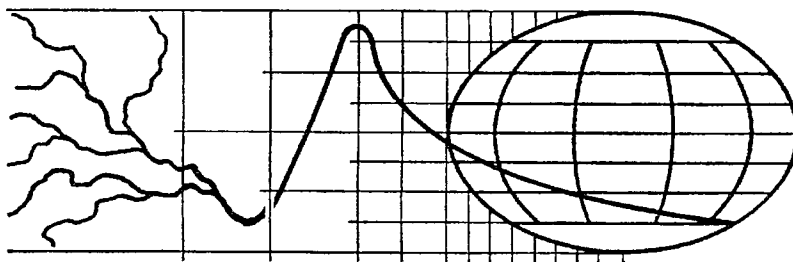


Weltdatenbank Abfluß
Bundesanstalt für Gewässerkunde
Koblenz, Deutschland

Global Runoff Data Centre
Federal Institute of Hydrology
Koblenz, Germany

Report No. 8

**First Interim Report on the Arctic
River Database for the Arctic Climate
System Study (ACSYS)**



GRDC



July 1995

56068 Koblenz, Kaiserin-Augusta-Anlagen 15-17
Phone +49-261-1306-224, Fax +49-261-1306-280

CONTENTS

	Page
1. Introduction	1
2. Rational for the establishment of the ARDB	1
3. Implementation of the ARDB	2
4. Data quality	4
5. Access to the ARDB	4
6. Data products for ACSYS	4
7. Presentation of the ARDB	8
References	10
Figure 1: GRDC-format for mean daily and mean monthly discharge data and missing values	3
Figure 2: Preliminary calculation of freshwater flux into the Arctic Ocean	5
Figure 3: Flow variability of the Ob river	6
Figure 4: Flow variability of the Yensisei river	7
Maps of ACSYS stations	12
Tables of overlapping time-series for ACSYS stations	16
Catalog of ACSYS stations	20
Catalog of missing data in time-series	30

1. Introduction

This report is the first Interim Report on the Arctic River Database (ARDB) for the Arctic Climate System Study (ACSYS) project. The report reflects the status of available data in the GRDC as of 30 May 1995 which has been updated from the dataset announced for distribution at the 7th session of the GEWEX Scientific Steering Committee in January 1995.

With the submission of this report, the GRDC timely responds to the need of an Arctic River Database (ARDB) spelt out in the Initial Implementation Plan for the ACSYS project.

It is hoped that the compilation of a more comprehensive ARDB will contribute to narrow the estimation bandwidth of Arctic river runoff which presently shows differences of 50% and more (ACSYS Science Plan, 1992). Such an estimation bandwidth is unacceptable for quantitative modelling purposes in the ACSYS project. The GRDC therefor calls for the active efforts from ACSYS participants to submit historical and current data on a regular basis.

2. Rational for the establishment of the ARDB

In accordance with the Initial Implementation Plan for ACSYS (9/1994), the specific objectives of the ACSYS hydrological programme are to:

- Determine the elements of the fresh water cycle in the Arctic region and their time and space variability;
- Quantify the role of atmospheric, hydrological and land surface processes and their interactions;
- Provide an observational basis for the assessment of possible long-term trends of the components of the fresh water balance in the Arctic region under changing climate;
- Develop mathematical models of the hydrological cycle under specific Arctic climate conditions, suitable for inclusion in coupled climate models.

The latter objective will be achieved by the adaption of refined macro-scale hydrological models to the specific environmental conditions of the Arctic.

4. Data quality

The data have been checked for plausibility as far as this was possible at the moment. More sophisticated tools will become available in the GRDC later this year. All data are published in national hydrological yearbooks and their quality is assessed as good - satisfactory. Due to the technical difficulties to determine discharge in the Arctic region (see remarks below) there exists a bandwidth of error in the discharge calculation in the order of absolutely 15% at hinterland stations and around 30% at coastal stations. The error bandwidth resulting from discharge measurements and the use of different time-series explain a large part of the differing calculations of runoff into the Arctic Ocean. Considering the quality of hydrological measurements by the hydrological services of the countries contributing to the ACSYS project it is safely assumed, that the time-series of the data from different sources are of comparable accuracy.

5. Access to the ARDB

The database, tables and graphics documented in this report can be obtained through GRDC on diskettes. The ACSYS Science Steering Group may however wish to define user rights for the access to the *entire* ACSYS database in close liaison with GRDC's data dissemination policy endorsed by the Steering Committee of the GRDC on its 2nd session in Koblenz, June 1995. *Subsets* of the database are in principal free for interested users.

6. Data products for ACSYS

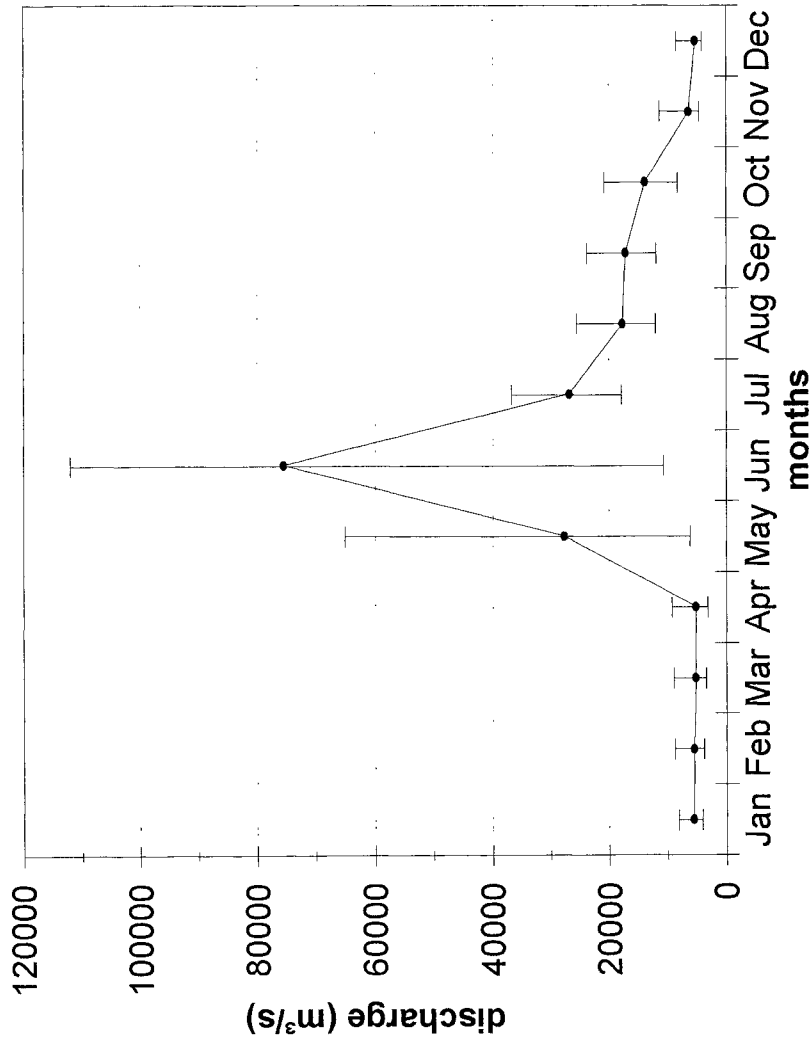
Because of the interim character of this report, the freshwater flux into the Arctic Ocean has not been computed. This will be done after the final compilation of the ARDB.

However, just to compare the flux figures given by Aagard and Carmack (1989), reproduced in the ACSYS Science Plan, the figures for the nine largest rivers draining into the Arctic Ocean have been computed from the current hydrological database of the GRDC (figure 2).

GRDC expects that ACSYS defines standard data products as input for further data analysis and hydrological modelling. Specific data products such as graphs and data files of the flow variability of selected rivers can be created on request. Examples of such graphs are presented in figure 3 and 4 for the rivers Ob and Yensisei.

GLOBAL RUNOFF DATA CENTRE (GRDC)

YENISEI at IGARKA
Subregion: YENISEI



Flow Variability of the Yenisei River

Figure 4

The tables of missing values show, that the available records are fairly complete in most cases. From the tables it is possible to judge which time series should be completed for analysis and modelling purposes.

It must be noted, that most discharge data are available as Mean Monthly values with the exception of stations in North America, where Mean Daily data are available in the GRDC database. The expectation of the Initial Implementation Plan to archive Mean Daily discharges for all ACSYS stations cannot be met presently. It seems not realistic that this target can be met on a short-term (1 year) basis.

The data from Iceland are special in that they represent Mean Daily discharges of the *calculated natural flows* of rivers in Iceland.

**MAPS AND TABLES OF THE
ARCTIC RIVER DATABASE
(ARDB)**

STATUS: 30 MAY 1995

GLOBAL RUNOFF DATA CENTRE (GRDC) ACSYS-STATIONS

EUROPE		Iceland		table 3					
No.	River	Station	Area (km ²)	Latitude	Longitude	first rec.	last rec.	day/month	
	Hvita i Borgarfirði	Kljafoss	1685	N 64.69	W 21.42	1951	1993	M/D	
	Oefusa	Selfoss	5760	N 63.94	W 21.01	1950	1992	M/D	
	Bruara	Efstadalsbru	225	N 64.26	W 20.52	1961	1991	M/D	
	Thjorsa	Urriðafoss	7200	N 63.93	W 20.60	1947	1993	M/D	
	Joekulsa i Fjotsdal	Holl	575	N 64.98	W 15.09	1962	1991	M/D	
	Joekulsa Vestari	Godðalabru	799	N 65.33	W 19.09	1971	1991	M/D	
	Djupa	Bru	260	N 63.95	W 17.65	1968	1992	M/D	
	Svarta	Ullarfoss	390	N 65.49	W 19.39	1932	1992	M/D	
	Joekulsa a Fjollum	Dettifoss	7000	N 66.03	W 16.45	1939	1984	M/D	
	Lagarfjot	Lagarfoss	2800	N 65.50	W 14.37	1949	1993	M/D	

GLOBAL RUNOFF DATA CENTRE (GRDC) ACSYS-STATIONS

NORTH AMERICA		Mackenzie		table 1						
No.	River	Station	Area (km ²)	Latitude	Longitude	first rec.	last rec.	day/month		
	Rengleng River	below Highway No. 8	1310	N 67.75	W 133.85	1973	1990	D		
	Snake River	near The mouth	8910	N 65.97	W 134.02	1975	1990	D		
	Weldon Creek	near The mouth	847	N 66.38	W 132.65	1978	1990	D		
	Carcajou River	below Imperial River	6860	N 65.28	W 127.68	1976	1990	D		
1	Mackenzie River	Norman Wells	1570000	N 65.28	W 126.85	1943	1990	D		
	Hyland River	km 108.5 Nahanni Range Road	2150	N 61.48	W 128.23	1976	1990	D		
	Root River	near The mouth	9840	N 62.47	W 123.42	1974	1990	D		
	Indin River	above Chalco Lake	1790	N 64.40	W 115.03	1977	1990	D		
2	South Nahanni River	above Clausen Creek	33400	N 61.25	W 124.03	1969	1990	D		
	Birch River	Highway No. 7	542	N 61.33	W 122.08	1974	1990	D		
	Hyland River	near Lower Post	9450	N 59.95	W 128.15	1978	1989	D		
	Dease River	Outlet of Dease Lake	1520	N 58.80	W 130.08	1978	1984	D		
3	Kechika	mouth	22700	N 59.62	W 127.31	1962	1984	M		
	Coal River	At The mouth	9190	N 59.68	W 136.95	1978	1989	D		
4	Liard River	Lower Crossing	104000	N 59.42	W 126.10	1944	1990	D		
5	Liard River	Fort Liard	222000	N 60.25	W 123.48	1942	1990	D		
6	Mackenzie River	near Fort Providence	970000	N 61.27	W 117.53	1958	1978	D		
	Snowdrift River	Outlet of Siltaza Lake	6030	N 62.17	W 109.85	1976	1990	D		
	Marten River	above Thoa River	736	N 60.60	W 108.97	1977	1990	D		
7	Muskwa	near Fort Nelson	20300	N 58.79	W 122.66	1944	1984	M		
8	Fort Nelson	above Muskwa River	22800	N 58.67	W 122.64	1978	1984	M		
	Salt River	below Peace Point Highway	821	N 59.83	W 111.97	1973	1980	D		
9	Slave River	Fitzgerald	606000	N 59.87	W 111.58	1921	1990	D		
10	Peace River	Peace Point	293000	N 59.12	W 112.43	1959	1990	D		

GLOBAL RUNOFF DATA CENTRE (GRDC) ACSYS-STATIONS

ASIA		LENA		table 1				
No.	River	Station	Area (km ²)	Latitude	Longitude	first rec.	last rec.	day/month
1	Vitim	Bodaibo	186000	N 57.90	E 114.25	1965	1984	M
2	Maya	Chabda	165000	N 59.75	E 134.75	1965	1984	M
	Zhuya	Svetly	4790	N 58.44	E 116.14	1978	1987	D
3	Anabar	Saskylakh	78800	N 71.98	E 113.95	1966	1984	M
	Kempendai	Kempendai	1290	N 61.91	E 118.68	1978	1987	D
4	Kirenga	Shorokhovo	46500	N 57.67	E 108.07	1965	1984	M
	Timpton	Nagorny	613	N 55.98	E 124.75	1978	1987	D
5	Iya	Tulun	14500	N 54.77	E 100.65	1965	1984	M
6	Lena	Kusur	2430000	N 70.70	E 127.65	1935	1984	M
	Ebitiem	Ebetem	1000	N 70.36	E 127.95	1980	1987	D
	Kenkeme	Vtoroy Stanok	3550	N 62.06	E 129.03	1978	1987	D
7	Tuba	Bugurtak	31800	N 53.77	E 92.77	1965	1984	D
	Chaptakhai	mouth	28,4			1978	1987	D
	Radio-Uruyete	near the mouth	22,8			1978	1987	D
	Podgornyi	near the mouth	20,3			1978	1987	D
	Buor-Iuryakh	Kujdusun	743			1978	1987	D
	Malaya Cherepanikha	Tiube	469			1978	1987	D
	Shestakovka	Kamyrdagystakh	170			1978	1987	D

Reference of GRDC-Reports

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