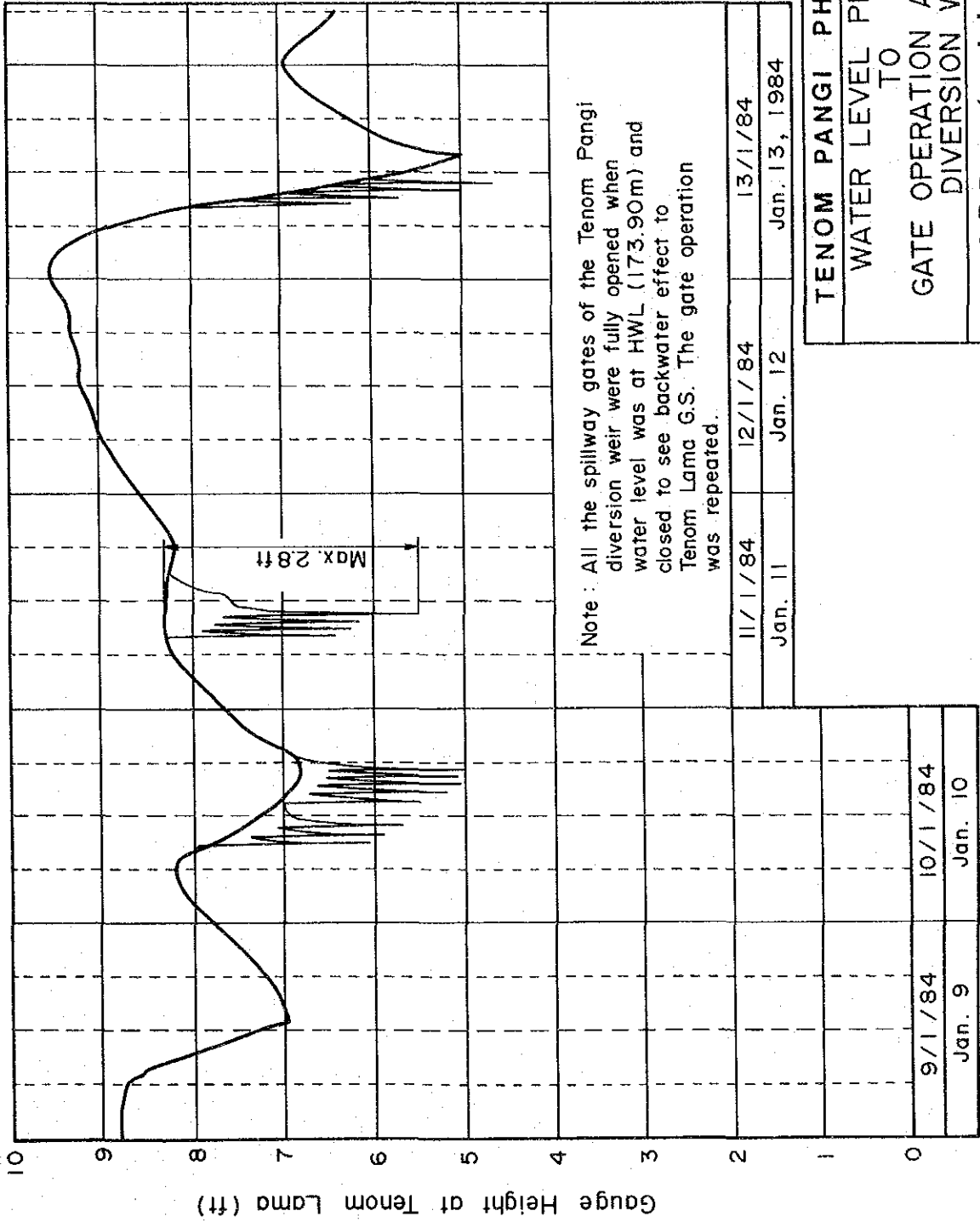
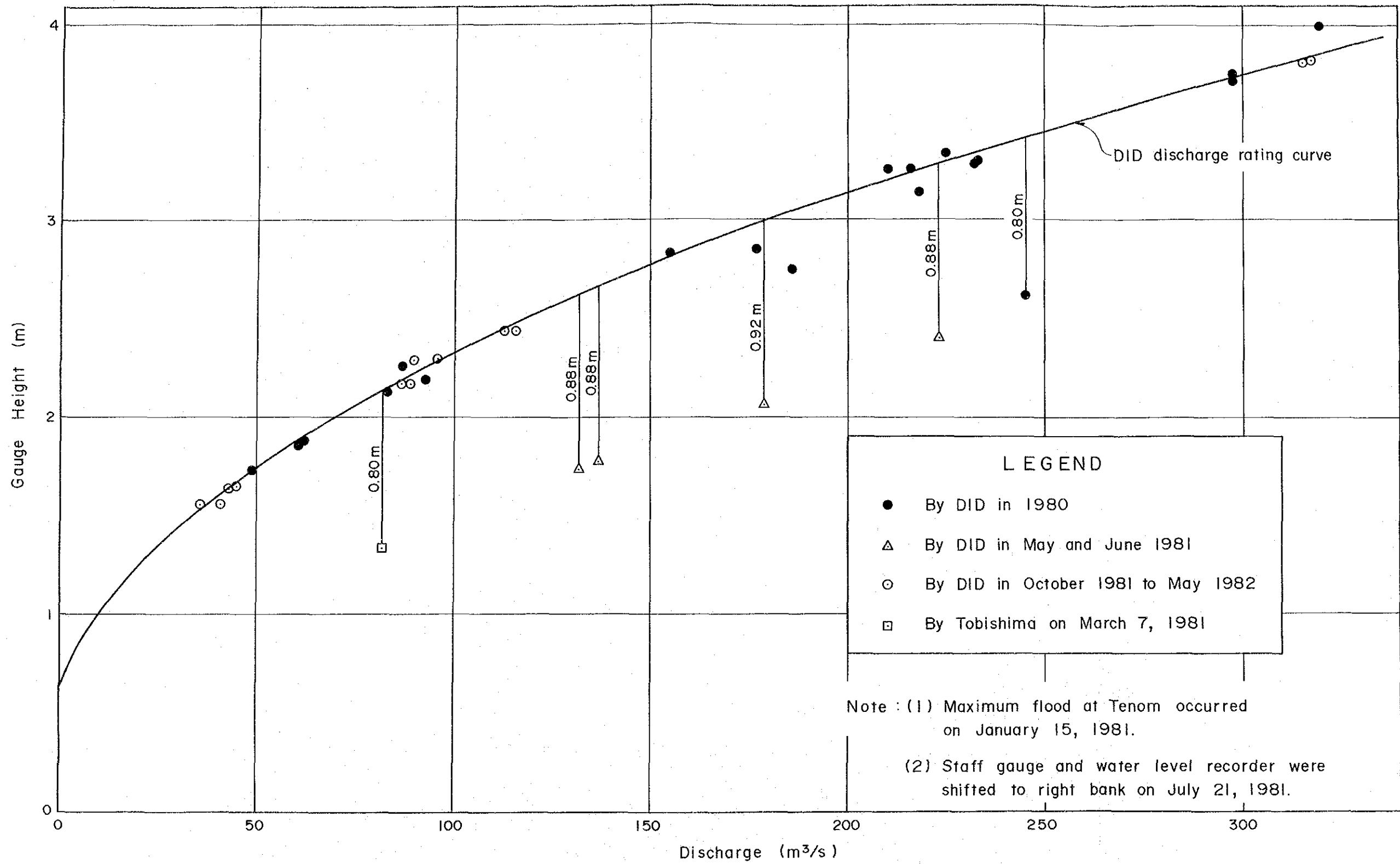


TENOM PANGI PHASE III
 FLOW RATING CURVE
 OF
 SOOK RIVER AT BIAH (5261402)
 SEB / JICA

FIGURE NO. : A30



TENOM PANGI PHASE III
 WATER LEVEL RESPONSE
 TO
 GATE OPERATION AT TENOM
 DIVERSION WEIR
 SEB / JICA

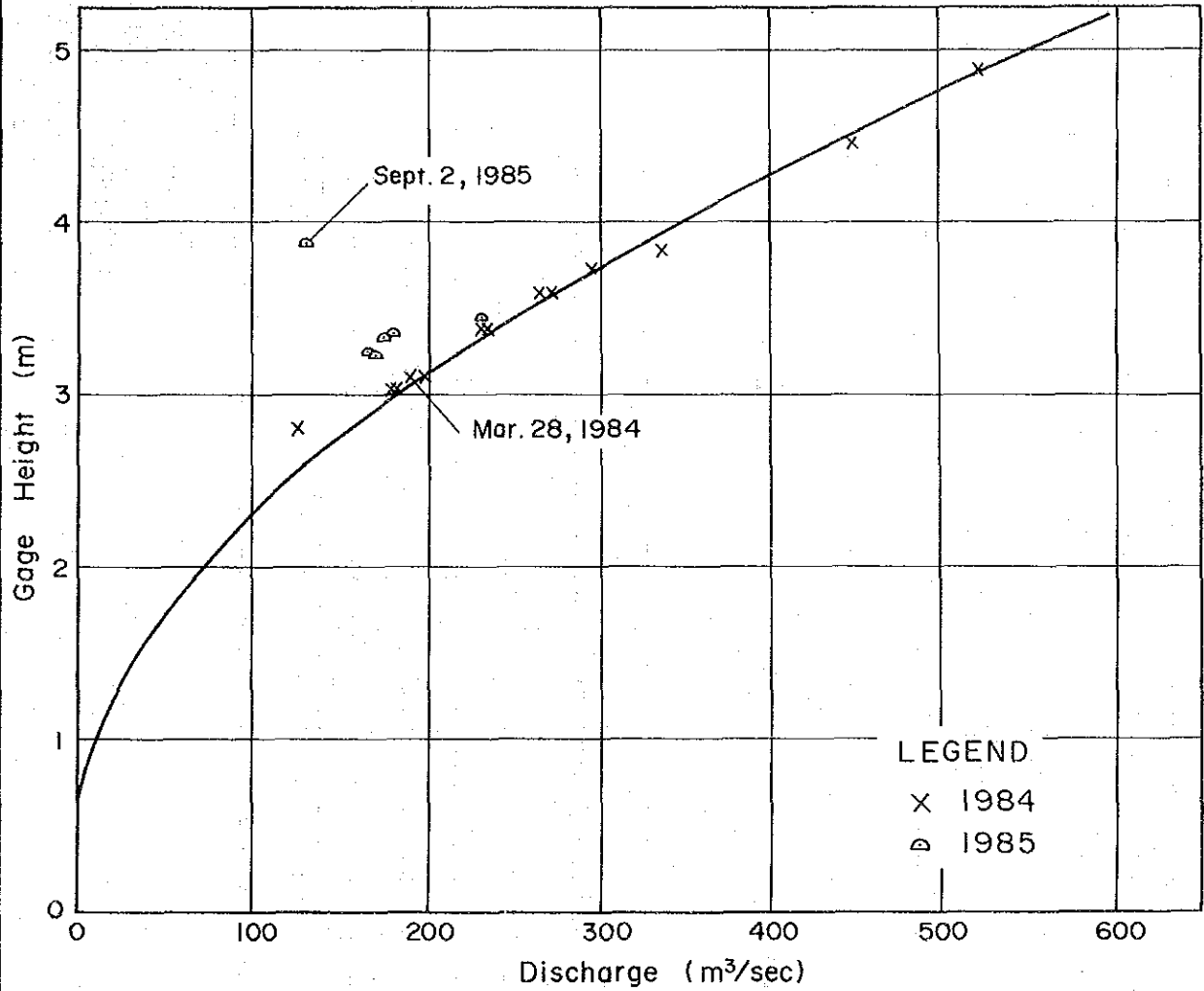


LEGEND

- By DID in 1980
- △ By DID in May and June 1981
- By DID in October 1981 to May 1982
- By Tobishima on March 7, 1981

Note : (1) Maximum flood at Tenom occurred on January 15, 1981.
 (2) Staff gauge and water level recorder were shifted to right bank on July 21, 1981.

TENOM PANGI PHASE III
 DISCHARGE MEASUREMENTS
 AT
 TENOM LAMA IN 1980 TO 1982
 SEB / JICA



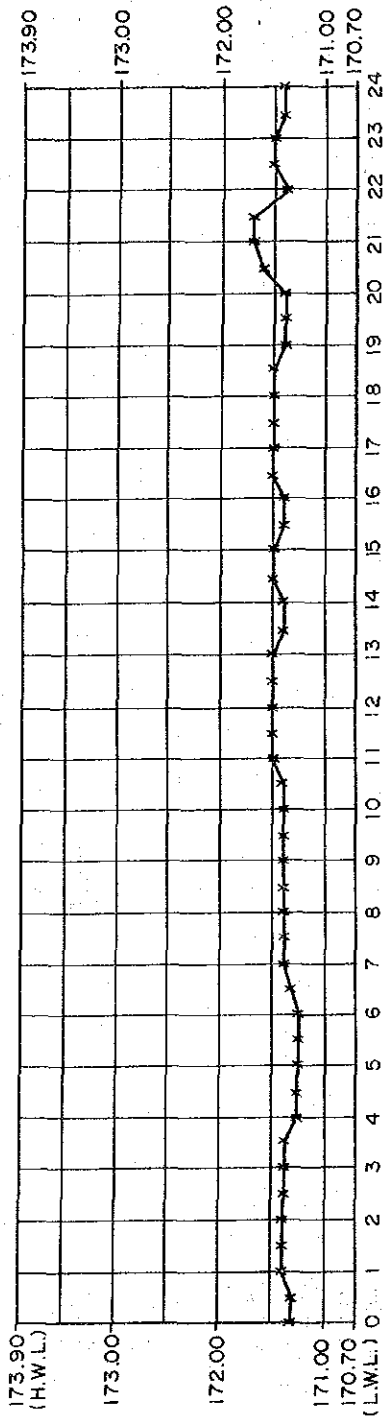
LEGEND

x 1984

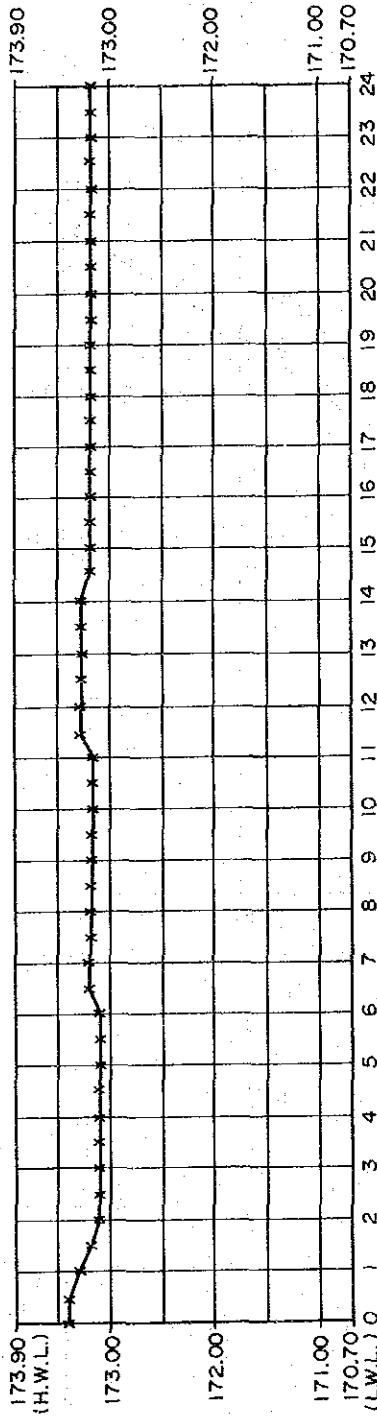
△ 1985

TENOM PANGI PHASE III
 DISCHARGE MEASUREMENT
 AT
 TENOM LAMA IN 1984 AND 1985
 SEB / JICA

FIGURE NO. : A33



(A) Hourly Pondage Water Level on March 28, 1984

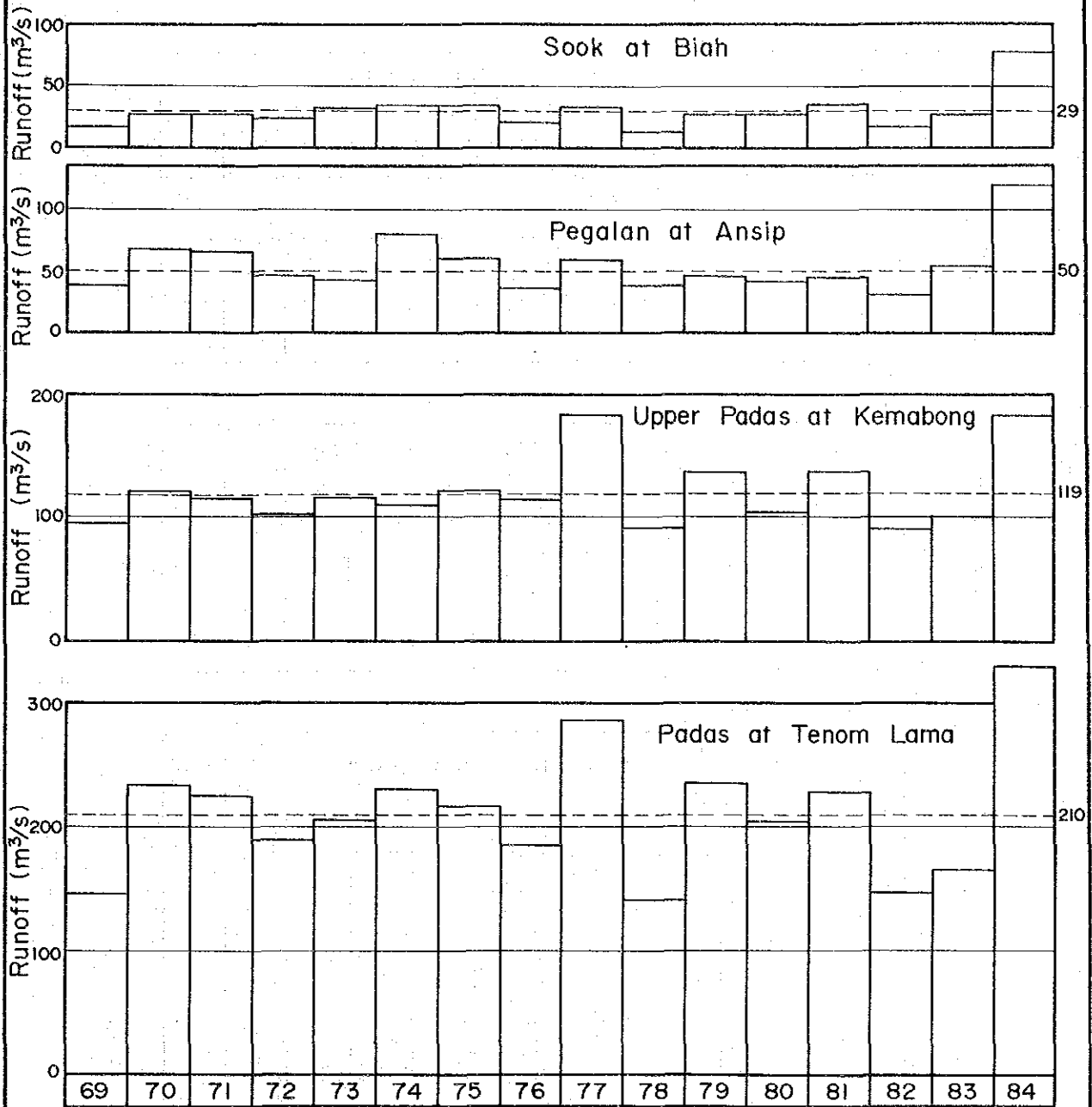


(B) Hourly Pondage Water Level on September 2, 1985

TENOM PANGI PHASE III
 TYPICAL PONDAGE WATER LEVEL
 AT TENOM PANGI DIVERSION WEIR
 BEFORE AND AFTER COMMISSIONING
 OF NO.3 UNIT IN LATE 1984

SEB / JICA

FIGURE NO. : A34

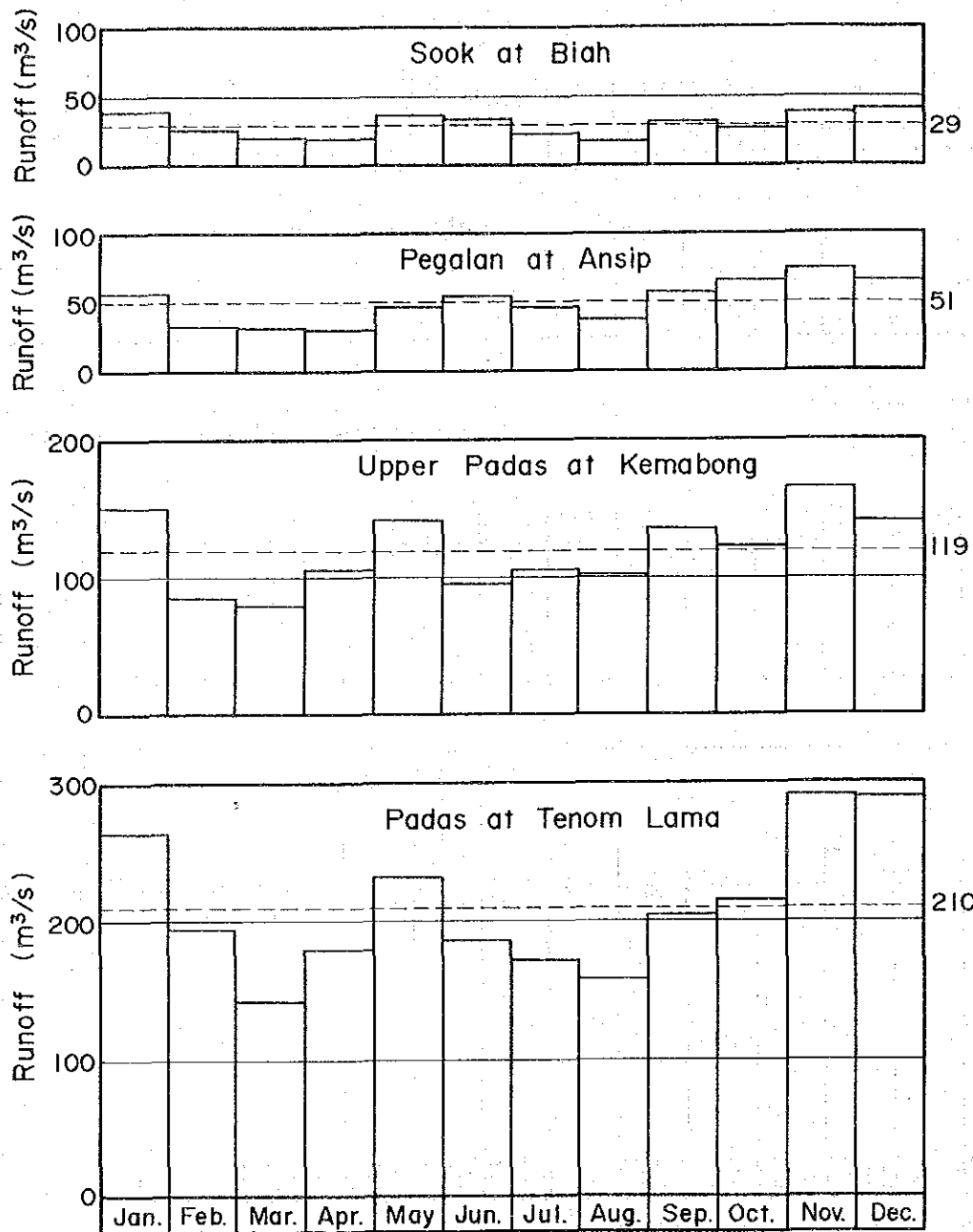


Note : Broken line shows mean runoff.

TENOM PANGI PHASE III

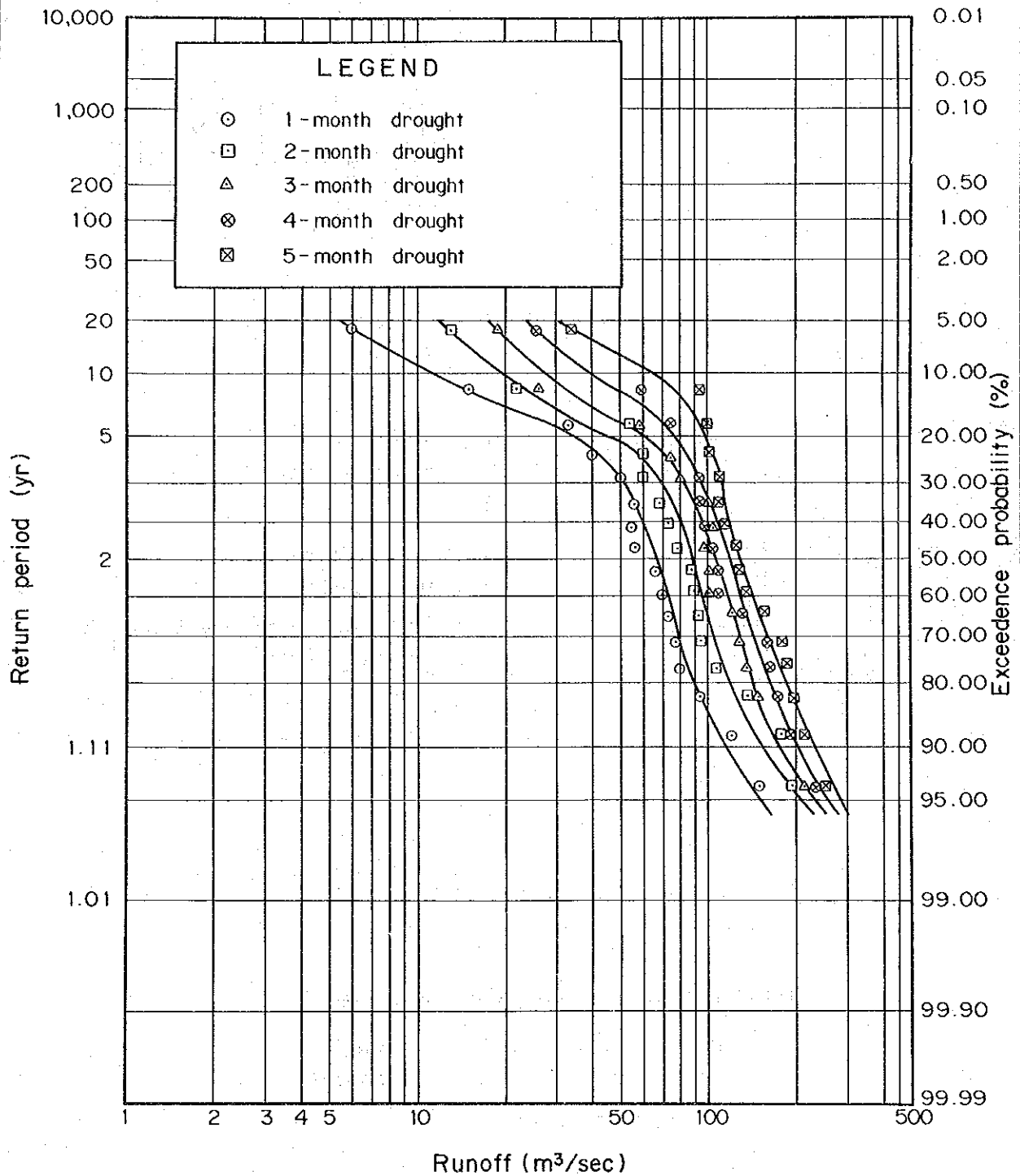
YEARLY FLUCTUATION OF
ANNUAL RUNOFF OF
PADAS RIVER SYSTEM

SEB / JICA



TENOM PANGI PHASE III
 MEAN MONTHLY RUNOFF
 OF
 PADAS RIVER SYSTEM
 SEB / JICA

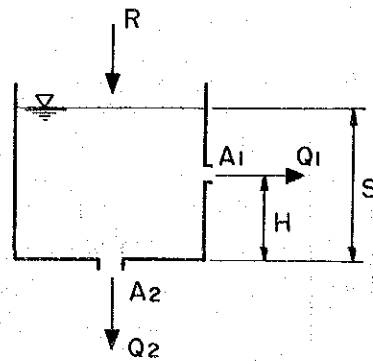
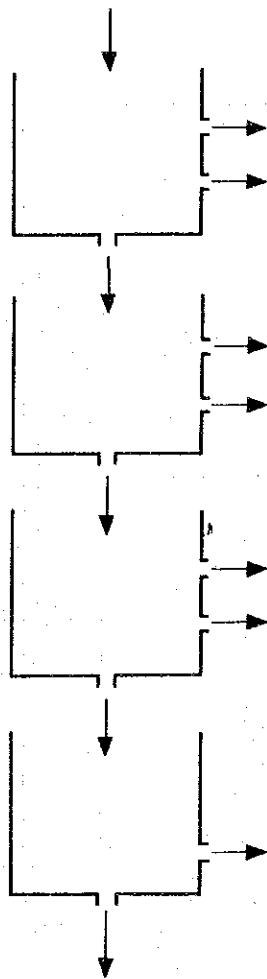
FIGURE NO.:A36



TENOM PANGI PHASE III

FREQUENCY CURVE OF DROUGHT
OF
PADAS RIVER AT TENOM LAMA

SEB / JICA



- R : Rainfall
- Q₁ : Discharge
- Q₂ : Infiltration
- A₁, A₂ : Multiplier
- H : Hole height
- S : The height from the bottom to the water surface

Equation for Continuity

$$R - (Q_1 + Q_2) = dS/dt$$

Then discharge and infiltration would be

$$Q_1 = A_1 (S - H) \quad (S \geq H)$$

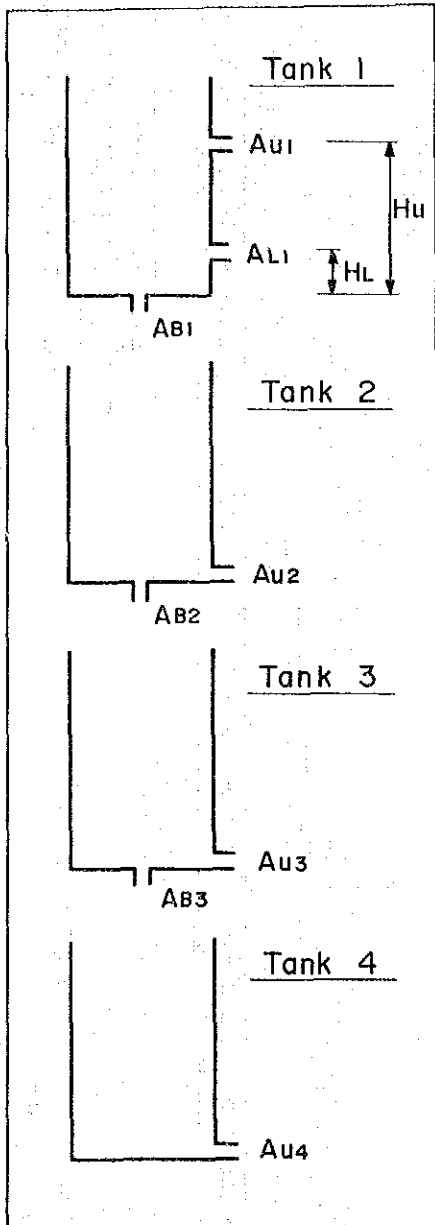
$$= 0 \quad (S < H)$$

$$Q_2 = A_2 \cdot S$$

TENOM PANGI PHASE III

ILLUSTRATION
OF
TANK MODEL METHOD

SEB / JICA



(1) Multiplier of hole

| | |
|-----|-------|
| Au1 | 0.25 |
| AL1 | 0.20 |
| AB1 | 0.28 |
| Au2 | 0.12 |
| AB2 | 0.08 |
| Au3 | 0.04 |
| AB3 | 0.012 |
| Au4 | 0.005 |

(2) Height of hole (mm)

| | |
|----|----|
| Hu | 60 |
| HL | 25 |

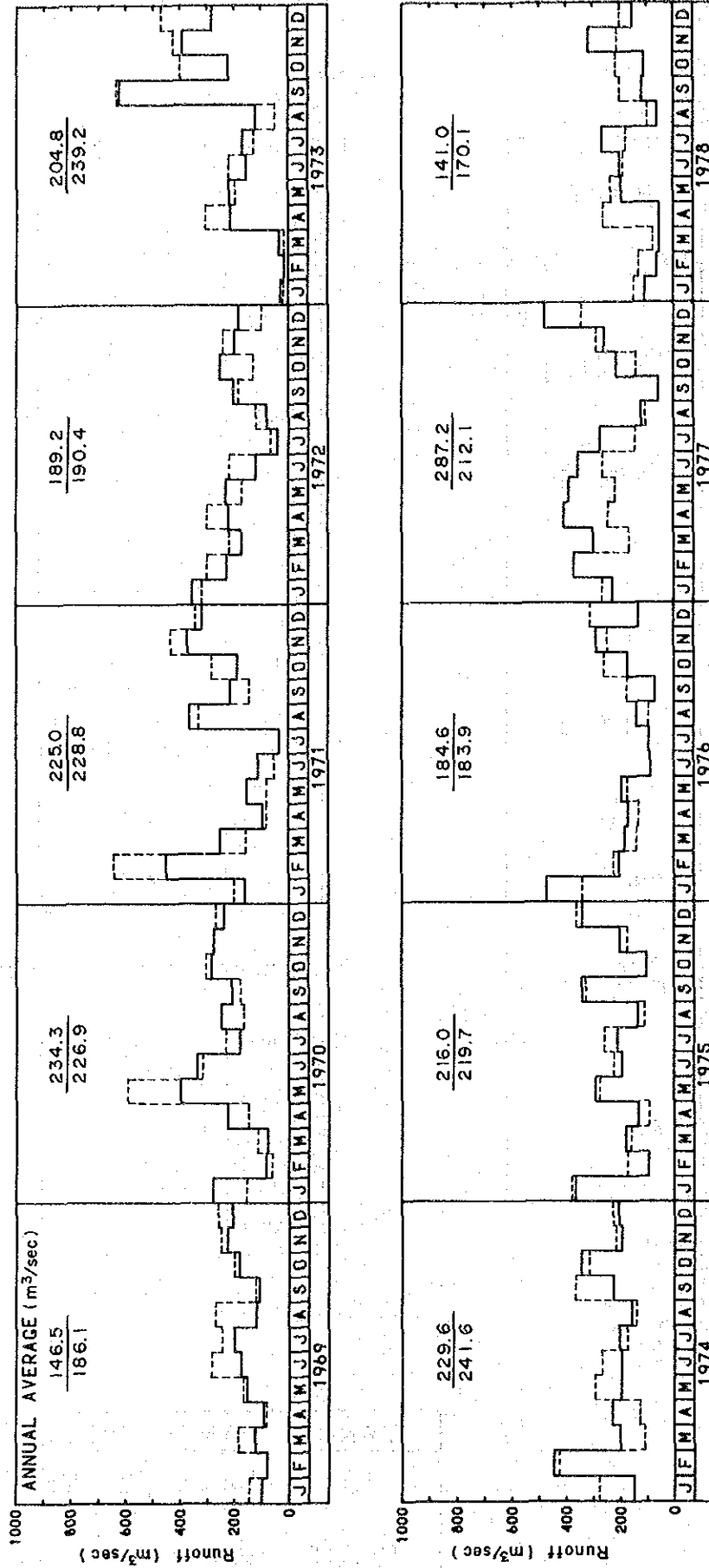
(3) Initial tank storage(mm)

| | |
|--------|-----|
| Tank 1 | 20 |
| Tank 2 | 100 |
| Tank 3 | 150 |
| Tank 4 | 250 |

TENOM PANGI PHASE III
 TANK MODEL CALIBRATED
 FOR
 PADAS RIVER AT TENOM LAMA
 SEB / JICA

FIGURE NO:A39 - 1

Station : TENOM LAMA River System : PADAS RIVER
 Stream : PADAS RIVER Drainage Area : 7718. 50.km.

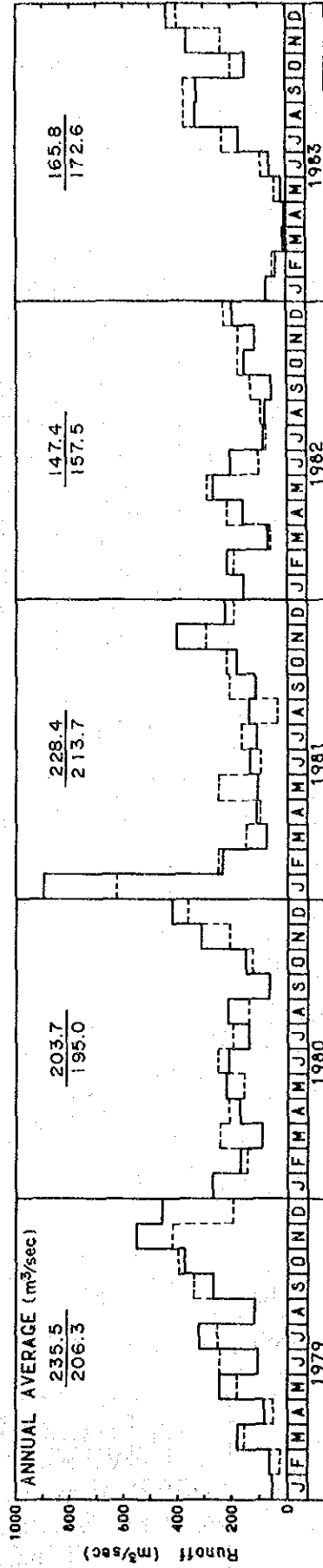


TENOM PANGI PHASE III
 COMPARISON OF SIMULATED
 AND RECORDED RUNOFF SERIES
 OF
 PADAS RIVER AT TENOM LAMA (1/2)
 SEB / JICA

Notes ;
 . The real and dotted lines denote recorded runoff and simulated runoff, respectively.
 . The average values above and below the line are based on recorded runoff and simulated runoff, respectively.

FIGURE NO: A39-2

Station : TENOM LAMA River System : PADAS RIVER
 Stream : PADAS RIVER Drainage Area : 7716. sq.km.



Notes :

- The real and dotted lines denote recorded runoff and simulated runoff, respectively.
- The average values above and below the line are based on recorded runoff and simulated runoff, respectively.

TENOM PANGI PHASE III
 COMPARISON OF SIMULATED
 AND RECORDED RUNOFF SERIES
 OF
 PADAS RIVER AT TENOM LAMA (2/2)
 SEB / JICA

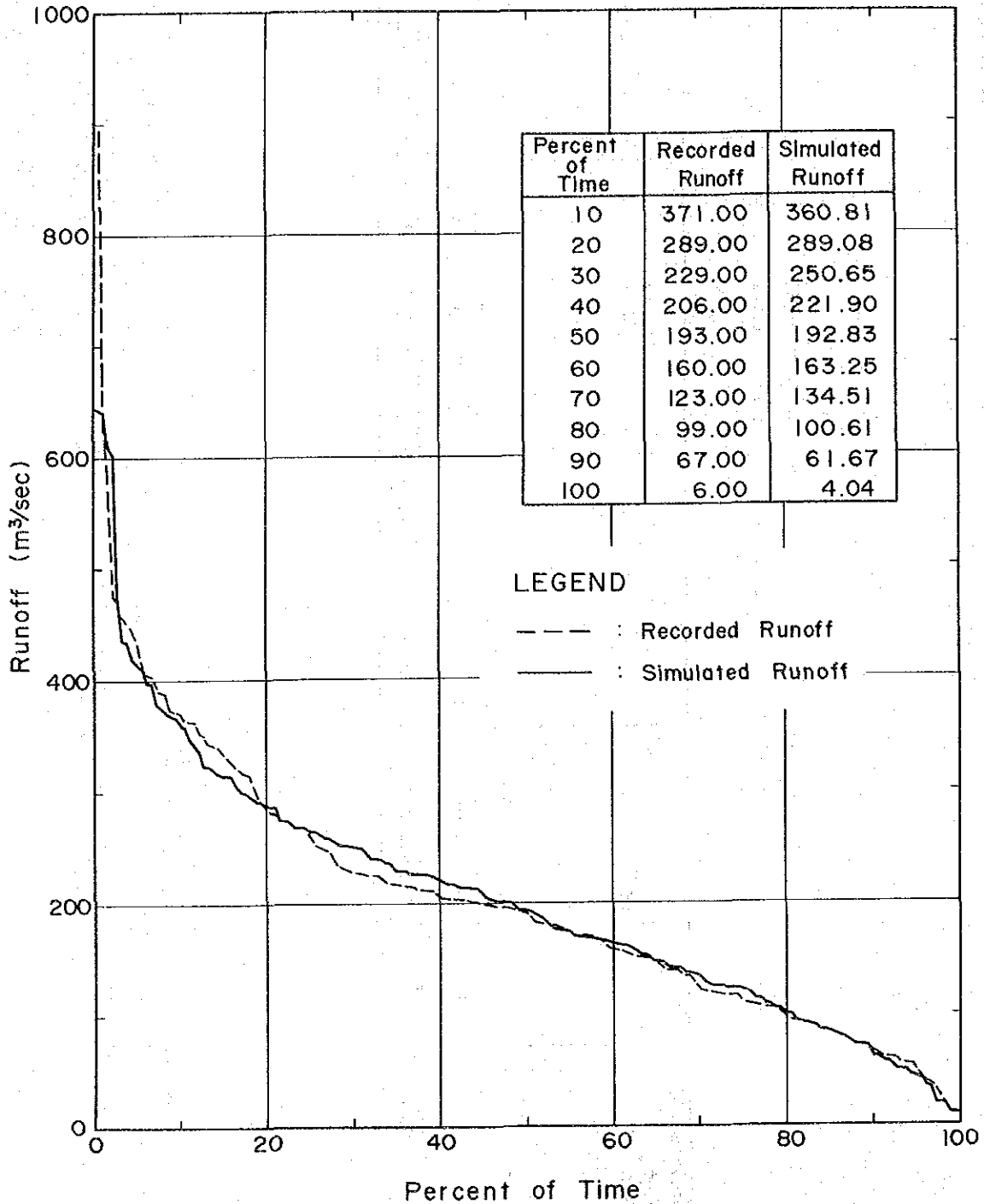
Station : TENOM LAMA

River System : PADAS RIVER

Stream : PADAS RIVER

Drainage Area : 7718. sq. km.

Period of Record : Jan. 1969 - Dec. 1983

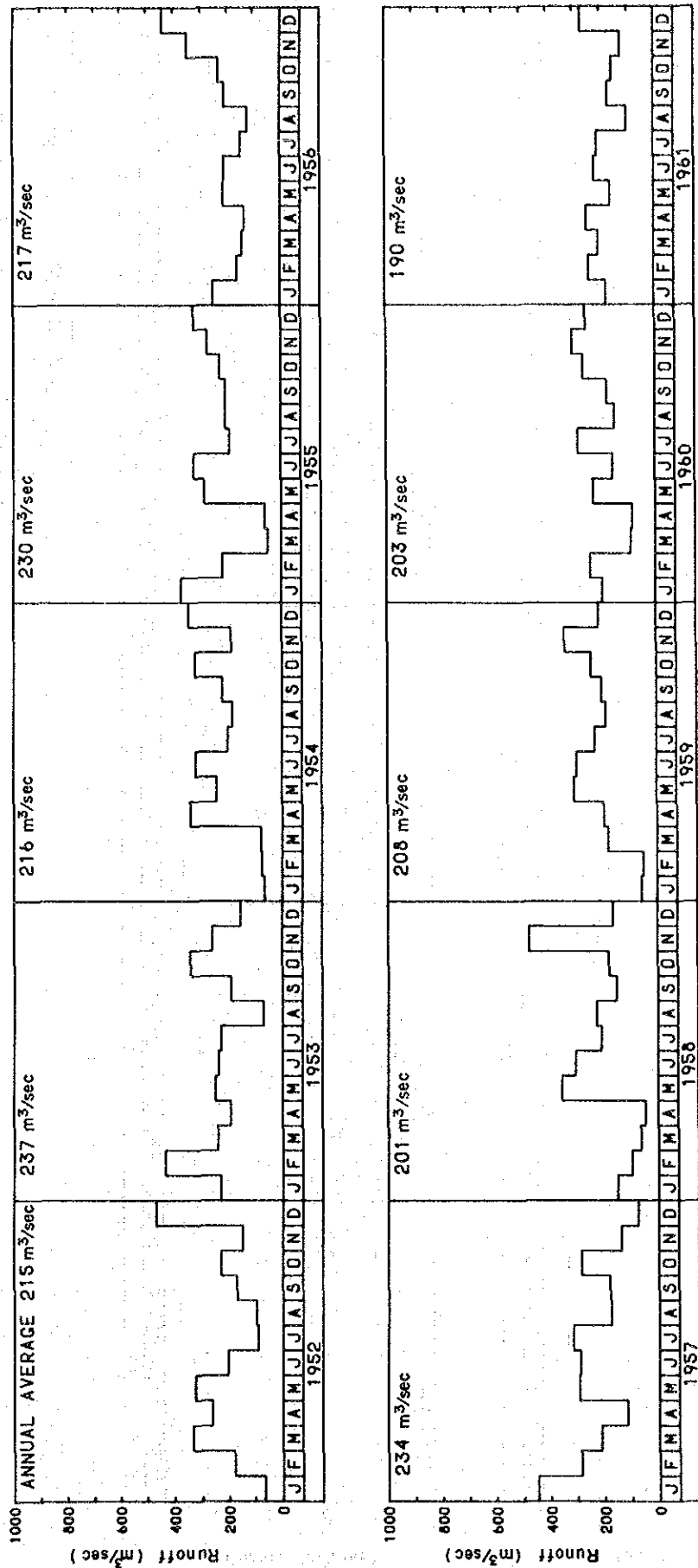


TENOM PANGI PHASE III
 COMPARISON OF RUNOFF DURATION
 CURVES FOR RECORDED AND SIMULATED
 RUNOFF SERIES OF PADAS RIVER AT
 TENOM LAMA

SEB / JICA

FIGURE NO: A41-1

Station : TENOM LAMA River System : PADAS RIVER
 Stream : PADAS RIVER Drainage Area : 7710. sq.km.

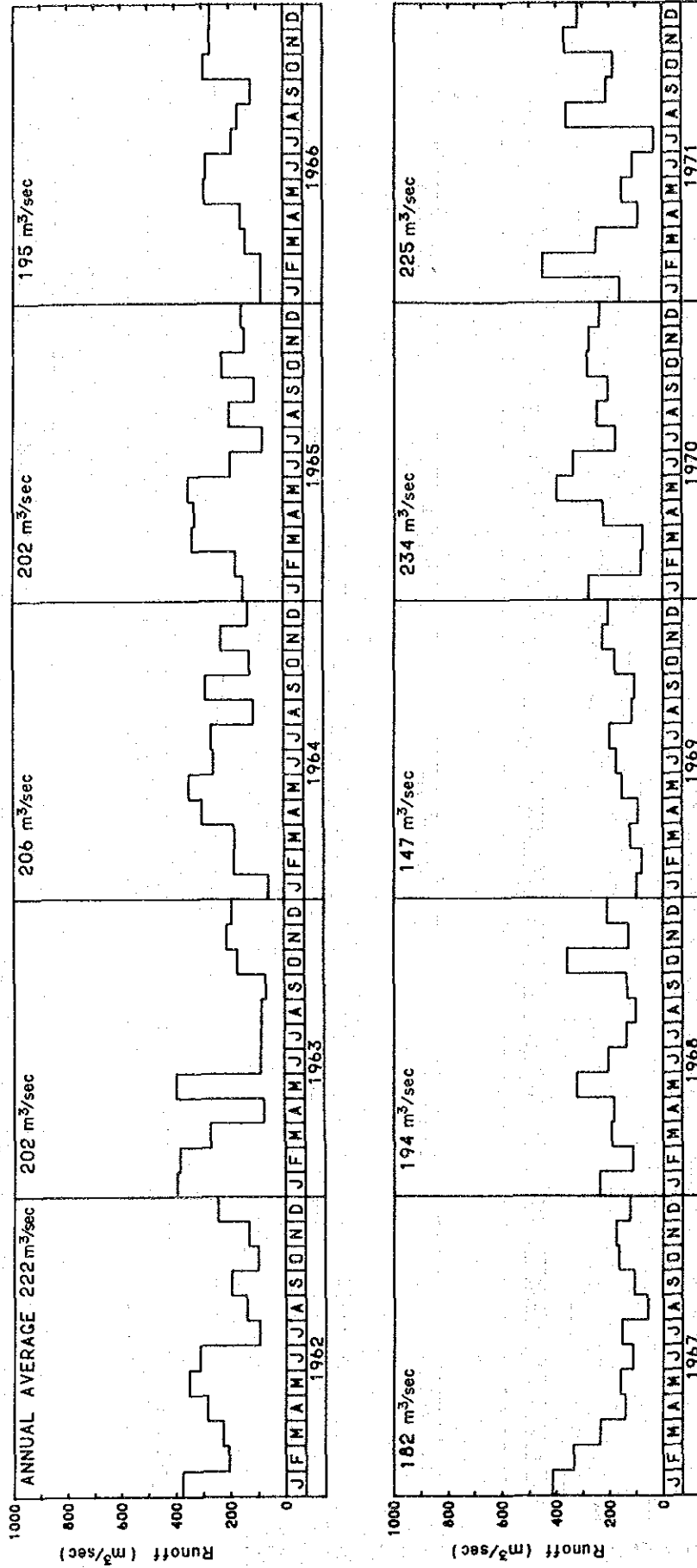


Note : Hydrographs of 1952 to 1968 are based on simulated runoff and those of 1969 to 1983 are based on recorded runoff.

TENOM PANGI PHASE III
 LONG-TERM MONTHLY RUNOFF SERIES
 OF
 PADAS RIVER AT TENOM LAMA (1/4)
 SEB / JICA

FIGURE NO: A41-2

Station : TENOM LAMA River System : PADAS RIVER
 Stream : PADAS RIVER Drainage Area : 7710. Sq.km.

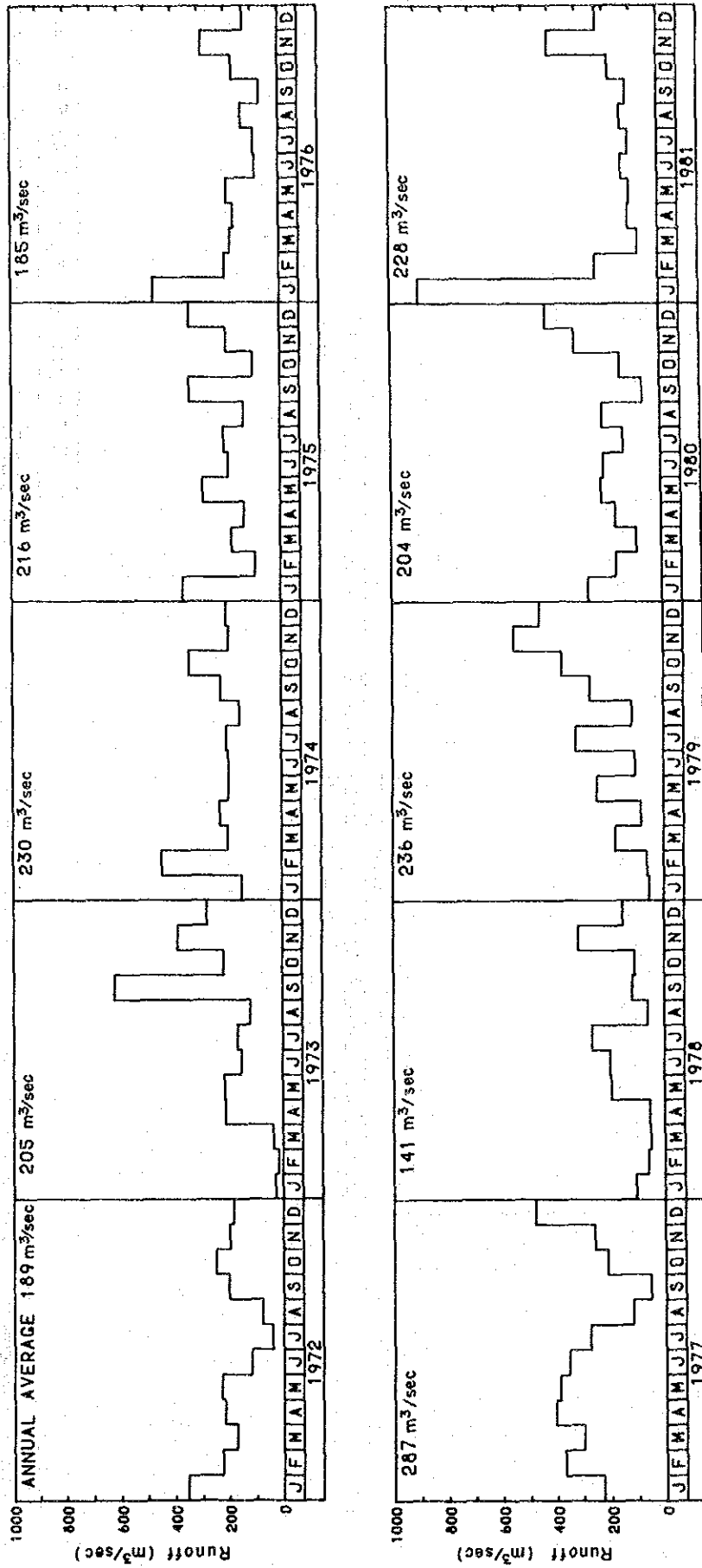


TENOM PANGI PHASE III
 LONG-TERM MONTHLY RUNOFF SERIES
 OF
 PADAS RIVER AT TENOM LAMA (2/4)
 SEB / JICA

Note : Hydrographs of 1952 to 1968 are based on simulated runoff and those of 1969 to 1983 are based on recorded runoff.

FIGURE NO:A41-3

Station : TENOM LAMA : PADAS RIVER
 Stream : PADAS RIVER : Drainage Area : 7710. sq.km.

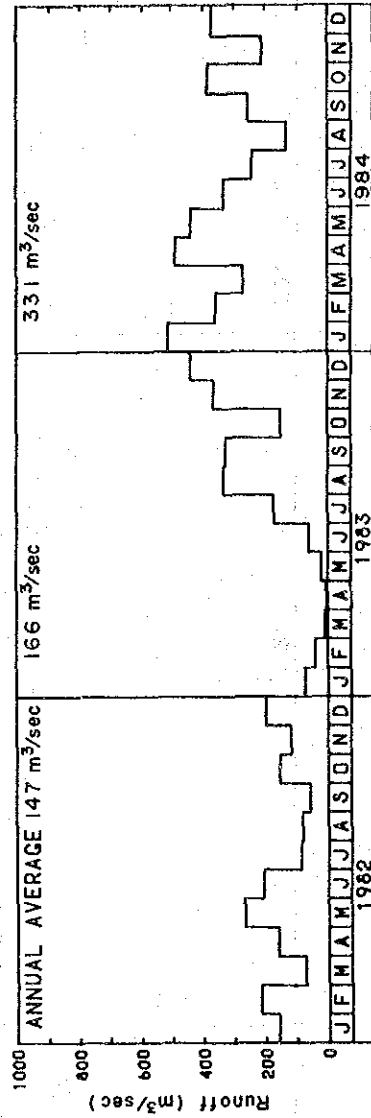


Note : Hydrographs of 1952 to 1968 are based on simulated runoff and those of 1969 to 1983 are based on recorded runoff.

TENOM PANGI PHASE III
 LONG-TERM MONTHLY RUNOFF SERIES
 OF
 PADAS RIVER AT TENOM LAMA (3/4)
 SEB / JICA

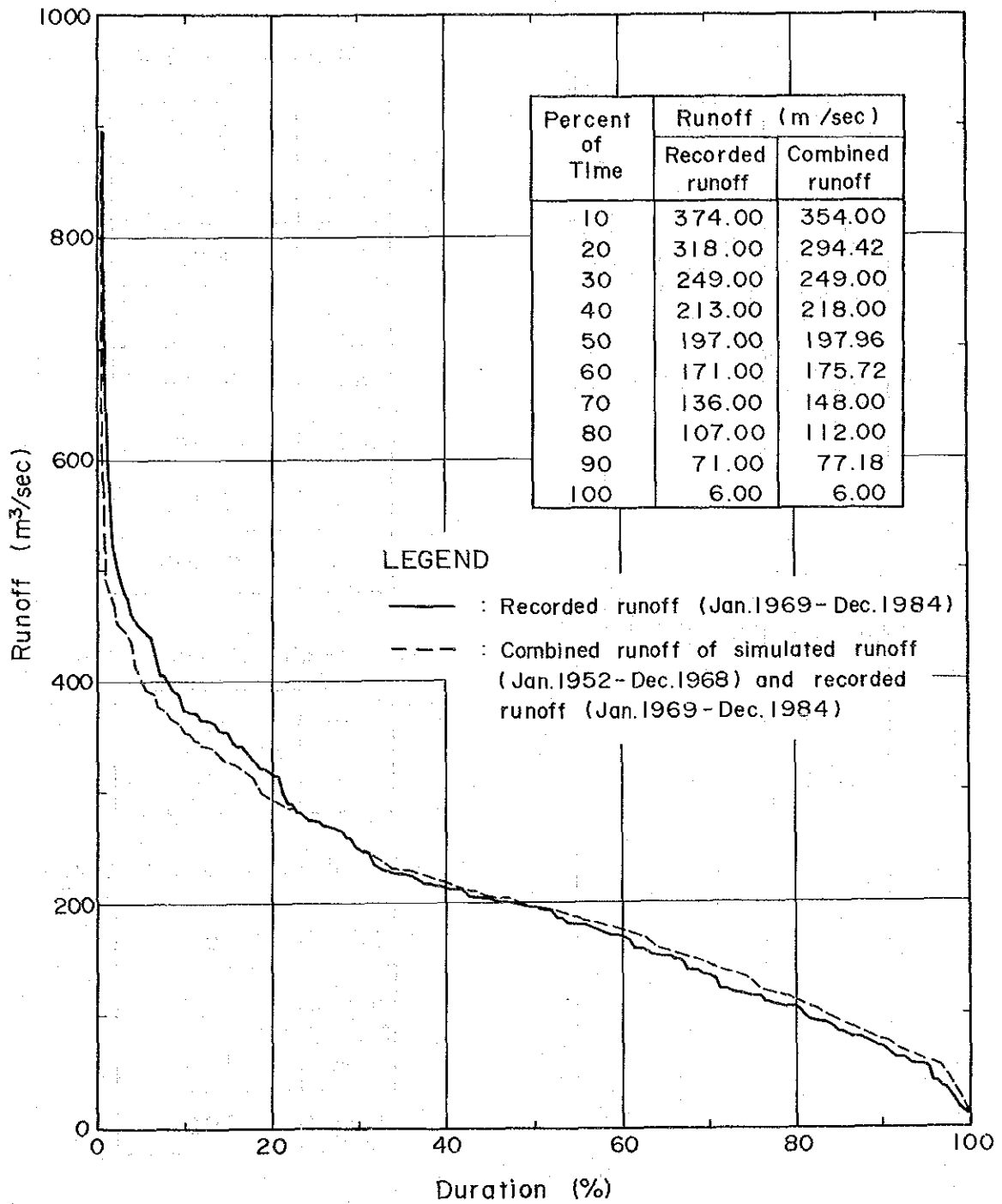
FIGURE NO:A41-4

Station : TENOM LAMA River System : PADAS RIVER
 Stream : PADAS RIVER Drainage Area : 7716. sq.km.

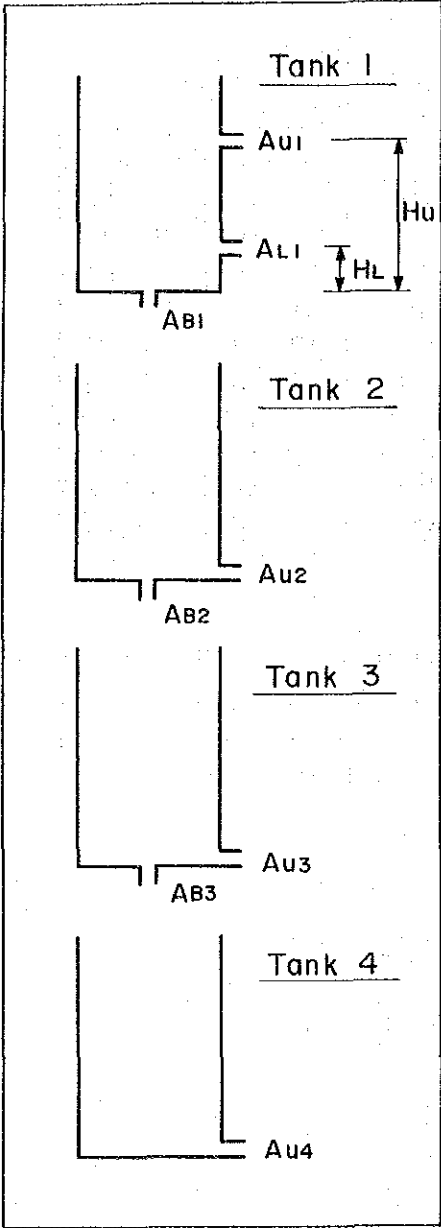


Note : Hydrographs of 1952 to 1968 are based on simulated runoff and those of 1969 to 1983 are based on recorded runoff.

TENOM PANGI PHASE III
 LONG-TERM MONTHLY RUNOFF SERIES
 OF
 PADAS RIVER AT TENOM LAMA (4/4)
 SEB / JICA



TENOM PANGI PHASE III
 RUNOFF DURATION CURVE
 OF
 PADAS RIVER AT TENOM LAMA
 SEB / JICA



(1) Multiplier of hole

| | |
|-----|-------|
| Au1 | 0.25 |
| AL1 | 0.30 |
| AB1 | 0.28 |
| Au2 | 0.22 |
| AB2 | 0.08 |
| Au3 | 0.04 |
| AB3 | 0.012 |
| Au4 | 0.005 |

(2) Height of hole (mm)

| | |
|----|----|
| Hu | 35 |
| HL | 10 |

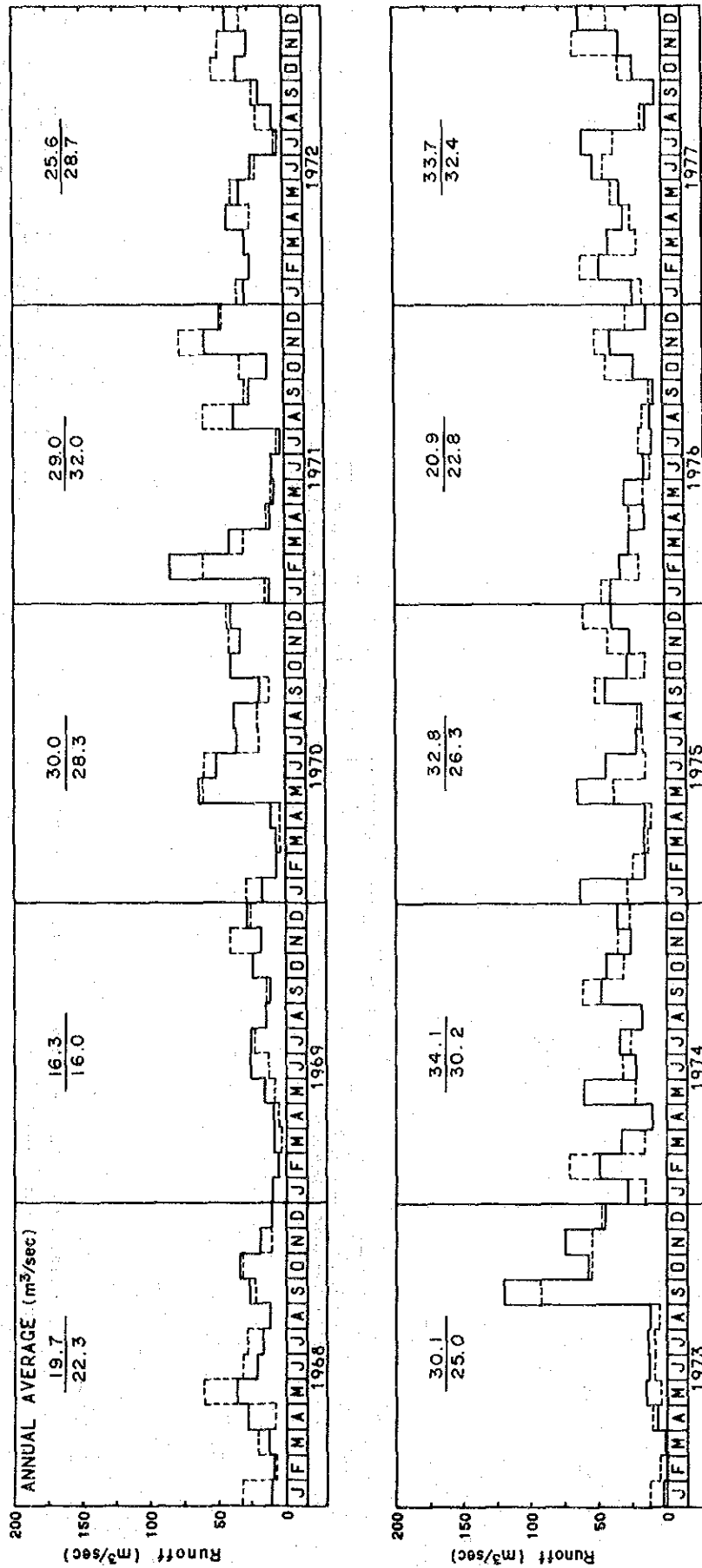
(3) Initial tank storage (mm)

| | |
|--------|-----|
| Tank 1 | 50 |
| Tank 2 | 70 |
| Tank 3 | 110 |
| Tank 4 | 200 |

TENOM PANGI PHASE III
 TANK MODEL CALIBRATED
 FOR
 SOOK RIVER AT BIAH
 SEB / JICA

FIGURE NO:A44-1

Station : BIAH : SOKK RIVER
 Stream : SOKK RIVER : 1684.59.km.
 River System : SOKK RIVER
 Drainage Area : 1684.59.km.

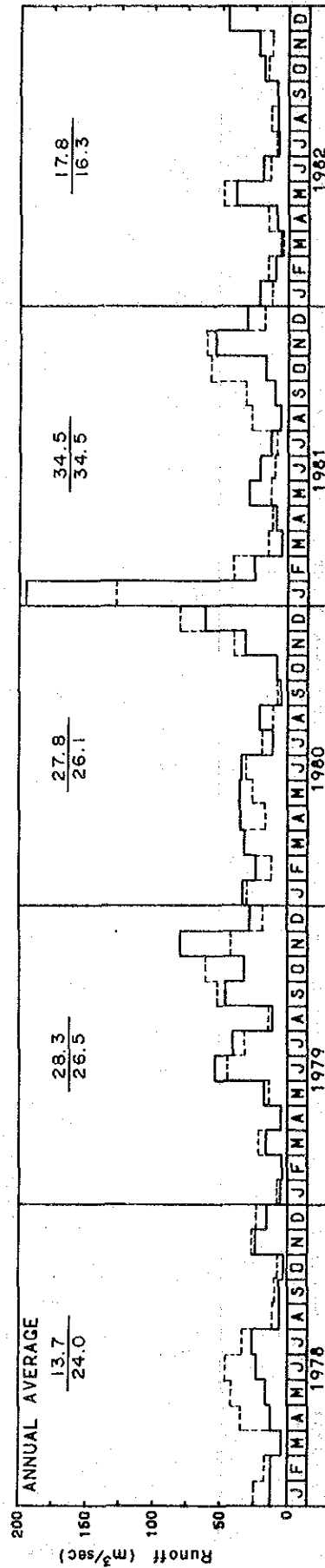


TENOM PANGI PHASE III
 COMPARISON OF SIMULATED
 AND RECORDED RUNOFF SERIES
 OF
 SOOK RIVER AT BIAH (1/2)
 SEB / JICA

Notes :
 • The real and dotted lines denote recorded runoff and simulated runoff, respectively.
 • The average values above and below the line are based on recorded runoff and simulated runoff, respectively.

FIGURE NO.: A44-2

Station : BIAH River System : SOOK RIVER
 Stream : SOOK RIVER Drainage Area : 1684. sq.km.



Notes :

- The real and dotted lines denote recorded runoff and simulated runoff, respectively.
- The average values above and below the line are based on recorded runoff and simulated runoff, respectively.

TENOM PANGI PHASE III
 COMPARISON OF SIMULATED
 AND RECORDED RUNOFF SERIES
 OF
 SOOK RIVER AT BIAH (2/2)
 SEB / JICA

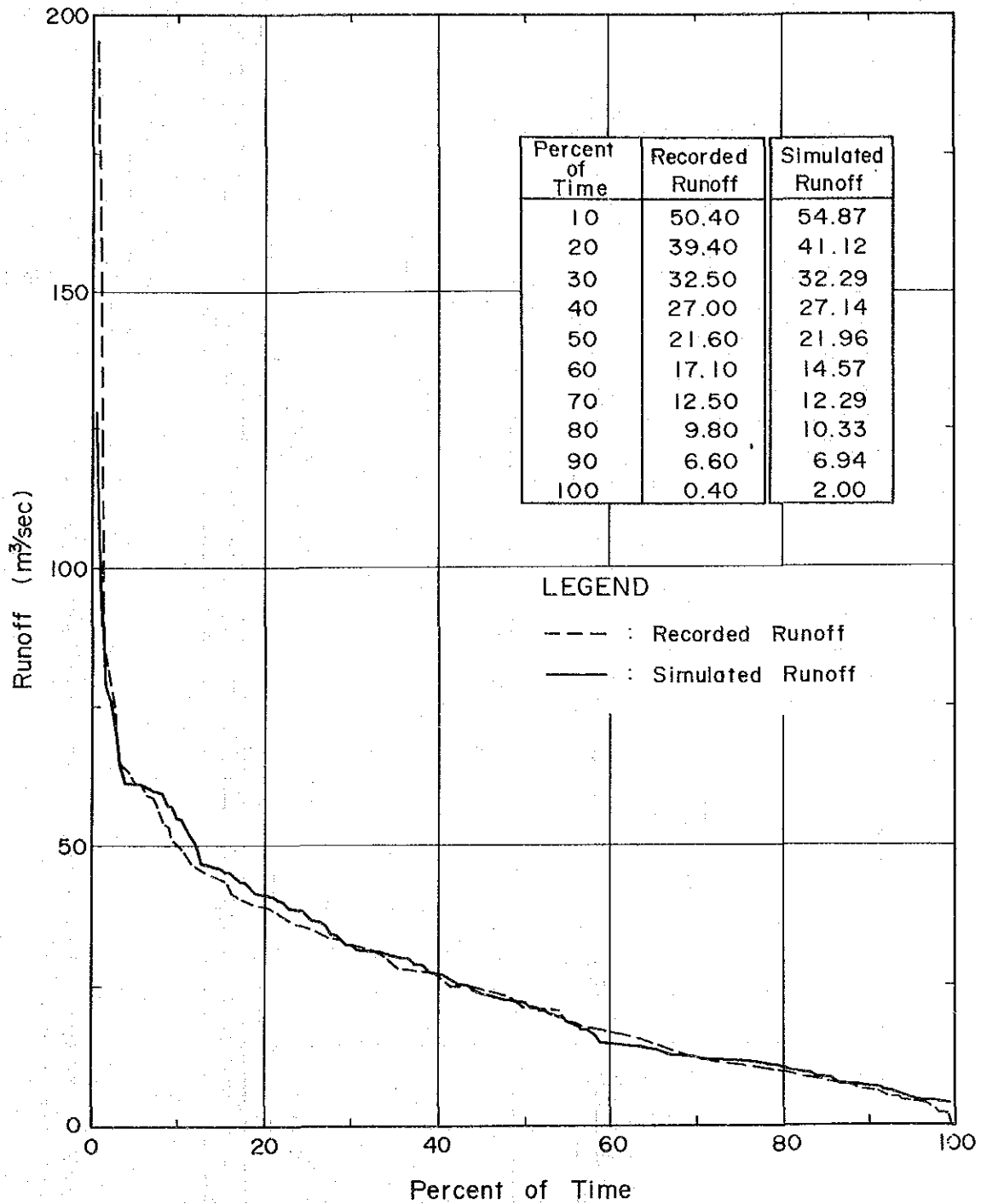
Station : BIAH

River System : SOOK RIVER

Stream : SOOK RIVER

Drainage Area : 1684. sq. km.

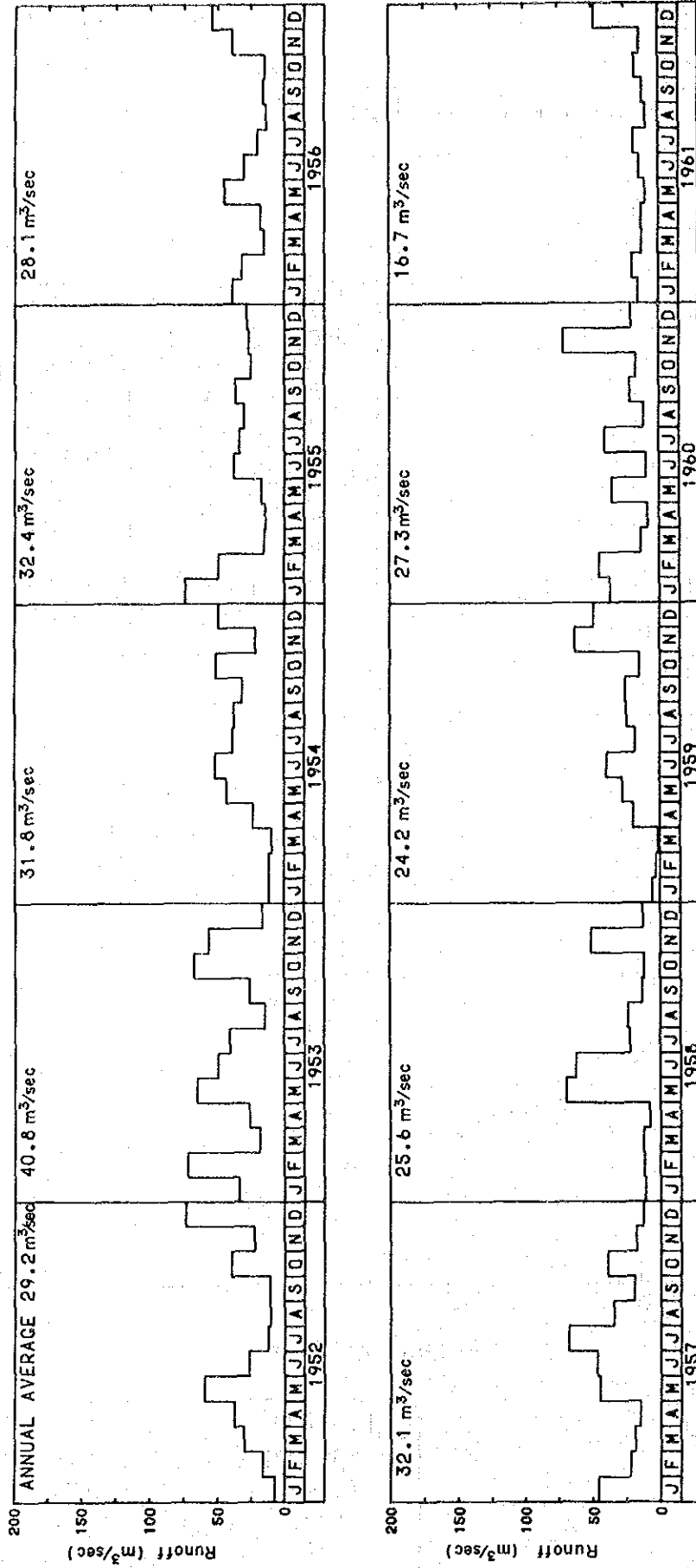
Period of Record : Jan. 1968 - Dec. 1982



TENOM PANGI PHASE III
 COMPARISON OF RUNOFF DURATION
 CURVE FOR RECORDED AND
 SIMULATED RUNOFF SERIES
 OF SOOK RIVER AT BIAH
 SEB / JICA

FIGURE NO.:A46-1

Station : BIAH River System : SOOK RIVER
 Stream : SOOK RIVER Drainage Area : 1664. sq.km.

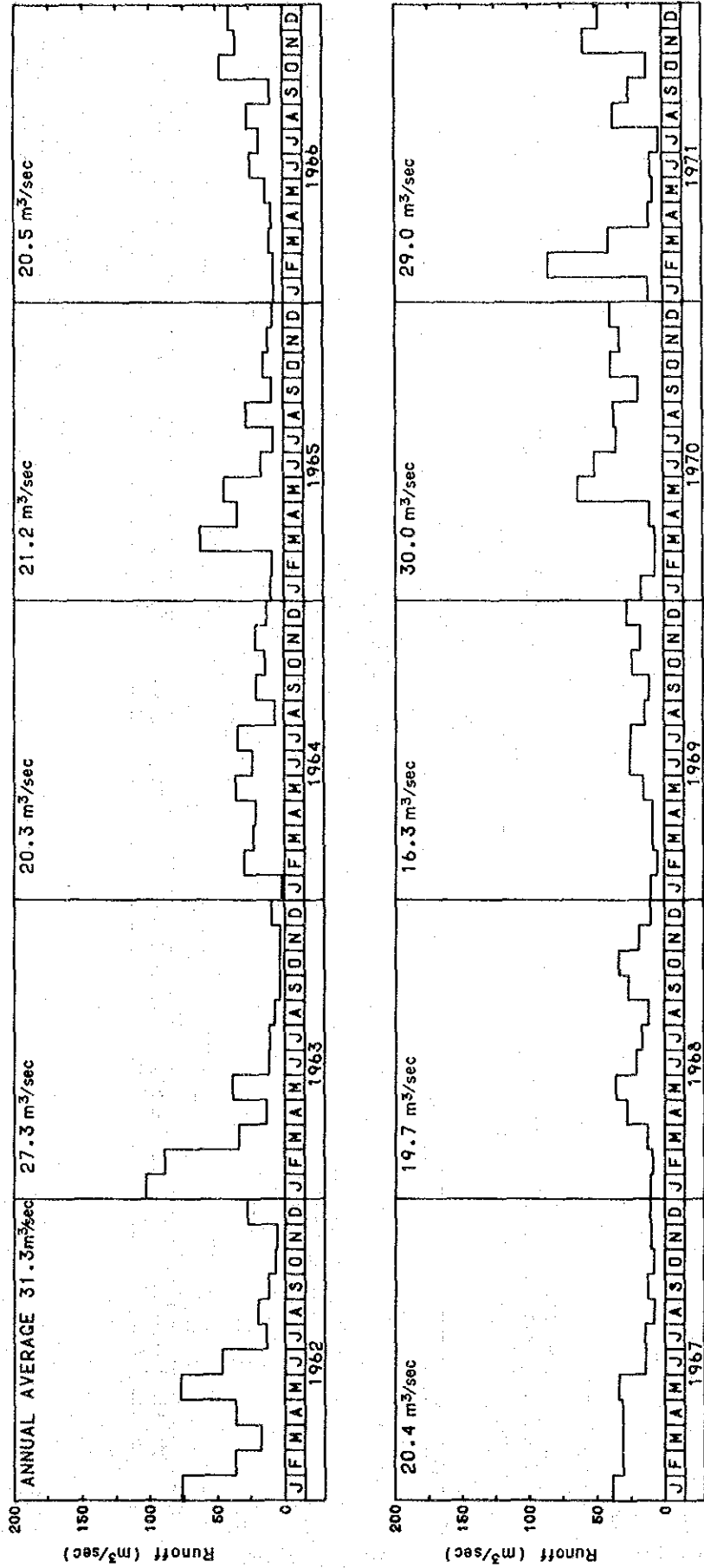


Note : Hydrographs of 1952 to 1967 are based on simulated runoff and those of 1968 to 1982 are based on recorded runoff.

TENOM PANGI PHASE III
 LONG-TERM MONTHLY RUNOFF SERIES
 OF
 SOOK RIVER AT BIAH (1/4)
 SEB / JICA

FIGURE NO.:A46-2

Station : BIAH
 Stream : SOOK RIVER
 River System : SOOK RIVER
 Drainage Area : 1684.59.km.

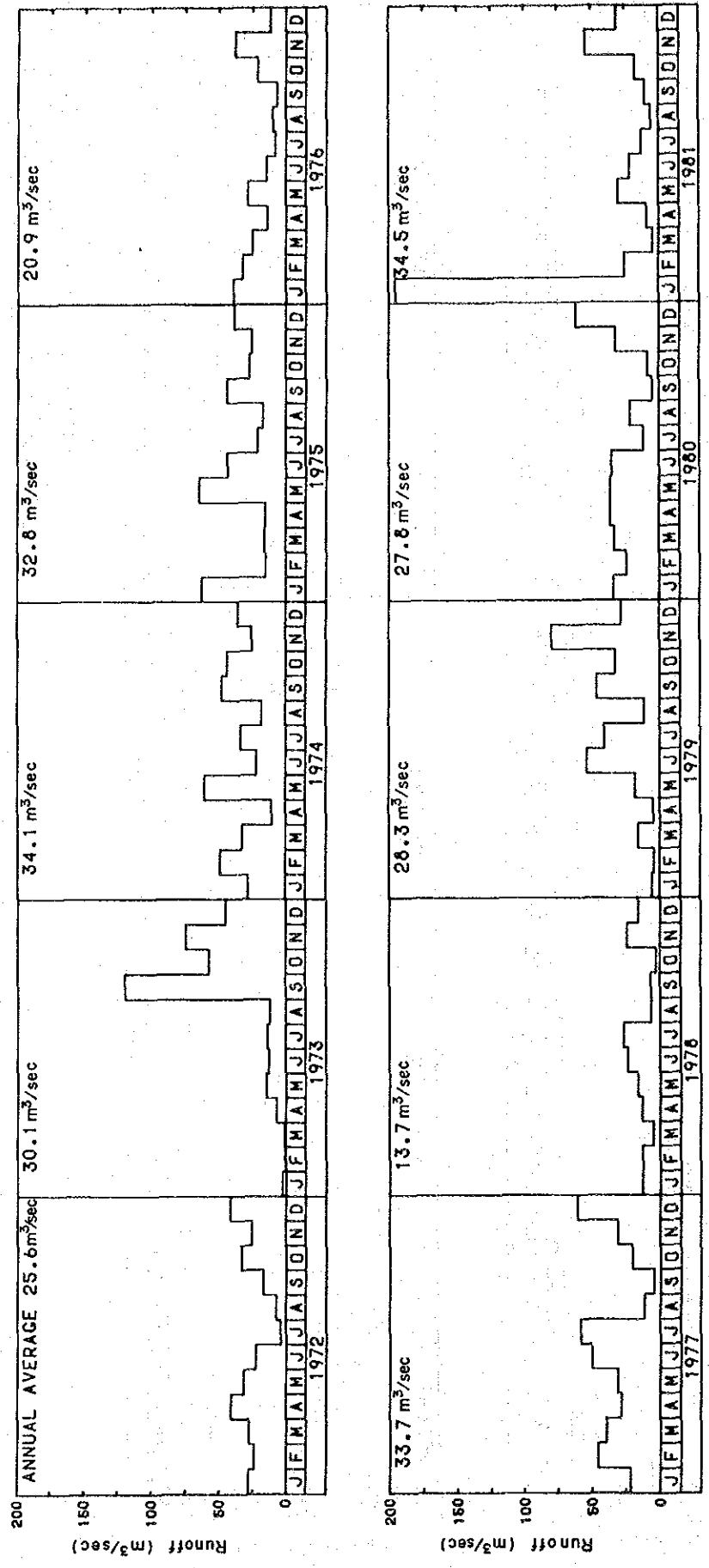


Note : Hydrographs of 1952 to 1967 are based on simulated runoff and those of 1968 to 1982 are based on recorded runoff.

TENOM PANGI PHASE III
 LONG-TERM MONTHLY RUNOFF SERIES
 OF
 SOOK RIVER AT BIAH (2/4)
 SEB / JICA

FIGURE NO: A46-3

Station : BIAH : SOOK RIVER
 Stream : SOOK RIVER : Drainage Area : 1664. sq.km.

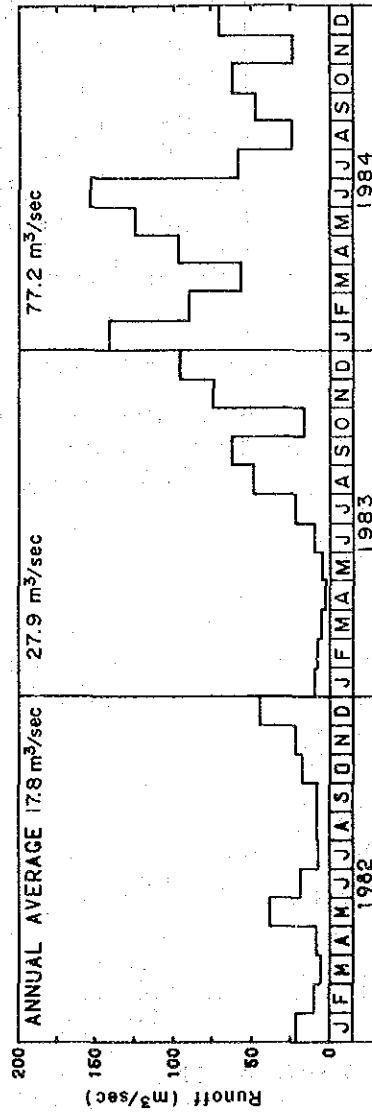


Note : Hydrographs of 1952 to 1967 are based on simulated runoff and those of 1968 to 1982 are based on recorded runoff.

TENOM PANGI PHASE III
 LONG-TERM MONTHLY RUNOFF SERIES
 OF
 SOOK RIVER AT BIAH (3/4)
 SEB / JICA

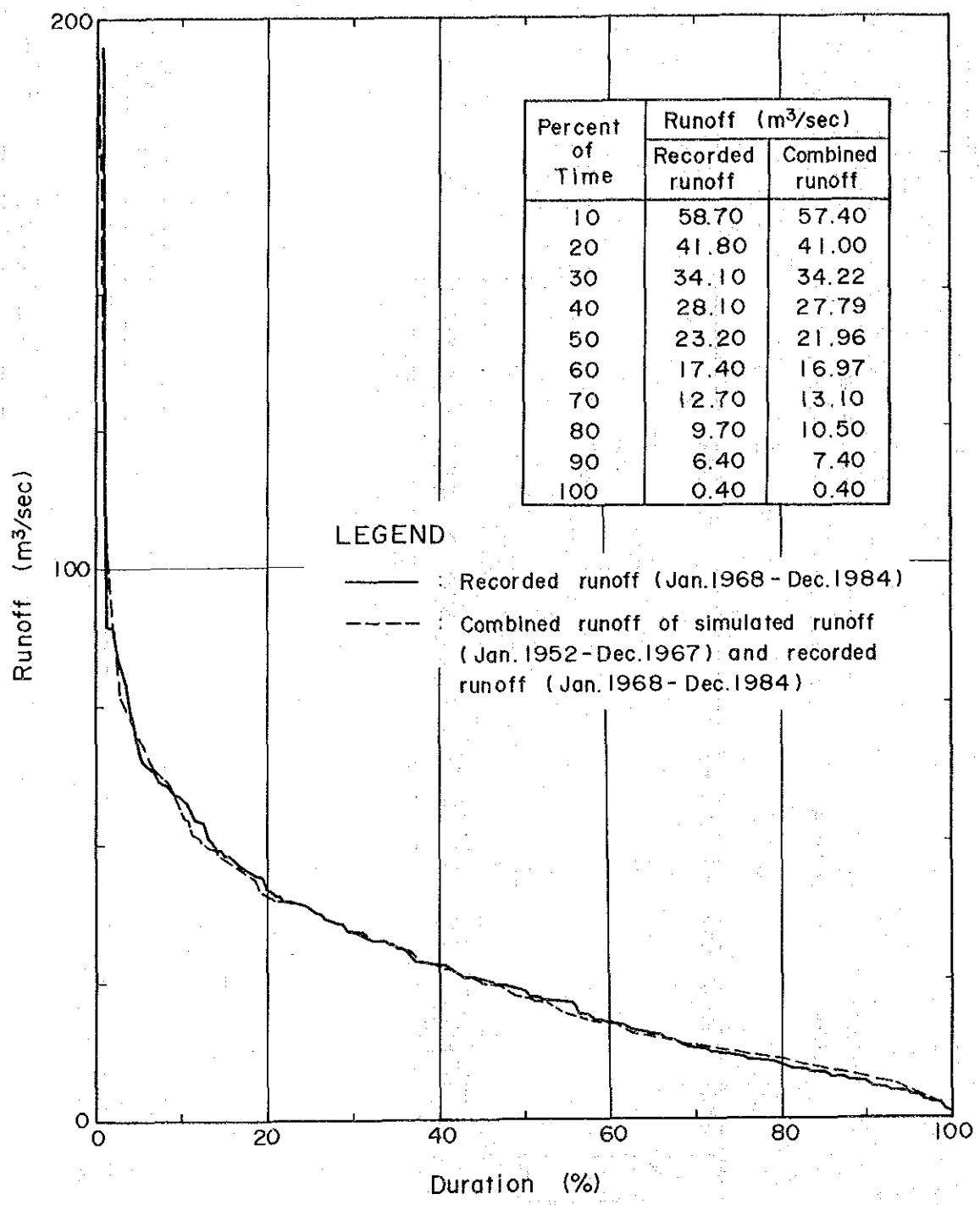
FIGURE NO: A46-4

Station : BIAH River System : SOOK RIVER
 Stream : SOOK RIVER Drainage Area : 1684.56.km.



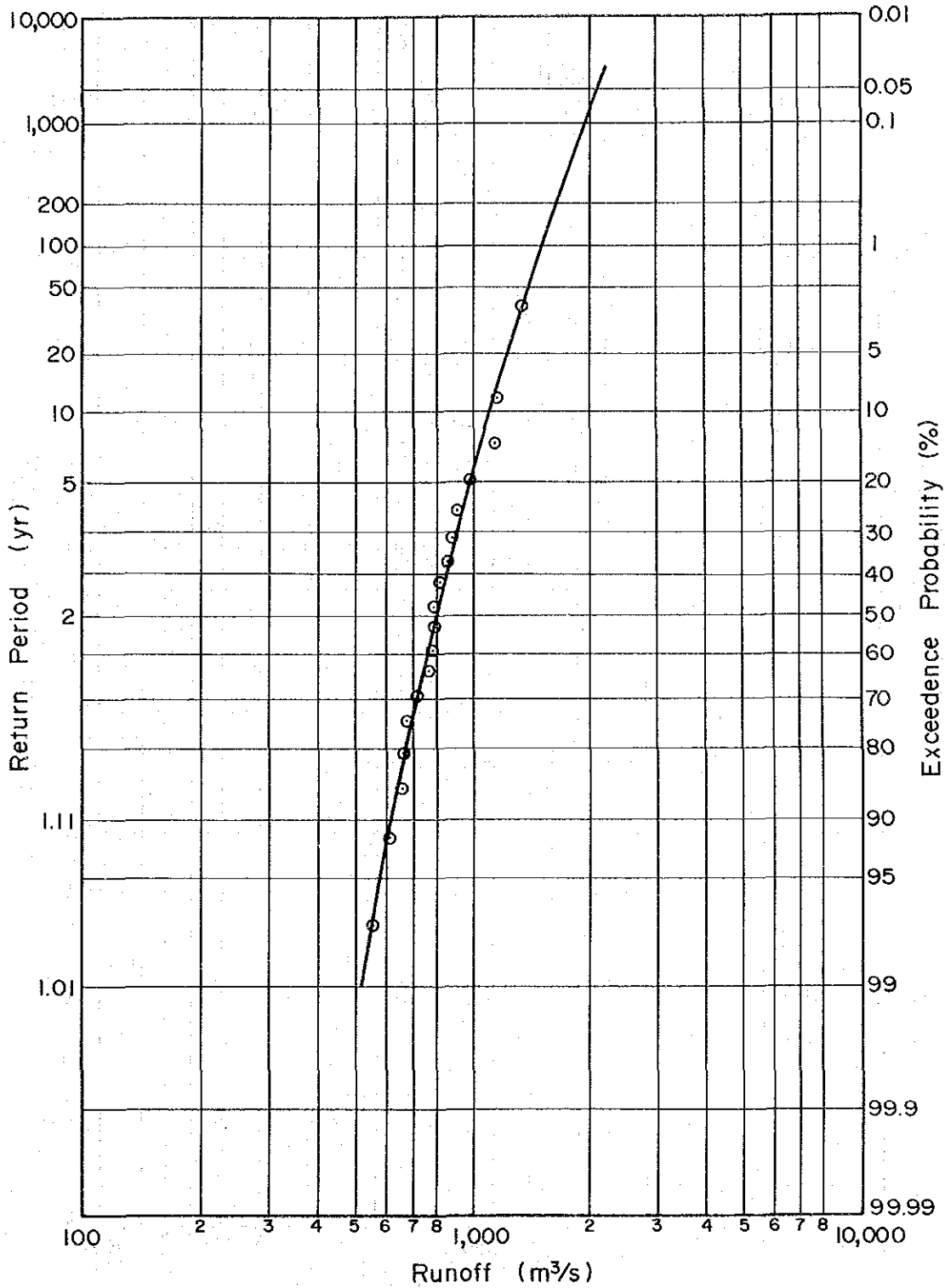
Note : Hydrographs of 1952 to 1967 are based on simulated runoff and those of 1968 to 1982 are based on recorded runoff.

TENOM PANGI PHASE III
 LONG-TERM MONTHLY RUNOFF SERIES
 OF
 SOOK RIVER AT BIAH (4/4)
 SEB / JICA



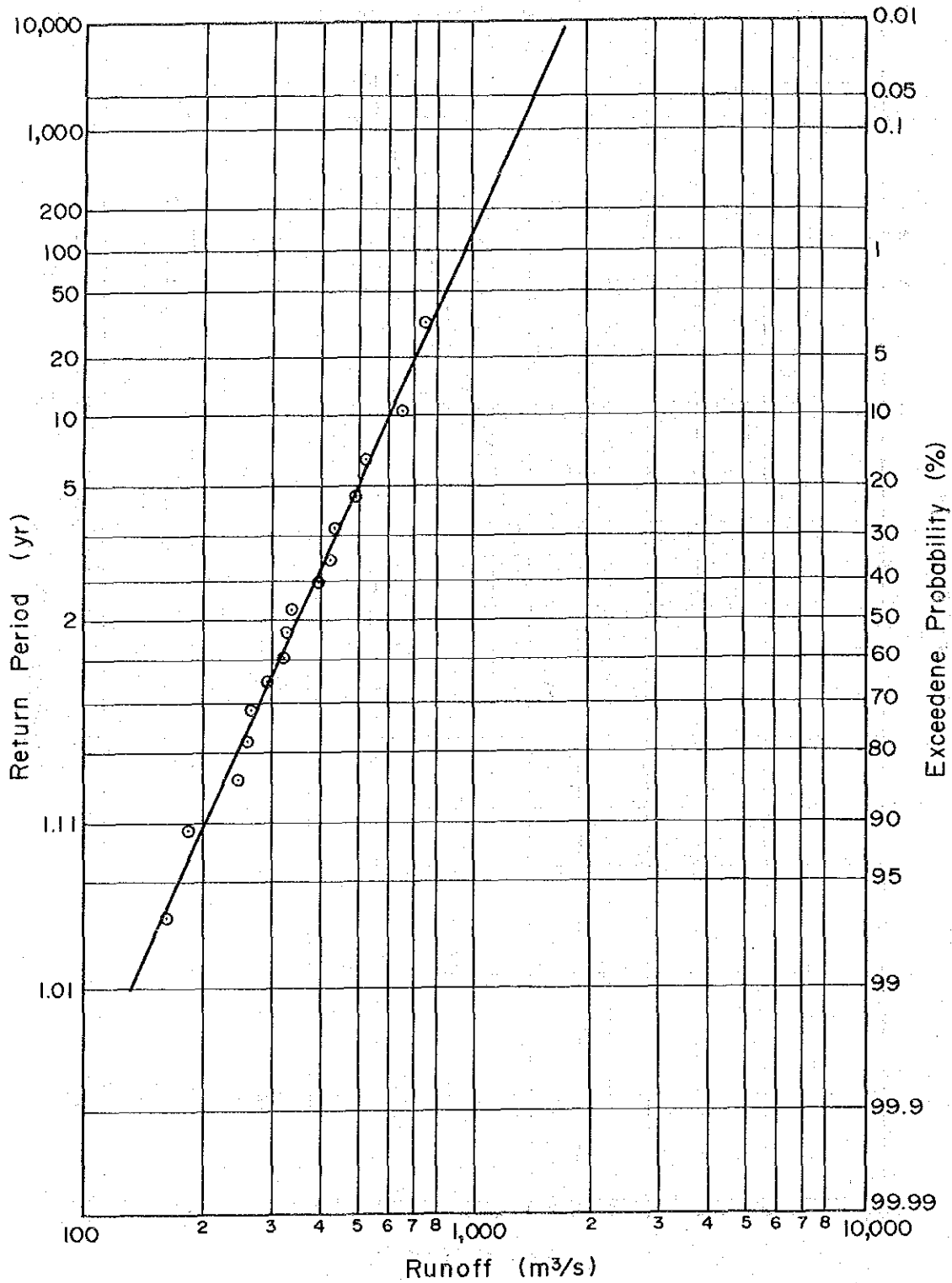
TENOM PANGI PHASE III
 RUNOFF DURATION CURVE
 OF
 SOOK RIVER AT BIAH
 SEB / JICA

FIGURE NO. : A48



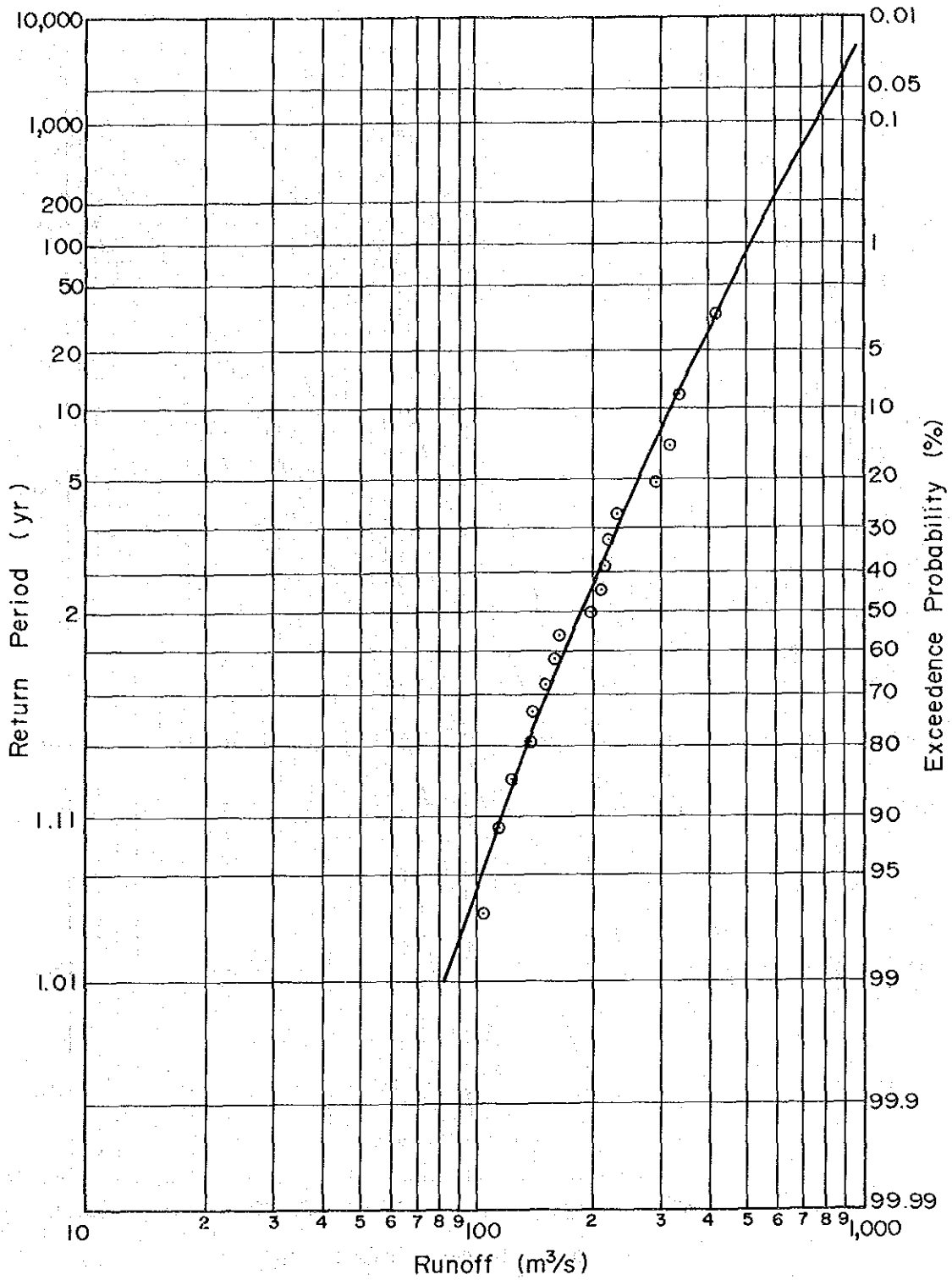
TENOM PANGI PHASE III
 FLOOD FREQUENCY OF PADAS RIVER
 AT
 TENOM LAMA (5159401)
 SEB / JICA

FIGURE NO. : A49



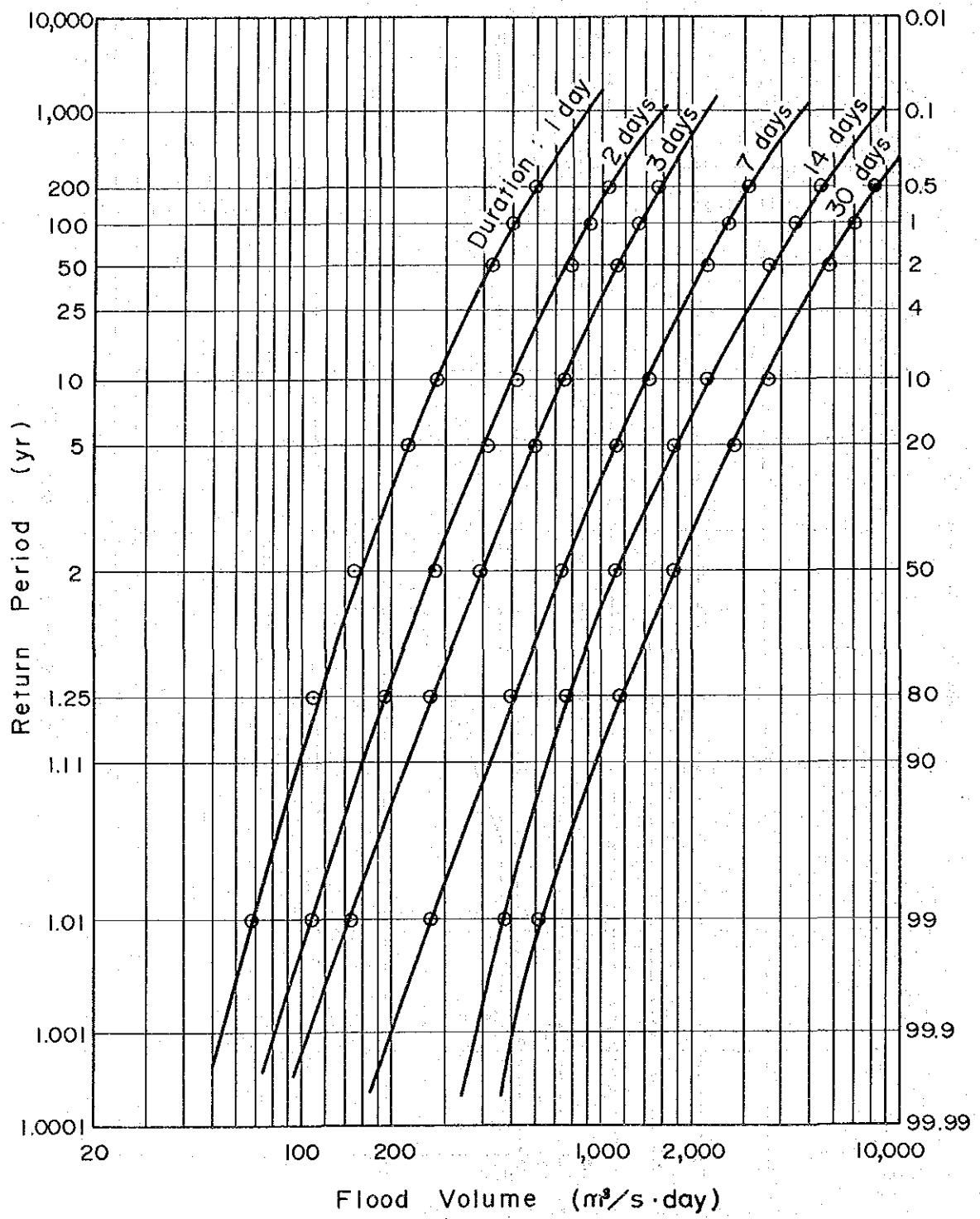
TENOM PANGI PHASE III
 FLOOD FREQUENCY OF PEGALAN RIVER
 AT
 ANSIP (5261401)
 SEB / JICA

FIGURE NO. : A50

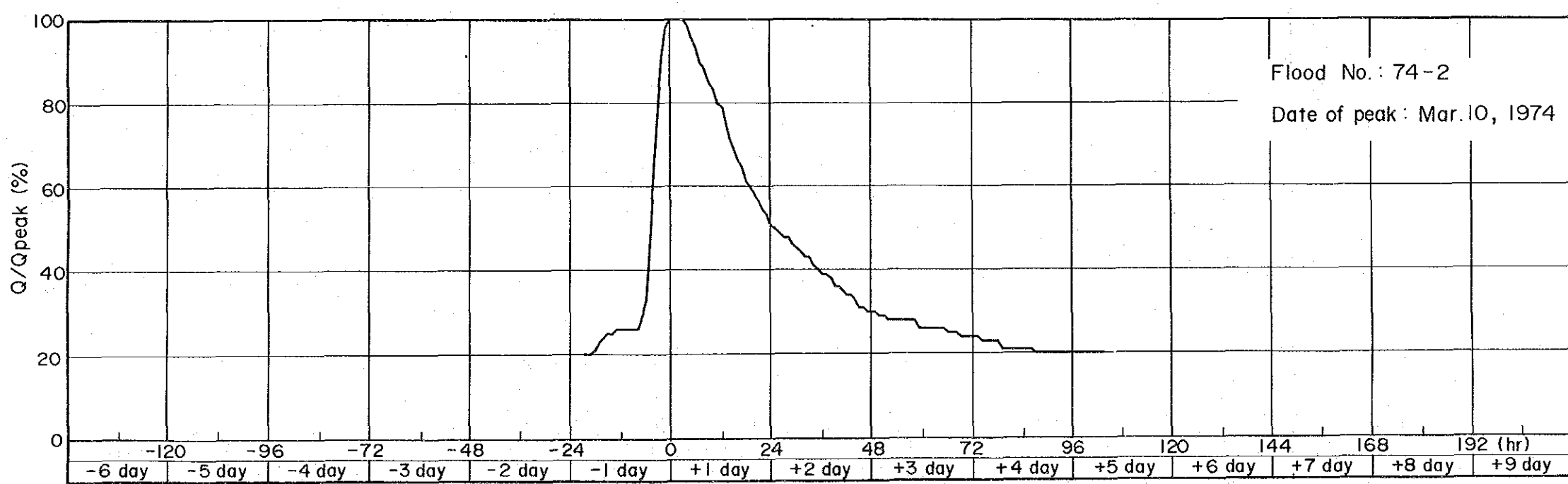
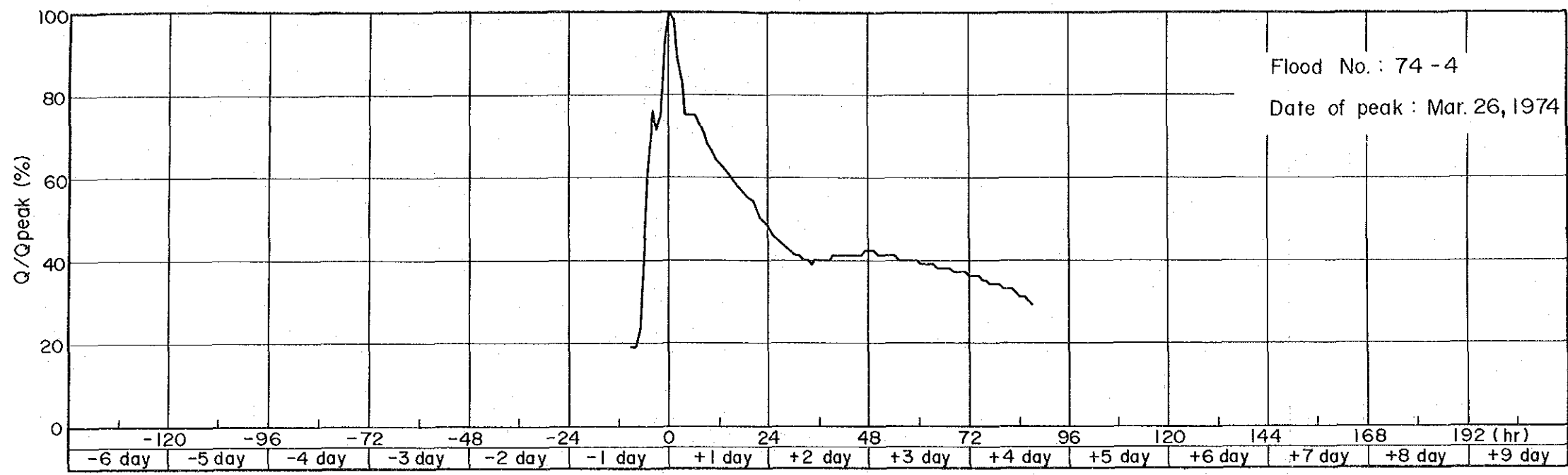


TENOM PANGI PHASE III
 FLOOD FREQUENCY
 OF
 SOOK RIVER AT BIAH (5261402)
 SEB / JICA

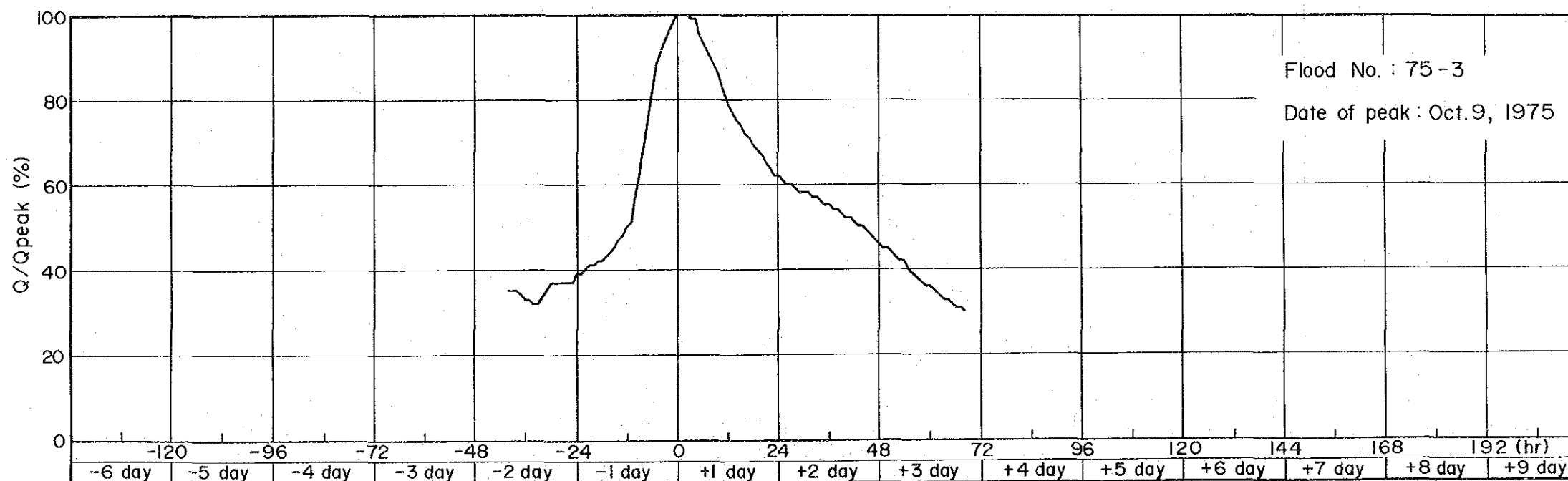
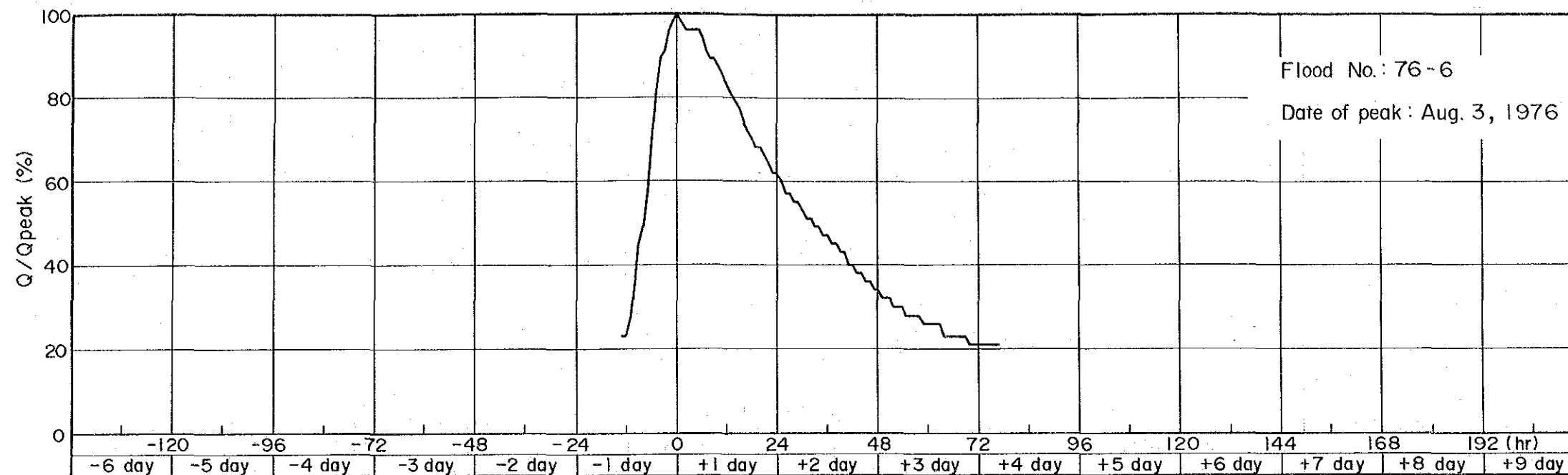
FIGURE NO. : A51



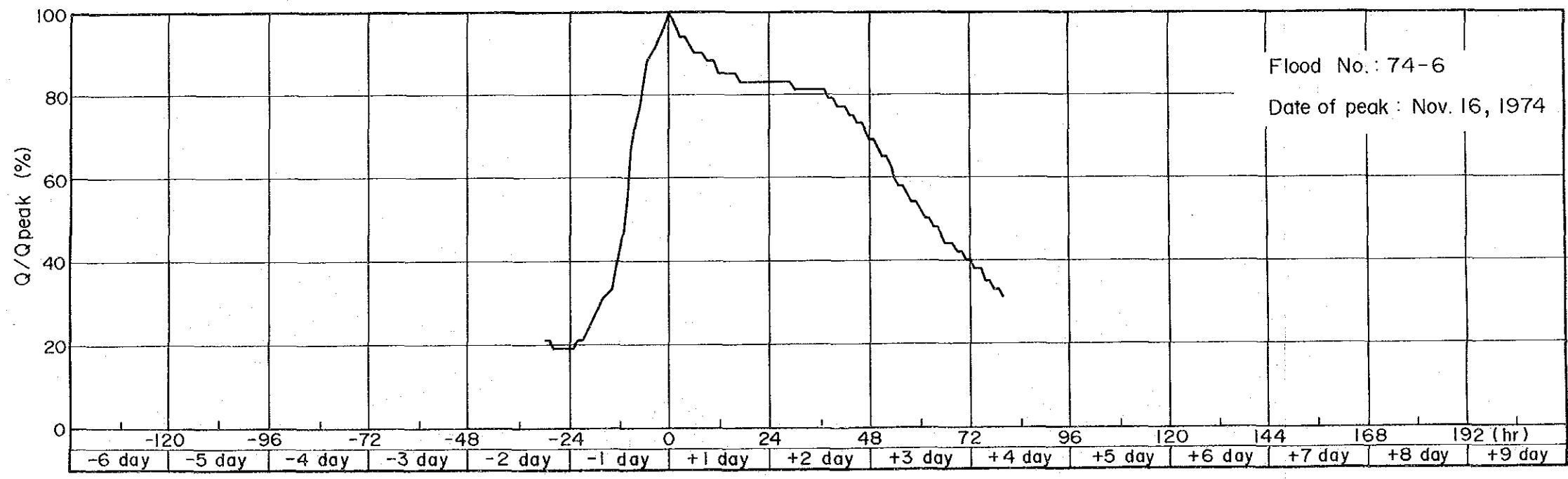
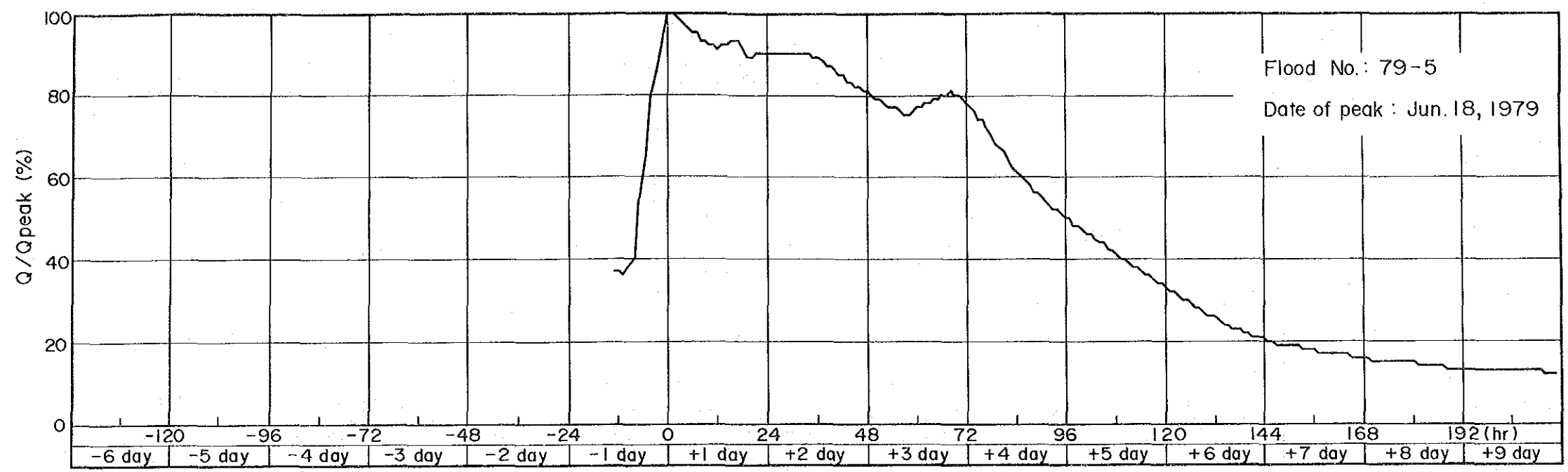
TENOM PANGI PHASE III
 FREQUENCY CURVE OF
 FLOOD VOLUME OF
 SOOK RIVER AT BIAH
 SEB / JICA



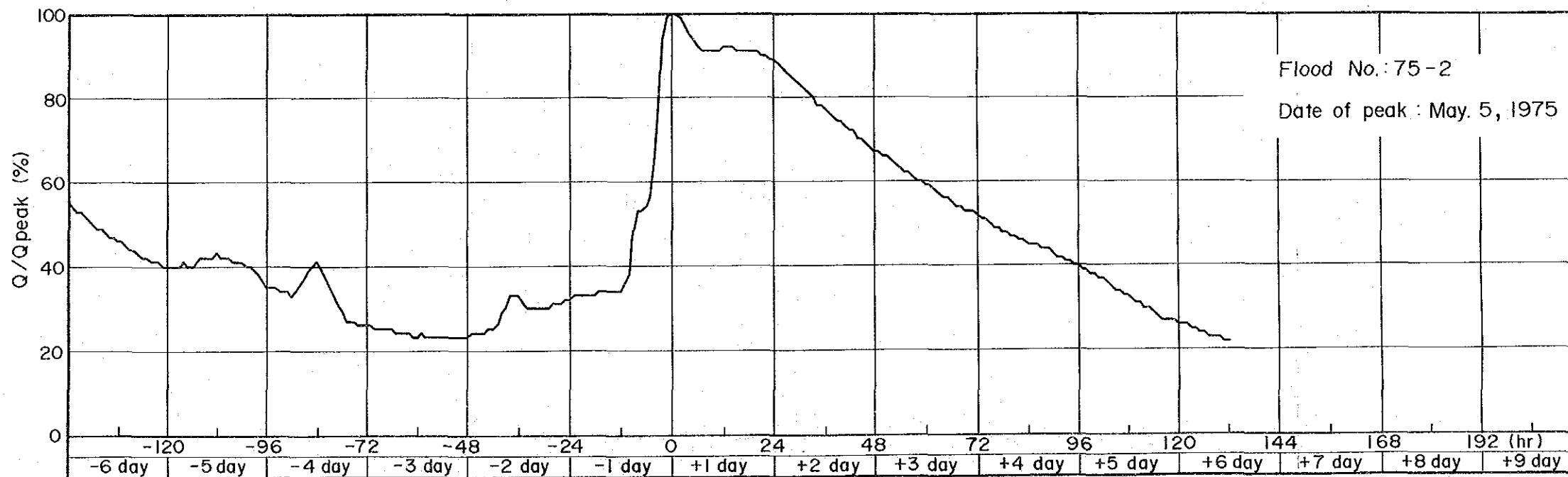
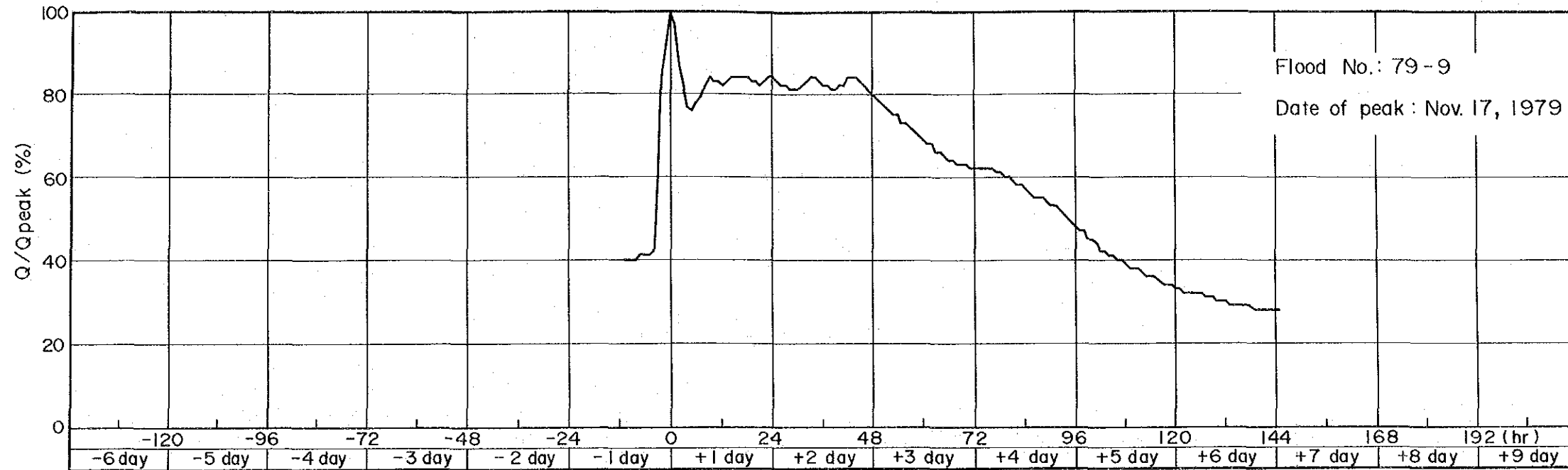
TENOM PANGI PHASE III
TYPICAL FLOOD HYDROGRAPHS
(TYPE Ia) OF SOOK RIVER
AT BIAH
SEB / JICA



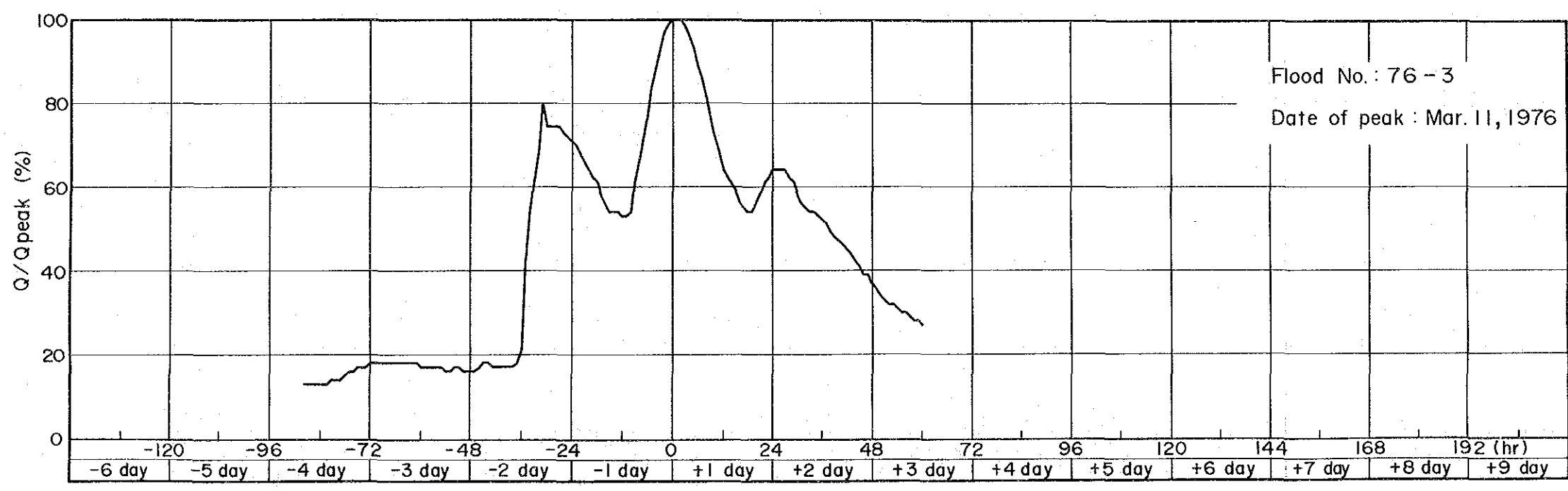
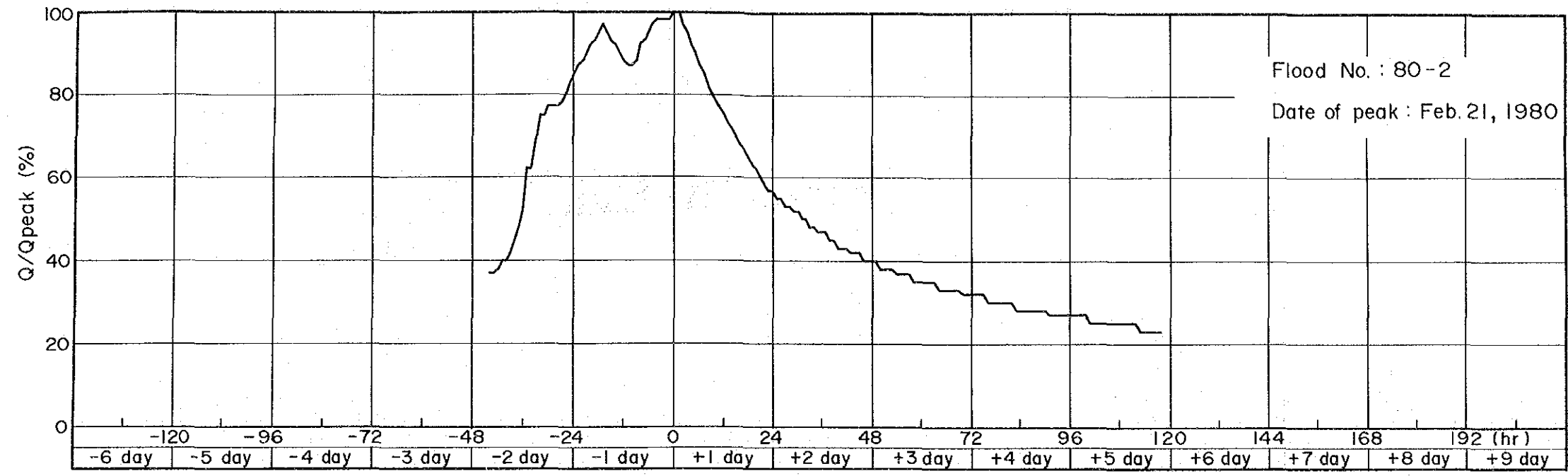
TENOM PANGI PHASE III
TYPICAL FLOOD HYDROGRAPHS
(TYPE Ib) OF SOOK RIVER
AT BIAH
SEB / JICA



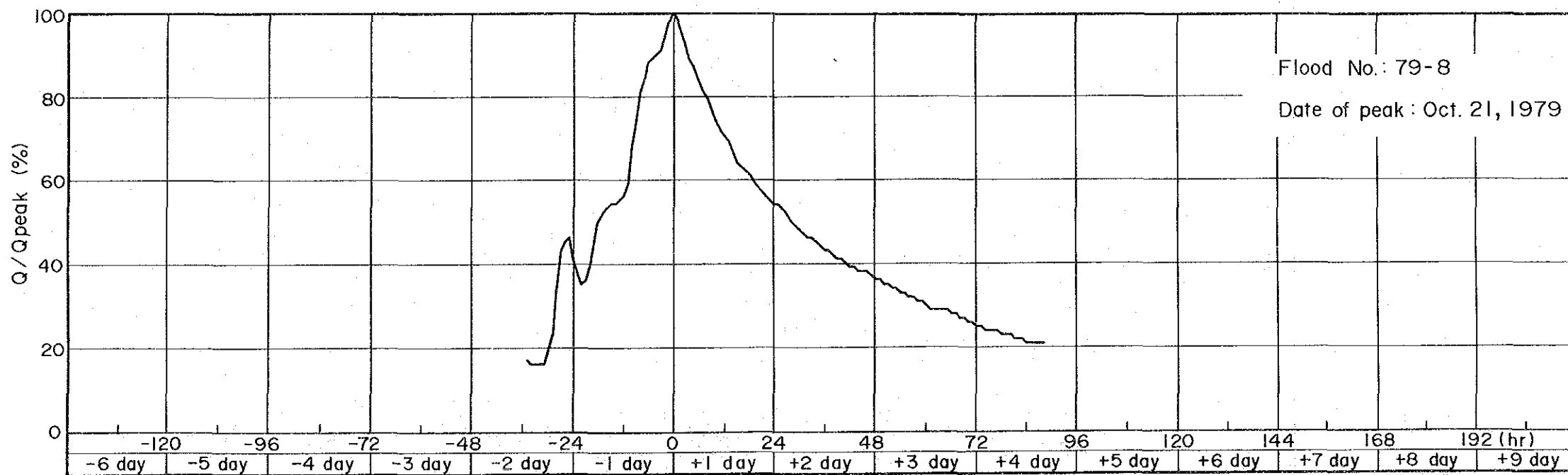
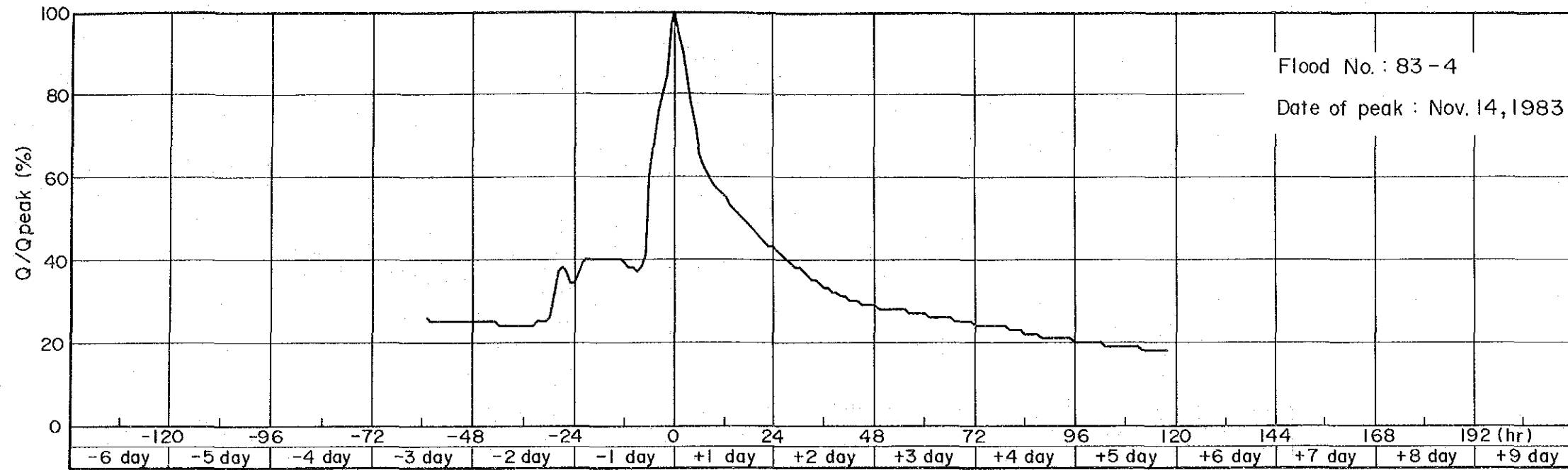
TENOM PANGI PHASE III
TYPICAL FLOOD HYDROGRAPHS
TYPE Ia) OF SOOK RIVER
AT BIAH
SEB / JICA



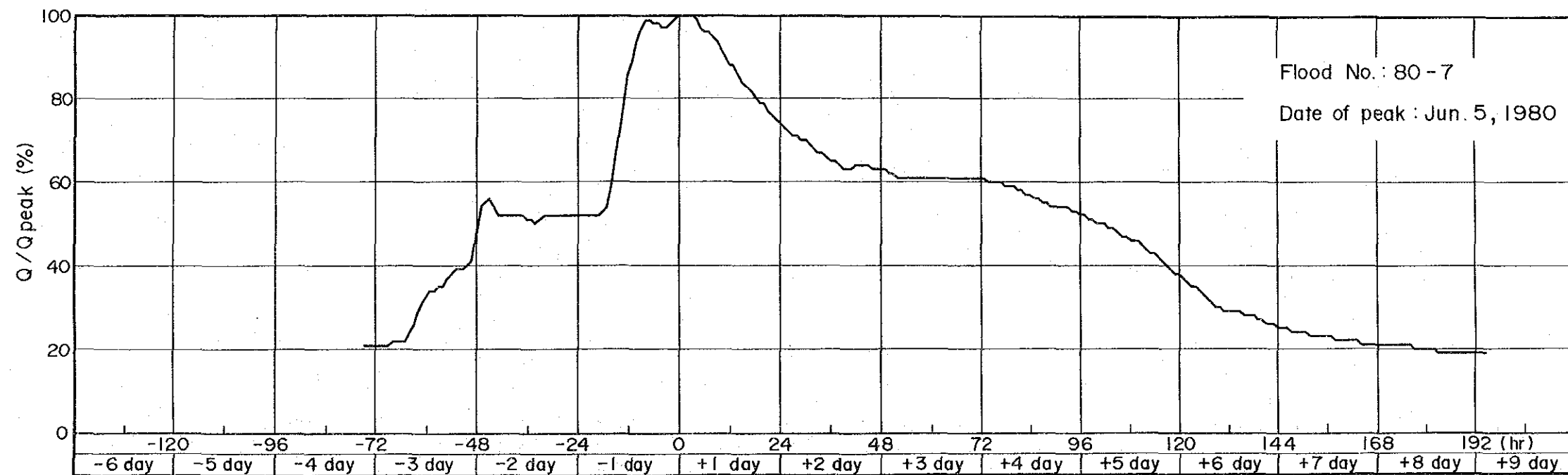
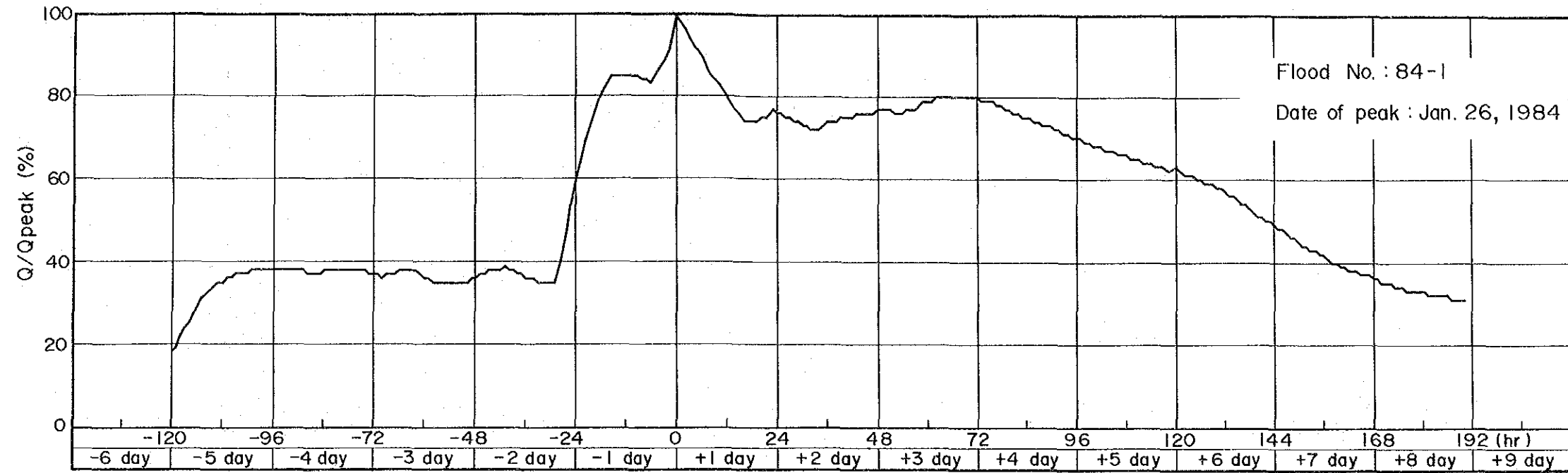
TENOM PANGI PHASE III
TYPICAL FLOOD HYDROGRAPHS
(TYPE IIb) OF SOOK RIVER
AT BIAH
SEB / JICA



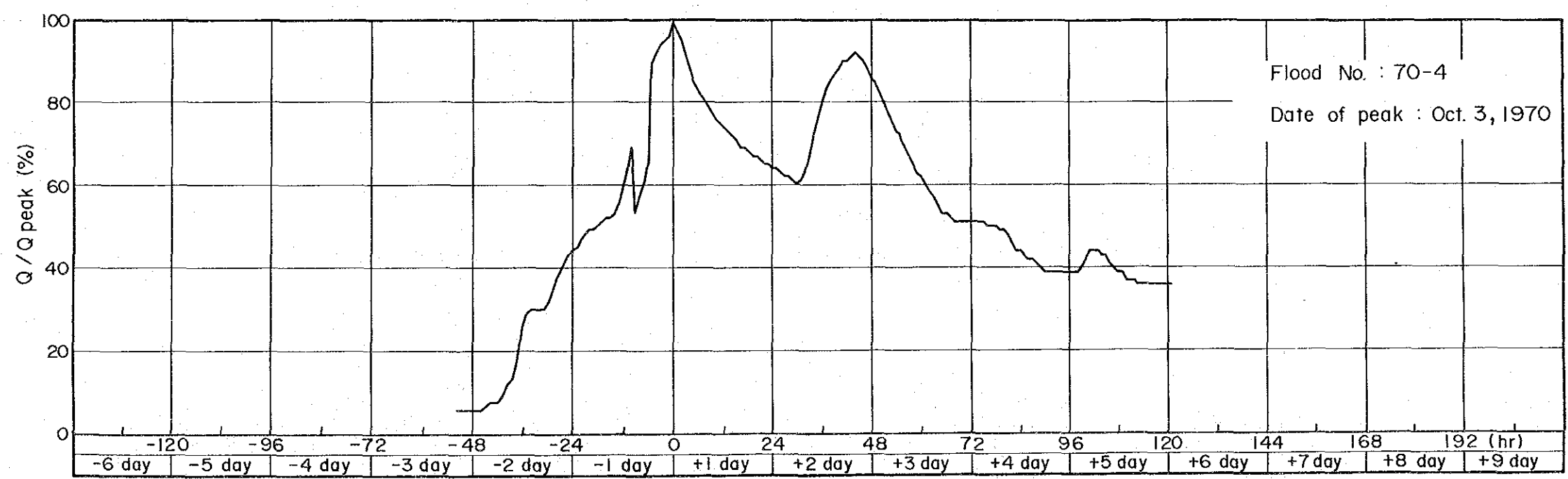
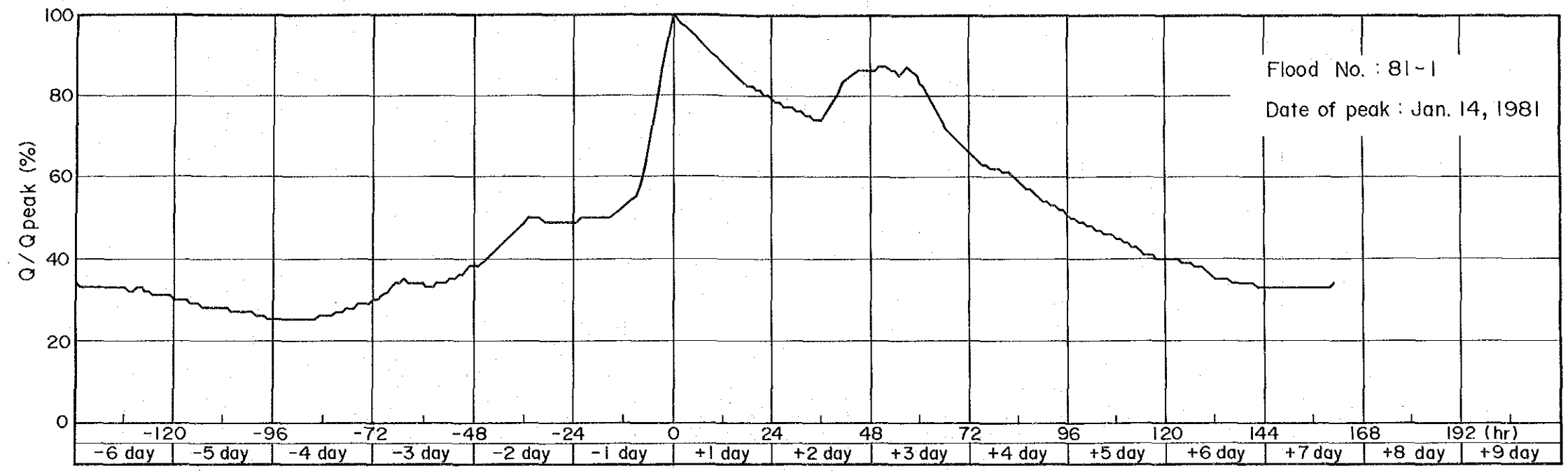
TENOM PANGI PHASE III
TYPICAL FLOOD HYDROGRAPHS
(TYPE III) OF SOOK RIVER
AT BIAH
SEB / JICA



TENOM PANGI PHASE III
TYPICAL FLOOD HYDROGRAPHS
(TYPE IVa) OF SOOK RIVER
AT BIAH
SEB / JICA

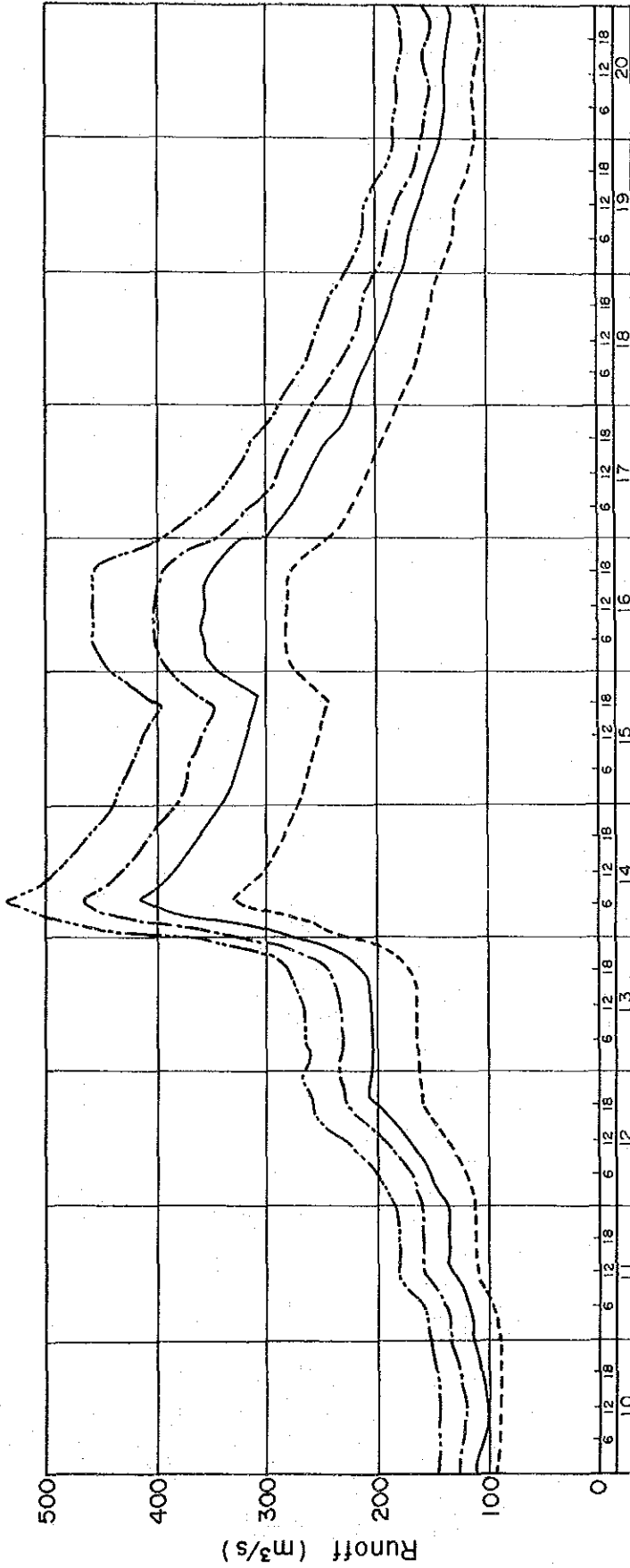


TENOM PANGI PHASE III
TYPICAL FLOOD HYDROGRAPHS
(TYPE IVb) OF SOOK RIVER
AT BIAH
SEB / JICA



TENOM PANGI PHASE III
 TYPICAL FLOOD HYDROGRAPHS
 (TYPE IVc) OF SOOK RIVER
 AT BIAH
 SEB / JICA

FIGURE NO. : A53



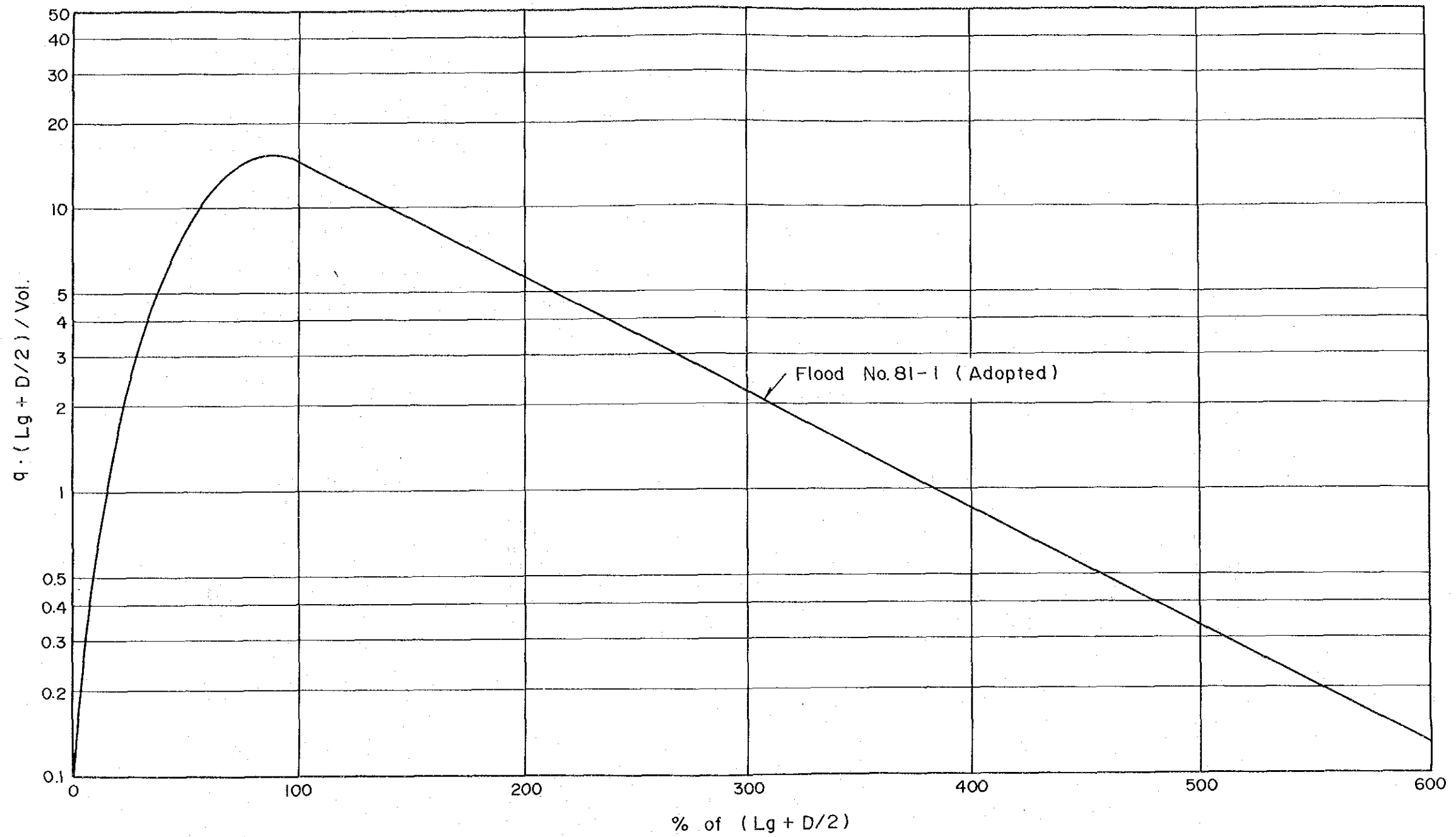
LEGEND

- RECORDED MAXIMUM FLOOD
- - - 10 YEARS PROBABLE FLOOD
- · - 50 YEARS PROBABLE FLOOD
- · · 100 YEARS PROBABLE FLOOD

TENOM PANGI PHASE III

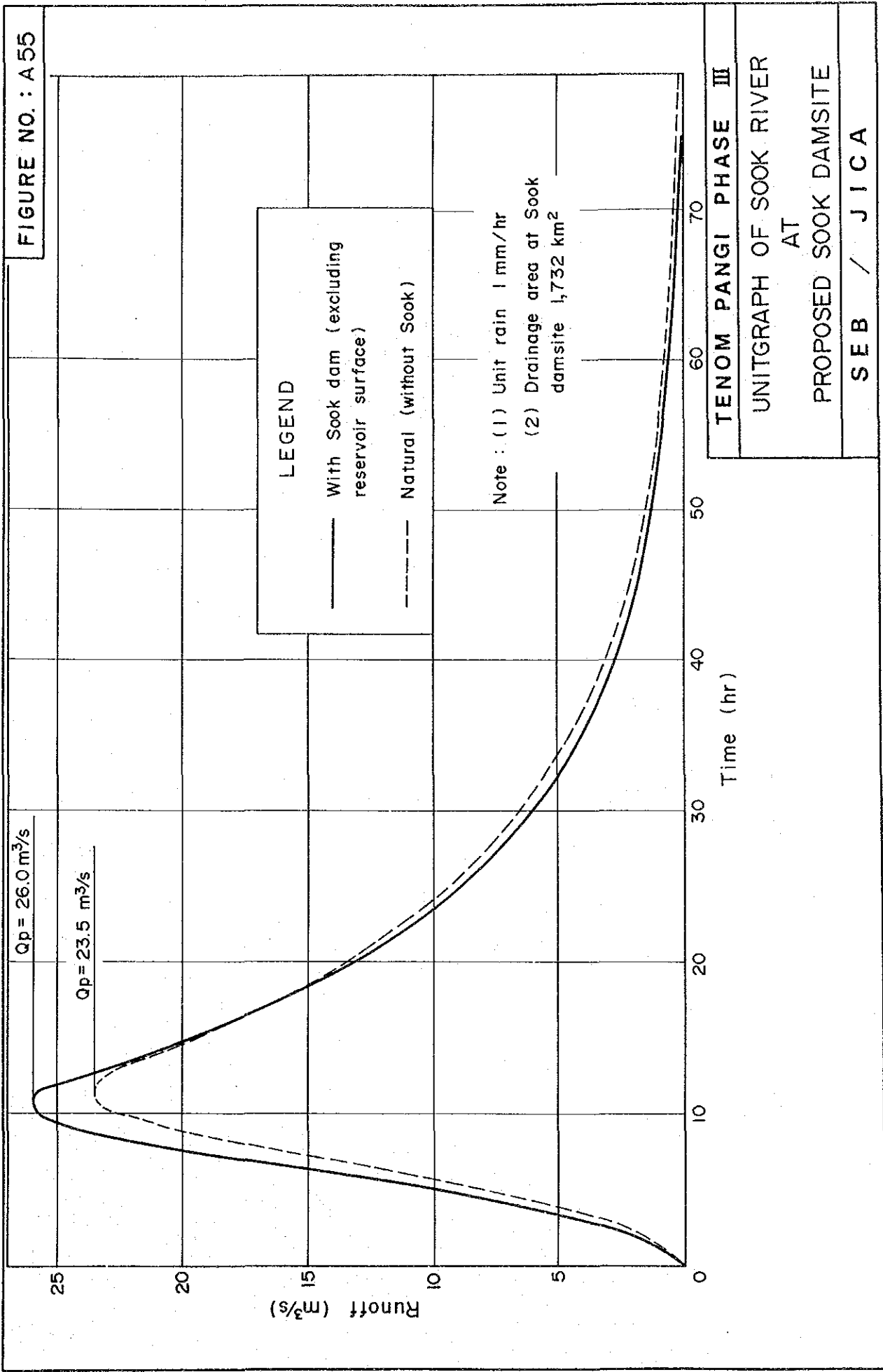
HYDROGRAPH OF RECORDED
 MAXIMUM FLOOD AND PROBABLE
 FLOODS OF SOOK RIVER AT BIAH

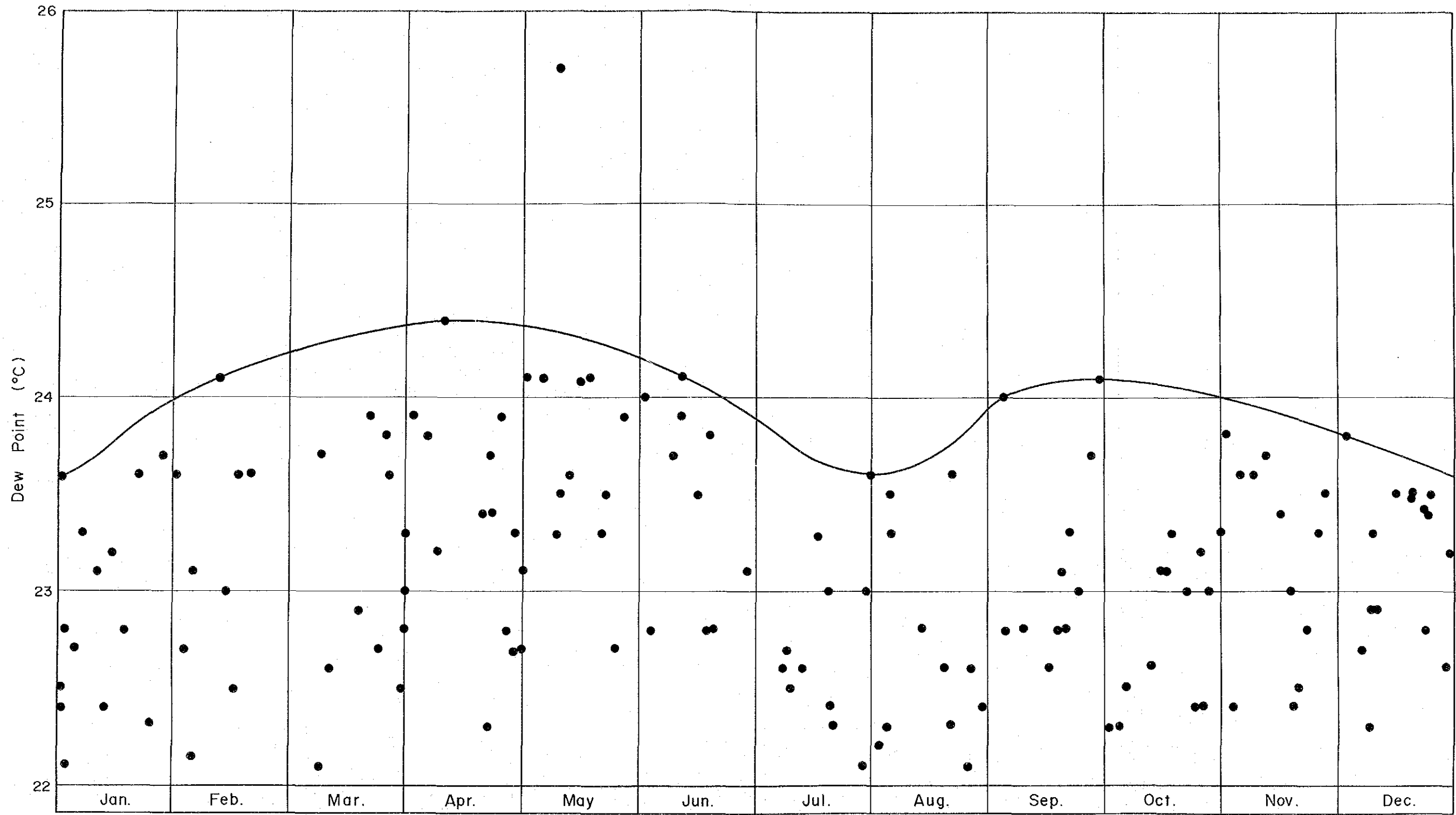
SEB / JICA



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|--|
| TENOM PANGI PHASE III |
| DIMENSIONLESS GRAPH FOR SOOK RIVER BASIN |
| SEB / JICA |

FIGURE NO. : A 55



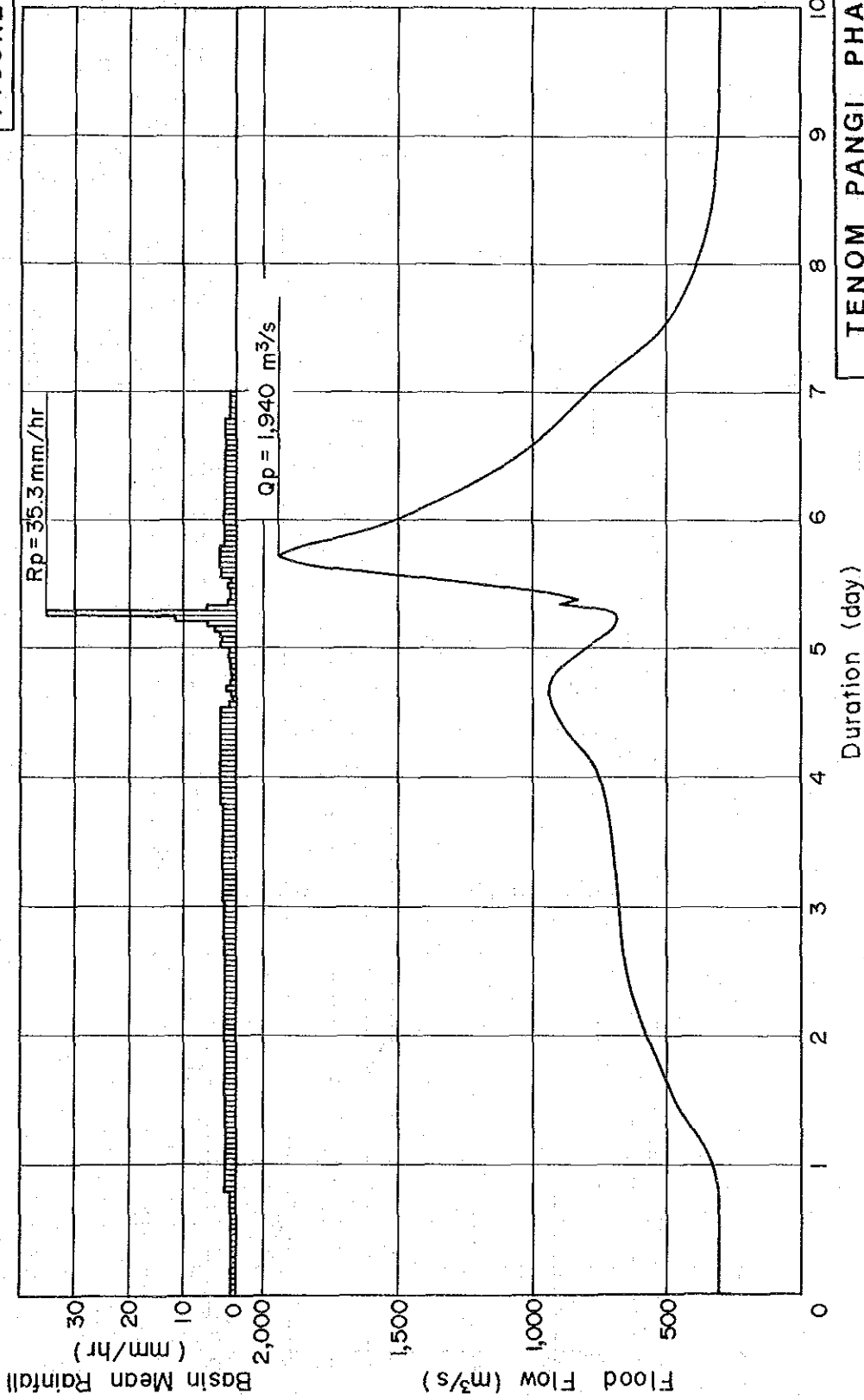


Notes ;

- 1) Observation time : 08:00 a.m. (00:00 GMT.)
- 2) Data : 1972~1985
- 3) Dew point at station elevation 290.0m

| |
|---|
| TENOM PANGI PHASE III |
| MAXIMUM DEW POINT RECORDS AT KENINGAU |
| SEB / JICA |

FIGURE NO. : A57



Note : Riass = 1.5 mm/hr
 10 day flood volume
 = $560 \times 10^6 \text{ m}^3$

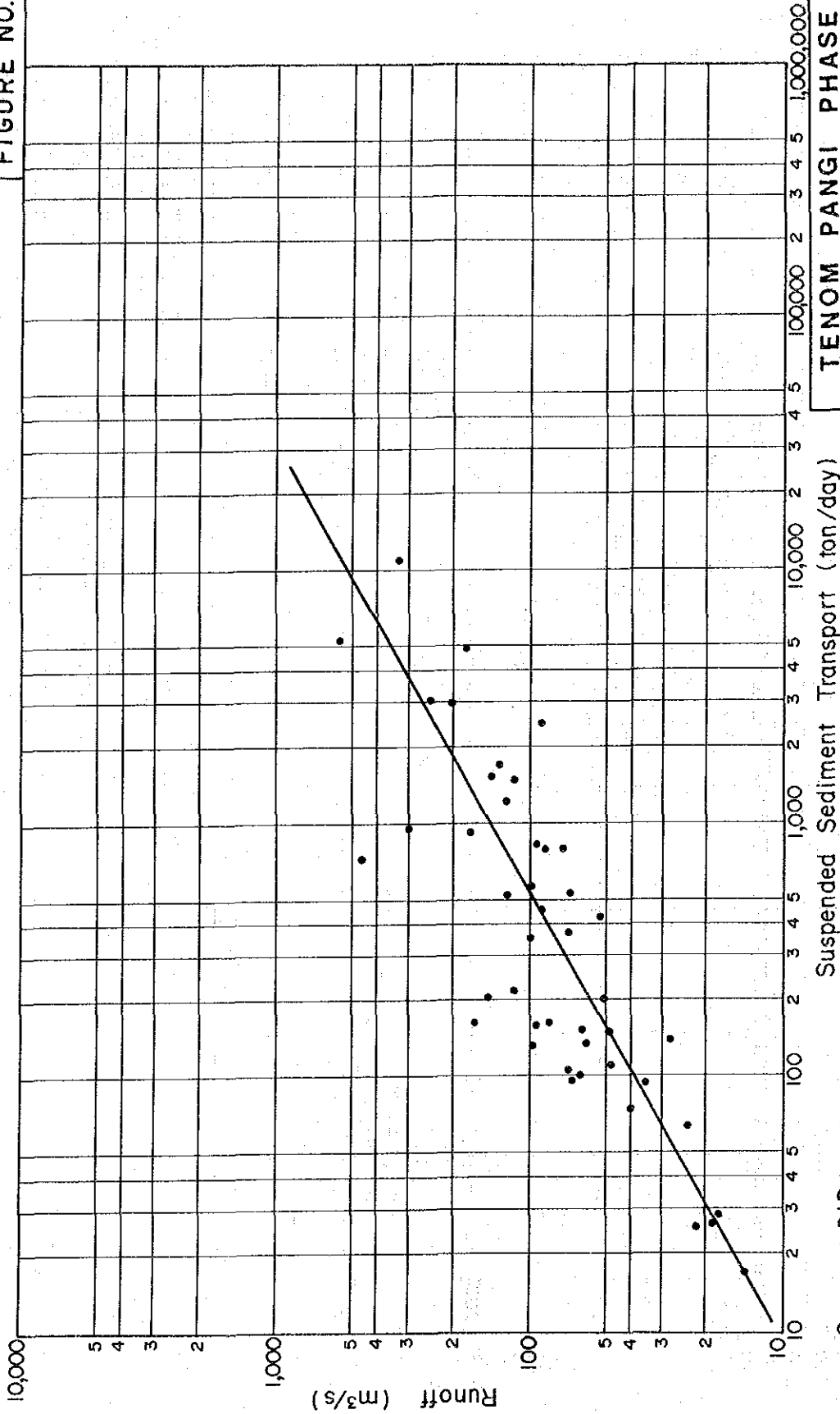
TENOM PANGI PHASE III

PROBABLE MAXIMUM FLOOD
 OF

SOOK DAM

SEB / JICA

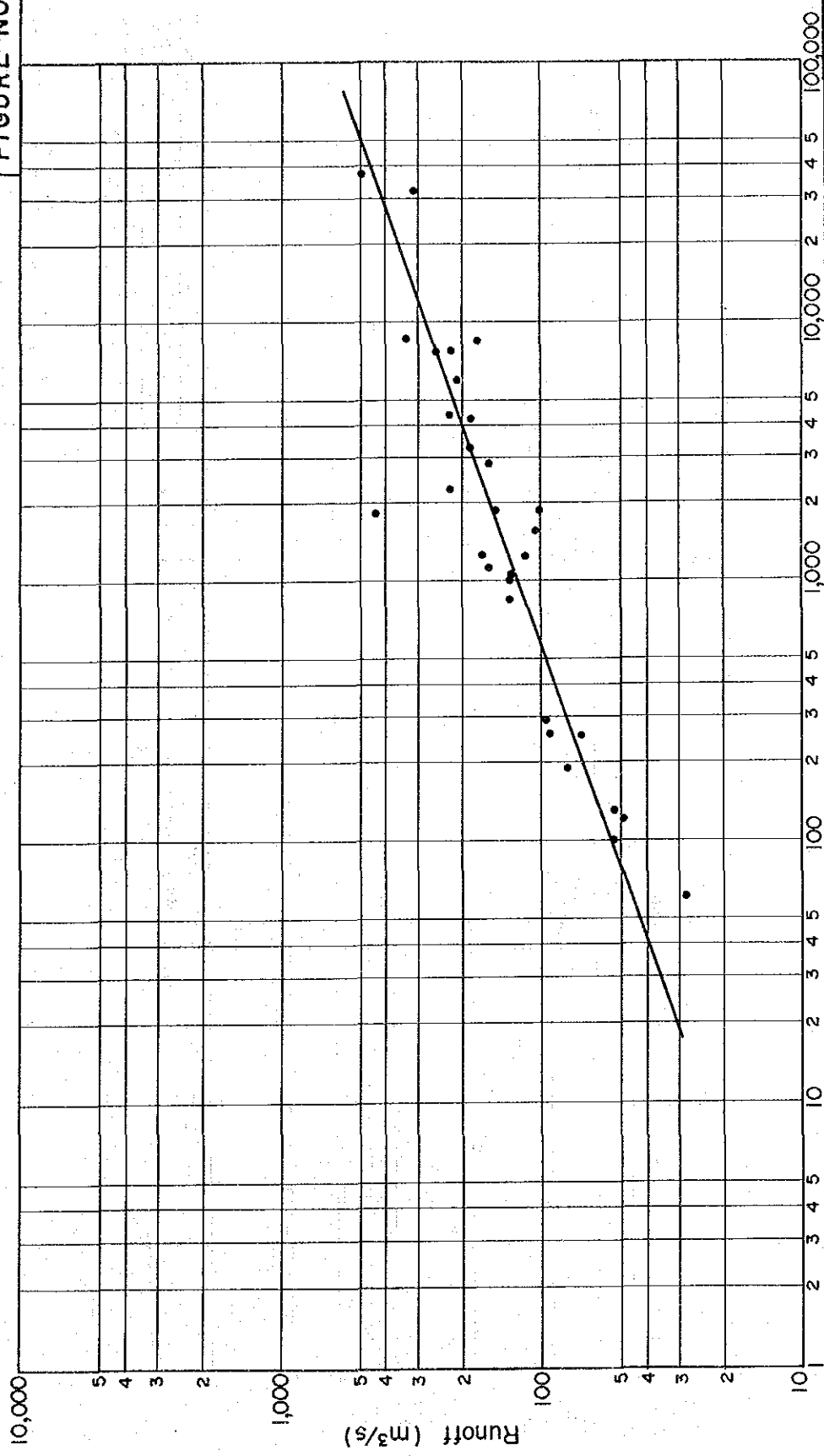
FIGURE NO. : A58



Source : DID

TENOM PANGI PHASE III
 SUSPENDED SEDIMENT RATING CURVE
 OF
 UPPER PADAS RIVER AT KEMABONG
 SEB / JICA

FIGURE NO. : A59



Suspended Sediment Transport (ton/day)

Source : DID

TENOM PANGI PHASE III

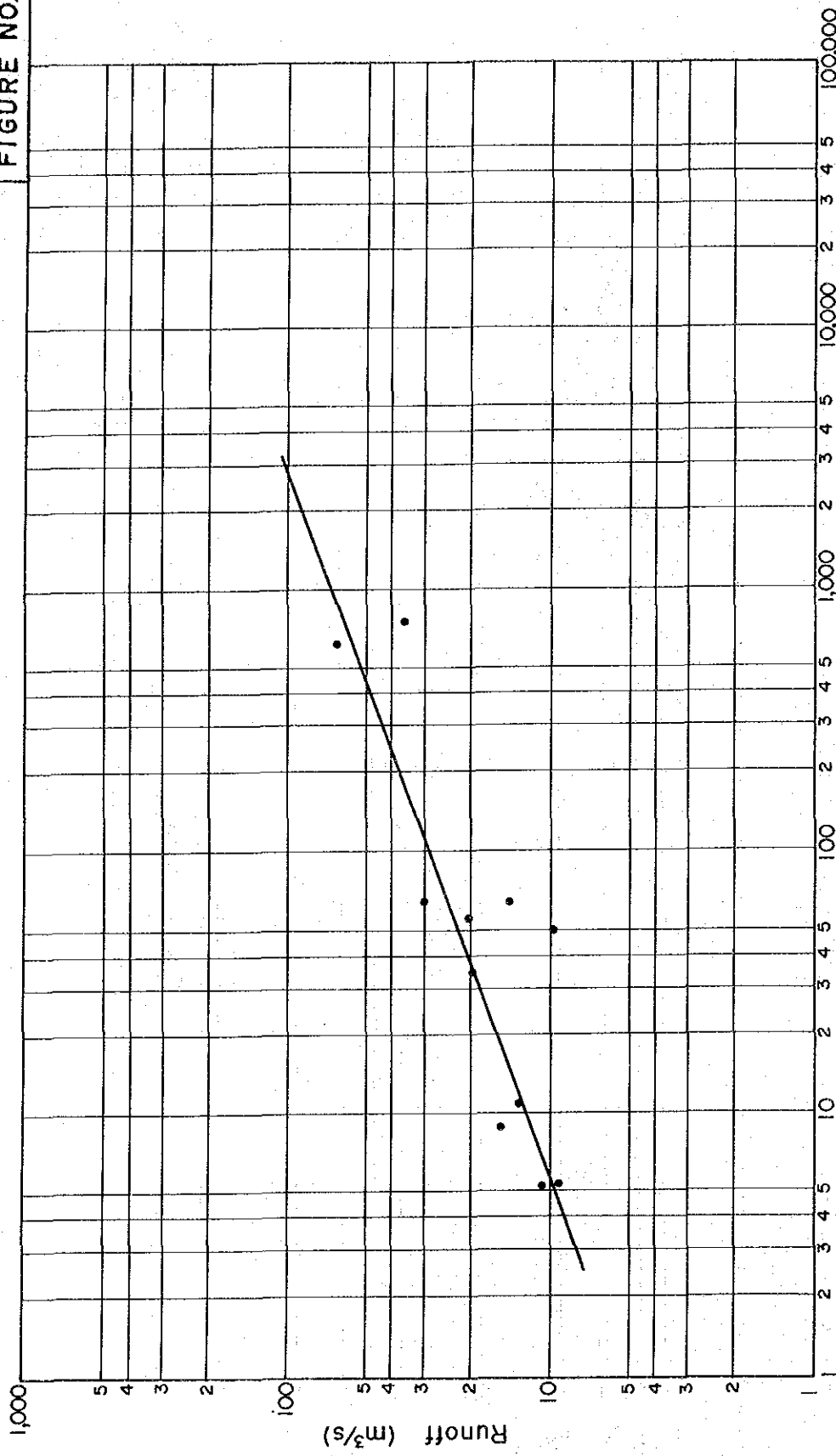
SUSPENDED SEDIMENT RATING CURVE

OF

PADAS RIVER AT TENOM LAMA

SEB / JICA

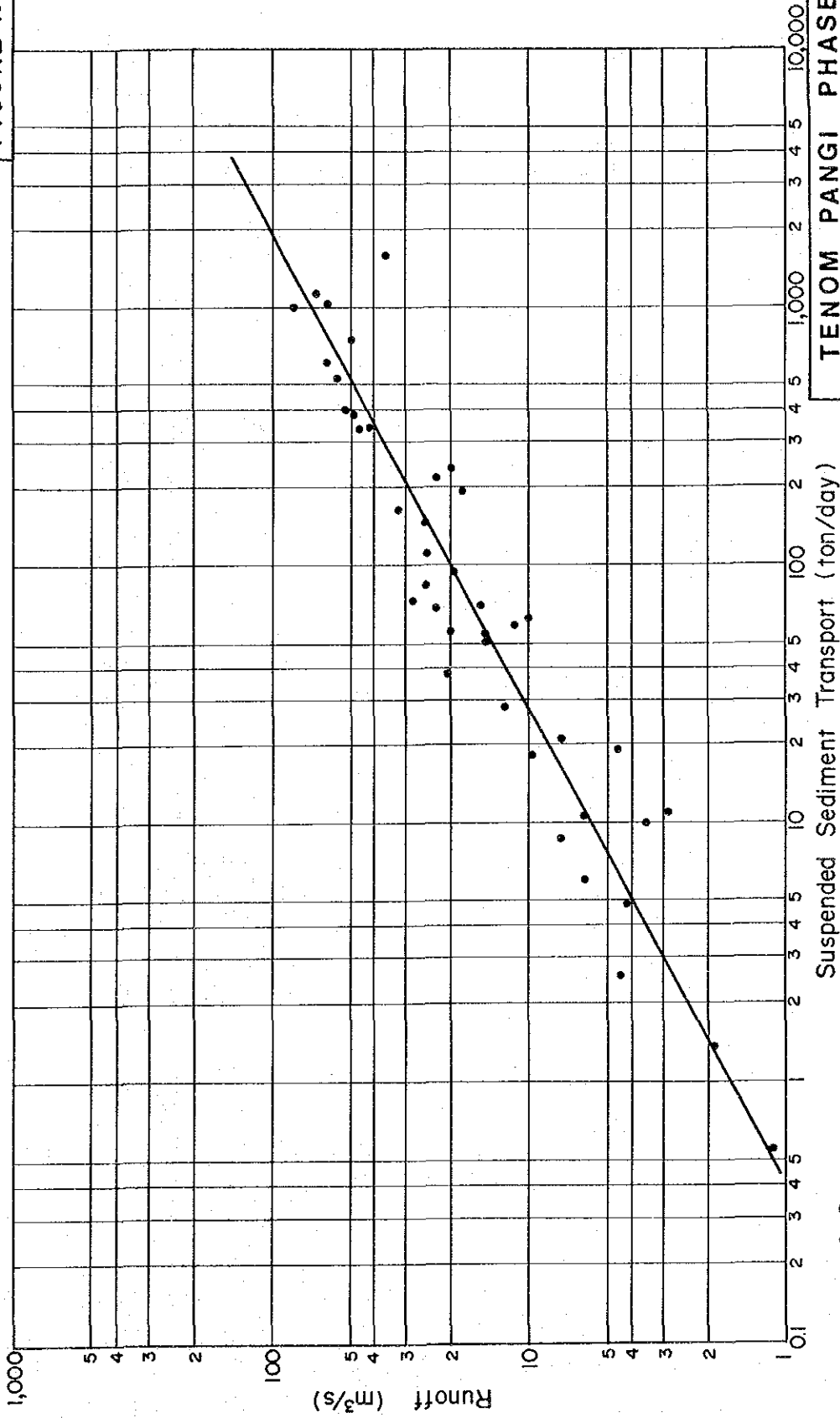
FIGURE NO. : AGO



Source : DID

TENOM PANGI PHASE III
 SUSPENDED SEDIMENT RATING CURVE
 OF
 PEGALAN RIVER AT ANSIP
 SEB / JICA

FIGURE NO. : A6I



Source : OLD

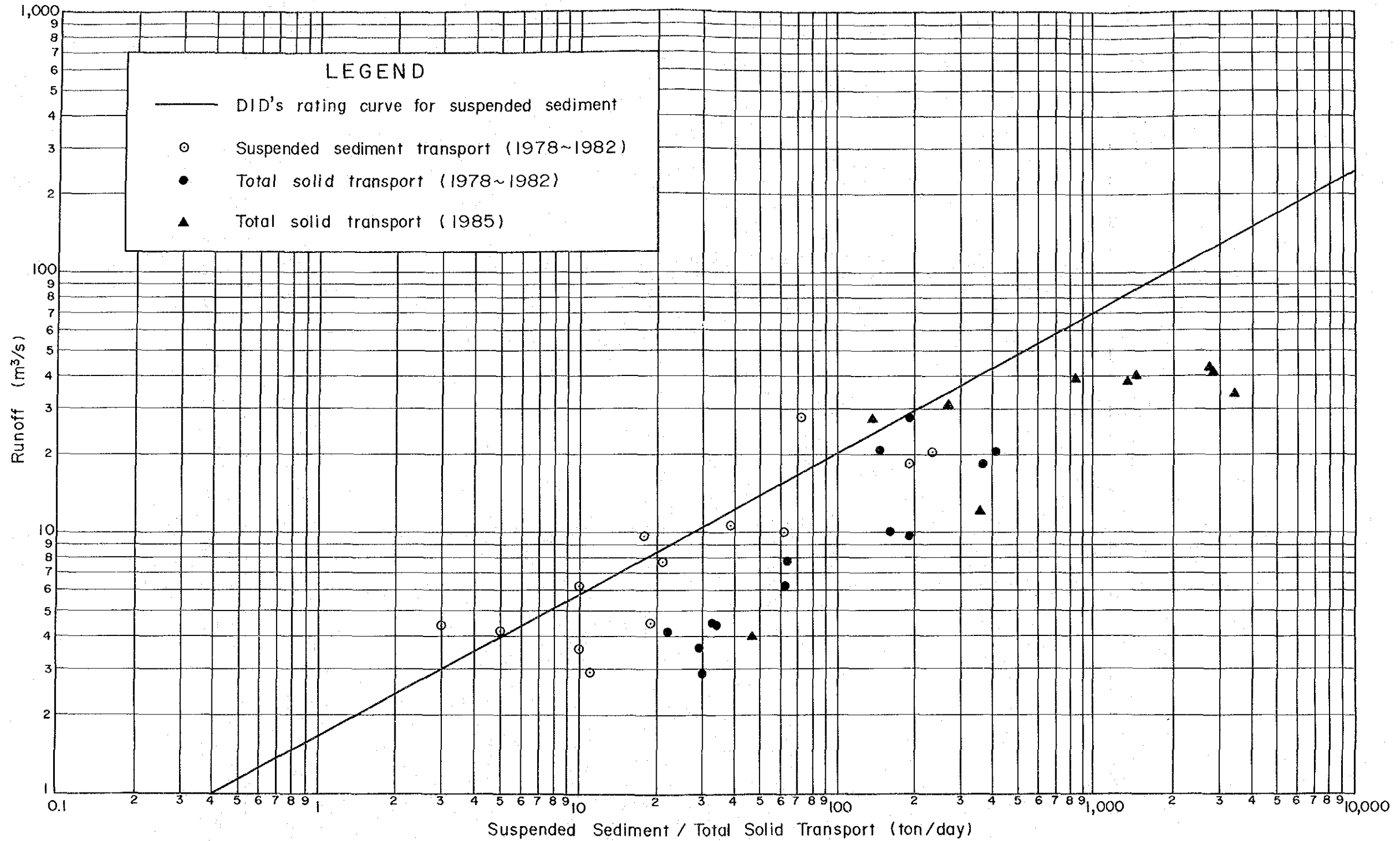
TENOM PANGI PHASE III

SUSPENDED SEDIMENT RATING CURVE

OF

SOOK RIVER AT BIAH

SEB / JICA



TENOM PANGI PHASE III
 SUSPENDED SEDIMENT AND
 TOTAL SOLID TRANSPORT
 OF SOOK RIVER AT BIAH
 SEB / JICA

