96
17	Annual meeting at SCUH, Kiev	17/06/97	17/06/97
18	Annual meeting at SCHRB, Minsk	06/07/98	06/07/98
19	1st Periodic Report Complete	01/10/96	01/10/96
20	2nd Periodic Report Complete	01/10/97	01/10/97
21	Final Report Complete	01/12/98	01/12/98



4.1.4 Use of equipment

Computer equipment purchased during the first year of the project in Russia and Belarus and in October 1996 in the Ukraine, has been used as follows during the reporting period:

1. To establish a hydrological database at SHI capable of storing and retrieving large volumes of catchment information and time series of gauged river flows and meteorological variables mean monthly temperature and precipitation.

2. To develop software for hydrological data processing, quality control and graphical representation of hydrological variables at several locations.

3. To enable the use of MAPINFO software, installed at the Regional Data Centre, St Petersburg, for digitising catchment boundaries and hydrometric areas. This is a very time consuming task to do manually. It is hoped to transfer this software to contractors in Belarus and the Ukraine in due course.

4. To enable the transfer of data by e-mail both to the SHI and to IH and to make contact between contractors quicker and easier.

5. To provide staff in FSU countries with training and experience using current methods of data processing and archiving. This will have benefits well beyond the scope of the present INTAS project.

4.2 FINANCIAL INFORMATION

4.2.1 Cost breakdown for 1 October, 1996 to 30 September 1997

Expenditure

Table 4.2 Expenditure by each contractor (ECU)

Cost category	INTAS CONTRACTORS				
	IH	GRDC[3]	SHI[3]	ABH[4]	HSUA[4]
Labour	-	-	1563	1125	1147[3]
Overheads	4591	-	312	-	-
Travel and subsistence	1266	1300	2188	1032[5]	706[3]
Equipment		-	5937	-	2700[6]
External services/ subcontractors			-	-	
Consumables			-	-	
Other costs	47	200	-	-	
TOTAL	5904[1]	1500[2]	10000	2157	4671

Notes
(1) Total expenditure quoted for IH. This exceeds the INTAS contribution; additional costs will be met by IH. (£1 = 1.44 ECU)
(2) Costs for labour, overheads, equipment and consumables met by German Government
(3) No breakdown provided - indicative figures only.
(4) Costs originally quoted in US$ (1 US$ - 0.80 ECU)
(5) 800 ECU allocated for Dr Chekan to attend FRIEND Steering Committee meeting in Paris, 17-18 October 1996 from 95/96 budget. UNESCO provided additional 400 US$ (360 ECU).
(6) Allocation for equipment from 95/96 budget.

Transfer of Funds

The planned purchase of essential computer equipment in the first year of the project necessitated making payments to FSU contractors in 1995/96 in excess of 40% of the contract value. Future payments will be adjusted, such that by the end of the contract all contractors will have received their agreed total allocation.

Table 4.3 *Summary of INTAS payments (ECU) for 1996/97*

INTAS Contractor	Agreed Payment ECU	Date of transfer	Amount ECU	Bank
IH	2500	20 Dec 96 8 Aug 97	5500(1) 4000(2)	
Germany	1500	Dec 96	1500	
Russia	10000	17 Dec 96	10000(3)	Mosbusiness Bank, St Petersburg
Ukraine	4000	June 97	4000	Direct transfer by travellers cheques
Belarus	3000	17 Dec 96	3000(4)	National Westminster Bank, London
TOTAL INTAS PAYMENT	21000	Nov 96	21000	Generale Bank, Brussels

Notes: The payments noted above were as agreed with contractors on commencement of the project. Although the total payment by INTAS was 30% of the total contract value , the distribution between contractors varies slightly from 30% to reflect the higher payments made to FSU contractors in the first year to enable them to buy computer equipment. All contractors will receive their agreed total by the end of the contract.

(1) Includes 3000 ECU to be transferred to Belarus
(2) IH paid Ukraine directly by travellers cheques; 4000 ECU for Ukraine transferred to IH.
(3) Transfer made in US$. Amount received after charges 12392.8 US$
(4) Transfer made in Sterling (£2370) based on 1 ECU=£0.79

There have been continued problems in disseminating funds to the Ukraine. In January 1997 IH were informed that as a result of changes in Ukrainian legislation, the tax exemptions on the transfer of funds and equipment to INTAS projects had been suspended. It was therefore advised that all payments to the Ukraine be temporarily suspended, until new regulations came into force. This situation prevailed until June 1997, when the funds were transferred directly by travellers cheques when an IH representative (Mr Gwyn Rees) visited Kiev for the Annual INTAS Progress Meeting. It has been suggested that future INTAS payments to the Ukraine could be made through the SHI. An additional financial problem in Belarus, is that 50% of cash payments have to be converted to local currency and this can leave insufficient "hard" currency to buy computers or to travel. There seems no way round this as the banks deal with all transfers.

Funding sources

FSU contractors received only the INTAS grant for this research project and had no other source of funding. UNESCO gave a small subsidy (396 ECU) for a representative from HSUA to attend an external meeting (the FRIEND Steering Committee meeting in Paris, September 1996). The German Government met GRDC costs in respect of labour, overheads, equipment and consumables. IH met expenditure in excess of the INTAS allocation of 2500 ECU from the IH FRIEND budget.

4.2.2 Cost breakdown for the remaining period

Table 4.4 *Planned expenditure of INTAS funds for the remaining period*

	IH	GRDC	SHI	ABH	HSUA
Labour	-	-	1437	165	1953
Overheads	1427		560	300	282
Travel and subsistence	1302	2000	4172	1058	1534
Equipment	-		3383	2658	3300
External services/ subcontractors	-		-	-	-
Consumables	-		-	300	600
Other costs	1271	-	-	200	300
TOTAL	4000	2000	9552	4681	7969

Table 4.5 *Payments requested from INTAS for 1997/98*

INTAS participant	Payment ECU
IH - UK	2000
GRDC - Germany	1000
SHI - Russia	7000
HSUA - Ukraine	3000
ABH - Belarus	1000
TOTAL	14000

These in total represent 20% of the contract value.

5. Summary

Title: **The Establishment of a Regional Data Centre of the European Territory of the Former Soviet Union (FSU)**

INTAS reference no: 94-4451
Project-coordinator: Institute of Hydrology, Wallingford, UK
Reporting period: 1 October, 1995 - 30 September, 1996

This contract is extension to the well established Flow Regimes from International, Experimental and Network Data (FRIEND) project, which is currently Project 1.1 of the fifth UNESCO hydrological programme. At the core of the FRIEND project is a hydrological data base, the European Water Archive, which is held at the Institute of Hydrology (IH), and contains river flow data, instantaneous peak flood data and thematic data for over 5000 river catchments from 27 countries in Europe. It currently receives data from four regional data centres in Norway, Germany, the Netherlands and France. This INTAS contract will enable the FRIEND project to be extended into the European Territory of the FSU (namely Russia, Ukraine and Belarus) by establishing a regional data centre in St Petersburg. The centre will be responsible for collating valuable hydrological data from European Russia and subsequent transfer to the European Water Archive at IH, where it can be made available for the first time to other FRIEND researchers. FSU researchers will also benefit from being more involved in the wider research interests of FRIEND.

The project participants are the Institute of Hydrology (coordinator), State Hydrological Institute (SHI) in St Petersburg, Russia, Ukrainian Committee for Hydrometeorology (HSUA), State Department for Hydrometeorology of the Republic of Belarus (ABH), and the Global Runoff Data Centre (GRDC) in Koblenz, Germany. Each FSU participant is responsible for the acquisition and collation of hydrological data within their own country and the subsequent transfer to the data centre in St Petersburg.

Despite difficulties in establishing satisfactory methods for transferring INTAS funds to the FSU, progress during the first two years of the contract has been good. INTAS funding has enabled all FSU participants to purchase computer equipment vital for hydrological data processing, archiving and retrieval. The Regional Data Centre is functioning well and is actively coordinating the preparation of data by FSU contractors. Much effort has been put into collating long time series of gauged daily flow data for selected catchments; on average 30 years of record is available at most stations. Catchment selection and the collation of the main catchment information is now complete. Digitising of catchment boundaries and hydrometric areas is also underway.

Many benefits have derived from the e-mail links established during the first year, mainly in transferring data and enabling easy contact between contractors. The benefits of this collaboration are already becoming apparent, with extensive informal contact between participants. INTAS Progress Meetings are held annually and FSU participants have also participated in the Third International FRIEND Conference and annual FRIEND Steering Committee Meetings. These collaborative links, the provision of computer equipment and up to date hydrological software and technical advice provided within the project will have real long term benefits in advancing hydrological science in European Russia.

REFERENCES

Gustard, A. *et al.*, 1997. FRIEND '97 - Regional Hydrology: Concepts and Models for Sustainable Water Resource Management. IAHS Publication No. 246, ISBN 1-901502-35-X.

Oberlin, G. & Desbos, E. (eds), 1997. FRIEND Third Report: 1994-1997, Cemagref, ISBN 2-85362-475-7.

Appendix 1

CATALOGUE OF FSU STATIONS ON GRDC DATABASE

GLOBAL RUNOFF DATA CENTRE (GRDC)
UPDATE LIST

Russian Federation	29.10	6970100	Onega	Porog	1989-1993	D	U
	29.10	6970150	Vonguda	Vonguda	1989-1993	D	U
	29.10	6970120	Kodina	Kodina	1989-1993	D	N
	29.10	6971750	Nenkosa	Nenkosa	1989-1992	D	U
	29.10	6970250	Northern Dvina	Ust-Pinega	1989-1993	D	U
	29.10	6970550	Kuloy	Kuloy	1989-1991	D	U
	29.10	6970500	Mezen	Malonisogorskaya	1989-1993	D	U
	29.10	6970560	Peza	Igumnovo	1989-1993	D	U
	29.10	6970630	Pesha	Volokovaya	1989-1993	D	U
	29.10	6970710	Pechora	Oksino	1989-1993	D	U
	29.10	2912600	Ob	Salekhard	1989-1994	D	U
	29.10	2999500	Pur	Samburg	1989-1990	D	U
	29.10	2999250	Taz	Sidorovsk	1989-1994	D	U
	29.10	2909150	Yenisei	Igarka	1989-1995	D	U
	29.10	2903420	Lena	Kusur	1989-1994	D	U
	29.10	2903430	Lena	Stolb	1989-1994	D	U
	29.10	2999850	Khatanga	Khatanga	1989-1991	D	U
	29.10	2903150	Anabar	Saskylakh	1989-1994	D	U
	29.10	2999920	Olenek	Sukhana	1989-1994	D	U
	29.10	2998110	Yana	Ubileynaya	1989-1994	D	U
	29.10	2998400	Indigirka	Vorontsovo	1989-1994	D	U
	29.10	2998450	Alazeja	Andrushkino	1989-1993	D	U
	29.10	2998150	Omoloy	Namu	1989-1993	D	U
	29.10	2998510	Kolyma	Kolymskaya	1989-1994	D	U
	29.10	2998800	Paljavaam	Paljavaam	1989-1995	D	U

Table: 1

GLOBAL RUNOFF DATA CENTRE (GRDC)

Overlapping Time Series: Byelorussia

River	Station	from	to	1855	1860	1865	1870	1875	1880	1885	1890	1895	1900	1905	1910	1915	1920	1925	1930	1935	1940	1945	1950	1955	1960	1965	1970	1975	1980	1985	1990	1995
Polota	Yankovo I	1978	1987																													
Myadelka	Pusaki	1978	1987																													
Molchad	Molchad	1978	1987																													
Neman	Stolbtsy	1978	1980																													
Pripiat	Mozyr	1965	1984																													

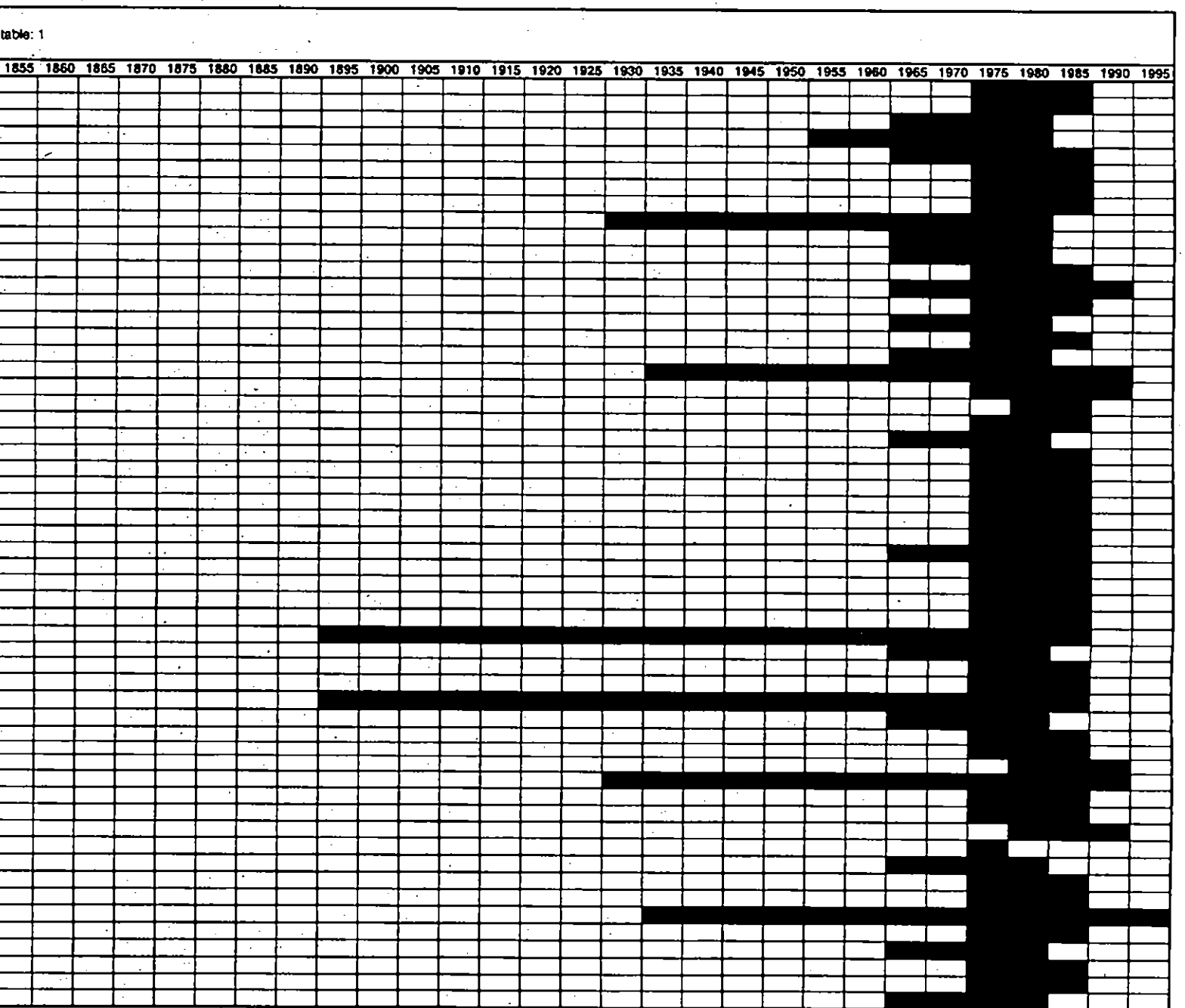
Overlapping Time Series: Ukraine

River	Station	from	to	1855	1860	1865	1870	1875	1880	1885	1890	1895	1900	1905	1910	1915	1920	1925	1930	1935	1940	1945	1950	1955	1960	1965	1970	1975	1980	1985	1990	1995
Prut	Chernovtzsy	1931	1987																													
Siret	Storozinec	1953	1970																													
Rika	Mezhgor'ye	1976	1987																													
Tissa	Rakhov	1978	1987																													
Tisza	Vilok	1954	1970																													
Zapadny Bug	Kamenka Bugskaya	1978	1987																													
Sluch	Gromada	1978	1987																													
Guyva	Gorodkovka	1978	1987																													
Irsha	Ukrainka	1978	1980																													
Desna	Chernigov	1884	1985																													
Southern Bug	Aleksandrovka	1965	1984																													
Ros	Krupoderentsy	1978	1987																													
Trubezh	Baryshevka	1892	1987																													
Trubezh	Pereyaslav-Khmelnicki	1978	1987																													
Ingul	Novogorozheno	1978	1987																													
Dniepr	Dniepr Power Plant	1952	1984																													
Seret	Chortkov	1978	1987																													
Kacha	Bashtanovka	1978	1987																													
Derekolka	Yalta	1978	1987																													
Salgir	Pionerskoe	1978	1987																													
Molochnaya	Tokmak	1978	1987																													
Krinka	Novoselovka	1978	1987																													

GLOBAL RUNOFF DATA CENTRE (GRDC)

Overlapping Time Series: Russian Federation table: 1

River	Station	from	to
Nyrvakinotveem	6 km from The mouth	1978	1987
Dolgiy	Kamenistyy	1978	1987
Anadyr	Novy Eropol	1965	1984
Penzhina	Kamenskoe	1957	1984
Khashyn	Kolyma Road (79th Km)	1969	1987
Plotnikova	Dal'niy	1978	1987
Kamchatka	Verkhne-Kamchatsk	1978	1987
Avacha	Elizovo	1978	1987
Kamchatka	Kluchi	1931	1984
Vitim	Bodaibo	1965	1984
Maya	Chabda	1965	1984
Zhuya	Svetly	1978	1987
Anabar	Saskylakh	1966	1994
Kempendai	Kempendai	1978	1987
Kirenga	Shorokhovo	1965	1984
Timpton	Nagorny	1978	1987
Iya	Tulun	1965	1984
Lena	Kusur	1935	1994
Lena	Stolb	1978	1994
Ebitiem	Ebetem	1980	1987
Kenkeme	Vtoroy Stanok	1978	1987
Tuba	Bugurtak	1965	1984
Chaptakhai	mouth	1978	1987
Radio-Uruyete	near The mouth	1978	1987
Podgornyi	near The mouth	1978	1987
Buor-Iuryakh	Kuidusun	1978	1987
Malaya Cherepanikha	Tlube	1978	1987
Shestakovka	Kamyrdagystakh	1978	1987
Tym	Ado-Tymovo	1965	1987
Lutoga	Chaplanovo	1978	1986
Nayba	Bykov	1978	1987
Partizanskaya	Molchanovka	1978	1987
Nikishikha	Atamanovka	1978	1987
Shilka	Sretensk	1896	1985
Selemdzha	Ust-Ulma	1965	1984
Bolshaya Bira	Birakan	1978	1987
Ikura	Birobidzhan	1978	1987
Amur	Khabarovsk	1896	1985
Ussuri	Kirovsky	1965	1984
Pavlovka	Uborka	1978	1987
Malinovka	Rakitnoe	1978	1987
Nemilen	Nemilen	1980	1990
Amur	Komsomolsk	1933	1990
Khara-Murin	Murino	1978	1987
Bolshaya Rechka	Possolskaya	1978	1987
Selenga	Mostovoy	1980	1991
Uda	Alygdzher	1979	1979
Khilok	Maleta	1965	1984
Olkha	Olkha	1978	1987
Gravlyka	Igarka	1978	1987
Yenisei	Igarka	1936	1995
Us	Ust-Zolotaya	1978	1987
Markha	Malykai	1965	1984
Syda	Otrok	1978	1987
Sizim	Sizim	1978	1987
Podkamennaya Tunguska	Kuzmovka	1965	1984



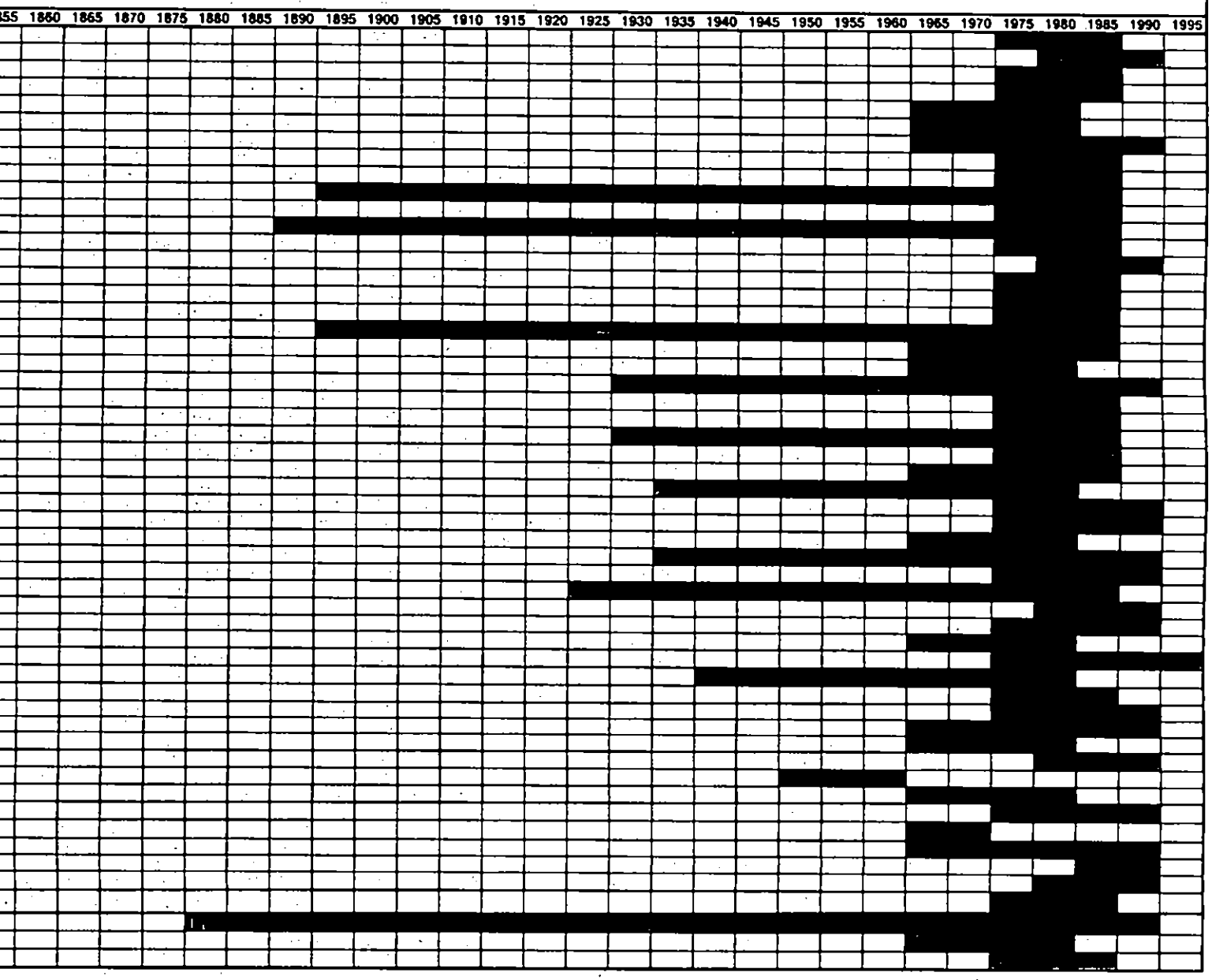
Status: August 1997

GLOBAL RUNOFF DATA CENTRE (GRDC)

Overlapping Time Series: Russian Federation

table: 2

River	Station	from	to
Nizhnaya Tunguska	Podvoloshino	1978	1987
Dzhida	Dzhida	1980	1991
Chernaya	Chernoye Ii	1978	1987
Mikhanskij	Velmo 2	1978	1987
Bolshoi Yugan	Ugut	1965	1984
Tym	Napas	1965	1984
Tom	Tomsk	1965	1990
Peschanaya	Tochilnoe	1978	1987
Mayma	Mayma	1978	1987
Biya	Biysk	1895	1985
Akkem	Akkem	1978	1987
Tom	Novokuznetsk	1894	1985
Usa	Mezhdourechensk	1978	1987
Irtish	Omsk	1980	1990
Bergamak	Pjazany	1978	1987
Aremzyanka	Chukmanka	1978	1987
Uy	Stepnoe	1978	1987
Tura	Tiumen	1896	1985
Lobva	Lobva	1969	1987
Northern Sosva	Sosva	1965	1984
Ob	Salekhard	1930	1994
Reshetka	Novoalekseevskoe	1978	1987
Yalynka	Kaltiukova	1978	1987
Amu-Darya	Kerki	1932	1989
Bolshoy Ik	Mrakovo	1978	1987
Kargat	Gavrilovsky	1969	1987
Yana	Dzanghky	1936	1984
Yana	Ubileynaya	1978	1994
Omoloy	Namu	1979	1993
Sugoy	3.2km Downstream of Om	1965	1984
Indigirka	Vorontsovo	1937	1994
Alazeja	Andrushkino	1978	1993
Kolyma	Srednе-Kolymsk	1927	1988
Kolyma	Emtegei	1980	1990
Kolyma	Kolymskaya	1978	1994
Nera	Ala-Chubuk	1965	1984
Paljavaam	Paljavaam	1978	1995
Amguema	mouth of Shoumny Brook	1944	1984
Nadym	Nadym	1978	1987
Taz	Sidorovsk	1978	1994
Pur	Samburg	1965	1990
Amga	Buyaga	1965	1984
Khatanga	Khatanga	1982	1991
Olenek	8km Upstream of mouth O	1952	1963
Olenek	7.5km Downstream of mou	1965	1984
Olenek	Sukhana	1978	1994
Maly Uzen	Aleksashkino	1965	1970
Onega	Porog	1965	1993
Kodina	Kodina	1989	1993
Vonguda	Vonguda	1981	1993
Solza	Soukhie Porogui	1978	1987
Northern Dvina(Severnaya	Ust-Pinega	1881	1993
Vaga	Filalevskaya	1965	1984
Mud'yuga	Patrakeyevskaya	1978	1987



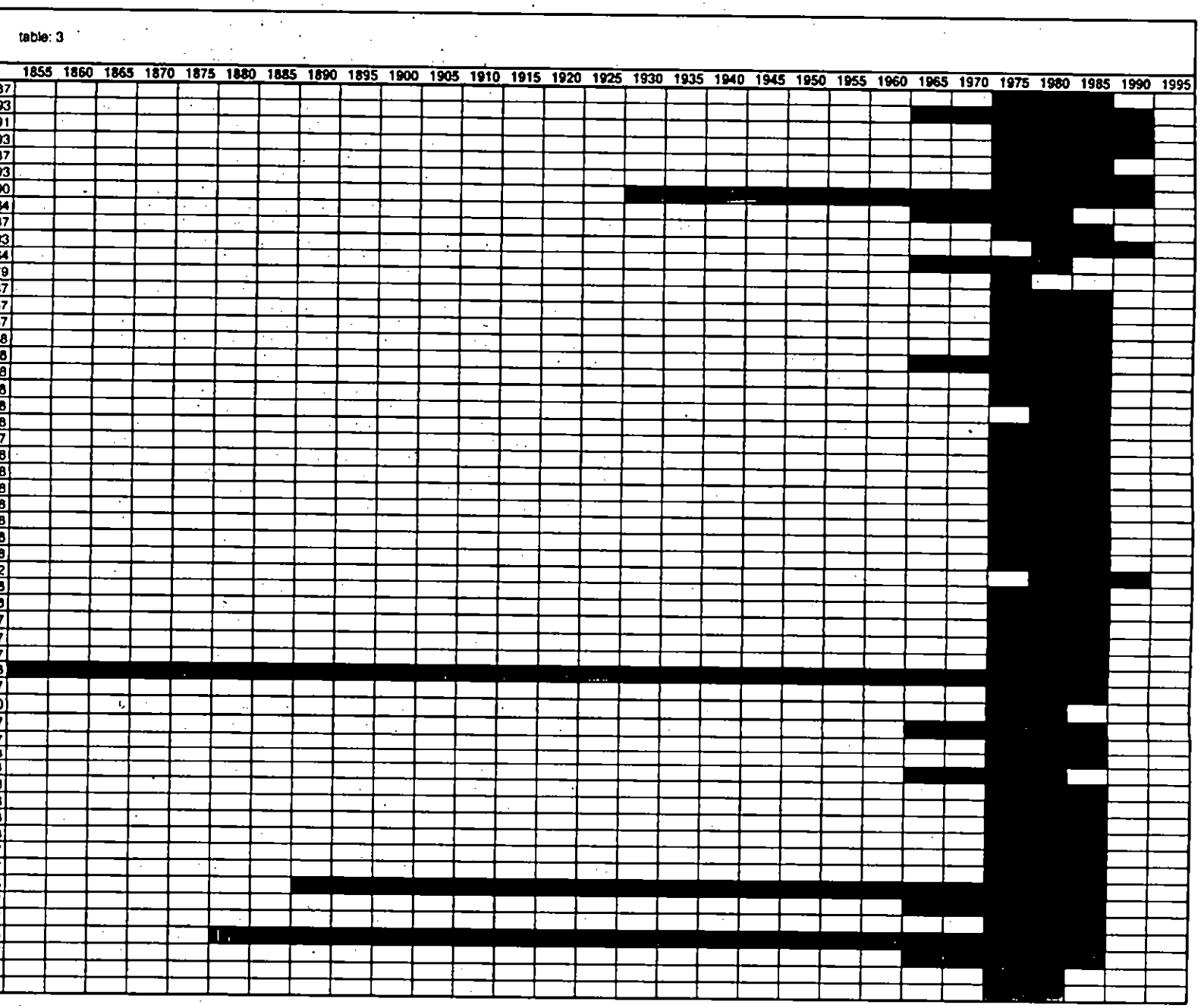
Status: August 1997

GLOBAL RUNOFF DATA CENTRE (GRDC)

Overlapping Time Series: Russian Federation

table: 3

River	Station	from	to
Pinega	Kulogory	1978	1987
Mezen	Malonisogorskaya	1965	1993
Kuloy	Kuloy	1978	1991
Peza	Igumnovo	1978	1993
Pizhma	Borovaya	1978	1987
Pesha	Volokovaya	1978	1993
Pechora	Ust-Tsilma	1932	1990
Vytchegda	Malaya Kushba	1965	1984
Pechora	Yaksha	1978	1987
Pechora	Oksino	1980	1993
Usa	Adzva	1965	1984
Iyema	Izvail	1978	1979
Equl	Chukhlom	1978	1987
Ema	Novoe	1978	1987
Jena	Jena	1979	1987
Ura	Ura-Guba	1979	1988
Kola	Oktiabrsky Railway,km 142	1965	1988
Umba	Palatka	1979	1988
Pechenga	Pechenga	1979	1988
Nama-Joki	Luostari	1980	1988
Titovka	km 15.5	1979	1988
Rosta	near The mouth	1979	1987
Sosnovka	Sosnovka	1979	1988
Chapoma	Chapoma	1979	1988
Chavanga	Chavanga	1979	1988
Varzuga	Varzuga	1979	1988
Kuzreka	Kuzreka	1979	1988
Olenica	Olenica	1979	1988
Kolvica	Kolvica	1979	1988
Nenoksa	Nenoksa	1980	1992
Nuhcha	Nuhcha	1978	1988
Maloshuika	Maloshuika	1978	1988
Pliussa	Brod	1978	1987
Sorot	Osinkino	1978	1987
Luga	Tolmatchevo	1978	1987
Neva	Novosaratovka	1859	1988
Perekhoda	Podsosonie	1978	1987
Dymka	Domachevo	1978	1980
Olonka	Olonets	1965	1987
Kumsa	Medvezh'yegorsk	1978	1987
Suma	Sumskiy Posad	1978	1988
Kem	Yushkozero	1965	1984
Kem	Putkinskaya Ges	1978	1988
Pueta	Kem	1978	1988
Shuya	Shueretskaya	1978	1988
Pongoma	Pongoma	1978	1988
Obsha	Belty	1978	1987
Volga	Eltsy	1978	1987
Volga	Staritsa	1891	1985
Oka	Kostomarovo	1965	1987
Moskva	Barsuki	1978	1987
Oka	Kaluga	1881	1985
Protva	Spas-Zagorie	1965	1987
Solonitsa	Bortnikovo	1978	1983
Shosha	Klopovo-Gorodishche	1978	1980



Status: August 1997

GLOBAL RUNOFF DATA CENTRE (GRDC)

Overlapping Time Series: Russian Federation table: 4

River	Station	from	to	1855	1860	1865	1870	1875	1880	1885	1890	1895	1900	1905	1910	1915	1920	1925	1930	1935	1940	1945	1950	1955	1960	1965	1970	1975	1980	1985	1990	1995
Unzha	Makariev	1965	1984																													
Svlaga	Vyrypaevka	1978	1987																													
Viatka	Kirov	1965	1984																													
Dymka	Tatarskaya Dymskaya	1978	1987																													
Belaya	Birsk	1965	1984																													
Belaya	Ufa	1878	1990																													
Velva	Oshib	1978	1987																													
Chusovaya	Staroutkinsk	1978	1987																													
Kolva	Petretsova	1978	1987																													
Soleuk	Nizhneitkulovo	1978	1987																													
Volga	Volgograd Power Plant	1879	1990																													
Krymza	Syzran	1978	1987																													
Don	Razdorskaya	1891	1990																													
Likhaya	Bogurayev	1978	1987																													
Medveditsa	Archedinskala	1965	1984																													
Vorona	Chutanovka	1965	1987																													
Peskovatka	Shumilinskaya	1978	1987																													
Sozh	Uskosy	1978	1987																													
Prut	Shirkovo	1978	1987																													
Ra'	Besedina	1978	1987																													
Kuban	Tikhovsky	1965	1984																													
Kuban	Krasnodar	1980	1990																													
Adagum	Krymsk	1978	1987																													
Ubinka	Severokaya	1978	1987																													
Psekoups	Gorlachy Klutch	1978	1987																													
Kurdzhips	Krasno-Oktiabrsky	1978	1987																													
Teberda	Teberda	1978	1987																													
Kuban	Kosta Khetagurov	1978	1987																													
Kalaus	Svetlograd	1965	1987																													
Kuma	Aleksandriyskaya	1978	1987																													
Terek	Ordzhonikidze	1965	1987																													
Kazikumukhskoe Kolsu	Guerguebil	1978	1987																													
Kara-Samur	Luchek	1965	1987																													
Psezuapse	Tat'yanovka	1978	1987																													
Shakhe	Solokh-Aul	1978	1987																													
Sochi	Plastunka	1978	1987																													

Status: August 1997

GLOBAL RUNOFF DATA CENTRE (GRDC)

STATIONS FROM BYELORUSSIA

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly data	Miss. Val. in %
6973500	Polota	Yankovo I	55.50 N	29.20 E	618	1 .1978	12.1987	D	0
6973500	Polota	Yankovo I	55.50 N	29.20 E	618	1.1978	12.1987	M	0
6973900	Myadelka	Pusaki			462	1 .1978	7 .1987	D	0
6973900	Myadelka	Pusaki			462	1.1978	7.1987	M	0
6974550	Molchad	Molchad	53.63 N	25.71 E	211	1 .1978	12.1987	D	0
6974550	Molchad	Molchad	53.63 N	25.71 E	211	1.1978	12.1987	M	0
6974600	Neman	Stolbtsy	53.46 N	26.80 E	3070	1 .1978	12.1980	D	0
6974600	Neman	Stolbtsy	53.46 N	26.80 E	3070	1.1978	12.1980	M	0
6979500	Pripiat	Mozyr	51.97 N	29.23 E	101000	1.1965	12.1984	M	0

Status: August 1997

GLOBAL RUNOFF DATA CENTRE (GRDC)

STATIONS FROM UKRAINE

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly data	Miss. Val. in %
6942100	Prut	Chernovtzsy	48.26 N	25.95 E	6890	1 .1978	12.1987	D	0
6942100	Prut	Chernovtzsy	48.26 N	25.95 E	6890	1.1931	12.1970	M	22
6942200	Siret	Storozinec			672	1.1953	12.1970	M	0
6944100	Rika	Mezhgor'ye	48.50 N	23.50 E	873	1 .1978	12.1987	D	0
6944100	Rika	Mezhgor'ye	48.50 N	23.50 E	873	1.1978	12.1987	M	0
6944200	Tissa	Rakhov	48.01 N	24.25 E	1070	1 .1978	12.1987	D	0
6944200	Tissa	Rakhov	48.01 N	24.25 E	1070	1.1978	12.1987	M	0
6944250	Tisza	Vilok			9140	1.1954	12.1970	M	0
6958100	Zapadny Bug	Kamenka Bugskaya	50.03 N	24.38 E	2260	1 .1978	12.1987	D	0
6958100	Zapadny Bug	Kamenka Bugskaya	50.03 N	24.38 E	2260	1.1978	12.1987	M	0
6979200	Sluch	Gromada	49.86 N	27.53 E	2480	1 .1978	12.1987	D	0
6979200	Sluch	Gromada	49.86 N	27.53 E	2480	1.1978	12.1987	M	0
6979250	Guyva	Gorodkovka	49.91 N	28.96 E	312	1 .1978	12.1987	D	0
6979250	Guyva	Gorodkovka	49.91 N	28.96 E	312	1.1978	12.1987	M	0
6979300	Irsha	Ukrainka	50.68 N	29.25 E	2600	1 .1978	12.1980	D	0
6979300	Irsha	Ukrainka	50.68 N	29.25 E	2600	1.1978	12.1980	M	0
6979600	Desna	Chernigov	51.45 N	31.35 E	81400	5.1884	12.1985	M	2
6980300	Southern Bug	Aleksandrovka	47.72 N	31.18 E	46200	1.1965	12.1984	M	0
6980400	Ros	Krupoderentsy	49.80 N	30.14 E	618	1 .1978	12.1987	D	<1
6980400	Ros	Krupoderentsy	49.80 N	30.14 E	618	1.1981	12.1981	M	0
6980410	Trubezh	Baryshevka	50.38 N	31.46 E	1990	4 .1892	12.1987	D	
6980410	Trubezh	Baryshevka	50.38 N	31.46 E	1990	4.1892	12.1987	M	
6980420	Trubezh	Pereyaslav-Khmelnicki	50.08 N	31.46 E	3430	1 .1978	12.1987	D	0
6980420	Trubezh	Pereyaslav-Khmelnicki	50.08 N	31.46 E	3430	1.1978	12.1987	M	0
6980500	Ingul	Novogorozheno	47.55 N	32.23 E	6670	1 .1978	12.1987	D	<1
6980500	Ingul	Novogorozheno	47.55 N	32.23 E	6670	1.1978	12.1987	M	0
6980800	Dniepr	Dniepr Power Plant	47.92 N	35.15 E	463000	1.1952	12.1984	M	0
6981200	Seret	Chortkov	48.93 N	25.83 E	3170	1 .1978	12.1987	D	20
6981200	Seret	Chortkov	48.93 N	25.83 E	3170	1.1978	12.1987	M	20
6982300	Kacha	Bashtanovka	45.75 N	33.66 E	321	1 .1978	12.1987	D	0
6982300	Kacha	Bashtanovka	45.75 N	33.66 E	321	1.1978	12.1987	M	0
6982500	Derekoika	Yalta	44.55 N	34.20 E	49.7	1 .1978	12.1987	D	0
6982500	Derekoika	Yalta	44.55 N	34.20 E	49.7	1.1978	12.1987	M	0
6983010	Salgir	Pionerskoe	44.93 N	34.21 E	261	1 .1978	12.1987	D	0
6983010	Salgir	Pionerskoe	44.93 N	34.21 E	261	1.1978	12.1987	M	0
6983200	Molochnaya	Tokmak	47.21 N	35.71 E	760	1 .1978	12.1987	D	0
6983200	Molochnaya	Tokmak	47.21 N	35.71 E	760	1.1978	12.1987	M	0
6983300	Krinka	Novoselovka	48.18 N	38.20 E	582	1 .1978	12.1987	D	0
6983300	Krinka	Novoselovka	48.18 N	38.20 E	582	1.1978	12.1987	M	0

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GLOBAL RUNOFF DATA CENTRE (GRDC)

STATIONS FROM RUSSIAN FEDERATION

table: 1

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly data	Miss. Val. in %
2901100	Nyrvakinotveem	6 km from The mouth	66.41 N	179.25 W	207	1 .1978	12.1987	D	10
2901100	Nyrvakinotveem	6 km from The mouth	66.41 N	179.25 W	207	1.1978	12.1987	M	10
2901150	Dolgiy	Kamenistyy			166	1 .1978	12.1987	D	0
2901150	Dolgiy	Kamenistyy			166	1.1978	12.1987	M	0
2901200	Anadyr	Novy Eropol	65.08 N	169.00 E	47300	1.1965	12.1984	M	0
2901300	Penzhina	Kamenskoe	62.42 N	166.03 E	71600	1.1957	12.1984	M	3
2901500	Khashyn	Kolyma Road (79th Km)	60.18 N	151.29 E	682	1 .1978	12.1987	D	0
2901500	Khashyn	Kolyma Road (79th Km)	60.18 N	151.29 E	682	1.1969	12.1987	M	2
2902500	Plotnikova	Dal'niy	52.50 N	157.00 E	649	1 .1978	12.1987	D	0
2902500	Plotnikova	Dal'niy	52.50 N	157.00 E	649	1.1978	12.1987	M	0
2902600	Kamchatka	Verkhne-Kamchatsk	54.43 N	158.31 E	3760	1 .1978	12.1987	D	0
2902600	Kamchatka	Verkhne-Kamchatsk	54.43 N	158.31 E	3760	1.1978	12.1987	M	0
2902700	Avacha	Elizovo	53.10 N	158.58 E	4750	1 .1978	12.1987	D	0
2902700	Avacha	Elizovo	53.10 N	158.58 E	4750	1.1978	12.1987	M	0
2902800	Kamchatka	Kluchi	56.43 N	161.05 E	45600	1.1931	12.1984	M	0
2903050	Vitim	Bodaibo	57.90 N	114.25 E	186000	1.1965	12.1984	M	0
2903080	Maya	Chabda	59.75 N	134.75 E	165000	1.1965	12.1984	M	0
2903100	Zhuya	Svetly	58.44 N	116.14 E	4790	1 .1978	12.1987	D	0
2903100	Zhuya	Svetly	58.44 N	116.14 E	4790	1.1978	12.1987	M	0
2903150	Anabar	Saskylakh	71.98 N	113.95 E	78800	1 .1978	12.1994	D	6
2903150	Anabar	Saskylakh	71.98 N	113.95 E	78800	1.1966	12.1994	M	6
2903200	Kempendai	Kempendai	61.91 N	118.68 E	1290	1 .1978	12.1987	D	10
2903200	Kempendai	Kempendai	61.91 N	118.68 E	1290	1.1978	12.1987	M	10
2903300	Kirenga	Shorokhovo	57.67 N	108.07 E	46500	1.1965	12.1984	M	0
2903400	Timpton	Nagorny	55.98 N	124.75 E	613	1 .1978	12.1987	D	0
2903400	Timpton	Nagorny	55.98 N	124.75 E	613	1.1978	12.1987	M	0
2903410	Iya	Tulun	54.77 N	100.65 E	14500	1.1965	12.1984	M	0
2903420	Lena	Kusur	70.70 N	127.65 E	2430000	1 .1978	12.1994	D	0
2903420	Lena	Kusur	70.70 N	127.65 E	2430000	1.1935	12.1994	M	0
2903430	Lena	Stolb	72.37 N	126.80 E	2460000	1 .1978	12.1994	D	0
2903430	Lena	Stolb	72.37 N	126.80 E	2460000	1.1978	12.1994	M	0
2903450	Ebitiem	Ebetem	70.36 N	127.95 E	1000	1 .1980	12.1987	D	<1
2903450	Ebitiem	Ebetem	70.36 N	127.95 E	1000	1.1980	12.1987	M	0
2903500	Kenkeme	Vtoroy Stanok	62.06 N	129.03 E	3550	1 .1978	12.1987	D	1
2903500	Kenkeme	Vtoroy Stanok	62.06 N	129.03 E	3550	1.1978	12.1987	M	1
2903700	Tuba	Bugurtak	53.77 N	92.77 E	31800	1.1965	12.1984	M	2

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GLOBAL RUNOFF DATA CENTRE (GRDC)

STATIONS FROM RUSSIAN FEDERATION

table: 2

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly data	Miss. Val. in %
2903910	Chaptakhai	mouth			28.4	1 .1978	12.1987	D	0
2903910	Chaptakhai	mouth			28.4	1.1978	12.1987	M	0
2903920	Radio-Uruyete	near The mouth			22.8	1 .1978	12.1987	D	<1
2903920	Radio-Uruyete	near The mouth			22.8	1.1978	12.1987	M	0
2903930	Podgornyi	near The mouth			20.3	1 .1978	12.1987	D	13
2903930	Podgornyi	near The mouth			20.3	1.1978	12.1987	M	12
2903940	Buor-Iuryakh	Kujdusun			743	1 .1978	12.1987	D	0
2903940	Buor-Iuryakh	Kujdusun			743	1.1978	12.1987	M	0
2903950	Malaya Cherepanikha	Tiube			469	1 .1978	12.1987	D	<1
2903950	Malaya Cherepanikha	Tiube			469	1.1978	12.1987	M	0
2903960	Shestakovka	Kamyrdagystakh			170	1 .1978	12.1987	D	<1
2903960	Shestakovka	Kamyrdagystakh			170	1.1978	12.1987	M	0
2904200	Tym	Ado-Tymovo	51.26 N	142.71 E	3420	1 .1978	12.1987	D	0
2904200	Tym	Ado-Tymovo	51.26 N	142.71 E	3420	1.1965	12.1987	M	0
2904800	Lutoga	Chaplanovo	46.81 N	142.44 E	667	1 .1978	12.1986	D	0
2904800	Lutoga	Chaplanovo	46.81 N	142.44 E	667	1.1978	12.1986	M	0
2904850	Nayba	Bykov	47.33 N	142.59 E	679	1 .1978	12.1987	D	<1
2904850	Nayba	Bykov	47.33 N	142.59 E	679	1.1978	12.1987	M	0
2905800	Partizanskaya	Molchanovka	43.44 N	133.51 E	549	1 .1978	12.1987	D	0
2905800	Partizanskaya	Molchanovka	43.44 N	133.51 E	549	1.1978	12.1987	M	0
2906100	Nikishikha	Atamanovka	51.93 N	113.68 E	575	1 .1978	12.1987	D	0
2906100	Nikishikha	Atamanovka	51.93 N	113.68 E	575	1.1978	12.1987	M	0
2906200	Shilka	Sretensk	52.25 N	117.72 E	175000	5.1896	12.1985	M	0
2906500	Selemdhza	Ust-Ulma	51.95 N	129.12 E	67000	1.1965	12.1984	M	0
2906600	Bolshaya Bira	Birakan	48.93 N	131.80 E	2910	1 .1978	12.1987	D	0
2906600	Bolshaya Bira	Birakan	48.93 N	131.80 E	2910	1.1978	12.1987	M	0
2906650	Ikura	Birobidzhan	48.81 N	132.89 E	155	1 .1978	12.1987	D	0
2906650	Ikura	Birobidzhan	48.81 N	132.89 E	155	1.1978	12.1987	M	0
2906700	Amur	Khabarovsk	48.43 N	135.05 E	1630000	5.1896	12.1985	M	0
2906800	Ussuri	Kirovsky	45.02 N	133.65 E	24400	1.1965	12.1984	M	0
2906850	Pavlovka	Uborka	44.31 N	134.26 E	3350	1 .1978	12.1987	D	0
2906850	Pavlovka	Uborka	44.31 N	134.26 E	3350	1.1978	12.1987	M	0
2906860	Malinovka	Rakitnoe	45.56 N	134.81 E	4730	1 .1978	12.1987	D	0
2906860	Malinovka	Rakitnoe	45.56 N	134.81 E	4730	1.1978	12.1987	M	0

GLOBAL RUNOFF DATA CENTRE (GRDC)

STATIONS FROM RUSSIAN FEDERATION

table: 3

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly data	Miss. Val. in %
2906880	Nemilen	Nemilen	52.56 N	136.50 E		1 .1980	12.1990	D	0
2906880	Nemilen	Nemilen	52.56 N	136.50 E		1.1980	12.1990	M	0
2906900	Amur	Komsomolsk	50.63 N	137.12 E	1730000	1 .1980	12.1990	D	1
2906900	Amur	Komsomolsk	50.63 N	137.12 E	1730000	1.1933	12.1990	M	0
2907100	Khara-Murin	Murino	51.36 N	104.31 E	1130	1 .1978	12.1987	D	0
2907100	Khara-Murin	Murino	51.36 N	104.31 E	1130	1.1978	12.1987	M	0
2907200	Bolshaya Rechka	Possolskaya	51.76 N	106.44 E	565	1 .1978	12.1987	D	0
2907200	Bolshaya Rechka	Possolskaya	51.76 N	106.44 E	565	1.1978	12.1987	M	0
2907400	Selenga	Mostovoy	52.00 N	107.33 E	440200	1 .1980	12.1991	D	0
2907400	Selenga	Mostovoy	52.00 N	107.33 E	440200	1.1980	12.1991	M	0
2908300	Uda	Alygdzher	53.53 N	98.21 E	4980	1 .1979	12.1979	D	0
2908300	Uda	Alygdzher	53.53 N	98.21 E	4980	1.1979	12.1979	M	0
2908400	Khilok	Maleta	50.77 N	108.25 E	25700	1.1965	12.1984	M	0
2908500	Olkha	Olkha	52.10 N	104.03 E	590	1 .1978	12.1987	D	0
2908500	Olkha	Olkha	52.10 N	104.03 E	590	1,1978	12.1987	M	0
2909100	Graviyka	Igarka	67.51 N	86.55 E	323	1 .1978	12.1987	D	8
2909100	Graviyka	Igarka	67.51 N	86.55 E	323	1.1978	12.1987	M	8
2909150	Yenisei	Igarka	67.48 N	86.50 E	2440000	5 .1978	12.1995	D	3
2909150	Yenisei	Igarka	67.48 N	86.50 E	2440000	1.1936	12.1995	M	0
2909250	Us	Ust-Zolotaya	52.03 N	92.66 E	6110	1 .1978	12.1987	D	0
2909250	Us	Ust-Zolotaya	52.03 N	92.66 E	6110	1.1978	12.1987	M	0
2909280	Markha	Malykai	63.43 N	117.05 E	89600	1.1965	12.1984	M	3
2909300	Syda	Otrok	54.33 N	92.50 E	1480	1 .1978	12.1987	D	0
2909300	Syda	Otrok	54.33 N	92.50 E	1480	1.1978	12.1987	M	0
2909350	Sizim	Sizim	51.36 N	95.96 E	867	1 .1978	12.1987	D	0
2909350	Sizim	Sizim	51.36 N	95.96 E	867	1.1978	12.1987	M	0
2909400	Podkamennaya Tunguska	Kuzmovka	62.22 N	92.02 E	218000	1.1965	12.1984	M	0
2909700	Nizhnaya Tunguska	Podvoloshino	58.28 N	108.41 E	8270	1 .1978	12.1987	D	0
2909700	Nizhnaya Tunguska	Podvoloshino	58.28 N	108.41 E	8270	1.1978	12.1987	M	0
2909750	Dzhida	Dzhida	60.33 N	103.83 E		1 .1980	12.1991	D	0
2909750	Dzhida	Dzhida	60.33 N	103.83 E		1.1980	12.1991	M	0
2909900	Chemaya	Chemoye li			301	1 .1978	12.1987	D	0
2909900	Chemaya	Chemoye li			301	1.1978	12.1987	M	0
2909950	Mikhanskij	Velmo 2			32.3	1 .1978	12.1987	D	0
2909950	Mikhanskij	Velmo 2			32.3	1.1978	12.1987	M	0
2910100	Bolshoi Yugan	Ugut	60.32 N	74.12 E	22100	1.1965	12.1984	M	0

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GLOBAL RUNOFF DATA CENTRE (GRDC)

STATIONS FROM RUSSIAN FEDERATION

table: 4

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly data	Miss. Val. in %
2910200	Tym	Napas	59.90 N	81.92 E	24500	1.1965	12.1984	M	0
2910300	Tom	Tomsk	56.58 N	84.87 E	57000	1.1980	12.1990	D	0
2910300	Tom	Tomsk	56.58 N	84.87 E	57000	1.1965	12.1990	M	0
2910450	Peschanaya	Tochilnoe	52.18 N	85.18 E	4720	1.1978	12.1987	D	0
2910450	Peschanaya	Tochilnoe	52.18 N	85.18 E	4720	1.1978	12.1987	M	0
2910460	Mayma	Mayma	52.00 N	85.85 E	780	1.1978	12.1987	D	0
2910460	Mayma	Mayma	52.00 N	85.85 E	780	1.1978	12.1987	M	0
2910470	Biya	Biysk	52.52 N	85.27 E	36900	1.1895	12.1985	M	0
2910480	Akkem	Akkem	50.33 N	86.91 E	78.9	1.1978	12.1987	D	66
2910480	Akkem	Akkem	50.33 N	86.91 E	78.9	1.1978	12.1987	M	66
2910490	Tom	Novokuznetsk	53.75 N	87.10 E	29800	1.1894	12.1985	M	0
2910500	Usa	Mezhdourechensk	53.64 N	88.10 E	3320	1.1978	12.1987	D	0
2910500	Usa	Mezhdourechensk	53.64 N	88.10 E	3320	1.1978	12.1987	M	0
2911100	Irtish	Omsk	55.20 N	73.21 E	321000	1.1980	12.1990	D	<1
2911100	Irtish	Omsk	55.20 N	73.21 E	321000	1.1980	12.1990	M	0
2911920	Bergamak	Pjazany			371	1.1978	12.1987	D	0
2911920	Bergamak	Pjazany			371	1.1978	12.1987	M	0
2911940	Aremzyanka	Chukmanka			478	1.1978	10.1987	D	1
2911940	Aremzyanka	Chukmanka			478	1.1978	10.1987	M	0
2912200	Uy	Stepnoe	54.13 N	60.48 E	3600	1.1978	12.1987	D	10
2912200	Uy	Stepnoe	54.13 N	60.48 E	3600	1.1978	12.1987	M	10
2912400	Tura	Tiumen	57.15 N	65.53 E	58500	1.1896	12.1985	M	0
2912500	Lobva	Lobva	59.05 N	60.26 E	2940	1.1978	12.1987	D	0
2912500	Lobva	Lobva	59.05 N	60.26 E	2940	1.1969	12.1987	M	0
2912550	Northern Sosva	Sosva	63.67 N	61.88 E	65200	1.1965	12.1984	M	5
2912600	Ob	Salekhard	66.57 N	66.53 E	2949998	1.1978	12.1994	D	0
2912600	Ob	Salekhard	66.57 N	66.53 E	2949998	1.1930	12.1994	M	0
2912900	Reshetka	Novoalekseevskoe			32	1.1978	12.1987	D	0
2912900	Reshetka	Novoalekseevskoe			32	1.1978	12.1987	M	0
2912950	Yalynka	Kaltiukova			62.6	1.1978	12.1987	D	0
2912950	Yalynka	Kaltiukova			62.6	1.1978	12.1987	M	0
2917110	Amu-Darya	Kerki	37.83 N	65.25 E	309000	1.1932	12.1989	M	30
2919600	Bolshoy Ik	Mrakovo	52.78 N	56.71 E	1870	1.1978	12.1987	D	0
2919600	Bolshoy Ik	Mrakovo	52.78 N	56.71 E	1870	1.1978	12.1987	M	0

Status: August 1997

GLOBAL RUNOFF DATA CENTRE (GRDC)

STATIONS FROM RUSSIAN FEDERATION

table: 5

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly data	Miss. Val. in %
2997500	Kargat	Gavrilovsky	55.16 N	80.00 E	3910	1 .1978	12.1987	D	0
2997500	Kargat	Gavrilovsky	55.16 N	80.00 E	3910	1.1969	12.1987	M	3
2998100	Yana	Dzanghky	69.67 N	135.33 E	216000	1.1938	12.1984	M	1
2998110	Yana	Ubileynaya	70.75 N	136.08 E	224000	1 .1978	12.1994	D	<1
2998110	Yana	Ubileynaya	70.75 N	136.08 E	224000	1.1978	12.1994	M	0
2998150	Omoloy	Namu	69.38 N	134.62 E	108000	1 .1979	12.1993	D	1
2998150	Omoloy	Namu	69.38 N	134.62 E	108000	1.1979	12.1993	M	0
2998200	Sugoy	3.2km Downstream of Omchikch	62.60 N	156.00 E	5880	1.1965	12.1984	M	0
2998400	Indigirka	Vorontsovo	69.58 N	147.35 E	305000	1 .1978	12.1994	D	2
2998400	Indigirka	Vorontsovo	69.58 N	147.35 E	305000	1.1937	12.1994	M	0
2998450	Alazeja	Andrushkino	69.17 N	154.50 E	29000	1 .1978	12.1993	D	<1
2998450	Alazeja	Andrushkino	69.17 N	154.50 E	29000	1.1978	12.1993	M	0
2998500	Kolyma	Sredne-Kolymsk	67.37 N	153.67 E	361000	1 .1978	12.1988	D	5
2998500	Kolyma	Sredne-Kolymsk	67.37 N	153.67 E	361000	1.1927	12.1988	M	12
2998501	Kolyma	Emtegei	62.83 N	146.50 E	9560	1 .1980	12.1990	D	<1
2998501	Kolyma	Emtegei	62.83 N	146.50 E	9560	1.1980	12.1990	M	0
2998510	Kolyma	Kolymskaya	68.73 N	158.72 E	526000	1 .1978	12.1994	D	0
2998510	Kolyma	Kolymskaya	68.73 N	158.72 E	526000	1.1978	12.1994	M	0
2998600	Nera	Ala-Chubuk	64.68 N	144.07 E	22300	1.1965	12.1984	M	8
2998800	Paljavaam	Paljavaam	68.53 N	174.15 E	6810	1 .1978	12.1995	D	0
2998800	Paljavaam	Paljavaam	68.53 N	174.15 E	6810	1.1978	12.1995	M	0
2998900	Amguema	mouth of Shoumny Brook	67.67 N	181.10 E	26700	1.1944	12.1984	M	25
2999200	Nadym	Nadym	65.62 N	72.67 E	48000	1 .1978	12.1987	D	0
2999200	Nadym	Nadym	65.62 N	72.67 E	48000	1.1978	12.1987	M	0
2999250	Taz	Sidorovsk	66.60 N	82.28 E	100000	1 .1978	12.1994	D	31
2999250	Taz	Sidorovsk	66.60 N	82.28 E	100000	1.1978	12.1994	M	30
2999500	Pur	Samburg	67.08 N	78.15 E	95100	1 .1978	12.1990	D	28
2999500	Pur	Samburg	67.08 N	78.15 E	95100	1.1965	12.1990	M	14
2999800	Amga	Buyaga	59.55 N	126.95 E	23900	1.1965	12.1984	M	0
2999850	Khatanga	Khatanga	71.98 N	102.45 E	275000	6 .1982	12.1991	D	66
2999850	Khatanga	Khatanga	71.98 N	102.45 E	275000	6.1982	9.1991	M	65
2999900	Olenek	8km Upstream of mouth Of Pur R	71.67 N	123.98 E	181000	1.1952	12.1963	M	2
2999910	Olenek	7.5km Downstream of mouth Of	72.12 N	123.22 E	198000	1.1965	12.1984	M	0
2999920	Olenek	Sukhana	68.62 N	118.33 E	127000	1 .1978	12.1994	D	0
2999920	Olenek	Sukhana	68.62 N	118.33 E	127000	1.1989	12.1994	M	0

Status: August 1997

GLOBAL RUNOFF DATA CENTRE (GRDC)

STATIONS FROM RUSSIAN FEDERATION

table: 6

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly data	Miss. Val. in %
6969100	Maly Uzen	Aleksashkino	50.92 N	47.82 E	1910	1.1965	12.1970	M	0
6970100	Onega	Porog	63.80 N	38.27 E	55770	1 .1978	10.1993	D	3
6970100	Onega	Porog	63.80 N	38.27 E	55770	1.1965	10.1993	M	13
6970120	Kodina	Kodina	63.72 N	39.62 E	1800	1 .1989	12.1993	D	5
6970120	Kodina	Kodina	63.72 N	39.62 E	1800	1.1989	12.1993	M	5
6970150	Vonguda	Vonguda	63.80 N	38.50 E	374	5 .1981	12.1993	D	<1
6970150	Vonguda	Vonguda	63.80 N	38.50 E	374	1.1989	12.1993	M	0
6970200	Solza	Soukhie Porogui	64.31 N	39.48 E	1190	1 .1978	12.1987	D	9
6970200	Solza	Soukhie Porogui	64.31 N	39.48 E	1190	1.1978	12.1987	M	4
6970250	Northern Dvina(Severnaya Dvina	Ust-Pinega	64.10 N	42.17 E	348000	1 .1883	12.1993	D	
6970250	Northern Dvina(Severnaya Dvina	Ust-Pinega	64.10 N	42.17 E	348000	6.1881	12.1993	M	2
6970270	Vaga	Filaievskaya	61.23 N	42.25 E	13200	1.1965	12.1984	M	0
6970300	Mud'yuga	Patrakeyevskaya	64.96 N	40.50 E	305	1 .1978	12.1987	D	0
6970300	Mud'yuga	Patrakeyevskaya	64.96 N	40.50 E	305	1.1978	12.1987	M	0
6970400	Pinega	Kulogory	64.71 N	43.66 E	36700	1 .1978	12.1987	D	0
6970400	Pinega	Kulogory	64.71 N	43.66 E	36700	1.1978	12.1987	M	0
6970500	Mezen	Malonisogorskaya	64.95 N	45.67 E	56400	1 .1978	12.1993	D	0
6970500	Mezen	Malonisogorskaya	64.95 N	45.67 E	56400	1.1965	12.1993	M	13
6970550	Kuloy	Kuloy	64.97 N	43.52 E	3040	1 .1978	11.1991	D	6
6970550	Kuloy	Kuloy	64.97 N	43.52 E	3040	1.1989	11.1991	M	0
6970560	Peza	Igumnovo	65.82 N	45.10 E	12000	1 .1978	10.1993	D	<1
6970560	Peza	Igumnovo	65.82 N	45.10 E	12000	1.1989	10.1993	M	0
6970600	Pizhma	Borovaya	65.33 N	51.81 E	4890	1 .1978	12.1987	D	0
6970600	Pizhma	Borovaya	65.33 N	51.81 E	4890	1.1978	12.1987	M	0
6970630	Pesha	Volokovaya	66.50 N	48.25 E	2780	1 .1978	12.1993	D	<1
6970630	Pesha	Volokovaya	66.50 N	48.25 E	2780	1.1989	12.1993	M	0
6970650	Pechora	Ust-Tsilma	65.47 N	52.25 E	248000	5 .1980	12.1990	D	4
6970650	Pechora	Ust-Tsilma	65.47 N	52.25 E	248000	1.1932	12.1984	M	0
6970680	Vytchegda	Malaya Kushba	61.67 N	53.73 E	26500	1.1965	12.1984	M	0
6970700	Pechora	Yaksha	61.86 N	56.66 E	9620	1 .1978	12.1987	D	0
6970700	Pechora	Yaksha	61.86 N	56.66 E	9620	1.1978	12.1987	M	0
6970710	Pechora	Oksino	67.63 N	52.18 E	312000	5 .1980	12.1993	D	<1
6970710	Pechora	Oksino	67.63 N	52.18 E	312000	1.1989	12.1993	M	0
6970850	Usa	Adzva	66.65 N	59.10 E	54700	1.1965	12.1984	M	0

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GLOBAL RUNOFF DATA CENTRE (GRDC)

STATIONS FROM RUSSIAN FEDERATION

table: 7

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly data	Miss. Val. in %
6970900	Iyema	Izvail			1150	1 .1978	12.1979	D	0
6970900	Iyema	Izvail			1150	1.1978	12.1979	M	0
6970910	Egul	Chukhlom			123	1 .1978	12.1987	D	0
6970910	Egul	Chukhlom			123	1.1978	12.1987	M	0
6970920	Ema	Novoe			179	1 .1978	12.1987	D	0
6970920	Ema	Novoe			179	1.1978	12.1987	M	0
6971050	Jena	Jena	67.58 N	30.84 E	1600	1 .1979	12.1987	D	0
6971050	Jena	Jena	67.58 N	30.84 E	1600	1.1979	12.1987	M	0
6971080	Ura	Ura-Guba	69.41 N	32.78 E	1020	1 .1979	12.1988	D	<1
6971080	Ura	Ura-Guba	69.41 N	32.78 E	1020	1.1979	12.1988	M	0
6971100	Kola	Oktiabrsky Railway,km 1429	68.88 N	33.05 E	3780	1 .1979	12.1988	D	<1
6971100	Kola	Oktiabrsky Railway,km 1429	68.88 N	33.05 E	3780	1.1965	12.1984	M	0
6971150	Umba	Paialka	66.64 N	34.08 E	6250	1 .1979	12.1988	D	0
6971150	Umba	Paialka	66.64 N	34.08 E	6250	1.1979	12.1988	M	0
6971200	Pechenga	Pechenga	69.53 N	31.17 E	1680	1 .1979	12.1988	D	4
6971200	Pechenga	Pechenga	69.53 N	31.17 E	1680	1.1979	12.1988	M	3
6971250	Nama-Joki	Luostari	69.58 N	31.70 E	142	10.1980	12.1988	D	4
6971250	Nama-Joki	Luostari	69.58 N	31.70 E	142	10.1980	12.1988	M	10
6971300	Titovka	km 15.5	69.55 N	31.65 E	942	1 .1979	12.1988	D	2
6971300	Titovka	km 15.5	69.55 N	31.65 E	942	1.1979	12.1988	M	0
6971350	Rosta	near The mouth	69.02 N	33.08 E	51.7	1 .1979	12.1987	D	4
6971350	Rosta	near The mouth	69.02 N	33.08 E	51.7	1.1979	12.1987	M	0
6971400	Sosnovka	Sosnovka	66.48 N	40.55 E	584	1 .1979	12.1988	D	<1
6971400	Sosnovka	Sosnovka	66.48 N	40.55 E	584	1.1979	12.1988	M	0
6971500	Chapoma	Chapoma	66.08 N	38.83 E	1090	1 .1979	12.1988	D	0
6971500	Chapoma	Chapoma	66.08 N	38.83 E	1090	1.1979	12.1988	M	0
6971550	Chavanga	Chavanga	66.12 N	37.78 E	1180	1 .1979	12.1988	D	4
6971550	Chavanga	Chavanga	66.12 N	37.78 E	1180	1.1979	12.1988	M	0
6971600	Varzuga	Varzuga	66.40 N	36.63 E	7940	1 .1979	12.1988	D	0
6971600	Varzuga	Varzuga	66.40 N	36.63 E	7940	1.1979	12.1988	M	0
6971650	Kuzreka	Kuzreka	66.62 N	34.80 E	250	1 .1979	12.1988	D	2
6971650	Kuzreka	Kuzreka	66.62 N	34.80 E	250	1.1979	12.1988	M	0
6971700	Olenica	Olenica	66.48 N	35.36 E	374	1 .1979	12.1988	D	2
6971700	Olenica	Olenica	66.48 N	35.36 E	374	1.1979	12.1988	M	0
6971710	Kolviza	Kolviza	67.08 N	33.07 E	1260	1 .1979	12.1988	D	2
6971710	Kolviza	Kolviza	67.08 N	33.07 E	1260	1.1979	12.1988	M	2

GLOBAL RUNOFF DATA CENTRE (GRDC)

STATIONS FROM RUSSIAN FEDERATION

table: 8

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly data	Miss. Val. in %
6971750	Nenoksa	Nenoksa	64.60 N	39.17 E	374	2 .1980	12.1992	D	1
6971750	Nenoksa	Nenoksa	64.60 N	39.17 E	374	1.1989	12.1992	M	4
6972100	Nuhcha	Nuhcha	63.92 N	36.22 E	1350	1 .1978	12.1988	D	0
6972100	Nuhcha	Nuhcha	63.92 N	36.22 E	1350	1.1978	12.1988	M	0
6972150	Maloshuika	Maloshuika	63.75 N	37.40 E	481	1 .1978	12.1988	D	0
6972150	Maloshuika	Maloshuika	63.75 N	37.40 E	481	1.1978	12.1988	M	0
6972250	Pliussa	Brod	56.58 N	28.58 E	5090	1 .1978	12.1987	D	0
6972250	Pliussa	Brod	56.58 N	28.58 E	5090	1.1978	12.1987	M	0
6972300	Sorot	Osinkino	57.06 N	29.35 E	3170	1 .1978	12.1987	D	0
6972300	Sorot	Osinkino	57.06 N	29.35 E	3170	1.1978	12.1987	M	0
6972400	Luga	Tolmatchevo	58.78 N	30.00 E	5990	1 .1978	12.1987	D	0
6972400	Luga	Tolmatchevo	58.78 N	30.00 E	5990	1.1978	12.1987	M	0
6972430	Neva	Novosaratovka	59.80 N	30.72 E	281000	1 .1980	12.1988	D	0
6972430	Neva	Novosaratovka	59.80 N	30.72 E	281000	1.1859	12.1984	M	1
6972450	Perekhoda	Podsosonie	57.80 N	30.86 E	138	1 .1978	12.1987	D	1
6972450	Perekhoda	Podsosonie	57.80 N	30.86 E	138	1.1978	12.1987	M	0
6972500	Dymka	Domachevo	59.57 N	33.84 E	112	1 .1978	12.1980	D	0
6972500	Dymka	Domachevo	59.57 N	33.84 E	112	1.1978	12.1980	M	0
6972600	Olonka	Olonets	60.93 N	33.06 E	2120	1 .1978	12.1987	D	0
6972600	Olonka	Olonets	60.93 N	33.06 E	2120	1.1965	12.1984	M	0
6972700	Kumsa	Medvezh'yegorsk	62.89 N	34.38 E	735	1 .1978	12.1987	D	0
6972700	Kumsa	Medvezh'yegorsk	62.89 N	34.38 E	735	1.1978	12.1987	M	0
6972750	Suma	Sumskiy Posad	64.15 N	35.43 E	1990	1 .1978	12.1988	D	0
6972750	Suma	Sumskiy Posad	64.15 N	35.43 E	1990	1.1978	12.1988	M	0
6972800	Kem	Yushkozero	64.70 N	32.00 E	19800	1.1965	12.1984	M	0
6972810	Kem	Putkinskaya Ges	64.95 N	34.62 E	27700	1 .1978	12.1988	D	0
6972810	Kem	Putkinskaya Ges	64.95 N	34.62 E	27700	1.1978	12.1988	M	0
6972815	Pueta	Kem	64.95 N	34.62 E	48	1 .1978	12.1988	D	0
6972815	Pueta	Kem	64.95 N	34.62 E	48	1.1978	12.1988	M	0
6972820	Shuya	Shueretskaya	64.75 N	34.70 E	934	1 .1978	12.1988	D	0
6972820	Shuya	Shueretskaya	64.75 N	34.70 E	934	1.1978	12.1988	M	0
6972900	Pongoma	Pongoma	65.33 N	34.38 E	1220	1 .1978	12.1988	D	0
6972900	Pongoma	Pongoma	65.33 N	34.38 E	1220	1.1978	12.1988	M	0
6973700	Obsha	Beliy	55.83 N	33.03 E	1590	1 .1978	12.1987	D	0
6973700	Obsha	Beliy	55.83 N	33.03 E	1590	1.1978	12.1987	M	0

Status: August 1997

GLOBAL RUNOFF DATA CENTRE (GRDC)

STATIONS FROM RUSSIAN FEDERATION

table: 9

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly data	Miss. Val. in %
6975050	Volga	Eltsy	56.71 N	33.98 E	9130	1 .1978	12.1987	D	0
6975050	Volga	Eltsy	56.71 N	33.98 E	9130	1.1978	12.1987	M	0
6975080	Volga	Staritsa	56.50 N	34.93 E	21100	1.1891	12.1985	M	0
6975100	Oka	Kostomarovo	53.08 N	36.03 E	4900	1 .1978	12.1987	D	0
6975100	Oka	Kostomarovo	53.08 N	36.03 E	4900	1.1965	12.1984	M	0
6975120	Moskva	Barsuki	54.25 N	37.53 E	755	1 .1978	12.1987	D	0
6975120	Moskva	Barsuki	54.25 N	37.53 E	755	1.1978	12.1987	M	0
6975140	Oka	Kaluga	54.52 N	36.27 E	54900	2.1881	12.1985	M	0
6975150	Protva	Spas-Zagorie	55.03 N	36.64 E	3640	1 .1978	12.1987	D	0
6975150	Protva	Spas-Zagorie	55.03 N	36.64 E	3640	1.1965	12.1984	M	0
6975300	Solonitsa	Bortnikovo	57.29 N	40.83 E	739	1 .1978	12.1983	D	<1
6975300	Solonitsa	Bortnikovo	57.29 N	40.83 E	739	1.1978	12.1983	M	0
6975400	Shosha	Klopovo-Gorodishche	57.46 N	41.23 E	339	1 .1978	12.1980	D	0
6975400	Shosha	Klopovo-Gorodishche	57.46 N	41.23 E	339	1.1978	12.1980	M	0
6975500	Unzha	Makariev	57.90 N	43.67 E	18500	1.1965	12.1984	M	0
6975700	Sviaga	Vyrypaevka	54.13 N	48.31 E	3600	1 .1978	12.1987	D	0
6975700	Sviaga	Vyrypaevka	54.13 N	48.31 E	3600	1.1978	12.1987	M	0
6976200	Viatka	Kirov	58.65 N	49.55 E	48300	1.1965	12.1984	M	0
6976300	Dymka	Tatarskaya Dymskaya	54.50 N	53.20 E	520	1 .1978	12.1987	D	0
6976300	Dymka	Tatarskaya Dymskaya	54.50 N	53.20 E	520	1.1978	12.1987	M	0
6976400	Belaya	Birsk	55.35 N	55.55 E	121000	1.1965	12.1984	M	0
6976450	Belaya	Ufa	54.73 N	55.93 E	100000	1 .1980	12.1990	D	0
6976450	Belaya	Ufa	54.73 N	55.93 E	100000	1.1878	12.1990	M	0
6976500	Velva	Oshib	59.33 N	55.16 E	836	1 .1978	12.1987	D	0
6976500	Velva	Oshib	59.33 N	55.16 E	836	1.1978	12.1987	M	0
6976700	Chusovaya	Staroutkinsk	57.21 N	59.46 E	5450	1 .1978	12.1987	D	0
6976700	Chusovaya	Staroutkinsk	57.21 N	59.46 E	5450	1.1978	12.1987	M	0
6976800	Kolva	Petretsova	61.23 N	57.10 E	2830	1 .1978	12.1987	D	10
6976800	Kolva	Petretsova	61.23 N	57.10 E	2830	1.1978	12.1987	M	10
6976900	Seleuk	Nizhneitkulovo			141	1 .1978	12.1987	D	0
6976900	Seleuk	Nizhneitkulovo			141	1.1978	12.1987	M	0
6977100	Volga	Volgograd Power Plant	48.77 N	44.72 E	1360000	1 .1980	12.1990	D	0
6977100	Volga	Volgograd Power Plant	48.77 N	44.72 E	1360000	1.1879	12.1984	M	17
6977200	Krymza	Syzran	53.16 N	48.48 E	352	1 .1978	12.1987	D	0
6977200	Krymza	Syzran	53.16 N	48.48 E	352	1.1978	12.1987	M	0

GLOBAL RUNOFF DATA CENTRE (GRDC)

STATIONS FROM RUSSIAN FEDERATION

table: 10

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly data	Miss. Val. in %
6978250	Don	Razdorskaya	47.50 N	40.67 E	378000	1 .1980	12.1990	D	0
6978250	Don	Razdorskaya	47.50 N	40.67 E	378000	1.1891	12.1984	M	1
6978300	Likhaya	Bogurayev	48.14 N	40.63 E	722	1 .1978	12.1987	D	10
6978300	Likhaya	Bogurayev	48.14 N	40.63 E	722	1.1978	12.1987	M	10
6978500	Medveditsa	Archedinskaia	49.82 N	43.17 E	33700	1.1965	12.1984	M	0
6978600	Vorona	Chutanovka	52.61 N	42.71 E	5560	1 .1978	12.1987	D	10
6978600	Vorona	Chutanovka	52.61 N	42.71 E	5560	1.1965	12.1984	M	0
6978650	Peskovatka	Shumilinskaya	49.96 N	41.46 E	572	1 .1978	12.1987	D	10
6979700	Sozh	Uskosy	54.29 N	32.20 E	2600	1 .1978	12.1987	D	0
6979700	Sozh	Uskosy	54.29 N	32.20 E	2600	1.1978	12.1987	M	0
6979800	Prut	Shirkovo	51.41 N	35.50 E	530	1 .1978	12.1987	D	0
6979800	Prut	Shirkovo	51.41 N	35.50 E	530	1.1978	12.1987	M	0
6979850	Rat'	Besedina	51.71 N	36.46 E	630	1 .1978	12.1987	D	0
6979850	Rat'	Besedina	51.71 N	36.46 E	630	1.1978	12.1987	M	0
6983350	Kuban	Tikhovsky	45.15 N	38.32 E	48100	1.1965	12.1984	M	0
6983355	Kuban	Krasnodsr	45.00 N	38.92 E	45900	1 .1980	12.1990	D	<1
6983355	Kuban	Krasnodsr	45.00 N	38.92 E	45900	1.1980	12.1990	M	0
6983400	Adagum	Krymsk	44.93 N	38.00 E	328	1 .1978	12.1987	D	<1
6983400	Adagum	Krymsk	44.93 N	38.00 E	328	1.1978	12.1987	M	0
6983500	Ubinka	Severokaya	44.84 N	38.68 E	201	1 .1978	12.1987	D	0
6983500	Ubinka	Severokaya	44.84 N	38.68 E	201	1.1978	12.1987	M	0
6983600	Psekoups	Goriachy Klutch	44.56 N	39.14 E	765	1 .1978	12.1987	D	0
6983600	Psekoups	Goriachy Klutch	44.56 N	39.14 E	765	1.1978	12.1987	M	0
6983700	Kurdzhips	Krasno-Oktiabrsky	44.41 N	40.00 E	765	1 .1978	12.1987	D	10
6983700	Kurdzhips	Krasno-Oktiabrsky	44.41 N	40.00 E	765	1.1978	12.1987	M	10
6983750	Teberda	Teberda	43.46 N	41.76 E	504	1 .1978	12.1987	D	0
6983750	Teberda	Teberda	43.46 N	41.76 E	504	1.1978	12.1987	M	0
6983800	Kuban	Kosta Khetagurov	43.73 N	41.83 E	3800	1 .1978	12.1987	D	0
6983800	Kuban	Kosta Khetagurov	43.73 N	41.83 E	3800	1.1978	12.1987	M	0
6984100	Kalaus	Svetlograd	45.23 N	42.78 E	4540	1 .1978	12.1987	D	10
6984100	Kalaus	Svetlograd	45.23 N	42.78 E	4540	1.1965	12.1984	M	0
6984300	Kuma	Aleksandriyskaya	44.18 N	43.31 E	3630	1 .1978	12.1987	D	10
6984300	Kuma	Aleksandriyskaya	44.18 N	43.31 E	3630	1.1978	12.1987	M	10
6984500	Terek	Ordzhonikidze	43.06 N	44.59 E	1490	1 .1978	12.1987	D	10
6984500	Terek	Ordzhonikidze	43.06 N	44.59 E	1490	1.1965	12.1984	M	0

Status: August 1997

GLOBAL RUNOFF DATA CENTRE (GRDC)

STATIONS FROM RUSSIAN FEDERATION

table: 11

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly data	Miss. Val. in %
6984700	Kazikumukhskoe Koisu	Guerguebil	42.46 N	47.01 E	1850	1 .1978	12.1987	D	10
6984700	Kazikumukhskoe Koisu	Guerguebil	42.46 N	47.01 E	1850	1.1978	12.1987	M	10
6984800	Kara-Samur	Luchek	41.73 N	47.14 E	481	1 .1978	12.1987	D	10
6984800	Kara-Samur	Luchek	41.73 N	47.14 E	481	1.1965	12.1984	M	0
6985050	Psezuapse	Tat'yanovka	43.93 N	39.41 E	255	1 .1978	12.1987	D	0
6985050	Psezuapse	Tat'yanovka	43.93 N	39.41 E	255	1.1978	12.1987	M	0
6985100	Shakhe	Solokh-Aul	43.73 N	39.78 E	423	1 .1978	12.1987	D	0
6985100	Shakhe	Solokh-Aul	43.73 N	39.78 E	423	1.1978	12.1987	M	0
6985150	Sochi	Plastunka	43.71 N	39.80 E	238	1 .1978	12.1987	D	0
6985150	Sochi	Plastunka	43.71 N	39.80 E	238	1.1978	12.1987	M	0

Appendix 2

INVENTORY OF DATA HELD ON THE EUROPEAN WATER ARCHIVE FOR BELARUS, RUSSIA AND THE UKRAINE

GAUGING STATION INVENTORY - OCTOBER 1997

Source : FRIEND unless stated otherwise

FID	Country	River	Site	UTM Loc	LAT	LNG	Area	Alt	AAR	% Urb	% Frs	% Lak	GDF from	GDF to	ANNMAX from	ANNMAX to	GMF from	GMF to	Source
2594002	BELARUS	NAREV	NEMERZHA										1972	1994					
2596001		PULVA	VYSOKOYE										1959	1994					
2603001		OLSHANKA	BOGDANOVO										1963	1994					
2703001		OVSJANKA	VERECHJE										1973	1994					
2703004		ESA	GADIVLJA										1952	1994					
3802005		RESTA	SUHARI										1953	1994					
3805008		SHAT	SHATSK										1963	1994					
3805010		DOBYSNA	MALEVICHSKAJA RUDNJA										1978	1994					
3807014		NESLUNA	RUDSK										1970	1994					

9 rows selected.

GAUGING STATION INVENTORY - OCTOBER 1997

Source : FRIEND unless stated otherwise

FID	Country	River	Site	UTM Loc	LAT	LNG	Area	Alt	AAR	% Urb	% Frs	% Lak	GDF from	GDF to	ANNMAX from	ANNMAX to	GMF from	GMF to	Source
2607001	RUSSIA	PISSA	ZELENY BOR	x	21.97	54.65	1360				21	2							
2607002		MAMONOVKA	MAMONOVO	x	19.93	54.47	300				12								
2607003		INSTRUCH	ULJANOVO	x	22.10	54.83	587				7	1					1901	1991	
2701001		ZAP.DVINA	ZAP.DVINA	x	32.08	56.23	2180	228			69	2	1955	1988					
2702001		VELESA	RUDNIA	x	32.10	56.05	870	208			69	1	1961	1988					
2702002		TOROPA	STARAIA TOROPA	x	31.70	56.28	1480	207			60	3							
2702003		OBSHA	BELIY	x	32.55	55.85	1590	230			59								
2901001		SELEZNEVKA	LUZHAIKA	x	28.50	60.80	486	61			84	4	1947	1988					
2901002		PEROVKA	GONCHAROVO	x	28.93	60.70	257	43			79	2	1948	1988					
2901003		OKHTA	NOVOIE DEVIATKINO	x	30.47	60.05	340	68	747		63	2	1932	1988					
2902001		SESTRA	BELOOSTROV	x	30.02	60.15	390	84			78	1	1941	1988					
2902002		OHTA	NOVOJE DEVJATKIN														1932	1991	
2903001		ASILAN-JOKI	ZASTAVA	x	29.83	61.18	1370												
2903002		VIDLITSA BOLSHI	GORY	x	32.47	61.30	977	95			80	11	1949	1988					
2903003		MEGREGA	KUJTEZHA	x	33.22	60.98	381	98			90	2							
2904001		SVIATREKA	PRIAZHA	x	33.63	61.67	355	181	705		86	8							
2904002		UNITSA	UNITSA	x	34.43	62.62	340	123			82	3	1950	1988					
2905001		PJALMA	PJALMA														1953	1991	
2905002		PIALMA	PIALMA	x	35.87	62.40	908	137	630		88	2	1946	1988					
2905003		MEGRA	PAVLOVSKAYA	x	35.97	60.70	660	209			89	4	1957	1988					
2906001		OJAT	MININSKAYA	x	34.85	60.47	693	217			80	2							
2907001		PASHA	PORETCHJE	x	34.10	59.92	1110	169			75	1							
2907002		TIKHVINKA	GORELUKHA	x	33.30	59.68	2070	108			66	1	1936	1988					
2907003		UVER	MEGLETSY	x	34.57	58.43	1750	171			57	2							
2907004		VEREBUSHKA	OKSOCHI	x	32.78	58.68	96	165			64	1							
2908001		MGA	GORY	x	30.98	59.77	709	48			69	1	1946	1988					
2908002		KEREST	SIABRENITSY	x	31.63	59.13	833	45			77	1							
2908003		SUDOMA	POROZHSK - 2	x	29.92	57.48	457	144			32	2							
2909001		OREDEZH	VYRITSA	x	30.37	59.42	920	96			64	1							
2909002		LUGA	VORONINO				864	58			53	1					1925	1985	
2910001		SISTA	EDNEE RAIKOVO	x	28.80	59.73	573	92			77	1							
2910002		LEMOVZHA	HOTNEZHA	x	29.30	59.13	948	98			81	1	1946	1987					
2911001		SHLINA	GODYSHY	x	33.87	57.65	1620	222			64	9					1929	1985	
2912001		LOKNJA	BORODINO														1946	1991	

GAUGING STATION INVENTORY - OCTOBER 1997

Source : FRIEND unless stated otherwise

FID	Country	River	Site	UTM Loc	LAT	LNG	Area	Alt	% AAR	% Urb	% Frs	% Lak	GDF from	GDF to	ANNMAX from	ANNMAX to	GMF from	GMF to	Source
2912002	RUSSIA	POLOMET	JAZHELBITSY	x	32.98	58.02	631	200			79	3							
2912003		LOVAT	UZKOJE	x	30.55	55.77	398	169			28	3							
2912004		LOKNIA	BORODINO	x	30.20	56.83	398	162			23	2	1946	1988					
2912005		KUNIA	UVAROVO	x	30.93	56.78	2480	149			63	1							
2912006		PEREKHODA	PODSOSONIE	x	30.83	57.90	138	85			30								
2913001		DOLGAIA	ZAGORIE	x	28.73	59.17	777	64			56	5							
2913002		RUJA	MAL.ROZHKY														1951	1991	
2913003		RUJA	MALYIE ROZHKI	x	28.20	58.98	219	72			73	1	1951	1988					
2913004		VELIKAIA	OPOCHKA	x	28.72	56.72	3500	167			56	6							
2913005		LSTA	GLAZATOVO	x	29.72	56.87	122	215			49	2							
2913006		UTROYA	BOLSHAYA GUBA	x	28.20	57.33	2970	110			23	2							
2913007		KUDEB	SVERIKOVO	x	28.03	57.52	739	131			38	1							
3001001		KODINA	KODINO	x	39.62	63.72	1800	81			77	1	1956	1988					
3001002		SOLZA	SUKHIE POROGI	x	39.40	64.38	1190	142			69	3	1936	1988					
3002001		VOZHEGA	NAZAROVSKAYA	x	39.55	60.53	1590	177			86	1	1956	1988					
3002002		LEKSHMA	LIADINY	x	38.28	61.57	321	168			64	18	1960	1988					
3101001		LOTTA	KALLOKOSKI	x	28.93	68.58	2540	240				2							
3101002		KOVDORA	KOVDOR	x	30.52	67.55	110	320			90	1	1979	1987					
3102001		TITOVKA	15TH KM	x	31.80	69.48	942	220			15	7	1956	1987					
3102002		URA	URA-GUBA	x	32.80	69.28	1020	180			40	10							
3102003		PECHA	PADUN	x	31.72	68.57	1600	230			60	3							
3102004		KOLA	1429TH KM	x	33.08	68.83	3780	200			55	6							
3103001		NIVKA	MOUTH	x	35.13	68.10	204	220			35	1							
3103002		IOKANGA	KOLMJARV	x	36.93	67.98	392	260				14							
3104001		UGONKA	KANEVKA	x	39.67	67.13	504	230			15	1							
3105001		SOSNOVKA	SOSNOVKA	x	40.55	66.53	584	200			5	3							
3106001		KUZREKA	KUZREKA	x	34.80	66.62	250	100			70	8							
3106002		UMBA	ISSUE	x	34.33	67.55	2380	330			45	18							
3106003		KOLVITSA	KOLVITSA	x	33.07	67.08	1260	160			70	13							
3107002		MALAIA - BELAIA	KHIBINY	x	33.25	67.68	80	650			10	1							
3108001		JENA	JENA	x	31.17	67.60	1620	310			90	1							
3108003		KOVDORA	KOVDOR																
3109001		TUMCHA	ALAKURTTI	x	30.37	66.95	2100	320			90	1							
3110001		PONGOMA	PONGOMA	x	34.38	65.33	1220	91			54	11							

GAUGING STATION INVENTORY - OCTOBER 1997

Source : FRIEND unless stated otherwise

FID	Country	River	Site	UTM Loc	LAT	LNG	Area	Alt	% AAR	% Urb	% Frs	% Lak	GDF from	GDF to	ANNMAX from	ANNMAX to	GMF from	GMF to	Source
3110002	RUSSIA	UMTA	KALEVALA	x	31.15	65.22	361	183			78	6							
3110003		TCHIRKO-KEM	ANDRONOVA GORA	x	32.38	64.15	2730	192			79	6							
3110004		SUMA	SUMSKY POSAD	x	35.43	64.25	1990	120			65	14							
3111001		SHUIA	SHUERETSKOE	x	34.70	64.75	934	90			72	8							
3111002		MJAGREKA	MJAGREKA				300	50			42	1					1957	1989	
3111003		MALOSHUIKA	MALOSHUIKA	x	37.40	63.75	481	143			80	1							
3201001		KUBENA	TROITSE-JENALSKOJE	x	40.42	60.55	1110	188			90	1	1936	1988					
3201002		JEMA	NOVOJE	x	39.67	59.12	179	183			66		1946	1988					
3201004		UFTYUGA	KOLENO	x	44.13	60.38	2360	150			84		1954	1988					
3202001		VOTCH	VERKHNIAYA VOTCH	x	54.20	61.13	1600	186			97	1	1960	1988					
3202002		JEGUL	CHUKHLOM	x	50.10	61.25	123	161			95		1946	1988					
3202004		LED	ZELENINSKAYA	x	42.67	62.25	2240	95			94	1	1936	1988					
3202005		EMTSA	BRIDGE	x	40.32	62.97	1860	120			82	1	1928	1988					
3202008		VIYA	GAVRINO	x	46.38	62.93	2490	168			94	1	1982	1988					
3301001		VELJU	KONOSH-EL	x	55.80	63.40	2050	168			93	1							
3301002		PIZHMA	LEVKINSKAYA	x	51.10	64.77	2250	243			91	1							
3302001		NIASHENSKY	KOTKINA	x	51.15	67.03	16	43			10	1							
3303001		KHOSEDA-YU	KHOSEDA-KHARD	x	59.40	67.03	2280	117			2	4							
3303002		KOLVA	KHOREY-VEY	x	58.07	67.42	5470	137				7							
3401001		SOSNA	IVAN-2	x	37.30	51.97	276	230			1								
3401002		DEVITSA	DEVITSA	x	38.95	51.63	1490	170			5								
3401003		LESNOY VORONEZH	ZAVORONEZHJ	x	40.48	52.88	2000	160			5								
3401004		TIKHAYA SOSNA	ALEKSEEVKA	x	38.70	50.63	2060	170			10								
3402001		BITYUG	MORDOVO	x	40.75	52.08	903	160			5								
3402002		ROSSOSH	PODGORENSKY	x	39.63	50.40	452	180			5								
3402003		PODGORNAYA	KALATCH	x	41.05	50.42	1790	180			5								
3403001		SAVALA	ZHERDEVKA	x	41.48	51.83	1790	160			5								
3403003		ATKARA	ATKARSK	x	45.02	51.87	1030	220			5								
3403004		ARCHEDA	NIZHNIANSKY	x	43.18	49.87	2050	140			5								
3403006		PANSHINKA	PANSHINO	x	44.03	49.05	965	100			5								
3404001		SEVERSKY DONETS	DALNIJE PES	x	36.63	50.53	1700	190			8	1							
3404002		OSKOL	STARY OSKOL	x	37.88	51.30	1540	200			5	1							
3405001		OLKHOVAYA	KOSHARY	x	41.02	49.03	1020	160			2								
3405002		BEREZOVAYA	ANTONOVKA	x	41.37	48.63	1260	130			1								

GAUGING STATION INVENTORY - OCTOBER 1997

Source : FRIEND unless stated otherwise

FID	Country	River	Site	UTM Loc	LAT	LNG	Area	Alt	% AAR	% Urb	% Frs	% Lak	GDF from	GDF to	ANNMAX from	ANNMAX to	GMF from	GMF to	Source
3406001	RUSSIA	KUNDRYUTCHJA	VLADIMIRSKAYA	x	40.28	47.93	1120	220			1								
3407001		AKSAI ESAULOVSK	VODIANSKY	x	43.40	48.00	2110	110			5								
3408001		MIUS	MATVEJEV KURGAN	x	38.88	47.57	5780	170			3								
3409001		TUZLOV	NESVETAI	x	39.67	47.47	1910	120			5								
3409002		TASHLA	DONSKOJE	x	41.98	45.45	428	310			5								
3409003		SREDNIJ EGORLYK	SHABLIEVSKO	x	41.63	46.50	2170	77			5								
3501001		AVARSKOJE KOISU	UKAL	x	46.33	42.10	1060	2630											
3502001		KARA-SAMUR	LUCHEK	x	41.30	41.62	481	2650			5								
3504001		KIZIKUMUKHSKOJE	KOISU GIERG	x	47.07	42.50	1850	1990											
3504002		SAMUR	AKHTY	x	47.75	41.48	2210	2560			5								
3504003		SELDY	KURUSH	x	47.85	41.28	26	3100											
3505001		AKTASH	ANDREJ AUL	x	46.63	43.15	398	1290			30								
3506001		ULLUTCHAI	MADGELIS	x	47.15	42.13	1190	1700											
3506002		KURAKH	KASUMKENT	x	48.13	41.67	1060	1730			5								
3509001		TEREK	VLADIKAVKAZ	x	44.68	43.03	1490	2540			10		1936	1987					
3509003		MALKA	KAMENNOMOSTSKOJE	x	43.07	43.73	1540	2000			10		1936	1987					
3509005		TCHEREK	SOVETSKIY	x	43.58	43.30	1350	2500			10		1936	1987					
3509007		BELKA	GUDERMES	x	46.08	43.35	1190	790			30		1936	1987					
3510001		KUMA	BEKESHEVSKAYA	x	42.47	44.00	434	1290			15		1956	1987					
3510002		PODKUMOK	KISLOVODSK	x	42.47	43.93	1010	1380			5		1936	1974					
3511001		KALAUS	SERGIEVKA	x	42.72	44.95	1590	380			5								
3512001		AMTA-BURGUSTA	KETCHENERY	x	44.52	47.30	99	120											
3512002		TOMUZLOVKA	NOVOSELITSKOJE	x	43.45	44.75	815	360			5		1951	1987					
3601001		TCHELBAS	KANEVSKAYA	x	38.97	46.07	4080	66			5	1							
3602002		MALY ZELETCHUK	ALIBERDUKOVS	x	41.73	44.00	1320	1910			20								
3602003		AKSAUT	KHASAUT-GRECHESKOJE	x	41.67	43.72	530	2460			35								
3602005		MALAYA LABA	BURNOJE	x	40.72	44.02	1090	1960			50								
3603001		TCHAMLYK	VOZNESENSKAYA	x	41.03	44.53	554	590			5								
3603002		BELAYA	KAMENNOMOSTSKI	x	38.67	44.28	1850	1330			80								
3604002		PSEKUPS	GORIATCHI KLYUTCH	x	39.10	44.63	765	310			95								
3604003		UBINKA	SEVERSKAYA	x	38.67	44.85	201	250			70								
3604004		ADAGUM	CRYMSK	x	38.00	44.93	328	220			70								
3605001		GASTOGAI	GASTOGAIEVSKAYA	x	37.47	45.03	106	160			52								
3605002		VULAN	ARKHIPO-OSIPOVKA	x	38.53	44.48	265	240			92								

GAUGING STATION INVENTORY - OCTOBER 1997

Source : FRIEND unless stated otherwise

FID	Country	River	Site	UTM Loc	LAT	LNG	Area	Alt	% AAR Urb	% Frs	% Lak	GDF from to	ANNMAX from to	GMF from to	Source
3605004	RUSSIA	SOCHI	PLASTUNKA	x	39.77	43.70	238	840		97					
3801001		DNIEPER	BOLSHEVO	x	33.85	55.73	247	235		53	1				
3801003		KHMARA	KRASILOVKA	x	32.63	54.35	534	216		19	1				
3801004		UNITSA	LOPATNIA	x	32.13	52.83	1180	181		32	1				
3811001		NAVLIA	NAVLIA	x	34.50	52.83	1560	210		15	1				
3811002		KOSTA	GLAZOVO	x	33.25	53.05	150	190		1	1				
3811004		TUSKAR	KURSK	x	36.22	51.75	2380	230		5	1				
3811006		VORSKLA	KAZINKA	x	35.60	50.47	1870	190		7	1				
4101001		MOLOGA	ILJITSYNO	x	36.40	57.65	396	150		67	1				
4101002		KOBOZHA	MOSHCHENIK	x	36.03	58.92	2350	160		60	2				
4101003		PES	MIAKISHEVO	x	34.38	58.90	710	200		76	3				
4101004		SUDA	BORISOVO-SUDSKOJE	x	36.00	59.90	2440	220		70	3				
4101005		IAGORBA	MOSTOVAYA	x	38.00	59.28	374	150		61	1				
4101006		KEMA	LEVKINO	x	37.60	60.52	4160	180		81	2				
4102002		ILD	SPAS-ILD	x	38.08	58.00	185	130		38					
4102005		OBNORA	SHARNA	x	40.80	58.35	1800	160		70	1				
4102008		NEIA	PARFENJEVO	x	43.42	58.48	954	170		75	1				
4102009		VOKHMA	TIKHON	x	46.67	59.38	1910	190		95	1				
4103002		MERA	MALOBEREZOVO	x	42.25	57.72	820	150		70	3				
4103003		LINDA	VASILKOVO	x	44.10	56.53	1010	120		70	1				
4103005		BOLSHAYA KAKSHA	SIAVA	x	46.35	58.02	1670	130		80	1				
4104004		PUTYNKA	MALAKHOVO	x	36.28	54.83	153	190		44	1				
4104005		ISTRA	PAVLOVSKAYA SLOBODA	x	37.10	55.82	1950	200		60	1				
4104007		USHNA	NOVLIANSKAYA	x	41.73	55.80	1140	140		46	1				
4105001		VORIA	MISHNEVO	x	38.22	55.98	947	190		72	1				
4105002		KOLOKSHA	BABAIEVO	x	40.10	56.10	1380	170		15	1				
4106001		TSON	NOVOLUNJE	x	35.78	52.90	689	220		13	1				
4106003		ISTJA	POPOVITCHI	x	40.08	54.27	816	160		6	1				
4106004		ZHIZDRA	DUBROVKA	x	35.08	53.88	1900	210		34					
4106005		OSETR	MARKINO	x	38.85	54.80	3020	190		14	1				
4107001		ISSA	PAIEVO	x	44.22	54.02	1790	220		10	1				
4107003		KARIAN	ZNAMENKA	x	41.43	52.42	530	160		1	1				
4107006		INSAR	SARANSK	x	45.22	54.20	1610	200		11					
4108002		SEREZHA	LESUNOVO	x	43.12	55.67	1810	160		65	1				

GAUGING STATION INVENTORY - OCTOBER 1997

Source : FRIEND unless stated otherwise

FID	Country	River	Site	UTM Loc	LAT	LNG	Area	Alt	% AAR	% Urb	% Frs	% GDF Lak	GDF from	GDF to	ANNMAX from	ANNMAX to	GMF from	GMF to	Source
4201001	RUSSIA	KOLVA	PETRETSOVO	x	57.32	61.28	2830	274			95								
4201002		BEREZOVAYA	BOLDYRJA	x	57.25	60.97	3030	300			98								
4202002		VOGULKA	SHAMARY	x	58.23	57.32	969	340			90								
4203001		BISERET	GAINY	x	54.33	60.32	3150	322			77								
4203003		BOLSHAYA ARSHA	VOZNESENSKAY	x	59.63	55.53	277	491			84								
4204001		NUGUSH	NOVOSEITOVO	x	57.18	53.55	353	649			83								
4204002		SEMUK	NIZHNEITKULOVO	x	56.33	53.38	141	363			74								
4204004		LEMEZA	NIZHNIJE LEMEZY	x	57.00	54.75	1680	429			88								
4205001		BELAYA	ARSKY KAMEN	x	58.27	53.87	2300	724			64								
4207001		KAMA	SHIRIAEVSKI	x	53.23	59.03	5030	251			81								
4207004		INVA	KUDYMKAR	x	54.65	56.98	2050	209			51								
4207005		VELVA	OSHIB	x	54.88	59.22	836	188			85								
4207007		LOZA	IGRA	x	53.07	57.55	1110	222			74								
4208001		TYUI	GUMBINO	x	57.05	55.98	2180	229			57								
4208002		BIR	MALUKHOIAZOVO	x	55.85	55.38	1210	180			32								
4208003		BYSTRY TANYP	TCHERNUSHKA	x	56.13	55.50	667	199			27								
4209001		VIATKA	KRASNOGLINJE	x	52.42	58.80	2320	239			91								
4209003		MOLOMA	PERMIATSKOJE	x	47.88	59.22	6070	172			80								
4210001		LOBAN	RYBNAYA VATAGA	x	51.03	57.23	2300	142			40								
4210002		NURMINKA	KUKMOR	x	50.92	56.18	107	158											
4211001		MELEUZ	MELEUZ	x	55.97	52.95	346	278			5								
4211002		STERLIA	OTRADOVKA	x	55.89	53.60	595	244			8								
4211004		TCHERMASAN	NOVOYURMANOVO	x	55.08	55.12	3570	202			9								
4211006		DYMKA	TATARSKAYA DYMKA	x	52.97	54.35	520	274			15								
4301003		ULEMA	NARMONKA	x	48.73	54.95	181	164			16								
4301005		KRYMZA	SYZRAN	x	48.23	53.23	352	174			26								
4301007		KURDYUM	NOVAYA LIPOVKA	x	46.18	51.68	881	145			10								
4302002		KAZANKA	ARSK	x	49.87	56.10	650	159			15								
4303001		KUTCHYUI	UTIASHKINO	x	51.32	55.22	1330	185			32								
4304002		MALY TCHEREMSHA	ABALDUEVKA	x	50.27	54.95	1230	144			16								
4304004		KONDURCHA	KOSHKI	x	50.48	54.18	2390	151			14								
4305001		SAMARA	NOVO-SERGIEVKA	x	53.65	52.12	1340	227			3								
4305002		KOLTUBANKA	LES	x	51.88	53.03	119	137			70								
4305003		BOLSHOI KINEL	AZAMATOVO	x	53.48	53.30	908	261			1								

GAUGING STATION INVENTORY - OCTOBER 1997

Source : FRIEND unless stated otherwise

FID	Country	River	Site	UTM Loc	LAT	LNG	Area	Alt	% AAR Urb	% Frs	% Lak	GDF from to	ANNMAX from to	GMF from to	Source
4305006	RUSSIA	TCHAPAJEVKA	PODJEM-MIKHAILO	x	50.52	52.82	1480	132		1					
4306001		MALY IRGIZ	SELEZNIKHA	x	48.67	52.22	2110	95		1					
4306003		BOLSHOI KARAMAN	SOVETSKOJE	x	46.75	51.45	3470	82		1					
4401001		URAL	VERKHNEURALSK	x	59.20	53.88	2650	570		50	1				
4401002		BOLSHOI KIZIL	VERKHNE-ABDRI	x	58.77	52.95	1830	570		41					
4401003		TANALYK	SAMARSKOJE	x	58.15	52.03	1750	482		1	1				
4402001		ZILAIR (URMAN-Z	ZILAI	x	57.40	52.22	334	570		89					
4402002		TCHERTANKA	ZHELTOJE	x	56.60	51.63	60	230			1				
4402003		BOLSHOI IK	MRAKOVO	x	56.63	52.72	1870	490		76					
4402004		SALMYSH	BULANOVO	x	56.12	51.92	2580	240		1	1				
4403001		KUGUTYK	DOMBROVSKY	x	59.55	50.75	767	310							
4404001		TCHERNAYA	KRASNY KHOLM	x	54.13	51.58	943	170							
4405001		MALY UZEN	MALY UZEN	x	47.62	50.47	3930	70			1				
4406001		TCHAGAN	SERGIEVSKY	x	51.90	51.93	545	150							

218 rows selected.

GAUGING STATION INVENTORY - OCTOBER 1997

Source : FRIEND unless stated otherwise

FID	Country	River	Site	UTM Loc	LAT	LNG	Area	Alt	AAR	% Urb	% Frs	% Lak	GDF from	GDF to	ANNMAX from	ANNMAX to	GMF from	GMF to	Source
591001	UKRAINE	CHORNA TYSA	YASYNIA										1960	1990					
591002		BILA TYSA	LUHY										1960	1990					
591003		MOKRANKA	RUS-KA MOKRA										1960	1990					
591004		TERBLYA	KOLOCHAVA										1960	1990					
591005		RIKA	VERHNII BYSTRYI										1960	1990					
591006		BORZHAVA	DOVHE										1960	1990					
591007		LATORYTSIA	PIDPOLOZZIA										1960	1990					
591008		UKH	ZHORNAVA										1960	1990					
591009		TURJA	SYMIR										1960	1990					
592001		PRUT	KREMENTSI										1960	1990					
592002		ILTSIA	ILTSY										1960	1990					
3808001		VIZHIVKA	RUDA										1960	1990					
3808003		VIRKA	SVARYNI										1960	1990					
3809001		RODOSTAVKA	TRIYTSIA										1960	1990					
3809003		TETERIV	TROSCHA										1960	1990					
3901002		SOB	ZOZOV										1960	1990					
4001001		DNIESTR	STRILKY										1960	1990					
4001005		SLAVSKA	SLAVSKE										1960	1990					
4001006		ORAVA	SVIATOSLAV										1960	1990					
4001009		LOMNYTSIA	OSMOLODA										1960	1990					

20 rows selected.

Appendix 3

MINUTES OF SECOND ANNUAL INTAS PROGRESS MEETING, KIEV, 16-17 JUNE 1997

INTAS - 94 - 4451

The Establishment of a Regional Data Centre of the European Water Archive for the European territory of the former Soviet Union

Second Annual Progress Meeting

State Hydrometeorological Committee of Ukraine
6, Zolotovoritska, 252601, Kiev-34, Ukraine

16 - 17 June 1997

MINUTES OF MEETING

Present:

Dr Vasyl 'O. Gromovyi, Deputy Chairman
State Committee of Ukraine for Hydrometeorology (SCUH).

Dr Vyacheslav Manukalo, Chief of Department of Science
State Committee of Ukraine for Hydrometeorology.

Dr Yuri Pokumeiko, Director
State Committee for Hydrometeorology of the Republic of Belarus (SCHRB).

Dr Grigory Chekan, Head of Hydrology and Hydrological Forecasts
State Committee for Hydrometeorology of the Republic of Belarus.

Prof. Valery Vuglinsky, Deputy Director,
State Hydrological Institute, Russia (SHI).

Dr Sergei Zhuravin, Head, International Cooperation Department
State Hydrological Institute, Russia.

Dr Wolfgang Grabs, Director,
Global Runoff Data Centre, Koblenz, Germany (GRDC).

Mr Gwyn Rees, Project Manager
Institute of Hydrology, Wallingford, United Kingdom (IH).

1. WELCOME ADDRESS, ELECTION OF CHAIRMAN AND ADOPTION OF AGENDA

Dr Gromovyi welcomed participants to the meeting and proceeded to describe the work of the State Committee of Ukraine for Hydrometeorology. He stated the there was a long-standing relationship between hydrometeorological organisations in Ukraine, Belarus and Russia, and that cooperation agreements now existed between Ukraine and Belarus and between Ukraine and Russia. He observed that the relationship with Germany and the UK was relatively new and he warmly welcomed Dr Grabs and Mr Rees to the meeting. Dr Gromovyi

expressed that SCUH were enthusiastic to participate in the FRIEND project and other IHP projects but feared a general lack of money may hamper their involvement. He wished every success for the meeting and proposed Dr Manukalo as Chairman. Dr Manukalo was duly elected and the agenda was adopted.

2. REVIEW ACTIONS OF MINUTES FROM PREVIOUS MEETING

Mr Rees quickly reviewed the minutes of the previous meeting, pointing out that many of the action points would be discussed under later agenda items.

Dr Manukalo congratulated the Institute of Hydrology on the production of the progress report.

Prof. Vuglinsky informed the meeting that INTAS now had a representative in St. Petersburg and suggested that the minutes of the meeting and the next progress report be submitted to this individual as well as to the INTAS office in Brussels. This was agreed.

Action: IH

3. REPORTS ON INTAS PROJECT IMPLEMENTATION

3(i) State Hydrological Institute, Russia (SHI)

Dr Zhuravin described the progress made by SHI:

He described that the catchment area constraint for station selection would have to be adjusted because there were few observations on small rivers, especially in the sparsely populated areas. He thought similar problems would be faced in Belarus and Ukraine;

He reported that the preparation of gauged daily flow data had not proceeded as quickly as he would have liked but said that he would be able to present flow data and catchment characteristic for an additional 50 stations in the next 2 - 3 weeks;

He reported that catchment boundaries have been drawn on paper maps and are awaiting digitising but that problems had been encountered with the computer software. He was optimistic that the problems would be resolved and that a version of MapInfo would be operational by the time he returned to St. Petersburg;

Dr Zhuravin was confident that the SHI will be back on schedule by October.

Mr Rees acknowledged the problem with catchment areas and stated that the primary requirement was for predominantly natural catchments.

He then asked how the database was developing. Dr Zhuravin explained that the Delphi database had expanded considerably and now contained meteorological data as well as hydrometric data. There had been some problems with Windows NT software running under Windows95.

Dr Grabs informed the meeting that GRDC used an UNIX based INFORMIX database with a Delphi front-end.

Mr Rees asked for a description of the database for the next INTAS progress report.

Action: SHI

3(ii) State Committee for Hydrometeorology of the Republic of Belarus (SCHRB)

Dr Pokumeiko informed the meeting that this was the first INTAS project for SCHRB but now they are involved in a second with BALTEX. He informed that Belarus faces similar problems to Russia and the Ukraine in selecting stations as few catchments have no human influence. He said that SCHRB were generally keeping to the work plan. However, some problems had been discovered with the accuracy of some river flow measurements but that these were being recalculated.

Dr Chekan detailed the implementation of the project at the SCHRB:

He reported that SCHRB had bought a pentium computer at 133MHz and had acquired software to process current hydrometric data. SCHRB were also hoping to get some additional software from Obninsk. He repeated that work was proceeding according to plan. He was pleased that the catchment information for selected stations was very reliable. He added that the first stage of digitising catchment boundaries had been carried out manually at an accuracy of 15" to 30". He promised that a written report on progress would be prepared immediately after this meeting.

Action: SCHRB

Mr Rees asked about the software SCHRB were using. Dr Chekan said that they were hoping to receive hydrological processing data from Obninsk plus digitising software from SHI.

3(iii) State Hydrometeorological Committee of Ukraine (SHCU)

Dr Manukalo reported the progress of the SHCU in the reporting year:

He informed the meeting that a Pentium computer, matrix printer and digitiser had been bought in October and that software for the processing of hydrological data had also been acquired.

He said that 70 gauging stations had been selected. Time series for 20 have been collated and sent to SHI. An additional 15 series have been collated and will be transferred to SHI, then IH by October.

Dr Zhuravin informed the meeting that all data received at SHI was checked and then reformatted to the FRIEND standard format before being transferred to IH.

Dr Manuaklo described that SCUH had had difficulty in finding maps at sufficiently high resolution for digitising. Hydrometric areas had been digitised from 1:1 000 000 maps while catchment boundaries had been digitised from 1: 200 000 maps which were publicly available but had no coordinate system defined. Reference had been made to other maps to overcome this problem.

Dr Manukalo referred to the problem of receiving INTAS payments but added that this had not hampered the work. Professor Vuglinsky asked if future payment could be made via SHI. Mr Rees replied saying that IH, and probably INTAS, were keen to distribute the funds as efficiently as possible and agreed to consider the most appropriate method when the next payment is due. **Action: IH**

Dr Pokumeiko explained that in Belarus, 50% of cash payments have to be converted to local currency adding that this does not normally leave enough Ahard@ currency to buy computers or to travel. He said that it was not possible to avoid this as the banks deal with all transfers.

3(iv) Institute of Hydrology, United Kingdom (IH)

Mr Rees presented a series of tables summarising the status of the FRIEND European Water Archive and especially the data obtained within the project.

Dr Manukalo queried why the catchment characteristics for the Ukraine had not been included. Dr Zhuravin explained that the catchment characteristics SHI had received were not in the standard, pre-defined, format and asked SCUH and SCHRB to ensure data is transferred in the correct format. He added that he had received information for 64 stations but only 10 had relevant catchment characteristic data. He agreed to provide a Amodel@ of the data required to SCUH and SCHRB . Meantime, he said he would send all relevant information to IH.

Action: SHI, SCUH, SCHRB

3(v) Global Runoff Data Centre, Germany (GRDC)

Dr Grabs informed the meeting that the GRDC had some data from Russia up to 1994 and that this related to the Arctic Climate System Study (ACSYS) in which he had been involved. The GRDC has a mixture of daily and monthly data for all three countries, but the series is by no means complete. The latest data he had from Ukraine and Belarus was up to 1987. Dr Grabs stressed the importance of overlapping periods for comparative analysis. He informed the meeting that information on the accuracy of data was commonly requested by users and encouraged this INTAS project to consider ACSYS' methods of determining accuracy. Mr Rees informed the meeting that the accuracy of the data was not one of the parameters presently stored on the European Water Archive. He acknowledged this to be a problem that he, and other participants of the FRIEND project, were well aware of and that a conference to discuss the quality of hydrometeorlogical data was being organised by the IHP/OHP committees of Germany and the Netherlands in 1998.

Dr Manukalo asked who used GRDC data. Dr Grabs described three groups of users: climate modellers; operational hydrologists; and academia (universities, research institutes). He estimated 60% of requests related to large international programmes, 25% to other research projects with 15% of requests for commercial activities. He reassured the meeting that the GRDC strictly complied to its policy of obtaining permission from national hydrological agencies before releasing data for commercial activities.

Dr Pokumeiko explained that before 1987 Belarus had been an active participant in WMO but, in the last 10 years, the lack of money has prevented their participation. He hoped that SCHRB would now be able to re-establish its contact with WMO.

Mr Rees asked if GRDC data was available to the FRIEND project. Dr Grabs replied positively saying that it would be available, on request.

4. OPEN DISCUSSION ON TECHNICAL ISSUES AFFECTING THE PROJECT

4(i) Station Numbering

Mr Rees described the problems of conflicting station numbers which he had encountered while loading the INTAS data. He informed the meeting that reference should be made to the European Water Archive Metadata Catalogue which contains the definitive list of station numbers. Mr Rees handed a copy of the Catalogue to Dr Zhuravin who agreed to review and verify the station numbering. Mr Rees agreed to send a revised copy of the Catalogue to SHI in which the stations are not grouped by country but ordered sequentially by FRIEND number.

Action: SHI, IH

4(ii) Digitising catchment boundaries

Mr Rees described the requirements for locating gauging stations, the format of the catchment boundaries and the need for a recognisable coordinate reference system.

Dr Pokumeiko said that station coordinates had been provided to SHI but had not been forwarded to IH. Dr Zhuravin said they would be forwarded when they are in the correct format.

Action: SCHRB, SHI

Dr Zhuravin informed that Russian data would be digitised with MapInfo and that conversion to Arc/Info format would be straightforward. He saw two possible approaches for Belarus and Ukraine data: the first, where the paper map with catchments drawn could be sent to SHI for digitising; or, second, SHI to provide SCHRB, SCUH with copies of MapInfo at a cost of approximately $300 each. Dr Manukalo suggested a third option in which boundaries could be supplied at 10" accuracy. Mr Rees commented that, if the areal representation of the catchment is preserved, this may be satisfactory in some cases but, if the information is to be used in conjunction with other data sets (soils, geology, land-use) to determine key catchment characteristics, better accuracy would be required.

Prof. Vuglinsky suggested there would be benefits to SCUH and SCHRB if they were to acquire MapInfo or Arc/Info but pointed out the time constraint within this project. Mr Rees suggested that staff from SCHRB and SCUH could travel to SHI and digitise their maps under the supervision of SHI staff, thus allowing skill transfer. Prof. Vuglinsky thought this would be too expensive and suggested that SCUH and SCHRB send their maps to SHI who would then assess the likely cost of digitising.

Mr Rees asked if SHI would re-digitise the catchment which had been digitised manually (15 Ukraine, 12 Belarus). Dr Zhuravin thought not but said SHI would check the manual boundaries.

It was finally agreed that SHI would coordinate this activity within the project and determine the most appropriate way to proceed.

Action: SHI

4(iii) Data Transfer

Dr Zhuravin informed the meeting that he had brought a disk to the meeting which specified the required format. He asked his colleagues from SCUH and SCHRB to abide to this format.

Dr Zhuravin suggested that the project continues to transfer data via e-mail. Mr Rees commented that ftp would be preferred if large amounts of data were to be transferred. Dr Zhuravin said the SHI presently did not have access to ftp but was hoping the facility would be available in the near future.

Dr Manukalo sought clarification of the catchment characteristics required. Mr Rees quickly described these and asked Dr Zhuravin to provide SCUH with the format details.

Action: SHI

Dr Grabs asked if participants would be prepared to contribute data collated in this project to the GRDC. Dr Manukalo queried whether this depended on the relationship between FRIEND and GRDC. Dr Pokumeiko wondered if the data was actually owned by INTAS. Mr Rees agreed to check the contract. **Action: IH**

Prof. Vuglinsky thought that the GRDC would not be interested in all of the data gathered and suggested that Dr Grabs should review what was available and select those stations that were of interest. He added that SHI would be willing, on the condition that the data was used for non-commercial activity only. Dr Grabs reaffirmed this was a condition for the release of GRDC data.

Mr Rees asked FSU participants if there were any objections to FRIEND providing INTAS data to GRDC.

Prof. Vuglinsky, speaking for SHI, SCHRB, SCUH, said there were no objections in principle on the condition that the data is not used for commercial purposes.

4(iv) Computer hardware/software

Prof. Vuglinsky said that MapInfo was used at SHI and suggested SHI could obtain copies of this software for SCHRB and SCUH should they require it. SCHRB and SCUH to consider this. **Action : SCUH, SCHRB**

Prof. Vuglinsky then asked if SHI staff could be sent to IH to obtain training in Arc/Info. Mr Rees replied saying that while IH had considerable expertise in Arc/Info, it was not able to provide training in third-party software products. He added that IH would be willing to host a visit by SHI scientists for them to observe how IH works with Arc/Info but pointed out there was no provision for this in the project budget. He suggested that SHI consider applying for a British Council grant, or similar, to fund such a visit.

5. PROJECT PLANNING

The meeting reviewed each of the activities in the project work plan. The updated version is attached (Annex 1). Though some slippage has occurred, projects participants are confident that all objectives will be met within the required timescale.

6. PROJECT FUNDING

Mr Rees explained what payments remained to be made within the contract and asked participants to complete and return the periodic payment request forms in good time.

Action: SHI, SCUH, SCHRB, GRDC

7. PREPARATION OF SECOND PERIODIC PROGRESS REPORT

Mr Rees reviewed the previous periodic progress report and said that this had been well received by INTAS. He suggested that the second progress report should follow the layout of the first and encouraged participants to submit their contributions by early September.

Action: SHI, SCUH, SCHRB, GRDC

8. INDIVIDUAL REPORTS ON FSU PARTICIPATION IN FRIEND SCIENTIFIC PROGRAMMES

8(i) SCUH

Dr Manukalo reported that a delegation from SCUH had attended the FRIEND Steering Committee in Paris on 17- 18 October 1996. He was also intending to visit the FRIEND conference in Slovenia from 30 September to 3 October to present a poster on the variation of river runoff in an experimental catchment in Ukraine. He would also be attending the FRIEND steering committee meeting which is to be held during the same week.

Dr Manukalo also reported the close links he had developed with Mr Domokos (Hungary) and other Danubian countries.

8(ii) SCHRB

Dr Chekan reported that he too attended the FRIEND Steering Committee meeting in Paris. He added that SCHRB had close contact with other FSU countries and other Baltic states, Poland especially. He was also hoping to attend the FRIEND conference in Slovenia.

8(iii) SHI

Dr Zhuravin informed the meeting that SHI were actively involved in Projects 1 (Database), 3 (Large Scale Variations) and 5 (Hydrological Processes) of the FRIEND programme. In June, SHI hosted a joint workshop for FRIEND Project 5 and the European Research Basin (ERB) network. This was arranged with the support of the German IHP/OHP committee. Plans to publish the proceedings of the workshop are in-hand. Dr Zhuravin stated that he was hoping to present a paper at the FRIEND conference in Slovenia. Prof. Vuglinsky confirmed he would present a paper at the conference on the assessment of the annual distribution of runoff.

9. PARTICIPATION IN OTHER INTERNATIONAL PROGRAMMES

Dr Manukalo reported on some of the international project FSU participants had been involved with: in December there had been CIS conference on meteorology with many presentations made from Belarus, Ukraine and Russia on hydrology, climate, development of hydrometry. This had been convened under the auspices of the Inter-state committee for meteorology; SHI, SCUH and SCHRB had also participated in a BALTEX conference in Riga; Fifteen Ukrainian scientists had also participated in the 18th conference of Danubian countries in Graz; etc...

10. PRESENTATION ON FRIEND AND THE EUROPEAN WATER ARCHIVE {AND} 11. PRESENTATION ON THE GLOBAL RUNOFF DATA CENTRE

Mr Rees and Dr Grabs each gave a 20 minute presentation on their respective topics to a general gathering of the SCUH.

12. STATEMENTS ON THE STATE OF HYDROMETRY IN BELARUS, RUSSIA AND UKRAINE

Dr Manukalo, Chekan and Zhuravin each described the state of hydrometry in their respective countries. Mr Rees requested that these be written up and presented as a contribution to the second progress report.

Action: SHI, SCHRB, SCUH

13. ANY OTHER BUSINESS

Dr Grabs suggested that the project should seek to produce a published report detailing the achievements of the project. All agreed this was a good idea which should be discussed in detail at the next progress meeting.

It was agreed that the next, and final, progress meeting should be held in Minsk in July or August, 1998. Mr Rees was asked to confirm the date.

Action: IH

G.Rees, 15 September 1997.