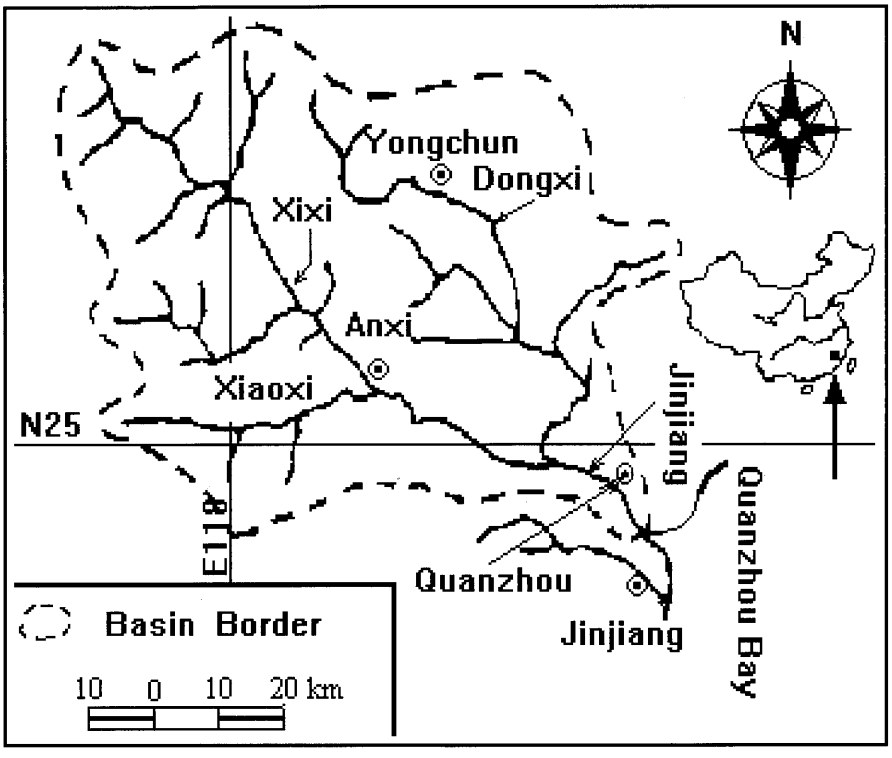
# Jin-jiang

## Map of River




## Table of Basic Data

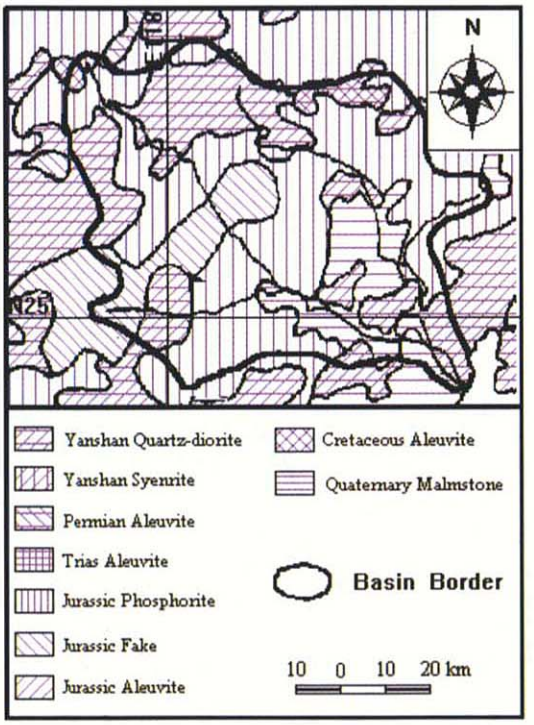
| | | |
|---|---|---|
| **Name:** Jin-jiang River | | **Serial No.:** China-2 |
| **Location:** Fujian Province, South-eastern China | N 24° 40′ ~ 25° 35′ | E 117° 25′ ~ 118° 45′ |
| **Area:** 5 629 km$^2$ | **Length of main stream:** 182 km | |
| **Origin:** Mt. Xueshan (1 405 m) | **Highest point:** Mt. Fue (1 560 m) | |
| **Outlet:** The Taiwan strait | **Lowest point:** River mouth (0 m) | |
| **Main geological features :** Granite, Sedimentary rock, Metamorphic rock | | |
| **Main tributaries:** Xixi River (2 466 km$^2$), Dongxi River (1 704 km$^2$) | | |
| **Main lakes:** None | | |
| **Main reservoirs:** Shanmei Reservoir (395 x 10$^6$ m$^3$, 1973) | | |
| **Mean annual precipitation:** 1 378 mm | | |
| **Mean annual runoff:** 50.1 m$^3$/s at Shilong (5 060 km$^2$) (1951~1979) | | |
| **Population:** 4 363 000 (1980) | **Main cities:** Jin-jiang, Quanzhou | |
| **Land use:** Forest (70.2%), Rice paddy (11.1%), Other agriculture (7.4%), Urban (4.9%) (1980) | | |

# 1. General Description

The Jin-jiang is the fourth largest river in Fujian Province. The river which originates from Mt. Xueshan (1 405 m) and Mt. Fue (1 560 m) is 182 km long and drains an area of 5 629 km$^2$ before flowing out into the Taiwan Strait. The basin has an average annual precipitation of 1 378 mm, and the annual discharge at Shilong (5 060 km$^2$) in 1954 was 101 m$^3$/s. The Shanmei Dam has been built in 1973 to store 395 x 10$^6$ m$^3$. The river has two main tributaries, the Dongxi, meaning east river and the Xixi, meaning west river. Xixi river above Anxi which flows through forested and irrigated mountainous areas is considered the upper reach, while that between Anxi and Shilong is considered the middle reach. Large rice fields can be found along the downstream of Shanmei Dam. The basin population in 1980 was 4 363 000.

# 2. Geographical Information

## 2.1 Geological Map

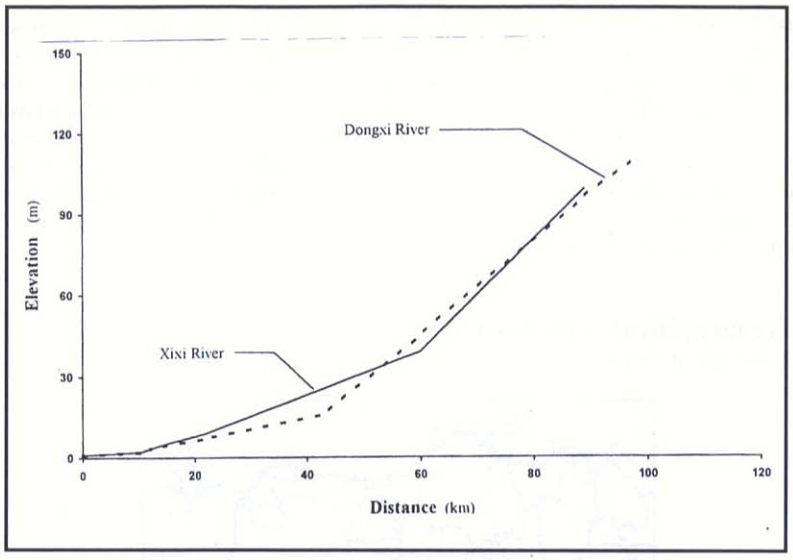



## 2.3 Characteristics of River and Main Tributaries

| No. | Name of river | Length [km]<br>Catchment area [km$^2$] | Highest peak [m]<br>Lowest point [m] | Cities<br>Population (1980) | Land use<br>[%] (1980) |
|---|---|---|---|---|---|
| 1 | **Jin-jiang**<br>(Main River) | 182<br>5 629 | Mt. Daiyun, 1 856<br>River mouth, 0 | Quanzhou city, etc.<br>265 900 | A (7.4)<br>F (70.2)<br>L (6.4)<br>P (11.1)<br>U (4.9) |
| 2 | **Wuming**<br>(Tributary) | 85<br>2 369 | ----------<br>---------- | Huian county, etc.<br>95 000 | |

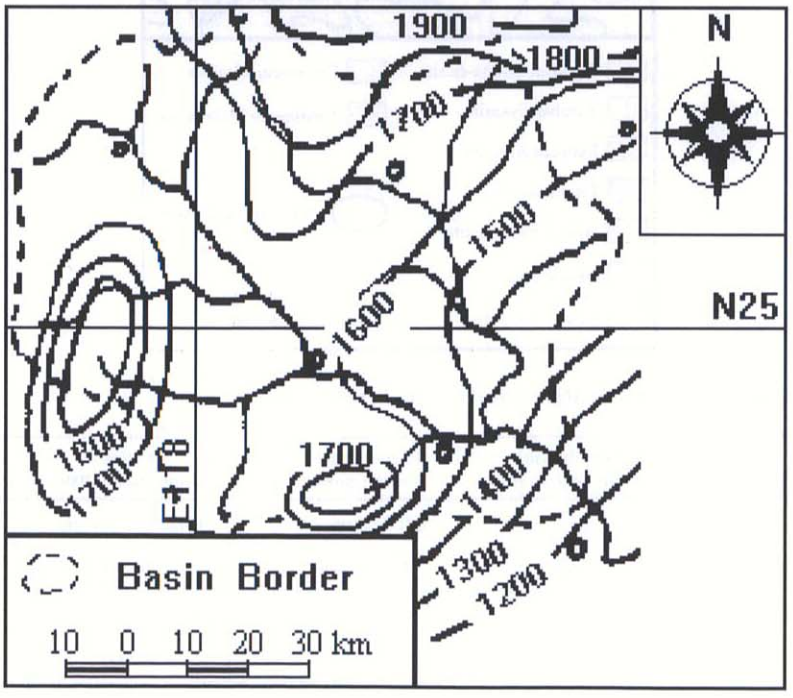
A: Other agricultural field F: Forest L: Lake, River, Marsh P: Paddy field U: Urban

## 2.4 Longitudinal Profiles




# 3. Climatological Information

## 3.1 Annual Isohyetal Map and Observation Stations



## 3.2 List of Meteorological Observation Stations

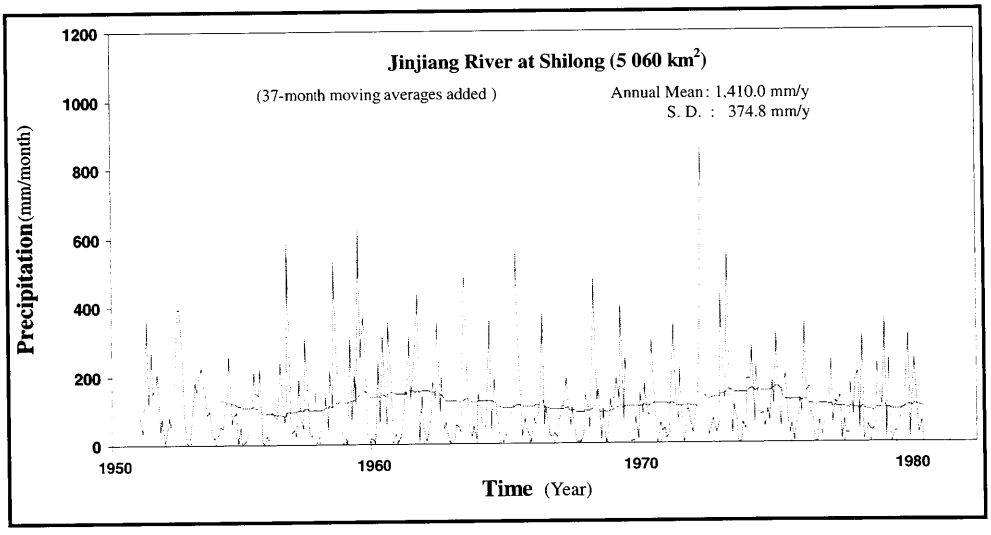
| No.* | Station | Elevation [m] | Location | Observation period | Mean annual precipitation [2] [mm] | Mean annual evaporation [1] [mm] | Observation items [2] |
|---|---|---|---|---|---|---|---|
| F72 | Anxi | 49 | N 25° 03′<br>E 118° 11′ | 1936~present | 1 627 | 1 035 | P(TB),E |
| F76 | Nanan | 34 | N 24° 58′<br>E 118° 23′ | 1936~present | 1 533 | 1 514** | P(TB),E |
| F90 | Shanmei | ----- | N 25° 10′<br>E 118° 24′ | 1971~present | 1 426 | 1 229 | P(TB),E |
| F96 | Shilong | 19 | N 24° 59′<br>E 118° 29′ | 1947~present | 1 396 | 1 508** | P(TB),E |
| F99 | Jin-jiang | ----- | N 24° 49′<br>E 118° 34′ | 1956~present | 1 139 | 1 441** | P(TB),E |

*: Serial number used by Water Resources Bureau, Fujian Province
**: Evaporation with 20 cm Evaporation pan, other Evaporation with E601 (diameter 601 mm)
1) Period for the mean is from the beginning of the observation period to 1979
2) E: Evaporation P: Precipitation TB: Tipping bucket with recording chart

## 3.3 Monthly Climate Data

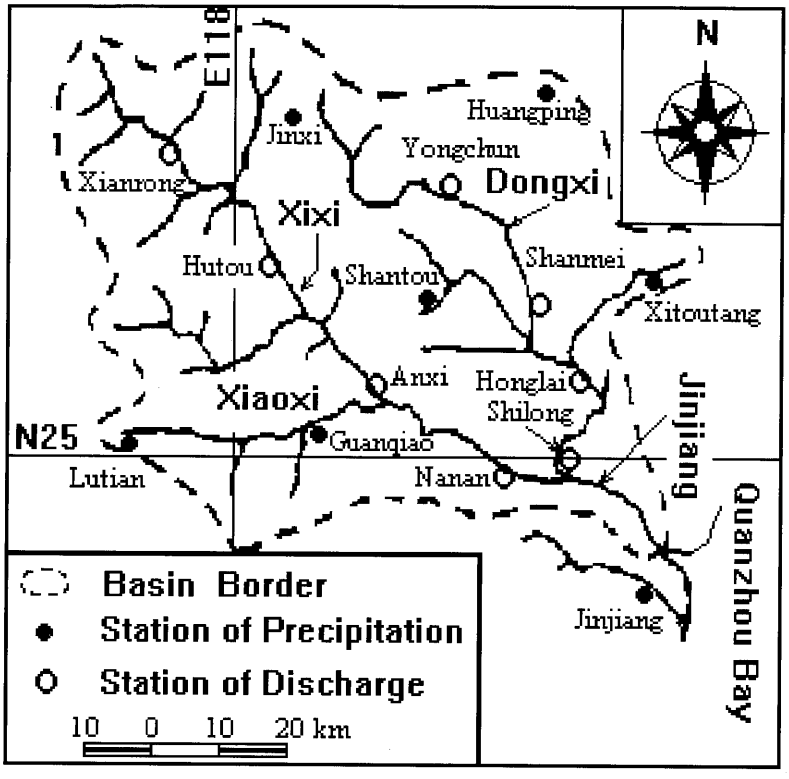
| Observation item | Observation station | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Annual | Period for the mean |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Temperature[°C] | Shilong | 7.8 | 9.5 | 13.9 | 18.8 | 22.8 | 25.1 | 27.2 | 26.9 | 24.5 | 19.7 | 14.5 | 9.9 | 18.4 | 1956~1979 |
| Precipitation [mm] | Yonghun | 42.8 | 74.7 | 110 | 144.3 | 257.7 | 296.9 | 240.8 | 242.8 | 176.1 | 63.8 | 35.3 | 30.2 | 1 716.3 | 1936~1979 |
| Evaporation [mm] | Yonghun | 60.6 | 52.6 | 74.9 | 96.4 | 116.4 | 124.5 | 179.8 | 162.6 | 134.3 | 111.7 | 83.5 | 67.6 | 1 264.9 | 1952~1965 |
| Solar radiation [MJ/m$^2$/d] | Fuzhou | 6.25 | 5.0 | 6.77 | 10.7 | 14.6 | 17.3 | 21.8 | 18.6 | 14.7 | 12.6 | 12.2 | 6.57 | 12.3 | 1983~1985 |
| Duration of sunshine [hr] | Shilong | 123 | 98 | 111 | 134 | 126 | 154 | 261 | 231 | 183 | 166 | 131 | 131 | 1 848 | 1957~1980 |

## 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

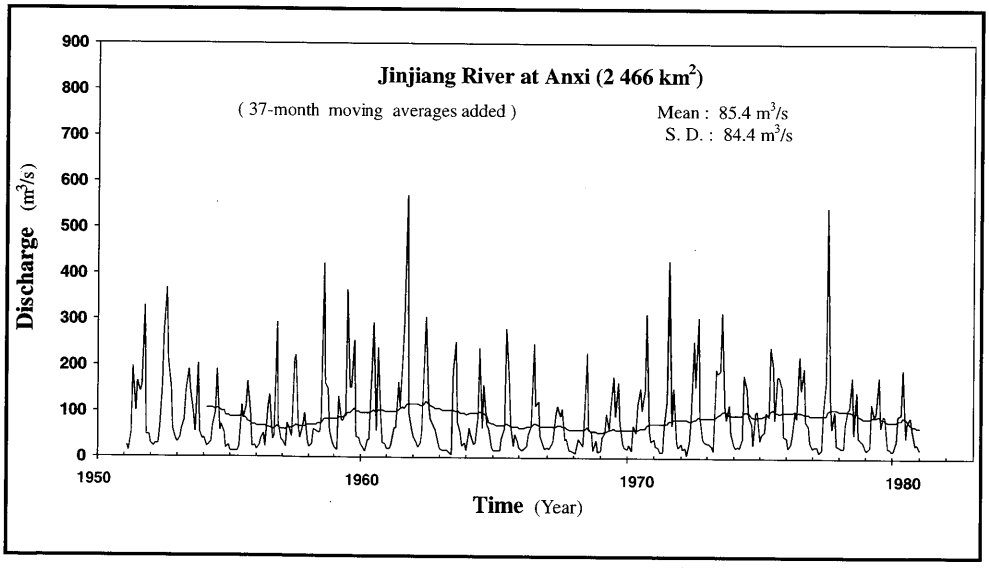
| Station | Location | Catchment area (A) [km$^2$] | Observation period | Observation items [1] (frequency) |
|---|---|---|---|---|
| Shilong | N 24° 59′<br>E 118° 29′ | 5 060 | 1951~present | Q, S |
| Anxi | N 25° 03′<br>E 118° 11′ | 2 466 | 1952~present | Q, S |
| Honglai | N 25° 05′<br>E 118° 30′ | 1 704 | 1954~present | Q, S |

| $\overline{Q}$ [2] [m$^3$/s] | Q max [3] [m$^3$/s] | $\overline{Q}_{max}$ [4] [m$^3$/s] | $\overline{Q}_{min}$ [5] [m$^3$/s] | $\overline{Q}$ / A [m$^3$/s/100km$^2$] | Q max / A [m$^3$/s/100km$^2$] | Period of statistics |
|---|---|---|---|---|---|---|
| 158.9 | 8 020 | 4 100 | 15.20 | 3.14 | 158 | 1950~1966 |
| 84.3 | 3 590 | 2 100 | 9.82 | 3.42 | 146 | 1951~1966 |
| 48.2 | 7 620 | 3 020 | 3.22 | 2.83 | 447 | 1953~1966 |

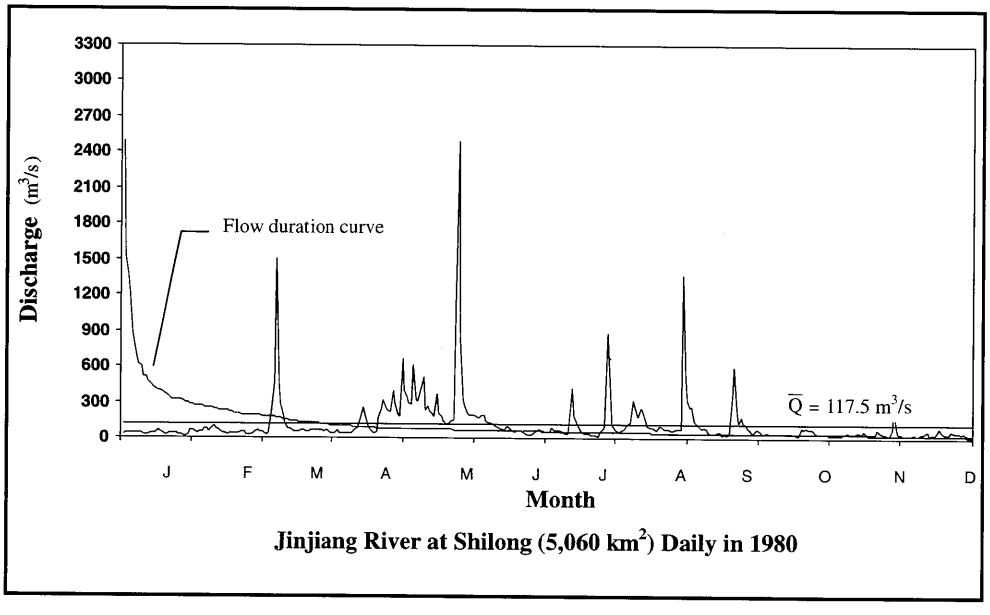
1) Q: Discharge
S: Sediment concentration

2) Mean annual discharge
3) Maximum discharge
4) Mean annual maximum discharge
5) Mean annual minimum discharge

## 4.3 Long-term Variation of Monthly Discharge




## 4.4 Annual Pattern of Discharge




Jinjiang River at Shilong (5,060 km²) Daily in 1980

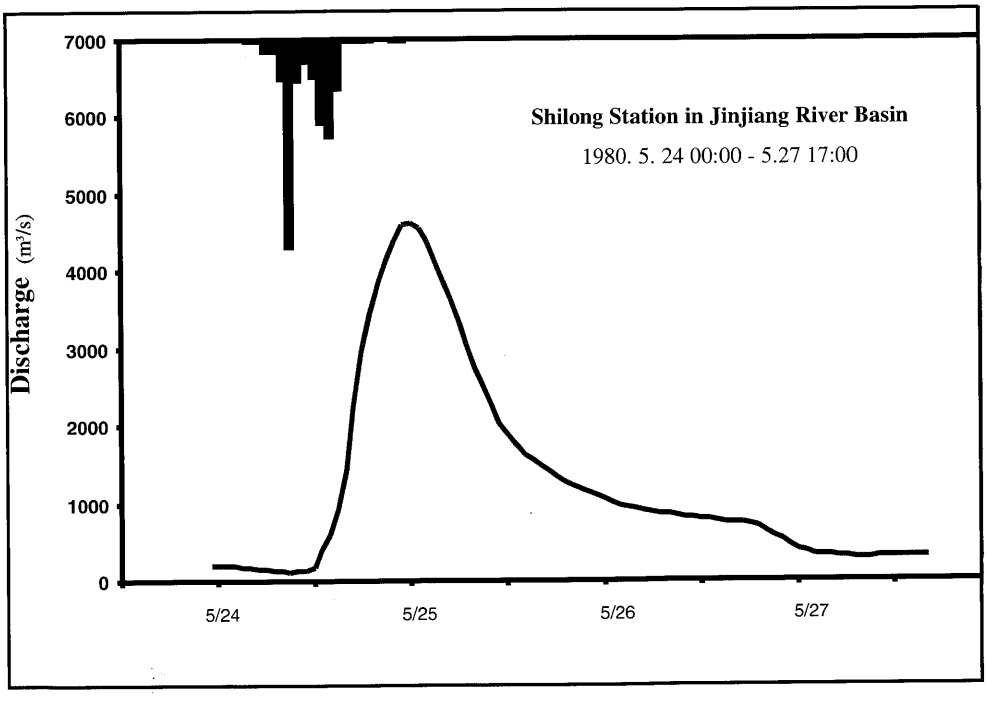
## 4.5 Annual Maximum and Minimum Discharges

### At Shilong [5 060 km$^2$]

| Year | Maximum[1] | | Minimum[2] | | Year | Maximum[1] | | Minimum[2] | |
|---|---|---|---|---|---|---|---|---|---|
| | Date | [m$^3$/s] | Date | [m$^3$/s] | | Date | [m$^3$/s] | Date | [m$^3$/s] |
| **1950** | 6.24 | 2 470 | 4.17 | 18.3 | **1959** | 9.12 | 4 370 | 1.29 | 25.0 |
| **1951** | 6.09 | 2 320 | 3.20 | 32.8 | **1960** | 6.10 | 6 820 | 3.10 | 8.10 |
| **1952** | 6.15 | 3 540 | 1.24 | 29.5 | **1961** | 9.13 | 7 380 | 1.29 | 23.6 |
| **1953** | 5.14 | 2 370 | 8.15 | 17.0 | **1962** | 5.30 | 2 710 | 2.25 | 19.0 |
| **1954** | 6.11 | 2 260 | 12.25 | 12.8 | **1963** | 7.01 | 5 420 | 5.31 | 0.10 |
| **1955** | 8.29 | 1 800 | 5.03 | 2.86 | **1964** | 6.17 | 2 270 | 4.22 | 9.58 |
| **1956** | 9.19 | 8 020 | 9.03 | 10.9 | **1965** | 7.28 | 5 290 | 3.22 | 7.66 |
| **1957** | 9.30 | 2 960 | 9.14 | 7.8 | **1966** | 8.18 | 2 730 | 5.28 | 12.8 |
| **1958** | 7.18 | 7 920 | 5.05 | 20.2 | | | | | |

1), 2) Instantaneous observation by recording chart

## 4.6 Hyetographs and Hydrographs of Major Floods




# 5. Water Resources

## 5.1 General Description

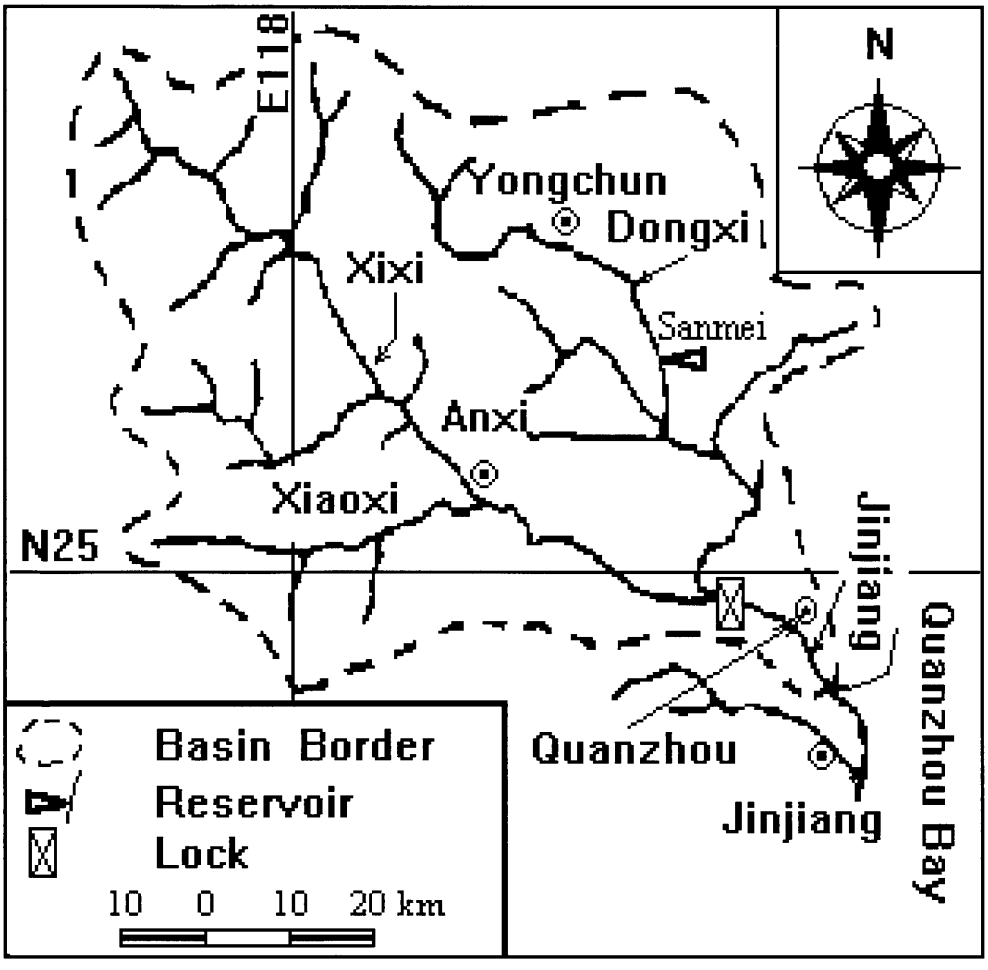
The Jin-jiang is located on the Southeastern part of Fujian Province. The western part of the river basin is mountainous. The river originates from the west and flows towards the east and out into the Quanzhou Bay. Along the river there are many diversion and pumping stations for irrigation purposes. There are 82 small reservoirs using Jin-jiang water, mostly built for power generation and irrigation in the 1960's.

During the 24 year period from 1947-1971, there were 42 occurrences of floods with discharges greater than 2 000 $m^3/s$ at Shilong which works out to be approximately twice a year. The main factor causing floods is the precipitation associated with typhoons. In the same 24 year period, there have been 11 occurrences of typhoon related floods with discharges greater than 4 000 $m^3/s$ at Shilong.

A number of reservoirs have been built in the basin for improving energy supply and increasing food production. The largest dam is Shanmei, built in 1973, which has a storage capacity of 395 x $10^6$ $m^3$. At present, the reservoir also serves as a source of municipal and industrial water to Quanzhou and Jin-jiang.

Because water is cold on the west high mountains, the grain yields in these areas are relatively low. There are more water diversion projects than water storing projects. Along the low land which is near the Quanzhou Bay, damages or crop failures caused by waterlogging still take place. The local authority is planning to build new dams and to increase effective irrigation areas in the future.

## 5.2 Map of Water Resources 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 |
|---|---|---|---|---|---|---|
| Dongxi | Shanmei | 1 023 | 395 | 376 | A,P | 1973 |
| | Hongwuyi | | 10.27 | | | 1974 |
| | Wenxi | | | | A | |
| Xixi | Bantou | 10.64 | | | A | 1972 |
| | Houxiao | 37.13 | | | A | 1965 |
| | Xinan | | | | | |
| | Shibi | 59.08 | | | A | 1958 |
| | Wutan | | | | | |

1) A: Agricultural use P: Hydro-power

## 5.4 Major Floods and Droughts

### Major Floods at Shilong [5 062 km$^2$]

| Date | Peak discharge [m$^3$/s] | Rainfall [mm] Duration | Meteorological cause | Dead and missing | Major damages (Districts affected) |
|---|---|---|---|---|---|
| **1961. 9.13** | 7 380 | 253.4<br>9.09~9.13 | Typhoon | ----- | Nanan county, etc. |

## 5.5 Groundwater and Water Quality

### River Water Quality[1)] at Anxi[2)] in 1986

| Date | Jan 15 | Feb 15 | Mar 15 | Apr 15 | May 15 | Jun 15 | Jul.5 | Aug 15 | Sep 10 | Oct 15 | Nov 15 | Dec 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| pH | 7.1 | 7.1 | 7.1 | 7.2 | 6.9 | 7.0 | 7.1 | 7.2 | 7.1 | 7.2 | 7.1 | 7.2 |
| $COD_{Mn}$ [mg/l] | 0.5 | 0.2 | 1.1 | 1.1 | 1.1 | 0.3 | 0.6 | 1.1 | 1.6 | 1.0 | 1.1 | 1.2 |
| SS [mg/l] | 86 | 68 | 800 | 34 | 846 | 238 | 172 | 8 | 252 | 211 | 16 | 38 |
| Discharge[3)] [m$^3$/s] | 23.6 | 14.2 | 90.2 | 14.4 | 124 | 157 | 223 | 29.7 | 77.3 | 12.8 | 14.4 | 21.9 |

1) Observed once a month on a dry day normally several days after rainfall.
2) Located near Anxi county 48 km from the river mouth.
3) Discharge on the observation date.

# 6. Socio-cultural Characteristics

Quanzhou is a famous historical and cultural city. It is also a centre of commerce and trade in the basin. Many overseas Chinese have their origins in this basin area. The Chentian, Xingjing and Kaiyuan temples are some of the well known places in the area. The Luoyang bridge, Nine-suns mountain, Mouya carved-cliff and Xingyuan mountain are famous scenic spots attracting many sightseers. Handicraft products such as wood carving, embroidery, stone carving, bamboo crating etc. have a long history in this basin.

## 7. References, Databooks and Bibliography (In Chinese)

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