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Federal Institute of Hydrology
Koblenz, Germany

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Water Resources Development and the Availability of Discharge Data in WMO-Regions II (Asia) and V (Australia, Pacific)

W. Grabs, J. Pauler, Th. de Couet

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D-56068 Koblenz, Kaiserin-Augusta-Anlagen 15-17, Germany
Phone +49-261-1306-5224, Fax: +49-261-1306-5280; email: grdc@koblenz.bfg.bund400.de

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GRDC - Report No. 20, Koblenz, June 1998

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Preamble[1]

This report has been compiled on the request and with the financial assistance of WMO and continues a series of regional reports about data availability in Africa and South America and the Caribbean. With a focus on regional development of water resources and availability of hydrological information in WMO-regions II (Asia) and V (South-West Pacific) this report highlights some of the hydrological issues and presents an overview of the data availability in these regions.

1 Geographical delineation of WMO - regions II and V

The regional associations of the World Meteorological Organization (WMO) established by WMO-Congress are as follows:

Regional Association I	Africa
Regional Association II	Asia
Regional Association III	South America
Regional Association IV	North and Central America
Regional Association V	South-West Pacific
Regional Association VI	Europe

Figure 1 shows the borders of WMO regions.

Countries covered by WMO region II include:
Afghanistan, Myanmar, Bangladesh, China, Hongkong, India, Iraq, Iran, Japan, Kirghiztan, Rep. Korea, Dem. People Rep. Korea, Kazakhstan, Laos, Mongolia, Nepal, Pakistan, Russian Federation, Sri Lanka, Tadzhikistan, Thailand, Taiwan, Uzbekistan, Vietnam.

Countries covered by WMO region V include:
Australia, Fiji, Guam, Micronesia, Malaysia, New Caledonia, Papua New Guinea, New Zealand, Palau, French Polynesia, Philippines, American Samoa, Singapore, USA.

[1] The statements and conclusions in this report are those of the Global Runoff Data Centre and do not necessarily reflect the view and opinion of the World Meteorological Organization (WMO).

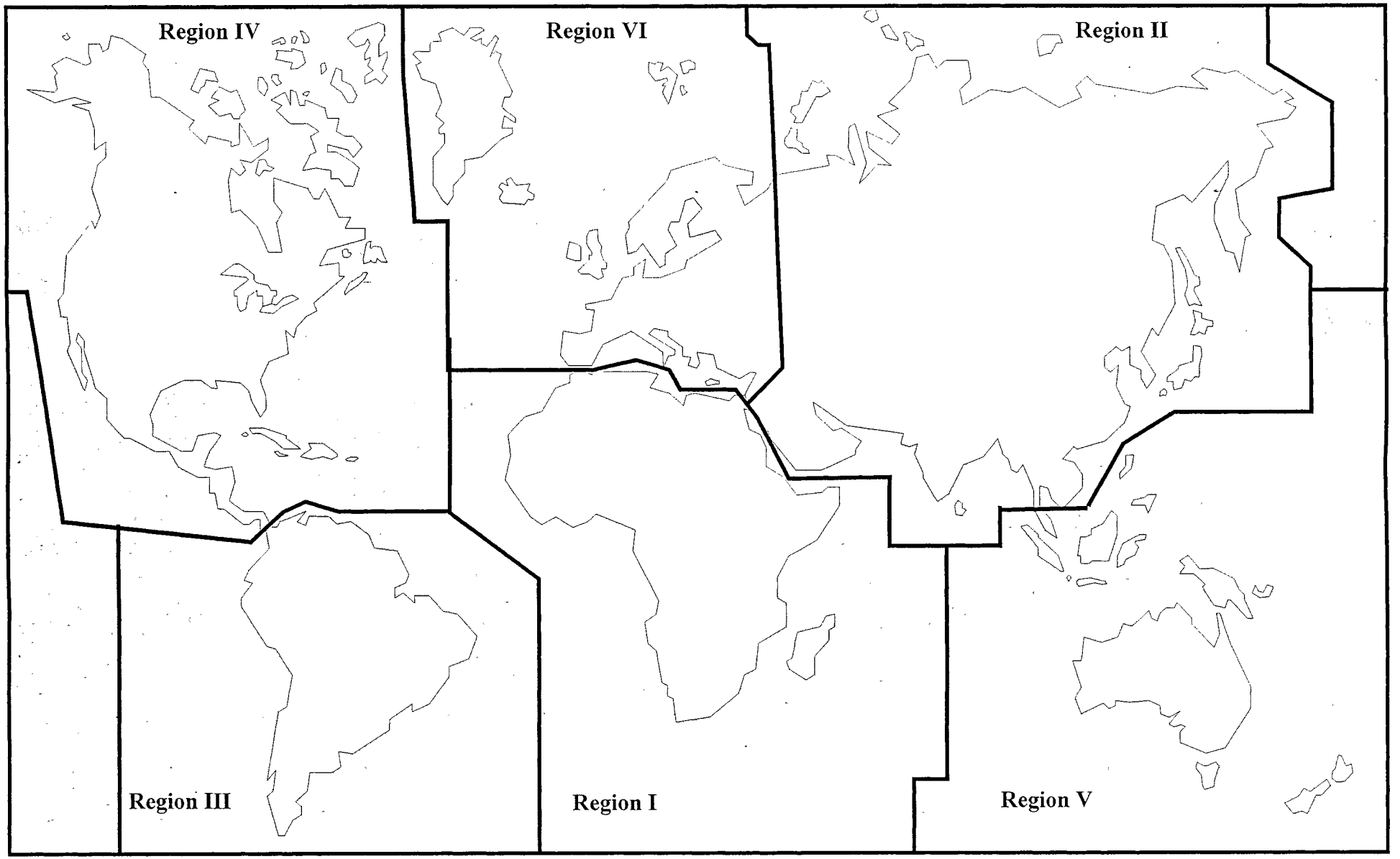


Figure 1: Borders of WMO Regions

2 Scope of the Report

"Within a perimeter of four hours around Hongkong live 50% of the world's population"
(Tony Tyler, Service Director, Cathay Pacific Airlines)

The terrestrial hydrological cycle determines the available water resources, the agricultural production potential, water for domestic purposes and the available water for the industrial infrastructure (Nachtnebel and Shuttleworth 1993). Increasing water demand with at present insufficient demand control mechanisms and an increasing vulnerability of water management systems to scarcity and pollution requires a much more precise quantitative assessment of the availability of the quantity and quality of water resources in time and space. The WMO Commission for Hydrology (CHy-IX) acknowledged that scarcity and misuse of freshwater pose a serious and growing threat to sustainable development and the protection of the environment. It observed "the deteriorating capability in many countries to assess accurately the status and trend of their freshwater resources, in terms of both quantity and quality" (cit. in Rodda 1993). The ratio of water consumption to water availability in Asia has risen from about 6% in 1900 to 22% in 2000. At this extent the water utilization ratio in Asia will be the highest among all continents and will be nearly twice the global average (Biswas, 1995). The cost of developing each cubic meter of water for the next generation will be 2-3 times higher than for the present generation in real terms (Biswas 1995). Developing water resources is also critical in Asia for the development of hydropower to meet the steep demand of energy for industrial development and a rising quality of life. With respect to the latter aspect, the pollution of rivers, coastal areas and oceans from land-based activities has reached proportions which make its remediation a common, regional task. Water resources development, the availability of data and information as a planning prerequisite and the utilization of information has to be seen in the dualistic concept of economic necessities and social acceptance which finds its expression in political priorities with regard to water resources.

Excluding the desert areas, the drainage basins associated with GRDC discharge stations drain 52% of the territory of Asia and 33% of the territory of Australia and Oceania (Grabs, De Couet, Pauler, 1996). This regional coverage is a good basis for regional hydrological assessments and monitoring of runoff.

The report tries to present a concise overview of current trends and constraints in its socio-economic context and the relation of these issues to the currently insufficient availability to good quality hydrological information. Given the large geographical extend of WMO regions II and V and the disparities in the hydrological regimes of these regions, surface water availability and the vastly differing state of national development, the report does not attempt to provide equal coverage for all countries of these regions. The report is guided by the deliberation that future "Hot Spots" in water resources management will coincide with the most densely inhabited regions of the world. Therefore, in its descriptive part, the report gives priority to the most densely populated regions of Asia.

3 Value of hydrological data and information

An insufficient information base and lack of high quality data and observations are prominent obstacles to the rational assessment, planning and operation of hydro-structures. "It seems that only when hydrological data are completely missing, is their value fully appreciated" (UNCED, 1992). A few examples demonstrate this observation:

- From 232 dam failures in Sichuan province, 52% or 122 dams failed due to inadequate discharge capacities of the spillways as a consequence of design of the structures with inadequate hydrological information such as historical time series and information about extreme events (Yongping 1989). To illustrate this point, the 100-year return peak flood discharge of Huang Bizhuan reservoir in Hobei province, China changed from 12.660 m3/s calculated on the basis of an 18 year time-series (in 1956) to 33.900 m3/s based on 43 years of hydrological records in 1981.

- After the break of the Banquiao dam in He'nan province, China, where about 230.000 people perished, the Chinese government initiated a study which found amongst the most grave findings amongst the 89 largest dams of China, that hydrological data were insufficient for planning, design and safe operation of one third of China's major dams (Wang 1997). Hegmanns (1997) cites an internal Memorandum of the Worldbank (Price 1995) which concludes that none of 25 investigated dams (including the largest dams Hirakud and Gandhi Sagar) in India could retain the water volumes as a result of floods which would lead to catastrophic consequences in case of a failure of these dams.

These cases from China and India serve only as examples which have been published and do not imply that in China and India the conditions for planning, design and operation of dams are inferior to those of other countries of the region.

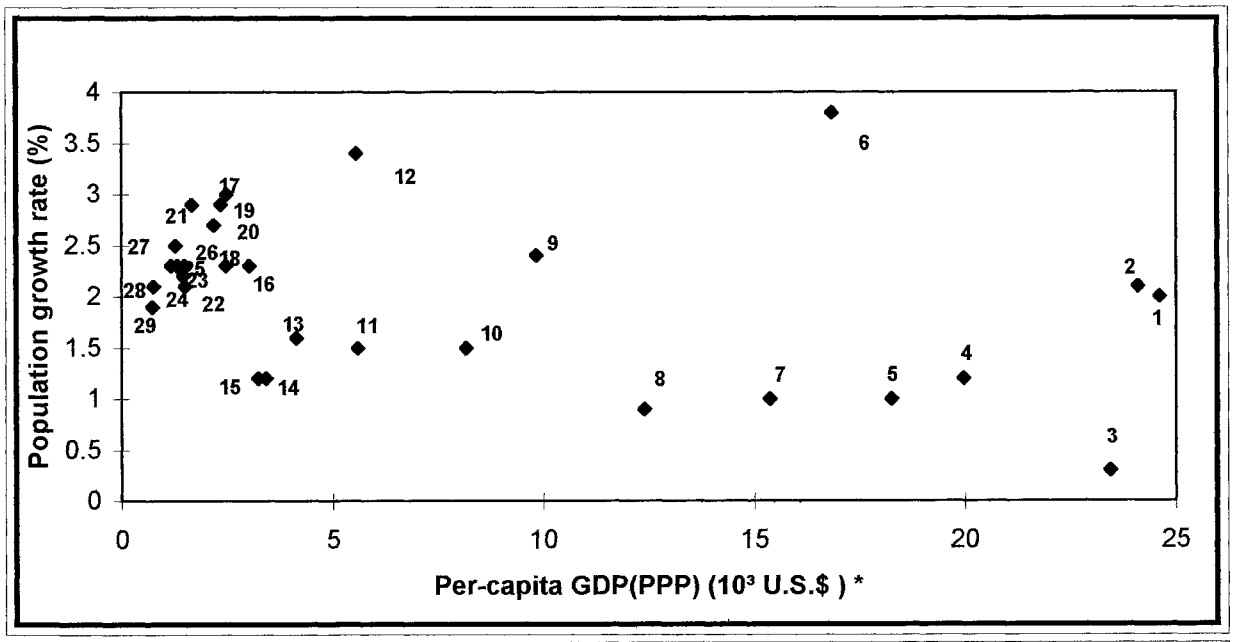
The cost - benefit ratio for various uses of data such as water resource development projects, storage design, flood forecast varies between 1:1.50 and 1:21.20 (WMO, UNESCO 1997). Even under the most conservative estimates therefore, the benefit equals or exceeds the costs for data collection analysis and use by at least 50% . These figures do not include long term benefits outside the scope of specific projects. The scarcity of available streamflow data can partially be explained with the economic focus on short-term return of investments, insufficient strategic planning in water resources development and an inadequate marketing of the benefits of data collection systems for water resources development and derived socio-economic benefits in a country or region.

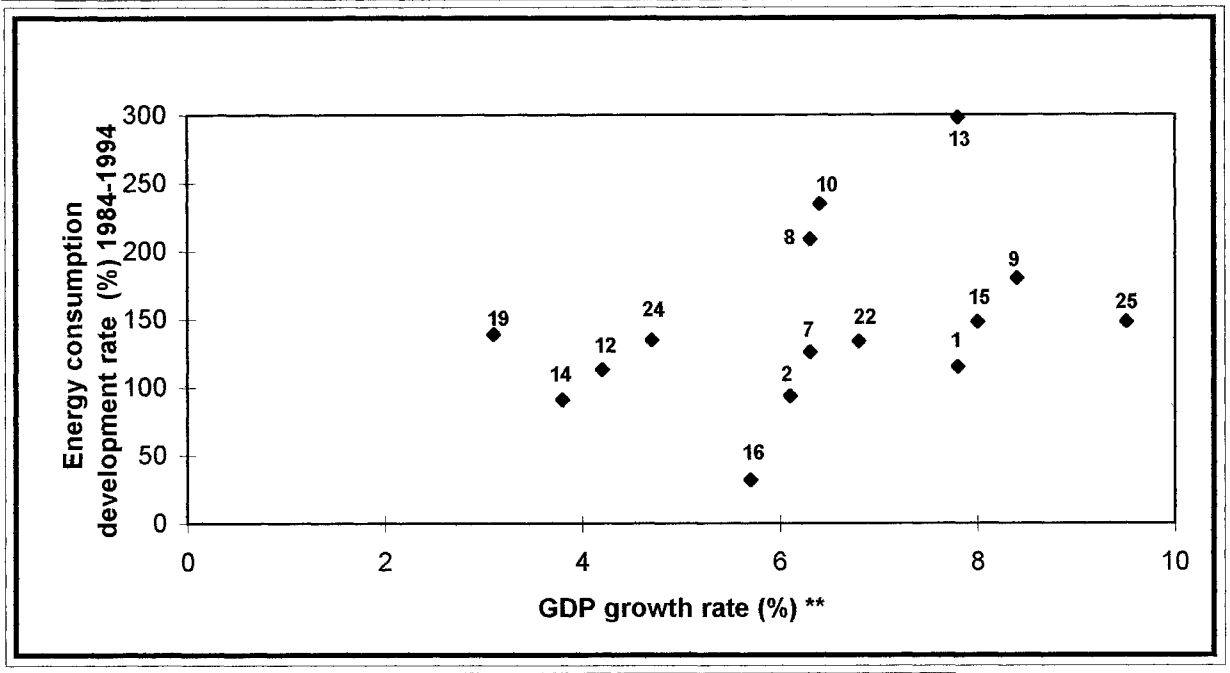
4. Economic context of water resources development and hydrological monitoring in WMO regions II and V

Insufficient investments in the water sector and low return from investments have been a major reason for government subsidies and, when governmental resources dried up, for lacking or unsatisfactory services in drinking water supply, waste water management etc. There is a large number of literature i.e. Erikson et al (1994) which calls for the establishment of water markets and effective pricing of water which substantiates the aforementioned (economic) value of water.

The sixth session of the UN Commission for Sustainable Development (April 1998) recognized the dual value of water as both: an economic good and a social basic necessity. Although the development of water markets and pricing structures needs further determined efforts to become efficient tools for demand management and an incentive for non-governmental investments into the water sector it must be recognized that economic considerations are always embedded in the social and cultural set of values in the regions concerned. With regard to meteorological (and hydrological) forecasts, Nicholls (1996) cites Krasnov (1986) who concludes that economic approaches alone suggest little social values to forecasts. Given the cultural setting in many countries of the region (Holmes and Tangtongtavy 1997; Hofstede 1991), the social values and perceptions *in most cases* dominate political decisions over economic considerations. This means that the economic value of hydrological information needs to be translated into culturally accepted social values and priorities. So far this aspect has not been sufficiently recognized by western influenced schools of economic thinking. Until now, major investments in the development and management of water resources are made by national governments (Tollan 1993) and yet, government support to National Hydrological Services is dwindling. With increasing investments into the sector by Non-Governmental Organizations (NGO's), it is recognized that a further fragmentation of information sources on the national level has become a reality. It would be a grave misconception to believe that water resources development could be undertaken mainly or to a large extend by NGO's without a national framework and a sound national and regional knowledge base on water availability in space and time and a consensus on allocation priorities. All experiences show that the development of a scarce resource gets into a competitive race for short-term economic benefits in which the sustainable use of the resource is left out of sight.

The assessment of the criticality of water resources has to be viewed in the socio-economic context of individual countries. In figure 2 and table 1 the population growth and selected indicators of economic development are shown for countries of the region. Even though the covered time-series do not coincide, the figures given in figure 2 can be viewed against the availability of freshwater per capita and year on the basis of a United Nations projection of population growth and sectoral water consumption in table 1. The data for energy consumption are reproduced in table 2. A comparison of the Purchasing Power Parity (PPP, see figure 2) with population growth reveals that with the exception of city states like Macau, Hongkong and Singapore, most nations with a high population growth are also amongst the poorest countries in comparison to others in the list. In the scatter plot below, GDP growth rate is plotted against the energy consumption development rate. For a country like Indonesia it is evident that a low population growth is one key factor for a high GDP growth of 7.8 % and an increase in energy consumption of nearly 300 % in the period 1984-1994 which is an expression of Indonesia's dynamic economic development in a rapid industrialization process until its sudden slump since October 1997. South Korea is expected to experience water scarcity in the coming decades despite a rather low population growth. Its growth rate of 6.3% is underlined by an increase in energy consumption of over 200% . The development process of South Korea indicates an increasing competition between domestic and industrial water consumption versus agricultural water consumption. Increasing pollution of water resources is likely to worsen the water scarcity and would affect strongly domestic and industrial water supply in terms of both: quantity of supply and cost. On the other hand, South Korea is (still) in the economic situation to avert a water crisis as a result of pollution.





* GDP(PPP): Purchasing Power Parity, based on World Bank ratios takes into account price differences between countries, for a more accurate measure of national wealth.

** GDP-growth(%) : Gross Domestic Product growth is the % increase of the value of all goods and services produced in one year.

1	Singapore	16	Philippines
2	Hong Kong	17	Maledives
3	Japan	18	P.N.Guinea
4	Australia	19	Pakistan
5	New Zealand	20	Mongolia
6	Macau	21	Laos
7	Taiwan	22	India
8	South Korea	23	Bhutan
9	Malaysia	24	Bangladesh
10	Thailand	25	Vietnam
11	Fiji	26	Cambodia
12	Iran	27	Nepal
13	Indonesia	28	Myanmar
14	Sri Lanka	29	Afghanistan
15	China		

Data compiled by ASIAWEEK 26 September and 31 October 1997 from various sources.

Figure 2 : Population growth and dynamics of economic development of selected countries in Asia

GLOBAL RUNOFF DATA CENTRE (GRDC)

Number	Country	Availability of freshwater per-capita and year *	Sectoral water consumption 1970-1987		
			Domestic	Industry	Agriculture
		m^3	%	%	%
1	Singapore	179	45	51	4
3	Japan	4499	17	33	50
8	South Korea	1158	19	35	46
9	Malaysia	14441	23	30	47
10	Thailand	2433	4	6	90
12	Iran	955	4	9	87
13	Indonesia	9180	13	11	76
14	Sri Lanka	1718	2	2	96
15	China	1835	6	7	87
16	Philippines	3090	18	21	61
18	P.N.Guinea	106346	n.a.	n.a.	n.a.
19	Pakistan	1643	1	1	98
20	Mongolia	6533	11	27	62
21	Laos	27870	8	10	82
22	India	1498	3	4	93
23	Bhutan	30293	36	10	54
24	Bangladesh	12018	3	1	96
25	Vietnam	3182	13	9	78
26	Cambodia	25297	5	1	94
27	Nepal	4178	4	1	95
28	Myanmar	14319	7	3	90
29	Afghanistan	1105	1	0	99

* UN - middle projection of population growth until 2025

Compiled from:
Wasser in Asien (1997)

Indices of water scarcity
(m^3 per capita and year)

< 500 acute freshwater deficit
500 - 1000 chronical freshwater deficit
1000 - 1667 periodical freshwater deficit = (water scarcity)

Table 1 : Availability and consumption of water in selected countries in Asia

On the other side of the scale are countries which will experience a water scarcity in the context of a low PPP, high population growth, low GDP but a strong increase in energy consumption in an overall environment where water is mainly consumed for agriculture. Pakistan can serve as an example for this situation. If the quantity-based scarcity is amplified by increasing water pollution, the economic reserves would be strained to avert the amplification of a water crisis. An economic upstart is evident for Vietnam: With a high population growth of still 2.3% and a PPP of less than 1.000 U.S $, Vietnam experienced a GDP growth of 9.5% and an increase in energy consumption of almost 150%. This represents the rapid build-up phase after the war with fast growth of domestic and industrial water consumption which accounted for 13% and 9%, respectively, of the sectoral water consumption in the period 1970-1987. Reduction of the population growth is seen as a key requirement to sustain economic growth and the ability for investments in water protection and demand reduction strategies. Another macro-economic aspect of demand management are the increasing development costs of water resources development in future. The necessary increase in investments will result in deductions in investments required in other sectors of high social and economic priority. This is mostly felt in nations with stagnating economies.

Country	TWh (1984)	TWh (1994)	% - Change
Indonesia	11,74	46.77	298
Thailand	19.46	65.14	235
South Korea	50.62	156.32	209
Malaysia	12.55	35.20	180
China	349.00	866.0	148
Vietnam	3.87	9.59	148
Pakistan	19.94	47.70	139
Bangladesh	2.87	6.75	135
India	137.89	322.90	134
Taiwan	49.02	110.64	126
Singapore	8.90	19.10	115
Iran	68.17	31.98	113
Hong Kong	15.04	29.21	94
Sri Lanka	1.89	3.61	91
Philippines	22.71	17.22	32

Table 2: Electricity consumption of selected countries in Terawatt-hours. Data from International Energy Agency, cited in: ASIAWEEK, 26 September 1997

4.1 Water, agriculture and the economy

Water is the main limiting factor in agricultural production (see table 1 which shows the sectoral water consumption for some Asian countries). A workshop on "Irrigated agriculture in Southeast Asia beyond 2000" in 1992 notes as one important area of common concern for the region the "Planning and management of water resources use, with particular reference to caring of the environment and to improving conservation and beneficial application of the water resources, with due regard to competing uses of water" (Heim et al 1994). On a global average, 93.4% of the available fresh water is consumed by agriculture (Shiklomanov, 1996, op. cit. WMO, UNESCO 1997). In India, 93% of water supplies go for irrigation. The degree of water scarcity is therefore determining the direction (aggravation, persistence or alleviation) of poverty development in the region. An example demonstrates the relationship between water scarcity and adverse effects on the national economy: The agricultural sector of India contributed about 57% to the gross national product (GNP) at the time of independence in 1947. Today, this figure is about 25% (The Economist, 11/1997). However, the agricultural sector uses more than 90% of the available water which is indicative of a low profitability of investments in the agricultural water sector from an economic point of view. With the realization of a predicted water crisis, food self-sufficiency is endangered. A general tendency in irrigated agriculture in Indonesia, Malaysia, the Philippines and Thailand is the continuing increase of the cost of investment per ha of irrigated land with a simultaneously falling revenue from crops harvested from irrigated land (Heim et al 1994). Compounding to this situation is the increasing competition for water mainly for industrial purposes, where the per unit investment in water development yields higher profits in terms of produced industrial outputs. Under both feasible options: Allocation of more water to agriculture or import of food using (scarce) foreign reserves, the economic productivity will be lower and therefore also the financial resources for investments in industrial and urban water pollution control and measures for poverty alleviation. The seriousness of the situation is underlined by a statement of the World Wildlife Fond (WWF 1990) which states that in the State of Uttar Pradesh "the number of villages short of water has risen from 17,000 to 70,000 in the last two decades". With respect to food production for a still growing population in regions II and V, the limited availability of freshwater and conflicting water uses may make it necessary to re-think the politically influenced paradigm for national food *self-sufficiency* to an economically driven paradigm of *food security*. This paradigm would seem promising for newly emerging industrialized countries which could afford to import food from irrigated agriculture in trade for industrial outputs.

The growth of mega-cities in the region (see para 4.3 below), limits of suitable land for irrigation, availability of suitable water and a decline in the profitability of irrigated agriculture leads to a stabilization of investments into irrigation schemes. In the future it can be expected that the optimization of water use in agriculture will stabilize water demand on a high level of the total freshwater demand. The largest demand for surface freshwater utilization is expected to arise from the need for energy production in a region, where most countries are chronically short of fossil resources. Table 2 above gives an impression of the dimension of the increase in demand for energy in the countries of the region.

4.2 Hydropower development

With regard to the energy consumption development, hydropower plays an increasing role in Asia as the only important renewable resource. It is therefore safe to assume that a large part of

the future energy supply will be provided through the development of the hydropower potential in the region. Exceptions to this general development are countries such as Iran where the hydropower potential is small. "Hydroelectric power will make large demands on the international rivers of the world. Thailand, a country that has urgent needs for both energy and water, lies alongside the Mekong river with its unexploited resources amounting to some 30,000 MW. India, with similar problems, needs to pursue the vast untapped resources of the Ganges and Brahmaputra rivers." (World Bank 1994). To give examples for the developments within the Mekong basin, three projects are now under consideration (Ryder, G. 1997):

Kohne Falls (238 MW) and Ban Koum (2.330 MW) both in south Laos and Sambor (3.300 MW) in northeast Cambodia. In the upper Mekong river in Yunnan province, China the Manwan dam (1.500 MW) has been finalized in 1994; the Dachaoshan dam (1.500 MW) is under construction and the Xiaowan dam (4.000 MW) is planned. The debate between prominent supporters and opponents of large dam projects often centres around the economic benefit of these projects and the socio-economic disadvantages and ecological costs of these projects. Energy for rapidly developing economies, water for agriculture and flood protection contrasts with loss of biodiversity and associated direct economic losses (i.e. fishing industries), loss of land use for agriculture and debated resettlement schemes.

Bearing in mind, that most of the necessary structures can only be built in the headwaters of some of the largest rivers it becomes clear, that key watersheds originating in the Himalayas serve as watertower for a large part of the region. The dimension and regional extent of these key basins is illustrated in map 1. It will be shown below that exactly for these critical regions, the hydrological information base is insufficient for sound planning and operation of reservoirs and runoff the river projects.

4.3 Thirsty cities

Until 2015, fourteen out of 27 mega-cities of the world will be in South- Southeast and East Asia. Mega-cities are "Thirsty Cities" and thus are hot-spots with regard to water supply and pollution problems. The main source for water supply of most of the mega-cities in Asia is surface water. An assessment of water resources and its use in China (ESCAP 1997) shows that for 570 cities with more than 100.000 inhabitants 428 cities or 75% lack adequate potable water supply with an estimated *daily* deficit of 10 million cubic metres. The case studies below highlight a scarcity syndrome which is common for almost all of the mega-cities in Asia: Increasing demand, even if the increase rate is lowered by use of efficient control mechanisms (efficient water use, pricing etc.) is confronted with increasing difficulties to tap new resources due to physical constraints and increasing water conflicts. The development of new resources and the use of water recycling technologies also have a price tag which is largely increased as a result of the staggering pollution of many freshwater sources. This syndrome complex puts a special pressure on the governmental and institutional capacity of decision-makers to optimize the rational use of water.

The adaptation of traditional management practices has not kept pace with the rapidly changing water supply and demand situation of mega-cities which are competing with their hinterlands for water use. As the majority of the region's population is projected to live in mega-cities, the water crisis of these cities can pose a threat to the political stability of governments and parts of the region. A further observation is, that in most cases a knowledge base for the rational assessment of the scope and extent of the problem is non-existent or not accessible. A

knowledge base however is the pre-condition for the participatory development of rational solutions which are transparent and acceptable by the affected people. Some case studies highlight the statements made above:

Madras (Weber 1997):
In 1993, the three drinking water reservoirs contained only 26 billion cubic meter water for the 5 million inhabitants of Madras instead of the average 131 billion cubic meter. The water crisis was manifest in the supply of 23 litres of water per day and capita which however was unevenly distributed. Suggestions for solutions to this problem have been manifold; none of these could be completed: The Veeranam Water Supply Scheme was abandoned mainly due to institutional weaknesses and intrastate disputes between Tamil Nadu (with Madras) and Karnataka: If the scheme had been completed, the water supply of Madras and the irrigation of the rice plantations in the Cauvery delta, which is the most productive rice plantation region of south India had depended on the political good will of the government of Karnataka state. The Pulicat Lake Supply Scheme was not executed because of environmental considerations and the elimination of profitable fishery, if the brack-water Pulicat lake had been converted into a freshwater lake. The Telugu-Ganga project is promising. However, due to intrastate conflicts about the water use of the Krishna river between the states of Maharashtra, Karnataka, Andhra Pradesh and Tamil Nadu the plan has not been realized so far. In addition it became apparent that such a scheme can only be operated if necessary hydrometeorological information is available: In spring 1996, lowflow in the upper course of the Krishna river resulted in a water volume of the Kandaleru reservoir which would have been insufficient for the water supply of Madras.

Bangkok
With a projected population of about 12 million inhabitants in 2015, Bangkok belongs to the 20 largest cities in the world. 43% of Metropolitan Bangkok is connected to the Metropolitan Water Works Authority, network water losses are in the order of 40%, which is typical for many large cities in Asia. Most of the water supply is drawn from the Chao Phraya river which is heavily polluted i.e. the concentration of heavy metals exceed the maximum permitted concentration by a factor of 13 for lead, 3 for Mercury and 6 for Cadmium (all numbers cited above are from: Kraas, F. 1997). A rapidly sinking groundwater table leads to saltwater intrusion and additional water quality problems. There are no ready solutions to the problem.

Beijing (compiled from: Sternfeld 1997)
The projected population for Beijing is 18 million in 2015. Already now the city faces almost annually severe water shortage with an average of 1.2 cubic meter water per person and year (This includes supply of water for municipal and industrial use!). Lack of surface water and over-exploitation of ground water leads to a lowering of the groundwater table of about 2 metres per year; a third of the groundwater wells have fallen dry (WWF 1990).

High sedimentation rates of the Yongding river and increased water withdrawal have lead to a drastic reduction of the utility of the Guanting reservoir, one of the main reservoirs for the Beijing water supply. Competing water demands between the city water supply and agriculture have led to intra-provincial water conflicts which so far could not be solved. Trans-basin water diversion schemes are contemplated but are yet not executed due to the competing water demand and use of the neighbouring provinces.

Karachi (Gul 1997)
Twenty million inhabitants are projected for this city by the year 2015. The supply deficit will be about 10 million cubic meters per day. Reducing water wastage caused by network leakage and water use, increase of water prices and the supply with water from the Indus river are favored (temporary) solutions for the severe problems.

5 Sharing of data and information

5.1 General approach

Sharing of data and information on a regional basis is especially important for transboundary river basins. Worldwide, as of 1987, nearly 286 treaties and agreements were related to 61 basins out of about 200 international river basins. (UPRETI, 1993). The first Petersberg Dialog Forum on Global Water Politics - Cooperation for Transboundary Water Management (Petersberg Declaration, March 1998) recognized water as a catalyst for regional cooperation. Main driver for this cooperation is the growing water demand in transboundary river basins. Water alone is considered not the root-source of conflicts; the potential for conflicts over water issues develops in combination with other sources for conflicts.

The use of water resources in the region is characterized by strong contrasts in water availability and conflicts resulting from sector allocation on a national level and water resources management including allocation in transboundary river basins. The strongly differing economic development status of countries in the region unfolds the little recognized level of the technical, economical and political capability of countries sharing transboundary rivers to utilize water resources for the development of national economies: Allocation schemes in transboundary river systems therefore tend to be biased towards water demand projections of more dynamic economies, leaving behind less dynamic or even stagnant economies. This is inherently visible i.e. in the management plans for the Mekong river. Conflicts are foreseen when these countries pick up development and thus water demand increases beyond levels which might have been agreed upon in treaties.

Monitoring of negotiation processes between transboundary riparian countries reveals a strong tendency of countries to maintain an administrative status quo in restrictive information sharing and a perception of high risks if information were shared. This stands in contrast to a perception of enhanced regional development opportunities if existing policies for sharing of data and information were changed. Again, root causes are found in most cases in the general political climate of cooperation which manifests itself inter alia in the handling of water-related issues.

Sharing of information assists decisions about the mutually beneficial use of water resources and by itself does *not pre-empt* negotiations on a political level and decisions about the allocation of water resources in a transboundary river basin. Governments and hydrological services must be informed about the regional and global benefits of shared information and about the value-added benefit which can be derived from shared information. *Sharing of hydrological data on a technical level does not by itself constitute a process of the internationalization of water disputes.* The opinion that water resources are tied to the national security, integrity and development potential of a nation is a strong factor which limits the transfer of information severely. There is the general perception that the sharing of hydrological data and information is not de-coupled from negotiation and decision-making processes, which impedes the transfer of hydrological data. It is important to recognize, that conflicts between

riparian states are maintained in a climate of mutual distrust which in its technical component can be traced to the lack or absence of shared data and information. The sharing of data and information can be a first step in a series of confidence-building measures to overcome a conflict situation on the basis of equal information which can be shared by all partners. Water resources development in the regions have partly been politized to an extend which makes the rationally based management of water resources on the basis of the river basins difficult. In the view of the GRDC, the exchange of hydrological information to users other than the directly involved parties does not invite interference of extra-regional powers if the information exchange is kept strictly on a technical level. In this way, the hydrological database forms an important basis for negotiations and decision-making. On the technical level, the hydrological database could then be made accessible to identified users with a genuine interest, while the riparian countries of a river basin decide independently on the political level about the mode and direction of bilateral or, as the case may be, multilateral negotiations and discussions about the beneficial use of the water resources of transboundary rivers.

5.2 Benefits for regional cooperation

From a regional and global viewpoint, some major benefits of shared information in regional cooperation are summarized.

- Coupling of the forecast capability of meteorological/climatological anomalies such as El Nino with the ability to predict hydrological responses to such anomalies. A recent study (Cluis 1998) shows marked responses of river flow to El Nino events over WMO regions II and V. Such studies are only possible with a large number of available discharge records to downplay local singularities which may be caused by basin specific processes. Areal coverage with discharge information allow the recognition of patterns of water availability (see chapter 9 below) and responses to anomalies. If near real-time information is available, the validation of predictions needs a large number of gauging stations for the validation of prediction models. In this context, flood and lowflow forecasts cannot be seen only from the basin view: There is a regional component to it especially in large, transboundary river basins.

- On the basis of large reporting networks it is also possible to detect trends and jumps in the availability of freshwater in a region (Portmann 1998). The "early warning" value of large numbers of reporting stations is a pre-condition for mid- and longterm regional planning. It is indeed the kingpin for the kind of resources assessments on which strategic socio-economic planning can build on.

- In economies which depend to a large degree on agricultural production, the assessment of regional hydrological response to climatic anomalies including climate change is vital both in mitigating negative effects of drought and lowflows as well as counterbalancing or averting speculation on commodity markets for agricultural products. With an increasing regional flow of goods and the interdependence of national markets from other countries inside and out of the region as well as an increasingly diverse and complex infrastructure linking nations, the regional aspect of hydrological processes, responses to change (i.e. through climate change, landuse changes, point- and non-point pollution sources) becomes a prominent issue for regional planners.

- Land-based sources of pollution use the watercourses as transport medium into the coastal zones and the oceans where pollutants are re-distributed by ocean currents (see chapter 6 below). Thus, monitoring of discharge close to the mouth of rivers and monitoring of the transport of pollutants is of high regional interest.

6 Linkage of water quantity and quality

Pollution: "Asia's rivers are, perhaps the most degraded in the world" (WWF 1990). From the same source it can be quoted: "About 70% of the country's (India, the author) surface waters are polluted; out of some 2,119 towns and cities, only 217 have partial or complete sewage treatment facilities. Almost 600 km of the 2,525 km of the Ganges river are dangerously polluted. Out of 78 rivers monitored in China, 54 are seriously polluted with untreated sewage and industrial waste. Between a quarter and a sixth of the flow of the Huangpujian river, a major source of drinking supply for Shanghai, is untreated waste. More than 40 of Malaysia's major rivers are so polluted with agricultural and industrial wastes that they are said to be biologically dead". The Bagmati river in Nepal is the only river draining the Kathmandu valley with more than 3 million inhabitants. The river is biologically dead even though its waters are used by a part of the urban and suburban population. The single most important reason for this rapid deterioration can be seen in the rapid growth of population, industrialization and industrial activities in Asia which have outpaced the ability of governments to expand sewage and water infrastructure which contributes largely to the increasing pollution of rivers and coastal regions along which most of the mega-cities are situated (UNEP 1995). The inability of many of the regions' national governments to respond to the worsening situation is compounded by the generally inadequate and unplanned private investment into this sector which is perceived by private investors as a sector with a high investment risk.

Ultimately, coastal regions and the open oceans are the dump- sites of pollutants carried by rivers into the sea. Ocean currents serve as an effective transport mechanism of pollutants on a global scale.

Considering, that a large portion of the population lives in coastal areas and that these areas are the spawning grounds for fish on which a large part of the world's population depends as a major source of protein, the protection of coastal regions and the oceans from land-based activities and the transport of pollutants into the ocean is a top priority for UNEP (UNEP 1995). The present methodology to assess water resources availability in most countries does not take into account the limiting effect of water pollution on the actually available water resources. In most countries, information about water quantity and quality is completely unrelated. As water pollution is dramatically increasing in practically all countries of the region, information about quantities of water availability present a strong bias, thus over-estimating net resource availability. It must be considered in this respect that treatment of polluted waters e.g. for agricultural use, domestic water supply etc. multiplies the unit costs of water with all socio-economic consequences as for example the production costs for agricultural products. Monitoring of water quantity and quality have to go hand in hand to allow a reliable assessment of the availability of freshwater for different purposes. In the absence of water quality data on a continuous monitoring basis, characteristic data from several selected river basins of WMO-regions II and V have been compiled from UNEP 1995 (Table 3 and 4).

7 Data collection networks - Some General Remarks

As in many other countries of the world, hydrometeorological services are declining in most Asian countries not only in terms of station density but in the quality and reliability of the data. Keeping in mind, that between 20-25% of the region's national investments are aimed to the water resources sector and that the cost-benefit ratio of hydrological data is in a bandwidth between 1:1.50 and 1:21.20 (see chapter 3 above), there is a clear lack of recognition of the crucial link between investments and sustainable backup of these investments with high quality data and information through capacity building in hydrometeorological services (Grabs 1996a). Real-time information systems are in place only in a few relatively advanced countries in the regions concerned mainly for flood forecast systems. Like in other regions of the world, hydrological services until recently have been viewed in most cases as basic statistical services which were expected to collect and archive hydrological information of the national territory. As these services usually operate under civil service rules and regulations, active marketing of the benefit of hydrological information for the national development and the response to user requirements with meaningful data products has not been a priority of national hydrological services (Grabs 1996b). Thus, despite the cross-sectoral growing demand for water related data and initial investments in hydrological services, the economic value of water data for the national and *regional* development has not been sufficiently appreciated in national policies and the capability of hydrological services. The widespread unawareness of decision makers of the potential of hydrological services to provide timely hydrological information for national planning purposes *is still* a significant reason for the overall diminishing support for national hydrological services. The need for water-related information is growing; separate institutions with immediate economic interests (e.g. National Electricity Authorities) are conducting their own data collection and archiving activities which results in the present situation, that in many countries hydrological databases are fragmented. The situation is worse in cases of transboundary river basins in a politized environment, and also in the compilation and use of hydrological information over the entire ESCAP Region.

Left with insufficient resources and direct access to data users after the termination of projects and programmes, some of these data bases lost their value after loosing the capacity and mandate to continuously update the database. The global and regional importance of long-term forecasts for national economies is aptly demonstrated with the services of Smith Barney Brokers Inc.: The company issues the daily "Futures Research Weather Report" for each planting region of the world. This report is disseminated to about 18.000 brokers worldwide. The report strongly influences commodity futures exchange transactions and speculation in agricultural products (Der Spiegel, 1997). It should be noted that agro-based economies are especially affected by speculation in agricultural commodities. The hydrological responses and impacts on irrigated agriculture can at present not be estimated accurately due to the lack of a near real-time reporting network of streamflow data from which affected countries would greatly benefit.

Table 3: General characteristics of selected rivers in WMO-region II

					Concentration (mg l^{-1})												
	Watershed	**Area**	**Discharge**	**Runoff**	**TDS**	**TDS(f)**	**TSS**	**TSS(f)**	**Na**	**K**	**Ca**	**Mg**	**Cl**	**SO_4**	**HCO_3**	**SiO_2**	**PO_4-P**	**NO_3-N**
1	Amu Daria*	0.231	38.5	64	368	10.6	3275	94.0	10.0	1.4	89.5	3.2	45.4	78.4	140.4	-	-	-
2	Amur	1.920	355.0	169	73	25.8	146	52.0	2.9	1.0	10.1	2.6	2.3	5.0	42.7	6.0	0.035	0.12
3	Brahmaputra	0.580	630.0	1087	99	62.2	857	540.0	2.1	1.9	14.0	3.8	1.1	10.0	58.0	7.8	0.060	0.82
4	Cauveri	0.087	21.0	241	396	8.3	2	0.04	60.0	5.5	28.0	24.0	50.0	32.0	177.0	19.0	-	0.03
5	Chang Jiang	1.830	873.0	477	221	192.9	550	480.0	5.1	1.4	38.9	7.1	5.3	15.7	141.0	6.5	0.014	0.77
6	Chao Phrya	0.110	27.8	253	192	5.3	396	11.0	1.3	0.9	38.4	4.6	1.2	7.7	131.0	6.6	-	0.65
7	Ganges	0.950	460.0	619	156	71.9	1130	520.0	6.4	2.5	22.0	4.9	3.1	5.6	104.0	7.7	0.075	0.86
8	Godavari	0.310	92.0	350	214	19.7	1848	170.0	18.0	2.5	21.2	8.6	12.7	7.0	131.0	13.1	-	0.19
9	Hong He	0.165	123.0	745	148	18.2	1057	130.0	11.1	1.5	16.5	8.1	8.3	11.4	81.0	10.0	-	-
10	Huang He	0.770	35.0	45	460	16.1	26470	900.0	54.5	4.1	47.0	20.6	54.7	66.8	205.0	7.7	0.016	0.17
11	Indigirka	0.356	59.0	166	49	2.9	237	14.0	4.3	1.0	5.5	1.6	2.5	9.3	18.8	5.9	-	-
12	Indus	0.920	50.0	54	240	12.1	1187	59.0	32.0	6.9	35.0	16.0	32.0	40.0	65.0	14.0	0.130	0.40
13	Irrawady	0.414	428.0	1034	201	86.0	607	260.0	30.0	2.0	10.0	6.0	18.0	5.0	120.0	10.0	-	-
14	Kolyma	0.647	135.0	205	77	10.4	44	6.0	0.2	0.1	11.6	2.4	0.3	4.8	54.0	4.0	-	0.05
15	Krishna	0.252	67.0	266	322	21.6	239	16.0	54.0	2.0	25.0	11.0	39.0	21.0	168.0	5.0	-	0.16
16	Lena	2.440	533.0	214	112	59.6	23	12.0	4.5	0.7	17.1	5.1	12.0	13.5	53.1	5.8	0.010	0.09
17	Mahanadi	0.132	66.0	500	147	9.7	909	60.0	10.2	1.5	10.4	9.5	30.9	15.0	60.9	9.0	-	-
18	Mekong	0.795	510.0	642	99	50.4	294	150.0	3.6	2.0	14.2	3.2	5.3	3.8	57.9	8.9	-	-
19	Narmada	0.102	40.7	452	327	13.3	3071	125.0	27.0	2.0	14.0	20.0	25.0	5.0	225.0	9.0	0.020	0.12
20	Ob	2.550	419.0	140	140	58.7	38	16.0	4.0	3.0	21.0	5.0	10.0	9.0	79.0	9.0	0.060	0.09
21	Salween	0.325	211.0	649	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22	Shatt El Arab	0.750	77.0	136	400	30.8	1364	105.0	31.0	3.0	52.0	22.0	32.0	73.0	180.0	6.9	0.010	-
23	Syr Daria*	0.219	21.5	-	545	3.7	1364	12.0	31.2	3.7	93.5	20.0	32.6	161.4	202.8	-	-	-
24	Tapti	0.062	18.0	290	488	11.7	1372	24.7	65.0	2.0	32.0	23.5	59.7	5.0	285.0	16.0	-	0.60
25	Xi Jiang	0.442	316.0	651	192	60.8	218	69.0	1.3	0.9	38.4	4.5	1.2	7.7	132.0	6.5	0.004	0.60
26	Yennissei	2.550	562.0	220	127	71.5	23	13.0	1.5	0.8	21.0	4.1	9.0	8.6	74.0	8.3	0.010	0.10

Source: UNEP 1995

Data are compiled for individual watersheds and aggregated to regional values for average values.

Area	Basin Area 10^6 km²
Runoff	Runoff, mm $year^{-1}$
TSS	Total Suspended Sediment, mg l^{-1} (calculated)
TDS(f)	Annual Load of TDS to Oceans, 10^6 tonnes $year^{-1}$
TSS(f)	Annual Load of TSS to Oceans, 10^6 tonnes $year^{-1}$ (ref.7)
Discharge	River Discharge, km³ $year^{-1}$
TDS	Total Dissolved Solids, mg l^{-1} (calculated as sum of major ions)
-	Missing Data

* These watersheds do not drain into oceans and are excluded from continental and global summations of discharge and flux.

Table 4: General characteristics of selected rivers in WMO-region V

					Concentration (mg l^{-1})												
	Watershed	**Area**	**Discharge**	**Runoff**	**TDS**	**TDS(f)**	**TSS**	**TSS(f)**	**Na**	**K**	**Ca**	**Mg**	**Cl**	**SO_4**	**HCO_3**	**SiO_2**	**PO_4-P**	**NO_3-N**
1	Burdekin	0.1290	8.5	66	280	2.4	355	3.0	32.5	3.2	23.0	12.8	34.0	1.1	155.0	18.5	-	-
2	Flinders	0.1090	2.0	18	147	0.3	-	-	13.0	4.0	14.0	4.9	10.5	4.3	81.0	14.8	-	-
3	Fly	0.0610	141.0	2203	116	16.3	816	115.0	2.3	0.4	21.3	1.8	0.1	2.7	78.3	9.0	-	-
4	Murray Darling	1.1400	7.9	7	453	3.6	3797	30.0	101.0	6.0	21.0	17.0	171.0	38.0	94.0	5.0	0.1	0.03
5	Sepik	0.0787	120.0	1525	112	13.4	68	8.2	3.0	0.4	15.0	4.0	0.5	5.0	71.0	13.0	-	-
6	Waikato	0.0137	12.8	934	128	1.6	14	0.2°	18.6	3.2	7.0	2.3	19.2	7.2	42.0	28.4	0.1	0.30

Source: UNEP 1995

Data are compiled for individual watersheds and aggregated to regional values for average values.

Area	Basin Area 10^6 km²
Runoff	Runoff, mm $year^{-1}$
TSS	Total Suspended Sediment, mg l^{-1} (calculated)
TDS(f)	Annual Load of TDS to Oceans, 10^6 tonnes $year^{-1}$
TSS(f)	Annual Load of TSS to Oceans, 10^6 tonnes $year^{-1}$ (ref.7)
Discharge	River Discharge, km³ $year^{-1}$
TDS	Total Dissolved Solids, mg l^{-1} (calculated as sum of major ions)
-	Missing Data
°	Calculated from Median

8 GRDC data in regions II and V: Availability versus accessibility

8.1 General data situation

Maps 2 and 3 show the distribution of GRDC data in WMO regions II and V. Tables 6 and 7 give an overview of the number of gauging stations in the countries of the regions. A summary of station data availability for region II shows, that only 4.3% of the stations mentioned in INFOHYDRO are available in the GRDC database. For region V, this figure is 5.8%, largely because of the contribution from Australia. As can be seen from the network density, the number of existing stations is inadequate and the number of stations in the GRDC database allows only a very general regional picture of the discharge and runoff situation in both regions. In addition, the table shows that several countries have contributed no data so far; others have not updated contributed data for the last 20 years. This stands in contrast to countries such as Nepal which contributes 50% of their station data to the GRDC. Even though it is clear that in any case only subsets of national discharge data sets are of interest for the activities of the GRDC, the gaps in data and thus derived hydrological information are evident.

The average length of time series of discharge data in the GRDC is 24 years for Asia versus e.g. 53 years for Europe (Grabs 1996c). Figures 3 and 4 show the yearly availability of mean daily and mean monthly discharge data for the regions. For region II, the majority of discharge information is available for the time period 1965 - 1985; the majority of daily values is available for the years 1975 - 1990. The strong increase of stations in GRDC is indicative of the efforts of the International Hydrological Decade of UNESCO and the resultant series of reports on discharge of selected rivers of the world and the Operational Hydrology Programme of WMO, making repeated calls for data. More than one third of the GRDC database has been compiled through direct bilateral data acquisition activities of the GRDC since 1993. The declining availability of data up to date can be explained by the long back-lag of hydrological data to be published. Typically, 3 to 4 years are needed by many countries to print and publish hydrological yearbooks.

Most of what has been said for region II is valid for region V with the notable exception of the availability of mean daily discharge data for most of the available time series. Like in region II, the contribution of daily data is the basis for the computation of mean monthly discharge data from the daily time series.

Hence, for many stations mean monthly (generated) and mean daily (original) data series are available. The distribution of discharge stations to classes of drainage basin size reveals for region II (figure 5), that the majority of drainage basins in the database is in the order of 5.000 km^2, which is the size of large scale water resources development schemes. Amongst the stations are also very large drainage basins from several of the region's largest rivers. From the representation of basin sizes, the database is suitable to deal with hydrological questions on all scale levels. In contrast to region II, the basin size distribution in region V (figure 6) is dominated by small basins (< 500 km^2), largely because of the lack of large rivers with the exception of the Sepik river. Table 5 shows that the number of stations at the main stem of major rivers in the region is inadequate, especially for the headwaters of the six key river basins in Asia. As the Himalayan mountain range can be viewed as the watertower of Asia, knowledge about the headwater discharge is of paramount interest for the calculation of baseflow in the majority of large rivers in Asia.

Country	Area [km²]	Number of stations (INFOHYDRO)	Network Density [km²] (INFOHYDRO)	Number of stations (GRDC)	Network Density [km²] (GRDC)
Islamic State of Afghanistan	647497	149	4346	2	323749
Bahrain	622		??	0	??
Bangladesh	143998	118	1220	4	36000
Cambodia	181035	0	??	0	??
China (& Taiwan)	9600000	3396	2827	59	162712
Democratic Peoples Rep. of Korea	122762	64	1918	7	17537
Hong Kong	1046	0	??	2	523
India	3280483	1118	2934	44	74556
Islamic Republic of Iran	1648000	828	1990	24	68667
Iraq	446000	129	3457	4	111500
Japan	377682	1440	262	25	15107
Kazakhstan (Asia)	2537250	281	9029	17	149250
Kuwait	16000	0	??	0	??
Kyrgyzstan	198500		??	25	7940
Lao People´s Democratic Rep.	236000	40	5900	16	14750
Maldives	298		??	0	??
Mongolia	1564663	78	20060	13	120359
Myanmar	694120	34	20415	4	173530
Nepal	140797	60	2347	30	4693
Oman	300000	121	2479	0	??
Pakistan	776260	224	3465	27	28750
Qatar	11000	0	??	0	??
Rep. of Korea	98477	47	2095	8	12310
Rep. of Yemen	482683		??	0	??
Russian Fed. (Asia)	17881000	2293	7798	89	200910
Saudi Arabia	2149690	74	29050	0	??
Sri Lanka	65610	63	1041	7	9373
Tajikistan	143100		??	27	5300
Thailand	514000	888	579	48	10708
Turkmenistan	488100		??	0	??
United Arab Emirates	83600	22	3800	0	??
Uzbekistan	447400		??	7	63914
Viet Nam	332559	76	4376	2	166280
Sum / Average	45610232	11543	3951	491	92893

Table 6: Comparison of station densities in the countries of WMO Region II

Country	Area [km²]	Number of stations (INFOHYDRO)	Network Density [km²] (INFOHYDRO)	Number of stations (GRDC)	Network Density [km²] (GRDC)
Australia	7682300	3285	2339	193	39805
Brunei Darussalam	5765	0	??	0	??
Fiji	18272	113	162	2	9136
French Polynesia	4000	25	160	3	1333
Indonesia	1919464	420	4570	0	??
Malaysia	332000	400	830	38	8737
New Caledonia	19100	41	466	5	3820
New Zealand	268675	591	455	34	7902
Papua New Guinea	466200	0	??	3	155400
Philippines	300000	831	361	47	6383
Singapore	518	1	518	1	518
Solomon Islands	28370	9	3152	0	??
USA (South West Pacific)	19300	112	172	15	1287
Vanautu	14673	12	1223	0	??
Sum / Average	11078637	5840	1897	341	32489

Table 7: Comparison of station densities in the countries of WMO Region V

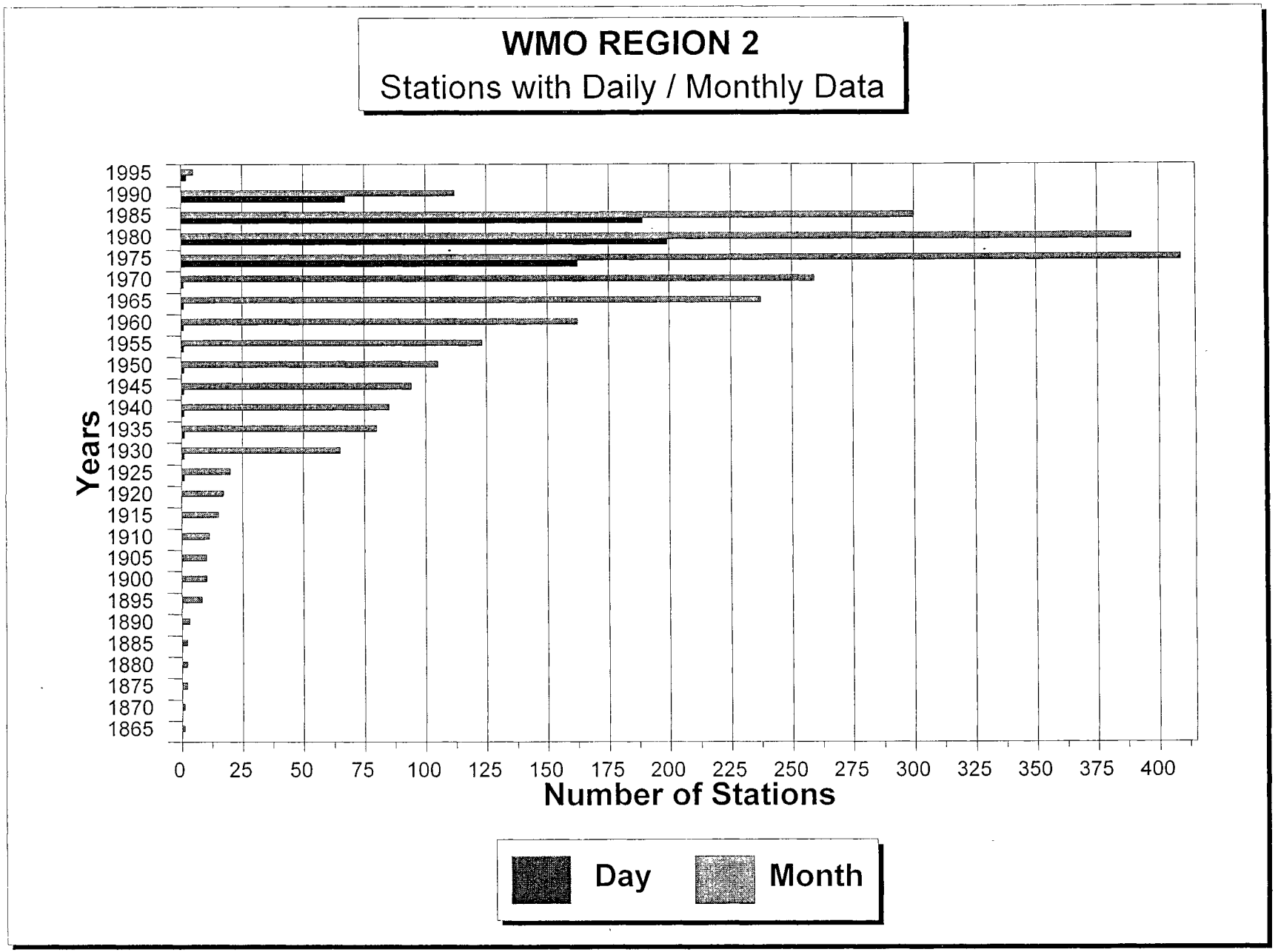


Figure 3: Available GRDC data in WMO - Region II

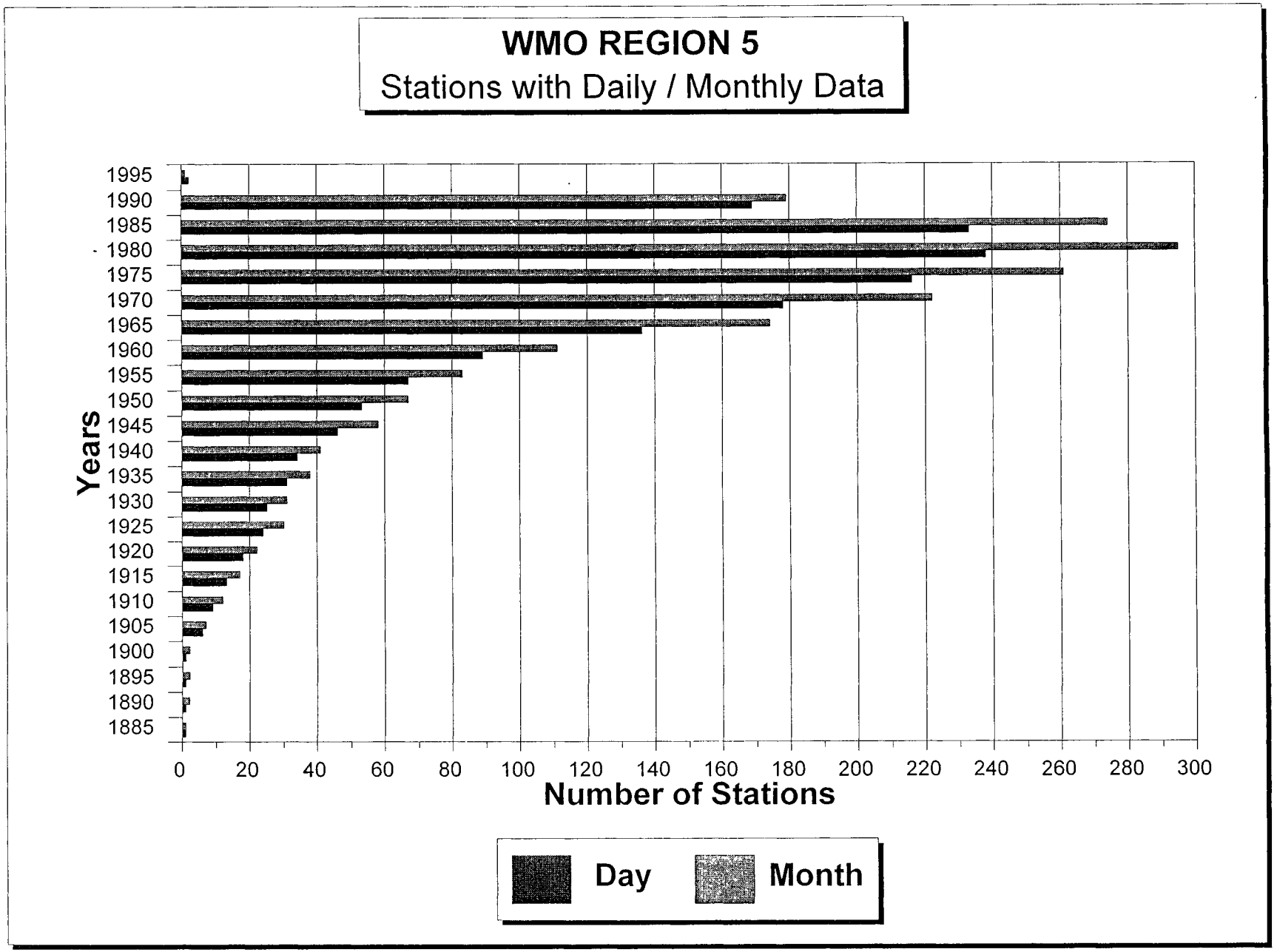


Figure 4: Available GRDC data in WMO - Region V

River	Basin area (km^2) of last station before mouth of river	Upper basin	Middle Basin	Lower Basin	Total
Mekong	545.000		7	1	8
Indus	832418	1		1	2
Yellow River	730.036			3	3
Ganges	846.300			3	3
Brahmaputra	636.130		1	1	2

Table 5: Number of GRDC-stations along the main stem of five major rivers

8.2 Overlapping time series of rivers in regions II and V

Overlapping time-series are a necessity for most regional comparisons, assessments and monitoring purposes. The tables in annex 1 and 2 show the overlap of time-series in Asia and the Pacific. A dominant characteristic is the non-availability of homogenous time-series for major parts of the regions. Very few long time series are available and short time series with non-overlapping records of rivers characterize the situation. A few countries such as the newly independent states of the former Soviet Union, Australia, New Zealand, China and Taiwan are exceptions. Other countries such as India have not updated their datasets and countries such as Indonesia have not contributed any data to the Centre. The catalog of river information in WMO regions II and V is given in annexes 3 and 4 to this report.

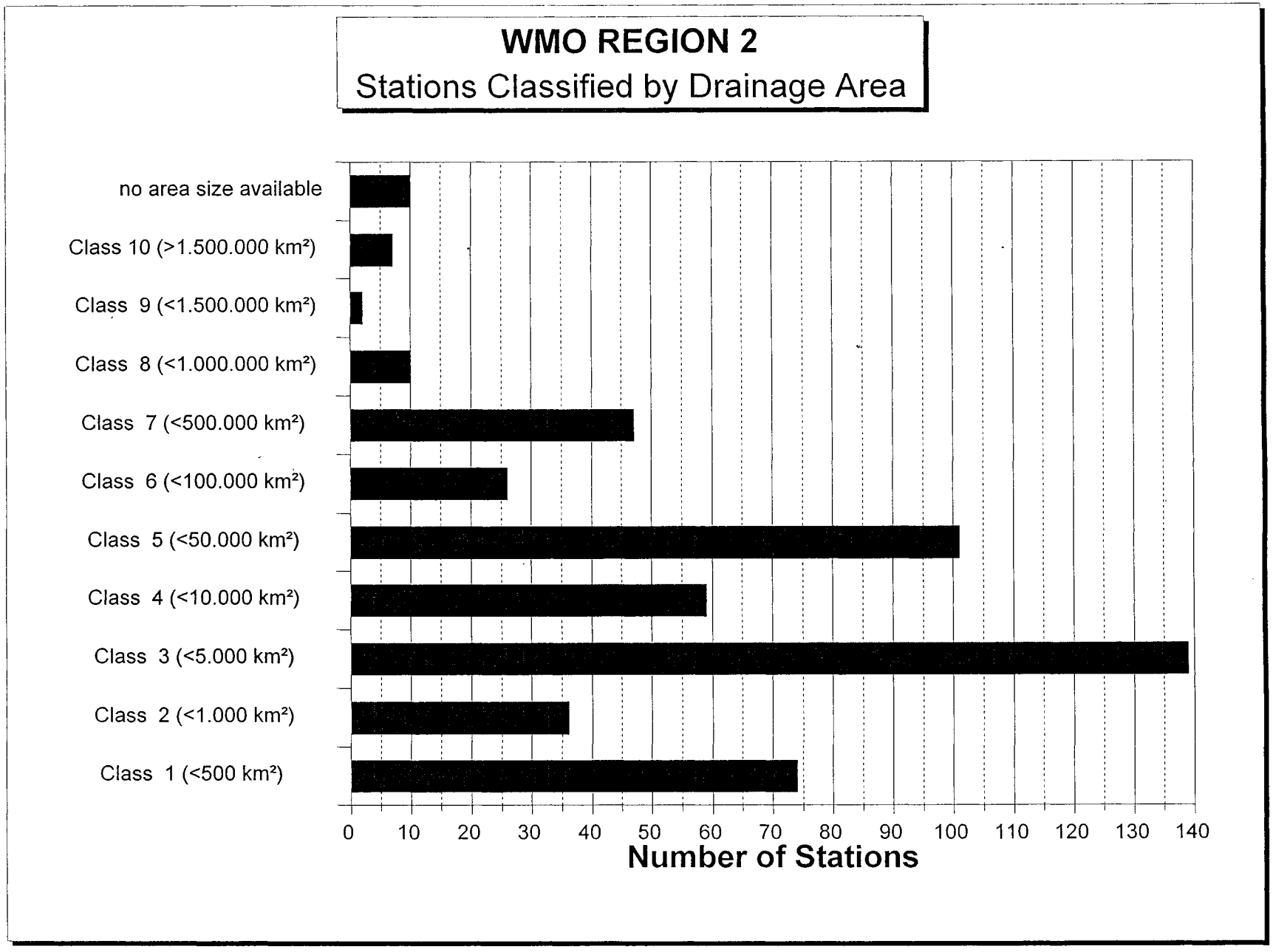


Figure 5: Drainage areas of GRDC stations in WMO - Region II

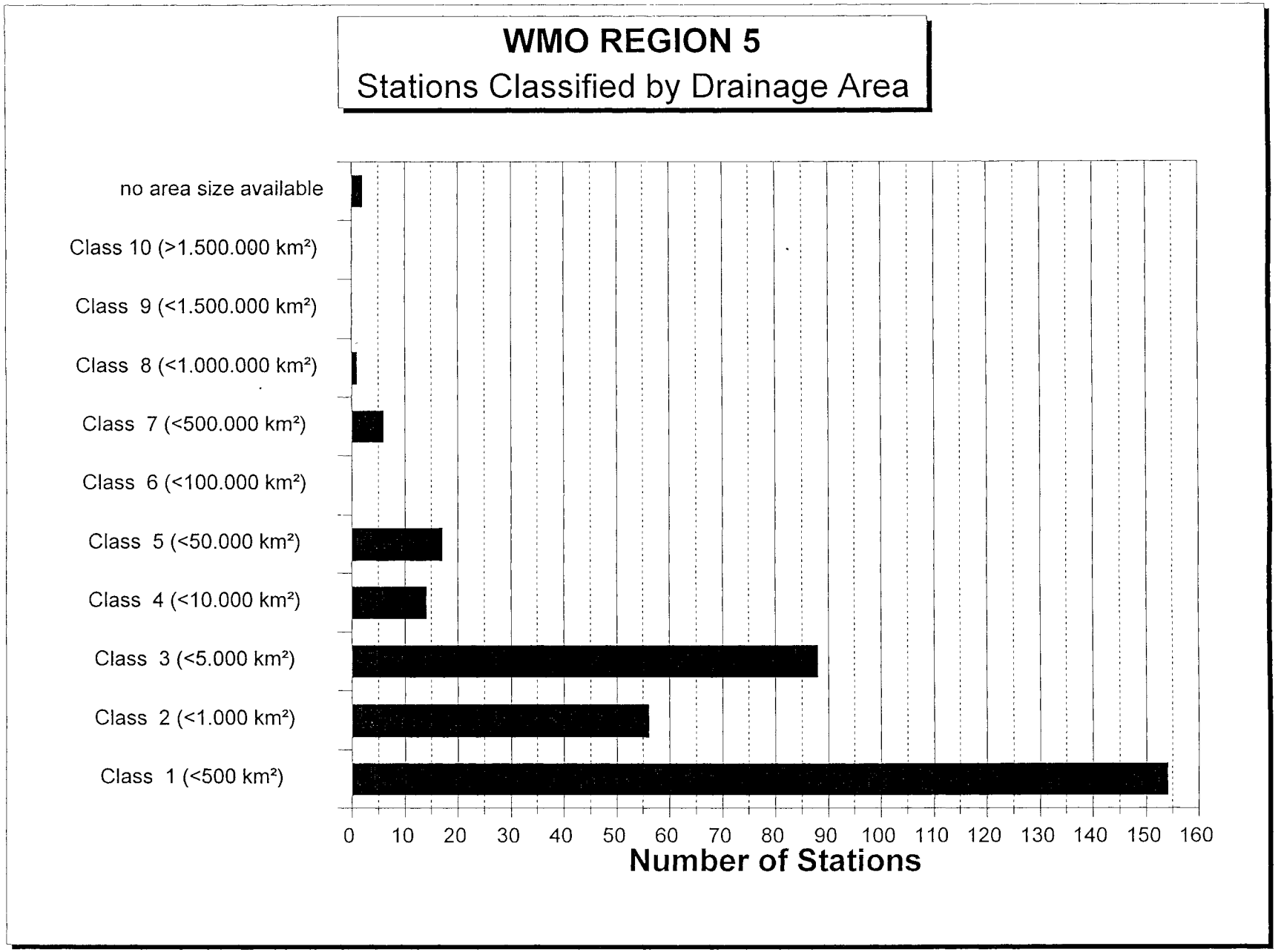


Figure 6: Drainage areas of GRDC stations in WMO - Region V

9 Monitoring of regional runoff

The GRDC has developed a software tool to monitor continental and global runoff on a grid-based, comparative basis (Grabs, 1996c). The software system "Global Runoff Monitor" allows the visualization of partial or the entire content of the GRDC database. The principal objective for the development of the tool has been to assess the temporal and spatial development of the runoff situation of continents or the entire globe ***on a comparative basis***.

In the absence of quality controlled station-related drainage basin boundaries, a grid overlay with 2.5° for the entire globe and 1.5° for the continents is created. All discharge stations which are located within the grid-cells are counted and a mean monthly runoff value is calculated as arithmetic mean from the time-series available for all of these stations. This runoff value is calculated on the base of the size of the grid cell. In this way, runoff of a grid cell is defined as grid-referenced discharge which occurs within a grid at a given time. It is clear from the description that the monitor produces gridded runoff only as a first estimate where only discharge data is used as input into the runoff monitor. The calculated mean monthly (grid-based) runoff values are classified and then plotted onto global or continental maps. For special purposes, the regions can be zoomed in to obtain a more detailed image of the station and runoff situation. The principal utility of the runoff monitor is to identify regions of relative water surplus or deficit in a given year or period of years in comparison with different time series. Depending on the analysis mode, the monitor allows the visualization of long-term development of runoff on a monthly basis, indicate the deviation of runoff values from the long-term monthly average, create slide-shows of the runoff development over regions, continents or the entire globe for any given year where data are available and prepare maps of the classified differences of runoff as a result of the comparison of two different time-series. In addition, the spatial distribution and density of discharge stations can be shown as well as the number of stations per grid. Several additional functionalities allow the user to select or discard stations for analysis or allocate stations to neighboring grid cells if this is necessary. Only those grid cells are used for the computation, where stations and data are available. It is evident from the maps (maps 4 to 20) that determined efforts are necessary to obtain the input discharge data for a truly regional coverage. For the purpose of this report, three sets of maps have been produced for region II, V and the entire ESCAP[2] region to demonstrate the potential capability of regional runoff monitoring. For two sets of maps, a 1.5° grid overlay has been created (for the ESCAP map, a 2.5° grid has been selected) and the comparative runoff calculation executed for those years where for a majority of stations the mean monthly discharge data were available. For all examples it can be demonstrated that complete, overlapping time-series are indispensable for regional runoff monitoring. This would allow also the regional visualization of runoff deviations in a given year or month from the long-term average or the comparison of the regional variability of runoff. Given the present availability of data, this type of work cannot be completed. For all maps it can be observed that the surplus deviations especially in the monsoon season are far greater (> 60%) than the deficit deviations in the dry seasons (< 20%). This behaviour is evident from the variability of hydrographs of most rivers in the region. For examples see annex 5.

[2] ESCAP: United Nations Economic and Social Committee for Asia and the Pacific with Secretariat in Bangkok

9.1 Runoff monitoring in WMO region II (maps 4 to 11)

For region II, the selected years were 1978 and 1981 where 1978 serves as reference year against which the year 1981 is compared. It is evident that all of India falls out of the comparison because of the non-availability of data for 1981. The maps for the months of February, May, August, November show, that the largest differences occur during the monsoon season largely in China and Indochina and parts of Central Asia, whereas no areas of explicit relative water deficit can be observed in the comparison period. In general, 1981 has been a much "wetter" year than 1978. The (+) - deviation of runoff is much higher than the (-) - deviation of runoff in all observed months.

9.2 Runoff monitoring in WMO region V (maps 12 to 19)

Because of the generally short time series in the region, the selected years were 1981 and 1985 where 1981 serves as reference year against which the year 1985 is compared. In the maps, Australia is dominant in the documentation of runoff differences. In general, 1985 has been only slightly wetter than the year 1981 including the month of August. For this month, only the southeast tip of Australia shows significant runoff surplus whereas all other areas in region V show no change or mild deficits (coastal areas of east Australia, Malaysia and west Borneo). Where (+) - deviations occur, they are more pronounced than (-) - deviations of runoff. Australia is a good example of the value of runoff monitoring when overlapping time series are available.

9.3 Runoff monitoring in the ESCAP region (map 20)

For the ESCAP region, the selected years were 1978 and 1985 where 1978 serves as reference year against which the year 1985 is compared. In this example, the annual runoff of the years are compared on a 2.5° grid size and the difference of runoff plotted as %-difference in map 20. Again, India, Pakistan and Indonesia could not be represented in the map due to lack of data. For the compared years, the following observations can be made:

Examples for areas of relative water surplus (+40 - > 60%):	Japan, North-East Siberia, tributaries of the Amur, upper Mekong basin
Examples for areas of relative water deficit (-20 - < 20%):	Northern Thailand, Myanmar, Malaysia, Sri Lanka, upper Hwang Ho river

10 Conclusions

The political recognition of the importance of data and information for the socio-economic development of WMO regions II and V has in many countries of these regions not been translated into nationally implemented strategies for the management of freshwater resources. An indicator for this statement is the inadequate availability of hydrological data both in quantity and quality of observations and the way these data are disseminated to decision-makers

and users. Hydrological processes are not bound to political borders and yet, the issue of water resources management in transboundary river basins is largely dominated by political sensitivity. Resource management and socio-economic development has also to be looked from a regional perspective and the viewpoint of a win-win situation for all concerned partner countries. The scientific tools and methodologies are largely in place to perform regional assessments, forecasts and projections if reliable and continuous data could be made available. Given the wide disparity of countrie's capacity to manage water resources in regions II and V, some countries should take the lead initiative for Technical Cooperation between Developing Countries (TCDC). National and international water disputes will be more frequent when water is perceived as scarce resource and socio-economic necessities may in future be the drivers for political decisions about the national and regional availability and beneficial use of hydrological information.

Acknowledgement

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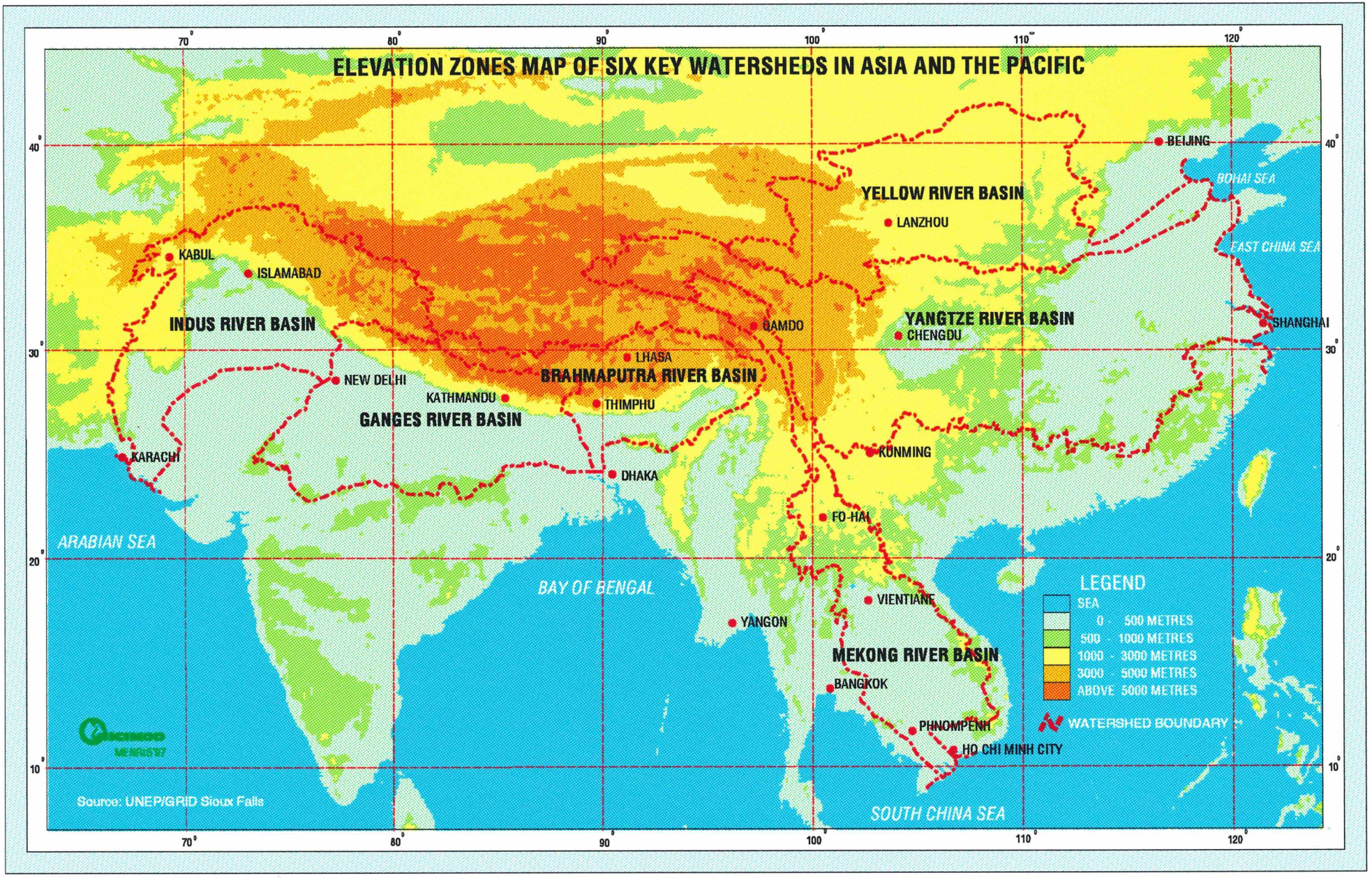
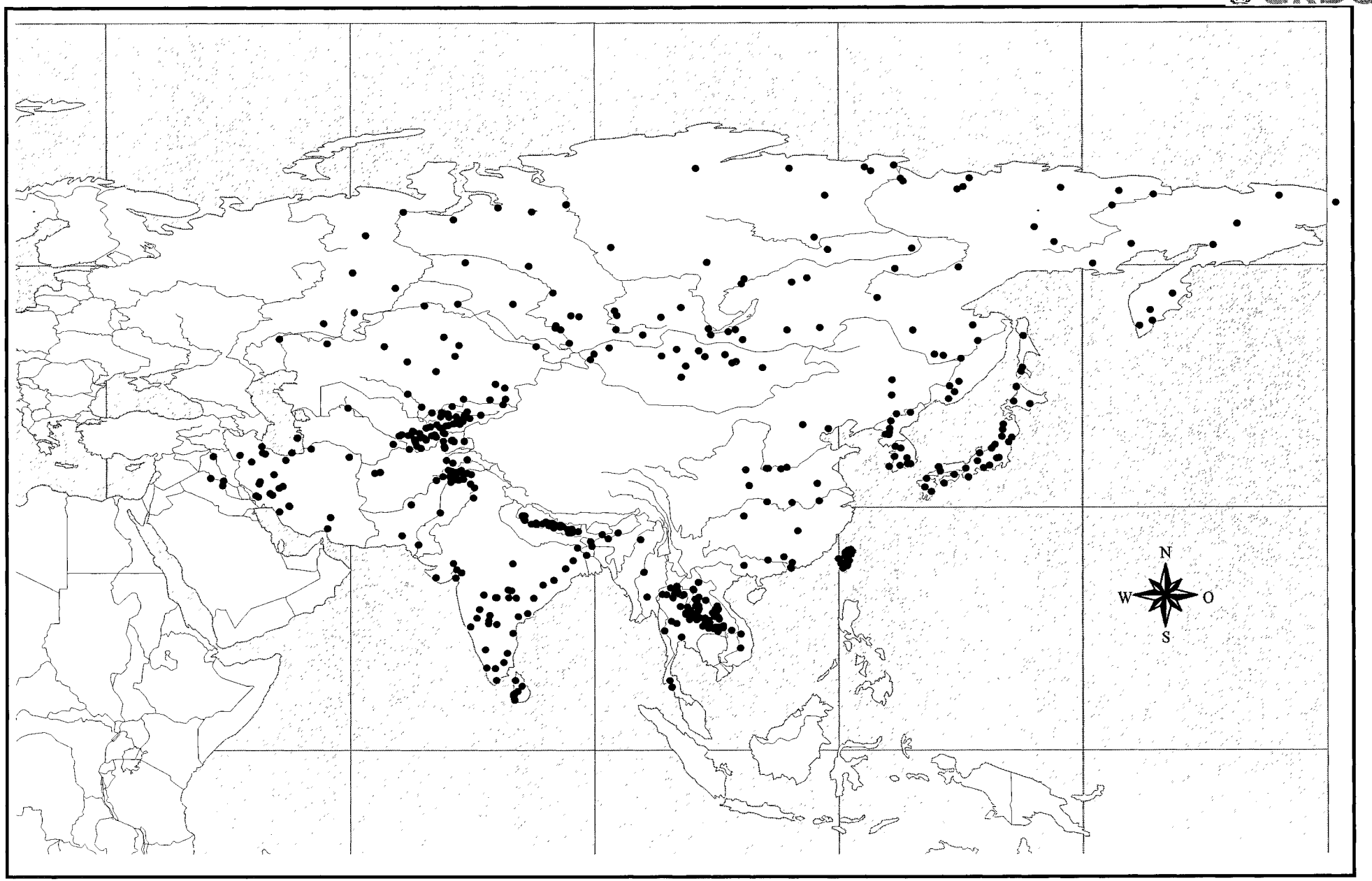
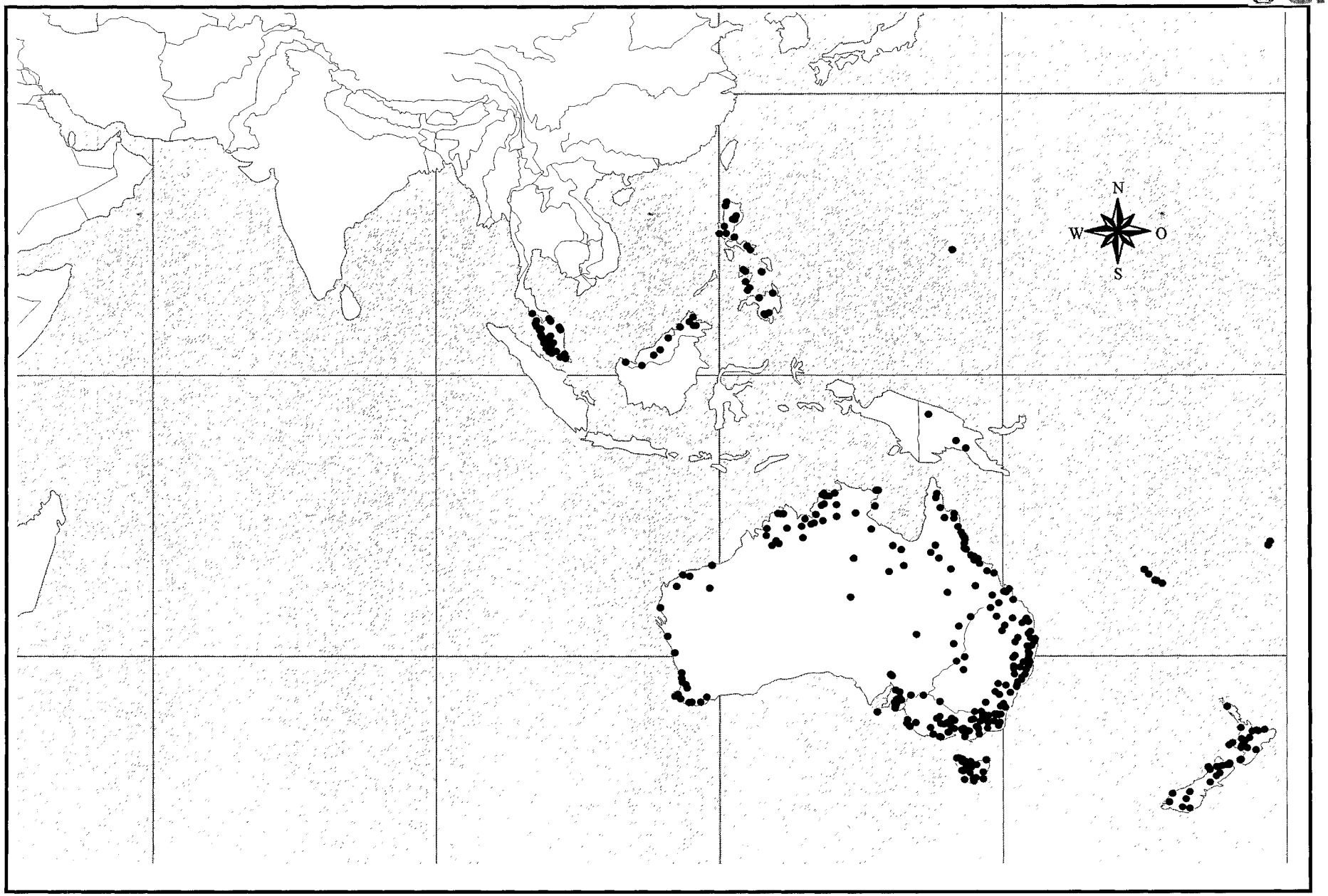


Map 1: Elevation zones of six key watersheds in Asia and the Pacific



Map 2 : GRDC stations in WMO-region II

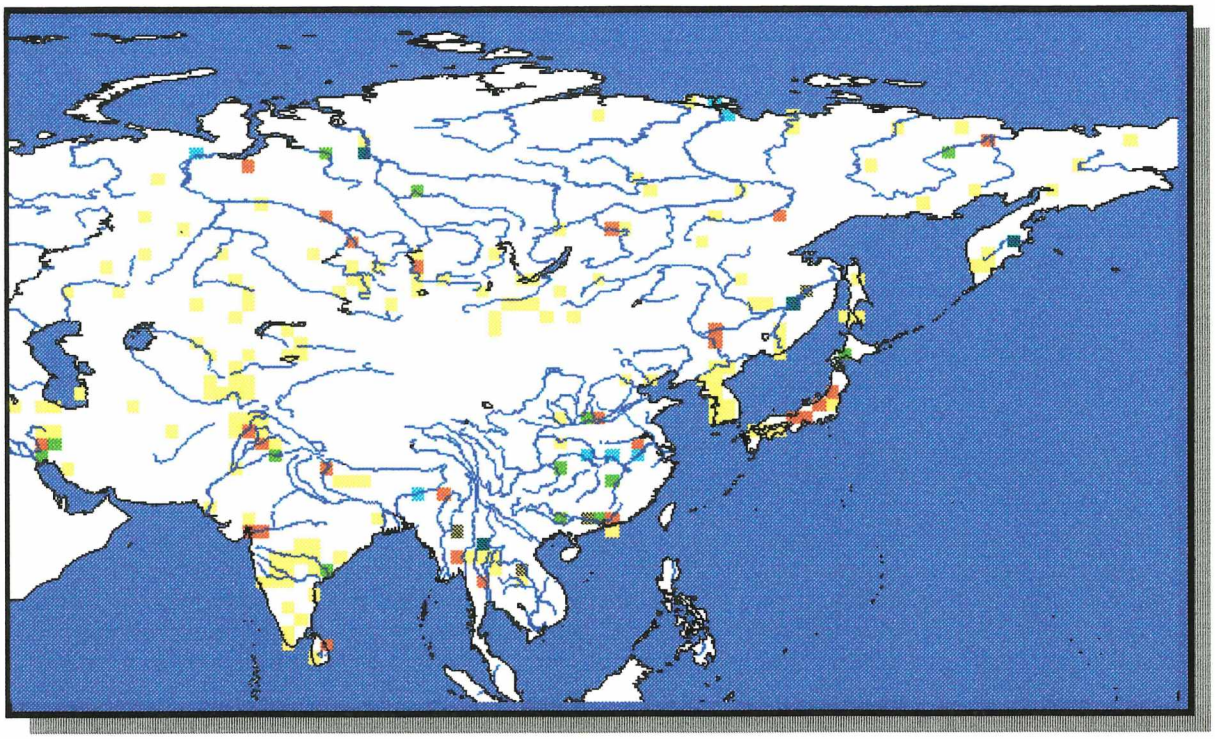


Map 3 : GRDC stations in WMO-region V

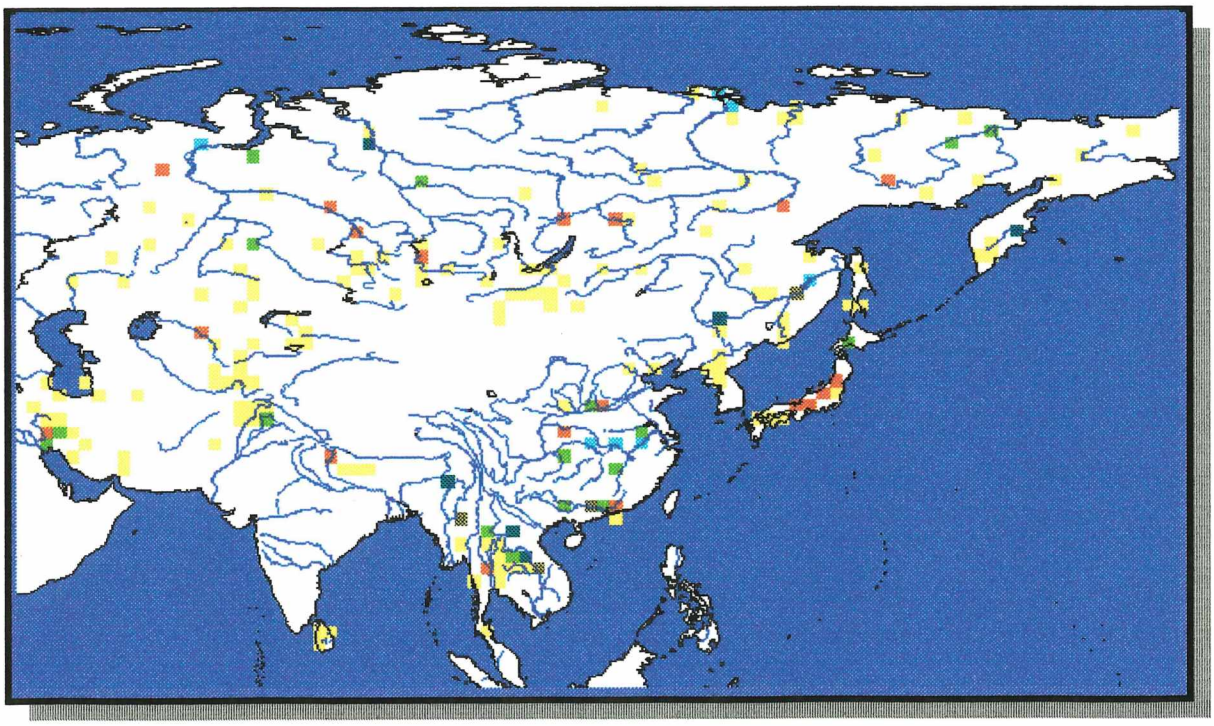
WMO-REGION 2: Value of Runoff in a 1.5° Grid

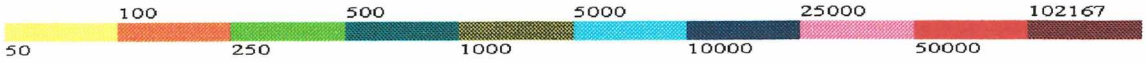
February

1978



1981



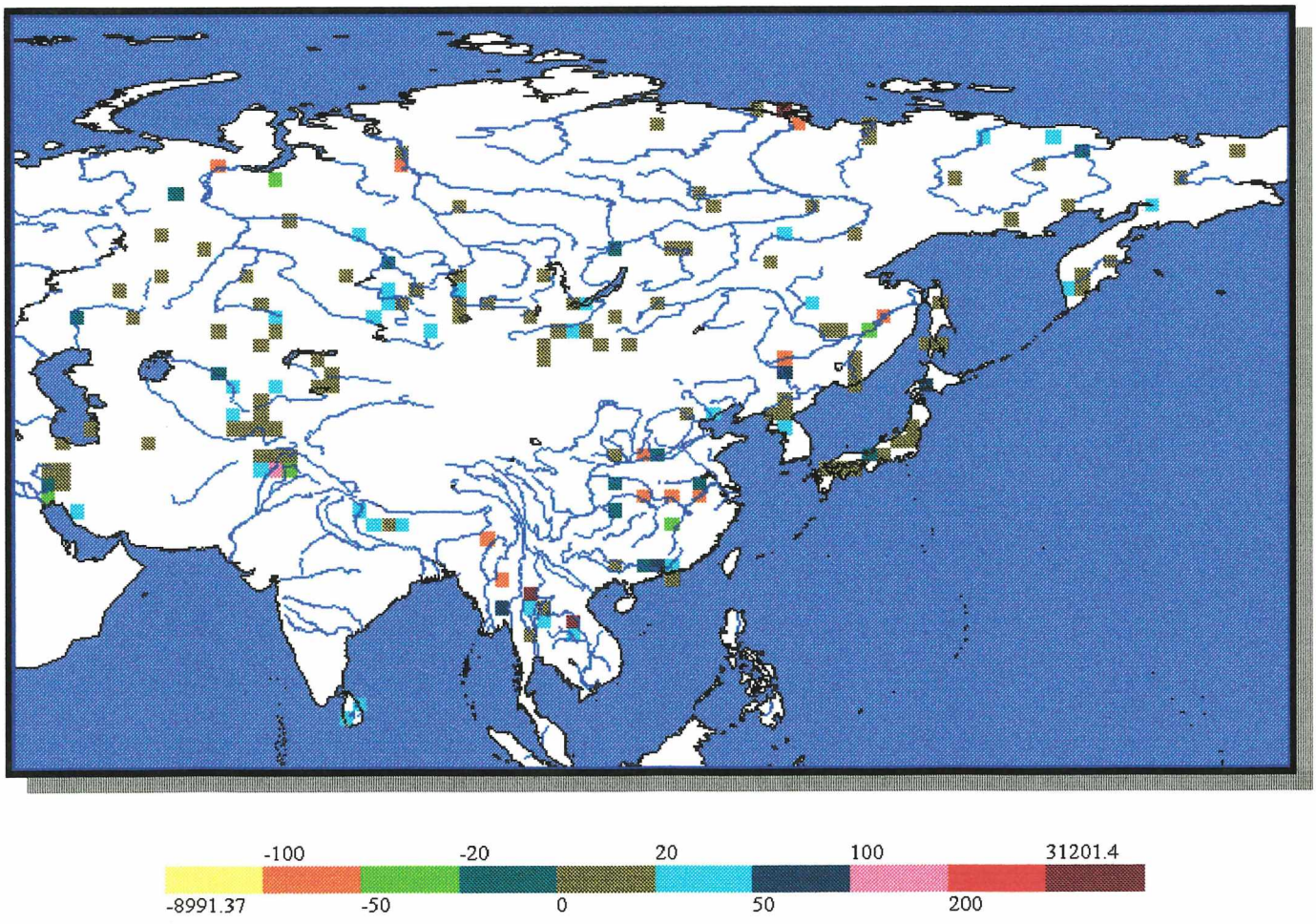


Map 4 :Runoff in February 1978 and February 1981 in WMO region II

WMO-REGION 2: Difference of Runoff in a 1.5° Grid

1978 compared with 1981

February

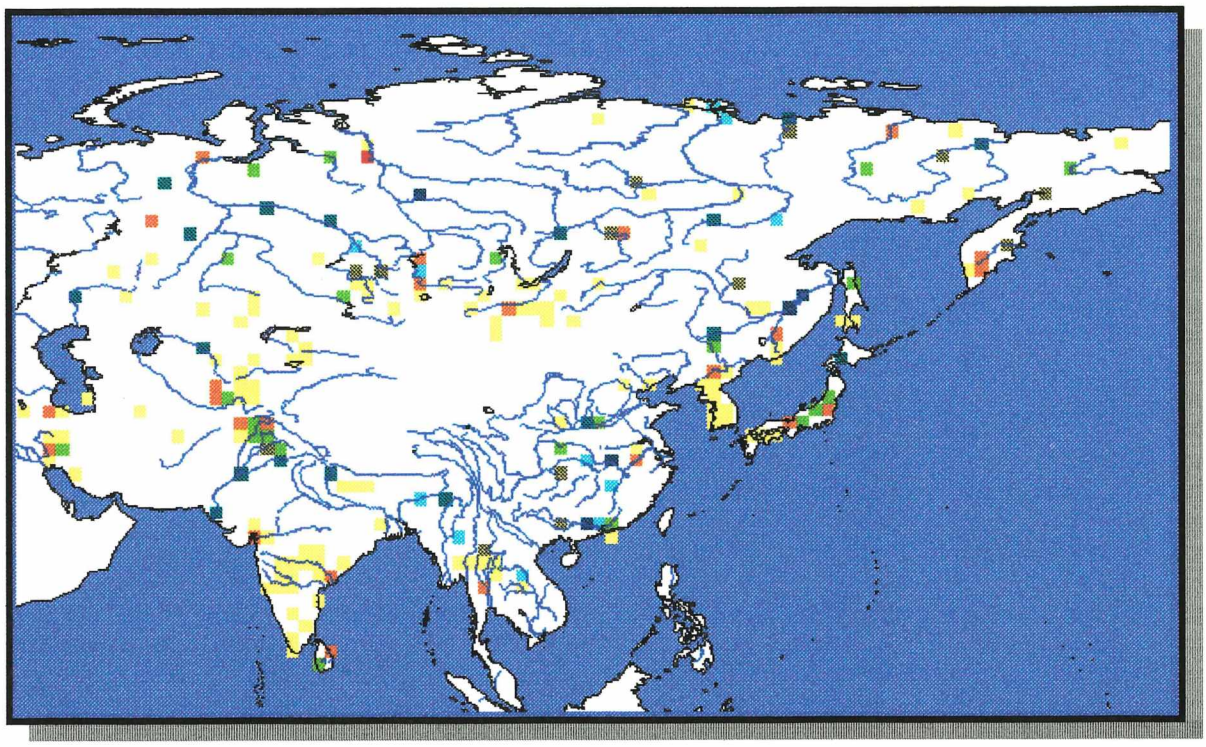


Map 5 :Difference of runoff between February 1978 and 1981 in WMO-region II

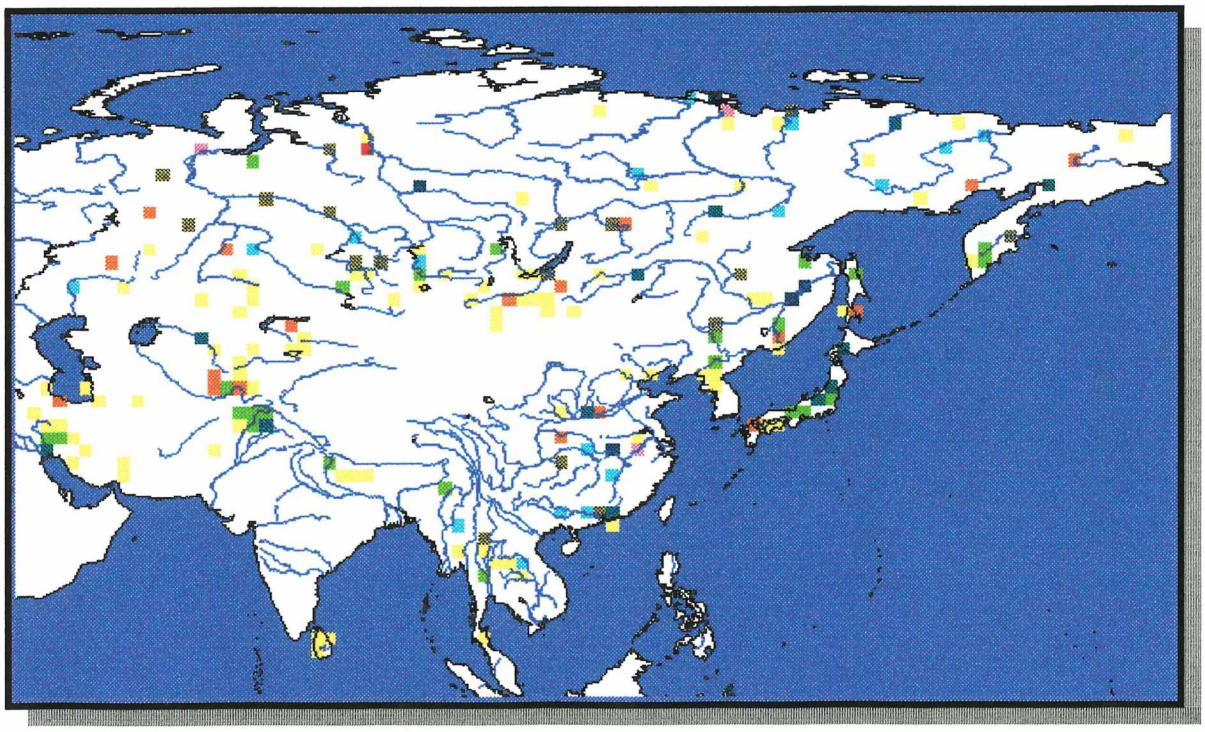
WMO-REGION 2: Value of Runoff in a 1.5° Grid

May

1978



1981

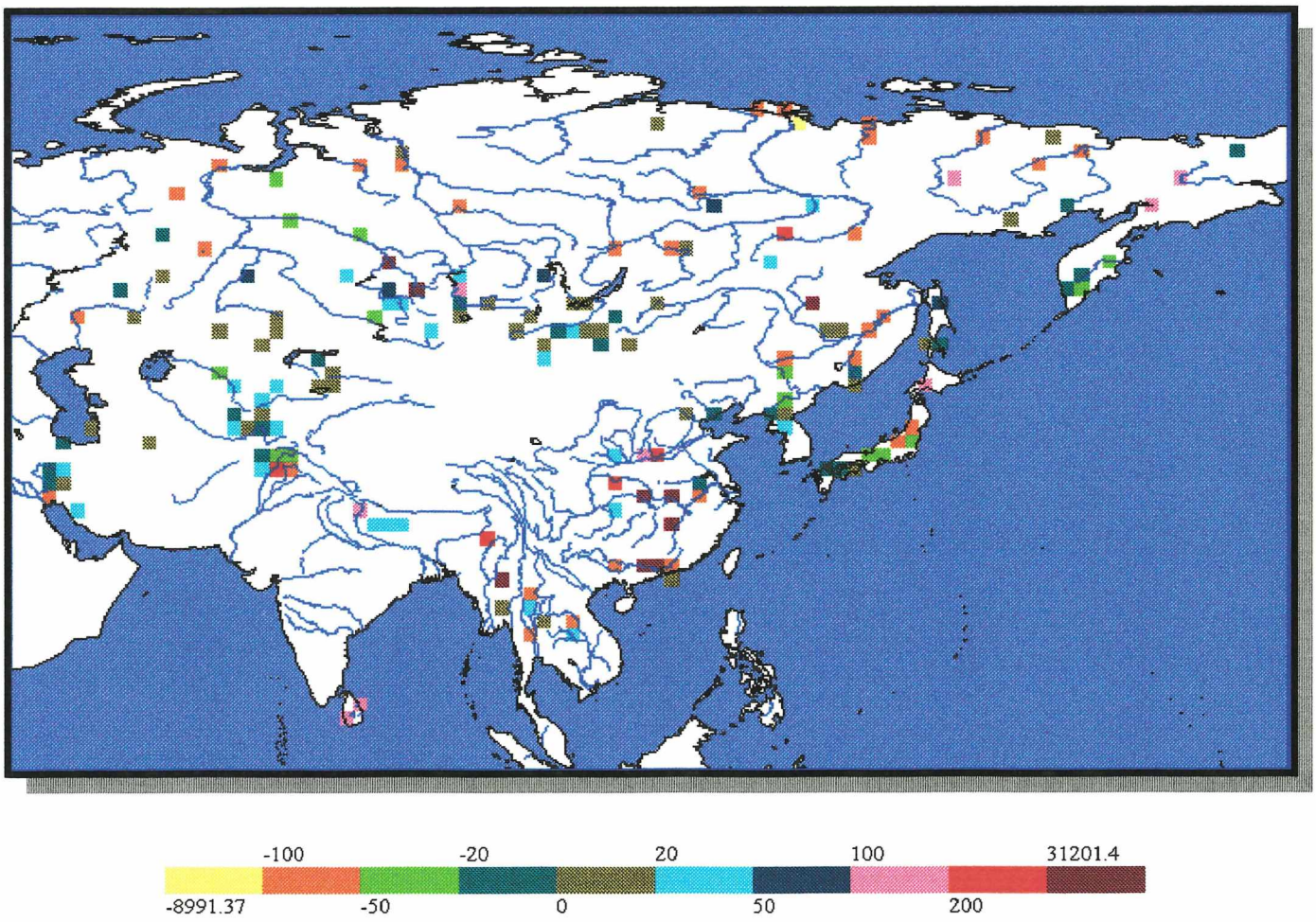


Map 6 :Runoff in May 1978 and May 1981 in WMO-region II

WMO-REGION 2: Difference of Runoff in a 1.5° Grid

1978 compared with 1981

May

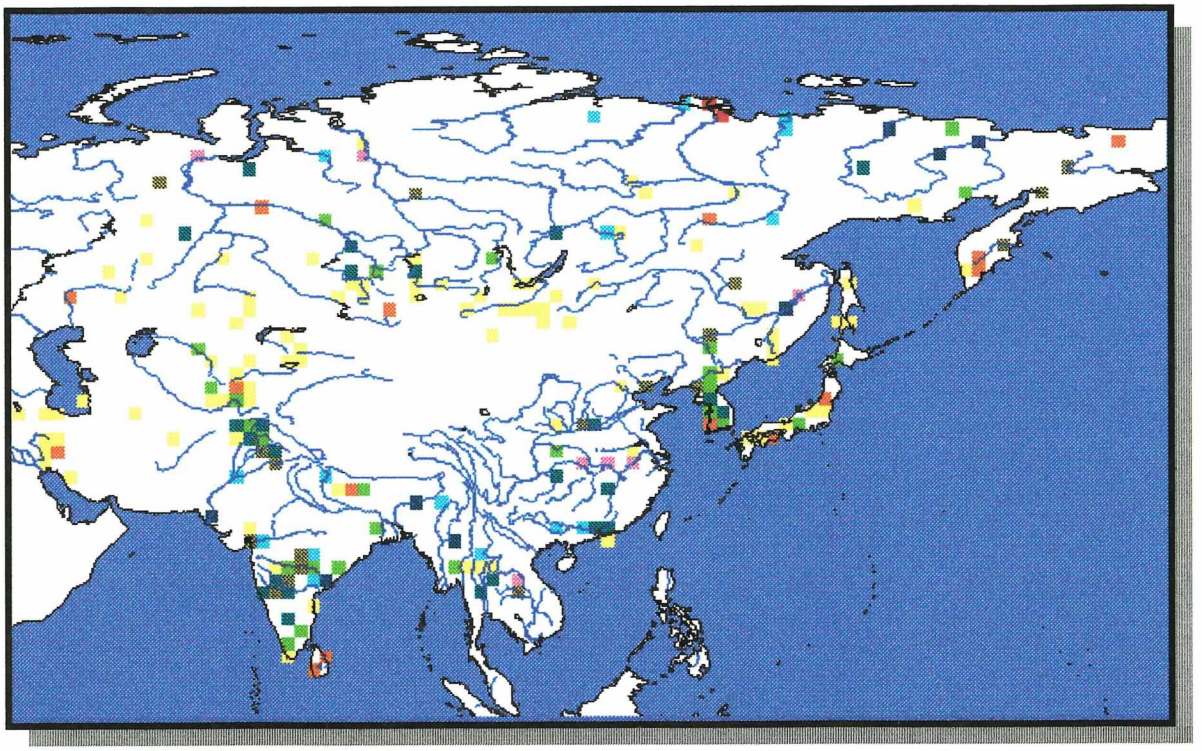


Map 7 :Difference of runoff between May 1978 and 1981 in WMO-region II

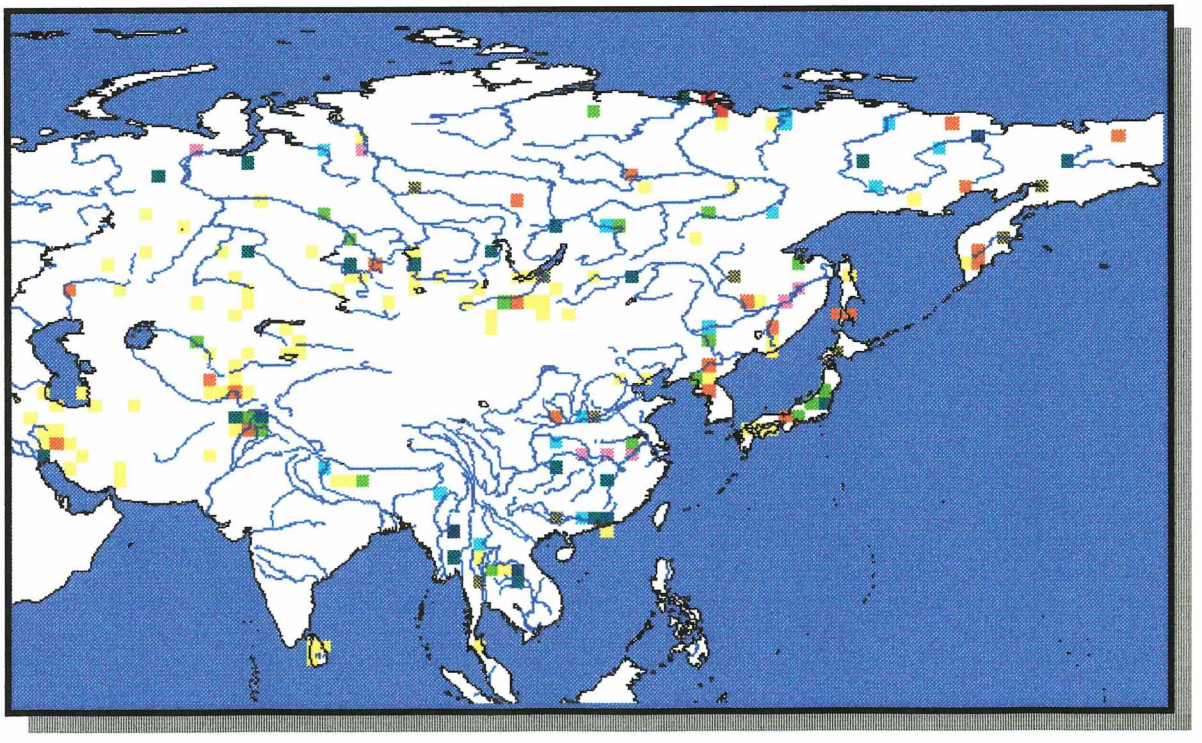
WMO-REGION 2: Value of Runoff in a 1.5° Grid

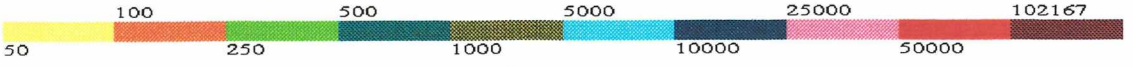
August

1978



1981



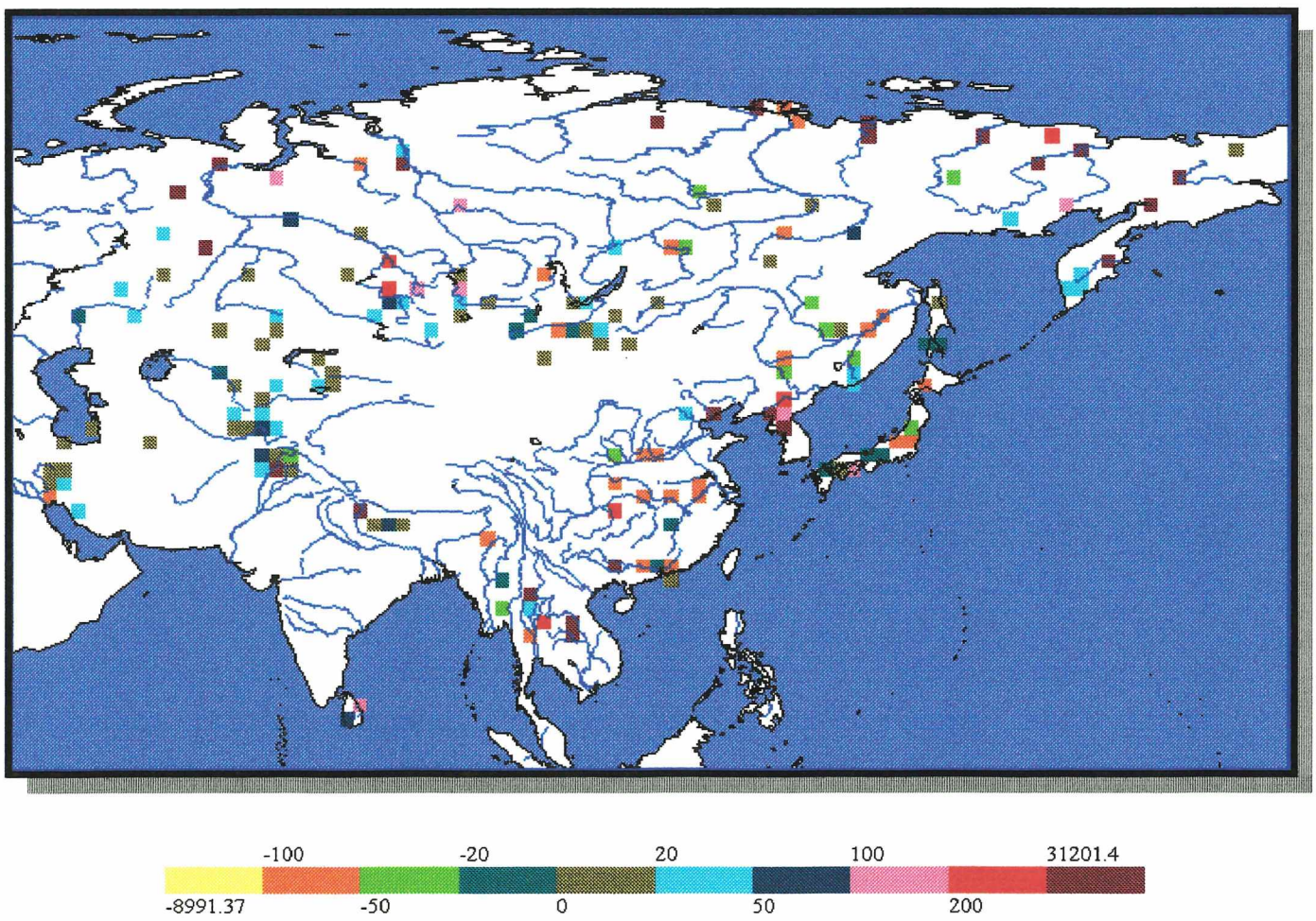


Map 8 :Runoff in August 1978 and August 1981 in WMO-region II

WMO-REGION 2: Difference of Runoff in a 1.5° Grid

1978 compared with 1981

August

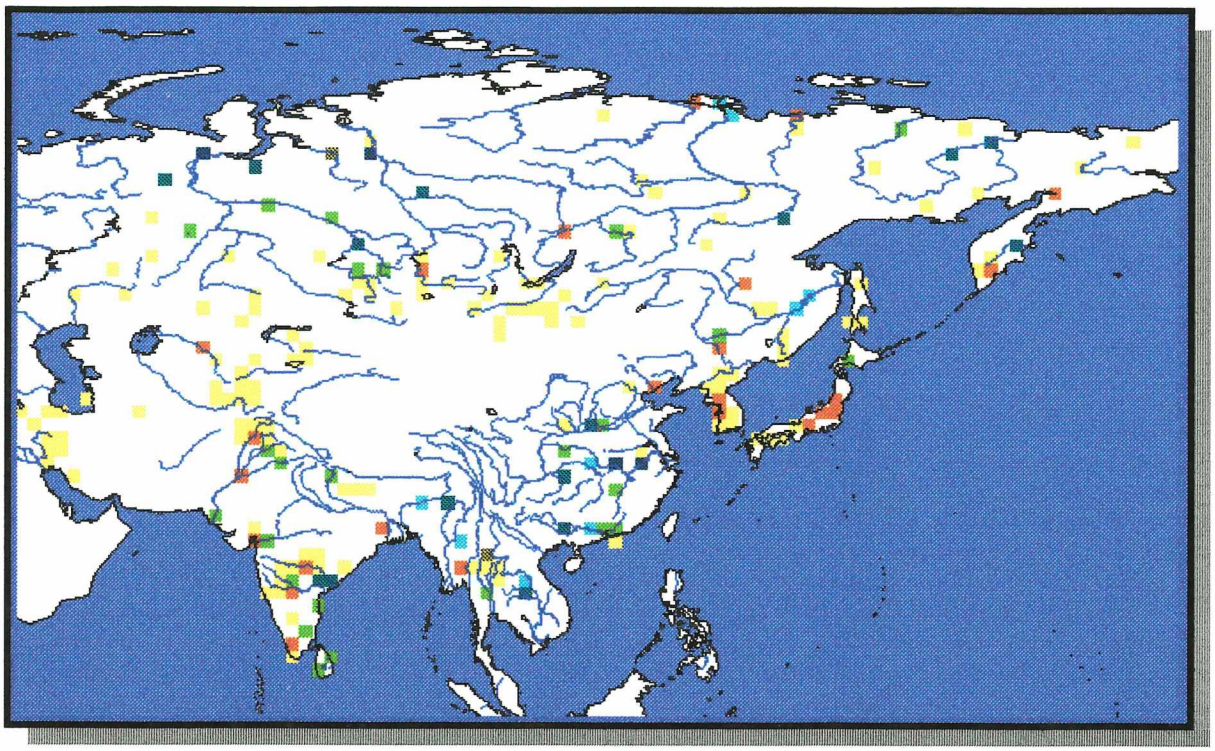


Map 9 :Difference of runoff between August 1978 and 1981 in WMO-region II

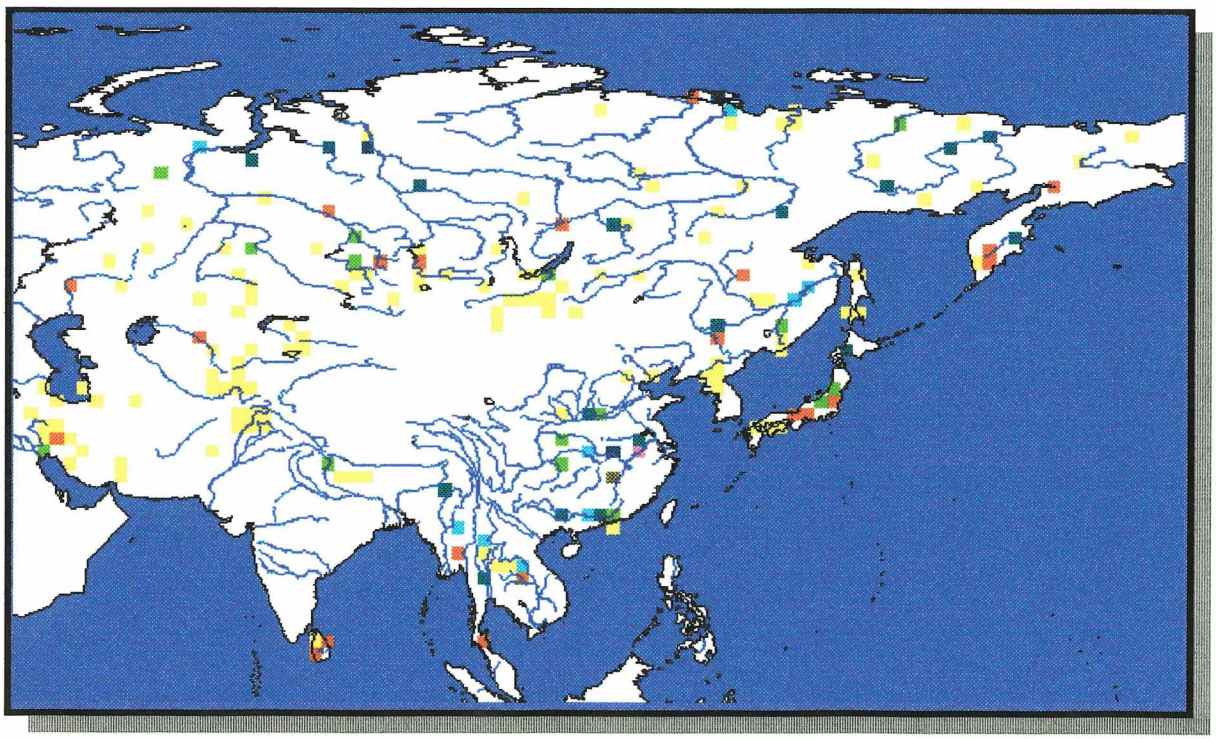
WMO-REGION 2: Value of Runoff in a 1.5° Grid

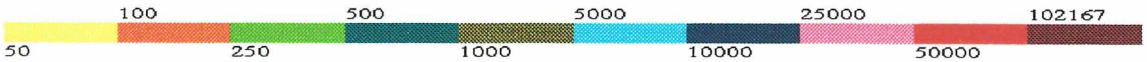
November

1978



1981



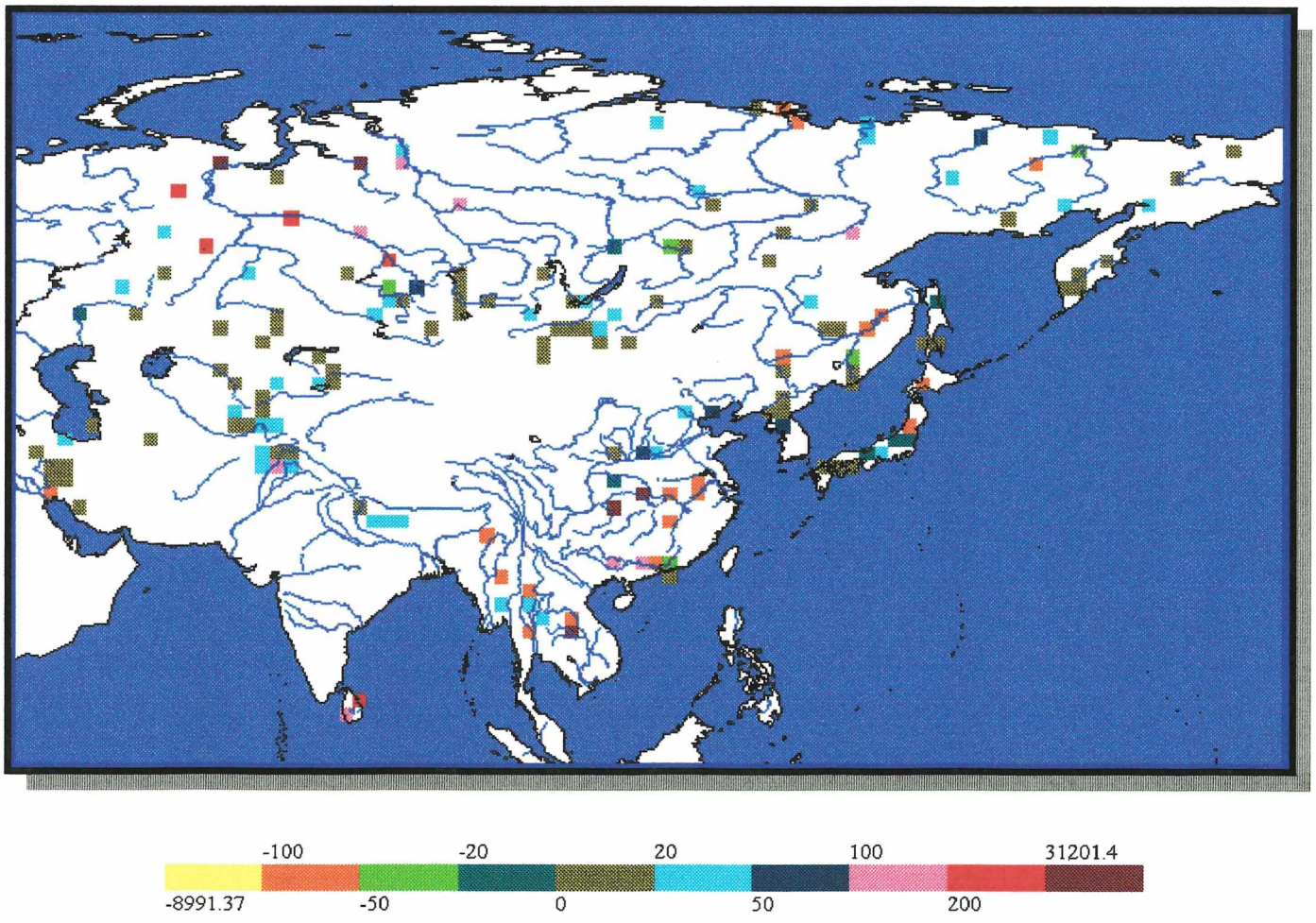


Map 10 :Runoff in November 1978 and November 1981 in WMO-region II

WMO-REGION 2: Difference of Runoff in a 1.5° Grid

1978 compared with 1981

November

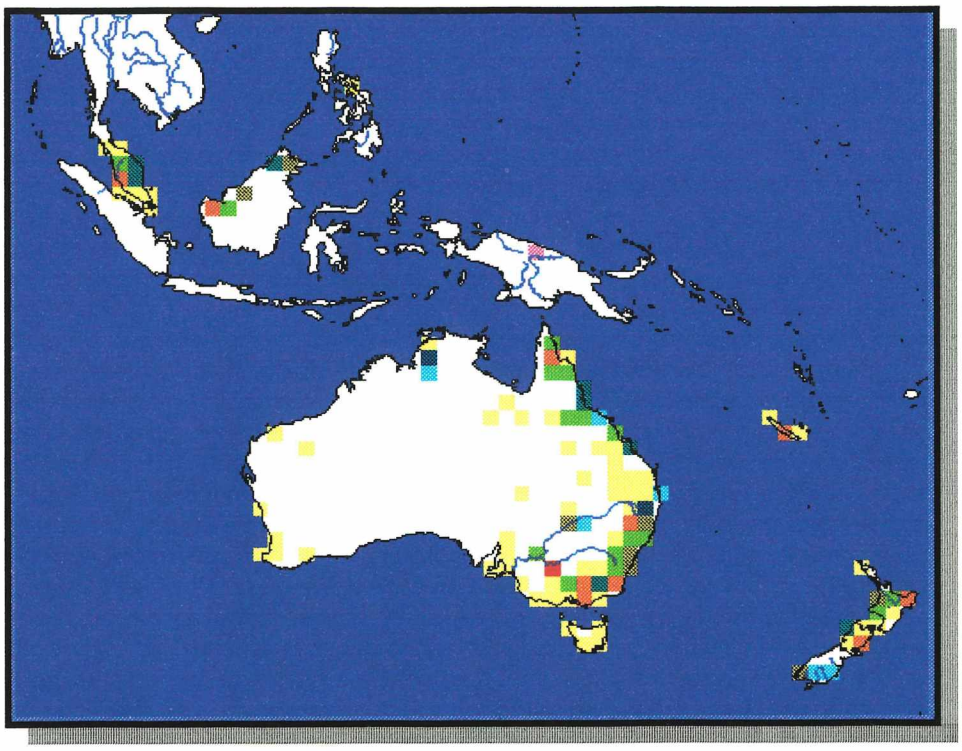


Map 11 :Difference of runoff between November 1978 and 1981 in WMO-region II

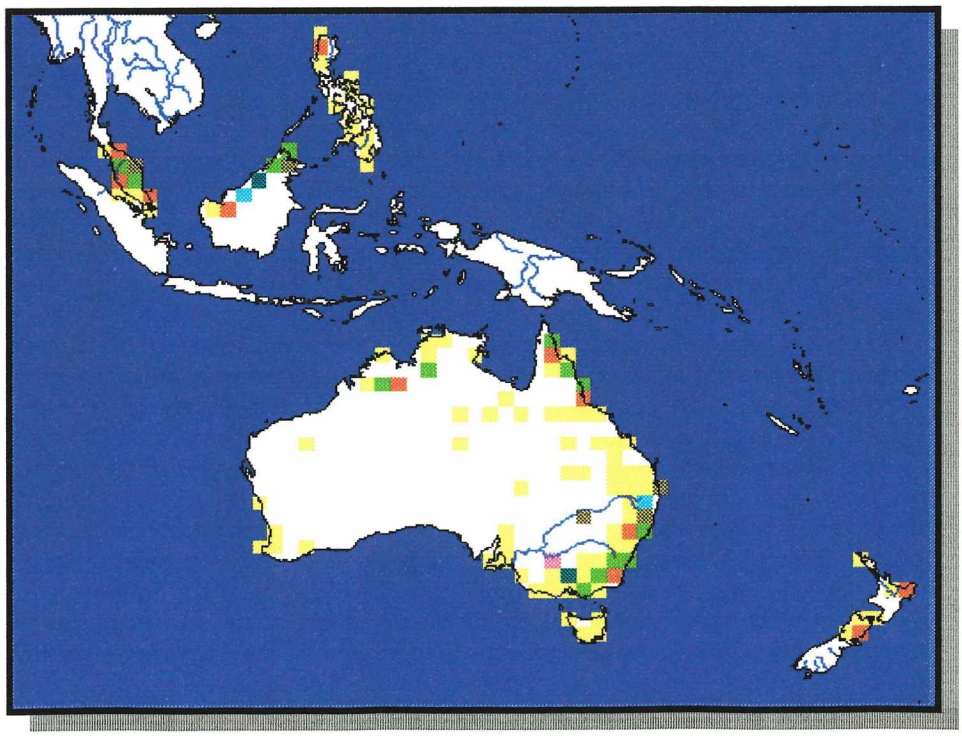
WMO-REGION 5: Value of Runoff in 1.5° Grid

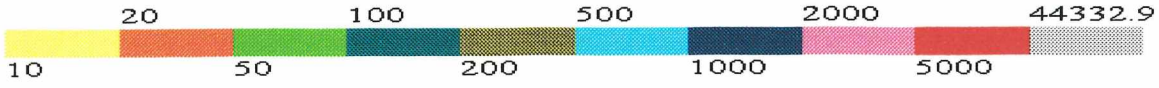
February

1981



1985



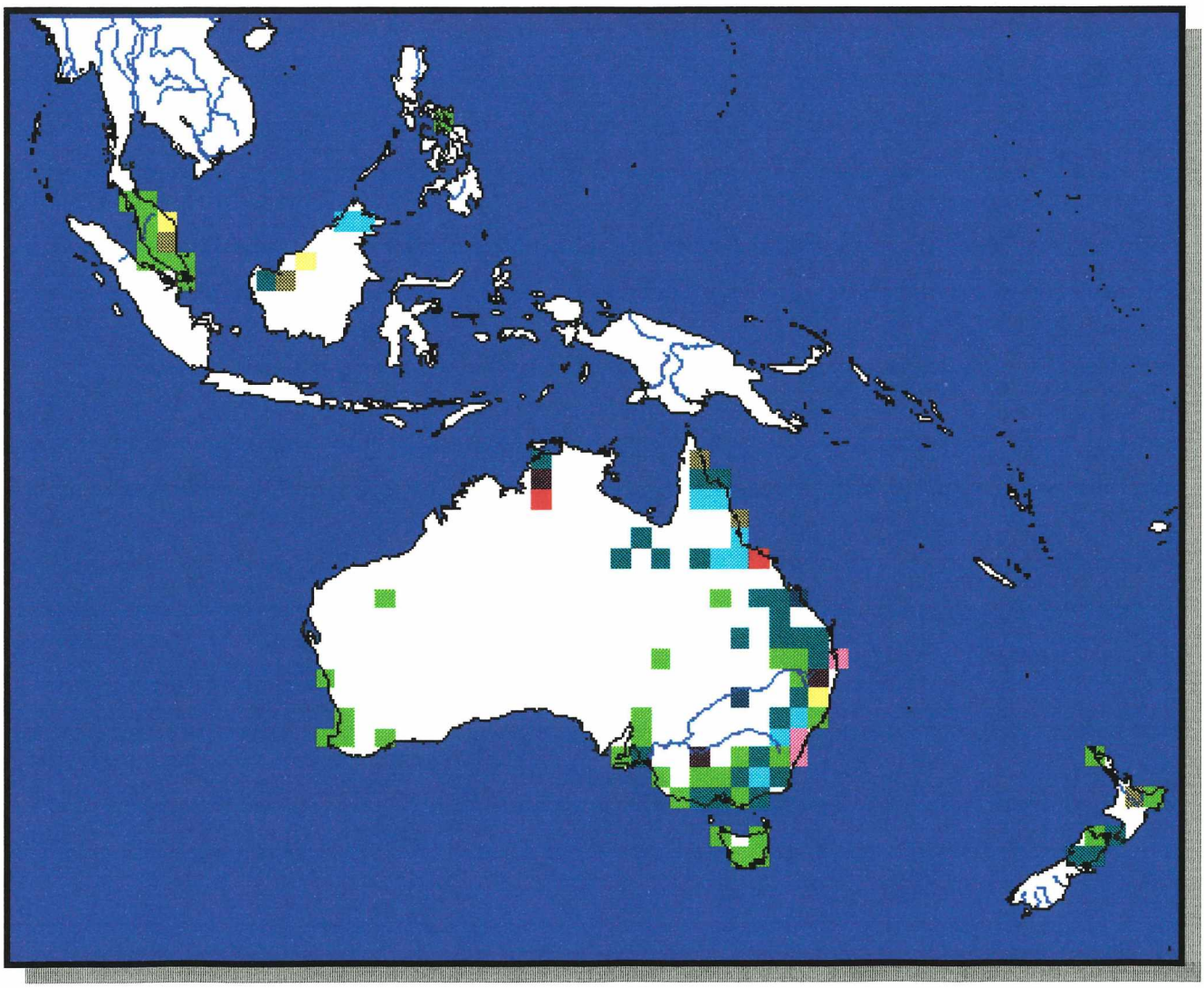


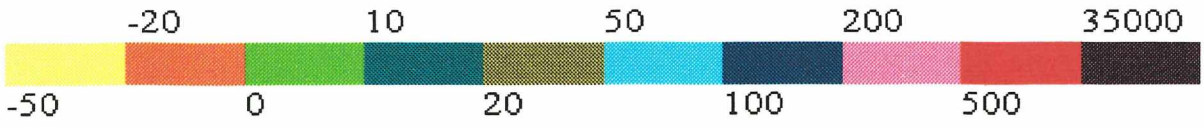
Map 12 :Runoff in February 1978 and February 1981 in WMO-region V

WMO-REGION 5: Difference of Runoff in a 1.5° Grid

1985 compared with 1981

February



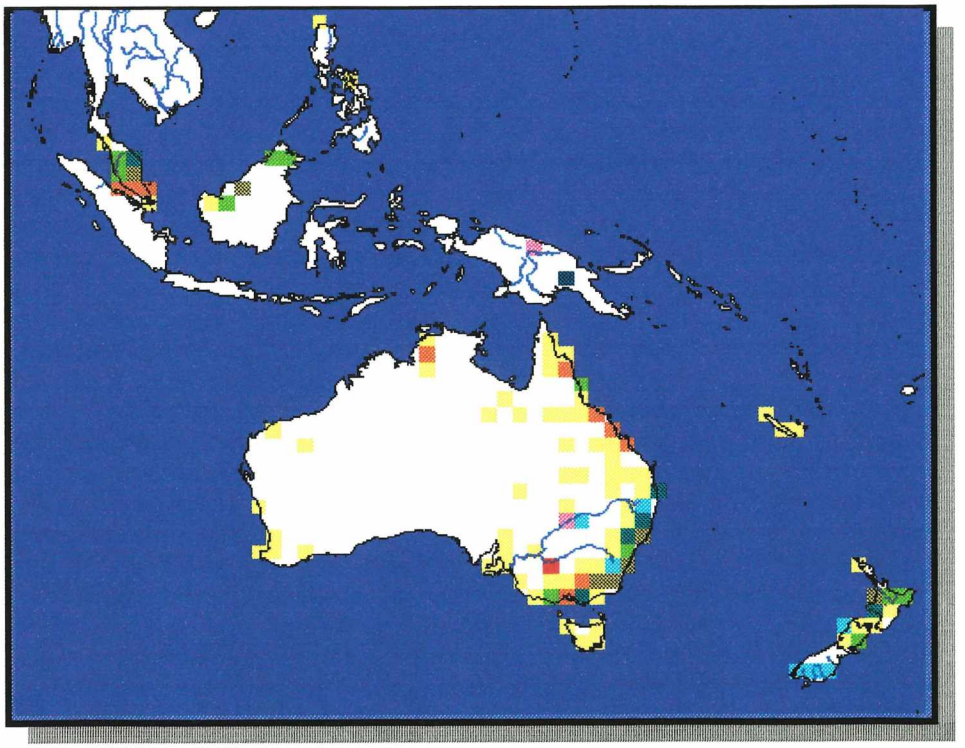


Map 13 :Difference of runoff between February 1978 and 1981 in WMO-region V

WMO-REGION 5: Value of Runoff in 1.5° Grid

May

1981



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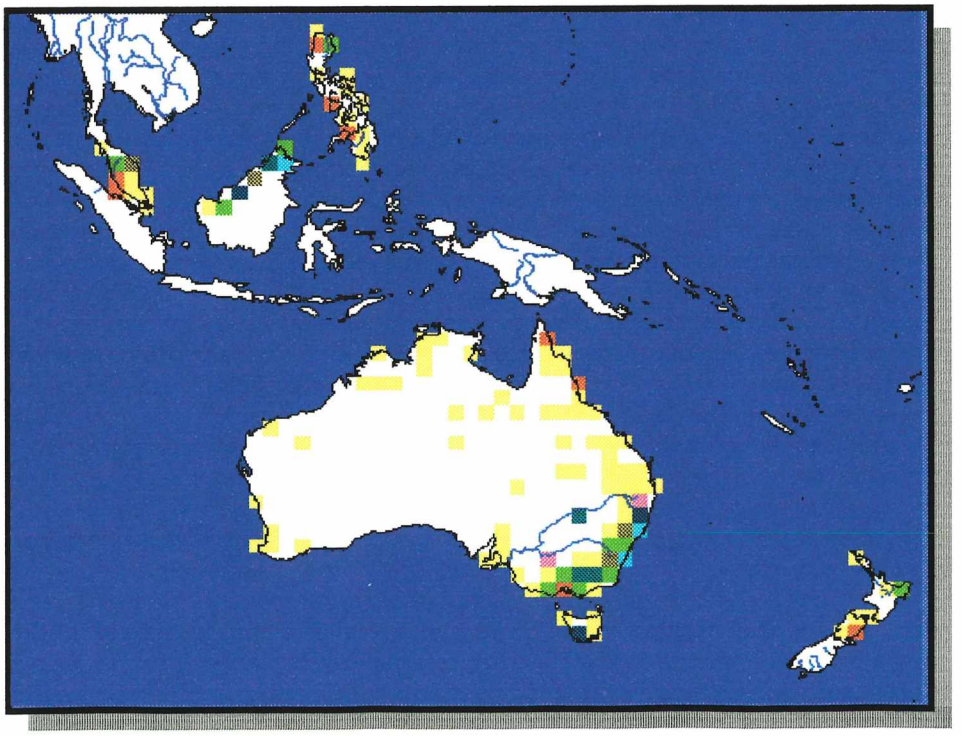
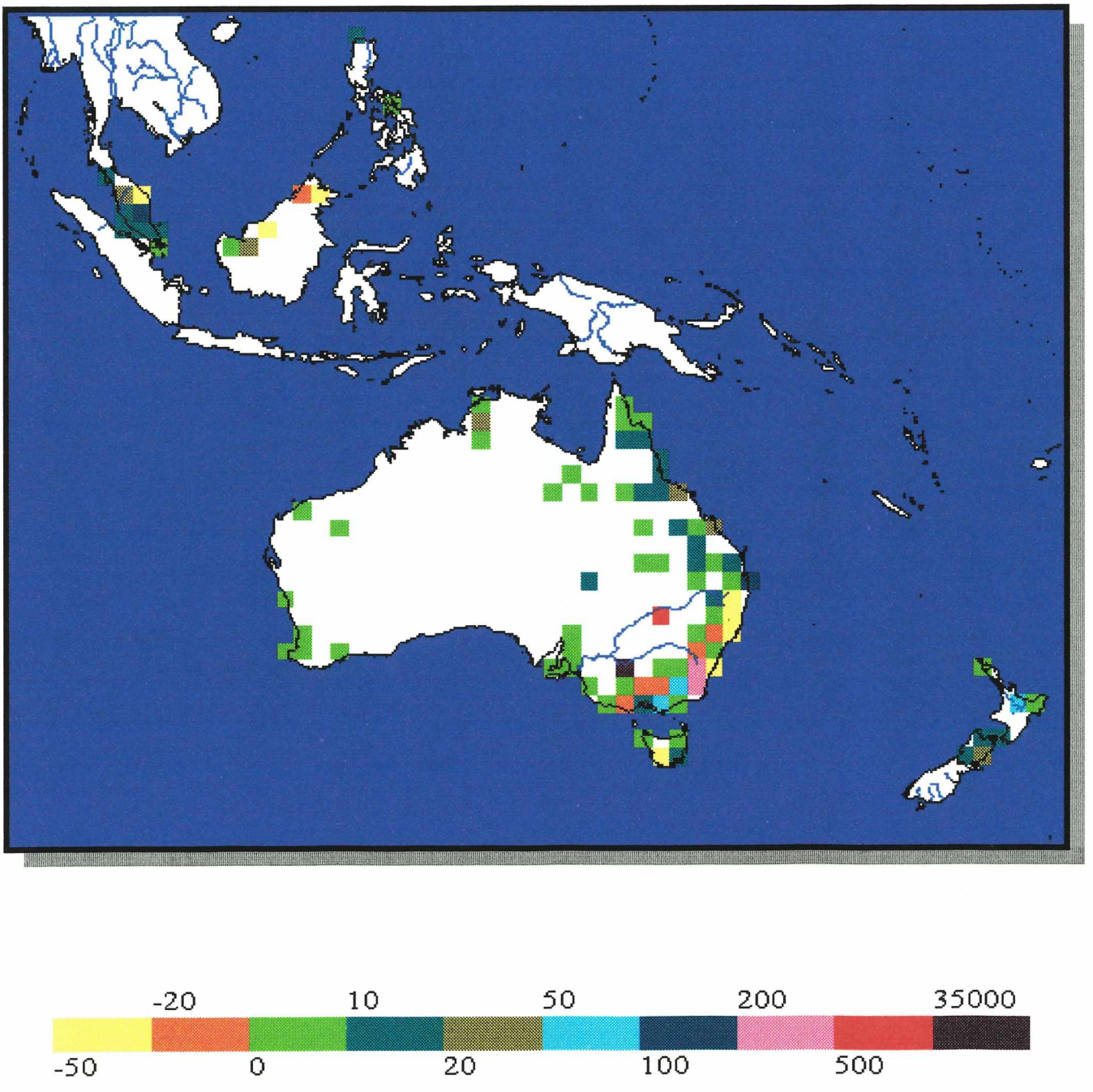


Map 14 :Runoff in May 1978 and May 1981 in WMO-region V

WMO-REGION 5: Difference of Runoff in a 1.5° Grid

1985 compared with 1981

May

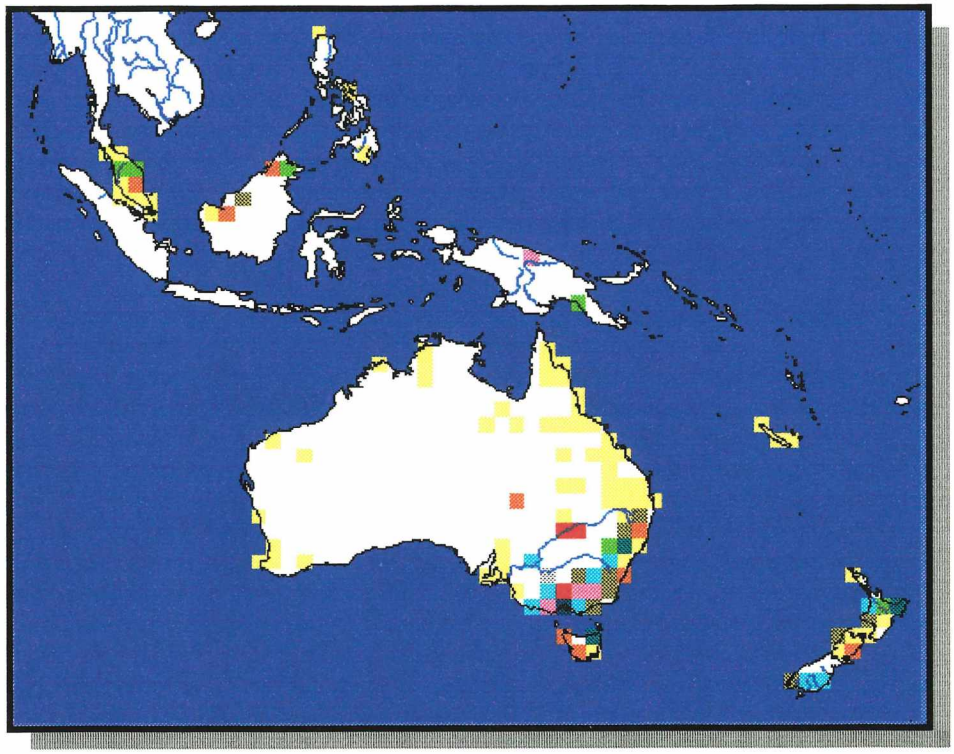


Map 15 :Difference of runoff between May 1978 and 1981 in WMO-region V

WMO-REGION 5: Value of Runoff in 1.5° Grid

August

1981



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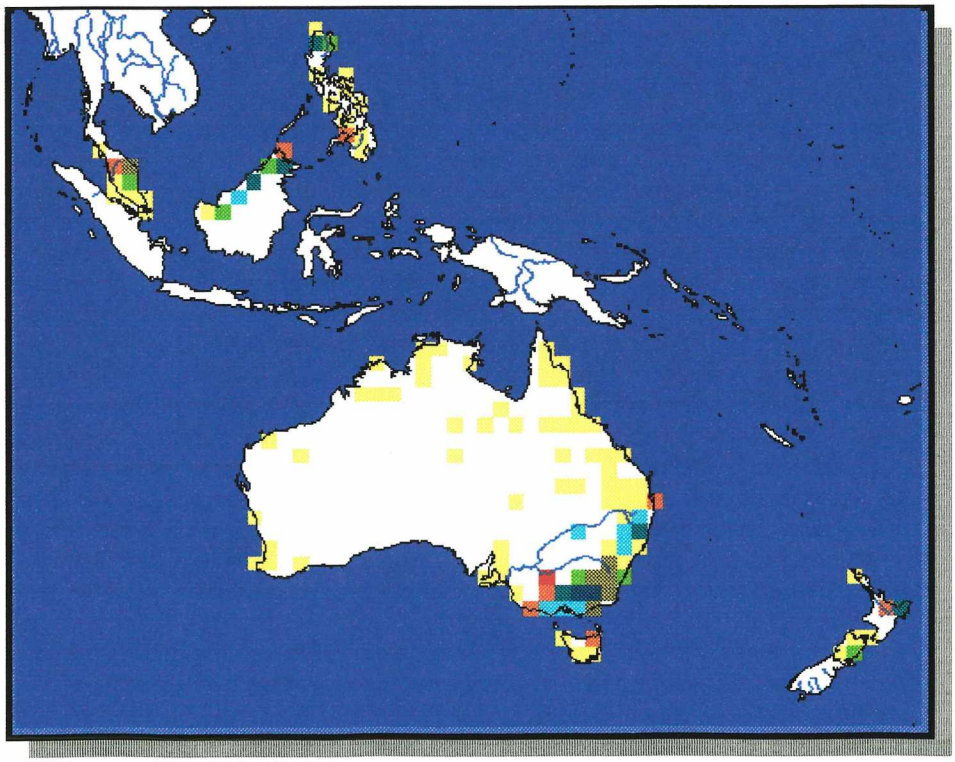
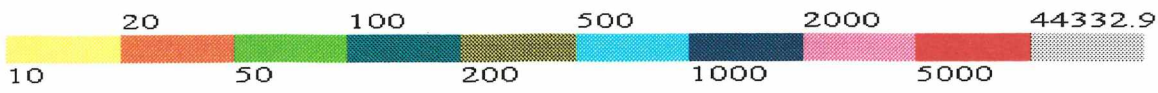


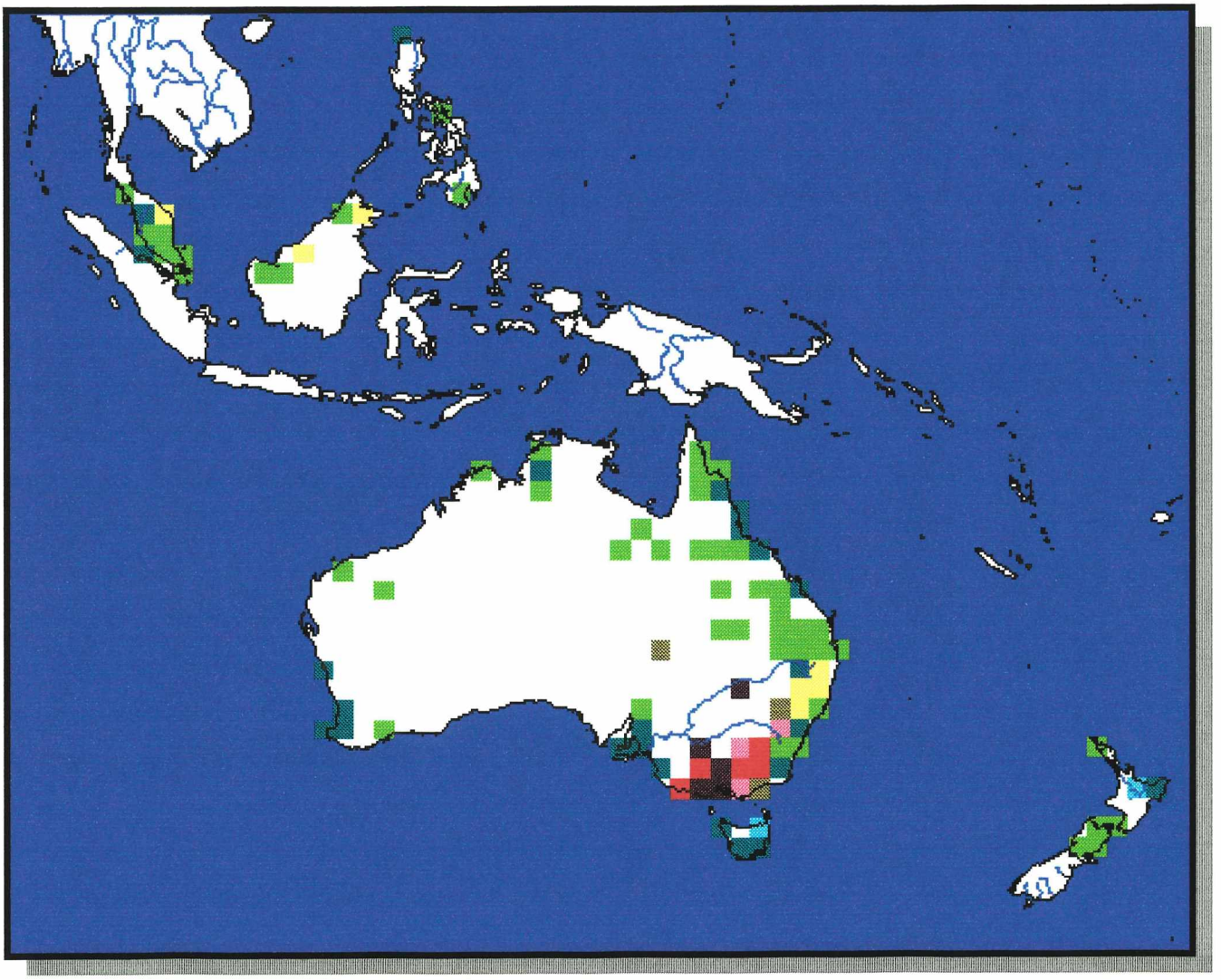


Map 16 :Runoff in August 1978 and August 1981 in WMO-region V

WMO-REGION 5: Difference of Runoff in a 1.5° Grid

1985 compared with 1981

August

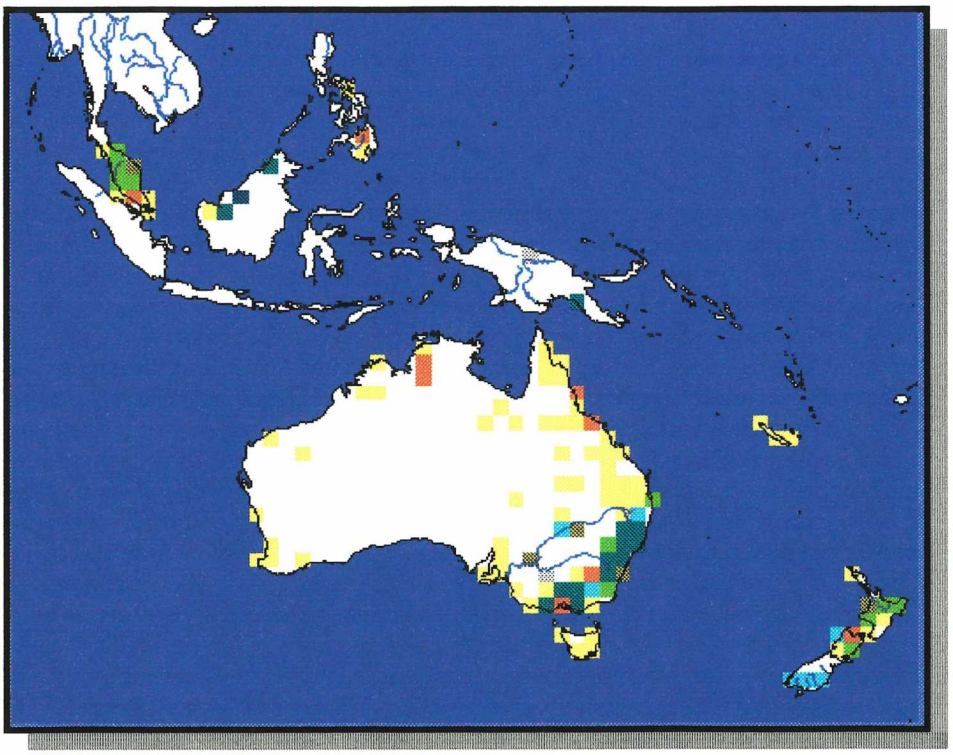


Map 17 :Difference of runoff between August 1978 and 1981 in WMO-region V

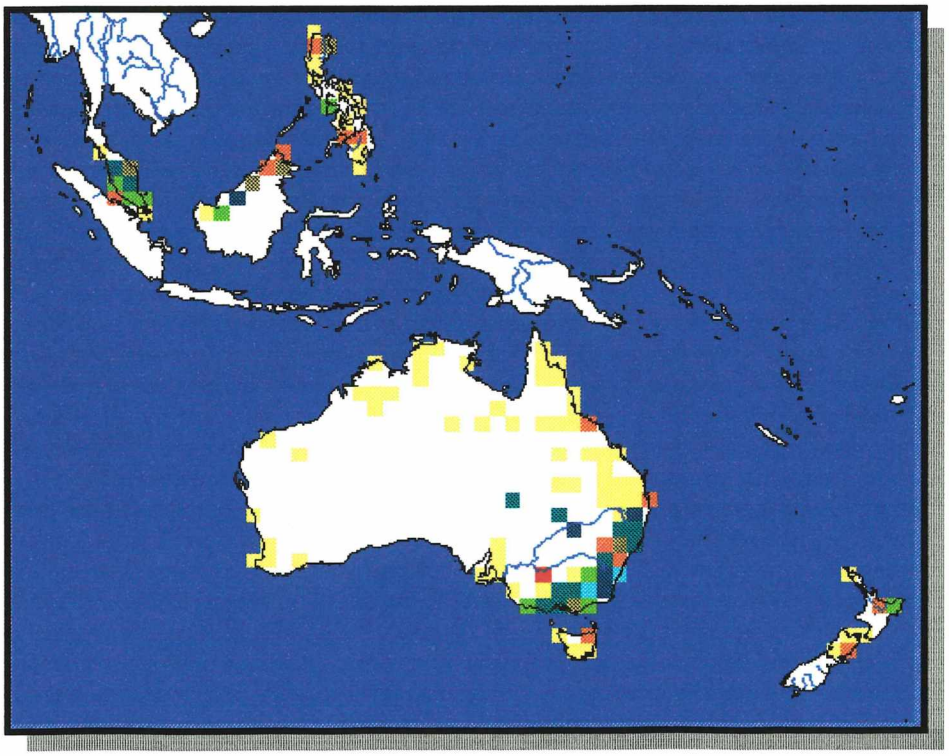
WMO-REGION 5: Value of Runoff in 1.5° Grid

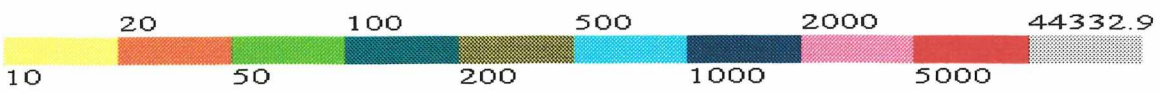
November

1981



1985



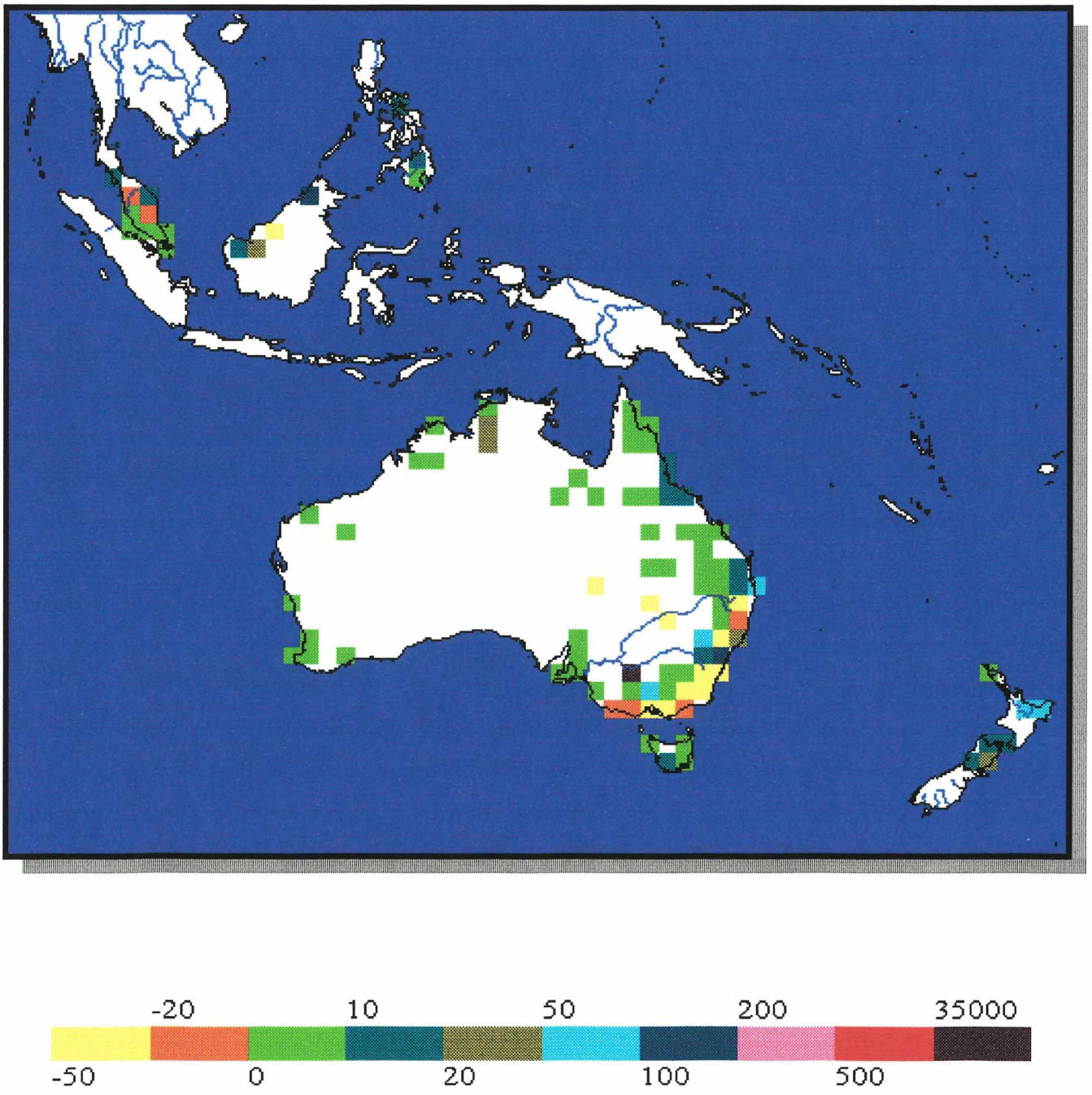


Map 18 :Runoff in November 1978 and November 1981 in WMO-region V

WMO-REGION 5: Difference of Runoff in a 1.5° Grid

1985 compared with 1981

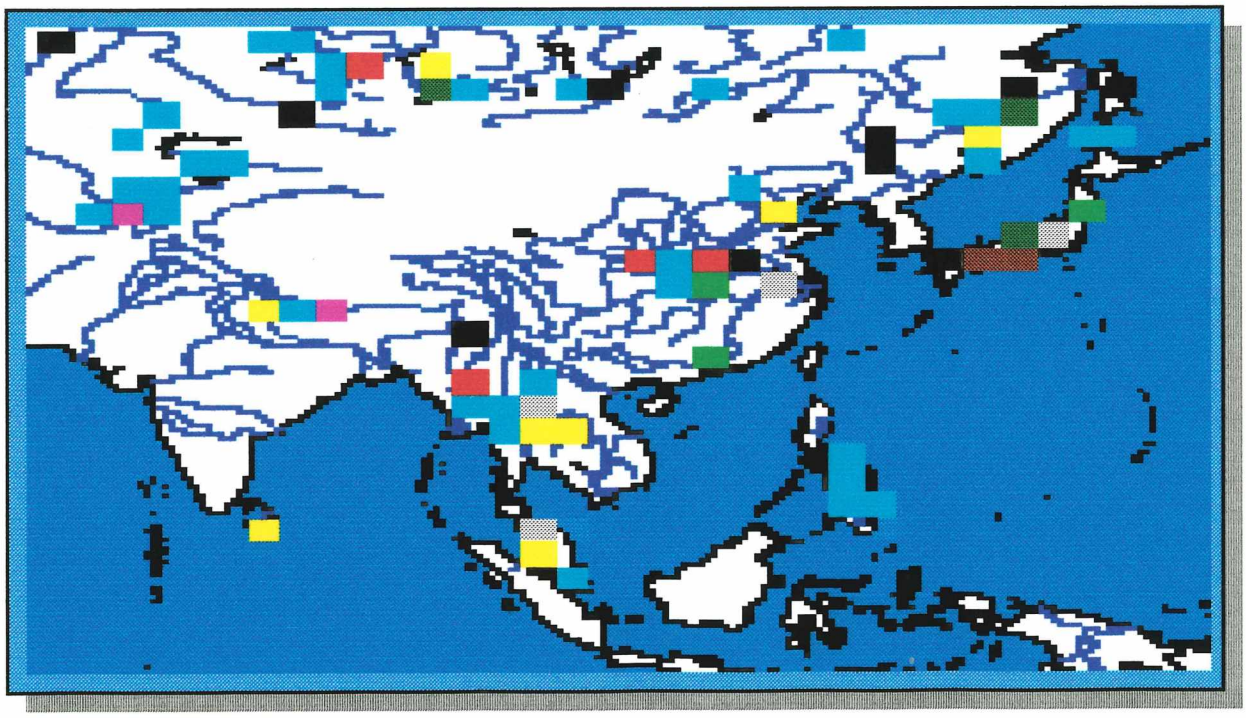
November



Map 19 :Difference of runoff between November 1978 and 1981 in WMO-region V

Difference of Runoff in a 2.5° Grid in Percent

1985 compared with 1978 (1978 = 100%)



< -20 -20 -10 0 10 20 30 40 50 > 60

Map 20 :Difference of runoff in ESCAP region between 1978 and 1985

ANNEX 1

Overlapping time-series in WMO-region II

AFGHANISTAN

River	Station	from	to
Hari Rud	Tagab Ghaza	1975	1978
Kawgan	Langar	1975	1978

MYANMAR

River	Station	from	to
Chindwin	Hkamti	1978	1988
Irrawaddy	Sagaing	1978	1988
Sittang	Toungoo	1978	1988
Thaukyegat	Dothaung	1978	1988

BANGLADESH

River	Station	from	to
Ganges	Paksey	1969	1975
Ganges	Hardinge Bridge	1985	1992
Tista	Kaunia	1969	1992
Brahmaputra	Bahadurabad	1969	1992

CHINA

River	Station	from	to
Songhuajiang	Haerbin	1898	1987
Songhuajiang	Jilin	1933	1986
Yongding	Guanting	1925	1988
Luanhe	Luanxian	1930	1988
Jinghe	Zhangjiashan	1932	1986
Huanghe(Yellow River)	Sanmenxia	1953	1988
Huanghe(Yellow River)	Shanxian	1919	1958
Yiluo	Heishiguan	1934	1986
Huanghe(Yellow River)	Huayuankou	1946	1988
Wujiang	Gongtan	1939	1982
Changjiang	Yichang	1877	1986
Changjiang	Hankou	1865	1986
Ganjiang	Jian	1973	1984
Changjiang (Yangtze)	Datong	1923	1986
Huaihe	Bengbu	1915	1986
Hanjiang	Ankang	1935	1986
Yujiang	Nanning	1936	1984
Xijiang	Wuzhou 3	1915	1984
Beijiang	Hengshi	1953	1987
Dongjiang	Boluo	1960	1987

HONGKONG

River	Station	from	to
Hok Tau	Hok Tau	1977	1983
Gauges	Lo Shue Ling	1977	1981

INDIA

River	Station	from	to
Jhelum	Baramula Br.	1968	1979
Jhelum	Munshibag	1968	1979
Chenab	Akhnoor	1968	1979
Ravi	Mukesar	1968	1979
Beas	Mandi Plain	1968	1979
Ganga	Farakka	1949	1973
Tista	Anderson Br.	1965	1971
Manas	Mathanguri	1955	1974
Brahmaputra	Pandu	1956	1979
Jia Bhorelli	N.T. Road Crossing	1958	1979
Sabarmati	Ahmedabad	1968	1979
Ozat	Anandpur	1965	1974
Mahi	Sevalia	1968	1979
Narmada	Garudeshwar	1949	1979
Tapi	Kathore	1940	1979
Narmada	Jamtara	1949	1974
Kalinadi	Dundeli	1968	1979
Periyar	Planchode	1968	1979
Subarnarekha	Kokpara	1964	1974
Damodar	Rhondia	1934	1979
Brahmani	Barkot Br.	1971	1972
Bhima	Takali	1968	1979
Krishna	Alamati	1971	1979
Bhima	Yadgiri	1971	1979
Krishna	Deosugur	1971	1974
Krishna	Vijayawada	1901	1979
Tungabhadra	Bawapuram	1968	1979
Hagari	Ramapuram	1971	1979
Penner	Nellore	1965	1979
Cauvery	Krishnarajasagar	1934	1979
Ponnaiyar	Tirukoilur Anicut	1976	1979
Cauvery	Grand Anicut	1971	1979
Vaigai	Peranai	1972	1979
Tamiraparni	Sri Vaikuntam	1971	1979
Mahanadi	Kaimundi	1965	1970
Godavari	Dhalegaon	1968	1979
Godavari	Babli	1971	1979
Godavari	Basar	1971	1979
Godavari	Mancherial	1968	1979
Wardha	Bamni Br.	1971	1979
Wainganga	Ashti	1968	1979
Indrawati	Parthgudem	1971	1979
Kolab	Kotta	1971	1979
Godavari	Polavaram	1901	1979

IRAQ

River	Station	from	to
Al-Furat (Euphrates)	Hit	1964	1972
Al-Furat (Euphrates)	Hindiya	1964	1972
Dijlah (Tigris)	Mosul	1964	1972
Dijlah (Tigris)	Baghdad	1964	1972

IRAN

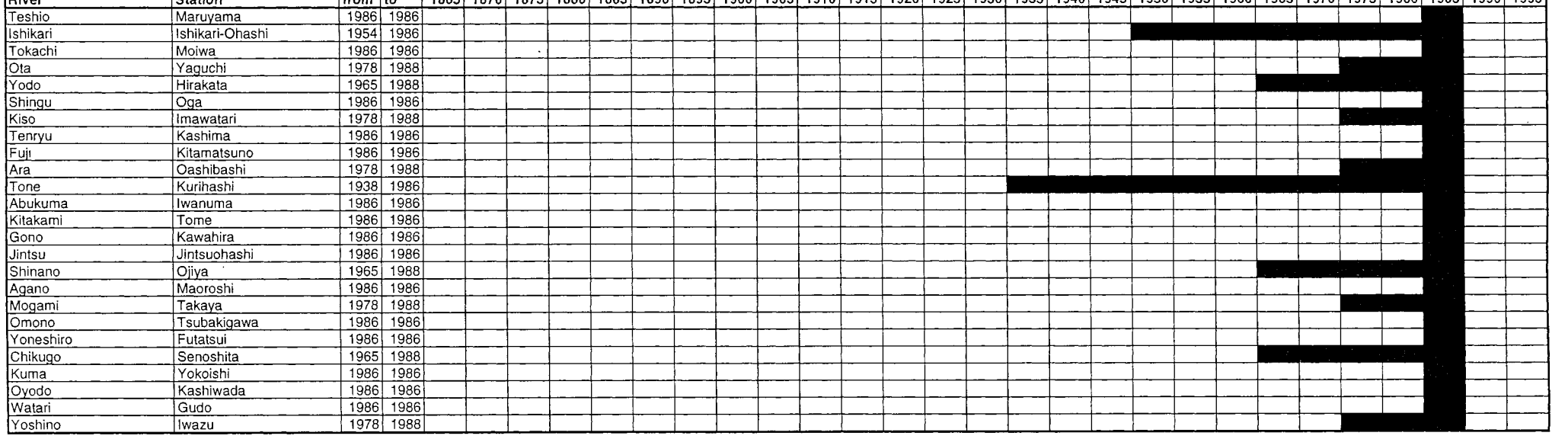
River	Station	from	to
Kashafrud	Olangasadi	1977	1983
Talwar	Salamat-Abad	1978	1983
Shafarud	Poonel	1965	1984
Shahrud	Looshan	1977	1983
Ghezalozan	Gilvan	1976	1979
Lar	Ploor	1965	1975
Babol	Babol	1965	1975
Gorgan-Rud	Gonbad-Kabus	1965	1984
Zarrinehrud	Sarigamesh	1977	1979
Bakhtiari	Tang-E-Panj	1977	1983
Sezar	Sepid-Dasht	1977	1983
Karkheh	Hamidiyeh	1976	1979
Karun	Ahvaz	1965	1984
Karun	Pol-E-Shalu	1976	1983
Khersan	Barz	1977	1983
Dalaki	Sareghanat	1977	1983
Shoor Jahrom	Bagh-Awaz	1977	1983
Minab	Berantin	1965	1984
Qom	Abbas-Abad	1977	1983
Zayandeh	Pol-E-Khaju	1980	1984
Kor	Ahmadabad Drudzan	1965	1971
Kor	Ahmadabad	1980	1984
Halil	Hossein Abad Jiroft	1980	1984

LAOS

River	Station	from	to
Nam Khan	Ban-Mixay (Ban Mout)	1980	1989
Mekong	Luang Prabang	1980	1991
Nam Lik	Ban-Hin Heup	1983	1990
Nam Ngum	Ban-Na Luong	1987	1989
Nam Ngum	Ban-Pak Kanhoung	1989	1991
Nam Ou	Muong Ngoy	1987	1991
Mekong	Vientiane	1980	1991
Nam Nhiep	Muong Mai	1987	1989
Se Bang Fai	Mahaxai	1989	1991
Se Bang Fai	Se-Bang Fai	1980	1985
Se Champhone	Kengkok	1980	1991
Nam Theun	Ban-Signo	1987	1991
Se Bang Hieng	Ban Keng Done	1989	1991
Mekong	Pakse	1980	1991
Se Done	Souvanna Khili	1987	1991
Se Kong	Attopeu	1989	1991

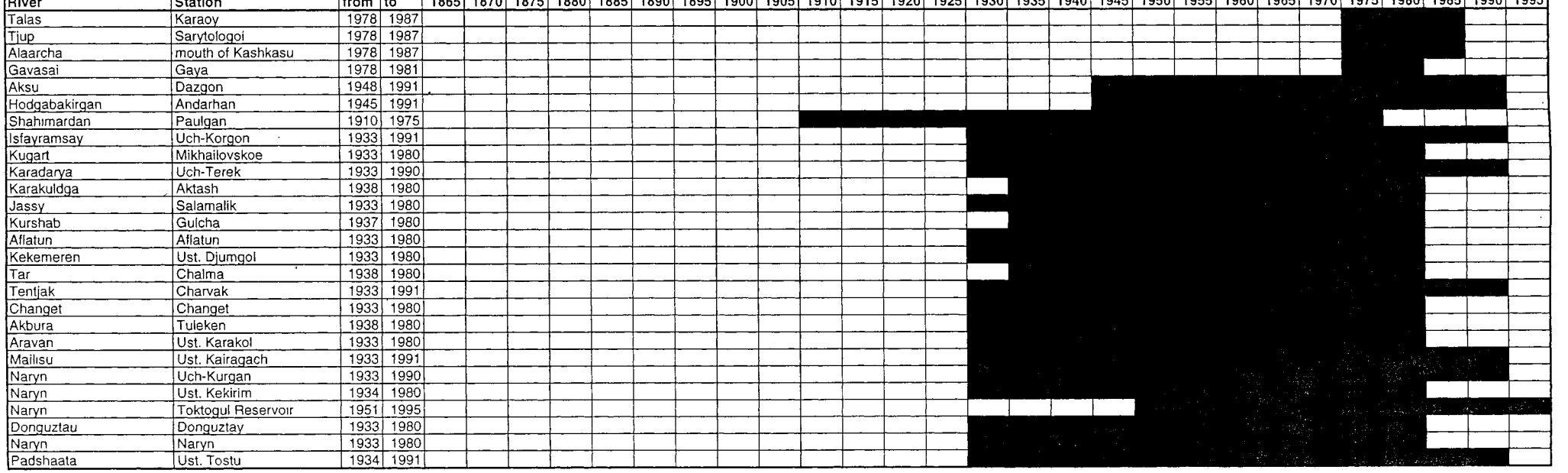
JAPAN

River	Station	from	to
Teshio	Maruyama	1986	1986
Ishikari	Ishikari-Ohashi	1954	1986
Tokachi	Moiwa	1986	1986
Ota	Yaguchi	1978	1988
Yodo	Hirakata	1965	1988
Shingu	Oga	1986	1986
Kiso	Imawatari	1978	1988
Tenryu	Kashima	1986	1986
Fuji	Kitamatsuno	1986	1986
Ara	Oashibashi	1978	1988
Tone	Kurihashi	1938	1986
Abukuma	Iwanuma	1986	1986
Kitakami	Tome	1986	1986
Gono	Kawahira	1986	1986
Jintsu	Jintsuohashi	1986	1986
Shinano	Ojiya	1965	1988
Agano	Maoroshi	1986	1986
Mogami	Takaya	1978	1988
Omono	Tsubakigawa	1986	1986
Yoneshiro	Futatsui	1986	1986
Chikugo	Senoshita	1965	1988
Kuma	Yokoishi	1986	1986
Oyodo	Kashiwada	1986	1986
Watari	Gudo	1986	1986
Yoshino	Iwazu	1978	1988



KIRGHIZTAN

River	Station	from	to
Talas	Karaoy	1978	1987
Tjup	Sarytologoi	1978	1987
Alaarcha	mouth of Kashkasu	1978	1987
Gavasai	Gaya	1978	1981
Aksu	Dazgon	1948	1991
Hodgabakirgan	Andarhan	1945	1991
Shahimardan	Paulgan	1910	1975
Isfayramsay	Uch-Korgon	1933	1991
Kugart	Mikhailovskoe	1933	1980
Karadarya	Uch-Terek	1933	1990
Karakuldga	Aktash	1938	1980
Jassy	Salamalik	1933	1980
Kurshab	Gulcha	1937	1980
Aflatun	Aflatun	1933	1980
Kekemeren	Ust. Djumgol	1933	1980
Tar	Chalma	1938	1980
Tentjak	Charvak	1933	1991
Changet	Changet	1933	1980
Akbura	Tuleken	1938	1980
Aravan	Ust. Karakol	1933	1980
Mailisu	Ust. Kairagach	1933	1991
Naryn	Uch-Kurgan	1933	1990
Naryn	Ust. Kekirim	1934	1980
Naryn	Toktogul Reservoir	1951	1995
Donguztau	Donguztay	1933	1980
Naryn	Naryn	1933	1980
Padshaata	Ust. Tostu	1934	1991



REP. KOREA

River	Station	from	to
Han	Indogyo	1947	1979
Han	Yeo Ju	1976	1979
Geum	Gyu Am	1976	1979
Yeong San	Na Ju	1976	1979
Seom Jin	Sing Jeun	1976	1979
Nag Dong	Wae Gwan	1976	1979
Nag Dong	Jin Dong	1976	1979
Nagdong	Samnangjin	1953	1972

DEM. PEOPLE REP. KOREA

River	Station	from	to
Sodusu	Yenam	1976	1979
Zangzagang	Jonchon	1976	1984
Amnokgang	Kumchang	1976	1984
Taedonggang	Mirim	1976	1982
Namgang	Samdung	1976	1984
Biryugang	Songchon	1976	1984
Taedonggang	Dokchon	1976	1981

KAZAKHSTAN

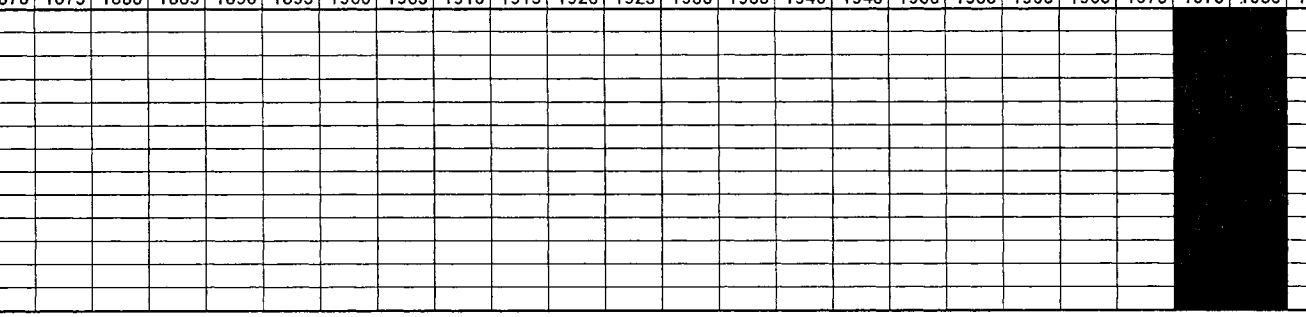
River	Station	from	to
Ishim	Petropavlovsk	1965	1984
Ishim	Tselinograd	1978	1987
Ulba	Ulba Perevalochnaya	1965	1987
Levaya Berezovka	Sredigorne	1978	1987
Kara-Turgay	Akutkul	1965	1975
Narsaj	Zhezdy	1978	1986
Zezdy	Dzezdy	1978	1983
Koktas	Mynly	1978	1985
Zhaksy-Sarysn	Sarysn	1978	1987
Nura	Sergiopolskoye	1965	1984
Talgar	Talgar	1978	1987
Karatal	Ush-Tobe	1965	1984
Sharyn	Sarytogai	1978	1987
Kara	Tekeli	1978	1987
Chu	Chapaevo	1965	1967
Syr-Darya	Tyumen-Aryk	1930	1984
Arys	Arys	1965	1984
Ural	Kushum	1915	1984
Ilek	Aktubinsk	1969	1984

VIETNAM

River	Station	from	to
Dak Bla	Kontum	1984	1991
Ea Krong	Cau-14	1984	1991

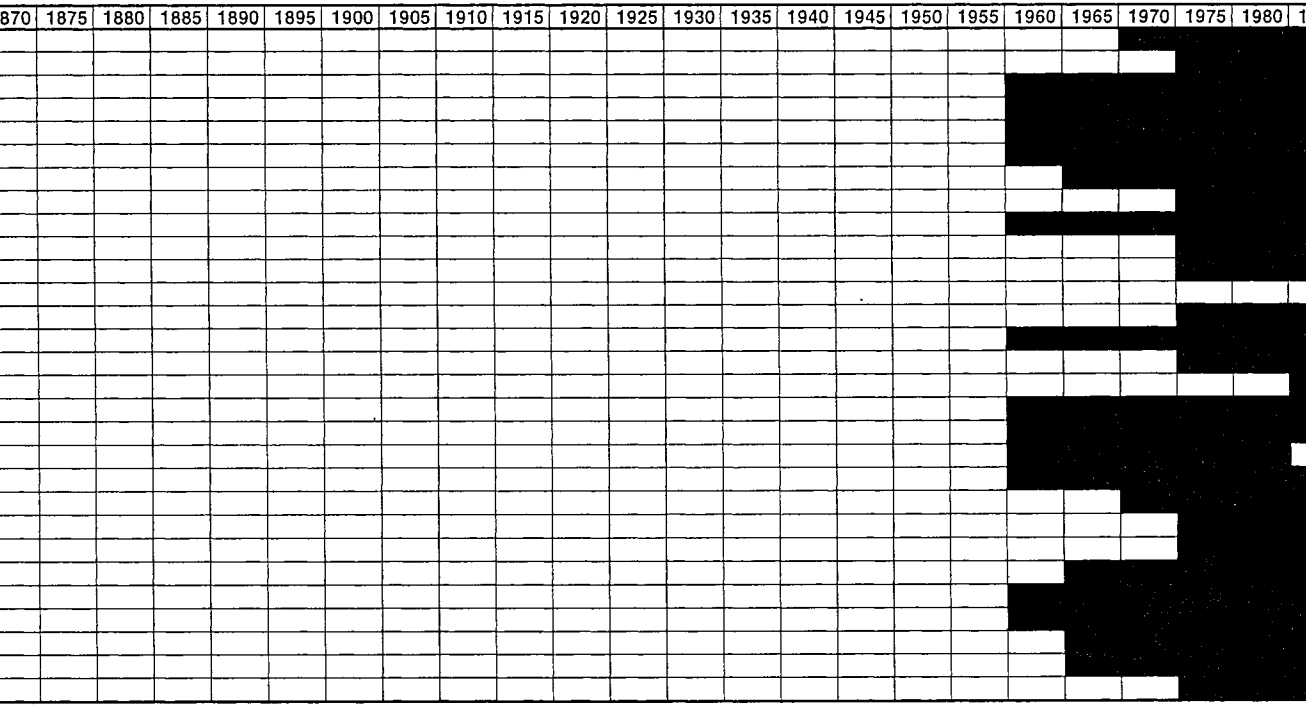
MONGOLIA

River	Station	from	to
Kerulen	Undurkham	1976	1984
Ider	Tosontsengel	1978	1982
Delgermuren	Muren	1976	1984
Khoit Tamir	Ikh Tamir	1978	1982
Selenga	Chutic	1976	1984
Orkhon	Orkhon	1976	1984
Kharaa	Barun Kharaa	1978	1982
Tola	Ulan-Bator	1976	1984
Terelj	Terelj	1978	1982
Kharkhiraa	Tarialan	1978	1982
Sagsain Gol	Buyant	1978	1982
Kobdo	Ulgi	1976	1984
Tuin Gol	Bayankhongar	1978	1981



NEPAL

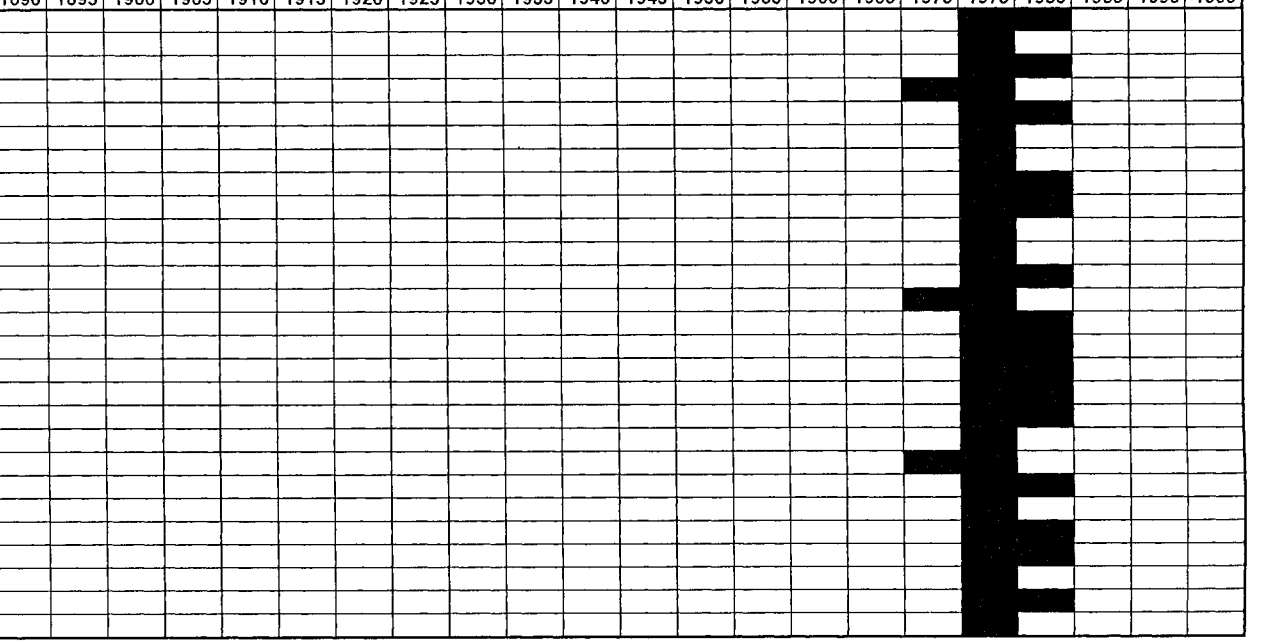
River	Station	from	to
Jhimruk Khola	Tigra Gaon	1972	1985
Seti River	Banga near Belgaon	1978	1987
Mari Khola	Nayagaon	1964	1985
Karnali River	Chisapani	1962	1993
Karnali River	Asara Ghat	1962	1993
Bheri River	Jamu	1963	1993
Babai River	Bargadha	1967	1986
Rapti	Bagasoti Gaon	1976	1985
Rapti	Jalkundi	1964	1985
Rapti River	Rajaiya	1978	1990
Tadi Khola	Tadipul Belkot	1978	1986
Bagmati River	Sundarijal	1991	1993
Chepe Khola	Garam Besi	1978	1992
Burhi Gandaki	Arughat	1964	1985
Andhi Khola	Dumrichaur Andhimuhan	1978	1989
Marsyangdi	Bimal Nagar	1987	1992
Kali Gandaki	Setibeni	1964	1993
Kali Gandaki	Kotagaon Shringe	1964	1985
Seti	Phoolbari	1964	1984
Narayani River	Devghat	1963	1993
Tamakosi	Busti	1971	1987
Balephi Khola	Jalbire	1978	1990
Arun River	Turkeghat	1976	1986
Bhote Kosi	Barabise	1965	1985
Dudh Kosi	Rabuwar Bazar	1964	1985
Sunkosi	Pachuwar Ghat	1964	1985
Sunkosi	Kampughat	1966	1985
Tamur River	Mulghat	1965	1986
Sapta Kosi	Chatara-Kothu	1977	1985



GLOBAL RUNOFF DATA CENTRE (GRDC)
Overlapping Time Series in WMO-Region 2

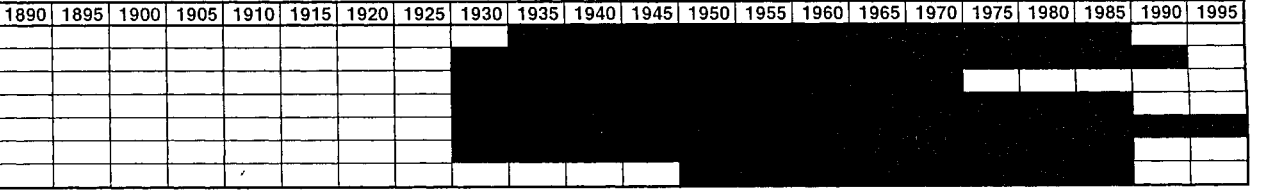
PAKISTAN

River	Station	from	to
Hunza River	Danyour Bridge	1978	1982
Brandu River	near Daggar	1978	1979
Siran River	near Phulra	1978	1981
Indus	Attock	1973	1979
Soan River	Dhok Pathan	1978	1981
Haro River	Sanjwal	1978	1979
Sil River	near Chahan	1979	1979
Haro River	Gurriala	1978	1982
Haro River	near Khanpur	1978	1980
Soan River	Chirah	1978	1979
Soan River	near Rawalpindi	1978	1979
Khost River	Chaffar Rift	1979	1981
Indus	Kotri	1973	1979
Kanshi River	near Palote	1979	1980
Poorch River	near Kotli	1978	1980
Jhelum River	Chinari	1978	1982
Kishanganga River	Muzzafarabad	1978	1982
Kunhar River	near Garhi Habib-Ullah	1978	1982
Kunhar River	Naran	1978	1979
Chenab	Panjnad	1973	1979
Chitral River	Chitral	1978	1981
Swat River	near Kalam	1978	1979
Swat River	Chakdara	1978	1981
Bara River	Jhansi Post	1978	1982
Kurram River	Thal	1978	1979
Tochi River	Tangi Post	1978	1980
Porali River	Sinchi Bent	1979	1979



UZBEKISTAN

River	Station	from	to
Chirchik	Hodjikent	1935	1985
Sokh	Sarykanda	1933	1991
Amu-Darya	Chatly	1931	1973
Kashkadarya	Chirakchi	1932	1989
Kashkadarya	Varganza	1932	1995
Surkhandarya	Manguzar	1932	1989
Tanhizdarya	Kattagan	1951	1989



GLOBAL RUNOFF DATA CENTRE (GRDC)
Overlapping Time Series in WMO-Region 2

RUSSIAN FEDERATION

Table 1

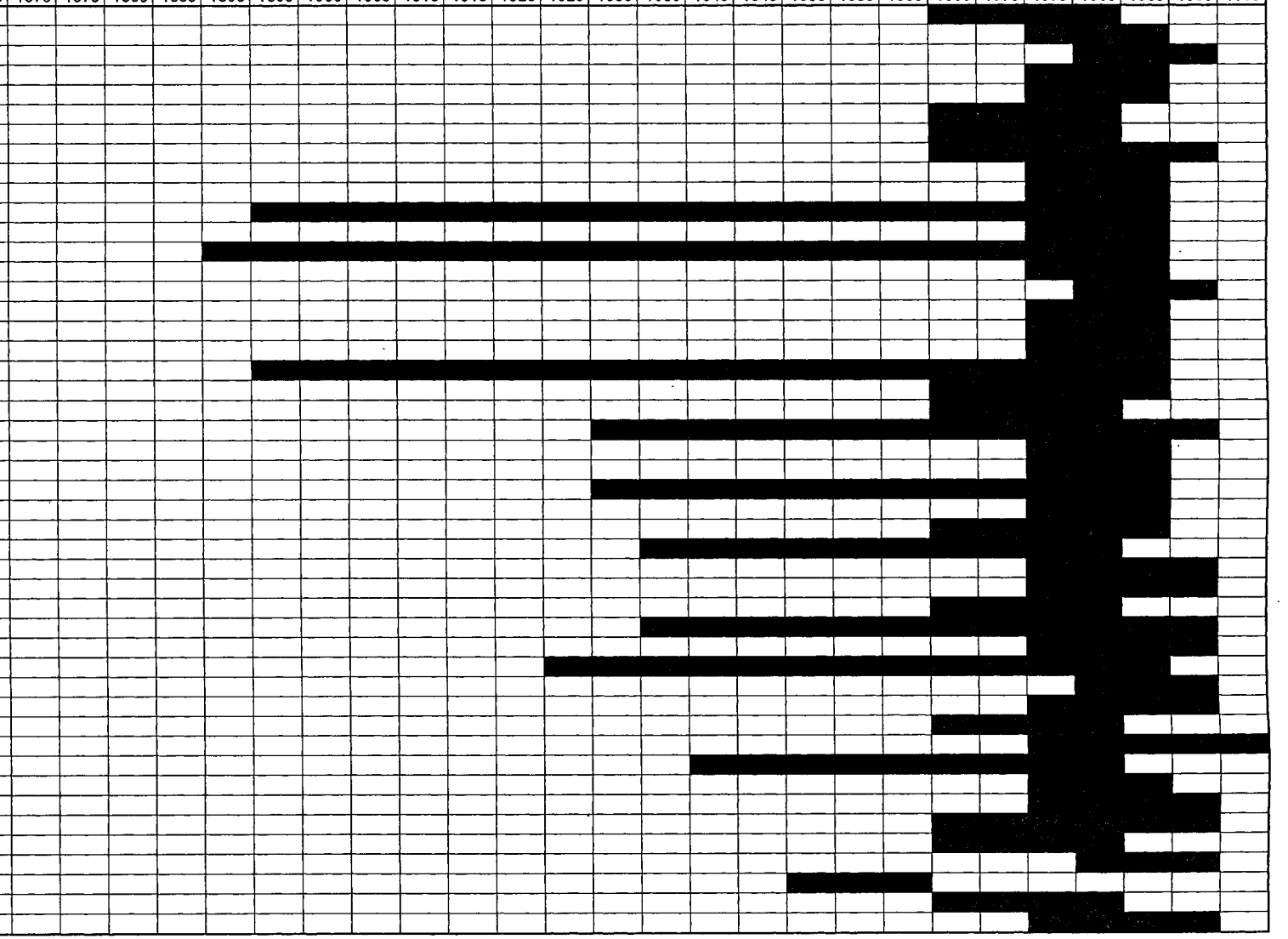
River	Station	from	to
Nyrvakinotveem	6 km from The mouth	1978	1987
Dolgiy	Kamenistyy	1978	1987
Anadyr	Novy Eropol	1965	1984
Penzhina	Kamenskoe	1957	1984
Khashyn	Kolyma Road (79th Km)	1969	1987
Plotnikova	Dal'niy	1978	1987
Kamchatka	Verkhne-Kamchatsk	1978	1987
Avacha	Elizovo	1978	1987
Kamchatka	Kluchi	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	Kujdusun	1978	1987
Malaya Cherepanikha	Tiube	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
Selemdhza	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
Gravıyka	Igarka	1978	1987
Yenisei	Igarka	1936	1995
Us	Ust-Zolotaya	1978	1987
Markha	Malykai	1965	1984
Syda	Otrok	1978	1987
Sizim	Sizim	1978	1987

GLOBAL RUNOFF DATA CENTRE (GRDC)
Overlapping Time Series in WMO-Region 2

RUSSIAN FEDERATION

Table 2

River	Station	from	to
Podkamennaya Tunguska	Kuzmovka	1965	1984
Nizhnaya Tunguska	Podvoloshino	1978	1987
Dzhida	Dzhida	1980	1991
Chernaya	Chernoye Ii	1978	1987
Mıkhanskij	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	1938	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	Sredne-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



GLOBAL RUNOFF DATA CENTRE (GRDC)
Overlapping Time Series in WMO-Region 2

SRI LANKA

River	Station	from	to
Malwatu Oya	Kapachchi	1965	1984
Mahaweli Ganga	Manampitiya	1965	1984
Mahaweli Ganga	Peradeniya	1949	1984
Kelani Ganga	Glencourse	1965	1984
Kelani Ganga	Hanwella	1976	1979
Kalu Ganga	Putupaula	1976	1979
Gin Ganga	Agaliya	1927	1989

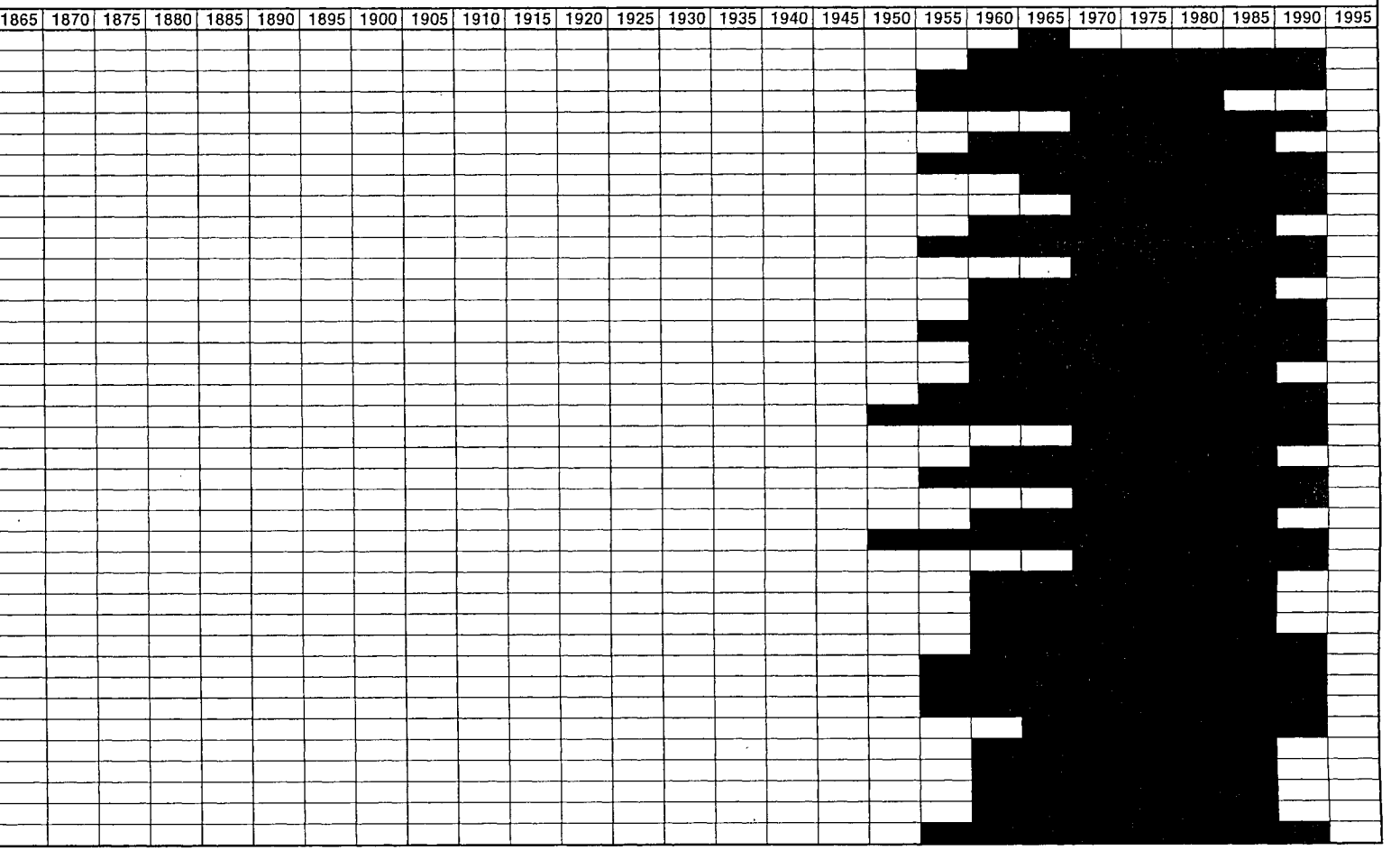
TADZHIKISTAN

River	Station	from	to
Isfara	Tash-Kurgan	1933	1991
Sangardak	King Guzar	1932	1989
Zaravchan	Dupuli	1932	1995
Akdarya	Khazarnova	1932	1989
Khanaka	Alibegi	1933	1986
Magiandarya	Sudgina	1932	1989
Yagnob	Takfon	1978	1986
Varzob	Dagana-Ata	1930	1986
Kafirnigan	Chinor	1932	1986
Kafirnigan	Tartki	1932	1992
Tupalang	Obizarang	1932	1989
Tupalang	Zarchob	1932	1989
Gunt	Khorog	1940	1985
Shahdara	Khabost	1938	1985
Muksu	Davsear	1961	1985
Obihingou	Tavildara	1958	1985
Liangar	At The mouth	1978	1986
Bartang	Nusur	1969	1985
Bartang	Barchadiv	1940	1985
Bartang	Murgab	1933	1985
Kudara	Ustie	1942	1978
Jazgulem	Motravn	1938	1984
Vakhsh	Tutkaul	1932	1967
Vakhsh	Komsomolabad	1949	1989
Vakhsh	Garm	1933	1990
Kizilsu	Dombrachi	1961	1985
Pjandge	Niz. Pjandge	1965	1989

GLOBAL RUNOFF DATA CENTRE (GRDC)
Overlapping Time Series in WMO-Region 2

TAIWAN

River	Station	from	to
Cho-Shui	Chi-Chi	1965	1968
Chi-Shui	Shin-Ying	1961	1993
Cho-Shui	Tung-Tou	1956	1993
Cho-Shui	Ying-Sheh	1959	1981
Po-Tzu	Niu-Chou-Chi Bridge	1973	1993
Xinfadaqiao	Laonong	1964	1989
Kao-Ping	Lao-Nung	1959	1993
Pa-Chang	Chu-Kou	1967	1993
Pa-Chang	Chun-Huei	1970	1993
Lushui	Liwu	1964	1989
Hou-Lung	Ta-Lu-Keng	1956	1993
Ta-An	Cho-Lan	1973	1993
Sandimen	Ailiao	1964	1989
Li-Chia	Li-Chia	1962	1993
Pei-Nan Chi	Yen-Ping	1956	1993
Lin-Pien	Hsin-Pei	1962	1993
Yufeng	Dahan	1964	1989
Tan-Shui	Yun-Feng	1957	1993
Tan-Shui	Fu-Shan	1953	1993
Tou-Chien	Nei-Wan	1971	1993
Yutian	Houqu	1964	1989
Tseng-Wen	Yu-Tien	1959	1993
Yen-Shui	Hsin-Shih	1973	1993
Fushan	Baishi	1964	1989
Nan-Ao	Shan-Chiao	1954	1993
Lan-Yang	Ku-Lu	1974	1993
Shanjiao	Nanaobai	1964	1989
Huanshanhe	Dajia	1964	1989
Nanhu	Nanhu	1964	1989
Li-Wu	Lu-Shui	1960	1993
Ta-Chia	Nan-Hu	1959	1993
Ta-Chia	Huan-Shan Junc.	1959	1993
Ta-Chia	Szu-Chi-Lang	1959	1993
Ta-Chia	Chi-Chia-Wan	1967	1993
Sijilang	Sijilong	1964	1989
Qijiawan	Yikawan	1964	1989
Tongtou	Qishui	1964	1989
Lishan	Fengping	1964	1989
Hsiu-Ku-Luan	Li-Shan	1959	1993



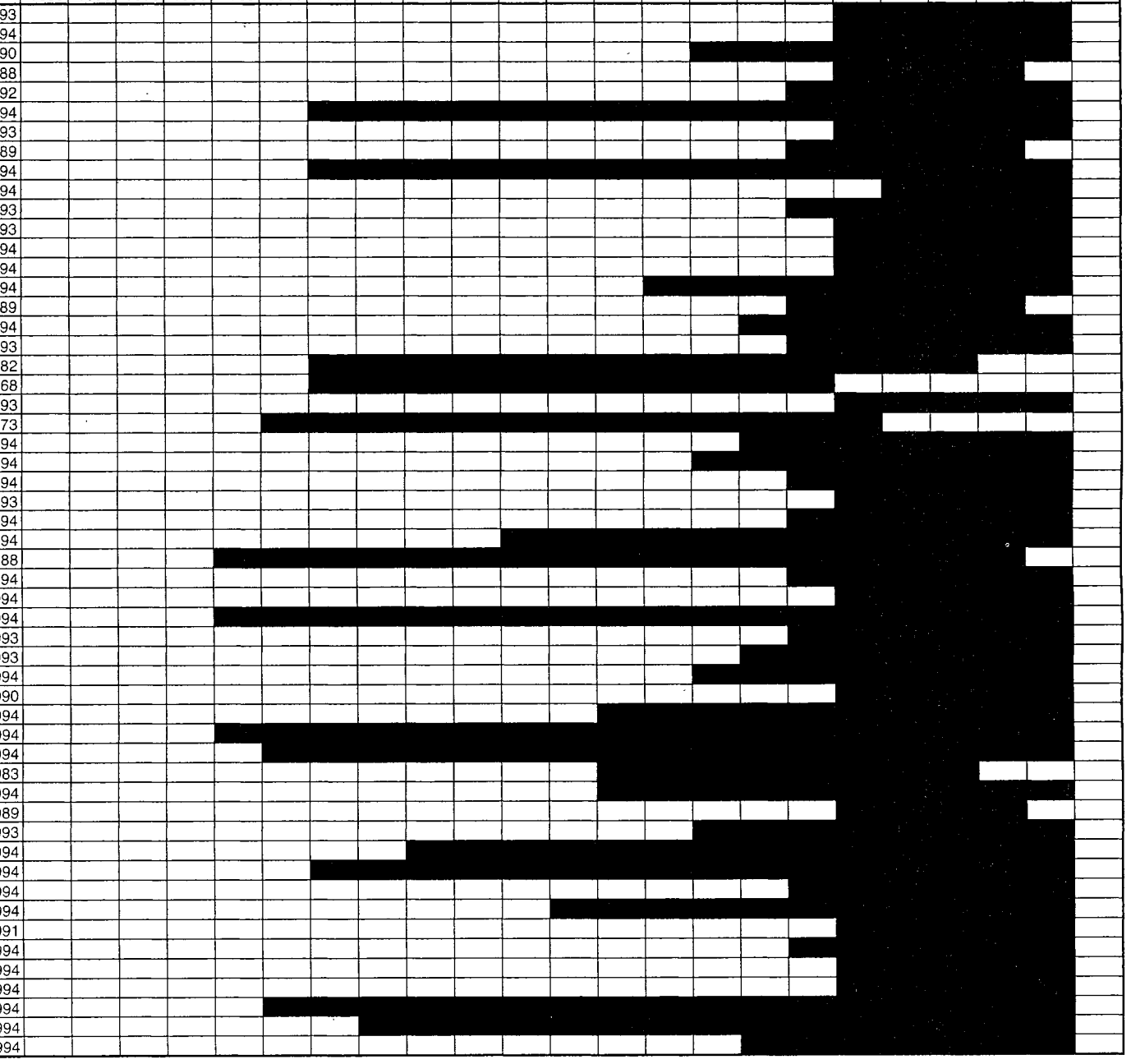
ANNEX 2

Overlapping time-series in WMO-region V

GLOBAL RUNOFF DATA CENTRE (GRDC)
Overlapping Time Series in WMO-Region 5

AUSTRALIA Table 1

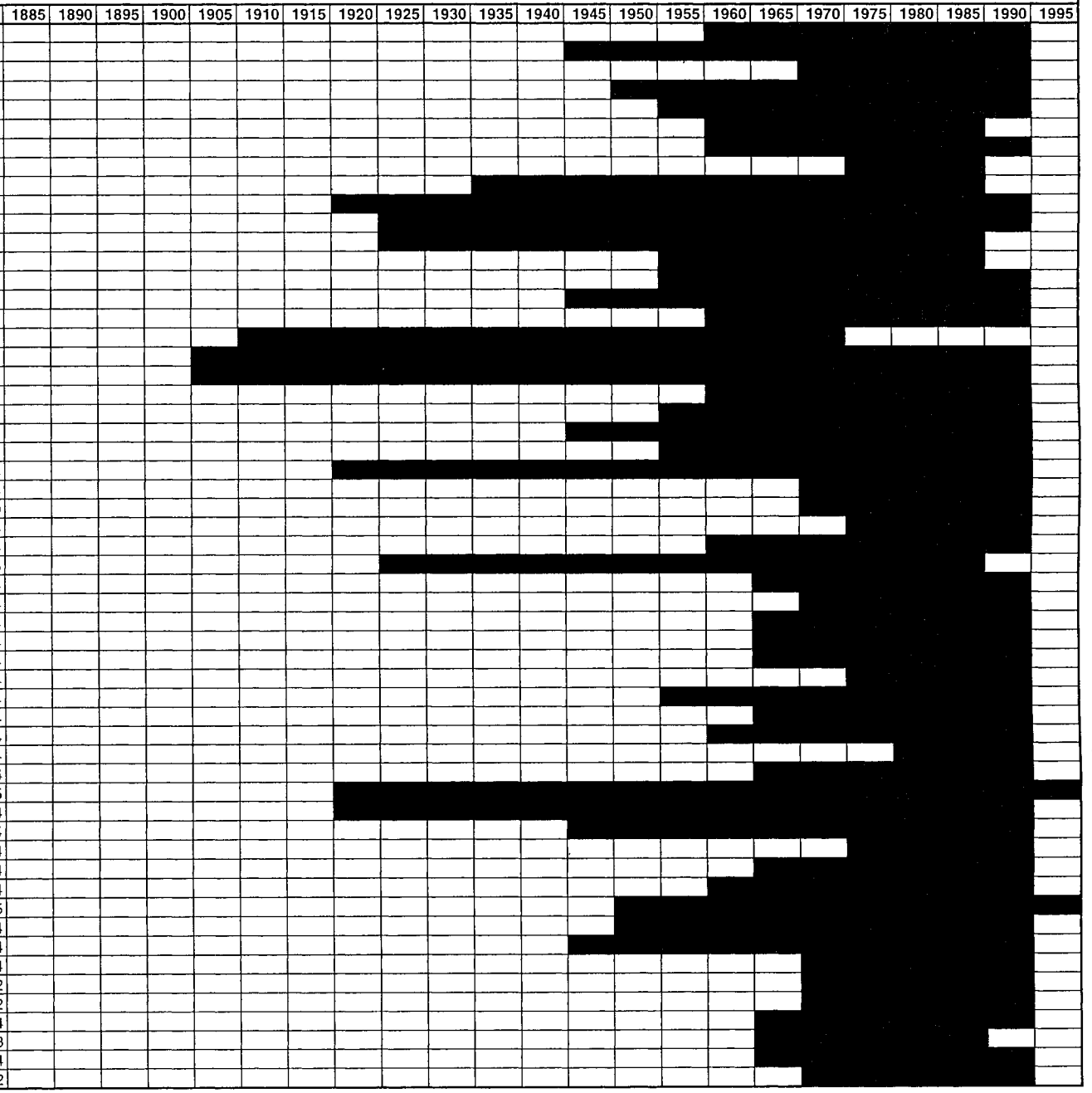
River	Station	from	to
Pascoe River	Garraway Creek Junction	1970	1993
Stewart River	Telegraph Road	1970	1994
Hann River	Sandy Creek	1958	1990
Jeannie River	Wakooka Road	1970	1988
Daintree River	Bairds	1968	1992
Barron River	Myola	1915	1994
Mulgrave River	Peets Bridge	1972	1993
Russell River	Powerline Crossing	1966	1989
South Johnstone River	Upstream Central Mill	1916	1994
Tully River	Euramo	1975	1994
Herbert River	Abergowrie	1968	1993
Black River	Bruce Highway	1973	1993
Alligator Creek	Allendale	1974	1994
Haughton River	Mount Piccaninny	1971	1994
Burdekin	Clare	1950	1994
Bogie River	Strathbogie	1967	1989
Broken River	Urannah	1962	1994
Mistake Creek	Charlton	1968	1993
Pioneer River	Pleystowe Recorder	1916	1982
Pioneer River	Pleystowe Mill	1917	1968
Waterpark Creek	Byfield	1974	1993
Fitzroy	Yaamba	1914	1973
Fitzroy	The Gap	1964	1994
Mimosa Creek	Redcliffe	1957	1994
Dawson River	Utopia Downs	1966	1994
Blackwater Creek	Currugh	1972	1993
Brown River	Lake Brown	1966	1994
Calliope River	Castlehope	1938	1994
Barker Creek	Wyalla	1909	1988
Cadarga Creek	Brovinia Station	1965	1994
Mary River	Dagun Pocket	1972	1994
Wide Bay Creek	Brooyar	1909	1994
South Pine River	Drapers Crossing	1965	1993
Bremer River	Walloon	1961	1993
Logan River	Round Mountain	1957	1994
Tallebudgera Creek	Tallebudgera Ck Rd	1970	1990
Oxley River	Eungella	1947	1994
Nymboida River	Nymboida	1909	1994
Clarence River	Tabulam	1912	1994
Little Murray River	North Dorrigo	1947	1983
Bielsdown Creek	Dorrigo #2 & #3	1947	1994
Taylors Arm	Grays Crossing	1970	1989
Nambucca River	Bowraville	1959	1993
Tia River	Tia	1927	1994
Styx River	Jeogla	1918	1994
Mammy Johnsons River	Pikes Crossing	1967	1994
Hunter River	Moonan Dam Site	1940	1994
Jilliby Creek	U/s Wyong River (Durren L	1972	1991
Jigadee Creek	Avondale	1969	1994
Capertee River	Glen Davis	1970	1994
South Creek	Mulgoa Road	1970	1994
Shoalhaven River	Warri	1914	1994
Corang River	Hockeys	1924	1994
Clyde River	Brooman	1960	1994



GLOBAL RUNOFF DATA CENTRE (GRDC)
Overlapping Time Series in WMO-Region 5

AUSTRALIA Table 2

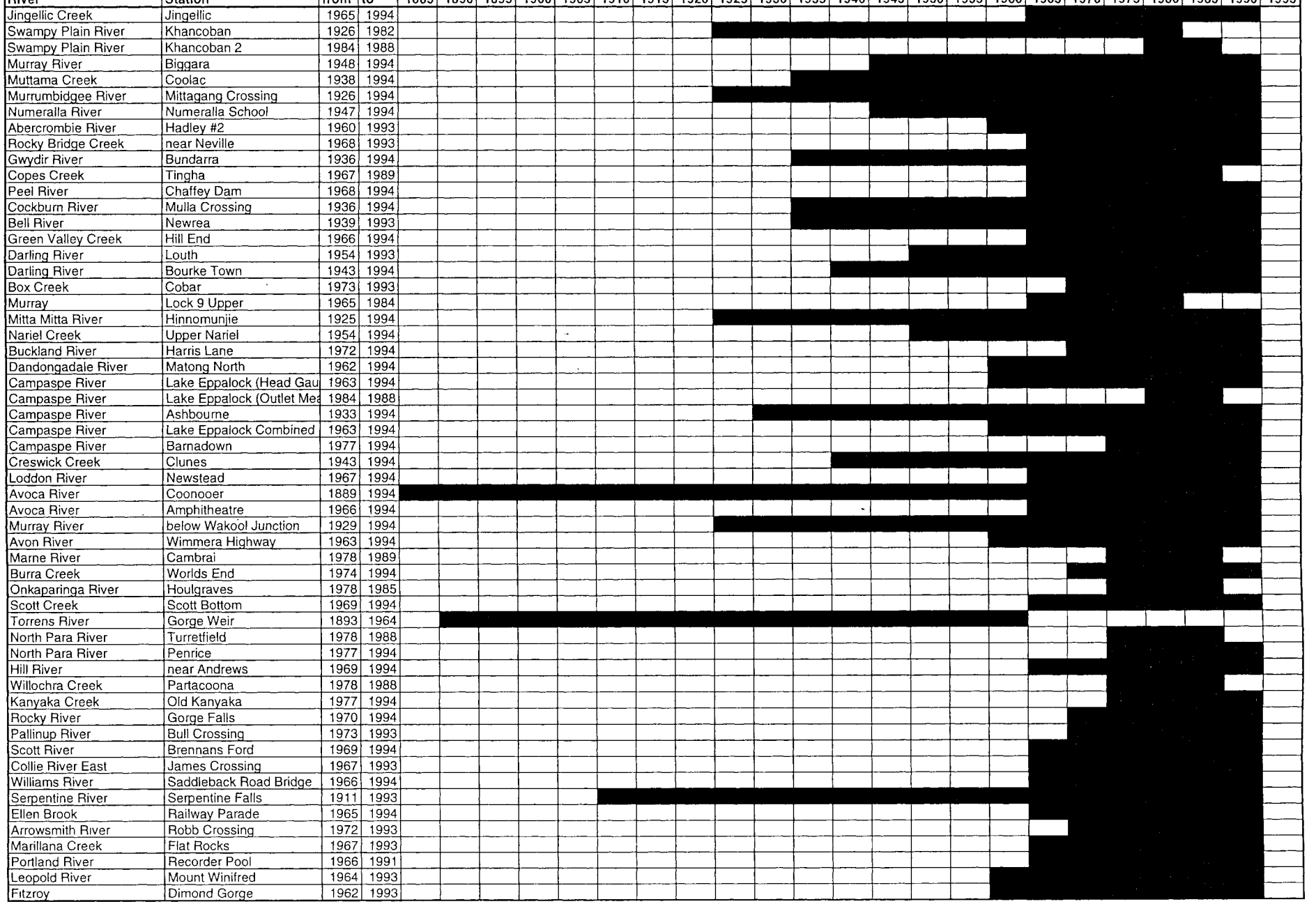
River	Station	from	to
Tuross River	Ds Wadbilliga Riv.Junction	1964	1994
Tuross River	Turossvale	1948	1994
Towamba River	Towamba	1970	1994
Delegate River	Quidong	1951	1994
Suggan Buggan River	Suggan Buggan	1957	1994
Snowy River	above Island Bend Pondag	1964	1988
Deddick River	Deddick (Caseys)	1964	1994
Mitchell River	Angusvale (Tabberabbera)	1978	1986
Mitchell River	Glenaladale	1937	1988
Wonnangatta River	Waterford	1922	1994
Thomson River	Coopers Creek	1929	1994
Latrobe River	Willow Grove	1925	1988
Loch River	Noojee	1957	1989
Tarwin River	Meeniyan	1955	1994
Bunyip River	Headworks	1948	1994
Little Yarra River	Yarra Junction	1963	1994
O'shannassy River	O'shannassy Weir	1912	1970
Maribyrnong River	Keilor	1908	1994
Moorabool River	Batesford	1908	1994
Gellibrand River	Carlisle	1964	1991
Arkins Creek West Branch	Wyelangta	1958	1994
Merri River	Woodford	1948	1994
Hopkins River	Hopkins Falls	1955	1994
Wannon River	Dunkeld	1920	1994
Mosquito Creek	Struan	1971	1994
Little Swanport River	Upstream Tasman Hwy	1971	1990
Ansons River	Downstream Big Boggy Cr	1979	1994
Nive River	Gowan Brae	1964	1994
King River	Crotty	1925	1988
Rubicon River	Tidal Limit	1967	1994
Arm River	above Mersey	1972	1994
Duck River	Scotchtown Road	1966	1994
Black River	South Forest	1968	1994
Flowerdale River	Moorleah	1966	1994
Seabrook Creek	Upstream Bass Highway	1977	1994
South Esk River	Upstream Macquarie River	1956	1994
Meander River	below Deloraine Weir	1968	1994
Forth River	above Lemonthyme	1962	1994
Allans Rivulet	Upstream Taranna	1983	1994
Pine Tree Rivulet	Lake Highway	1969	1994
Hellyer River	Guildford Junction	1922	1995
Florentine River	above Derwent River	1921	1994
Huon River	above Frying Pan Creek	1948	1994
Peak Rivulet	Upstream Esperance Rive	1975	1994
Mountain River	Downstream Grundys Cre	1968	1994
Davey River	below Crossing River	1964	1994
Franklin River	Mt. Fincham Track	1953	1995
Bracker Creek	Terraine	1952	1994
Dogwood Creek	Gilweir	1945	1994
Yuleba Creek	Forestry Station	1972	1994
Bngalow Creek	Meandarra	1972	1992
Canal Creek	Leyburn	1972	1992
Warrego River	Augathella	1967	1994
Paroo River	Yarranvale	1967	1988
Paroo River	Caiwarro	1967	1994
Bowna Creek	Yambla	1973	1992



GLOBAL RUNOFF DATA CENTRE (GRDC)
Overlapping Time Series in WMO-Region 5

AUSTRALIA Table 3

River	Station	from	to
Jingellic Creek	Jingellic	1965	1994
Swampy Plain River	Khancoban	1926	1982
Swampy Plain River	Khancoban 2	1984	1988
Murray River	Biggara	1948	1994
Muttama Creek	Coolac	1938	1994
Murrumbidgee River	Mittagang Crossing	1926	1994
Numeralla River	Numeralla School	1947	1994
Abercrombie River	Hadley #2	1960	1993
Rocky Bridge Creek	near Neville	1968	1993
Gwydir River	Bundarra	1936	1994
Copes Creek	Tingha	1967	1989
Peel River	Chaffey Dam	1968	1994
Cockburn River	Mulla Crossing	1936	1994
Bell River	Newrea	1939	1993
Green Valley Creek	Hill End	1966	1994
Darling River	Louth	1954	1993
Darling River	Bourke Town	1943	1994
Box Creek	Cobar	1973	1993
Murray	Lock 9 Upper	1965	1984
Mitta Mitta River	Hinnomunjie	1925	1994
Nariel Creek	Upper Nariel	1954	1994
Buckland River	Harris Lane	1972	1994
Dandongadale River	Matong North	1962	1994
Campaspe River	Lake Eppalock (Head Gau	1963	1994
Campaspe River	Lake Eppalock (Outlet Mea	1984	1988
Campaspe River	Ashbourne	1933	1994
Campaspe River	Lake Eppalock Combined	1963	1994
Campaspe River	Barnadown	1977	1994
Creswick Creek	Clunes	1943	1994
Loddon River	Newstead	1967	1994
Avoca River	Coonooer	1889	1994
Avoca River	Amphitheatre	1966	1994
Murray River	below Wakool Junction	1929	1994
Avon River	Wimmera Highway	1963	1994
Marne River	Cambrai	1978	1989
Burra Creek	Worlds End	1974	1994
Onkaparinga River	Houlgraves	1978	1985
Scott Creek	Scott Bottom	1969	1994
Torrens River	Gorge Weir	1893	1964
North Para River	Turretfield	1978	1988
North Para River	Penrice	1977	1994
Hill River	near Andrews	1969	1994
Willochra Creek	Partacoona	1978	1988
Kanyaka Creek	Old Kanyaka	1977	1994
Rocky River	Gorge Falls	1970	1994
Pallinup River	Bull Crossing	1973	1993
Scott River	Brennans Ford	1969	1994
Collie River East	James Crossing	1967	1993
Williams River	Saddleback Road Bridge	1966	1994
Serpentine River	Serpentine Falls	1911	1993
Ellen Brook	Railway Parade	1965	1994
Arrowsmith River	Robb Crossing	1972	1993
Marillana Creek	Flat Rocks	1967	1993
Portland River	Recorder Pool	1966	1991
Leopold River	Mount Winifred	1964	1993
Fitzroy	Dimond Gorge	1962	1993

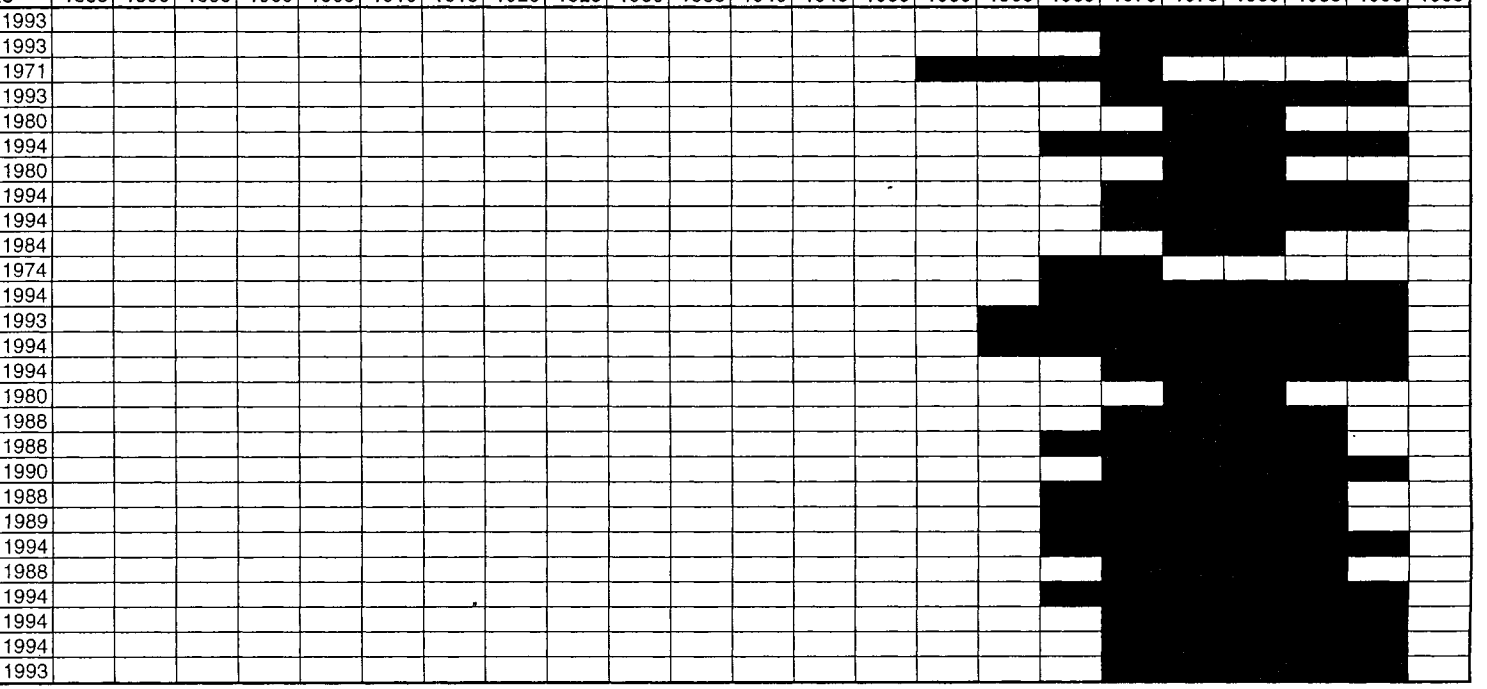


GLOBAL RUNOFF DATA CENTRE (GRDC)
Overlapping Time Series in WMO-Region 5

AUSTRALIA

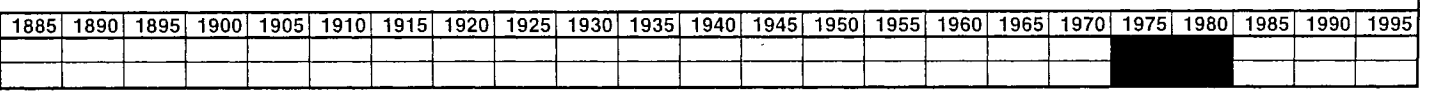
Table 4

River	Station	from	to
Fletcher River	Dromedary	1967	1993
Morgan River	Moondoalnee	1971	1993
Ord	Coolibah Pocket	1955	1971
Ord	Old Ord Homestead	1970	1993
Keep River	Legune Road Crossing	1977	1980
Victoria River	Coolibah Homestead	1965	1994
Fitzmaurice River	Dakota Camp	1977	1980
Dry River	Manbulloo Boundary	1971	1994
Green Ant Creek	Tipperary	1970	1994
Daly	Mount Nancar	1976	1984
Daly	Gourley	1965	1974
Elizabeth River	Stuart Highway	1968	1994
Blackmore River	Tumbling Waters	1961	1993
Mary River	el Sherana Road Crossing	1960	1994
Upper Latram River	Upstream Eldo Road Cros	1971	1994
Rinderry Creek	Damsite	1977	1980
Elizabeth Creek	Mining Camp	1974	1988
Paroo Creek	Damsite	1968	1988
Flinders River	Glendower	1972	1990
Norman River	Strathpark	1969	1988
Wenlock River	Wenlock	1969	1989
Angurugu River	Upstream Groote Eylandt I	1969	1994
Georgina River	Camooweal	1970	1988
Darr River	Darr	1969	1994
Cooper Creek	Callamurra	1973	1994
Todd River	Wills Terrace	1972	1994
Tennant Creek	Old Telegraph Station	1973	1993



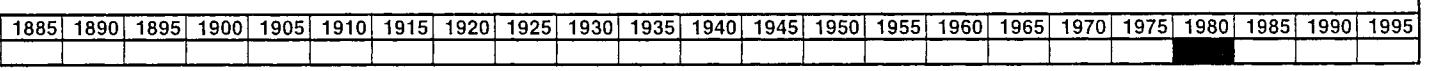
FIJI

River	Station	from	to
Navua	Nakavu	1978	1980
Wainimala	Nairukuruku	1978	1980



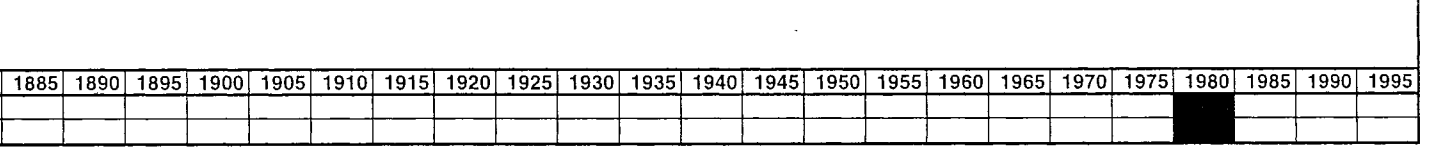
GUAM

River	Station	from	to
Ylig River	near Yona	1982	1983



MICRONESIA

River	Station	from	to
Nanpil River	Upstream from Kiepw Rive	1982	1983
Qaringeel Stream	Qaringeel, Yap	1982	1983



GLOBAL RUNOFF DATA CENTRE (GRDC)
Overlapping Time Series in WMO-Region 5

MALAYSIA

River	Station	from	to
Golok	Rantau Panjang	1978	1987
Tasho	Titi Baru	1975	1985
Muda	Ladang Victoria	1976	1985
Muda	Jeniang	1975	1985
Krian	Dusun Limai	1969	1969
Krian	Selama	1981	1985
Perak	Iskandar Bridge	1965	1985
Plus	Kampung Lintang	1981	1985
Kinta	Weir G.Tanjung Tualang	1981	1985
Batang	Tanjung Keramat	1981	1985
Bidor	Malayan Bidor Tin Bhd	1981	1985
Kelantan	Guillemard Bridge	1949	1986
Jelai	Jeram Bungor	1981	1985
Lipis	Benta	1981	1985
Triang	Juntai	1981	1985
Pahang	Temerloh	1965	1984
Trengganu	Kampung Tanggol	1969	1987
Dungun	Jambatan Jerangau	1981	1985
Bernam	Jambatan S.K.C.	1981	1985
Selangor	Rantau Panjang	1978	1987
Selangor	Rantau Panjang	1969	1987
Klang	Kuala Lumpur	1969	1975
Langat	Dingkil	1969	1985
Linggi	Sua Betong	1981	1985
Melaka	Pantai Belimbing	1981	1985
Muar	Buluh Kasap	1981	1985
Sembrong	Brizay Bridge	1969	1985
Kahang	Batu 26 Jalan Kluang	1981	1985
Johore	Rantau Panjang	1978	1987
Johore	Rantau Panjang	1969	1987
Sarawak Kanan	Pekan Buan Bidi	1981	1985
Ai	Lubok Antu	1981	1985
Rajang	Ng Benin	1981	1985
Rajang	Balaga	1981	1985
Tutoh	Long Terawan	1982	1985
Pedas	Tenom	1981	1985
Labuk	Tempias	1981	1985
Sugut	Bukit Mandau	1982	1985
Milan	Tangkulap	1981	1985
Kinabatangan	Balat	1981	1985

PALAU

River	Station	from	to
Diongradid River	near Ngetbong, Babelthua	1982	1983

FRENCH POLYNESIA

River	Station	from	to
Papeiha	Cote 10	1974	1986
Punaruu	Cote 50	1973	1983
Papenoo	Cote 45	1973	1979

GLOBAL RUNOFF DATA CENTRE (GRDC)
Overlapping Time Series in WMO-Region 5

NEW CALEDONIA

River	Station	from	to
Tipindje	Ouen-Kout	1955	1984
Houailou	Carovin	1978	1982
Ouenghi	Pont Rt1	1978	1982
Tontouna	Mine Liliane	1973	1979
Riviere Des Lacs	Goulet	1958	1984

PAPUA NEW GUINEA

River	Station	from	to
Sepik	Ambunti	1980	1984
Purari	Wabo Dam Site	1976	1984
Tauri	Hells Gate	1981	1984

AMERICAN SAMOA

River	Station	from	to
Aasu Stream	Aasu, Tutuila	1982	1983

SINGAPORE

River	Station	from	to
Bukit Timah Canal	Bukit Timah Road,10km	1969	1988

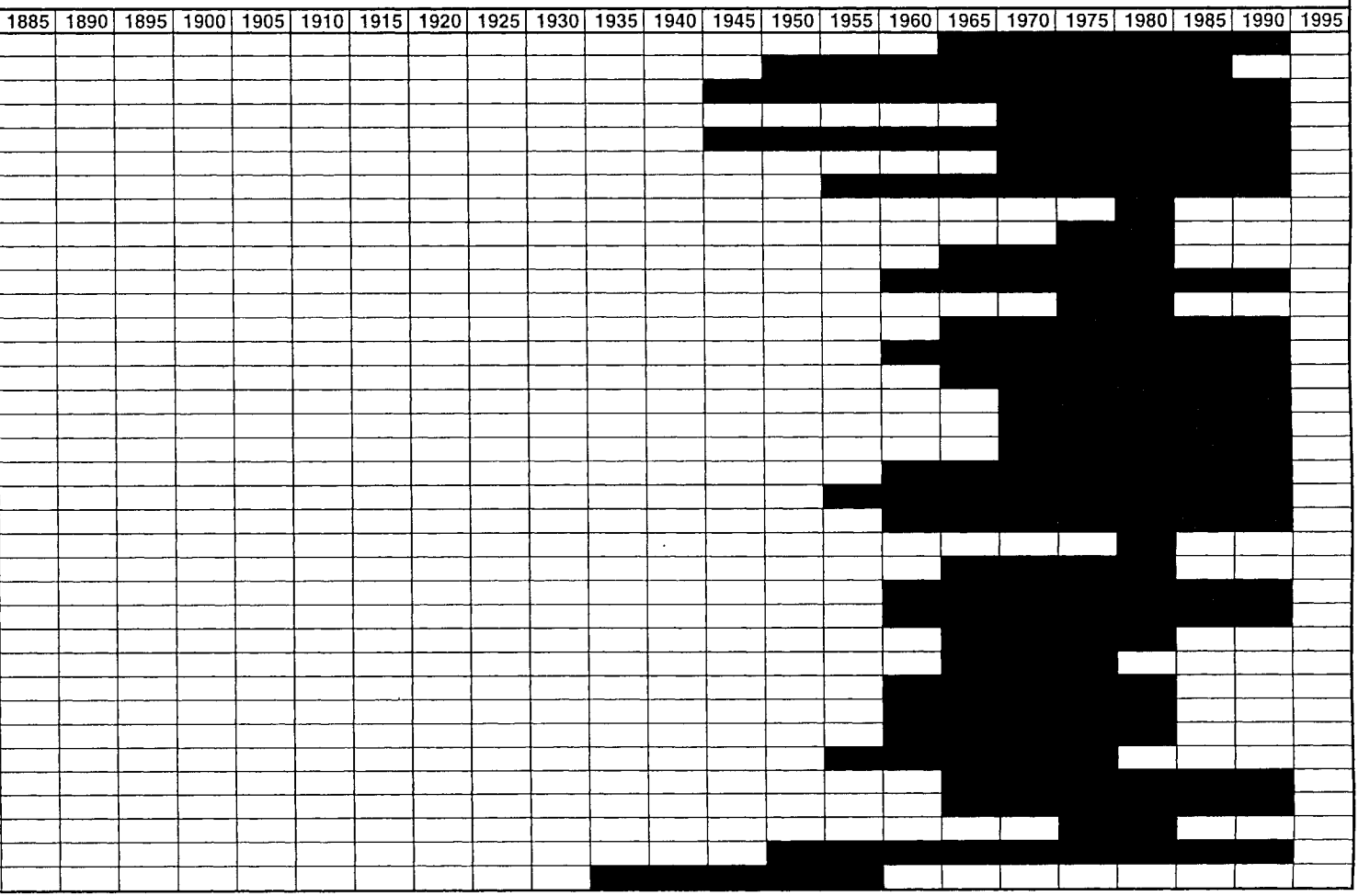
USA

River	Station	from	to
Wainiha River	near Hanalei	1978	1990
East Branch of Nf Wailua R	near Lihue	1978	1990
Kamananui Stream	Maunawai	1978	1990
Kalihi Stream	Kalihi	1978	1990
Halawa Stream	near Halawa	1978	1990
Wailuku River	near Kaumana	1978	1982

GLOBAL RUNOFF DATA CENTRE (GRDC)
Overlapping Time Series in WMO-Region 5

NEW ZEALAND

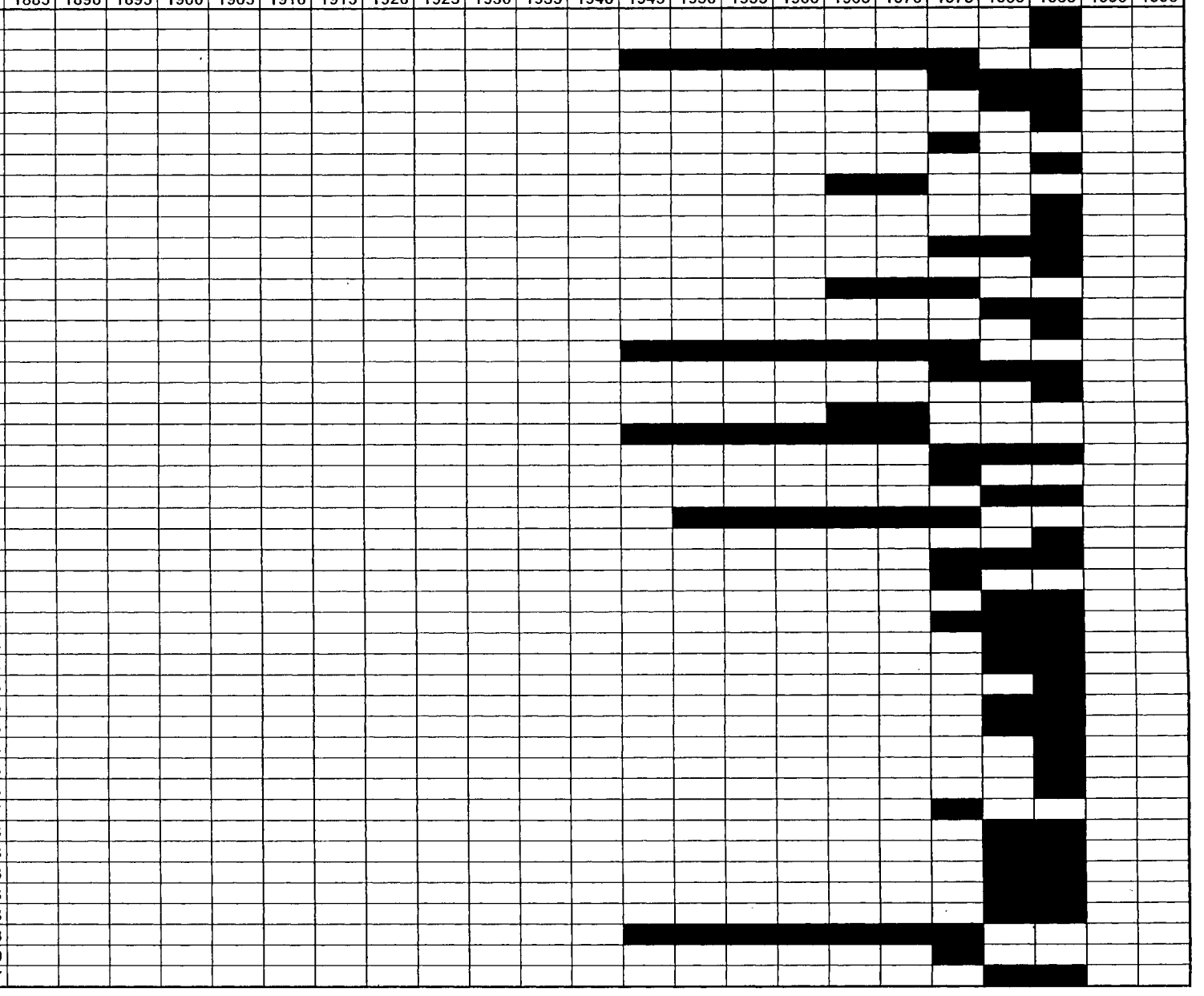
River	Station	from	to
Opahi River	Pond	1966	1991
Kaituna	Lake Rotoiti Outlet	1950	1989
Tarawera	Awakaponga	1948	1991
Whakatane	Whakatane	1973	1993
Rangitaiki	Murupara	1948	1991
Rangitikei	Mangaweka	1970	1994
Motu	Houpoto	1957	1991
Omakere	Fordale	1980	1984
Waikato River	Ngaruawahia	1976	1984
Waikato River	Taupo Outlet	1966	1984
Ongarue	Taringamutu	1963	1994
Wanganui	Paetawa	1976	1984
Wanganui	Te Porere	1967	1994
Mangawhero	Ore Ore	1963	1994
Hutt River	Kaitoke	1968	1994
Hutt River	Birchville	1971	1994
Punehu	Pihama	1970	1994
Manganui	Sh3	1973	1994
Selwyn River	Whitecliffs	1964	1994
Hurunui	Mandamus	1956	1991
Clarence	Jollies	1962	1994
Clutha	Clyde	1980	1984
Clutha	Balclutha	1969	1984
Ahuriri	Sth Diadem	1964	1994
Mataura	Gore Hbr	1961	1993
Waiau River	Lake Manapouri Outlet	1966	1984
Cleddau	Milford	1969	1975
Taylor	Borough Weir	1962	1984
Wairau	Tuamarina	1961	1983
Waihopai	Craiglochart	1961	1983
Branch	Recorder	1959	1979
Inangahua River	Blacks Point	1965	1991
Inangahua River	Blacks Point	1965	1991
Buller	Te Kuha	1976	1984
Buller	Lake Rotoiti Outlet	1951	1991
Gowan	Lake Rotoroa	1935	1959



GLOBAL RUNOFF DATA CENTRE (GRDC)
Overlapping Time Series in WMO-Region 5

PHILIPPINES

River	Station	from	to
Baruyen	Bangui	1985	1988
Cabacanan	Baduang,pagudpud	1986	1988
Bonga	Bangay	1946	1979
Gasgas	Manalpac,solsona	1978	1988
Abra	Bumagcat,tayum	1984	1988
Pinacanauan de Ilagan	Alangilan Ii,ilagan	1985	1988
Cagayan	Palattao	1976	1976
Ilut	Cordon	1985	1988
Cagayan	Pangal	1969	1974
Rosario	Rosario,diadi	1985	1988
Lanog	Careb,bagabag	1985	1988
Magat	Bato,bambang	1979	1988
Marang	Beti,aritao	1986	1988
Agno	Carmen	1969	1977
Maloma	San Felipe	1984	1987
Porac	Nasudeco,floridablanca	1985	1988
Pampanga	San Agustin	1946	1977
Marikina	Santo Nino,marikina	1978	1988
Palico	Bilaran,nasugbu	1985	1988
Agus	Infanta	1969	1974
Sipocot	Sabang	1946	1970
Pawili	San Vicente,ocampo	1978	1985
Bicol	Sto Domingo	1976	1978
Cumadcad	Cumadcad,castilla	1980	1988
Mambusao	Tumalalud	1950	1978
Jalaur	Poblacion Passi	1985	1988
Jalaur	Calyan,pototan	1976	1988
Hilabangan	Pangsud	1976	1979
Bais	Cabanlutan,bais	1984	1988
Okoy	Valencia	1979	1988
Siaton	Poblacion Siaton	1984	1988
Antequera	Antequera,santo Rosario	1984	1988
Pagsangaan	Liloan	1985	1988
Sapiniton	Libtong,san Miguel	1984	1988
Labangan	Bagalupa,labangan	1984	1988
Dapitan	Opao,dapitan	1985	1988
Aloran	Juan Bacayo,aloran	1986	1988
Mandulog	Iligan	1986	1988
Marbel	Marbel 8	1976	1977
Buluan	Poblacion Buluan	1981	1988
Alip	Poblacion Alip,datu Paglas	1981	1988
Maribulan	Maribulan,alabel	1984	1988
Lun Padidu	Kawas,alabel	1984	1988
Glan	Kalabalol,glan	1984	1988
Padada	Lapulabao	1949	1978
Andanan	Bayugan I	1976	1979
Wawa	Wawa,bayugan I	1981	1987



ANNEX 3

GRDC station catalog for WMO-region II

GLOBAL RUNOFF DATA CENTRE (GRDC)

INDIA (IN)

Table 1

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
2836100	Jhelum	Baramula Br.	34.22 N	74.33 E	12494	1.1968	12.1979	M	8
2836500	Jhelum	Munshibag	34.07 N	74.83 E	4324	1.1968	12.1979	M	14
2837100	Chenab	Akhnoor	32.90 N	74.75 E	22681	1.1968	12.1979	M	8
2838100	Ravi	Mukesar	32.45 N	75.23 E	5700	1.1968	12.1979	M	8
2839100	Beas	Mandi Plain	31.17 N	75.13 E	18274	1.1968	12.1979	M	8
2846800	Ganga	Farakka	25.00 N	87.92 E	835000	1.1949	12.1973	M	16
2851050	Tista	Anderson Br.	27.00 N	88.00 E		1.1965	12.1971	M	7
2851250	Manas	Mathanguri	26.65 N	90.95 E	32770	2.1955	12.1974	M	40
2851300	Brahmaputra	Pandu	26.13 N	91.70 E	405000	1.1956	11.1979	M	38
2851500	Jia Bhorelli	N.T. Road Crossing	26.83 N	92.92 E	10820	1.1958	12.1979	M	36
2853050	Sabarmati	Ahmedabad	23.08 N	72.63 E	12950	1.1968	12.1979	M	8
2853100	Ozat	Anandpur	21.33 N	70.50 E	1105	1.1965	12.1974	M	15
2853150	Mahi	Sevalia	22.30 N	73.03 E	33670	1.1968	12.1979	M	8
2853200	Narmada	Garudeshwar	21.92 N	73.65 E	89345	1.1949	12.1979	M	16
2853300	Tapi	Kathore	21.28 N	72.95 E	61575	6.1940	12.1979	M	25
2853500	Narmada	Jamtara	23.02 N	79.93 E	16576	1.1949	12.1974	M	0
2853700	Kalinadi	Dundeli	15.25 N	74.75 E	1393	1.1968	12.1979	M	8
2853900	Periyar	Planchode	10.17 N	76.75 E	5387	1.1968	12.1979	M	8
2854020	Subarnarekha	Kokpara	22.42 N	86.42 E	15152	1.1964	12.1974	M	3
2854050	Damodar	Rhondia	23.43 N	87.37 E	19220	1.1934	12.1979	M	11
2854080	Brahmani	Barkot Br.	21.00 N	85.00 E		1.1971	12.1972	M	0
2854100	Bhima	Takali	17.40 N	75.85 E	33916	1.1968	12.1979	M	8
2854150	Krishna	Alamati	16.33 N	75.55 E	36286	1.1971	12.1979	M	12
2854180	Bhima	Yadgiri	16.68 N	77.13 E	69863	1.1971	12.1979	M	11
2854200	Krishna	Deosugur	16.00 N	77.00 E		1.1971	11.1974	M	0
2854300	Krishna	Vijayawada	16.52 N	80.62 E	251355	1.1901	12.1979	M	6
2854400	Tungabhadra	Bawapuram	15.55 N	77.95 E	67180	1.1968	12.1979	M	8
2854450	Hagari	Ramapuram	15.63 N	76.97 E	23500	1.1971	12.1979	M	11
2854500	Penner	Nellore	14.45 N	79.98 E	53290	1.1965	12.1979	M	6
2854700	Cauvery	Krishnarajasagar	12.42 N	76.58 E	10600	1.1934	12.1979	M	32
2854750	Ponnaiyar	Tirukoilur Anicut	11.98 N	79.27 E	12888	1.1976	12.1979	M	0
2854800	Cauvery	Grand Anicut	10.83 N	78.83 E	74004	1.1971	12.1979	M	33
2854900	Vaigai	Peranai	10.10 N	77.80 E	2253	1.1972	12.1979	M	15
2854980	Tamiraparni	Sri Vaikuntam	8.63 N	77.93 E	4505	1.1971	12.1979	M	22
2855800	Mahanadi	Kaimundi	20.42 N	83.67 E	132090	1.1965	12.1970	M	0

GLOBAL RUNOFF DATA CENTRE (GRDC)

INDIA (IN)

Table 2

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
2856200	Godavari	Dhalegaon	19.20 N	76.37 E	30840	1.1968	12.1979	M	8
2856300	Godavari	Babli	18.87 N	77.82 E	55510	1.1971	12.1979	M	11
2856320	Godavari	Basar	18.87 N	77.98 E	86660	1.1971	12.1979	M	11
2856500	Godavari	Mancherial	18.83 N	79.45 E	102900	1.1968	12.1979	M	8
2856530	Wardha	Bamni Br.	19.80 N	79.37 E	46020	1.1971	12.1979	M	11
2856550	Wainganga	Ashti	19.68 N	79.78 E	50990	1.1968	12.1979	M	8
2856600	Indrawati	Parthgudem	18.82 N	80.35 E	40000	1.1971	12.1979	M	11
2856800	Kolab	Kotta	18.78 N	82.52 E	2041	1.1971	12.1979	M	11
2856900	Godavari	Polavaram	16.92 N	81.78 E	299320	6.1901	12.1979	M	5

CHINA (CI)

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
2106500	Songhuajiang	Haerbin	45.77 N	126.58 E	391000	1.1898	12.1987	M	4
2106600	Songhuajiang	Jilin	43.88 N	126.53 E	44100	7.1933	12.1986	M	24
2178300	Yongding	Guanting	40.23 N	115.60 E	42500	1.1925	12.1988	M	6
2178500	Luanhe	Luanxian	39.73 N	118.75 E	44100	1.1930	12.1988	M	15
2180500	Jinghe	Zhangjiashan	34.63 N	108.60 E	43200	7.1932	12.1986	M	4
2180700	Huanghe(Yellow River)	Sanmenxia	34.82 N	111.37 E	688421	1.1953	12.1988	M	0
2180710	Huanghe(Yellow River)	Shanxian	34.82 N	111.15 E	687869	1.1919	12.1958	M	0
2180750	Yiluo	Heishiguan	34.72 N	112.93 E	18600	8.1934	12.1986	M	24
2180800	Huanghe(Yellow River)	Huayuankou	34.92 N	113.65 E	730036	4.1946	12.1988	M	4
2181400	Wujiang	Gongtan	28.90 N	108.35 E	58300	2.1939	12.1982	M	8
2181600	Changjiang	Yichang	30.66 N	111.23 E	1010000	4.1877	12.1986	M	0
2181800	Changjiang	Hankou	30.58 N	114.28 E	1488036	1.1865	12.1986	M	1
2181850	Ganjiang	Jian	27.10 N	114.98 E	56200	1.1973	12.1984	M	0
2181900	Changjiang (Yangtze)	Datong	30.77 N	117.62 E	1705383	1.1923	12.1986	M	26
2181950	Huaihe	Bengbu	32.93 N	117.38 E	121330	7.1915	12.1986	M	24
2182100	Hanjiang	Ankang	32.68 N	109.02 E	41400	1.1935	12.1986	M	10
2186500	Yujiang	Nanning	22.80 N	108.37 E	75500	6.1936	12.1984	M	15
2186800	Xijiang	Wuzhou 3	23.48 N	111.30 E	329705	1.1915	12.1984	M	37
2186900	Beijiang	Hengshi	23.85 N	113.27 E	34013	5.1953	12.1987	M	0
2186950	Dongjiang	Boluo	23.17 N	114.30 E	25325	1.1960	12.1987	M	0

GLOBAL RUNOFF DATA CENTRE (GRDC)

IRAQ (IQ)

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
2595300	Al-Furat (Euphrates)	Hit	33.63 N	42.82 E	264100	10.1964	12.1972	M	11
2595400	Al-Furat (Euphrates)	Hindiya	32.72 N	44.27 E	274100	10.1964	12.1972	M	11
2595600	Dijlah (Tigris)	Mosul	36.32 N	43.15 E	54900	10.1964	12.1972	M	11
2595700	Dijlah (Tigris)	Baghdad	33.30 N	44.38 E	134000	10.1964	12.1972	M	11

REP. KOREA (KO)

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
2677100	Han	Indogyo	37.52 N	126.97 E	25046	7.1947	12.1979	M	23
2677300	Han	Yeo Ju	37.30 N	127.65 E	11132	1.1976	12.1979	M	0
2694100	Geum	Gyu Am	36.27 N	126.90 E	8261	1.1976	12.1979	M	0
2694200	Yeong San	Na Ju	35.02 N	126.23 E	2000	1.1976	12.1979	M	0
2694300	Seom Jin	Sing Jeun	35.18 N	127.57 E	4480	1.1976	12.1979	M	0
2694450	Nag Dong	Wae Gwan	36.10 N	128.40 E	11195	1.1976	12.1979	M	0
2694500	Nag Dong	Jin Dong	35.38 N	128.48 E	20403	1.1976	12.1979	M	0
2694510	Nagdong	Samnangjin	35.40 N	128.85 E	22916	1.1953	12.1972	M	5

DEM. PEOPL. REP. KOREA (KR)

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
2875100	Sodusu	Yenam	41.73 N	128.83 E	720	1.1976	12.1979	M	0
2876400	Zangzagang	Jonchon	40.67 N	126.45 E	2192	1.1976	12.1984	M	0
2876500	Amnokgang	Kumchang	41.53 N	127.13 E	18245	1.1976	12.1984	M	0
2893100	Taedonggang	Mirim	39.02 N	125.78 E	12175	1.1976	12.1982	M	0
2893200	Namgang	Samdung	38.98 N	126.18 E	2727	1.1976	12.1984	M	0
2893250	Biryugang	Songchon	39.27 N	126.22 E	1878	1.1976	12.1984	M	0
2893300	Taedonggang	Dokchon	39.75 N	126.30 E	3300	1.1976	12.1981	M	0

GLOBAL RUNOFF DATA CENTRE (GRDC)

IRAN (IR)

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
2418700	Kashafrud	Olangasadi	36.23 N	59.85 E	5006	9 .1977	9 .1983	D	19
2418700	Kashafrud	Olangasadi	36.23 N	59.85 E	5006	10.1977	9.1983	M	25
2421200	Talwar	Salamat-Abad	35.67 N	47.85 E	5983	9 .1978	9 .1983	D	2
2421200	Talwar	Salamat-Abad	35.67 N	47.85 E	5983	10.1978	9.1983	M	12
2421300	Shafarud	Poonel	37.53 N	49.10 E	350	1.1965	12.1984	M	27
2421400	Shahrud	Looshan	36.62 N	49.52 E	4578	9 .1977	9 .1983	D	2
2421400	Shahrud	Looshan	36.62 N	49.52 E	4578	10.1977	9.1983	M	10
2421450	Ghezalozan	Gilvan	36.77 N	49.17 E	49300	1.1976	12.1979	M	0
2421500	Lar	Ploor	35.87 N	52.05 E	1250	1.1965	8.1975	M	9
2421550	Babol	Babol	36.78 N	52.78 E	1430	1.1965	8.1975	M	9
2421800	Gorgan-Rud	Gonbad-Kabus	37.25 N	55.17 E	5310	1.1965	12.1984	M	30
2422500	Zarrinehrud	Sarigamesh	36.47 N	46.42 E	72200	9 .1977	9 .1979	D	4
2422500	Zarrinehrud	Sarigamesh	36.47 N	46.42 E	72200	10.1977	9.1979	M	26
2423300	Bakhtiari	Tang-E-Panj	32.93 N	48.77 E	6338	9 .1977	9 .1983	D	1
2423300	Bakhtiari	Tang-E-Panj	32.93 N	48.77 E	6338	10.1977	9.1983	M	10
2423350	Sezar	Sepid-Dasht	33.22 N	48.88 E	6994	9 .1977	9 .1983	D	1
2423350	Sezar	Sepid-Dasht	33.22 N	48.88 E	6994	10.1977	9.1983	M	10
2423450	Karkheh	Hamidiyeh	31.47 N	48.42 E	45882	1.1976	12.1979	M	0
2423500	Karun	Ahvaz	31.32 N	48.67 E	60769	1.1965	12.1984	M	28
2423800	Karun	Pol-E-Shalu	31.75 N	50.13 E	24335	9 .1977	9 .1983	D	1
2423800	Karun	Pol-E-Shalu	31.75 N	50.13 E	24335	1.1976	9.1983	M	0
2423850	Khersan	Barz	31.52 N	50.42 E	8973	9 .1977	9 .1983	D	1
2423850	Khersan	Barz	31.52 N	50.42 E	8973	10.1977	9.1983	M	10
2427200	Dalaki	Sareghanat	29.47 N	51.27 E	5055	9 .1977	9 .1983	D	1
2427200	Dalaki	Sareghanat	29.47 N	51.27 E	5055	10.1977	9.1983	M	10
2427500	Shoor Jahrom	Bagh-Awaz	38.60 N	53.47 E	4888	9 .1977	7 .1983	D	4
2427500	Shoor Jahrom	Bagh-Awaz	38.60 N	53.47 E	4888	10.1977	6.1983	M	7
2427700	Minab	Berantin	27.40 N	57.17 E	9285	1.1965	12.1984	M	27
2428200	Qom	Abbas-Abad	34.07 N	50.60 E	10286	9 .1977	9 .1983	D	5
2428200	Qom	Abbas-Abad	34.07 N	50.60 E	10286	10.1977	9.1983	M	10
2428300	Zayandeh	Pol-E-Kaleh	32.38 N	51.23 E	5650	1.1980	12.1984	M	0
2428350	Zayandeh	Pol-E-Khaju	32.63 N	51.68 E	14320	1.1980	12.1984	M	0
2428500	Kor	Ahmadabad Drudzan	30.20 N	52.47 E	5100	1.1965	8.1971	M	0
2428505	Kor	Ahmadabad	30.15 N	52.52 E	4830	1.1980	12.1984	M	0
2428800	Halil	Hossein Abad Jiroft	28.78 N	57.55 E	8420	1.1980	12.1984	M	0

GLOBAL RUNOFF DATA CENTRE (GRDC)

JAPAN (JP)

Table 1

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
2587080	Teshio	Maruyama	44.92 N	141.88 E	4685	1 .1986	12.1986	D	0
2587080	Teshio	Maruyama	44.92 N	141.88 E	4685	1.1986	12.1986	M	0
2587100	Ishikari	Ishikari-Ohashi	43.12 N	141.53 E	12697	1 .1986	12.1986	D	0
2587100	Ishikari	Ishikari-Ohashi	43.12 N	141.53 E	12697	1.1954	12.1986	M	6
2587400	Tokachi	Moiwa	42.81 N	143.51 E	8277	1 .1986	12.1986	D	0
2587400	Tokachi	Moiwa	42.81 N	143.51 E	8277	1.1986	12.1986	M	0
2588100	Ota	Yaguchi	34.45 N	132.50 E	1527	1 .1978	12.1988	D	0
2588100	Ota	Yaguchi	34.45 N	132.50 E	1527	1.1978	12.1988	M	0
2588200	Yodo	Hirakata	34.80 N	135.63 E	7281	1 .1978	12.1988	D	0
2588200	Yodo	Hirakata	34.80 N	135.63 E	7281	1.1965	12.1988	M	4
2588250	Shingu	Oga	33.73 N	135.94 E	2251	1 .1986	12.1986	D	0
2588250	Shingu	Oga	33.73 N	135.94 E	2251	1.1986	12.1986	M	0
2588300	Kiso	Imawatari	35.73 N	137.08 E	4632	1 .1978	12.1988	D	1
2588300	Kiso	Imawatari	35.73 N	137.08 E	4632	1.1978	12.1988	M	1
2588320	Tenryu	Kashima	34.90 N	137.81 E	4880	1 .1986	12.1986	D	0
2588320	Tenryu	Kashima	34.90 N	137.81 E	4880	1.1986	12.1986	M	0
2588480	Fuji	Kitamatsuno	35.20 N	138.55 E	3536	1 .1986	12.1986	D	<1
2588480	Fuji	Kitamatsuno	35.20 N	138.55 E	3536	1.1986	12.1986	M	0
2588500	Ara	Oashibashi	36.08 N	139.43 E	1019	1 .1978	12.1988	D	0
2588500	Ara	Oashibashi	36.08 N	139.43 E	1019	1.1978	12.1988	M	0
2588550	Tone	Kurihashi	36.13 N	139.70 E	8588	1 .1986	12.1986	D	0
2588550	Tone	Kurihashi	36.13 N	139.70 E	8588	1.1938	12.1986	M	6
2588650	Abukuma	Iwanuma	38.08 N	140.87 E	5265	1 .1986	12.1986	D	0
2588650	Abukuma	Iwanuma	38.08 N	140.87 E	5265	1.1986	12.1986	M	0
2588700	Kitakami	Tome	38.64 N	141.28 E	7869	1 .1986	12.1986	D	0
2588700	Kitakami	Tome	38.64 N	141.28 E	7869	1.1986	12.1986	M	0
2589200	Gono	Kawahira	34.99 N	132.30 E	3807	1 .1986	12.1986	D	0
2589200	Gono	Kawahira	34.99 N	132.30 E	3807	1.1986	12.1986	M	0
2589400	Jintsu	Jintsuohashi	36.70 N	137.32 E	2688	1 .1986	12.1986	D	0
2589400	Jintsu	Jintsuohashi	36.70 N	137.32 E	2688	1.1986	12.1986	M	0
2589500	Shinano	Ojiya	37.30 N	138.80 E	9719	1 .1978	12.1988	D	<1
2589500	Shinano	Ojiya	37.30 N	138.80 E	9719	1.1965	12.1988	M	4
2589550	Agano	Maoroshi	37.75 N	139.20 E	6997	1 .1986	12.1986	D	0
2589550	Agano	Maoroshi	37.75 N	139.20 E	6997	1.1986	12.1986	M	0
2589700	Mogami	Takaya	38.75 N	140.07 E	6271	1 .1978	12.1988	D	0
2589700	Mogami	Takaya	38.75 N	140.07 E	6271	1.1978	12.1988	M	0

GLOBAL RUNOFF DATA CENTRE (GRDC)

JAPAN (JP)

Table 2

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
2589750	Omono	Tsubakigawa	39.60 N	140.17 E	4035	1 .1986	12.1986	D	0
2589750	Omono	Tsubakigawa	39.60 N	140.17 E	4035	1.1986	12.1986	M	0
2589800	Yoneshiro	Futatsui	40.24 N	140.25 E	3750	1 .1986	12.1986	D	0
2589800	Yoneshiro	Futatsui	40.24 N	140.25 E	3750	1.1986	12.1986	M	0
2590100	Chikugo	Senoshita	33.53 N	130.80 E	2315	1 .1978	12.1988	D	0
2590100	Chikugo	Senoshita	33.53 N	130.80 E	2315	1.1965	12.1988	M	4
2590300	Kuma	Yokoishi	32.49 N	130.63 E	1856	1 .1986	12.1986	D	0
2590300	Kuma	Yokoishi	32.49 N	130.63 E	1856	1.1986	12.1986	M	0
2590400	Oyodo	Kashiwada	31.95 N	131.38 E	2126	1 .1986	12.1986	D	0
2590400	Oyodo	Kashiwada	31.95 N	131.38 E	2126	1.1986	12.1986	M	0
2591100	Watari	Gudo	32.98 N	132.93 E	1808	1 .1986	12.1986	D	0
2591100	Watari	Gudo	32.98 N	132.93 E	1808	1.1986	12.1986	M	0
2591800	Yoshino	Iwazu	34.05 N	134.20 E	2768	1 .1978	12.1988	D	0
2591800	Yoshino	Iwazu	34.05 N	134.20 E	2768	1.1978	12.1988	M	0

MYANMAR (BM)

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
2260100	Chindwin	Hkamti	26.00 N	95.70 E	27420	1 .1978	12.1988	D	0
2260100	Chindwin	Hkamti	26.00 N	95.70 E	27420	1.1978	12.1988	M	0
2260500	Irrawaddy	Sagaing	21.98 N	96.10 E	117900	1 .1978	12.1988	D	0
2260500	Irrawaddy	Sagaing	21.98 N	96.10 E	117900	1.1978	12.1988	M	0
2261500	Sittang	Toungoo	18.92 N	96.47 E	14660	1 .1978	12.1988	D	0
2261500	Sittang	Toungoo	18.92 N	96.47 E	14660	1.1978	12.1988	M	0
2261510	Thaukyegat	Dothaung	18.92 N	96.47 E	2468	1 .1978	12.1988	D	0
2261510	Thaukyegat	Dothaung	18.92 N	96.47 E	2468	1.1978	12.1988	M	0

GLOBAL RUNOFF DATA CENTRE (GRDC)

KIRGHIZTAN (KG)

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
2915400	Talas	Karaoy	42.50 N	72.50 E	2450	1 .1978	12.1987	D	0
2915400	Talas	Karaoy	42.50 N	72.50 E	2450	1.1978	12.1987	M	0
2915800	Tjup	Sarytologoi	42.73 N	78.75 E	513	1 .1978	12.1987	D	0
2915800	Tjup	Sarytologoi	42.73 N	78.75 E	513	1.1978	12.1987	M	0
2915900	Alaarcha	mouth of Kashkasu			233	1 .1978	12.1987	D	10
2915900	Alaarcha	mouth of Kashkasu			233	1.1978	12.1987	M	10
2916600	Gavasai	Gaya	41.20 N	71.08 E	657	1 .1978	12.1981	D	0
2916600	Gavasai	Gaya	41.20 N	71.08 E	657	1.1978	12.1981	M	0
2916660	Aksu	Dazgon	39.82 N	69.32 E	712	1.1948	12.1991	M	4
2916665	Hodgabakirgan	Andarhan	39.98 N	69.85 E	1740	1.1945	12.1991	M	0
2916670	Shahimardan	Paulgan	40.12 N	71.72 E	1300	7.1910	12.1975	M	14
2916680	Isfayramsay	Uch-Korgon	40.16 N	72.03 E	2220	1 .1978	12.1987	D	0
2916680	Isfayramsay	Uch-Korgon	40.16 N	72.03 E	2220	1.1933	12.1991	M	5
2916690	Kugart	Mikhailovskoe	40.87 N	73.12 E	1010	1.1933	12.1980	M	1
2916700	Karadarya	Uch-Terek	41.75 N	71.20 E		1.1933	12.1990	M	20
2916710	Karakuldga	Aktash	40.65 N	73.85 E	907	5.1938	4.1980	M	2
2916720	Jassy	Salamalik	40.85 N	73.22 E	1180	1.1933	12.1980	M	2
2916730	Kurshab	Gulcha	40.30 N	73.47 E	2740	10.1937	12.1980	M	7
2916740	Aflatun	Aflatun	41.60 N	71.98 E	863	1.1933	12.1980	M	24
2916750	Kekemeren	Ust. Djumgol	41.85 N	74.35 E	5290	7.1933	12.1980	M	2
2916760	Tar	Chalma	40.57 N	73.68 E	3840	5.1938	12.1980	M	0
2916770	Tentjak	Charvak	41.25 N	73.00 E	1300	1.1933	12.1991	M	8
2916780	Changet	Changet	40.87 N	73.12 E	381	1.1933	12.1980	M	0
2916800	Akbura	Tuleken	40.40 N	72.87 E	2430	5.1938	12.1980	M	0
2916810	Aravan	Ust. Karakol	40.35 N	72.62 E	1680	1.1933	12.1980	M	0
2916840	Mailisu	Ust. Kairagach	41.02 N	74.67 E	530	1.1933	12.1991	M	6
2916850	Naryn	Uch-Kurgan	41.17 N	72.10 E	58400	1.1933	12.1990	M	0
2916860	Naryn	Ust. Kekirim	41.42 N	74.00 E	34600	4.1934	12.1980	M	6
2916870	Naryn	Toktogul Reservoir				1.1951	3.1995	M	0
2916880	Donguztau	Donguztay	40.85 N	73.55 E	166	1.1933	12.1980	M	0
2916890	Naryn	Naryn	41.43 N	76.02 E	10500	1.1933	12.1980	M	0
2916900	Padshaata	Ust. Tostu	41.60 N	71.70 E	366	1.1934	12.1991	M	7

GLOBAL RUNOFF DATA CENTRE (GRDC)

LAOS (LA)

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
2469049	Nam Khan	Ban-Mixay (Ban Mout)	19.78 N	102.17 E	6100	4 .1980	12.1989	D	31
2469049	Nam Khan	Ban-Mixay (Ban Mout)	19.78 N	102.17 E	6100	4.1980	12.1989	M	30
2469050	Mekong	Luang Prabang	19.88 N	102.13 E	268000	4 .1980	12.1991	D	23
2469050	Mekong	Luang Prabang	19.88 N	102.13 E	268000	4.1980	12.1991	M	23
2469055	Nam Lik	Ban-Hin Heup	18.65 N	102.35 E	5115	7 .1983	12.1990	D	44
2469055	Nam Lik	Ban-Hin Heup	18.65 N	102.35 E	5115	7.1983	12.1990	M	43
2469057	Nam Ngum	Ban-Na Luong	18.90 N	102.77 E	5220	1 .1987	12.1989	D	33
2469057	Nam Ngum	Ban-Na Luong	18.90 N	102.77 E	5220	1.1987	12.1989	M	33
2469058	Nam Ngum	Ban-Pak Kanhoung	18.42 N	102.55 E		1 .1989	12.1991	D	0
2469058	Nam Ngum	Ban-Pak Kanhoung	18.42 N	102.55 E		1.1989	12.1991	M	0
2469060	Nam Ou	Muong Ngoy	20.70 N	102.75 E	19700	4 .1987	12.1991	D	<1
2469060	Nam Ou	Muong Ngoy	20.70 N	102.75 E	19700	4.1987	12.1991	M	0
2469072	Mekong	Vientiane	17.92 N	102.62 E	299000	4 .1980	12.1991	D	23
2469072	Mekong	Vientiane	17.92 N	102.62 E	299000	4.1980	12.1991	M	23
2469091	Nam Nhiep	Muong Mai	18.50 N	103.65 E	4270	1 .1987	12.1989	D	33
2469091	Nam Nhiep	Muong Mai	18.50 N	103.65 E	4270	1.1987	12.1989	M	33
2469095	Se Bang Fai	Mahaxai	17.41 N	105.20 E	4520	1 .1989	12.1991	D	0
2469095	Se Bang Fai	Mahaxai	17.41 N	105.20 E	4520	1.1989	12.1991	M	0
2469098	Se Bang Fai	Se-Bang Fai	17.07 N	104.98 E	8560	4 .1980	8 .1985	D	18
2469098	Se Bang Fai	Se-Bang Fai	17.07 N	104.98 E	8560	4.1980	8.1985	M	18
2469110	Se Champhone	Kengkok	16.43 N	105.20 E	2640	4 .1980	12.1991	D	53
2469110	Se Champhone	Kengkok	16.43 N	105.20 E	2640	4.1980	12.1991	M	51
2469111	Nam Theun	Ban-Signo	17.83 N	105.05 E	3370	1 .1987	12.1991	D	20
2469111	Nam Theun	Ban-Signo	17.83 N	105.05 E	3370	1.1987	12.1991	M	20
2469120	Se Bang Hieng	Ban Keng Done	16.19 N	105.32 E	19400	1 .1989	12.1991	D	14
2469120	Se Bang Hieng	Ban Keng Done	16.19 N	105.32 E	19400	1.1989	12.1991	M	13
2469260	Mekong	Pakse	15.12 N	105.80 E	545000	4 .1980	12.1991	D	32
2469260	Mekong	Pakse	15.12 N	105.80 E	545000	4.1980	12.1991	M	29
2469265	Se Done	Souvanna Khili	15.38 N	105.82 E	5760	1 .1987	12.1991	D	20
2469265	Se Done	Souvanna Khili	15.38 N	105.82 E	5760	1.1987	12.1991	M	20
2469300	Se Kong	Attopeu	14.81 N	106.84 E	10500	1 .1989	12.1991	D	0
2469300	Se Kong	Attopeu	14.81 N	106.84 E	10500	1.1989	12.1991	M	0

GLOBAL RUNOFF DATA CENTRE (GRDC)

MONGOLIA (MO)

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
2706100	Kerulen	Undurkham	47.32 N	110.67 E	39400	1.1976	12.1984	M	0
2707050	Ider	Tosontsengel	48.73 N	98.28 E	8012	4 .1978	11.1982	D	32
2707050	Ider	Tosontsengel	48.73 N	98.28 E	8012	4.1978	11.1982	M	32
2707100	Delgermuren	Muren	49.58 N	100.13 E	16300	1.1976	12.1984	M	0
2707200	Khoit Tamir	Ikh Tamir	47.50 N	101.25 E	2993	1 .1978	12.1982	D	2
2707200	Khoit Tamir	Ikh Tamir	47.50 N	101.25 E	2993	1.1978	12.1982	M	1
2707500	Selenga	Chutic	49.37 N	102.83 E	92300	1.1976	12.1984	M	0
2707600	Orkhon	Orkhon	48.65 N	103.57 E	23600	1.1976	12.1984	M	0
2707700	Kharaa	Barun Kharaa	48.92 N	106.07 E	9580	1 .1978	12.1982	D	0
2707700	Kharaa	Barun Kharaa	48.92 N	106.07 E	9580	1.1978	12.1982	M	0
2707800	Tola	Ulan-Bator	47.90 N	106.92 E	6300	1.1976	12.1984	M	0
2707900	Terelj	Terelj	48.05 N	107.42 E	1232	5 .1978	12.1982	D	11
2707900	Terelj	Terelj	48.05 N	107.42 E	1232	5.1978	12.1982	M	0
2743100	Kharkhiraa	Tarialan	49.77 N	91.83 E	738	1 .1978	12.1982	D	0
2743100	Kharkhiraa	Tarialan	49.77 N	91.83 E	738	1.1978	12.1982	M	0
2744100	Sagsain Gol	Buyant	48.30 N	89.50 E	4630	1 .1978	12.1982	D	0
2744100	Sagsain Gol	Buyant	48.30 N	89.50 E	4630	1.1978	12.1982	M	0
2744200	Kobdo	Ulgi	48.98 N	89.95 E	22057	1.1976	12.1984	M	0
2792500	Tuin Gol	Bayankhongar	46.13 N	100.68 E	2552	1 .1978	12.1981	D	<1
2792500	Tuin Gol	Bayankhongar	46.13 N	100.68 E	2552	1.1978	12.1981	M	0

AFGHANISTAN (AH)

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
2218200	Hari Rud	Tagab Ghaza	34.35 N	63.65 E	11920	10.1975	9 .1978	D	0
2218200	Hari Rud	Tagab Ghaza	34.35 N	63.65 E	11920	10.1975	9.1978	M	19
2218300	Kawgan	Langar	34.22 N	63.00 E	7490	10.1975	9 .1978	D	0
2218300	Kawgan	Langar	34.22 N	63.00 E	7490	10.1975	9.1978	M	19

GLOBAL RUNOFF DATA CENTRE (GRDC)

NEPAL (NE)

Table 1

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
2548310	Jhimruk Khola	Tigra Gaon	28.05 N	82.83 E	683	1 .1978	12.1985	D	0
2548310	Jhimruk Khola	Tigra Gaon	28.05 N	82.83 E	683	1.1972	12.1985	M	0
2548320	Seti River	Banga near Belgaon	28.98 N	81.14 E	7460	1 .1978	12.1987	D	0
2548320	Seti River	Banga near Belgaon	28.98 N	81.14 E	7460	1.1978	12.1987	M	0
2548350	Mari Khola	Nayagaon	28.07 N	82.80 E	1980	1.1964	12.1985	M	0
2548400	Karnali River	Chisapani	28.64 N	81.29 E	42890	1 .1987	12.1990	D	3
2548400	Karnali River	Chisapani	28.64 N	81.29 E	42890	1.1962	12.1993	M	0
2548450	Karnali River	Benighat	28.96 N	81.12 E	21240	1.1963	12.1993	M	16
2548460	Karnali River	Asara Ghat	28.95 N	81.44 E	19240	1.1962	12.1993	M	15
2548500	Bheri River	Jamu	28.76 N	81.35 E	12290	1.1963	12.1993	M	42
2548550	Babai River	Bargadha	28.42 N	81.42 E	3000	1.1967	12.1986	M	0
2548610	Rapti	Bagasoti Gaon	27.90 N	82.85 E	3380	1.1976	12.1985	M	0
2548620	Rapti	Jalkundi	27.95 N	82.23 E	5150	1.1964	12.1985	M	0
2549210	Rapti River	Rajaiya	27.44 N	84.97 E	579	1 .1978	12.1990	D	13
2549210	Rapti River	Rajaiya	27.44 N	84.97 E	579	1.1978	12.1990	M	12
2549220	Tadi Khola	Tadipul Belkot	27.86 N	85.14 E	653	1 .1978	12.1986	D	<1
2549220	Tadi Khola	Tadipul Belkot	27.86 N	85.14 E	653	1.1978	12.1986	M	0
2549225	Bagmati River	Sundarijal	27.78 N	85.43 E	17.000	1.1991	12.1993	M	13
2549230	Chepe Khola	Garam Besi	28.06 N	84.49 E	308	1 .1978	12.1992	D	6
2549230	Chepe Khola	Garam Besi	28.06 N	84.49 E	308	1.1978	12.1992	M	5
2549235	Burhi Gandaki	Arughat	28.04 N	84.82 E	4270	1.1964	12.1985	M	0
2549240	Andhi Khola	Dumrichaur Andhimuhan	27.97 N	83.59 E	476	1 .1978	12.1989	D	1
2549240	Andhi Khola	Dumrichaur Andhimuhan	27.97 N	83.59 E	476	1.1978	12.1989	M	0
2549250	Marsyangdi	Bimal Nagar	27.95 N	84.43 E	3850	1 .1987	12.1992	D	3
2549250	Marsyangdi	Bimal Nagar	27.95 N	84.43 E	3850	1.1987	12.1992	M	0
2549300	Kali Gandaki	Setibeni	28.01 N	83.60 E	6630	1.1964	12.1993	M	0
2549350	Kali Gandaki	Kotagaon Shringe	27.75 N	84.35 E	11400	1.1964	12.1985	M	4
2549400	Seti	Phoolbari	28.23 N	84.00 E	582	1.1964	12.1984	M	4
2549500	Narayani River	Devghat	27.71 N	84.43 E	31100	1.1963	12.1993	M	19
2550110	Tamakosi	Busti	27.63 N	86.08 E	2753	1 .1978	12.1987	D	<1
2550110	Tamakosi	Busti	27.63 N	86.08 E	2753	1.1971	12.1987	M	0
2550120	Balephi Khola	Jalbire	27.81 N	85.77 E	629	1 .1978	12.1990	D	8
2550120	Balephi Khola	Jalbire	27.81 N	85.77 E	629	1.1978	12.1990	M	7

GLOBAL RUNOFF DATA CENTRE (GRDC)

NEPAL (NE)

Table 2

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
2550200	Arun River	Turkeghat	27.33 N	87.19 E	28200	1.1976	12.1986	M	0
2550300	Bhote Kosi	Barabise	27.79 N	85.89 E	2410	1.1965	12.1985	M	4
2550350	Dudh Kosi	Rabuwar Bazar	27.27 N	86.66 E	4100	1.1964	12.1985	M	0
2550400	Sunkosi	Pachuwar Ghat	27.56 N	85.75 E	4920	1.1964	12.1985	M	0
2550450	Sunkosi	Kampughat	26.87 N	86.82 E	17600	1.1966	12.1985	M	0
2550500	Tamur River	Mulghat	26.93 N	87.33 E	5640	1.1965	12.1986	M	0
2550600	Sapta Kosi	Chatara-Kothu	26.87 N	87.16 E	54100	1.1977	12.1985	M	0

BANGLADESH (BW)

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
2646100	Ganges	Paksey	24.08 N	89.03 E	846900	1.1969	12.1975	M	15
2646200	Ganges	Hardinge Bridge	24.08 N	89.03 E	846300	4 .1985	3 .1992	D	1
2646200	Ganges	Hardinge Bridge	24.08 N	89.03 E	846300	4.1985	3.1992	M	0
2651080	Tista	Kaunia	25.75 N	89.50 E		4 .1985	3 .1992	D	<1
2651080	Tista	Kaunia	25.75 N	89.50 E		1.1969	3.1992	M	44
2651100	Brahmaputra	Bahadurabad	25.18 N	89.67 E	636130	4 .1985	3 .1992	D	<1
2651100	Brahmaputra	Bahadurabad	25.18 N	89.67 E	636130	1.1969	3.1992	M	44

GLOBAL RUNOFF DATA CENTRE (GRDC)

PAKISTAN (PK)

Table 1

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
2335100	Hunza River	Danyour Bridge	35.92 N	74.38 E	12950	1 .1978	12.1982	D	20
2335100	Hunza River	Danyour Bridge	35.92 N	74.38 E	12950	1.1978	12.1982	M	20
2335180	Brandu River	near Daggar	34.48 N	72.48 E	598	1 .1978	12.1979	D	0
2335180	Brandu River	near Daggar	34.48 N	72.48 E	598	1.1978	12.1979	M	0
2335190	Siran River	near Phulra	34.33 N	73.08 E	1057	1 .1978	12.1981	D	2
2335190	Siran River	near Phulra	34.33 N	73.08 E	1057	1.1978	12.1981	M	0
2335200	Indus	Attock	33.90 N	72.25 E	265122	1.1973	12.1979	M	0
2335210	Soan River	Dhok Pathan	33.13 N	72.33 E	6475	1 .1978	12.1981	D	0
2335210	Soan River	Dhok Pathan	33.13 N	72.33 E	6475	1.1978	12.1981	M	0
2335215	Haro River	Sanjwal	33.75 N	72.43 E	1800	1 .1978	12.1979	D	<1
2335215	Haro River	Sanjwal	33.75 N	72.43 E	1800	1.1978	12.1979	M	0
2335220	Sil River	near Chahan	33.45 N	72.87 E	241	1 .1979	12.1979	D	2
2335220	Sil River	near Chahan	33.45 N	72.87 E	241	1.1979	12.1979	M	0
2335230	Haro River	Gurriala	33.75 N	72.25 E	2056	1 .1978	12.1982	D	<1
2335230	Haro River	Gurriala	33.75 N	72.25 E	2056	1.1978	12.1982	M	0
2335240	Haro River	near Khanpur	33.45 N	72.90 E	777	1 .1978	12.1980	D	0
2335240	Haro River	near Khanpur	33.45 N	72.90 E	777	1.1978	12.1980	M	0
2335250	Soan River	Chirah	33.39 N	73.30 E	326	1 .1978	12.1979	D	0
2335250	Soan River	Chirah	33.39 N	73.30 E	326	1.1978	12.1979	M	0
2335260	Soan River	near Rawalpindi	33.55 N	73.10 E	1684	1 .1978	12.1979	D	<1
2335260	Soan River	near Rawalpindi	33.55 N	73.10 E	1684	1.1978	12.1979	M	0
2335600	Khost River	Chaffar Rift	30.33 N	67.50 E	1321	1 .1979	12.1981	D	33
2335600	Khost River	Chaffar Rift	30.33 N	67.50 E	1321	1.1979	12.1981	M	33
2335950	Indus	Kotri	25.37 N	68.37 E	832418	4.1973	12.1979	M	13
2336300	Kanshi River	near Palote	34.33 N	73.05 E	1111	1 .1979	12.1980	D	<1
2336300	Kanshi River	near Palote	34.33 N	73.05 E	1111	1.1979	12.1980	M	0
2336320	Poorch River	near Kotli	33.48 N	73.88 E	3238	1 .1978	12.1980	D	0
2336320	Poorch River	near Kotli	33.48 N	73.88 E	3238	1.1978	12.1980	M	0
2336350	Jhelum River	Chinari	34.15 N	73.83 E	13598	1 .1978	12.1982	D	<1
2336350	Jhelum River	Chinari	34.15 N	73.83 E	13598	1.1978	12.1982	M	0
2336400	Kishanganga River	Muzzafarabad	34.37 N	73.48 E	7278	1 .1978	12.1982	D	0
2336400	Kishanganga River	Muzzafarabad	34.37 N	73.48 E	7278	1.1978	12.1982	M	0
2336450	Kunhar River	near Garhi Habib-Ullah	34.40 N	73.37 E	2383	1 .1978	12.1982	D	0
2336450	Kunhar River	near Garhi Habib-Ullah	34.40 N	73.37 E	2383	1.1978	12.1982	M	0
2336500	Kunhar River	Naran	34.58 N	73.63 E	1036	1 .1978	12.1979	D	<1
2336500	Kunhar River	Naran	34.58 N	73.63 E	1036	1.1978	12.1979	M	0

PAKISTAN (PK)

Table 2

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
2337100	Chenab	Panjnad	29.35 N	71.03 E	280238	1.1973	12.1979	M	0
2340200	Chitral River	Chitral	35.83 N	71.80 E	11396	1 .1978	12.1981	D	<1
2340200	Chitral River	Chitral	35.83 N	71.80 E	11396	1.1978	12.1981	M	0
2340300	Swat River	near Kalam	35.50 N	72.58 E	2020	1 .1978	12.1979	D	0
2340300	Swat River	near Kalam	35.50 N	72.58 E	2020	1.1978	12.1979	M	0
2340500	Swat River	Chakdara	34.63 N	72.03 E	5776	1 .1978	12.1981	D	19
2340500	Swat River	Chakdara	34.63 N	72.03 E	5776	1.1978	12.1981	M	18
2340800	Bara River	Jhansi Post	33.83 N	71.35 E	1846	1 .1978	12.1982	D	<1
2340800	Bara River	Jhansi Post	33.83 N	71.35 E	1846	1.1978	12.1982	M	0
2341300	Kurram River	Thal	33.35 N	70.52 E	5543	1 .1978	12.1979	D	0
2341300	Kurram River	Thal	33.35 N	70.52 E	5543	1.1978	12.1979	M	0
2341700	Tochi River	Tangi Post	33.83 N	71.35 E	5128	2 .1978	12.1980	D	1
2341700	Tochi River	Tangi Post	33.83 N	71.35 E	5128	2.1978	12.1980	M	0
2396700	Porali River	Sinchi Bent	26.50 N	66.38 E	4040	1 .1979	12.1979	D	<1
2396700	Porali River	Sinchi Bent	26.50 N	66.38 E	4040	1.1979	12.1979	M	0

HONGKONG (HK)

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
2285001	Hok Tau	Hok Tau	22.48 N	114.18 E	5.020	4 .1977	3 .1983	D	6
2285001	Hok Tau	Hok Tau	22.48 N	114.18 E	5.020	4.1977	3.1983	M	0
2285002	Gauges	Lo Shue Ling	22.55 N	114.13 E	10.780	4 .1977	3 .1981	D	0
2285002	Gauges	Lo Shue Ling	22.55 N	114.13 E	10.780	4.1977	3.1981	M	0

GLOBAL RUNOFF DATA CENTRE (GRDC)

RUSSIAN FEDERATION (RS)

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

RUSSIAN FEDERATION (RS)

Table 2

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
2903910	Chaptakhai	mouth			28.400	1 .1978	12.1987	D	0
2903910	Chaptakhai	mouth			28.400	1.1978	12.1987	M	0
2903920	Radio-Uruyete	near The mouth			22.800	1 .1978	12.1987	D	<1
2903920	Radio-Uruyete	near The mouth			22.800	1.1978	12.1987	M	0
2903930	Podgornyi	near The mouth			20.300	1 .1978	12.1987	D	13
2903930	Podgornyi	near The mouth			20.300	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
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

GLOBAL RUNOFF DATA CENTRE (GRDC)

RUSSIAN FEDERATION (RS)

Table 3

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
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	Chernaya	Chernoye li			301	1 .1978	12.1987	D	0
2909900	Chernaya	Chernoye li			301	1.1978	12.1987	M	0
2909950	Mikhanskij	Velmo 2			32.300	1 .1978	12.1987	D	0
2909950	Mikhanskij	Velmo 2			32.300	1.1978	12.1987	M	0
2910100	Bolshoi Yugan	Ugut	60.32 N	74.12 E	22100	1.1965	12.1984	M	0
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

RUSSIAN FEDERATION (RS)

Table 4

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
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	78.900	1 .1978	12.1987	D	66
2910480	Akkem	Akkem	50.33 N	86.91 E	78.900	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			32.000	1 .1978	12.1987	D	0
2912900	Reshetka	Novoalekseevskoe			32.000	1.1978	12.1987	M	0
2912950	Yalynka	Kaltiukova			62.600	1 .1978	12.1987	D	0
2912950	Yalynka	Kaltiukova			62.600	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
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

RUSSIAN FEDERATION (RS)

Table 5

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
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 Omchikcha	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

GLOBAL RUNOFF DATA CENTRE (GRDC)

SRI LANKA (SB)

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
2357200	Malwatu Oya	Kapachchi	8.60 N	80.27 E	2121	1.1965	12.1984	M	20
2357400	Mahaweli Ganga	Manampitiya	7.92 N	81.08 E	7343	1.1965	12.1984	M	0
2357500	Mahaweli Ganga	Peradeniya	7.27 N	80.58 E	1189	10.1949	9.1984	M	2
2357600	Kelani Ganga	Glencourse	6.98 N	80.18 E	1463	1.1965	12.1984	M	0
2357610	Kelani Ganga	Hanwella	6.92 N	80.08 E	1782	1.1976	12.1979	M	0
2357700	Kalu Ganga	Putupaula	6.62 N	80.07 E	2598	1.1976	12.1979	M	0
2357750	Gin Ganga	Agaliya	6.18 N	80.20 E	681	10.1927	12.1989	D	4
2357750	Gin Ganga	Agaliya	6.18 N	80.20 E	681	10.1927	12.1989	M	1

UZBEKISTAN (UZ)

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
2916550	Chirchik	Hodjikent	41.70 N	70.00 E	10900	1.1935	12.1985	M	5
2916650	Sokh	Sarykanda	39.88 N	71.00 E	2480	1 .1978	12.1987	D	0
2916650	Sokh	Sarykanda	39.88 N	71.00 E	2480	1.1933	12.1991	M	0
2917100	Amu-Darya	Chatly	42.28 N	59.70 E	450000	1.1931	12.1973	M	2
2917300	Kashkadarya	Chirakchi	39.03 N	66.35 E	4550	1.1932	12.1989	M	8
2917310	Kashkadarya	Varganza	38.83 N	66.00 E	511	1.1932	3.1995	M	0
2917400	Surkhandarya	Manguzar	37.20 N	67.25 E	13500	1.1932	12.1989	M	11
2917420	Tanhizdarya	Kattagan	38.92 N	67.12 E	435	5.1951	12.1989	M	4

VIETNAM (VS)

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
2369800	Dak Bla	Kontum	14.33 N	108.00 E	3056	4 .1984	12.1991	D	36
2369800	Dak Bla	Kontum	14.33 N	108.00 E	3056	4.1984	12.1991	M	32
2369900	Ea Krong	Cau-14	12.60 N	107.93 E	8650	4 .1984	12.1991	D	36
2369900	Ea Krong	Cau-14	12.60 N	107.93 E	8650	4.1984	12.1991	M	32

GLOBAL RUNOFF DATA CENTRE (GRDC)

TADZHIKISTAN (TA)

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
2916590	Isfara	Tash-Kurgan	40.25 N	70.62 E	1560	1.1933	12.1991	M	3
2917410	Sangardak	King Guzar	38.43 N	67.88 E	901	1.1932	12.1989	M	3
2917450	Zaravchan	Dupuli	39.38 N	67.77 E	10200	1.1932	3.1995	M	0
2917460	Akdarya	Khazarnova	39.00 N	67.42 E	845	1.1932	12.1989	M	1
2917470	Khanaka	Alibegi	38.63 N	68.57 E	362	5.1933	12.1986	M	0
2917480	Magiandarya	Sudgina	39.48 N	67.67 E	1100	1.1932	12.1989	M	1
2917500	Yagnob	Takfon	39.18 N	68.53 E	1490	1 .1978	12.1986	D	0
2917500	Yagnob	Takfon	39.18 N	68.53 E	1490	1.1978	12.1986	M	0
2917550	Varzob	Dagana-Ata	38.76 N	68.75 E	1270	1 .1978	12.1986	D	0
2917550	Varzob	Dagana-Ata	38.76 N	68.75 E	1270	7.1930	12.1986	M	0
2917600	Kafirnigan	Chinor	38.58 N	69.05 E	3040	1 .1978	12.1986	D	0
2917600	Kafirnigan	Chinor	38.58 N	69.05 E	3040	1.1932	12.1986	M	0
2917610	Kafirnigan	Tartki	37.60 N	68.15 E	9780	2.1932	8.1992	M	2
2917630	Tupalang	Obizarang	38.05 N	68.00 E	2630	1.1932	12.1989	M	6
2917635	Tupalang	Zarchob	38.27 N	67.90 E	2200	1.1932	12.1989	M	4
2917700	Gunt	Khorog	37.53 N	71.52 E	13700	1.1940	12.1985	M	0
2917710	Shahdara	Khabost	37.35 N	71.57 E	4180	3.1938	12.1985	M	0
2917750	Muksu	Davsear	39.13 N	71.57 E	6550	1.1961	12.1985	M	9
2917760	Obihingou	Tavildara	38.70 N	70.52 E	5390	11.1958	12.1985	M	2
2917800	Liangar	At The mouth	38.14 N	72.70 E	335	1 .1978	12.1986	D	3
2917800	Liangar	At The mouth	38.14 N	72.70 E	335	1.1978	12.1986	M	2
2917810	Bartang	Nusur	38.30 N	72.40 E	21400	1.1969	12.1985	M	0
2917820	Bartang	Barchadiv	38.30 N	72.48 E	16700	1.1940	12.1985	M	7
2917830	Bartang	Murgab	38.17 N	73.97 E	10500	1.1933	12.1985	M	19
2917840	Kudara	Ustie	38.33 N	72.48 E	4500	1.1942	5.1978	M	8
2917850	Jazgulem	Motravn	38.20 N	71.42 E	1940	4.1938	12.1984	M	4
2917900	Vakhsh	Tutkaul	38.33 N	69.30 E	31200	1.1932	5.1967	M	0
2917910	Vakhsh	Komsomolabad	38.87 N	69.98 E	29500	1.1949	12.1989	M	44
2917920	Vakhsh	Garm	39.00 N	70.33 E	20000	1.1933	12.1990	M	8
2917940	Kizilsu	Dombrachi	39.27 N	71.38 E	8370	1.1961	12.1985	M	0
2917950	Pjandge	Niz. Pjandge	37.33 N	68.67 E	113000	1.1965	12.1989	M	29

GLOBAL RUNOFF DATA CENTRE (GRDC)

THAILAND (TH)

Table 1

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
2962017	Pai	Ban Paeng (Dam Site)	19.23 N	98.34 E	1750	1 .1978	12.1987	D	20
2962017	Pai	Ban Paeng (Dam Site)	19.23 N	98.34 E	1750	1.1978	12.1987	M	20
2964011	Ping	Ban Muang Kut	19.21 N	98.87 E	1765	4 .1977	3 .1978	D	8
2964011	Ping	Ban Muang Kut	19.21 N	98.87 E	1765	4.1977	3.1978	M	0
2964035	Wang	Ban Hai	18.80 N	99.65 E	1284	4 .1977	3 .1989	D	17
2964035	Wang	Ban Hai	18.80 N	99.65 E	1284	4.1977	3.1989	M	16
2964042	Nam Nan	Tha Wang Pha	19.10 N	100.80 E	2200	4 .1980	3 .1981	D	0
2964042	Nam Nan	Tha Wang Pha	19.10 N	100.80 E	2200	4.1980	3.1981	M	0
2964043	Yom	Ban Hae	19.30 N	100.38 E	155	4 .1977	3 .1981	D	0
2964043	Yom	Ban Hae	19.30 N	100.38 E	155	4.1977	3.1981	M	0
2964051	Pua	Ban Nafang	19.22 N	100.97 E	148	1 .1978	12.1987	D	20
2964051	Pua	Ban Nafang	19.22 N	100.97 E	148	1.1978	12.1987	M	20
2964078	Sakae Krang	Ban Pang Makha	15.90 N	99.48 E	833	4 .1977	3 .1989	D	17
2964078	Sakae Krang	Ban Pang Makha	15.90 N	99.48 E	833	4.1977	3.1989	M	16
2964080	Nan	Sirikit Dam	17.77 N	100.55 E	13300	4.1955	3.1989	M	0
2964081	Pa Sak	Nam Phung Bridge	16.95 N	101.22 E	268	4 .1979	3 .1983	D	0
2964081	Pa Sak	Nam Phung Bridge	16.95 N	101.22 E	268	4.1979	3.1983	M	0
2964082	Mae Nam Pa Sak	Bua Chum	16.77 N	101.23 E	1070	4 .1980	3 .1981	D	0
2964082	Mae Nam Pa Sak	Bua Chum	16.77 N	101.23 E	1070	4.1980	3.1981	M	0
2964100	Chao Phraya	Nakhon Sawan	15.67 N	100.12 E	110569	4 .1978	3 .1994	D	0
2964100	Chao Phraya	Nakhon Sawan	15.67 N	100.12 E	110569	1.1976	3.1994	M	0
2964120	Chao Phraya	Ban Bang Kaeo				4 .1978	3 .1994	D	<1
2964120	Chao Phraya	Ban Bang Kaeo				4.1978	3.1994	M	0
2964130	Chao Phraya	Ban Re Rai			120693	4 .1978	3 .1994	D	0
2964130	Chao Phraya	Ban Re Rai			120693	4.1978	3.1994	M	0
2964999	Quae Yai	Srinagarind Dam			10880	4.1952	3.1989	M	0
2965700	Trang	Trang	7.77 N	99.54 E	1801	1.1980	12.1984	M	3
2966060	Mae Nam Khwae Noi	Thong Pha Phum	14.73 N	98.63 E	4040	4 .1980	3 .1981	D	0
2966060	Mae Nam Khwae Noi	Thong Pha Phum	14.73 N	98.63 E	4040	4.1980	3.1981	M	0
2966400	Mae Nam Prachin Buri	Kabin Buri	13.97 N	100.70 E	5330	4 .1980	3 .1981	D	0
2966400	Mae Nam Prachin Buri	Kabin Buri	13.97 N	100.70 E	5330	4.1980	3.1981	M	0
2966800	Tapi	Surat Thani	8.57 N	99.25 E	5200	1.1980	12.1984	M	0
2969009	Nam Mae Fang	Ban Tha Mai Liam	20.02 N	99.35 E	1800	4 .1980	12.1989	D	28
2969009	Nam Mae Fang	Ban Tha Mai Liam	20.02 N	99.35 E	1800	4.1980	12.1989	M	28

GLOBAL RUNOFF DATA CENTRE (GRDC)

THAILAND (TH)

Table 2

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
2969010	Mekong	Chiang Saen	20.27 N	100.10 E	189000	4 .1980	12.1991	D	23
2969010	Mekong	Chiang Saen	20.27 N	100.10 E	189000	5.1960	12.1991	M	0
2969011	Kok	Ban Tha Don	20.06 N	99.36 E	2980	4 .1980	12.1987	D	13
2969011	Kok	Ban Tha Don	20.06 N	99.36 E	2980	4.1980	12.1987	M	12
2969012	Mekong	Sop-Kok	20.23 N	100.13 E	201000	4 .1980	12.1987	D	36
2969012	Mekong	Sop-Kok	20.23 N	100.13 E	201000	4.1980	12.1987	M	35
2969014	Nam Mae Kok	Dam-Site	19.93 N	99.73 E	5870	4 .1980	12.1990	D	26
2969014	Nam Mae Kok	Dam-Site	19.93 N	99.73 E	5870	4.1980	12.1990	M	25
2969028	Pum	Ban Mae Chai	19.35 N	99.87 E	165	1 .1978	3 .1982	D	0
2969028	Pum	Ban Mae Chai	19.35 N	99.87 E	165	1.1978	3.1982	M	0
2969029	Nam Mae Lao	Ban Tha Sai	19.85 N	99.83 E	3050	4 .1980	12.1991	D	32
2969029	Nam Mae Lao	Ban Tha Sai	19.85 N	99.83 E	3050	4.1980	12.1991	M	29
2969030	Nam Mae Ing	Thoeng	19.68 N	100.18 E	5700	4 .1980	12.1991	D	32
2969030	Nam Mae Ing	Thoeng	19.68 N	100.18 E	5700	4.1980	12.1991	M	29
2969069	Nam Heung	Ban Pak Huai	17.70 N	101.40 E	4090	4 .1980	12.1991	D	23
2969069	Nam Heung	Ban Pak Huai	17.70 N	101.40 E	4090	4.1980	12.1991	M	23
2969070	Nam Loei	Wang Saphung	17.28 N	101.77 E	1240	4 .1980	12.1987	D	36
2969070	Nam Loei	Wang Saphung	17.28 N	101.77 E	1240	4.1980	12.1987	M	35
2969076	Nam Pong	Si Chomphu	16.87 N	102.18 E	1250	4 .1980	12.1991	D	32
2969076	Nam Pong	Si Chomphu	16.87 N	102.18 E	1250	4.1980	12.1991	M	29
2969077	Huai Luang	Ban Tha Tum	17.47 N	102.80 E	1210	6 .1980	3 .1987	D	19
2969077	Huai Luang	Ban Tha Tum	17.47 N	102.80 E	1210	6.1980	3.1987	M	29
2969078	Huai Mong	Ban Kruat	17.82 N	102.43 E	2370	5 .1980	3 .1986	D	17
2969078	Huai Mong	Ban Kruat	17.82 N	102.43 E	2370	5.1980	3.1986	M	16
2969079	Huai Phaniang	Ban Wang Mun	17.17 N	102.73 E	1260	4 .1980	12.1987	D	0
2969079	Huai Phaniang	Ban Wang Mun	17.17 N	102.73 E	1260	4.1980	12.1987	M	0
2969080	Lam Choen	Ban Tha Dua	16.48 N	102.12 E	1520	4 .1980	12.1991	D	32
2969080	Lam Choen	Ban Tha Dua	16.48 N	102.12 E	1520	4.1980	12.1991	M	29
2969081	Huai Rai	Ban Nong Kiang	16.13 N	101.67 E	1370	4 .1980	12.1991	D	32
2969081	Huai Rai	Ban Nong Kiang	16.13 N	101.67 E	1370	4.1980	12.1991	M	29
2969082	Nam Chi	Ban Chot	16.10 N	102.57 E	10200	4 .1980	12.1991	D	32
2969082	Nam Chi	Ban Chot	16.10 N	102.57 E	10200	4.1980	12.1991	M	29
2969083	Nam Chi	Ban Kok	16.35 N	102.95 E	28500	4 .1980	12.1988	D	31
2969083	Nam Chi	Ban Kok	16.35 N	102.95 E	28500	4.1980	12.1988	M	31
2969086	Lam Pao	Kamalasai	16.33 N	103.57 E	5680	4 .1980	3 .1981	D	0
2969086	Lam Pao	Kamalasai	16.33 N	103.57 E	5680	4.1980	3.1981	M	0

GLOBAL RUNOFF DATA CENTRE (GRDC)

THAILAND (TH)

Table 3

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
2969087	Nam Mun	Satuk	15.30 N	103.28 E	26800	4 .1980	3 .1987	D	14
2969087	Nam Mun	Satuk	15.30 N	103.28 E	26800	4.1980	3.1987	M	14
2969090	Mekong	Nong Khai	17.87 N	102.72 E	302000	4 .1980	12.1991	D	23
2969090	Mekong	Nong Khai	17.87 N	102.72 E	302000	4.1980	12.1991	M	23
2969095	Mekong	Nakhon Phanom	17.40 N	104.80 E	373000	4 .1980	12.1991	D	32
2969095	Mekong	Nakhon Phanom	17.40 N	104.80 E	373000	1.1962	12.1991	M	3
2969096	Nam Kam	Na-Kae	16.95 N	104.50 E	2360	4 .1980	12.1991	D	23
2969096	Nam Kam	Na-Kae	16.95 N	104.50 E	2360	4.1980	12.1991	M	23
2969100	Mekong	Mukdahan	16.53 N	104.73 E	391000	4 .1980	12.1991	D	23
2969100	Mekong	Mukdahan	16.53 N	104.73 E	391000	4.1924	12.1991	M	0
2969115	Nam Yang	Ban Na Thom	16.05 N	104.03 E	3240	4 .1980	12.1991	D	0
2969115	Nam Yang	Ban Na Thom	16.05 N	104.03 E	3240	4.1980	12.1991	M	0
2969116	Huai Khayung	Ban Huai Khayung	15.00 N	104.63 E	2900	1 .1989	12.1991	D	0
2969116	Huai Khayung	Ban Huai Khayung	15.00 N	104.63 E	2900	1.1989	12.1991	M	0
2969120	Mun	Kaset Wisai	15.65 N	103.56 E	1310	4 .1981	3 .1989	D	16
2969120	Mun	Kaset Wisai	15.65 N	103.56 E	1310	4.1981	3.1989	M	12
2969123	Huai Thap Than	Huai Thap Than	15.03 N	104.02 E	2030	4 .1980	12.1987	D	18
2969123	Huai Thap Than	Huai Thap Than	15.03 N	104.02 E	2030	4.1980	12.1987	M	18
2969124	Nam Mun	Rasi Salai	15.33 N	104.15 E	44600	4 .1980	12.1991	D	32
2969124	Nam Mun	Rasi Salai	15.33 N	104.15 E	44600	4.1980	12.1991	M	29
2969150	Nam Chi	Yasothon	15.78 N	104.15 E	43100	4 .1980	12.1991	D	23
2969150	Nam Chi	Yasothon	15.78 N	104.15 E	43100	4.1953	12.1991	M	0
2969200	Nam Mun	Ubon	15.22 N	104.87 E	104000	4 .1980	12.1991	D	23
2969200	Nam Mun	Ubon	15.22 N	104.87 E	104000	6.1955	12.1991	M	0
2969210	Lam Dom Yai	Ban Fang Phe	14.68 N	105.15 E	1410	1 .1989	12.1991	D	0
2969210	Lam Dom Yai	Ban Fang Phe	14.68 N	105.15 E	1410	1.1989	12.1991	M	0
2969220	Nam Mun	Kaeng Saphu Tai	15.23 N	105.25 E	116000	1 .1989	12.1991	D	0
2969220	Nam Mun	Kaeng Saphu Tai	15.23 N	105.25 E	116000	1.1989	12.1991	M	0

GLOBAL RUNOFF DATA CENTRE (GRDC)

TAIWAN (TW)

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
2385100	Cho-Shui	Chi-Chi	23.83 N	120.75 E	2311	1.1965	12.1968	M	0
2385101	Chi-Shui	Shin-Ying	23.28 N	120.30 E	227	1.1961	12.1993	M	0
2385150	Cho-Shui	Tung-Tou	23.63 N	120.65 E	259	1.1956	12.1993	M	0
2385151	Cho-Shui	Ying-Sheh	24.03 N	121.17 E	188	1.1959	12.1981	M	0
2385160	Po-Tzu	Niu-Chou-Chi Bridge	23.50 N	120.45 E	150	1.1973	12.1993	M	0
2385200	Xinfadaqiao	Laonong	23.05 N	120.65 E	812	1.1964	12.1989	M	0
2385210	Kao-Ping	Lao-Nung	23.05 N	120.65 E	812	1.1959	12.1993	M	0
2385250	Pa-Chang	Chu-Kou	23.43 N	120.58 E	83.000	1.1967	12.1993	M	0
2385251	Pa-Chang	Chun-Huei	23.45 N	120.45 E	122	1.1970	12.1993	M	0
2385300	Lushui	Liwu	24.18 N	121.50 E	434	1.1964	12.1989	M	0
2385350	Hou-Lung	Ta-Lu-Keng	24.45 N	120.83 E	247	1.1956	12.1993	M	0
2385360	Ta-An	Cho-Lan	24.30 N	120.80 E	599	1.1973	12.1993	M	0
2385400	Sandimen	Ailiao	22.70 N	120.63 E	408	1.1964	12.1989	M	0
2385420	Li-Chia	Li-Chia	22.75 N	121.03 E	149	1.1962	12.1993	M	0
2385430	Pei-Nan Chi	Yen-Ping	22.90 N	121.07 E	476	1.1956	12.1993	M	0
2385460	Lin-Pien	Hsin-Pei	22.45 N	120.53 E	310	1.1962	12.1993	M	0
2385500	Yufeng	Dahan	24.65 N	121.28 E	335	1.1964	12.1989	M	0
2385510	Tan-Shui	Yun-Feng	24.65 N	121.28 E	335	1.1957	12.1993	M	0
2385511	Tan-Shui	Fu-Shan	24.78 N	121.50 E	160	1.1953	12.1993	M	0
2385520	Tou-Chien	Nei-Wan	24.70 N	121.17 E	139	1.1971	12.1993	M	0
2385550	Yutian	Hougu	23.12 N	120.45 E	160	1.1964	12.1989	M	0
2385560	Tseng-Wen	Yu-Tien	23.17 N	120.45 E	161	1.1959	12.1993	M	0
2385570	Yen-Shui	Hsin-Shih	23.05 N	120.27 E	146	1.1973	12.1993	M	0
2385600	Fushan	Baishi	24.78 N	121.50 E	258	1.1964	12.1989	M	0
2385620	Nan-Ao	Shan-Chiao	22.75 N	121.03 E	149	1.1954	12.1993	M	0
2385630	Lan-Yang	Ku-Lu	24.57 N	121.48 E	274	1.1974	12.1993	M	0
2385650	Shanjiao	Nanaobai	24.55 N	121.65 E	36.800	1.1964	12.1989	M	0
2385700	Huanshanhe	Dajia	24.30 N	121.27 E	257	1.1964	12.1989	M	0
2385750	Nanhu	Nanhu	24.30 N	121.28 E	125	1.1964	12.1989	M	0
2385760	Li-Wu	Lu-Shui	24.18 N	121.50 E	435	1.1960	12.1993	M	0
2385765	Ta-Chia	Nan-Hu	24.30 N	121.28 E	126	1.1959	12.1993	M	0
2385766	Ta-Chia	Huan-Shan Junc.	24.30 N	121.27 E	258	1.1959	12.1993	M	0
2385767	Ta-Chia	Szu-Chi-Lang	24.30 N	121.27 E	156	1.1959	12.1993	M	0
2385768	Ta-Chia	Chi-Chia-Wan	24.33 N	121.30 E	111	1.1967	12.1993	M	0
2385800	Sijilang	Sijilong	24.30 N	121.27 E	156	1.1964	12.1989	M	0
2385850	Qijiawan	Yikawan	24.33 N	121.30 E	110	1.1964	12.1989	M	0
2385900	Tongtou	Qishui	23.63 N	119.98 E	259	1.1964	12.1989	M	0
2385960	Hsiu-Ku-Luan	Li-Shan	23.42 N	121.30 E	249	1.1959	12.1993	M	0

ANNEX 4

GRDC station catalog for WMO-region V

GLOBAL RUNOFF DATA CENTRE (GRDC)

AUSTRALIA (AU)

Table: 1

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
5101020	Pascoe River	Garraway Creek Junction	12.66 S	143.05 E	1335	11.1970	11.1993	D	14
5101020	Pascoe River	Garraway Creek Junction	12.66 S	143.05 E	1335	12.1970	10.1993	M	15
5101040	Stewart River	Telegraph Road	14.17 S	143.40 E	480	1 .1970	1 .1994	D	20
5101040	Stewart River	Telegraph Road	14.17 S	143.40 E	480	2.1970	10.1993	M	17
5101050	Hann River	Sandy Creek	15.23 S	143.85 E	1010	7 .1958	11.1990	D	3
5101050	Hann River	Sandy Creek	15.23 S	143.85 E	1010	7.1958	11.1990	M	0
5101060	Jeannie River	Wakooka Road	14.76 S	144.86 E	335	1 .1970	12.1988	D	8
5101060	Jeannie River	Wakooka Road	14.76 S	144.86 E	335	2.1970	12.1988	M	7
5101080	Daintree River	Bairds	16.18 S	145.28 E	910	9 .1968	6 .1992	D	2
5101080	Daintree River	Bairds	16.18 S	145.28 E	910	10.1968	4.1992	M	1
5101100	Barron River	Myola	16.80 S	145.61 E	1940	1 .1915	6 .1994	D	<1
5101100	Barron River	Myola	16.80 S	145.61 E	1940	1.1915	5.1994	M	0
5101110	Mulgrave River	Peets Bridge	17.14 S	145.76 E	545	2 .1972	8 .1993	D	3
5101110	Mulgrave River	Peets Bridge	17.14 S	145.76 E	545	3.1972	3.1993	M	0
5101115	Russell River	Powerline Crossing	17.42 S	145.92 E	231	10.1966	4 .1989	D	1
5101118	South Johnstone River	Upstream Central Mill	17.61 S	145.98 E	390	6 .1916	2 .1994	D	<1
5101118	South Johnstone River	Upstream Central Mill	17.61 S	145.98 E	390	6.1916	1.1994	M	0
5101130	Tully River	Euramo	17.99 S	145.94 E	1475	2 .1975	5 .1994	D	3
5101130	Tully River	Euramo	17.99 S	145.94 E	1475	2.1975	4.1994	M	1
5101160	Herbert River	Abergowrie	18.49 S	145.92 E	7530	2 .1968	12.1993	D	7
5101160	Herbert River	Abergowrie	18.49 S	145.92 E	7530	2.1968	11.1993	M	6
5101170	Black River	Bruce Highway	19.24 S	146.63 E	260	7 .1973	3 .1993	D	10
5101170	Black River	Bruce Highway	19.24 S	146.63 E	260	7.1973	3.1993	M	5
5101180	Alligator Creek	Allendale	19.39 S	146.96 E	69.000	9 .1974	4 .1994	D	4
5101180	Alligator Creek	Allendale	19.39 S	146.96 E	69.000	9.1974	3.1994	M	5
5101190	Haughton River	Mount Piccaninny	19.78 S	146.96 E	1140	9 .1971	6 .1994	D	20
5101190	Haughton River	Mount Piccaninny	19.78 S	146.96 E	1140	1.1972	2.1994	M	12
5101200	Burdekin	Clare	19.76 S	147.24 E	129660	10.1950	4 .1994	D	2
5101200	Burdekin	Clare	19.76 S	147.24 E	129660	10.1950	3.1994	M	8
5101203	Bogie River	Strathbogie	20.14 S	147.56 E	1090	10.1967	9 .1989	D	14
5101203	Bogie River	Strathbogie	20.14 S	147.56 E	1090	10.1967	9.1989	M	12
5101205	Broken River	Urannah	20.92 S	148.32 E	1100	10.1962	2 .1994	D	3
5101205	Broken River	Urannah	20.92 S	148.32 E	1100	10.1962	12.1993	M	4
5101208	Mistake Creek	Charlton	22.51 S	147.10 E	2670	5 .1968	4 .1993	D	13
5101208	Mistake Creek	Charlton	22.51 S	147.10 E	2670	5.1968	2.1993	M	8

GLOBAL RUNOFF DATA CENTRE (GRDC)

AUSTRALIA (AU)

Table: 2

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
5101250	Pioneer River	Pleystowe Recorder	21.14 S	149.05 E	1375	9 .1916	12.1982	D	<1
5101250	Pioneer River	Pleystowe Recorder	21.14 S	149.05 E	1375	10.1916	11.1982	M	1
5101251	Pioneer River	Pleystowe Mill	21.15 S	149.05 E	1370	1.1917	12.1968	M	0
5101290	Waterpark Creek	Byfield	22.84 S	150.66 E	245	1 .1974	12.1993	D	<1
5101290	Waterpark Creek	Byfield	22.84 S	150.66 E	245	1.1974	11.1993	M	0
5101300	Fitzroy	Yaamba	23.15 S	150.37 E	136650	10.1914	1 .1973	D	34
5101300	Fitzroy	Yaamba	23.15 S	150.37 E	136650	10.1914	12.1968	M	27
5101301	Fitzroy	The Gap	23.09 S	150.11 E	135860	4 .1964	8 .1994	D	1
5101301	Fitzroy	The Gap	23.09 S	150.11 E	135860	5.1964	6.1994	M	3
5101303	Mimosa Creek	Redcliffe	24.33 S	149.57 E	2605	1 .1957	5 .1994	D	13
5101303	Mimosa Creek	Redcliffe	24.33 S	149.57 E	2605	1.1957	3.1994	M	5
5101305	Dawson River	Utopia Downs	25.75 S	149.32 E	5955	6 .1966	5 .1994	D	<1
5101305	Dawson River	Utopia Downs	25.75 S	149.32 E	5955	7.1966	3.1994	M	0
5101307	Blackwater Creek	Currugh	23.50 S	148.87 E	775	6 .1972	12.1993	D	18
5101307	Blackwater Creek	Currugh	23.50 S	148.87 E	775	9.1972	11.1993	M	7
5101308	Brown River	Lake Brown	24.84 S	148.69 E	2970	6 .1966	5 .1994	D	28
5101308	Brown River	Lake Brown	24.84 S	148.69 E	2970	7.1967	3.1994	M	13
5101320	Calliope River	Castlehope	23.98 S	151.09 E	1310	10.1938	4 .1994	D	<1
5101320	Calliope River	Castlehope	23.98 S	151.09 E	1310	10.1938	3.1994	M	0
5101360	Barker Creek	Wyalla	26.43 S	152.04 E	1440	10.1909	7 .1988	D	<1
5101360	Barker Creek	Wyalla	26.43 S	152.04 E	1440	10.1909	6.1988	M	0
5101365	Cadarga Creek	Brovinia Station	25.94 S	151.02 E	1295	10.1965	8 .1994	D	17
5101365	Cadarga Creek	Brovinia Station	25.94 S	151.02 E	1295	10.1965	11.1993	M	16
5101380	Mary River	Dagun Pocket	26.32 S	152.70 E	2110	1 .1972	1 .1994	D	<1
5101380	Mary River	Dagun Pocket	26.32 S	152.70 E	2110	1.1972	11.1993	M	0
5101385	Wide Bay Creek	Brooyar	26.01 S	152.41 E	685	9 .1909	3 .1994	D	<1
5101385	Wide Bay Creek	Brooyar	26.01 S	152.41 E	685	1.1909	3.1994	M	0
5101420	South Pine River	Drapers Crossing	27.35 S	152.92 E	158	10.1965	5 .1993	D	1
5101420	South Pine River	Drapers Crossing	27.35 S	152.92 E	158	10.1965	3.1993	M	1
5101430	Bremer River	Walloon	27.60 S	152.69 E	620	10.1961	9 .1993	D	6
5101430	Bremer River	Walloon	27.60 S	152.69 E	620	10.1961	8.1993	M	6
5101450	Logan River	Round Mountain	28.07 S	152.93 E	1270	7 .1957	7 .1994	D	<1
5101450	Logan River	Round Mountain	28.07 S	152.93 E	1270	7.1957	5.1994	M	0
5101460	Tallebudgera Creek	Tallebudgera Ck Rd	28.15 S	153.40 E	57.000	6 .1970	2 .1990	D	3
5101460	Tallebudgera Creek	Tallebudgera Ck Rd	28.15 S	153.40 E	57.000	6.1970	2.1990	M	0

GLOBAL RUNOFF DATA CENTRE (GRDC)

AUSTRALIA (AU)

Table: 3

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
5202010	Oxley River	Eungella	28.36 S	153.29 E	213	5 .1947	7 .1994	D	1
5202010	Oxley River	Eungella	28.36 S	153.29 E	213	6.1947	7.1994	M	0
5202040	Nymboida River	Nymboida	29.98 S	152.72 E	1660	1 .1909	7 .1994	D	2
5202040	Nymboida River	Nymboida	29.98 S	152.72 E	1660	1.1909	7.1994	M	1
5202043	Clarence River	Tabulam	28.89 S	152.57 E	4550	9 .1912	4 .1994	D	11
5202043	Clarence River	Tabulam	28.89 S	152.57 E	4550	9.1912	4.1994	M	8
5202045	Little Murray River	North Dorrigo	30.28 S	152.66 E	104	1 .1947	4 .1983	D	1
5202045	Little Murray River	North Dorrigo	30.28 S	152.66 E	104	2.1947	4.1983	M	0
5202048	Bielsdown Creek	Dorrigo #2 & #3	30.31 S	152.72 E	82.000	9 .1947	3 .1994	D	<1
5202048	Bielsdown Creek	Dorrigo #2 & #3	30.31 S	152.72 E	82.000	9.1947	2.1994	M	0
5202050	Taylors Arm	Grays Crossing	30.74 S	152.77 E	319	3 .1970	1 .1989	D	9
5202050	Taylors Arm	Grays Crossing	30.74 S	152.77 E	319	4.1970	1.1989	M	0
5202055	Nambucca River	Bowraville	30.64 S	152.86 E	539	9 .1959	12.1993	D	1
5202055	Nambucca River	Bowraville	30.64 S	152.86 E	539	10.1959	11.1993	M	2
5202060	Tia River	Tia	31.19 S	151.81 E	261	11.1927	2 .1994	D	1
5202060	Tia River	Tia	31.19 S	151.81 E	261	11.1927	1.1994	M	0
5202065	Styx River	Jeogla	30.61 S	152.16 E	163	5 .1918	4 .1994	D	<1
5202065	Styx River	Jeogla	30.61 S	152.16 E	163	5.1918	4.1994	M	0
5202090	Mammy Johnsons River	Pikes Crossing	32.24 S	151.98 E	156	12.1967	2 .1994	D	5
5202090	Mammy Johnsons River	Pikes Crossing	32.24 S	151.98 E	156	1.1968	2.1994	M	3
5202100	Hunter River	Moonan Dam Site	31.92 S	151.21 E	764	6 .1940	5 .1994	D	3
5202100	Hunter River	Moonan Dam Site	31.92 S	151.21 E	764	6.1940	5.1994	M	0
5202110	Jilliby Creek	U/s Wyong River (Durren Lane)	33.25 S	151.39 E	92.000	12.1972	4 .1991	D	3
5202110	Jilliby Creek	U/s Wyong River (Durren Lane)	33.25 S	151.39 E	92.000	1.1973	4.1991	M	0
5202115	Jigadee Creek	Avondale	33.07 S	151.47 E	55.000	12.1969	5 .1994	D	7
5202115	Jigadee Creek	Avondale	33.07 S	151.47 E	55.000	1.1970	5.1994	M	2
5202120	Capertee River	Glen Davis	33.12 S	150.28 E	1010	8 .1970	5 .1994	D	9
5202120	Capertee River	Glen Davis	33.12 S	150.28 E	1010	8.1970	4.1994	M	0
5202130	South Creek	Mulgoa Road	33.89 S	150.77 E	88.400	6 .1970	7 .1994	D	2
5202130	South Creek	Mulgoa Road	33.89 S	150.77 E	88.400	6.1970	6.1994	M	0
5202150	Shoalhaven River	Warri	35.35 S	149.73 E	1450	9 .1914	6 .1994	D	30
5202150	Shoalhaven River	Warri	35.35 S	149.73 E	1450	9.1914	5.1994	M	29
5202155	Corang River	Hockeys	35.08 S	150.03 E	166	9 .1924	7 .1994	D	1
5202155	Corang River	Hockeys	35.08 S	150.03 E	166	9.1924	7.1994	M	0
5202160	Clyde River	Brooman	35.47 S	150.24 E	951	7 .1960	7 .1994	D	4
5202160	Clyde River	Brooman	35.47 S	150.24 E	951	7.1960	7.1994	M	0

GLOBAL RUNOFF DATA CENTRE (GRDC)

AUSTRALIA (AU)

Table: 4

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
5202180	Tuross River	Ds Wadbilliga Riv.Junction	36.20 S	149.76 E	900	6 .1964	6 .1994	D	<1
5202180	Tuross River	Ds Wadbilliga Riv.Junction	36.20 S	149.76 E	900	6.1964	6.1994	M	0
5202185	Tuross River	Turossvale	36.27 S	149.51 E	93.000	6 .1948	7 .1994	D	22
5202185	Tuross River	Turossvale	36.27 S	149.51 E	93.000	7.1948	6.1994	M	21
5202200	Towamba River	Towamba	37.07 S	149.66 E	745	4 .1970	7 .1994	D	1
5202200	Towamba River	Towamba	37.07 S	149.66 E	745	4.1970	6.1994	M	0
5202225	Delegate River	Quidong	36.91 S	149.03 E	1127	2 .1951	7 .1994	D	<1
5202225	Delegate River	Quidong	36.91 S	149.03 E	1127	3.1951	6.1994	M	0
5202227	Suggan Buggan River	Suggan Buggan	36.95 S	148.33 E	357	7 .1957	7 .1994	D	1
5202227	Suggan Buggan River	Suggan Buggan	36.95 S	148.33 E	357	8.1957	7.1994	M	0
5202228	Snowy River	above Island Bend Pondage	36.32 S	148.45 E	207	1 .1964	12.1988	D	4
5202228	Snowy River	above Island Bend Pondage	36.32 S	148.45 E	207	1.1964	12.1988	M	4
5302220	Deddick River	Deddick (Caseys)	37.09 S	148.42 E	808	3 .1964	7 .1994	D	8
5302220	Deddick River	Deddick (Caseys)	37.09 S	148.42 E	808	4.1964	7.1994	M	6
5302240	Mitchell River	Angusvale (Tabberabbera)	37.60 S	147.33 E	3330	1 .1978	6 .1986	D	12
5302240	Mitchell River	Angusvale (Tabberabbera)	37.60 S	147.33 E	3330	1.1978	6.1986	M	5
5302242	Mitchell River	Glenaladale	37.75 S	147.37 E	3900	9 .1937	5 .1988	D	0
5302242	Mitchell River	Glenaladale	37.75 S	147.37 E	3900	9.1937	5.1988	M	0
5302245	Wonnangatta River	Waterford	37.49 S	147.17 E	1980	3 .1922	8 .1994	D	33
5302245	Wonnangatta River	Waterford	37.49 S	147.17 E	1980	4.1922	8.1994	M	30
5302250	Thomson River	Coopers Creek	37.99 S	146.42 E	906	11.1929	6 .1994	D	8
5302250	Thomson River	Coopers Creek	37.99 S	146.42 E	906	12.1929	5.1994	M	8
5302260	Latrobe River	Willow Grove	38.08 S	146.15 E	580	1 .1978	12.1988	D	2
5302260	Latrobe River	Willow Grove	38.08 S	146.15 E	580	1.1925	12.1988	M	0
5302265	Loch River	Noojee	37.87 S	146.00 E	97.100	3 .1957	1 .1989	D	<1
5302265	Loch River	Noojee	37.87 S	146.00 E	97.100	3.1957	12.1988	M	0
5302270	Tarwin River	Meeniyan	38.58 S	145.98 E	1070	6 .1955	7 .1994	D	<1
5302270	Tarwin River	Meeniyan	38.58 S	145.98 E	1070	7.1955	6.1994	M	0
5302280	Bunyip River	Headworks	37.94 S	145.73 E	41.000	7 .1948	8 .1994	D	2
5302280	Bunyip River	Headworks	37.94 S	145.73 E	41.000	7.1948	7.1994	M	0
5302290	Little Yarra River	Yarra Junction	37.78 S	145.62 E	140	4 .1963	6 .1994	D	<1
5302290	Little Yarra River	Yarra Junction	37.78 S	145.62 E	140	4.1963	5.1994	M	0
5302295	O'shannassy River	O'shannassy Weir	37.69 S	145.81 E	119	1.1912	12.1970	M	0
5302300	Maribyrnong River	Keilor	37.72 S	144.83 E	1300	1 .1908	4 .1994	D	29
5302300	Maribyrnong River	Keilor	37.72 S	144.83 E	1300	1.1908	4.1994	M	28
5302320	Moorabool River	Batesford	38.09 S	144.27 E	1110	1 .1908	7 .1994	D	43
5302320	Moorabool River	Batesford	38.09 S	144.27 E	1110	1.1908	6.1994	M	-19

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Table: 5

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
5302350	Gellibrand River	Carlisle	38.58 S	143.32 E	565	2 .1964	7 .1991	D	<1
5302350	Gellibrand River	Carlisle	38.58 S	143.32 E	565	3.1964	7.1991	M	0
5302351	Arkins Creek West Branch	Wyelangta	38.63 S	143.44 E	2.600	2 .1958	8 .1994	D	<1
5302351	Arkins Creek West Branch	Wyelangta	38.63 S	143.44 E	2.600	2.1958	7.1994	M	0
5302360	Merri River	Woodford	38.32 S	147.47 E	899	8 .1948	6 .1994	D	<1
5302360	Merri River	Woodford	38.32 S	147.47 E	899	8.1948	5.1994	M	0
5302365	Hopkins River	Hopkins Falls	38.33 S	142.62 E	8360	6 .1955	8 .1994	D	<1
5302365	Hopkins River	Hopkins Falls	38.33 S	142.62 E	8360	6.1955	7.1994	M	0
5302380	Wannon River	Dunkeld	37.63 S	142.33 E	671	6 .1920	5 .1994	D	14
5302380	Wannon River	Dunkeld	37.63 S	142.33 E	671	6.1920	5.1994	M	12
5402390	Mosquito Creek	Struan	37.10 S	140.77 E	1215	6 .1971	3 .1994	D	<1
5402390	Mosquito Creek	Struan	37.10 S	140.77 E	1215	6.1971	3.1994	M	0
5803020	Little Swanport River	Upstream Tasman Hwy	42.34 S	147.89 E	597	6 .1971	2 .1990	D	<1
5803020	Little Swanport River	Upstream Tasman Hwy	42.34 S	147.89 E	597	6.1971	2.1990	M	0
5803030	Ansons River	Downstream Big Boggy Creek	41.05 S	148.22 E	228	5 .1979	12.1994	D	<1
5803030	Ansons River	Downstream Big Boggy Creek	41.05 S	148.22 E	228	6.1979	11.1994	M	0
5803040	Nive River	Gowan Brae	42.03 S	146.42 E	185	5 .1964	11.1994	D	<1
5803040	Nive River	Gowan Brae	42.03 S	146.42 E	185	5.1964	11.1994	M	0
5803090	King River	Crotty	42.17 S	145.65 E	449	1 .1978	12.1988	D	<1
5803090	King River	Crotty	42.17 S	145.65 E	449	1.1925	12.1988	M	10
5803120	Rubicon River	Tidal Limit	41.25 S	146.57 E	259	6 .1967	10.1994	D	<1
5803120	Rubicon River	Tidal Limit	41.25 S	146.57 E	259	7.1967	9.1994	M	0
5803130	Arm River	above Mersey	41.69 S	146.21 E	86.000	1 .1972	11.1994	D	<1
5803130	Arm River	above Mersey	41.69 S	146.21 E	86.000	1.1972	11.1994	M	0
5803140	Duck River	Scotchtown Road	40.87 S	145.12 E	339	4 .1966	12.1994	D	4
5803140	Duck River	Scotchtown Road	40.87 S	145.12 E	339	5.1966	12.1994	M	2
5803150	Black River	South Forest	40.87 S	145.29 E	324	5 .1968	12.1994	D	<1
5803150	Black River	South Forest	40.87 S	145.29 E	324	6.1968	11.1994	M	0
5803160	Flowerdale River	Moorleah	40.97 S	145.61 E	152	3 .1966	12.1994	D	<1
5803160	Flowerdale River	Moorleah	40.97 S	145.61 E	152	4.1966	11.1994	M	0
5803170	Seabrook Creek	Upstream Bass Highway	41.01 S	145.76 E	40.800	5 .1977	12.1994	D	<1
5803170	Seabrook Creek	Upstream Bass Highway	41.01 S	145.76 E	40.800	5.1977	11.1994	M	0
5803180	South Esk River	Upstream Macquarie River	41.60 S	147.20 E	3278	12.1956	12.1994	D	3
5803180	South Esk River	Upstream Macquarie River	41.60 S	147.20 E	3278	1.1957	11.1994	M	2
5803185	Meander River	below Deloraine Weir	41.51 S	146.67 E	474	9 .1968	12.1994	D	<1
5803185	Meander River	below Deloraine Weir	41.51 S	146.67 E	474	10.1968	11.1994	M	2

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Table: 6

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
5803190	Forth River	above Lemonthyme	41.61 S	146.13 E	310	12.1962	11.1994	D	<1
5803190	Forth River	above Lemonthyme	41.61 S	146.13 E	310	12.1962	11.1994	M	2
5803200	Allans Rivulet	Upstream Taranna	43.07 S	147.89 E	7.500	3 .1983	11.1994	D	1
5803200	Allans Rivulet	Upstream Taranna	43.07 S	147.89 E	7.500	4.1983	10.1994	M	0
5803300	Pine Tree Rivulet	Lake Highway	41.80 S	146.67 E	19.400	4 .1969	10.1994	D	<1
5803300	Pine Tree Rivulet	Lake Highway	41.80 S	146.67 E	19.400	4.1969	9.1994	M	0
5803310	Hellyer River	Guildford Junction	41.25 S	145.67 E	101	1 .1922	1 .1995	D	<1
5803310	Hellyer River	Guildford Junction	41.25 S	145.67 E	101	2.1922	1.1995	M	0
5803520	Florentine River	above Derwent River	42.44 S	146.51 E	435	10.1921	11.1994	D	<1
5803520	Florentine River	above Derwent River	42.44 S	146.51 E	435	11.1921	11.1994	M	1
5803600	Huon River	above Frying Pan Creek	43.04 S	146.84 E	2097	4 .1948	11.1994	D	<1
5803600	Huon River	above Frying Pan Creek	43.04 S	146.84 E	2097	4.1948	10.1994	M	0
5803680	Peak Rivulet	Upstream Esperance River	43.32 S	146.90 E	36.500	4 .1975	11.1994	D	<1
5803680	Peak Rivulet	Upstream Esperance River	43.32 S	146.90 E	36.500	4.1975	10.1994	M	0
5803690	Mountain River	Downstream Grundys Creek	42.94 S	147.13 E	40.000	3 .1968	11.1994	D	<1
5803690	Mountain River	Downstream Grundys Creek	42.94 S	147.13 E	40.000	4.1968	10.1994	M	0
5803700	Davey River	below Crossing River	43.14 S	145.95 E	686	2 .1964	7 .1994	D	<1
5803700	Davey River	below Crossing River	43.14 S	145.95 E	686	3.1964	7.1994	M	0
5803800	Franklin River	Mt. Fincham Track	42.24 S	145.77 E	757	4 .1953	1 .1995	D	<1
5803800	Franklin River	Mt. Fincham Track	42.24 S	145.77 E	757	4.1953	12.1994	M	0
5104160	Bracker Creek	Terraine	28.49 S	151.28 E	685	10.1952	4 .1994	D	2
5104160	Bracker Creek	Terraine	28.49 S	151.28 E	685	10.1952	3.1994	M	1
5104220	Dogwood Creek	Gilweir	26.71 S	150.18 E	3010	10.1945	2 .1994	D	12
5104220	Dogwood Creek	Gilweir	26.71 S	150.18 E	3010	12.1945	1.1994	M	6
5104223	Yuleba Creek	Forestry Station	26.71 S	150.18 E	1475	9 .1972	2 .1994	D	25
5104223	Yuleba Creek	Forestry Station	26.71 S	150.18 E	1475	1.1973	1.1994	M	9
5104225	Brigalow Creek	Meandarra	27.31 S	149.89 E	340	7 .1972	10.1992	D	11
5104225	Brigalow Creek	Meandarra	27.31 S	149.89 E	340	10.1972	3.1992	M	9
5104228	Canal Creek	Leyburn	28.03 S	151.58 E	395	3 .1972	2 .1992	D	10
5104228	Canal Creek	Leyburn	28.03 S	151.58 E	395	11.1972	2.1992	M	0
5104230	Warrego River	Augathella	25.79 S	146.58 E	8070	10.1967	3 .1994	D	29
5104230	Warrego River	Augathella	25.79 S	146.58 E	8070	10.1967	12.1993	M	30
5104240	Paroo River	Yarranvale	26.79 S	145.34 E	1890	10.1967	10.1988	D	9
5104240	Paroo River	Yarranvale	26.79 S	145.34 E	1890	11.1967	9.1988	M	10
5104245	Paroo River	Caiwarro	28.69 S	144.79 E	23570	4 .1967	2 .1994	D	9
5104245	Paroo River	Caiwarro	28.69 S	144.79 E	23570	5.1967	1.1994	M	3

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Table: 7

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
5204010	Bowna Creek	Yambla	35.92 S	146.98 E	316	12.1973	8 .1992	D	<1
5204010	Bowna Creek	Yambla	35.92 S	146.98 E	316	1.1974	8.1992	M	0
5204013	Jingellic Creek	Jingellic	35.90 S	147.69 E	378	7 .1965	6 .1994	D	3
5204013	Jingellic Creek	Jingellic	35.90 S	147.69 E	378	7.1965	6.1994	M	0
5204015	Swampy Plain River	Khancoban	36.28 S	148.12 E	601	12.1926	12.1982	D	1
5204015	Swampy Plain River	Khancoban	36.28 S	148.12 E	601	12.1926	12.1982	M	2
5204016	Swampy Plain River	Khancoban 2	36.28 S	148.12 E	601	1 .1984	12.1988	D	0
5204016	Swampy Plain River	Khancoban 2	36.28 S	148.12 E	601	1.1984	12.1988	M	0
5204018	Murray River	Biggara	36.32 S	148.05 E	1165	7 .1948	7 .1994	D	<1
5204018	Murray River	Biggara	36.32 S	148.05 E	1165	8.1948	6.1994	M	0
5204100	Muttama Creek	Coolac	34.93 S	148.16 E	1025	6 .1938	7 .1994	D	6
5204100	Muttama Creek	Coolac	34.93 S	148.16 E	1025	6.1938	6.1994	M	5
5204105	Murrumbidgee River	Mittagang Crossing	36.18 S	149.09 E	1891	3 .1926	7 .1994	D	<1
5204105	Murrumbidgee River	Mittagang Crossing	36.18 S	149.09 E	1891	4.1926	6.1994	M	0
5204108	Numeralla River	Numeralla School	36.18 S	149.35 E	673	12.1947	7 .1994	D	13
5204108	Numeralla River	Numeralla School	36.18 S	149.35 E	673	12.1947	6.1994	M	12
5204120	Abercrombie River	Hadley #2	34.11 S	149.60 E	1630	6 .1960	6 .1993	D	1
5204120	Abercrombie River	Hadley #2	34.11 S	149.60 E	1630	7.1960	5.1993	M	0
5204125	Rocky Bridge Creek	near Neville	33.80 S	149.18 E	145	4 .1968	6 .1993	D	<1
5204125	Rocky Bridge Creek	near Neville	33.80 S	149.18 E	145	5.1968	5.1993	M	0
5204180	Gwydir River	Bundarra	30.17 S	151.06 E	3990	12.1936	7 .1994	D	3
5204180	Gwydir River	Bundarra	30.17 S	151.06 E	3990	12.1936	6.1994	M	1
5204185	Copes Creek	Tingha	29.95 S	151.25 E	86.000	8 .1967	2 .1989	D	5
5204185	Copes Creek	Tingha	29.95 S	151.25 E	86.000	9.1967	2.1989	M	0
5204190	Peel River	Chaffey Dam	31.34 S	151.14 E	407	12.1968	7 .1994	D	<1
5204190	Peel River	Chaffey Dam	31.34 S	151.14 E	407	12.1968	6.1994	M	1
5204195	Cockburn River	Mulla Crossing	31.06 S	151.13 E	907	12.1936	7 .1994	D	4
5204195	Cockburn River	Mulla Crossing	31.06 S	151.13 E	907	1.1937	6.1994	M	2
5204210	Bell River	Newrea	31.34 S	151.14 E	407	8 .1939	9 .1993	D	2
5204210	Bell River	Newrea	31.34 S	151.14 E	407	8.1939	9.1993	M	0
5204215	Green Valley Creek	Hill End	32.95 S	149.47 E	119	11.1966	7 .1994	D	3
5204215	Green Valley Creek	Hill End	32.95 S	149.47 E	119	12.1966	6.1994	M	2
5204250	Darling River	Louth	30.54 S	145.11 E	489300	1 .1954	10.1993	D	23
5204250	Darling River	Louth	30.54 S	145.11 E	489300	1.1954	9.1993	M	23
5204255	Darling River	Bourke Town	30.09 S	145.94 E	386000	1 .1943	4 .1994	D	2
5204255	Darling River	Bourke Town	30.09 S	145.94 E	386000	1.1943	4.1994	M	0

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Table: 8

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
5204258	Box Creek	Cobar	31.47 S	145.82 E	15.000	12.1973	1 .1993	D	19
5204258	Box Creek	Cobar	31.47 S	145.82 E	15.000	12.1973	1.1993	M	15
5204268	Murray	Lock 9 Upper	34.18 S	141.60 E	991000	1.1965	12.1984	M	20
5304019	Mitta Mitta River	Hinnomunjie	36.94 S	147.60 E	1530	6 .1925	7 .1994	D	<1
5304019	Mitta Mitta River	Hinnomunjie	36.94 S	147.60 E	1530	7.1925	6.1994	M	0
5304025	Nariel Creek	Upper Nariel	36.44 S	147.82 E	252	4 .1954	3 .1994	D	3
5304025	Nariel Creek	Upper Nariel	36.44 S	147.82 E	252	4.1954	2.1994	M	0
5304030	Buckland River	Harris Lane	36.72 S	146.87 E	435	5 .1972	6 .1994	D	<1
5304030	Buckland River	Harris Lane	36.72 S	146.87 E	435	5.1972	6.1994	M	0
5304035	Dandongadale River	Matong North	36.80 S	146.63 E	182	8 .1962	7 .1994	D	<1
5304035	Dandongadale River	Matong North	36.80 S	146.63 E	182	8.1962	7.1994	M	0
5304060	Campaspe River	Lake Eppalock (Head Gauge)	36.85 S	144.52 E	2030	10.1963	8 .1994	D	<1
5304060	Campaspe River	Lake Eppalock (Head Gauge)	36.85 S	144.52 E	2030	10.1963	8.1994	M	2
5304061	Campaspe River	Lake Eppalock (Outlet Meas. Wei	36.85 S	144.87 E		1 .1984	12.1988	D	<1
5304061	Campaspe River	Lake Eppalock (Outlet Meas. Wei	36.85 S	144.87 E		1.1984	12.1988	M	0
5304062	Campaspe River	Ashbourne	37.38 S	144.45 E	33.300	4 .1933	7 .1994	D	<1
5304062	Campaspe River	Ashbourne	37.38 S	144.45 E	33.300	4.1933	6.1994	M	0
5304063	Campaspe River	Lake Eppalock Combined	36.85 S	144.53 E	2028	12.1963	7 .1994	D	33
5304063	Campaspe River	Lake Eppalock Combined	36.85 S	144.53 E	2028	12.1963	6.1994	M	33
5304065	Campaspe River	Barnadown	36.63 S	144.55 E	2530	10.1977	6 .1994	D	<1
5304065	Campaspe River	Barnadown	36.63 S	144.55 E	2530	11.1977	5.1994	M	2
5304069	Creswick Creek	Clunes	37.29 S	143.78 E	308	8 .1943	4 .1994	D	<1
5304069	Creswick Creek	Clunes	37.29 S	143.78 E	308	8.1943	4.1994	M	0
5304070	Loddon River	Newstead	37.10 S	144.05 E	1090	8 .1967	6 .1994	D	<1
5304070	Loddon River	Newstead	37.10 S	144.05 E	1090	8.1967	6.1994	M	0
5304080	Avoca River	Coonooer	36.44 S	143.30 E	2670	8 .1889	2 .1994	D	0
5304080	Avoca River	Coonooer	36.44 S	143.30 E	2670	8.1889	2.1994	M	0
5304081	Avoca River	Amphitheatre	37.18 S	143.40 E	78.000	11.1966	5 .1994	D	<1
5304081	Avoca River	Amphitheatre	37.18 S	143.40 E	78.000	11.1966	4.1994	M	1
5304140	Murray River	below Wakool Junction	34.85 S	143.33 E		7 .1929	7 .1994	D	<1
5304140	Murray River	below Wakool Junction	34.85 S	143.33 E		7.1929	6.1994	M	0
5304150	Avon River	Wimmera Highway	36.65 S	142.98 E	596	2 .1963	7 .1994	D	4
5304150	Avon River	Wimmera Highway	36.65 S	142.98 E	596	2.1963	7.1994	M	3
5404260	Marne River	Cambrai	34.68 S	139.23 E	240	1 .1978	5 .1989	D	<1
5404260	Marne River	Cambrai	34.68 S	139.23 E	240	1.1978	5.1989	M	0

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Table: 9

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
5404265	Burra Creek	Worlds End	33.85 S	139.08 E	437	1 .1974	4 .1994	D	<1
5404265	Burra Creek	Worlds End	33.85 S	139.08 E	437	1.1974	3.1994	M	0
5405030	Onkaparinga River	Houlgraves	35.08 S	138.72 E	321	1 .1978	12.1985	D	0
5405030	Onkaparinga River	Houlgraves	35.08 S	138.72 E	321	1.1978	12.1985	M	0
5405035	Scott Creek	Scott Bottom	35.10 S	138.68 E	27.000	3 .1969	6 .1994	D	<1
5405035	Scott Creek	Scott Bottom	35.10 S	138.68 E	27.000	4.1969	6.1994	M	0
5405040	Torrens River	Gorge Weir	34.85 S	138.73 E	343	1.1893	12.1964	M	0
5405050	North Para River	Turretfield	34.57 S	138.77 E	699	1 .1978	12.1988	D	0
5405050	North Para River	Turretfield	34.57 S	138.77 E	699	1.1978	12.1988	M	0
5405051	North Para River	Penrice	34.47 S	139.06 E	116	6 .1977	5 .1994	D	<1
5405051	North Para River	Penrice	34.47 S	139.06 E	116	7.1977	4.1994	M	0
5405070	Hill River	near Andrews	33.62 S	138.63 E	236	1 .1969	5 .1994	D	2
5405090	Willochra Creek	Partacoona	31.95 S	138.10 E	6240	1 .1978	12.1988	D	2
5405090	Willochra Creek	Partacoona	31.95 S	138.10 E	6240	1.1978	12.1988	M	1
5405095	Kanyaka Creek	Old Kanyaka	32.10 S	138.28 E	188	9 .1977	3 .1994	D	<1
5405095	Kanyaka Creek	Old Kanyaka	32.10 S	138.28 E	188	10.1977	3.1994	M	1
5405130	Rocky River	Gorge Falls	35.97 S	136.70 E	168	8 .1970	2 .1994	D	10
5405130	Rocky River	Gorge Falls	35.97 S	136.70 E	168	9.1970	1.1994	M	12
5606020	Pallinup River	Bull Crossing	34.34 S	118.65 E	3655	4 .1973	10.1993	D	7
5606020	Pallinup River	Bull Crossing	34.34 S	118.65 E	3655	5.1973	10.1993	M	3
5606090	Scott River	Brennans Ford	34.28 S	115.30 E	632	4 .1969	2 .1994	D	8
5606090	Scott River	Brennans Ford	34.28 S	115.30 E	632	5.1969	1.1994	M	4
5606120	Collie River East	James Crossing	33.38 S	116.58 E	169	2 .1967	8 .1993	D	5
5606120	Collie River East	James Crossing	33.38 S	116.58 E	169	2.1967	8.1993	M	3
5606140	Williams River	Saddleback Road Bridge	32.99 S	116.43 E	1437	6 .1966	3 .1994	D	7
5606140	Williams River	Saddleback Road Bridge	32.99 S	116.43 E	1437	6.1966	3.1994	M	0
5606145	Serpentine River	Serpentine Falls	32.37 S	116.01 E	769	7 .1958	9 .1993	D	5
5606145	Serpentine River	Serpentine Falls	32.37 S	116.01 E	769	1.1911	9.1993	M	0
5606160	Ellen Brook	Railway Parade	31.75 S	116.02 E	590	4 .1965	2 .1994	D	6
5606160	Ellen Brook	Railway Parade	31.75 S	116.02 E	590	5.1965	1.1994	M	3
5607010	Arrowsmith River	Robb Crossing	29.62 S	115.29 E	878	4 .1972	11.1993	D	8
5607010	Arrowsmith River	Robb Crossing	29.62 S	115.29 E	878	4.1972	10.1993	M	5
5607080	Marillana Creek	Flat Rocks	22.72 S	118.97 E	1440	8 .1967	11.1993	D	12
5607080	Marillana Creek	Flat Rocks	22.72 S	118.97 E	1440	8.1967	10.1993	M	9
5607085	Portland River	Recorder Pool	21.45 S	116.87 E	544	12.1966	9 .1991	D	10
5607085	Portland River	Recorder Pool	21.45 S	116.87 E	544	12.1966	8.1991	M	10

GLOBAL RUNOFF DATA CENTRE (GRDC)

AUSTRALIA (AU)

Table: 10

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
5608020	Leopold River	Mount Winifred	18.01 S	126.31 E	5140	11.1964	5 .1993	D	36
5608020	Leopold River	Mount Winifred	18.01 S	126.31 E	5140	11.1966	4.1993	M	25
5608023	Fitzroy	Dimond Gorge	17.68 S	126.02 E	16800	9 .1962	11.1993	D	9
5608023	Fitzroy	Dimond Gorge	17.68 S	126.02 E	16800	10.1962	10.1993	M	21
5608030	Fletcher River	Dromedary	17.12 S	124.98 E	65.730	11.1967	6 .1993	D	15
5608030	Fletcher River	Dromedary	17.12 S	124.98 E	65.730	11.1967	6.1993	M	13
5608060	Morgan River	Moondoalnee	14.81 S	126.50 E	1360	10.1971	9 .1993	D	21
5608060	Morgan River	Moondoalnee	14.81 S	126.50 E	1360	10.1971	8.1993	M	18
5608090	Ord	Coolibah Pocket	16.13 S	128.74 E	46100	11.1955	3 .1971	D	47
5608090	Ord	Coolibah Pocket	16.13 S	128.74 E	46100	11.1955	3.1971	M	3
5608095	Ord	Old Ord Homestead	17.37 S	128.85 E	19600	9 .1970	5 .1993	D	14
5608095	Ord	Old Ord Homestead	17.37 S	128.85 E	19600	10.1970	5.1993	M	13
5708100	Keep River	Legune Road Crossing	15.35 S	129.07 E	3496	9 .1977	8 .1980	D	0
5708100	Keep River	Legune Road Crossing	15.35 S	129.07 E	3496	9.1977	8.1980	M	0
5708110	Victoria River	Coolibah Homestead	15.53 S	130.95 E	44900	2 .1967	4 .1994	D	19
5708110	Victoria River	Coolibah Homestead	15.53 S	130.95 E	44900	4.1965	3.1994	M	18
5708120	Fitzmaurice River	Dakota Camp	14.87 S	130.23 E	4920	9 .1977	7 .1980	D	27
5708120	Fitzmaurice River	Dakota Camp	14.87 S	130.23 E	4920	9.1977	7.1980	M	0
5708130	Dry River	Manbulloo Boundary	15.09 S	132.41 E	6290	11.1971	6 .1994	D	4
5708130	Dry River	Manbulloo Boundary	15.09 S	132.41 E	6290	11.1971	5.1994	M	3
5708140	Green Ant Creek	Tipperary	13.74 S	131.10 E	435	10.1970	7 .1994	D	13
5708140	Green Ant Creek	Tipperary	13.74 S	131.10 E	435	10.1970	6.1994	M	14
5708145	Daly	Mount Nancar	13.83 S	130.73 E	47000	1.1976	12.1984	M	14
5708148	Daly	Gourley	13.90 S	130.80 E	46300	1.1965	8.1974	M	37
5708150	Elizabeth River	Stuart Highway	12.61 S	131.07 E	101	9 .1968	4 .1994	D	6
5708150	Elizabeth River	Stuart Highway	12.61 S	131.07 E	101	9.1968	4.1994	M	0
5708155	Blackmore River	Tumbling Waters	12.78 S	130.93 E	174	11.1961	11.1993	D	20
5708155	Blackmore River	Tumbling Waters	12.78 S	130.93 E	174	11.1961	11.1993	M	21
5708180	Mary River	el Sherana Road Crossing	12.60 S	132.23 E	466	11.1960	3 .1994	D	19
5708180	Mary River	el Sherana Road Crossing	12.60 S	132.23 E	466	11.1960	3.1994	M	13
5708190	Upper Latram River	Upstream Eldo Road Crossing	12.32 S	136.82 E	31.000	9 .1971	3 .1994	D	<1
5708190	Upper Latram River	Upstream Eldo Road Crossing	12.32 S	136.82 E	31.000	9.1971	3.1994	M	0
5708260	Rinderry Creek	Damsite	12.32 S	136.62 E	43.000	9 .1977	8 .1980	D	14
5708260	Rinderry Creek	Damsite	12.32 S	136.62 E	43.000	9.1977	8.1980	M	0
5109120	Elizabeth Creek	Mining Camp	18.22 S	138.36 E	675	6 .1974	10.1988	D	7
5109120	Elizabeth Creek	Mining Camp	18.22 S	138.36 E	675	6.1974	10.1988	M	4

GLOBAL RUNOFF DATA CENTRE (GRDC)

AUSTRALIA (AU)

Table: 11

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
5109130	Paroo Creek	Damsite	20.34 S	139.52 E	300	11.1968	9 .1988	D	18
5109130	Paroo Creek	Damsite	20.34 S	139.52 E	300	1.1969	9.1988	M	11
5109150	Flinders River	Glendower	20.71 S	144.52 E	2110	9 .1972	3 .1990	D	8
5109150	Flinders River	Glendower	20.71 S	144.52 E	2110	11.1972	2.1990	M	0
5109160	Norman River	Strathpark	19.54 S	143.26 E	285	10.1969	7 .1988	D	5
5109160	Norman River	Strathpark	19.54 S	143.26 E	285	1.1970	7.1988	M	0
5109250	Wenlock River	Wenlock	13.10 S	142.94 E	725	3 .1969	11.1989	D	6
5109250	Wenlock River	Wenlock	13.10 S	142.94 E	725	3.1969	11.1989	M	5
5709020	Angurugu River	Upstream Groote Eylandt Mission	13.98 S	136.47 E	156	11.1969	3 .1994	D	17
5709020	Angurugu River	Upstream Groote Eylandt Mission	13.98 S	136.47 E	156	12.1969	3.1994	M	13
5110010	Georgina River	Camooweal	20.97 S	137.95 E	2875	2 .1970	9 .1988	D	14
5110010	Georgina River	Camooweal	20.97 S	137.95 E	2875	2.1970	9.1988	M	8
5110030	Darr River	Darr	23.22 S	144.15 E	2730	6 .1969	5 .1994	D	8
5110030	Darr River	Darr	23.22 S	144.15 E	2730	7.1969	4.1994	M	8
5410100	Cooper Creek	Callamurra	27.70 S	140.87 E	230000	2 .1973	4 .1994	D	<1
5410100	Cooper Creek	Callamurra	27.70 S	140.87 E	230000	3.1973	4.1994	M	0
5710060	Todd River	Wills Terrace	23.70 S	133.88 E	450	6 .1972	5 .1994	D	18
5710060	Todd River	Wills Terrace	23.70 S	133.88 E	450	7.1972	4.1994	M	13
5712090	Tennant Creek	Old Telegraph Station	19.55 S	134.23 E	97.000	9 .1973	3 .1993	D	19
5712090	Tennant Creek	Old Telegraph Station	19.55 S	134.23 E	97.000	9.1973	3.1993	M	15

PAPUA NEW GUINEA (NG)

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
5550500	Sepik	Ambunti	4.22 S	142.16 E	40922	1.1980	10.1984	M	17
5553100	Purari	Wabo Dam Site	7.00 S	145.07 E	11100	1.1976	11.1984	M	54
5553500	Tauri	Hells Gate	7.81 S	146.11 E	2410	1.1981	12.1984	M	33

GLOBAL RUNOFF DATA CENTRE (GRDC)

MALAYSIA (MS)

Table: 1

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
5221100	Golok	Rantau Panjang	6.02 N	101.97 E	761	1 .1978	12.1987	D	30
5221100	Golok	Rantau Panjang	6.02 N	101.97 E	761	1.1978	12.1987	M	31
5222050	Tasho	Titi Baru	6.59 N	100.22 E	126	1.1975	12.1985	M	1
5222100	Muda	Ladang Victoria	5.52 N	100.57 E	4010	1.1976	11.1985	M	0
5222150	Muda	Jeniang	5.80 N	100.62 E	1710	2.1975	12.1985	M	6
5222280	Krian	Dusun Limai	5.20 N	100.67 E	689	1.1969	11.1969	M	0
5222300	Krian	Selama	5.22 N	100.69 E	629	1.1981	11.1985	M	6
5222500	Perak	Iskandar Bridge	4.82 N	100.97 E	7770	1.1965	12.1985	M	17
5222550	Plus	Kampung Lintang	4.94 N	101.11 E	188	1.1981	12.1985	M	11
5222600	Kinta	Weir G.Tanjung Tualang	4.32 N	101.15 E	1700	1.1981	12.1985	M	0
5222700	Batang	Tanjung Keramat	4.14 N	101.14 E	455	1.1981	12.1985	M	0
5222800	Bidor	Malayan Bidor Tin Bhd	4.07 N	101.24 E	339	1.1981	12.1985	M	1
5223100	Kelantan	Guillemard Bridge	5.77 N	102.15 E	11900	1.1949	12.1986	M	7
5223600	Jelai	Jeram Bungor	4.19 N	102.14 E	7320	1.1981	12.1985	M	35
5224200	Lipis	Benta	4.02 N	101.96 E	1670	1.1981	12.1985	M	25
5224300	Triang	Juntai	3.07 N	102.21 E	904	1.1981	12.1985	M	1
5224500	Pahang	Temerloh	3.45 N	102.43 E	19000	1.1965	12.1984	M	18
5225500	Trengganu	Kampung Tanggol	5.13 N	103.05 E	3340	1 .1978	11.1987	D	10
5225500	Trengganu	Kampung Tanggol	5.13 N	103.05 E	3340	1.1969	10.1987	M	25
5225600	Dungun	Jambatan Jerangau	4.84 N	103.21 E	1480	1.1981	11.1985	M	5
5226300	Bernam	Jambatan S.K.C.	3.80 N	101.36 E	1090	1.1981	12.1985	M	3
5226500	Selangor	Rantau Panjang	3.40 N	101.43 E	1450	1 .1978	12.1987	D	8
5226500	Selangor	Rantau Panjang	3.40 N	101.43 E	1450	1.1969	12.1987	M	23
5226700	Klang	Kuala Lumpur	3.48 N	101.70 E	490	1.1969	12.1975	M	45
5226800	Langat	Dingkil	2.85 N	101.68 E	1240	1.1969	12.1985	M	29
5227100	Linggi	Sua Betong	2.50 N	101.97 E	523	1.1981	12.1985	M	5
5227400	Melaka	Pantai Belimbing	2.34 N	102.26 E	350	1.1981	12.1985	M	5
5227800	Muar	Buluh Kasap	2.55 N	102.75 E	3130	1.1981	12.1985	M	10
5228900	Sembrong	Brizay Bridge	1.93 N	103.17 E	186	1.1969	8.1985	M	41
5229200	Kahang	Batu 26 Jalan Kluang	2.25 N	103.59 E	587	1.1981	12.1985	M	5
5229500	Johore	Rantau Panjang	1.78 N	103.73 E	1300	1 .1978	12.1987	D	4
5229500	Johore	Rantau Panjang	1.78 N	103.73 E	1300	1.1969	12.1987	M	20
5230050	Sarawak Kanan	Pekan Buan Bidi	1.39 N	110.11 E	217	1.1981	12.1985	M	0
5230200	Ai	Lubok Antu	1.04 N	111.82 E	1300	1.1981	12.1985	M	5

GLOBAL RUNOFF DATA CENTRE (GRDC)

MALAYSIA (MS)

Table: 2

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
5230400	Rajang	Ng Benin	2.15 N	113.07 E	21192	1.1981	12.1985	M	20
5230500	Rajang	Balaga	2.70 N	113.77 E	18190	6.1981	12.1985	M	0
5230600	Tutoh	Long Terawan	3.97 N	114.64 E	3210	5.1982	12.1985	M	0
5231200	Pedas	Tenom	5.12 N	115.92 E	7718	3.1981	3.1985	M	0
5231500	Labuk	Tempias	5.72 N	116.85 E	2010	1.1981	12.1985	M	28
5231550	Sugut	Bukit Mandau	6.19 N	117.24 E	2150	9.1982	12.1985	M	12
5231600	Milan	Tangkulap	5.30 N	117.32 E	5730	2.1981	12.1985	M	6
5231700	Kinabatangan	Balat	5.30 N	117.59 E	10800	7.1981	12.1985	M	7

U.S.A. (US)

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
5171100	Wainiha River	near Hanalei	22.14 N	159.56 W	26.400	1 .1978	12.1990	D	0
5171100	Wainiha River	near Hanalei	22.14 N	159.56 W	26.400	1.1978	12.1990	M	0
5171200	East Branch of Nf Wailua River	near Lihue	22.07 N	159.42 W	16.200	1 .1978	12.1990	D	0
5171200	East Branch of Nf Wailua River	near Lihue	22.07 N	159.42 W	16.200	1.1978	12.1990	M	0
5171300	Kamananui Stream	Maunawai	21.64 N	158.06 W	25.300	1 .1978	9 .1990	D	0
5171300	Kamananui Stream	Maunawai	21.64 N	158.06 W	25.300	1.1978	9.1990	M	0
5171400	Kalihi Stream	Kalihi	21.34 N	157.88 W	13.400	1 .1978	12.1990	D	0
5171400	Kalihi Stream	Kalihi	21.34 N	157.88 W	13.400	1.1978	12.1990	M	0
5171500	Halawa Stream	near Halawa	21.16 N	156.76 W	12.000	1 .1978	12.1990	D	0
5171500	Halawa Stream	near Halawa	21.16 N	156.76 W	12.000	1.1978	12.1990	M	0
5171600	Wailuku River	near Kaumana	19.72 N	155.27 W	112	1 .1978	9 .1982	D	0
5171600	Wailuku River	near Kaumana	19.72 N	155.27 W	112	1.1978	9.1982	M	0

GLOBAL RUNOFF DATA CENTRE (GRDC)

NEW ZEALAND (NZ) Table: 1

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
5863100	Opahi River	Pond	35.40 S	173.72 E	10.600	2 .1966	9 .1991	D	3
5863100	Opahi River	Pond	35.40 S	173.72 E	10.600	2.1966	8.1991	M	0
5864050	Kaituna	Lake Rotoiti Outlet	38.03 S	176.34 E	632	1.1950	12.1989	M	0
5864100	Tarawera	Awakaponga	37.94 S	176.76 E	906	5 .1948	7 .1991	D	1
5864100	Tarawera	Awakaponga	37.94 S	176.76 E	906	6.1948	7.1991	M	0
5864110	Whakatane	Whakatane	38.01 S	176.99 E	1557	1.1973	12.1993	M	0
5864120	Rangitaiki	Murupara			1184	6 .1948	7 .1991	D	3
5864120	Rangitaiki	Murupara			1184	6.1948	6.1991	M	0
5864121	Rangitikei	Mangaweka	39.81 S	175.81 E	2787	1.1970	12.1994	M	0
5864150	Motu	Houpoto	37.86 S	177.65 E	1393	4 .1957	8 .1991	D	1
5864150	Motu	Houpoto	37.86 S	177.65 E	1393	4.1957	8.1991	M	0
5864500	Omakere	Fordale	40.02 S	176.73 E	54.000	1.1980	12.1984	M	3
5865300	Waikato River	Ngaruawahia	37.68 S	175.15 E	11395	1.1976	12.1984	M	0
5865500	Waikato River	Taupo Outlet	38.70 S	176.07 E	3290	1 .1978	2 .1984	D	<1
5865500	Waikato River	Taupo Outlet	38.70 S	176.07 E	3290	1.1966	1.1984	M	11
5865550	Ongarue	Taringamutu	38.86 S	175.24 E	1075	1.1963	12.1994	M	0
5865600	Wanganui	Paetawa	39.77 S	175.15 E	6643	1.1976	12.1984	M	0
5865601	Wanganui	Te Porere	39.05 S	175.59 E	28.000	1.1967	12.1994	M	0
5865650	Mangawhero	Ore Ore	39.57 S	175.26 E	506	1.1963	12.1994	M	0
5865700	Hutt River	Kaitoke	41.05 S	175.19 E	89.000	12.1967	8 .1991	D	<1
5865700	Hutt River	Kaitoke	41.05 S	175.19 E	89.000	1.1968	12.1994	M	0
5865701	Hutt River	Birchville	41.10 S	175.09 E	427	1.1971	12.1994	M	0
5865800	Punehu	Pihama	39.49 S	173.91 E	30.000	1.1970	12.1994	M	0
5865810	Manganui	Sh3	39.28 S	174.26 E	11.000	1.1973	12.1994	M	0
5867100	Selwyn River	Whitecliffs	43.46 S	171.89 E	163	5 .1964	7 .1991	D	<1
5867100	Selwyn River	Whitecliffs	43.46 S	171.89 E	163	6.1964	12.1994	M	0
5867500	Hurunui	Mandamus	42.79 S	172.55 E	1070	10.1956	7 .1991	D	1
5867500	Hurunui	Mandamus	42.79 S	172.55 E	1070	11.1956	7.1991	M	1
5867600	Clarence	Jollies	42.46 S	172.91 E	440	1.1962	12.1994	M	0
5868050	Clutha	Clyde	45.22 S	169.35 E	12020	1.1980	12.1984	M	3
5868100	Clutha	Balclutha	46.23 S	169.73 E	20306	1.1969	12.1984	M	2
5868200	Ahuriri	Sth Diadem	44.47 S	169.73 E	557	1.1964	12.1994	M	0
5868300	Mataura	Gore Hbr	46.10 S	168.95 E	3465	1.1961	12.1993	M	0
5869400	Waiau River	Lake Manapouri Outlet	45.57 S	167.58 E	4620	1 .1978	3 .1984	D	<1
5869400	Waiau River	Lake Manapouri Outlet	45.57 S	167.58 E	4620	1.1966	3.1984	M	56

GLOBAL RUNOFF DATA CENTRE (GRDC)

NEW ZEALAND (NZ)

Table: 2

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
5869500	Cleddau	Milford	44.68 S	167.93 E	155	1.1969	12.1975	M	8
5870100	Taylor	Borough Weir	41.60 S	173.93 E	69.000	1.1962	12.1984	M	0
5870110	Wairau	Tuamarina	41.44 S	173.96 E	3430	1.1961	12.1983	M	0
5870200	Waihopai	Craiglochart	41.62 S	173.69 E	764	1.1961	12.1983	M	0
5870300	Branch	Recorder	41.70 S	173.18 E	550	1.1959	12.1979	M	0
5870500	Inangahua River	Blacks Point	42.13 S	171.88 E	234	5 .1965	9 .1991	D	5
5870500	Inangahua River	Blacks Point	42.13 S	171.88 E	234	5.1965	8.1991	M	1
5870600	Buller	Te Kuha	41.83 S	171.70 E	6350	1.1976	12.1984	M	1
5870650	Buller	Lake Rotoiti Outlet	41.81 S	172.82 E	195	8 .1951	7 .1991	D	4
5870650	Buller	Lake Rotoiti Outlet	41.81 S	172.82 E	195	8.1951	6.1991	M	0
5870700	Gowan	Lake Rotoroa	41.79 S	172.59 E	368	1.1935	12.1959	M	0

PHILIPPINES (PH)

Table: 1

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
5654010	Baruyen	Bangui	18.50 N	120.83 E	188	7 .1985	12.1988	D	5
5654010	Baruyen	Bangui	18.50 N	120.83 E	188	7.1985	12.1988	M	0
5654020	Cabacanan	Baduang,pagudpud	18.58 N	120.80 E	60.000	6 .1986	12.1988	D	0
5654020	Cabacanan	Baduang,pagudpud	18.58 N	120.80 E	60.000	6.1986	12.1988	M	0
5654100	Bonga	Bangay	18.08 N	120.70 E	534	4.1946	9.1979	M	3
5654110	Gasgas	Manalpac,solsona	18.08 N	120.83 E	73.000	1 .1978	12.1988	D	27
5654110	Gasgas	Manalpac,solsona	18.08 N	120.83 E	73.000	1.1978	12.1988	M	25
5654140	Abra	Bumagcat,tayum	17.62 N	120.73 E	2575	12.1983	12.1988	D	5
5654140	Abra	Bumagcat,tayum	17.62 N	120.73 E	2575	1.1984	12.1988	M	1
5654190	Pinacanauan de Ilagan	Alangilan Ii,ilagan	17.13 N	121.90 E	1565	3 .1985	12.1988	D	<1
5654190	Pinacanauan de Ilagan	Alangilan Ii,ilagan	17.13 N	121.90 E	1565	3.1985	12.1988	M	0
5654200	Cagayan	Palattao	17.02 N	121.82 E	4341	1.1976	12.1976	M	4
5654250	Ilut	Cordon	16.67 N	121.43 E	18.000	4 .1985	12.1988	D	<1
5654250	Ilut	Cordon	16.67 N	121.43 E	18.000	4.1985	12.1988	M	0
5654300	Cagayan	Pangal	16.60 N	121.68 E	4244	1.1969	6.1974	M	0
5654310	Rosario	Rosario,diadi	16.65 N	121.30 E	24.000	4 .1985	12.1988	D	<1
5654310	Rosario	Rosario,diadi	16.65 N	121.30 E	24.000	4.1985	12.1988	M	0

GLOBAL RUNOFF DATA CENTRE (GRDC)

PHILIPPINES (PH)

Table: 2

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
5654320	Lanog	Careb,bagabag	16.58 N	121.20 E	525	4 .1985	12.1988	D	<1
5654320	Lanog	Careb,bagabag	16.58 N	121.20 E	525	4.1985	12.1988	M	0
5654340	Magat	Bato,bambang	16.43 N	121.11 E	2640	7 .1979	12.1988	D	75
5654340	Magat	Bato,bambang	16.43 N	121.11 E	2640	7.1979	12.1988	M	73
5654350	Marang	Beti,aritao	16.24 N	121.05 E	1270	1 .1986	12.1988	D	<1
5654350	Marang	Beti,aritao	16.24 N	121.05 E	1270	1.1986	12.1988	M	0
5654400	Agno	Carmen	15.90 N	120.60 E	2209	1.1969	12.1977	M	8
5654450	Maloma	San Felipe	15.13 N	120.06 E	107	1 .1984	11.1987	D	30
5654450	Maloma	San Felipe	15.13 N	120.06 E	107	2.1984	11.1987	M	28
5654470	Porac	Nasudeco,floridablanca	14.99 N	120.53 E	111	10.1985	12.1988	D	44
5654470	Porac	Nasudeco,floridablanca	14.99 N	120.53 E	111	10.1985	12.1988	M	53
5654500	Pampanga	San Agustin	15.17 N	120.78 E	6487	1.1946	12.1977	M	5
5654550	Marikina	Santo Nino,marikina	14.64 N	121.09 E	499	1 .1978	12.1988	D	62
5654550	Marikina	Santo Nino,marikina	14.64 N	121.09 E	499	1.1978	12.1988	M	61
5654570	Palico	Bilaran,nasugbu	14.06 N	120.69 E	165	3 .1985	12.1988	D	7
5654570	Palico	Bilaran,nasugbu	14.06 N	120.69 E	165	3.1985	12.1988	M	6
5654600	Agus	Infanta	14.75 N	121.62 E	879	1.1969	5.1974	M	6
5654750	Sipocot	Sabang	13.81 N	122.99 E	447	3.1946	12.1970	M	12
5654850	Pawili	San Vicente,ocampo	13.55 N	123.36 E	112	1 .1978	12.1985	D	46
5654850	Pawili	San Vicente,ocampo	13.55 N	123.36 E	112	1.1978	12.1985	M	45
5654900	Bicol	Sto Domingo	13.40 N	123.32 E	884	2.1976	12.1978	M	8
5654950	Cumadcad	Cumadcad,castilla	12.98 N	123.78 E	13.000	7 .1980	12.1988	D	7
5654950	Cumadcad	Cumadcad,castilla	12.98 N	123.78 E	13.000	7.1980	12.1988	M	0
5657400	Mambusao	Tumalalud	11.26 N	122.57 E	307	6.1950	7.1978	M	1
5657450	Jalaur	Poblacion Passi	11.10 N	122.79 E	534	6 .1985	12.1988	D	5
5657450	Jalaur	Poblacion Passi	11.10 N	122.79 E	534	7.1985	12.1988	M	0
5657500	Jalaur	Calyan,pototan	10.93 N	122.67 E	1499	1 .1978	12.1988	D	51
5657500	Jalaur	Calyan,pototan	10.93 N	122.67 E	1499	1.1976	12.1988	M	44
5658500	Hilabangan	Pangsud	9.97 N	122.83 E	431	1.1976	12.1979	M	4
5658600	Bais	Cabanlutan,bais	9.60 N	123.08 E	56.000	7 .1984	12.1988	D	9
5658600	Bais	Cabanlutan,bais	9.60 N	123.08 E	56.000	8.1984	12.1988	M	7

GLOBAL RUNOFF DATA CENTRE (GRDC)

PHILIPPINES (PH)

Table: 3

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
5658620	Okoy	Valencia	9.31 N	123.23 E	55.000	12.1979	12.1988	D	49
5658620	Okoy	Valencia	9.31 N	123.23 E	55.000	12.1979	12.1988	M	52
5658650	Siaton	Poblacion Siaton	9.06 N	123.03 E	132	5 .1984	12.1988	D	<1
5658650	Siaton	Poblacion Siaton	9.06 N	123.03 E	132	5.1984	12.1988	M	0
5658900	Antequera	Antequera,santo Rosario	9.76 N	123.90 E	54.000	3 .1984	12.1988	D	<1
5658900	Antequera	Antequera,santo Rosario	9.76 N	123.90 E	54.000	3.1984	12.1988	M	0
5659100	Pagsangaan	Liloan	11.04 N	124.54 E	333	3 .1985	7 .1988	D	9
5659100	Pagsangaan	Liloan	11.04 N	124.54 E	333	3.1985	7.1988	M	7
5659200	Sapiniton	Libtong,san Miguel	11.30 N	124.83 E	14.000	12.1984	8 .1988	D	12
5659200	Sapiniton	Libtong,san Miguel	11.30 N	124.83 E	14.000	12.1984	7.1988	M	18
5660100	Labangan	Bagalupa,labangan	7.92 N	123.36 E	592	4 .1984	11.1988	D	6
5660100	Labangan	Bagalupa,labangan	7.92 N	123.36 E	592	5.1984	11.1988	M	1
5660110	Dapitan	Opao,dapitan	8.54 N	123.48 E	164	5 .1985	12.1988	D	12
5660110	Dapitan	Opao,dapitan	8.54 N	123.48 E	164	5.1985	12.1988	M	9
5660120	Aloran	Juan Bacayo,aloran	8.42 N	123.82 E	30.000	9 .1986	12.1988	D	8
5660120	Aloran	Juan Bacayo,aloran	8.42 N	123.82 E	30.000	9.1986	12.1988	M	0
5660250	Mandulog	Iligan	8.26 N	124.26 E	812	9 .1986	12.1988	D	3
5660250	Mandulog	Iligan	8.26 N	124.26 E	812	10.1986	12.1988	M	24
5660300	Marbel	Marbel 8	6.42 N	124.90 E	133	1.1976	12.1977	M	0
5660310	Buluan	Poblacion Buluan	6.53 N	124.79 E	720	8 .1981	12.1988	D	13
5660310	Buluan	Poblacion Buluan	6.53 N	124.79 E	720	8.1981	12.1988	M	4
5660320	Alip	Poblacion Alip,datu Paglas	6.27 N	124.84 E	380	8 .1981	12.1988	D	11
5660320	Alip	Poblacion Alip,datu Paglas	6.27 N	124.84 E	380	8.1981	12.1988	M	4
5660330	Maribulan	Maribulan,alabel	6.12 N	125.27 E	401	8 .1984	12.1988	D	14
5660330	Maribulan	Maribulan,alabel	6.12 N	125.27 E	401	8.1984	12.1988	M	3
5660340	Lun Padidu	Kawas,alabel	6.03 N	125.29 E	237	7 .1984	12.1988	D	9
5660340	Lun Padidu	Kawas,alabel	6.03 N	125.29 E	237	8.1984	12.1988	M	0
5660350	Glan	Kalabalol,glan	5.82 N	125.22 E	359	8 .1984	12.1988	D	22
5660350	Glan	Kalabalol,glan	5.82 N	125.22 E	359	8.1984	12.1988	M	13
5660400	Padada	Lapulabao	6.66 N	125.28 E	821	1.1949	5.1978	M	9
5660500	Andanan	Bayugan I	8.73 N	125.72 E	201	1.1976	12.1979	M	18
5660550	Wawa	Wawa,bayugan I	8.84 N	125.72 E	396	11.1981	9 .1987	D	8
5660550	Wawa	Wawa,bayugan I	8.84 N	125.72 E	396	11.1981	9.1987	M	17

GLOBAL RUNOFF DATA CENTRE (GRDC)

FIJI (FJ)

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
5172100	Navua	Nakavu	18.19 S	178.10 E	963	1 .1978	12.1980	D	2
5172100	Navua	Nakavu	18.19 S	178.10 E	963	1.1978	12.1980	M	0
5172200	Wainimala	Nairukuruku	17.81 S	178.28 E	790	2 .1978	12.1980	D	12
5172200	Wainimala	Nairukuruku	17.81 S	178.28 E	790	3.1978	12.1980	M	5

MICRONESIA (KA)

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
5978100	Nanpil River	Upstream from Kiepw River, Po	6.92 N	158.37 E	7.770	10.1982	9 .1983	D	0
5978100	Nanpil River	Upstream from Kiepw River, Po	6.92 N	158.37 E	7.770	10.1982	9.1983	M	40
5978500	Qaringeel Stream	Qaringeel, Yap	9.52 N	138.08 E	0.620	10.1982	9 .1983	D	0
5978500	Qaringeel Stream	Qaringeel, Yap	9.52 N	138.08 E	0.620	10.1982	9.1983	M	40

NEW CALEDONIA (NC)

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
5762050	Tipindje	Ouen-Kout	20.78 S	164.99 E	247	6.1955	12.1984	M	0
5762082	Houailou	Carovin	21.28 S	165.43 E	266	1 .1978	12.1982	D	0
5762082	Houailou	Carovin	21.28 S	165.43 E	266	1.1978	12.1982	M	0
5762331	Ouenghi	Pont Rt1	21.90 S	166.11 E	245	1 .1978	12.1982	D	0
5762331	Ouenghi	Pont Rt1	21.90 S	166.11 E	245	1.1978	12.1982	M	0
5762500	Tontouna	Mine Liliane	21.95 S	166.28 E	380	1.1973	12.1979	M	8
5762700	Riviere Des Lacs	Goulet	22.23 S	166.85 E	69.000	1.1958	12.1984	M	0

GLOBAL RUNOFF DATA CENTRE (GRDC)

PALAU (PB)

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
5977400	Diongradid River	near Ngetbong, Babelthuap	7.60 N	134.58 E	11.500	10.1982	9 .1983	D	0
5977400	Diongradid River	near Ngetbong, Babelthuap	7.60 N	134.58 E	11.500	10.1982	9.1983	M	40

FRENCH POLYNESIA (PF)

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
5475152	Papeiha	Cote 10	17.65 S	149.32 W	25.000	3 .1974	10.1986	D	1
5475152	Papeiha	Cote 10	17.65 S	149.32 W	25.000	4.1974	10.1986	M	0
5475202	Punaruu	Cote 50	17.63 S	149.57 W	29.000	3 .1973	3 .1983	D	2
5475202	Punaruu	Cote 50	17.63 S	149.57 W	29.000	3.1973	2.1983	M	0
5475500	Papenoo	Cote 45	17.55 S	149.42 W	78.000	1.1973	12.1979	M	0

AMERICAN SAMOA (SH)

GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
5985200	Aasu Stream	Aasu, Tutuila	14.28 S	170.75 W	2.670	10.1982	9 .1983	D	0
5985200	Aasu Stream	Aasu, Tutuila	14.28 S	170.75 W	2.670	10.1982	9 .1983	D	0

SINGAPORE (SR)

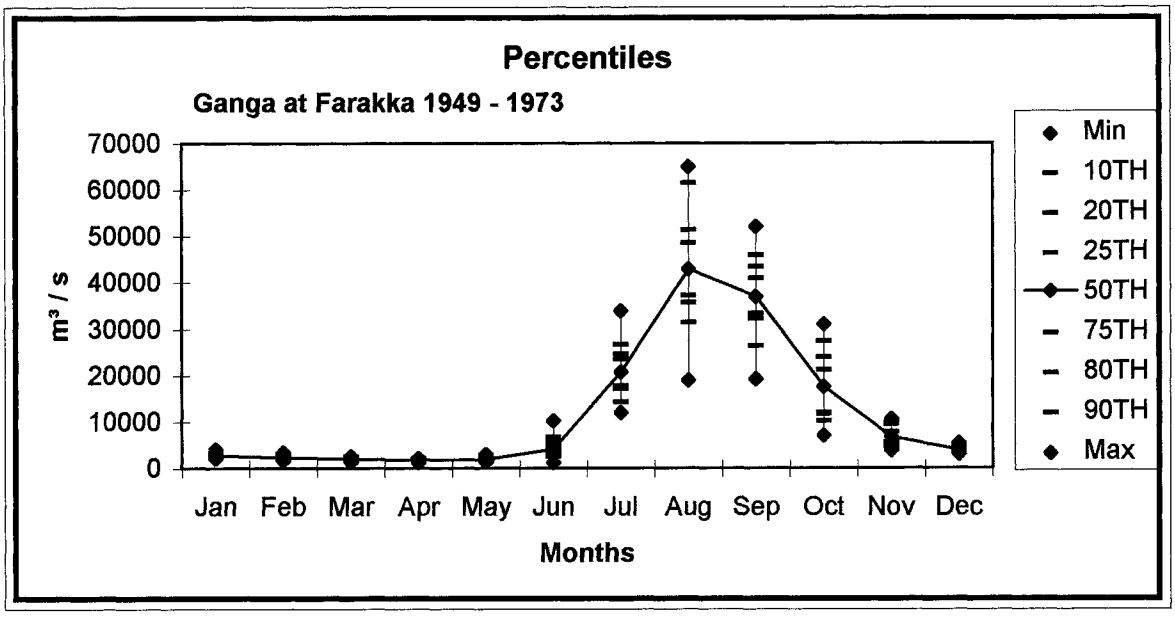
GRDC-No.	River	Station	Latitude	Longitude	Area (km²)	first rec.	last rec.	Daily/Monthly Data	Miss. Val. in %
5732100	Bukit Timah Canal	Bukit Timah Road,10km	1.33 N	103.78 E	6.400	1 .1978	12.1988	D	0
5732100	Bukit Timah Canal	Bukit Timah Road,10km	1.33 N	103.78 E	6.400	1.1969	12.1988	M	15

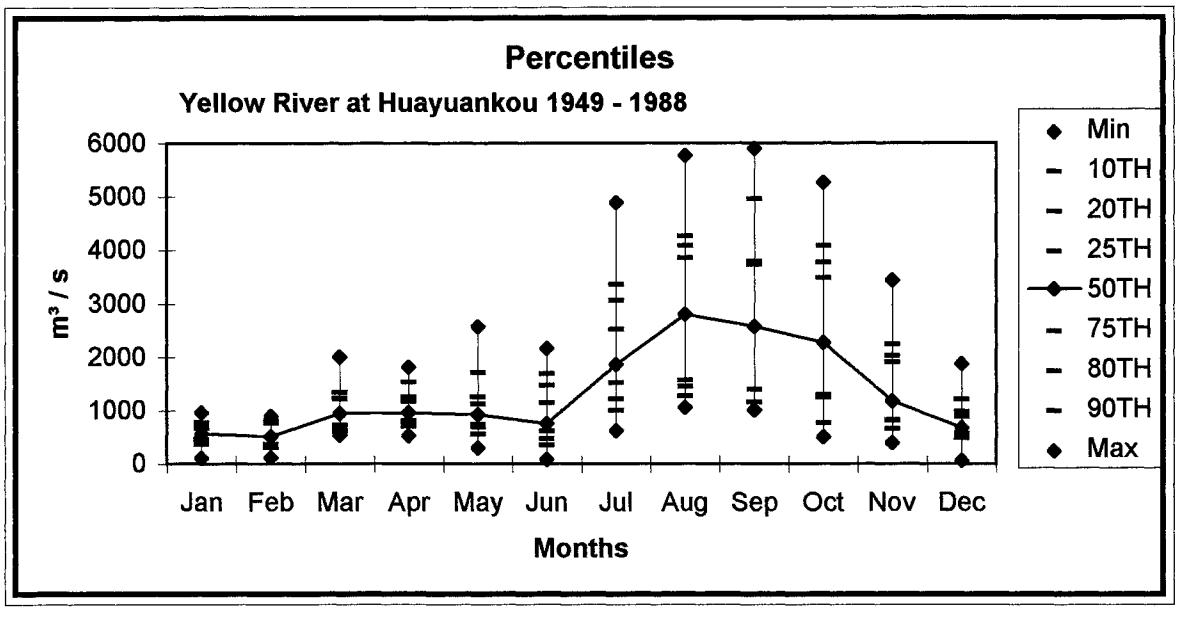
ANNEX 5

Variability of discharge of selected rivers of WMO-regions II and V

GLOBAL RUNOFF DATA CENTRE (GRDC)

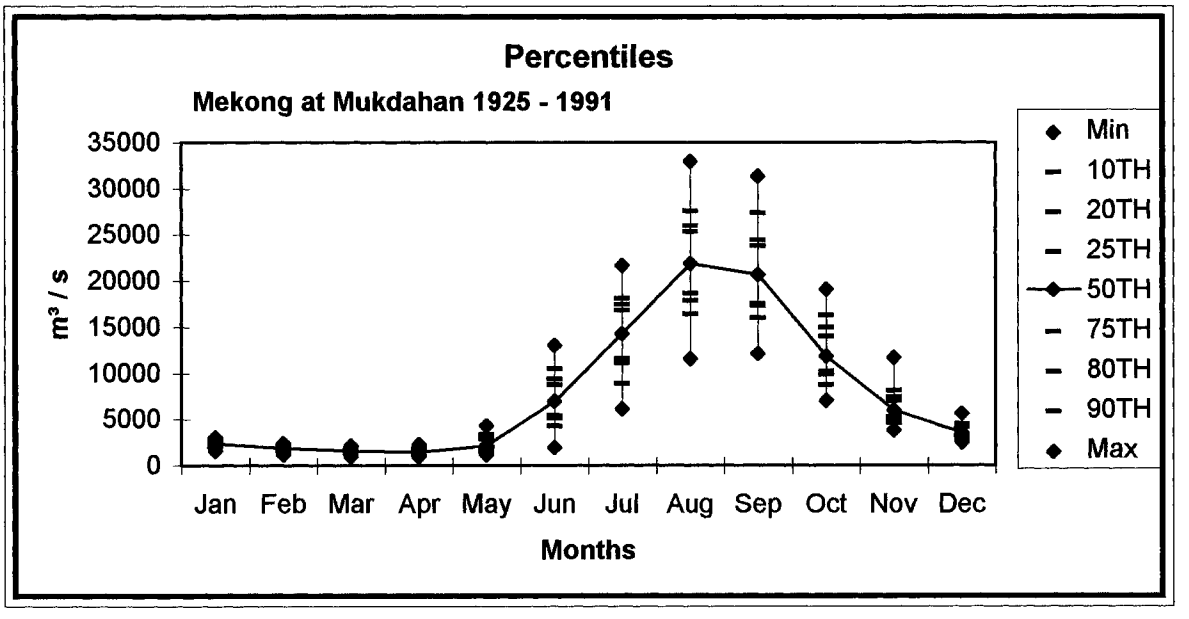
Varability of discharge of selected rivers of WMO-regions II and V

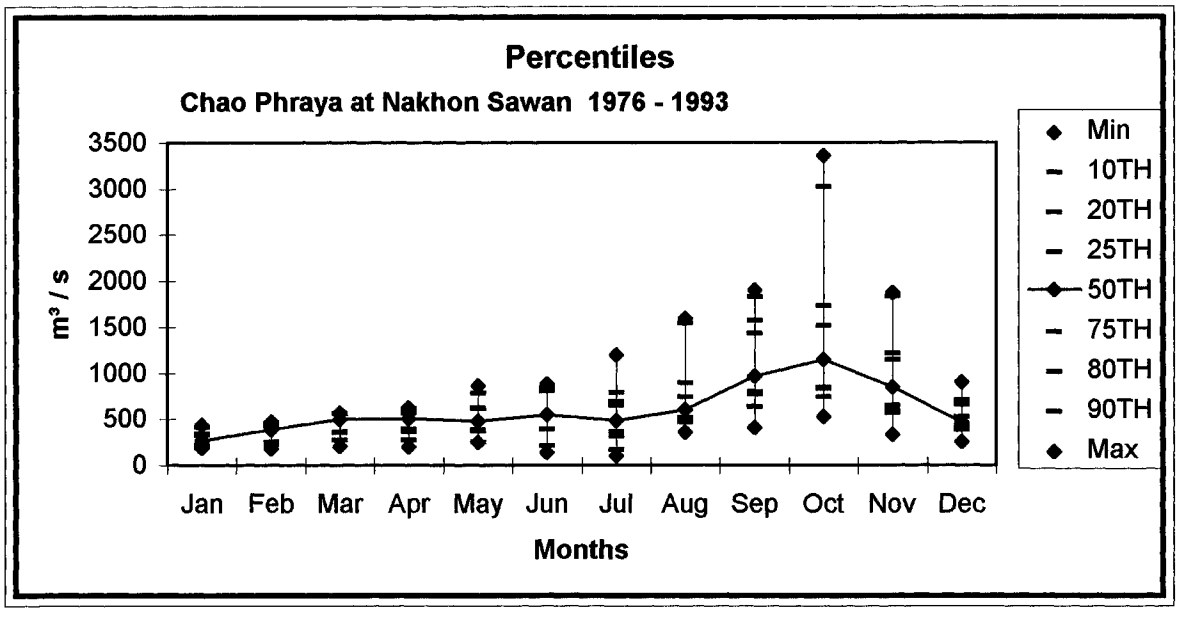




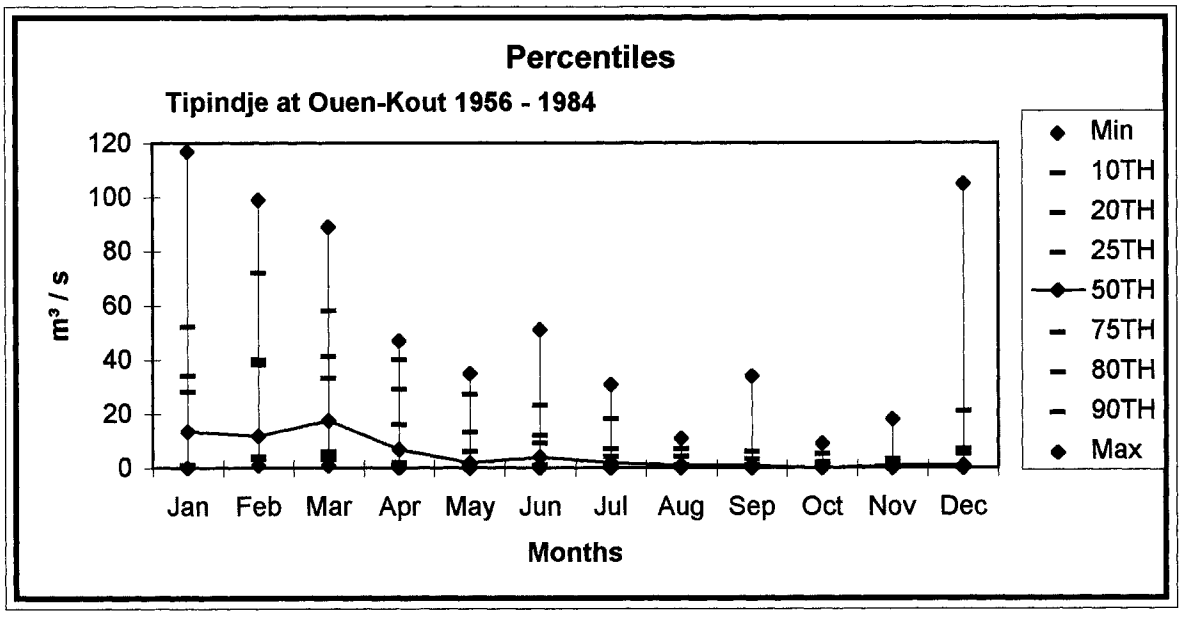
GLOBAL RUNOFF DATA CENTRE (GRDC)

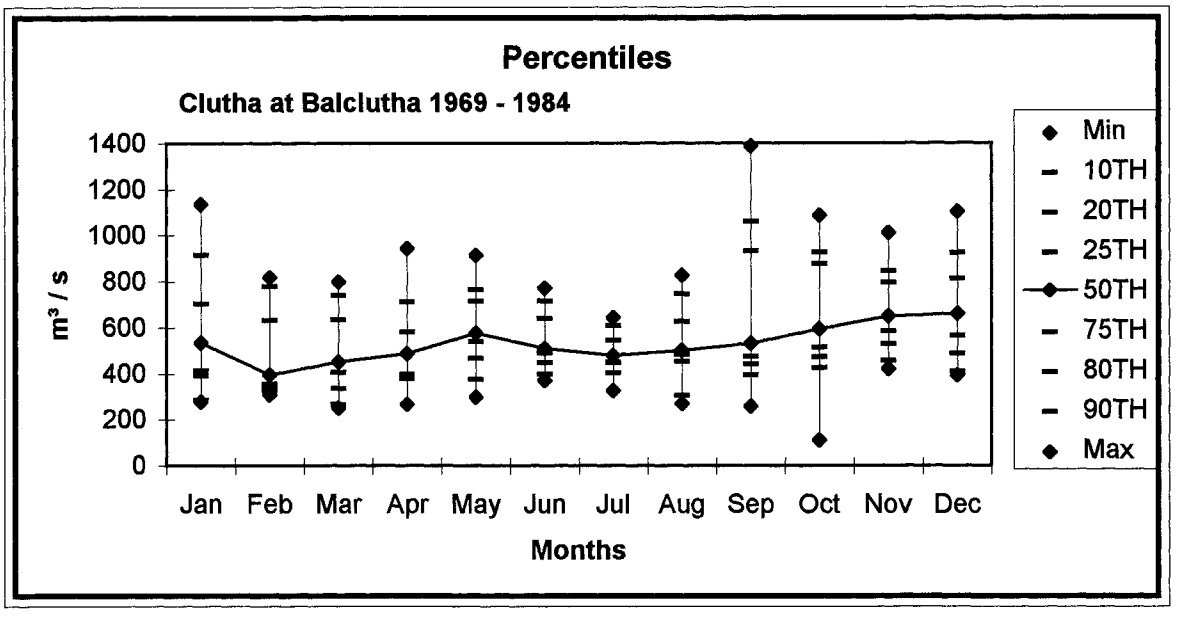
Varability of discharge of selected rivers of WMO-regions II and V



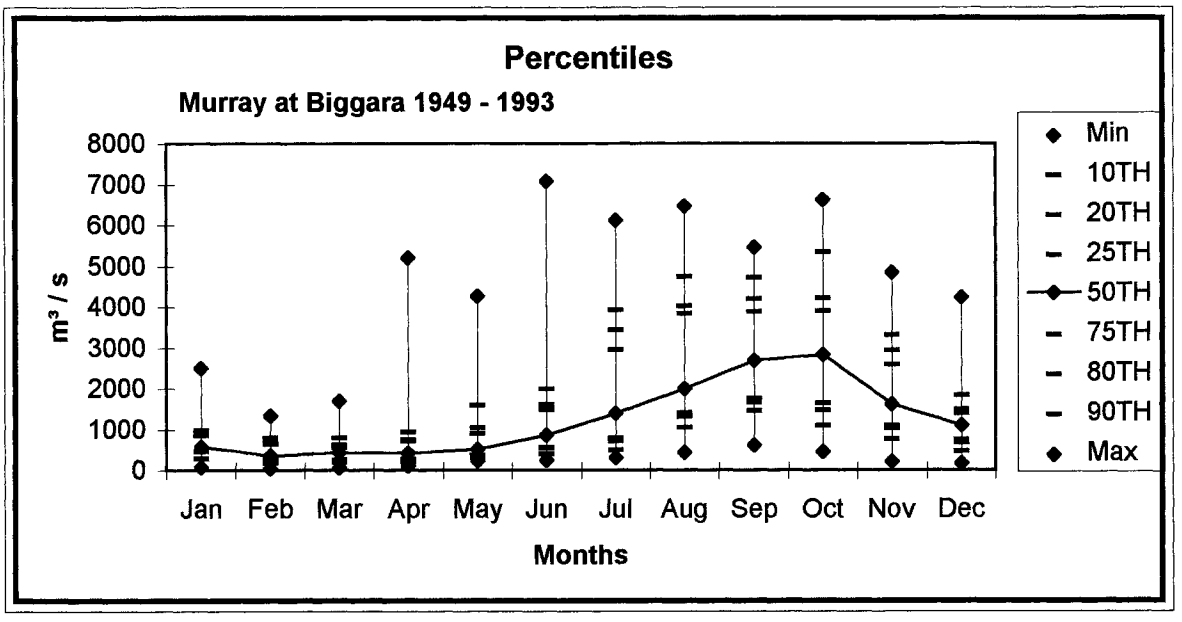


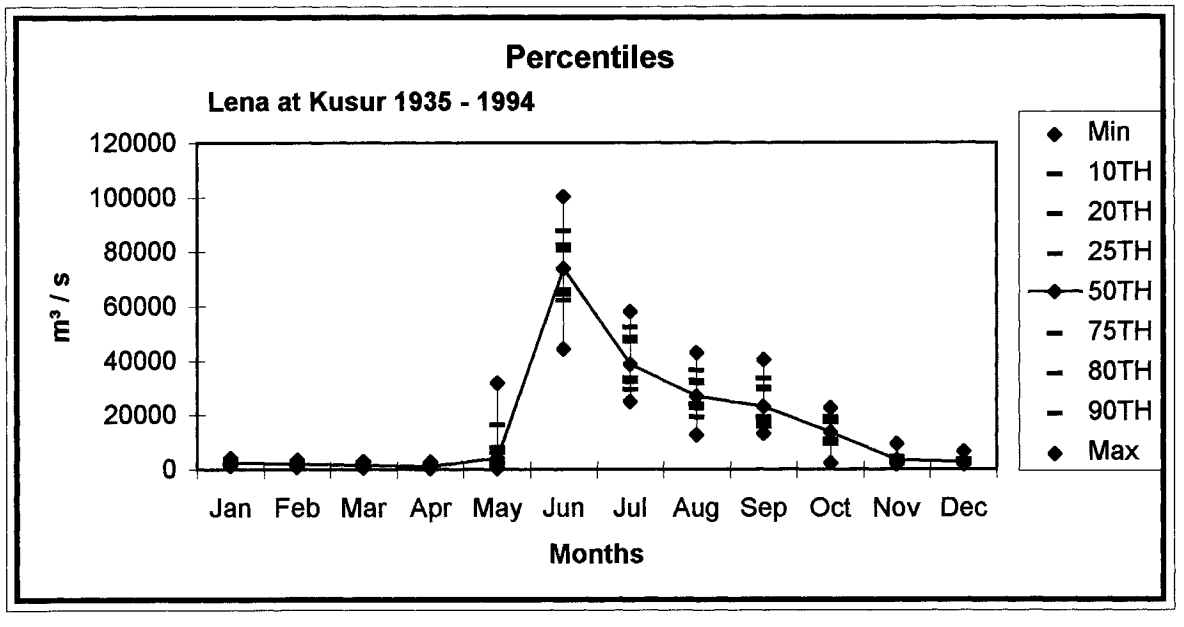
Varability of discharge of selected rivers of WMO-regions II and V





Varability of discharge of selected rivers of WMO-regions II and V





Report No. 1 (May 1993)	Second Workshop on the Global Runoff Data Centre, Koblenz, Germany, 15 - 17 June, 1992.
Report No. 2 (May 1993)	Dokumentation bestehender Algorithmen zur Übertragung von Abflußwerten auf Gitternetze. (Incl. abtract in English by the GRDC: Documentation of existing algorithms for transformation of runoff data to grid cells) by G.C. Wollenweber.
Report No. 3 (June 1993)	GRDC - Status Report 1992.
Report No. 4 (June 1994)	GRDC - Status Report 1993.
Report No. 5 (November 1994)	Hydrological Regimes of the Largest Rivers in the World - A Compilation of the GRDC Database.
Report No. 6 (December 1994)	Report of the First Meeting of the GRDC Steering Committee, Koblenz, Germany, June 20 - 21, 1994.
Report No. 7 (June 1995)	GRDC - Status Report 1994.
Report No. 8 (July 1995)	First Interim Report on the Arctic River Database for the Arctic Climate System Study (ACSYS).
Report No. 9 (August 1995)	Report of the Second Meeting of the GRDC Steering Committee, Koblenz, Germany, June 27 - 28.
Report No. 10 (March 1996)	Freshwater Fluxes from Continents into the World Oceans based on Data of the Global Runoff Data Base.
Report No. 11 (April 1996)	GRDC - Status Report 1995.
Report No. 12 (June 1996)	Second Interim Report on the Arctic River Database for the Arctic Climate System Study (ACSYS).
Report No. 13 (Februray 1997)	GRDC Status Report 1996

Report No. 14 (February 1997)	The use of GRDC - information Review of data use 1993/1994. Status: January 1997
Report No. 15 (June 1997)	Third Interim Report on the Arctic River Data Base (ARDB) for the Arctic Climate System Study (ACSYS): Plausibility Control and Data Corrections (Technical Report)
Report No. 16 (August 1997)	The GRDC Database. Concept and Implementation.
Report No. 17 (Sept. 1997)	Report on the Third Meeting of the GRDC Steering Committee, Koblenz, Germany June 25-27, 1997
Report No. 18 (July 1998)	GRDC Status Report 1997
Report No. 19 (July 1998)	Evaluation of Statistical Properties of Discharge Data of Stations Discharging Into the Oceans - Europe and Selected World-Wide Stations - (F. Portmann)
Report No. 20 (July 1998)	Water Resources Development and the Availability of Discharge Data in WMO Region II (Asia) and V (South-West Pacific)