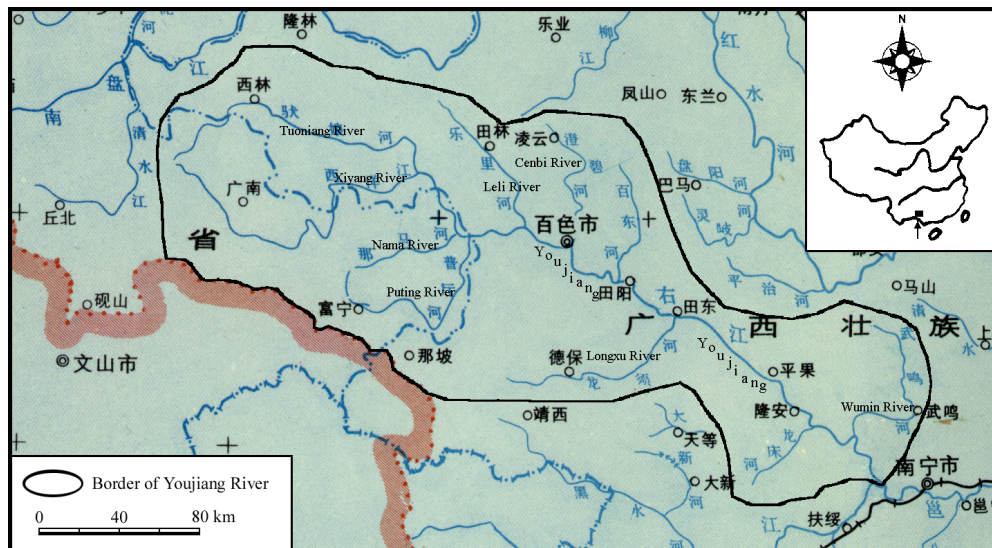


# Youjiang

## Map of River



## Table of Basic Data

<b>Name(s):</b> Youjiang		<b>Serial No.:</b> China-8
<b>Location:</b> Guangxi Province, Southern China	N 22°50' ~ 24°25'	E 104°45' ~ 108°30'
<b>Area:</b> 40 900 km <sup>2</sup>	<b>Length of the main stream:</b> 718 km	
<b>Origin:</b> Jiulongshan (1 819 m)	<b>Highest point:</b> Jiulongshan 1 819(m)	
<b>Outlet:</b> Yujiang	<b>Lowest point:</b> River mouth 70 (m)	
<b>Main geological features:</b> Carbonate rock, Clastic rock		
<b>Main tributaries:</b> Putinghe (2 400 km <sup>2</sup> ), Cengbihe (2 149 km <sup>2</sup> ), Longxuhe (2 140 km <sup>2</sup> ), Wuminhe (4 131 km <sup>2</sup> ), Lelihe (1 410 km <sup>2</sup> )		
<b>Main lakes:</b> None		
<b>Main reservoirs:</b> Cenbihe (1 130 ×10 <sup>6</sup> m <sup>3</sup> ), Xianhu (122.6× 10 <sup>6</sup> m <sup>3</sup> )		
<b>Mean annual precipitation:</b> 1200 mm (1960~1985) (basin average)		
<b>Mean annual runoff:</b> 279 m <sup>3</sup> /s at Baise (21 930 km <sup>2</sup> ) (1960~1995)		
<b>Population:</b> 3 724 500 (1990)	<b>Main cities:</b> Baise, Tianlin, Longan, Tianyang	
<b>Land use:</b> Forest (27.3 %), Rice paddy (4.3 %), Other agriculture (14.7 %), Water surface (2.8 %), Urban (50.6 %) (1989)		

# 1. General Description

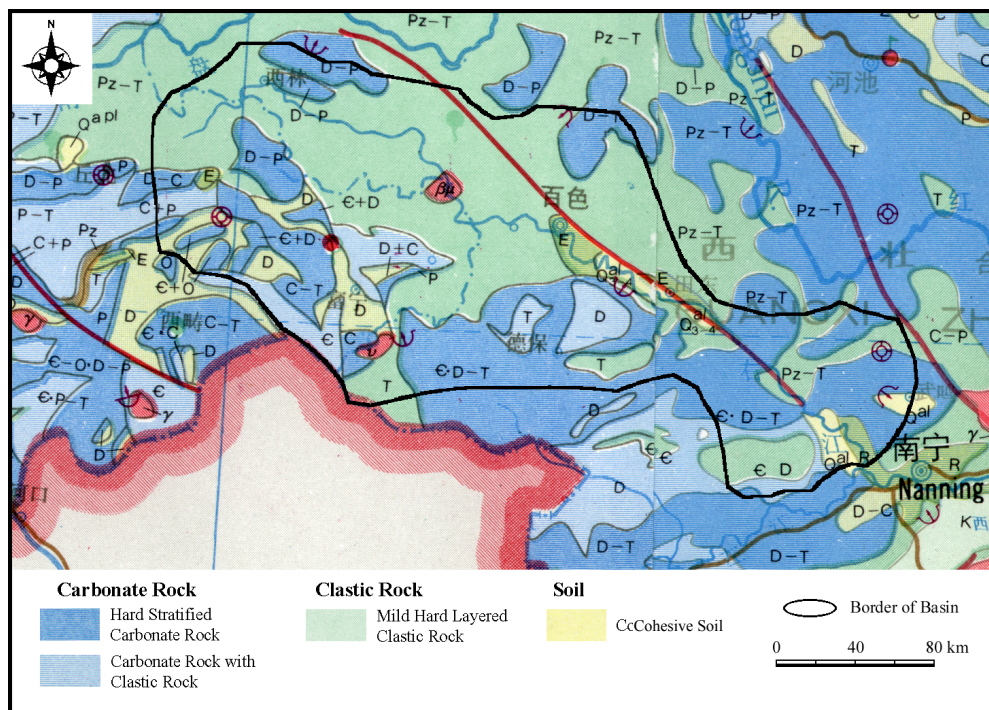
Youjiang is located in the western part of Guangxi Autonomous Region. The river which originates from Jiulongshan (1 819 m) is 718 km long and drains an area of 40 900 km<sup>2</sup>. It is the upper stream of Yujiang, a tributary of Xijiang in the Pearl River basin. The mean annual precipitation for the catchment is 1 200 mm, and the mean annual discharge at Baise station (21 930 km<sup>2</sup>) is 279 m<sup>3</sup>/s (1976~1995). The river basin belongs to the subtropical region with warm and humid weather and is suitable for cultivation. The river passes through low areas should be low areas. Therefore, the water level is considerably lower than the land elevation. The main crop in the valley area along the main stream is rice.

Two large reservoirs, named Chengbihe and Xianhu, were completed in Chengbi River and Wumin River for hydropower, water supply, flood control and irrigation. The Baise Prefecture is one of the developing areas in China. The problems related to water are flood control and hydropower development in the upper stream. Although the water availability (6 060 m<sup>3</sup> per capita) in Youjiang is 2.5 times the national average, the effective irrigation area in the lower stream is very limited due to lack of projects.

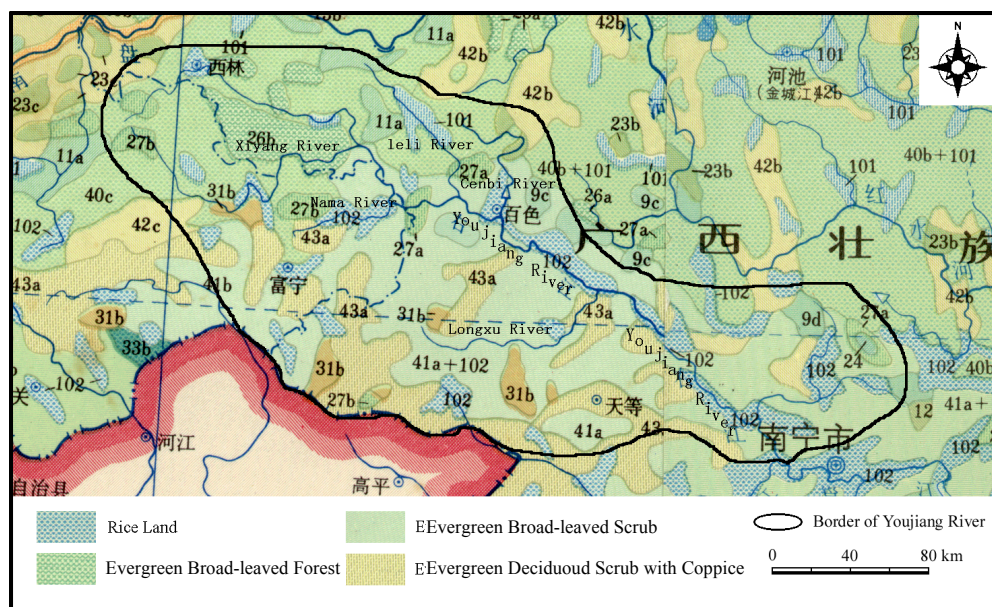
The population of the catchment was 3 124 500 in 1980.

# 2. Geographical Information

## 2.1. Geological Map



## 2.2. Land Use Map



## 2.3. Characteristics of the River and the Main Tributaries

No.	Name of river	Length [km] Catchment area [km <sup>2</sup> ]	Highest peak [m] Lowest point [m]	Cities Population (1990)	Land use [%] (1985)
1	<b>Youjiang</b> (Main River)	718 40 900	Jiulongshan 1819 -	Baise, Longan 1 239 000	F (27.3) L (2.8) P (4.3) OA (14.7) U (50.6)
2	<b>Putinghe</b> (Tributary)	135 2 400	Liushaoshan 1 500 -	-	
3	<b>Cenbihe</b> (Tributary)	121 2 149	Cenwangshan 2062 -	Lingyun 167 397	
4	<b>Longxuhe</b> (Tributary)	130 2 140	Xinlishan 4500 -	Jinxi 495 800	
5	<b>Wuminhe</b> (Tributary)	198 4 131	Mt. Mashan 500 -	Wumin 524 000	
6	<b>Lelihe</b> (Tributary)	130 1 410	Nanshemeng 1000 -	Tianlin 118 300	

F: Forest

L: Lake, River, Marsh

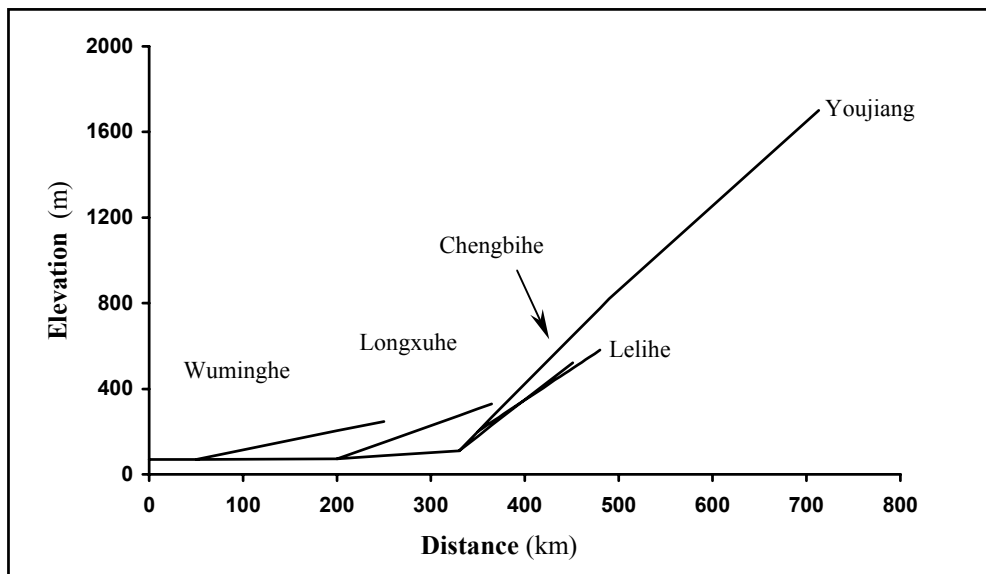
P: Paddy Field

OA: Other agricultural field (vegetable field, grass field)

U: Urban

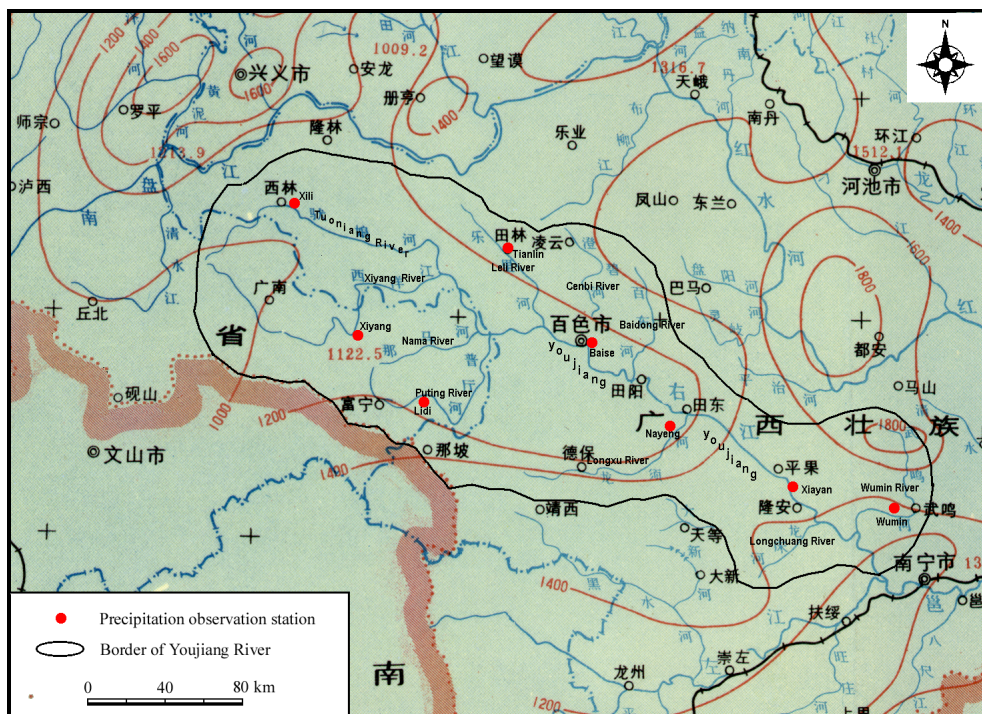


### 2.4. Longitudinal Profiles



## 3. Climatological Information

### 3.1. Annual Isohyetal Map and Observation Stations





### 3.2. List of Meteorological Observation Stations

No.	Station	Elevation [m]	Location	Observation period	Mean annual precipitation <sup>1)</sup> [mm]	Mean annual evaporation <sup>1)</sup> [mm]	Observation items <sup>2)</sup>
12	Xilin	691	N 24°29' E 105°05'	1965 ~ present	1 101.5	1 397.2	P(TB),E
15	Guangnan	1 250	N 24°02' E 105°02'	1953 ~ present	1 061.7	1 668.5	P(TB),E
20	Wacun	232	N 23°11' E 105°57'	1955 ~ present	1 182.0	1 205.4	P(TB)
41	Baise	173	N 23°54' E 116°36'	1946 ~ present	1 114.9	1 686.5	P(TB),E
49	Tiandong	111	N 23°27' E 107°07'	1954 ~ present	1 171.7	1 901.8	P(TB)
61	Xiayan	95	N 23°17' E 107°39'	1957 ~ present	1 373.4	1 300.6	P(TB),E
73	Wumin	110	N 23°10' E 108°15'	1954 ~ present	1 170.3	1 297.9	P(TB),E

Evaporation measured with  $\Phi$ 20 cm evaporation vessel

1) Period for the mean is from 1956 to 1979

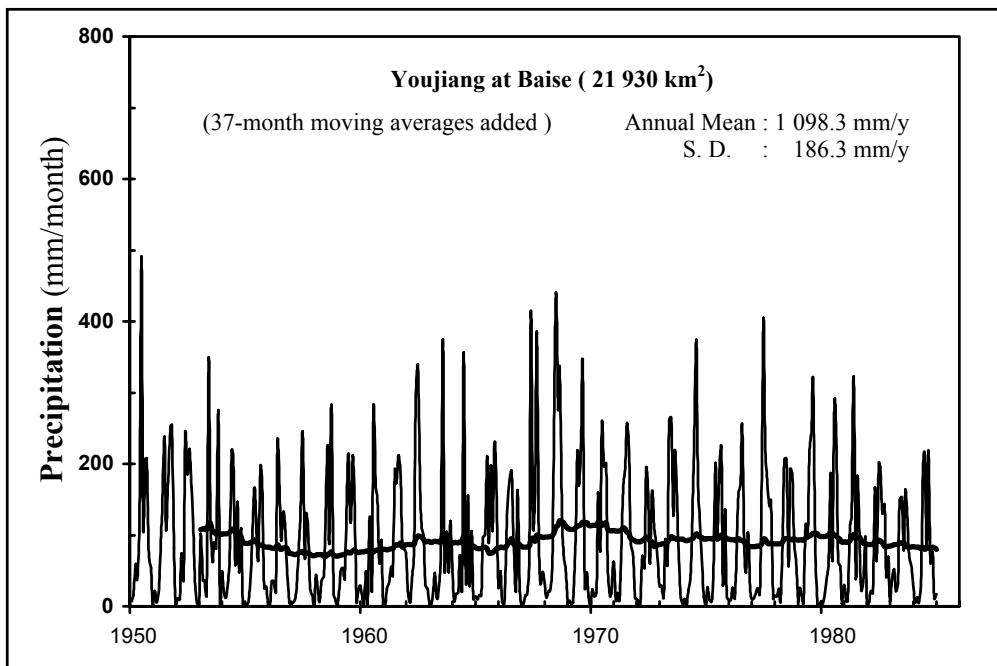
2) P: Precipitation; E: Evaporation; TB: Tipping bucket with recording chart

### 3.3. Monthly Climate Data at Baise station

Observation item	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual	Period for the mean
Temperature [°C]	13.3	15.3	19.5	23.8	26.8	27.9	28.6	27.8	26.3	22.9	18.6	14.9	22.1	1951~1980
Precipitation [mm]	18.7	16.6	29.1	64.7	168.4	197.1	183.1	198.3	108.8	80.6	33.8	15.7	1 114.9	1951~1980
Evaporation [mm]	75.9	90.5	141.8	183.5	203.1	178.4	194.7	169.5	156.6	125.9	91.4	75.3	1 686.5	1952~1980
Solar radiation [MJ/m <sup>2</sup> /day] *	8.15	7.88	8.24	11.1	15.3	15.6	17.0	16.0	16.1	13.7	11.3	9.08	12.5	1961~1985
Duration of sunshine [hr]	97.1	95.6	128.9	161.4	183	117.3	215.8	211.7	203.6	164.3	142.0	125.9	1906.6	1952~1980

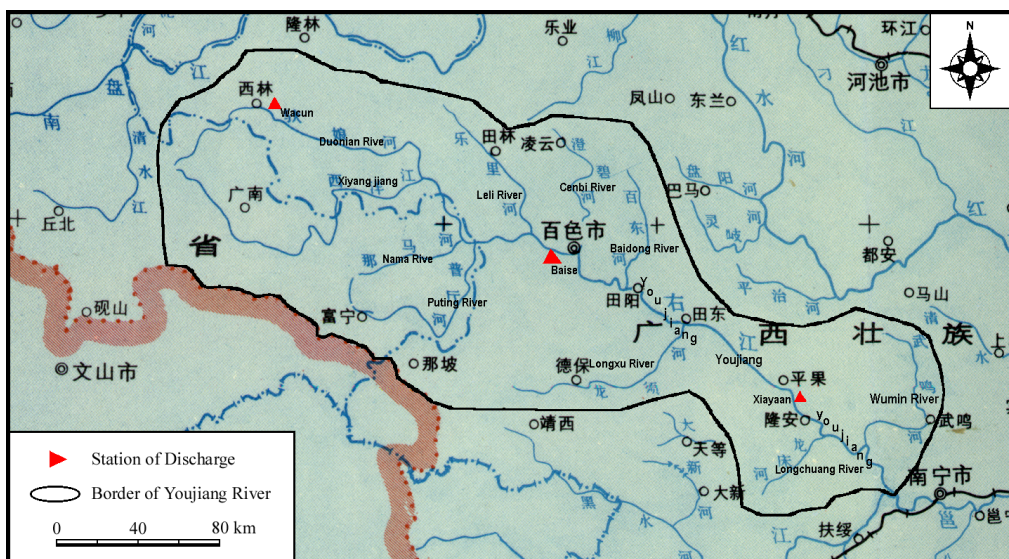
\*Observed at Nanning.

### 3.4. Long-term Variation of Monthly Precipitation



## 4. Hydrological Information

### 4.1. Map of Streamflow Observation Stations



#### 4.2. List of Hydrological Observation Stations

No.	Station	Location	Catchment area (A) [km <sup>2</sup> ]	Observation period	Observation items (frequency)
4	Wacun	N 24°11' E 105°57'	11 580	1958 ~ present	H2,Q
5	Baise	N 23°53' E 106°34'	21 930	1937~ present	H2,Q
7	Xiayan	N 23°17' E 107°37'	32 570	1957 ~ present	H2,Q

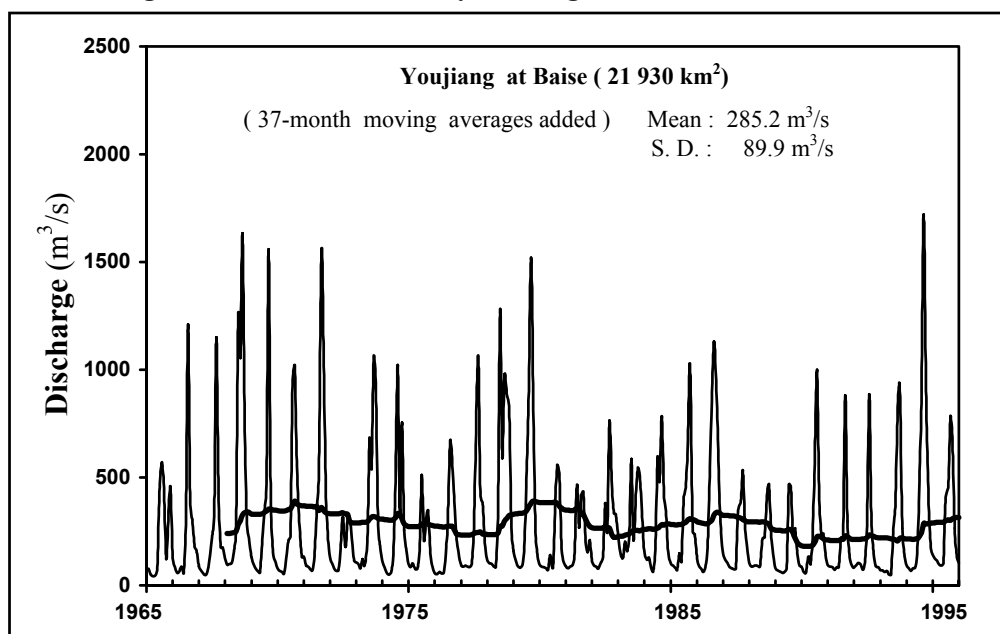
No.	$\bar{Q}$ <sup>1)</sup> [m <sup>3</sup> /s]	Q max <sup>2)</sup> [m <sup>3</sup> /s]	$\bar{Q}_{max}$ <sup>3)</sup> [m <sup>3</sup> /s]	$\bar{Q}_{min}$ <sup>4)</sup> [m <sup>3</sup> /s]	$\bar{Q}/A$ [m <sup>3</sup> /s/100km <sup>2</sup> ]	Qmax / A [m <sup>3</sup> /s/100km <sup>2</sup> ]	Period of statistics
4	133	4270	1970	13.1	1.15	36.9	1959 ~ 1985
5	282	8400	3150	38.0	1.29	38.3	1937 ~ 1985
7	451	5920	3740	63.3	1.39	18.2	1957 ~ 1985

H2: water level by manual; Q: discharge

1) Mean annual discharge 2) Maximum discharge

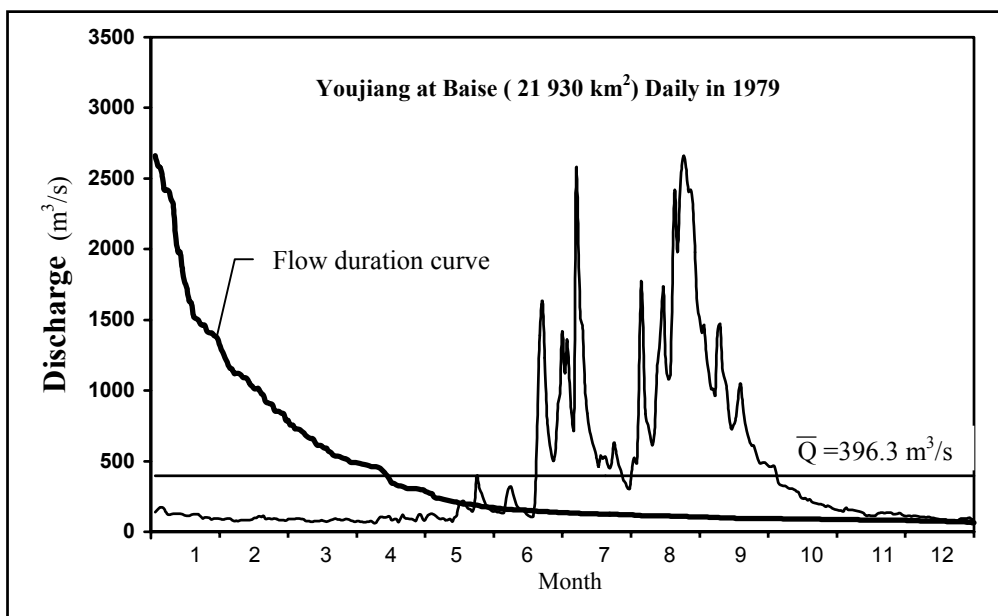
3) Mean maximum discharge 4) Mean minimum discharge

#### 4.3. Long-term Variation of Monthly Discharge Series





#### 4.4. Annual Pattern of Discharge Series

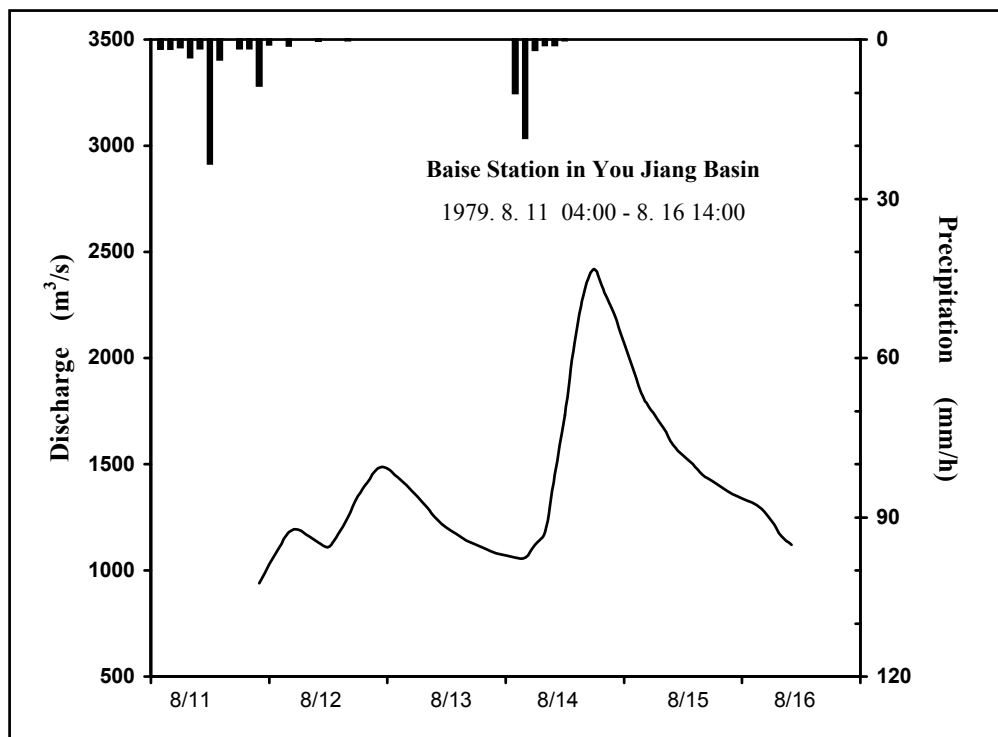


#### 4.5. Annual Maximum and Minimum Discharges at Baise (21 930 km<sup>2</sup>)

Year	Maximum <sup>1)</sup>		Minimum <sup>2)</sup>		Year	Maximum <sup>1)</sup>		Minimum <sup>2)</sup>	
	Date	[m <sup>3</sup> /s]	Month	[m <sup>3</sup> /s]		Date	[m <sup>3</sup> /s]	Month	[m <sup>3</sup> /s]
1960	8.29	1 000	5	12.0	1971	8.18	3 430	4	44.5
1961	8.6	2 970	3	40.5	1972	6.19	1 810	4	52.0
1962	7.3	2 790	4	38.8	1973	8.24	3 920	4	47.8
1963	7.13	1 500	4	18.8	1974	7.13	2 740	3	43.8
1964	8.12	3 560	5	30.0	1975	6.17	1 280	5	35.0
1965	11.3	1 770	5	27.2	1976	7.7	3 410	3	33.2
1966	7.4	4 380	3	31.7	1977	8.5	3 080	5	48.4
1967	8.8	3 290	5	34.4	1978	6.22	4 330	4	57.0
1968	6.25	5 230	3	78.2	1979	7.7	3 010	4	54.4
1969	8.13	3 290	5	45.0	1980	8.16	1 380	5	44.3
1970	7.25	3 350	4	42.5					

1), 2) Instantaneous observation by recording chart

#### 4.6. Hyetographs and Hydrographs of Major Floods



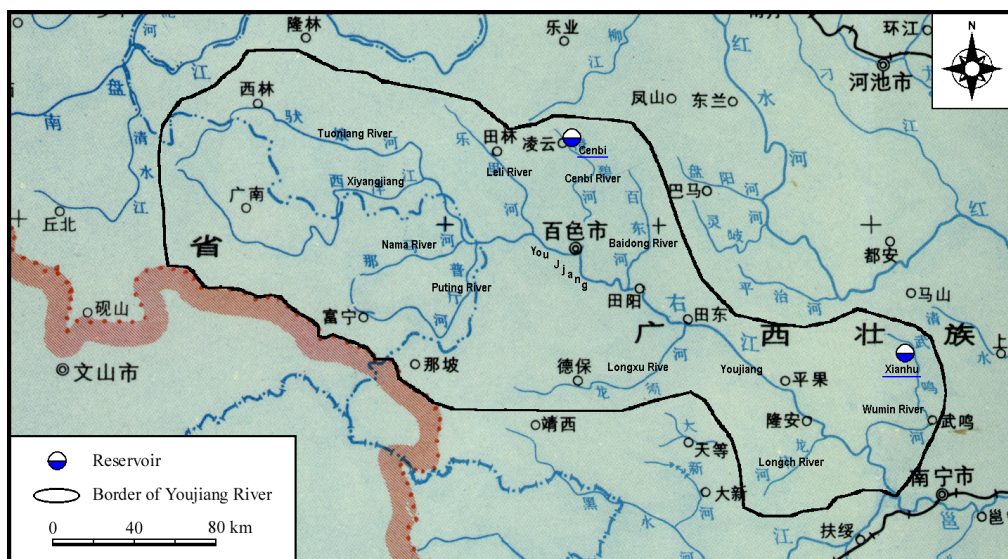
## 5. Water Resources

### 5.1. General Description

The Youjiang is the upper stream of Yujiang in the Guangxi Autonomous Region. The river originates from the west and flows towards the east, joins with Zuojiang at Laokou, after which it is called Yujiang. Along the main stream of the river, there are some pumping stations for irrigation purposes. Since surface water is very abundant, there is almost no groundwater withdrawal in the catchment. There are two reservoirs built for hydropower, flood control and irrigation, that are the Chenbihe and Xianhu reservoirs, and were completed in 1966 and 1960 with capacities  $1.130 \times 10^6 \text{ m}^3$  and  $123 \times 10^6 \text{ m}^3$  respectively.

The climate in the basin is of subtropical type. The average annual precipitation varies in the range 1 100~1 600 mm. Of an irrigated area of 27 000 ha, some 1 300 ha are effective. One of the main components of floods in Nanning, the capital of the Guangxi, is the flooding in Youjiang. Floods are caused by the subtropical low pressure system in the summer. During the 24 year period from 1957~1980, there were 6 occurrences of floods with discharges greater than  $4 500 \text{ m}^3/\text{s}$  at Xiayan station. When it is combined with the crests of Zuojiang, Nanning City is seriously threatened by floods.

## 5.2. Map of Water Resource Systems



## 5.3. List of Major Water Resources Facilities

### Major Reservoirs

Name of river	Name of dam	Catchment area [km <sup>2</sup> ]	Gross capacity [10 <sup>6</sup> m <sup>3</sup> ]	Effective capacity [10 <sup>6</sup> m <sup>3</sup> ]	Purpose <sup>1)</sup>	Year of completion
Chenbi River	Chenbihe	2 000	1 130	560	P,F,A	1966
Wumin River	Xianhu	342	122.6	57.5	P,F,A	1960

1) F: Flood control; A: Agricultural use; P: Hydro-power

## 5.4. Major Flood and Drought Experiences

### Major Floods at Baise (Catchment area 21 930 km<sup>2</sup>)

Date	Peak discharge [m <sup>3</sup> /s]	Rainfall [mm] Duration	Meteorological cause	Major damages (Districts affected)
1949.6.29	5 460	400 6.22~6.30	Frontal Rain	Baise, Longan City etc
1968.6.25	5 230	300 6.19~6.30		Nanning City
1976.7.7	3 410	250 7.4~7.14	Frontal Rain	-



## 6. Socio-cultural Characteristics

In Chinese ‘You’ means right. (‘Zuo’ means left). Since the river basin is a part of Guangxi Autonomous Region, Zhuang Minority is the dominant nationality in this area.

Baise, called the Goose City or Phoenix City, is the main city in the upper stream of Youjiang. It was a base of the Youjiang revolution after the Youjiang insurgence.

## 7. References, Databooks and Bibliography

Geology Press, (1973): The atlas of geology in China.

China Atlas Press, (1978): *China Meteorology Atlas*.

Guangxi Hydrological Service, (1985): Guangxi Hydrology Handbook.

Pearl River Water Resources Commission, (1981): Collection of Flood Control for Pearl River Basin.

Guangxi Water Resources and Hydropower Survey and Design Institute, (1985): *Water Resources Development for Guangxi Autonomous Region*.

China Bookstore Press, (1992): China Historical Floods.

Atlas Press (1974): Provinces Atlas of China.