

Gan-jiang

Map of River

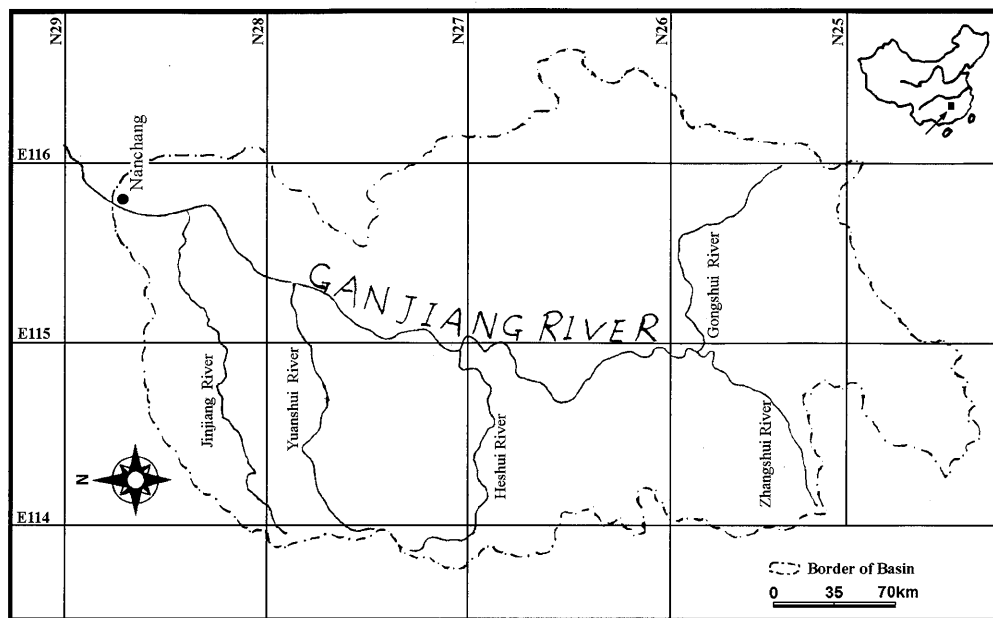


Table of Basic Data

Name: Ganjiang River (In Changjiang River)		Serial No. : China-4
Location: Jiangxi Province, Southern China	N 24°28' ~ 28°48'	E 113°43' ~ 116°45'
Area: 82, 015 km ²	Length of main stream: 549 km	
Origin: Mt. Jiulianshan (1,248 m)	Highest point : Mt. Wugongshan (1,918 m)	
Outlet: Boyang lake	Lowest point : Confluence (20 m)	
Main geological features : Carbonatite, Magmatic rock, Metamorphic rock, Friable rock		
Main tributaries: Gongshui (27, 074 km ³), Zhangshui (7, 695 km ³), Heshui (5, 500 km ³), Yuanshui (5, 900 km ³), Jinjiang (7, 394 km ³)		
Main lakes: None		
Main reservoirs: Yuoluokou (116×10 ⁶ m ³), Jiangkou (890×10 ⁶ m ³), Shangyou (184×10 ⁶ m ³), Sheshang (427×10 ⁶ m ³), Panqiao (90.3×10 ⁶ m ³), Shangyoujiang (822×10 ⁶ m ³),		
Mean annual precipitation : 1,546 mm (1960~1985) (basin average)		
Mean annual runoff: 2, 080 m ³ /s at Waizhou (80, 948 km ³) (1960~1985)		
Population: 20, 862, 470 (1990)	Main cities: Ganzhou, Nanchang, Ji'an, Jinggangshan	
Land use: Forest (64.4%), Rice paddy (9.4%), Other agriculture (4.7%),Water surface(10%), Urban (10%) (1989)		

1. General Description

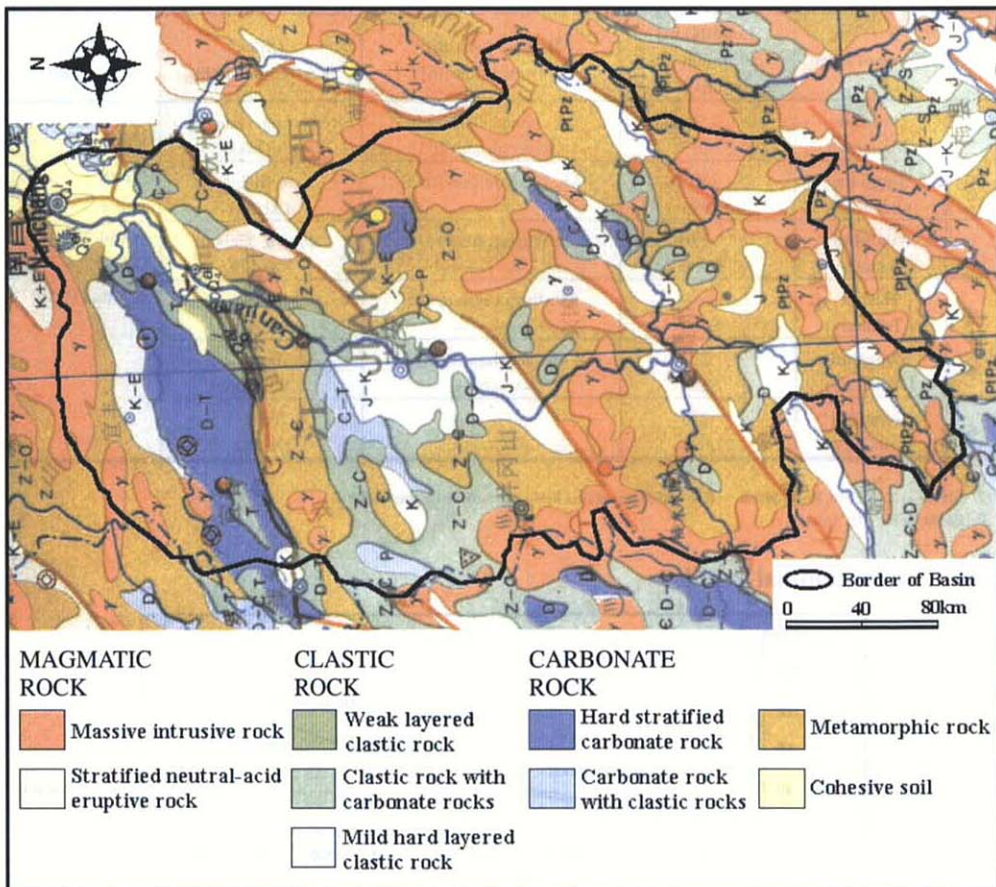
Ganjiang is located in the Jiangxi province which in abbreviated form is called "Gan". It is one of the largest tributaries in the lower and downstream parts of Yangtze river. The main river originates from Mt. Jiulianshan. The boundaries of Jiangxi surround the mountains except the northern part. The general direction of Ganjiang is from south to north. The river joins Yangtze via Boyang lake, which is the largest fresh water lake in China. The catchment area of the basin is 82,015 km² and the length of the main river is 549 km. Mountains and hills occupy 42% of the catchment area. The annual precipitation for the catchment is 1,546 mm, and the annual discharge at Waizhou is 2,080 m³/s. The Boyang lake is mainly used for navigation.

The Ganjiang catchment contains red and yellow soil distributed in the low hill areas, occupying about 66% of the land use in the province. Therefore, the province has been known also as the "red land". There are six large reservoirs, namely Shangyoujiang, Jiangkou, Youluokou, Sheshang, Panqiao and Shangyou, located in the tributaries. Water and soil erosion and flash floods are serious problems in the upper stream. Along the middle stream (Wan'an-Xiajiang), frequent drought disasters have been experienced in the past. A significant part of the land area in the downstream reaches of the basin is not developed for cultivation.

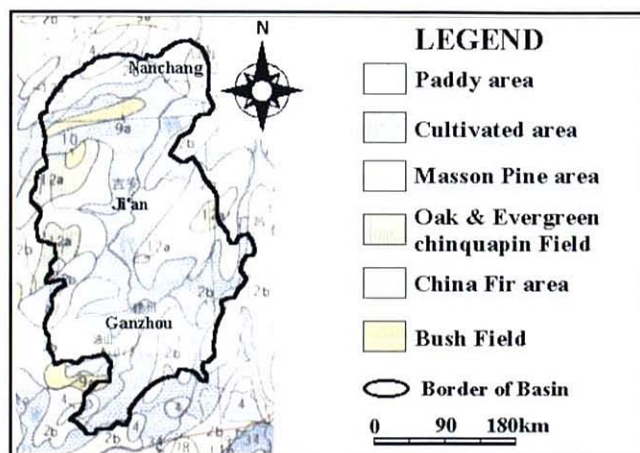
The Jiangxi is an important agricultural province in China. The population of the catchment was 20,862,470 in 1990. The climate is warm and humid, and in most of parts of the catchment, crops can be planted in all four seasons.

2. Geographical Information

2.1 Geological Map



2.2 Land Use Map

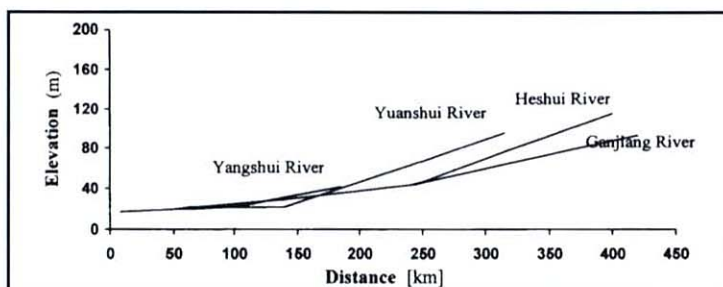


2.3 Characteristics of River and Main Tributaries

No.	Name of river	Length[km] Catchment area [km ²]	Highest peak [m] Lowest point [m]	Cities Population (1990)	Land use ¹⁾ [%] (1985)
1	Ganjiang (Main river)	549 82,015	Mt. Jiulianshan 1,248 River mouth 20	Nanchang, Ganzhou 1,337,600	F (64.4)
2	Jingjiang (Tributary)	235 7,394	Mt. Lianyunshan 1,600 -----	Gaoan, Shanggao 152,200	L (10) P (9.4)
3	Yuanshui (Tributary)	170 5,900	Mt. Wugongshan 1,918 -----	Xingyu, Yichun 320,600	OA (4.7) U (10)
4	Heshui (Tributary)	----- 5,500	Mt. Jinggangshan 995 -----	Yongxing 42,080	Other (1.5)
5	Zangshui (Tributary)	232 7,695	Mt. Youshan 1,073 -----	Dayu 63,280	
6	Gongshui (Tributary)	278 27,074	----- -----	Yudu 68,140	

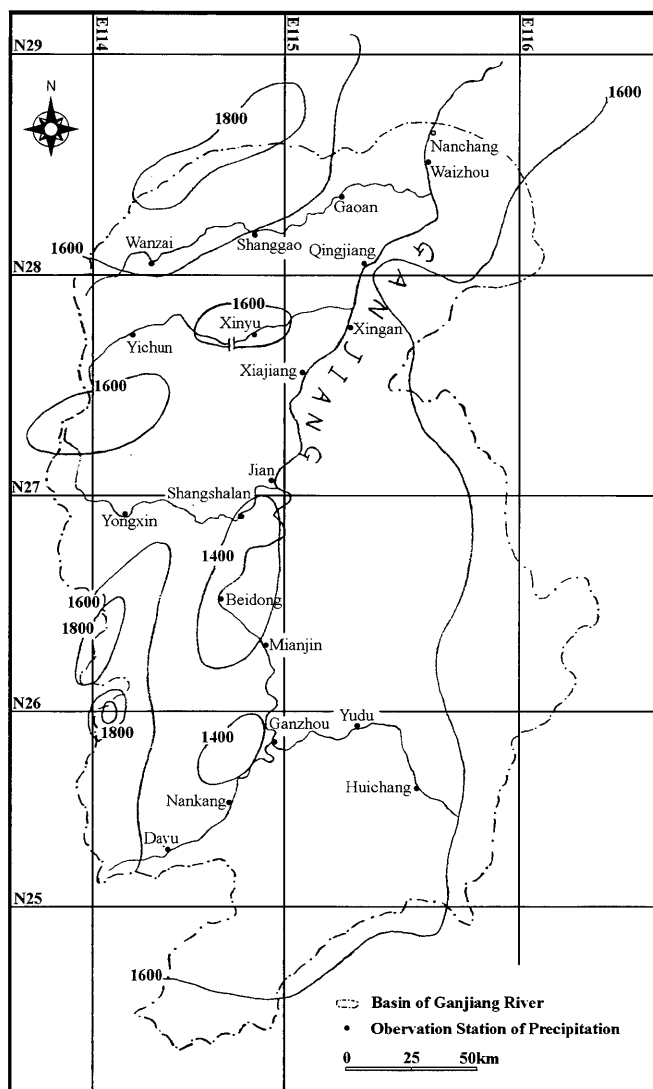
1) F: Forest L: Lake, River, Marsh OA: Other agricultural field (vegetable field, grass field)
P: Paddy Field U: Urban

2.4 Longitudinal Profiles



3. Climatological Information

3.1 Mean Annual Isohyetal Map and Observation Stations



3.2 List of Meteorological Observation Stations

No.*	Station	Elevation [m]	Location	Observation period	Mean annual precipitation [mm] ¹⁾	Mean annual evaporation [mm] ¹⁾	Observation items ²⁾
20	Ganzhou	124	N 25°53' E 114°51'	1956 ~ present	1,466.5	1,161.6	P(TB),E
1	Mianjin	81	N 26°23' E 114°52'	1952 ~ present	1,355.9	998.7	P(TB)
7	Xiajiang	50	N 27°33' E 115°09'	1935 ~ present	1,543.6	1,051.4	P(TB)
79	Jiacun	32	N 28°22' E 115°18'	1953 ~ present	1,626.7	989.2	P(TB),E
69	Yicun	91	N 27°48' E 114°23'	1953 ~ present	1,605.4	950.9	P(TB)
54	Yongxing	120	N 25°57' E 114°15'	1943 ~ present	1,503.1	1,060.7	P(TB),E
	Yudu	120	N 25°58' E 115°25'	1950 ~ present	1,501.7	1,220.6	P(TB)
	Dayu	216	N 25°24' E 114°21'	1954 ~ present	1,543.8	1,342.2	P(TB),E

*: These numbers are assigned by the provincial hydrological service

1) Evaporation used with 20 Evaporation pan, Period for the mean is from 1956 to 1979.

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

3.3 Monthly Climate Data

Station : Ji'an

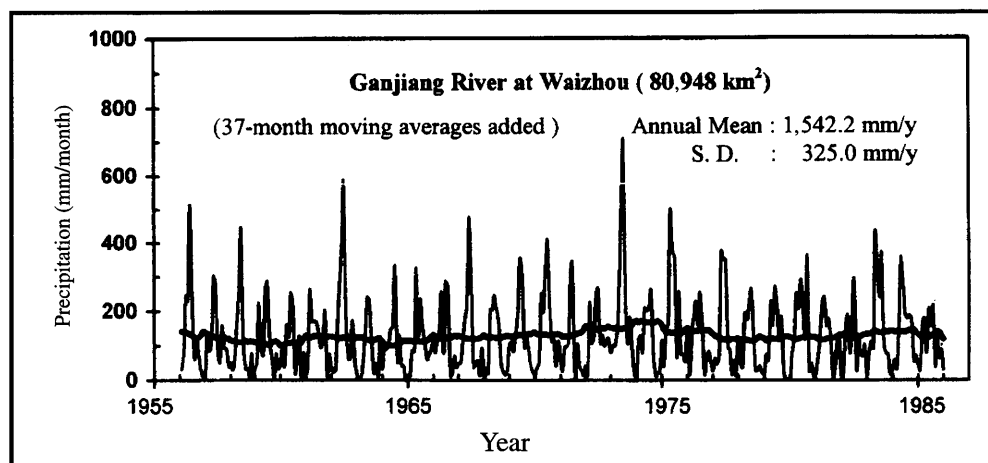
Observation item	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual	Period for the mean
Temperature [°C]	6.3	7.8	12.2	18.2	22.5	26.4	29.5	28.7	25.1	19.9	13.5	8.8	18.2	1971~1985
Precipitation [mm]	53.9	88.4	149.2	207.3	265.4	216.9	110.7	112.4	74.0	65.1	56.6	48.8	1,448.5	1952~1979
Evaporation ¹⁾ [mm]	50.8	50.6	76.7	108.7	125.9	157.7	244.7	227.2	175.6	128.8	82.0	60.4	1,042.4	1952~1979
Solar radiation [MJ/m ² /day] *	6.85	5.73	6.64	9.57	13.8	14.6	18.5	18.8	14.0	10.3	9.43	7.41	11.5	1982~1985
Duration of sunshine [hr] **	110.8	84.7	90.7	108.9	141.1	164.8	276.2	251.4	200	178.6	150.7	130.7	1,888.5	1952~1980

* Observed at Nanchang.

** Observed at Ganzhou.

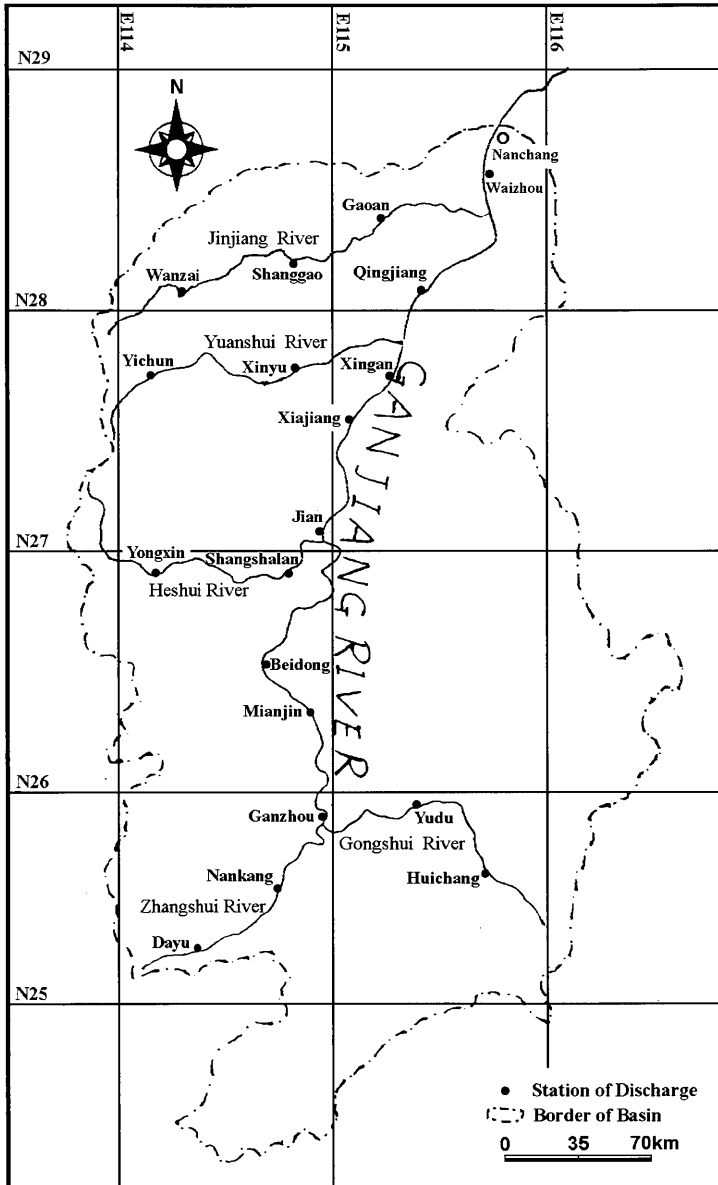
1) Evaporation with 20cm evaporation pan.

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 ²]	Observation period	Observation items (frequency)**
1	Mianjin	N 26°23' E 114°52'	36,818	1953 ~ present	H2,Q
14	Waizhou	N 28°38' E 115°50'	80,948	1949 ~ present	H2,Q
19	Xiashan	N 25°55' E 115°13'	15,975	1953 ~ present	H2,Q
40	Bashang	N 25°49' E 114°57'	7,657	1953 ~ present	H2,Q
55	Shangshalan	N 26°56' E 114°48'	5,257	1952 ~ present	H2,Q
70	Maozhou	N 27°50' E 114°32'	3,110	1965 ~ present	H2,Q
79	Jiacun	N 28°22' E 115°18'	5,752	1953 ~ present	H2,Q

No.*	\bar{Q} ¹⁾ [m ³ /s]	Q max ²⁾ [m ³ /s]	\bar{Q} max ³⁾ [m ³ /s]	\bar{Q} min ⁴⁾ [m ³ /s]	\bar{Q} / A [m ³ /s/100km ²]	Qmax / A [m ³ /s/100km ²]	Period of statistics
1	948	12,800	7,824	161	2.57	34.8	1965 ~ 1985
14	2,198	20,400	12,162	395	2.72	25.2	1965 ~ 1985
19	436	7,210	4,462	58.5	2.73	45.1	1965 ~ 1985
40	200	3,980	1,680	28.6	2.61	52.0	1965 ~ 1985
55	138	4,400	2,016	16.5	2.63	83.7	1965 ~ 1985
70	84.4	2,480	1,555	11.0	2.71	79.7	1965 ~ 1985
79	161	3,540	2,112	22.9	2.81	61.5	1965 ~ 1985

*: these numbers are assigned by the provincial hydrological service

** : H2: water level by manual, Q: discharge

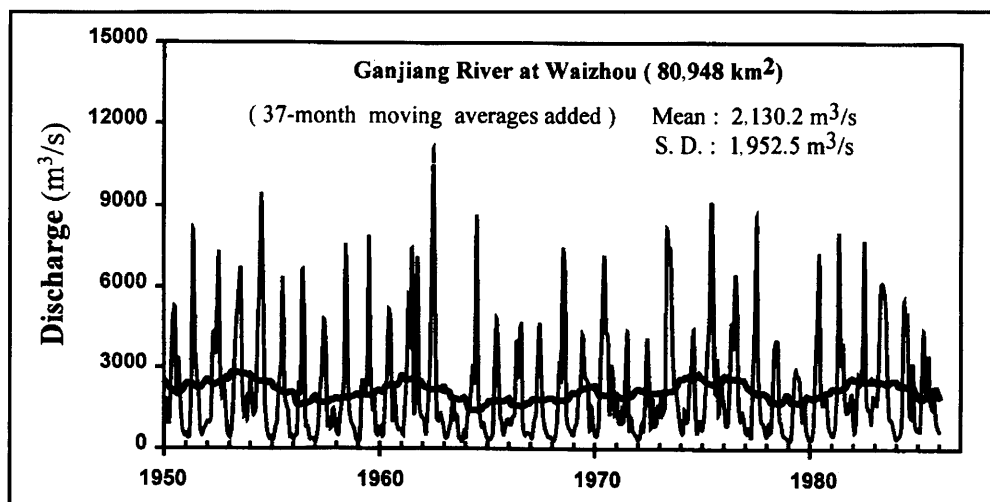
1) Mean annual discharge

2) Maximum annual discharge

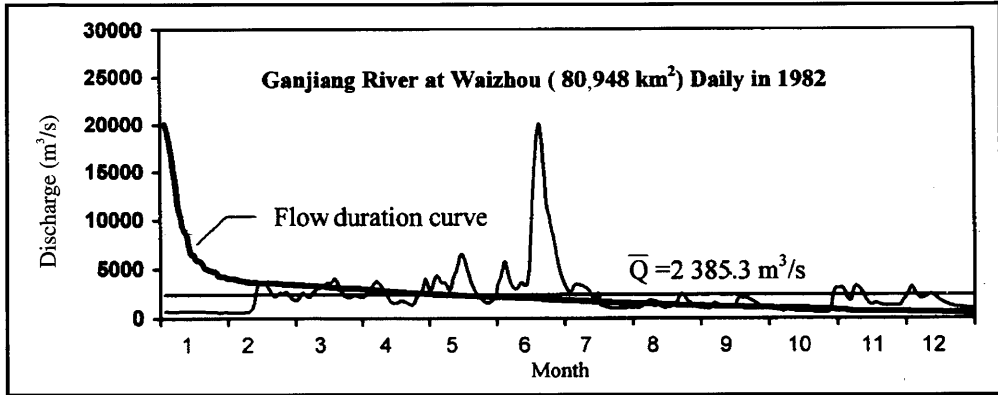
3) Mean annual maximum discharge

4) Mean annual minimum discharge

4.3 Long-term Variation of Monthly Discharge



4.4 Annual Pattern of Discharge



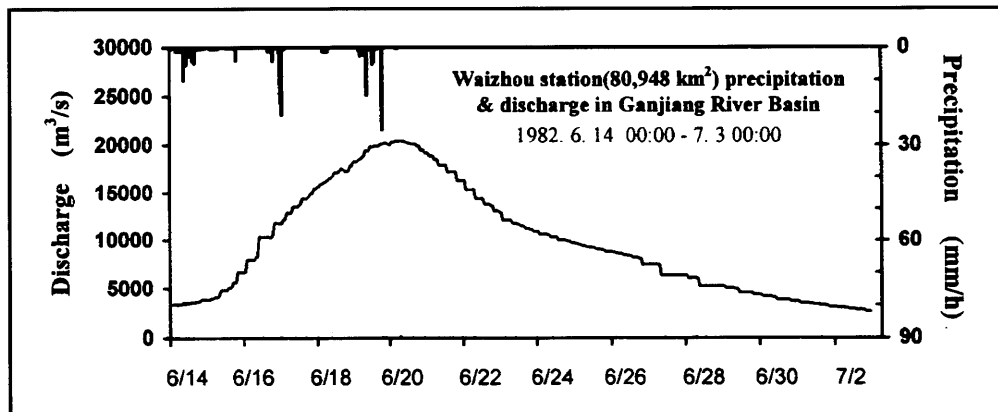
4.6 Annual Maximum and Minimum Discharges

At Waizhou (80,948 km²)

Year	Maximum ¹⁾		Minimum ²⁾		Year	Maximum ¹⁾		Minimum ²⁾	
	Date	[m ³ /s]	Month	[m ³ /s]		Date	[m ³ /s]	Month	[m ³ /s]
1965	5.17	12,700	3	265	1976	7.14	14,200	12	527
1966	7.12	10,000	10	264	1977	6.22	13,300	3	369
1967	6.24	8,830	1	315	1978	6.11	8,460	12	260
1968	6.28	20,100	1	257	1979	3.23	7,050	1	275
1969	8.12	12,100	9	469	1980	5.11	13,600	1	319
1970	5.10	15,600	1	423	1981	4.12	15,100	1	415
1971	6.2	9,040	12	294	1982	6.20	20,400	2	555
1972	5.10	6,540	4	315	1983	3.31	10,500	12	350
1973	4.12	15,600	12	566	1984	4.10	12,100	1	354
1974	7.1	7,800	9	451	1985	6.8	8,620	2	515
1975	5.24	14,300	1	611					

1), 2) Instantaneous observation by recording chart

4.7 Hyetographs and Hydrographs of Major Floods



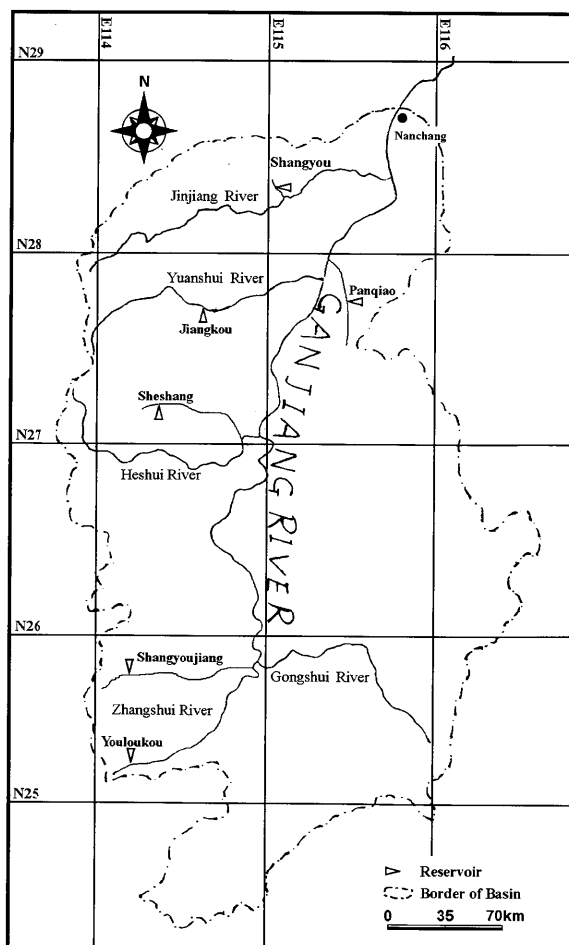
5. Water Resources

5.1 General Description

The Ganjiang is the largest river in the Jiangxi Province. The river basin takes up about 80% of the provincial area. The main river and tributaries originate from the eastern, western and southern mountains and hills. Effective irrigation facilities have been provided for over 10 million ha of land in 1980 with reservoirs (53%), transmission lines (24%) and pumping (21%).

Precipitation in the basin mainly occurs from April to June, contributing up to 48% of the annual total. In 1962, there were two major floods in Ganjiang. At the Xiajiang station (62,724 km²), the first peak flood discharge was 17,400 m³/s on June 19, while the second was 19,100 m³/s on June 29. From July to September, the precipitation is mild. Combined with high temperature in summer, it has led to drought disasters in the past. Due to the abundance of mountains and hills in the surrounding, flash floods occur frequently along the upper tributaries. There are about 7,000 water resources projects, constructed mainly on the tributaries in the mountainous areas with storage capacity of some 20x10⁹ m³ for flood control, irrigation and hydropower generation. A multi-purpose reservoir at Wan'an on the main river is currently under construction with the objective of providing flood control, water supply, and increasing hydropower percentages in energy systems. It is expected to improve the operation of energy systems.

5.2 Map of Water Resource Systems



5.3 List of Major Water Resources Facilities

Major Reservoirs

Name of river	Name of dam (Reservoir)	Catchment area [km ²]	Gross capacity [10 ⁶ m ³]	Effective capacity [10 ⁶ m ³]	Purpose ¹⁾	Year of completion
Zhangshui	Yuouloukou	557	116	54	P,F,A	1969
Yuanshui	Jiangkou	3,900	890	340	P	1970
Jinjiang	Shangyou	140	184	129	P,F,A	1966
Xiushui	Panqiao	90.3	160	75	P	1960
Lushui	Sheshang	427	203	141	P,F,A	1973
Shangyoujiang	Shangyoujiang	2,750	822	471	P,F,A	1957

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

5.4 Major Floods and Droughts

Major Floods at Waizhou (Catchment area 80,948 km²)

Date	Peak discharge [m ³ /s]	Rainfall [mm] Duration	Meteorological cause	Dead and missing	Major damages (Districts affected)
1962.6.20	20,800	200.6 6.15-7.12	Frontal rain	---	Nanching, Ji'an City etc.
1968.6.28	20,100	57.0 6.21-6.28	Frontal Rain	---	Yongxin, Anfu City etc.
1982.6.20	20,400	140.5 6.11-6.19	Frontal Rain	---	Ganzhou, Ji'an city etc.

Major Droughts

Period	Affected area	Major damages and counteractions
1956.7-10	Ganzhou City	Water supply cut ratio 81%
1962.7-10	Ganzhou City	Water supply cut ratio 62%
1963.7-10	Ganzhou City	Water supply cut ratio 62%

6. Socio-cultural Characteristics

The Jingganshan is a famous Chinese revolution base, located in the southern part of the basin. Mao Zedong and his followers have spent many years in this region for establishing the Chinese Worker-Peasant Red Army and a Red Central Government. Consequently, many historical monuments exist in Jingganshan, e.g. in Huangyangjie and Ciping. Jingdezhen city is widely known as a capital of china. The products from this region are exported to many countries.

7. References, Databooks and Bibliography

- China Atlas Press (1978): *China Meteorology Atlas*.
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 Yangtze River Water Commission (1952-1980): *The year-book of hydrological data in Yangtze river basin*.