Nam Suang

Map of River

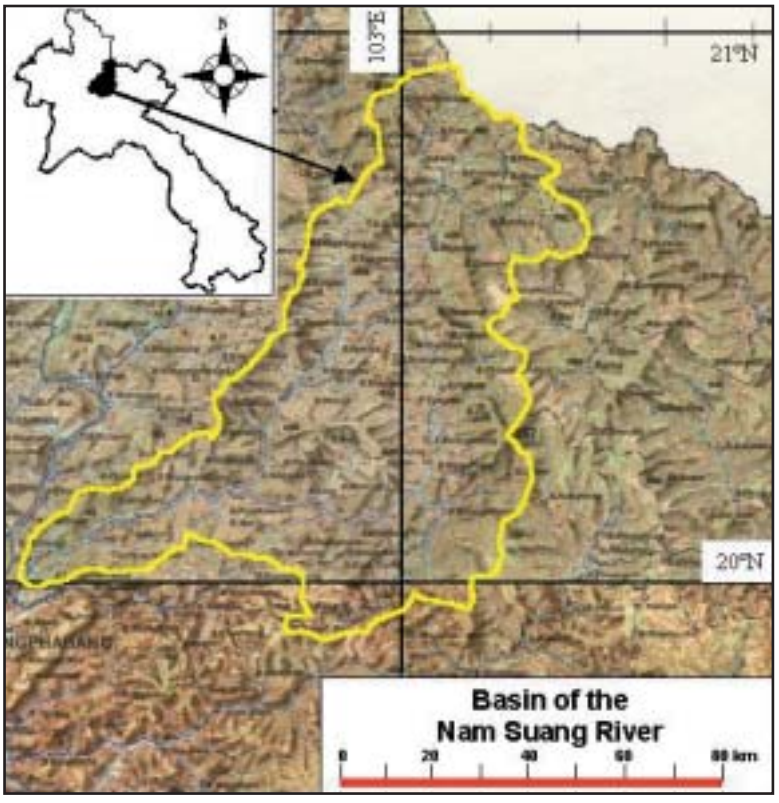


Table of Basic Data

Name(s): Nam Suang River		**Serial No. :** Lao-8
Location: Northern region, Lao PDR	E 102° 15' - 103°15'	N 19° 37' - 20° 54'
Area: 5,800 km^2	**Length of the main stream:** 150 km	
Origin: Near Ban Sopkok, 1,482 m	**Highest Pt:** 2,257 m	
Outlet: Ban Sibounhom	**Lowest Pt:** Paksuang 320 m	
Main base rock: Mesozoic to Palaeozoic sandstone, siltstone muddy limestones		
Main tributaries: Nam Seng (2,052 km^2)		
Main base lakes: none		
Main reservoirs: none		
Mean annual precipitation: 1,282 mm at Luang prabang (1950 - 2000)		
Mean annual runoff: 115.87 m^3/s at Ban Sibounhom (1965 - 1998)		
Population: 127,000 (1996)	**Main cities:** Luang Prabang, Viengkham	
Land use: Forest (22%), Agriculture (20%), Bare mountains (56%), Urban (2%)		

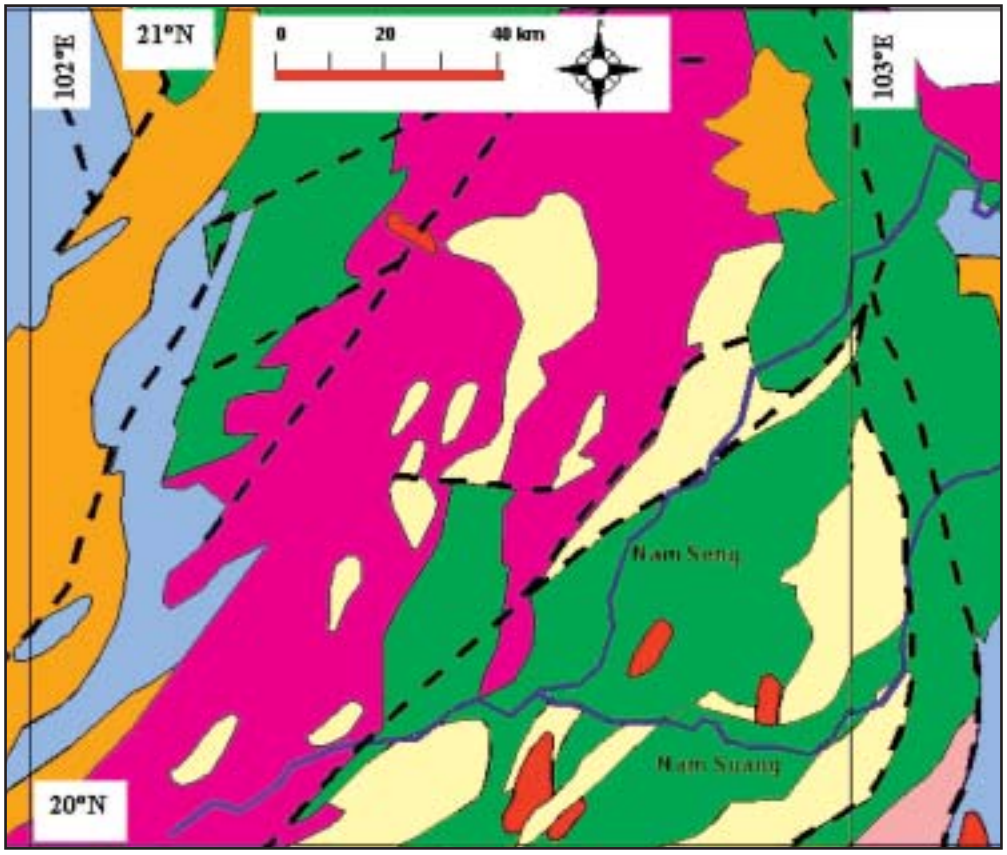
1. General Description

The Nam Suang river with a length of 150 km has its source near Ban Sopkok at 1482 m, flows in a southwestly direction for about 50 km and then turns to the west and finally west south west to enter the Mekong River. It is often confused with the Nam Xeng or Nam Seng. The two rivers meet in Pakseng District and flow together to Paksuang where they join the Mekong River. The drainage area at Ban Sibounhom, 8 km from the river mouth, is 5,800 km^2 with 76.4% of the catchment classified as mountains, and 22.9% as hills. Forest cover is only 22%, the lowest for the whole country. Soil classes are: 0.6% red yellow Podzoiic, and 99.3% undifferenciated shallow soils. Hydrogeology classes are: 3.2% sandstone and conglomerate, 4.5% limestone, 50.6 % sedimentary rocks, 4.9% gneiss, schist, quartzite, and granite, 29.8 % shale and 7.1% miscellaneous impermeable rocks.

The climate is tropical with an annual precipitation of 1,349 mm. People living in the basin practise subsistence agriculture using shifting slash and burn cultivation of the forest. This form of agriculture affects the natural environment and the habitats of rare species, and conservation measures have been established to prohibit logging, burning and hunting. However, change to land use and traditional agricultural practices is difficult and it will take time to bring about the required changes.

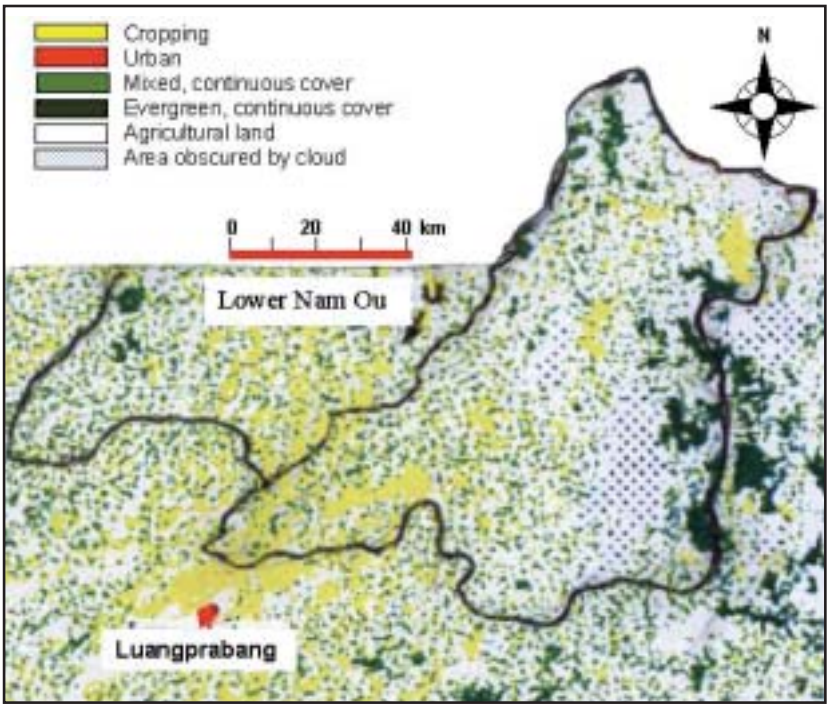
2. Geographical Information

2.1 Geological Map



MESOZOIC	Cretaceous	3 2 1	Mz_2	Mostly red continental sandstones and clays, with lagoonal mudrocks in the upper levels bearing evaporite units of halite and gypsum.
	Jurassic	3 2 1		
	Triassic	3 2	Mz_1	Mostly continental sequence with local water marine facies persisting from Upper Palaeozoic. Continental red clayey arenites with occasional thin coal seams and conglomerates. Middle Triassic marine limestone units occur at the base of this interval interbedded with clays in NE and NW Marine Liassic in SE.
		1	Pz_3	Shallow shell sea sequence interdigitated with a volcanosedimentary sequence.
PALAEOZOIC	Permian	2 1	vPz_3	Mostly sandstone, siltstone, and shale in the N and NW. Some silicic, intermediate and mafic extrusive rocks (v) associated with subvolcanic intrusive centres.
	Carboniferous	2	cPz_3	Bedded to massive dark grey to light grey marine limestone (c) form extensive karst tracts in N and E, and in the E are intercalated with siltstone, mudstone and some coal seams. Epiclastic rocks predominate over limestone in the W and S.
		1	cPz_2	Mostly shallow sea sequence of muddy limestone (c). Some continental Carboniferous in Vientiane basin. Salavan (S Central) and Phongsali Devonian(N).
	Devonian	3 2 1		

2.2 Land Use Map

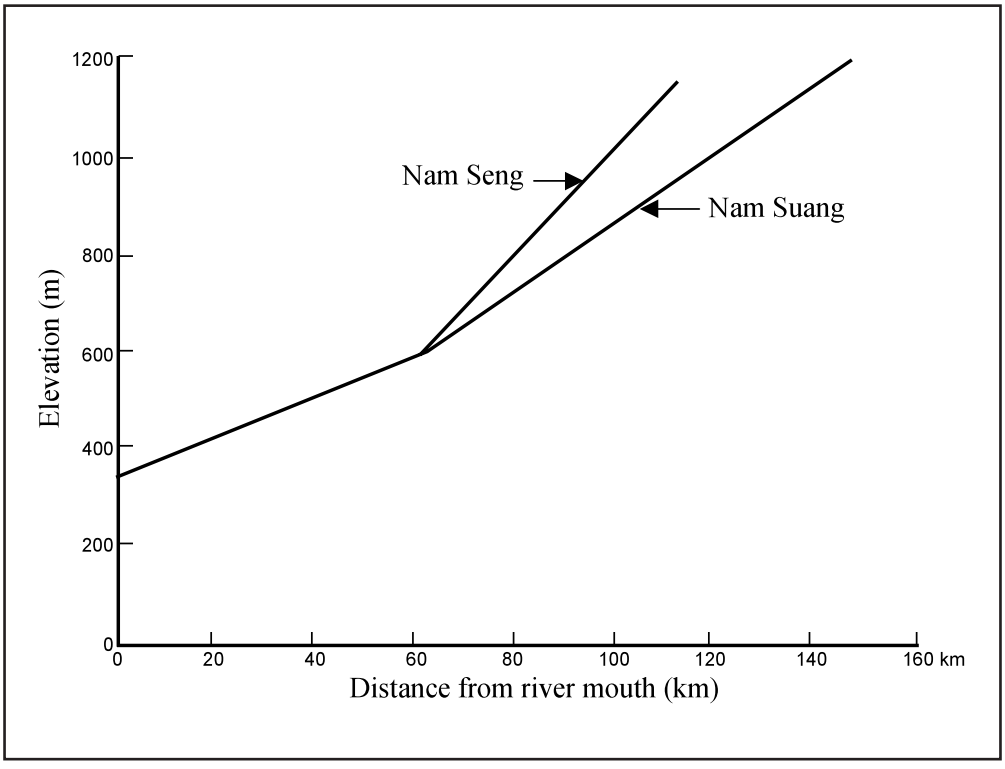


2.3 Characteristics of the River and the Main Tributaries

No.	Name of river	Length [km] Catchment area [km^2]	Highest peak [m] Lowest point [m]	Cities Population (year)	Land use [%]
1	Nam Suang	150 5,800	2,257 320	L. Prabang 100,000	F (22) A (20) P (5) O (53)
2	Nam Seng	90 2,052	1,426 600	Pakbeng 27,000	F (22) A (25) P (6) O (47)

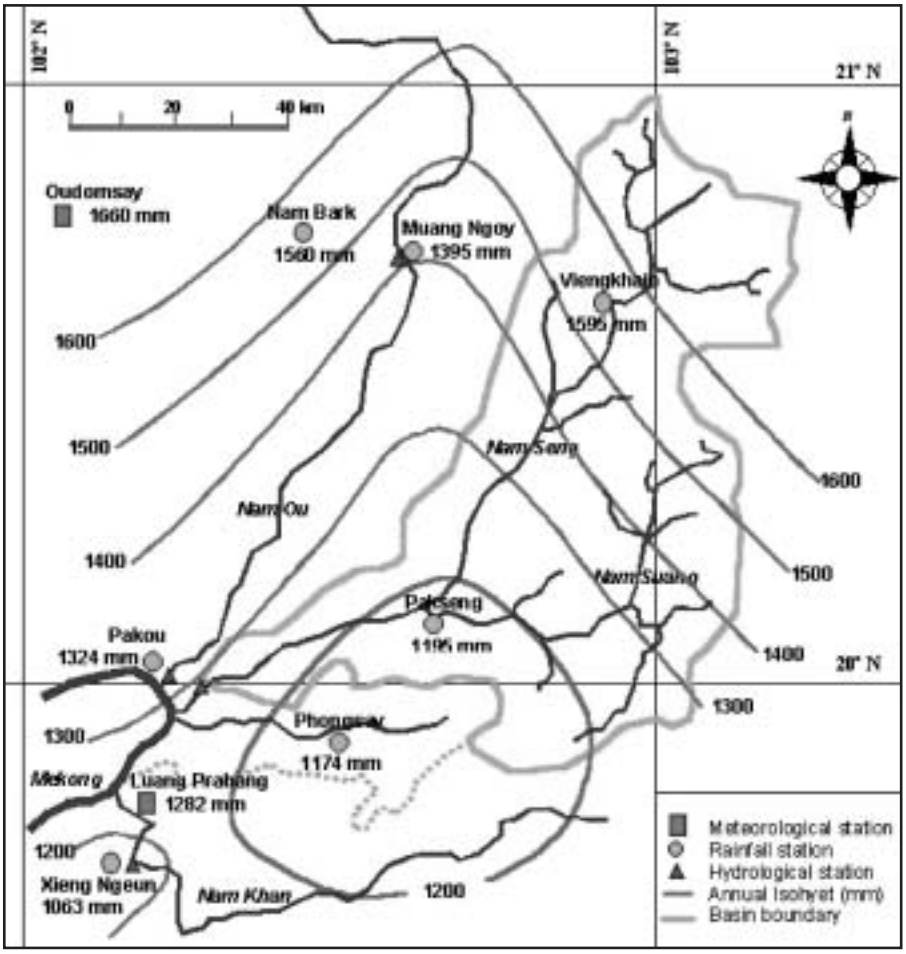
F: Forest; L: Lake, river, marsh; P: Paddy field ; U: Urban
O: Orchard; A: Agricultural field (vegetable field, grass field)

2.4 Longitudinal Profiles



3. Climatological Information

3.1 Annual Isohyetal Map and Observation Stations



3.2 List of Meteorological Observation Stations

Number	Station	Elevation [m]	Location	Observation period	Mean annual Precipitation [mm]	Mean annual evaporation [mm]	Observation Items*
1	**Luang Prabang**	305	N 19° 53' E 102° 08'	1950 - 2000	1,282	1,595	P, E, DS, SR, T
2	**Pakseng**	600	N 20° 10' E 102° 40'	1936 - 1996	1,195		P
3	**Phonexay**	450	N 19° 55' E 102° 36'	1993 - 1996	1,174		P
4	**Viengkham**	700	N 20° 28' E 102° 53'	1993 - 1996	1,595		P

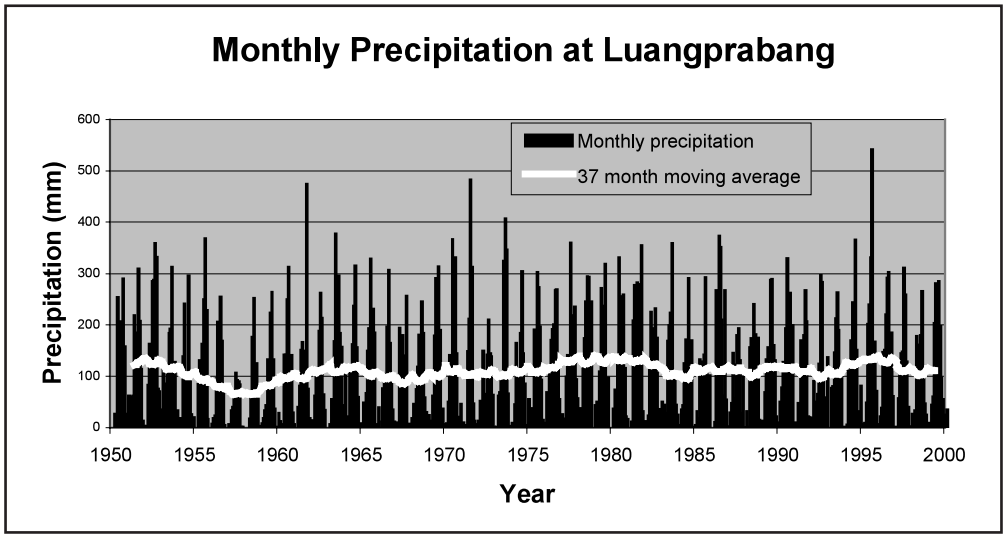
* P: Precipitation E: Evaporation DS: Duration of sunshine SR: Solar radiation T: Temperature

3.3 Monthly Climate Data

Station: Luangprabang (1950-2000)

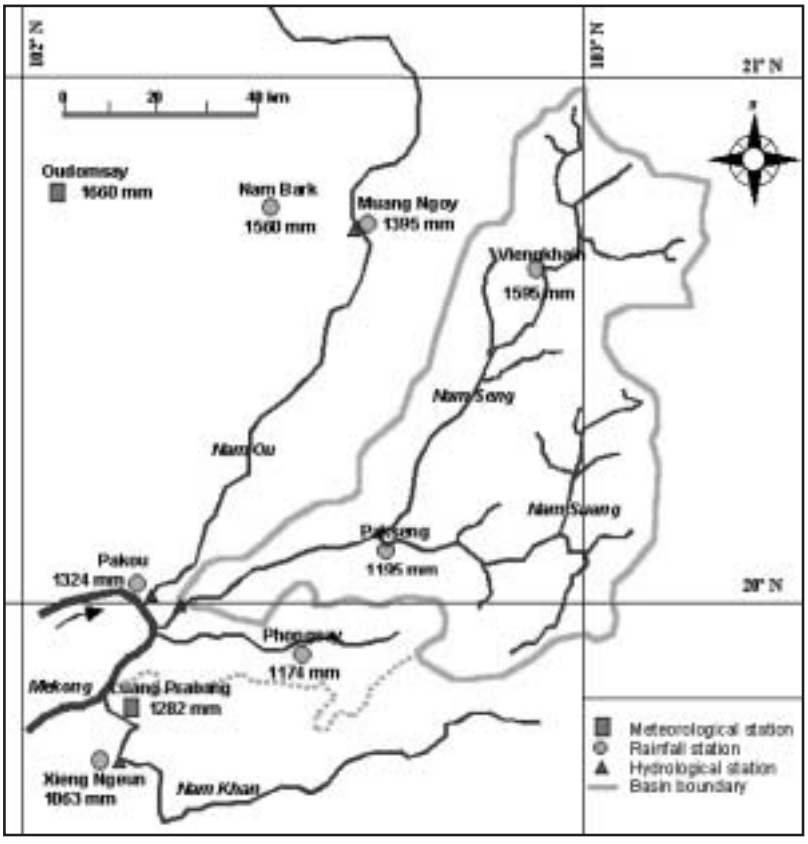
Observation station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Temperature [°C]	20.9	23.0	25.7	28.0	28.6	28.4	27.8	27.5	27.3	25.9	23.4	20.5	25.6
Precipitation [mm]	11.9	18.4	33.9	94.7	148.7	182.2	226.1	265.7	164.3	96.0	29.2	12.1	1,282
Evaporation PET [mm]	99.9	112.0	151.1	162.9	170.6	150.3	136.6	133.3	144.9	131.3	105.2	95.1	1,595
Solar radiation [MJ/m^2/d]	44.2	47.9	56.2	58.9	59.9	50.9	49.8	50.8	52.0	44.9	43.0	40.3	50.5
Duration of sunshine [hrs]	173.1	185.5	197.0	213.1	190.0	124.8	111.3	123.7	170.3	188.0	169.3	165	2,011

3.4 Long-term Variation of Monthly Precipitation



4. Hydrological Information

4.1 Map of Streamflow Observation Stations



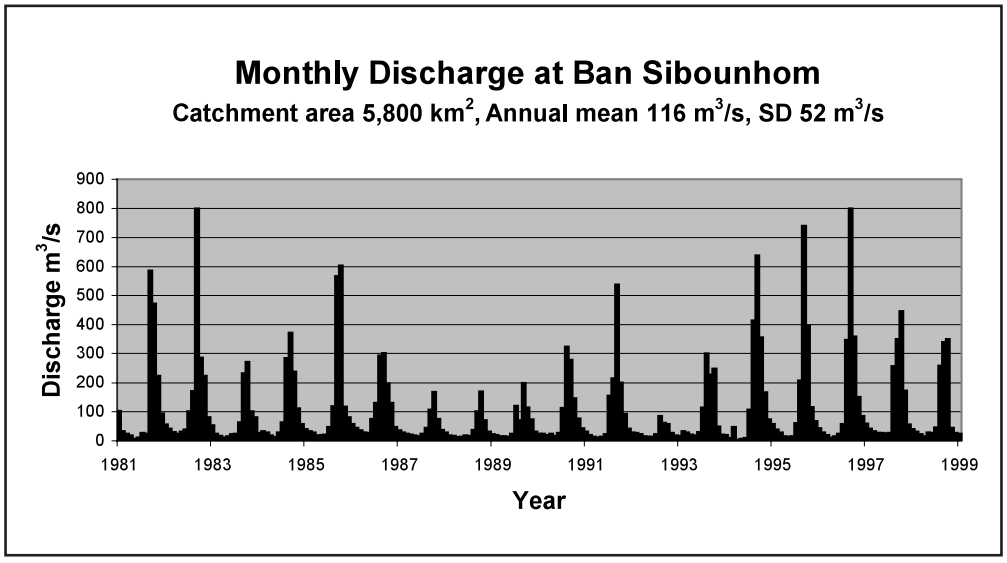
4.2 List of Hydrological Observation Stations

No.	Station	Location	Elevation [m]	Catchment area (A) [km^2]	Observation period	Observation items[a] (frequency)
1	Ban Sibounhom	N 19° 58' E 102° 16'	325	5,800	1968 - 98	H2, Q, P

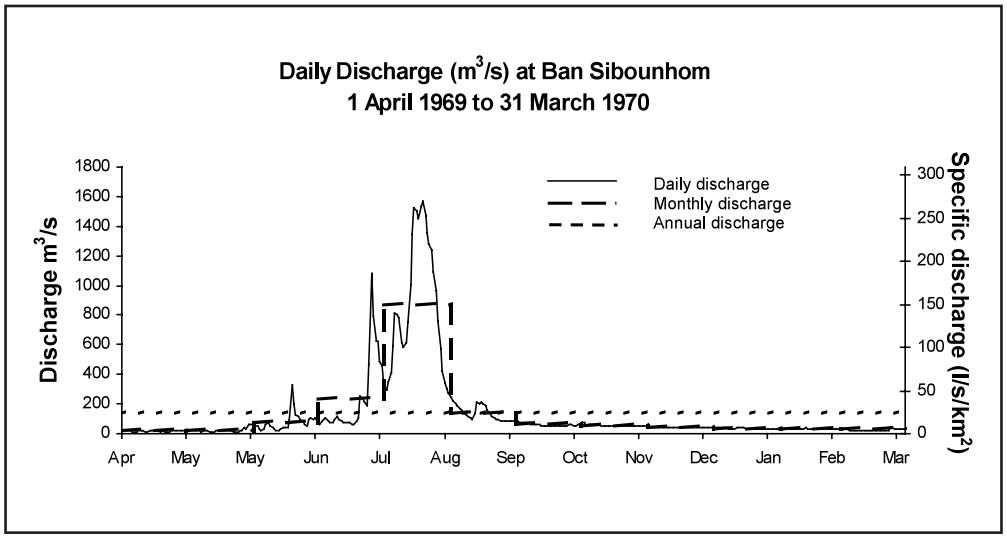
No.	Q[b] [m^3/s]	Qmax[c] [m^3/s]	Qmax[d] [m^3/s]	Qmin[e] [m^3/s]	Q/A [m^3/s/100km^2]	Qmax[c]/A [m^3/s/100km^2]	period of statistics
1	115.87	2,000	1,289	22.04	2.0	34.483	1965 - 98

[a] H2: manual water level, Q: discharge, P: precipitation
[b] mean annual discharge [c] maximum discharge [d] mean annual maximum discharge
[e] mean annual minimum discharge

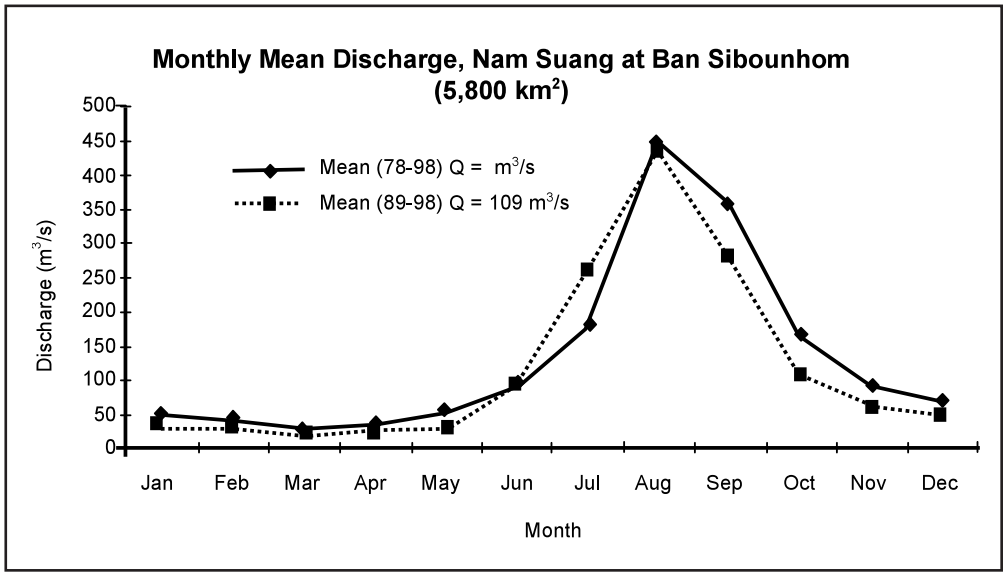
4.3 Long-term Variation of Monthly Discharge



4.4 Annual Pattern of Discharge



4.5 Unique Hydrological Features



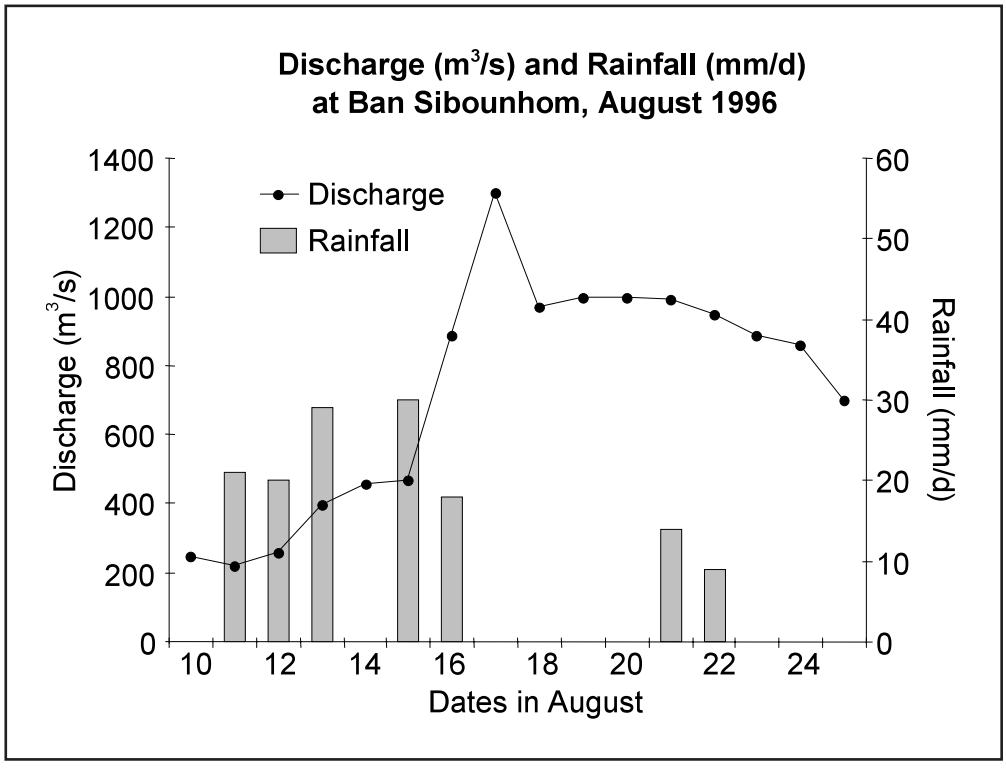
4.6 Annual Maximum and Minimum Discharges

Nam Suang at Ban Sibounhom, Catchment area = 5,800 km^2

Year	Maximum		Minimum	
	Date[a]	Discharge[b] [m^3/s]	Month	Discharge[c] [m^3/s]
1965	7.26	690	**5**	0.50
1966	9.2	1,900	**5**	12.0
1967	8.20	980	**3**	0.34
1968	8.16	990	**5**	12.0
1969	8.19	1,570	**5**	12.5
1970	8.12	1,500	**5**	20.0
1971	x	x	**x**	x
1972	8.30	1,710	**6**	17.0
1973	x	x	**x**	x
1974	9.2	1,170	**3**	65.8
1975	9.1	1,950	**5**	57.8
1976	8.15	2,000	**3**	60.2
1977	7.31	1,210	**6**	58.6
1978	8.11	1,510	**4**	75.4
1979	9.13	1,800	**3**	12.0
1980	8.27	1,600	**5**	9.2
1981	8.5	1,900	**4**	12.5
1982	8.10	1,620	**5**	13.0
1983	9.18	700	**3**	9.5
1984	7.16	1,100	**4**	9.0
1985	8.31	1,900	**4**	12.0
1986	7.31	980	**4**	13.0
1987	9.3	503	**5**	11.1
1988	8.11	647	**4**	11.8
1989	8.15	1,950	**4**	85.0
1990	8.1	1,700	**4**	10.0
1991	8.16	1,320	**3**	99.9
1992	7.27	258	**5**	12.3
1993	9.8	564	**x**	x
1994	8.30	1,076	**3**	6.99
1995	8.21	1,166	**5**	12.7
1996	8.17	1,307	**3**	7.9
1997	9.7	1,193	**6**	16.5
1998	9.8	787	**3**	16.5
Sum =		4,1251		683.1
Mean =		1,289.1		22.0

[a] date in form month. day
[b] 2 readings per day
[c] daily reading

4.7 Hyetographs and Hydrographs of Major Floods



Daily rainfall is from Viengkham (upper basin), while the discharge is at Ban Sibounhom (basin outlet).

6. Socio-cultural Characteristics.

With the designation of Luang Prabang city as a world cultural heritage site by UNESCO in 1996, an increasing number of tourists have visited not only the city, but the whole province of Luang Prabang. During 1999-2000 visitor numbers were significant. The Buddha cave, "Thamting", situated near Paksuang, Pakou is an important attraction. People living in the lower Nam Suang are famous for their traditional handicraft goods and these are sold to tourists as souvenirs.

7. References, Databooks and Bibliography

National geographic Department map 1:1,000,000 Scale, 1986.
Department of Geology and Mines: 1:1,000,000 Scale map of Geological and Mineral, Occurrence map of Lao P.D.R 1991.
MRC Hydrologic yearbooks available until 1995 and Forest cover map of Lao P.D.R, 1996/97.
WAD, Hydrological data of Nam Ou and Nam Suang, 1990-98.