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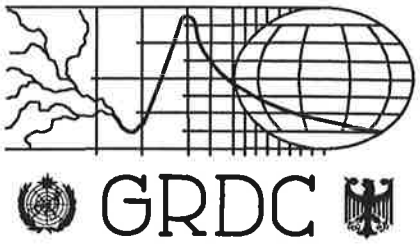

REPORT No. 100

DISCHARGE DATA FROM 50 SELECTED RIVERS FOR GCM VALIDATION

by

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and
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HAMBURG, MARCH 1993

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REPb90

Foreword

This Technical Report refers to a joint project between GRDC Koblenz and MPI Hamburg. The Gobal Runoff Data Centre operates under the auspices of WMO at the Federal Institute of Hydrology (Bundesanstalt für Gewässerkunde) in Koblenz under the supervision of the German Ministry of Traffic according to an agreement between the F.R.Germany and WMO for its World Climate Programm (WCP).

GRDC became operational as the implementation of project A.5 of WCP-Water "Collection of Global Runoff Data Sets". The aim of this project is to provide a **global dataset for the validation of climate simulations by global general circulation models (GCMs)**. Today GRDC is embedded in further projects of WCP-Water (A.2, A.8, A.9, B3) and cooperates in many international and national programs and projects.

We are introducing a dataset of the measured discharge of the 50 largest rivers of the world that we wish to make available to GCM modelers. River discharge data provides an independent data source for the validation of the hydrological cycle in general circulation models. This type of data is particularly valuable, because in some cases the available time series are exceptionally long.

The data are presented as time series of annual average discharge (averaged over the period for which data is available, see below for caveats) and as annual cycles of monthly mean discharge averaged over the length of the time series available. In this display we have also included the range of the standard deviations. The areas covered by the various catchments are given in a table which also indicates the geographic location of the gauge. Catchment areas are still being digitized and will be made available in due course.

The usefulness of the dataset is, however, limited by several aspects. It is required that the daily or monthly time series we use are indeed characteristic of the hydrologic regimes and regions that we wish to simulate. Comparison of model output and gauged data is impossible unless the position of the observational gauge and the "model gauge" agree. This is e.g. important if more tributaries follow downstream from the gauge (the values listed here for the Orinoco are observed just before the final major contributory, the Caroni river adds another 16% to the flow).The discharge values may also be obscured if water is withdrawn for irrigation purposes or if the streamflow is regulated by the operation of reservoirs (cf. Aswan dam station). Many rivers worldwide are affected by water management techniques for energy production and other anthropogenic influences. Some information on anthropogenic influence on the river discharge is held at GRDC, but by no means all that is required to make a meaningful comparison study. Several time series also need to be extended into the 1990s. And finally, some of the time series in our archives may be incomplete.

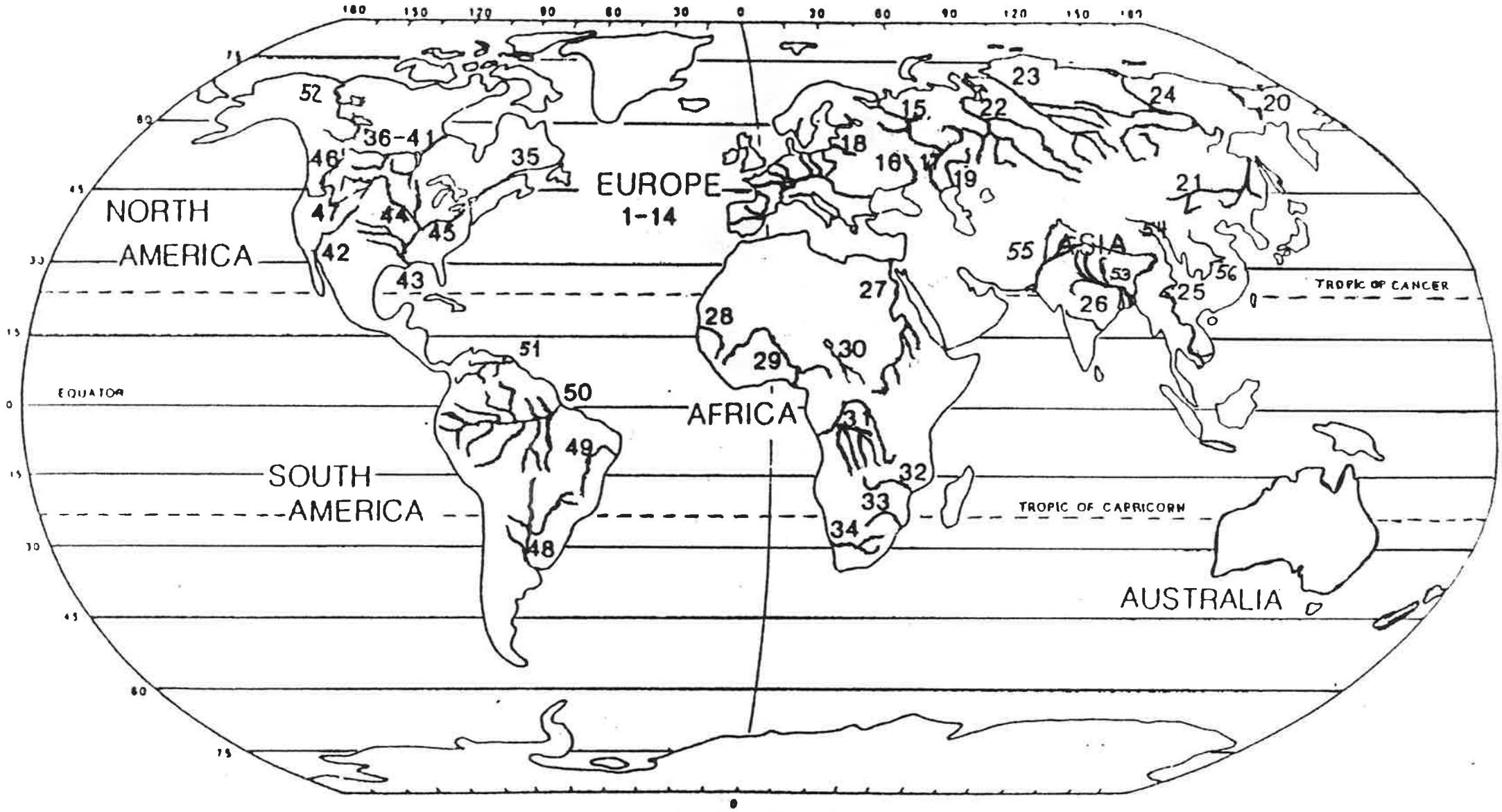
We would like you to help us by analysing and checking the values given in this report against the data that is available to you. Please let us know if the timeseries are correct and complete and where GRDC can obtain better quality data. We would also appreciate receiving information on irrigation, power generation and water management that may affect the streamflow today or may have affected it in the course of time.

The data can be obtained free of charge from:

GRDC, Bundesanstalt für Gewässerkunde, Postfach 309, 5400 Koblenz, F.R.G.

Hamburg and Koblenz, March 1993

L. Dümenil
K .Isele
H.-J. Liebscher
U. Schröder
M. Schumacher
K. Wilke


NORTH AMERICA
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AFRICA
SOUTH AMERICA
AUSTRALIA
EQUATOR
TROPIC OF CANCER
TROPIC OF CAPRICORN
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River	Station	Coordinates		Catchment Area [km^2]	Availability of Data
Amazon	Obidos	01.90 S	55.50 W	4640300	1928-1989
Amur	Komsomolsk	50.63 N	137.12 E	1730000	1933-1984
Brahmaputra	Bahadurabad	25.18 N	89.67 E	636130	1969-1975
Brahmaputra	Pandu	26.13 N	91.70 E	405000	1956-1979
Changjiang	Yichang	30.66 N	111.23 E	1010000	1878-1983
Changjiang	Hankou	30.58 N	114.28 E	1488036	1865-1979
Changjiang	Datong	30.77 N	117.62 E	1705383	1976-1979
Chari	N'Djamena	12.12 N	15.03 E	600000	1933-1991
Colorado	Lees Ferry , Ariz.	36.87 N	111.58 W	289562	1911-1984
Columbia	The Dallas, Oreg.	45.60 N	121.17 W	267300	1915-1972
Danube	Orsova	44.70 N	22.42 E	576232	1840-1988
Danube	Ceatal Izmail	45.18 N	28.80 E	807000	1921-1990
Don	Razdorskaya	47.50 N	40.67 E	378000	1891-1984
Ebro	Tortosa	40.82 N	00.52 E	84230	1913-1984
Elbe (Labe)	Decin	50.78 N	14.22 E	51104	1851-1984
Ganga	Farakka	25.00 N	87.92 E	935000	1949-1973
Ganges	Paksey	24.08 N	89.03 E	846900	1969-1975
Garonne	Mas D'Agenais	44.42 N	00.23 E	52000	1920-1979
Godavari	Polavaram	16.92 N	81.78 E	299320	1901-1979
Göta-Vänern	Vänersborg	58.38 N	12.32 E	46830	1807-1984
Guadalquivir	Alcala del Rio	37.52 N	05.98 W	46995	1913-1984
Indus	Attock	33.90 N	72.25 E	265122	1973-1979
Indus	Kotri	25.37 N	68.37 E	832418	1973-1979
Kolyma	Sredne-Kolymsk	67.37 N	153.67 E	361000	1927-1984
Lena	Kusur	70.70 N	127.65 E	2430000	1935-1984
Limpopo	Chokwe	24.50 S	33.00 E	342000	1976-1979
Loire	Montjean	47.38 N	00.83 W	110000	1868-1979
Mackenzie River	Norman Wells	65.28 N	126.85 W	1570000	1966-1979
Mackenzie River	Near Fort Provid.	61.27 N	117.53 W	970000	1966-1975
Mekong	Mukdahan	16.53 N	104.73 E	391000	1924-1987
Mississippi	Alton, Ill.	38.88 N	90.18 W	444185	1927-1984
Mississippi	Tarbert Landing	31.02 N	91.62 W	3923799	1965-1984
Missouri	Herman, Mont.	38.72 N	91.43 W	1357677	1897-1988
Nelson River	Above Bladder R.	54.77 N	97.92 W	1000000	1965-1984
Neman	Smalininkai	55.02 N	22.52 E	81200	1812-1984
Niagara	Queenston	43.15 N	79.05 W	686000	1860-1984
Niger	Koulikoro	12.87 N	07.55 E	120000	1907-1988
Nile	Aswan Dam	23.96 N	32.90 E		1869-1984
N. Saskatchewan	Prince Albert	53.20 N	105.77 W	131000	1910-1984
Northern Dvina	Ust-Pinega	64.10 N	42.17 E	348000	1881-1985
Ob	Salekhard	66.57 N	66.53 E	2950000	1930-1983
Odra	Gozdowice	52.77 N	14.32 E	109729	1900-1987
Ohio	Metropolis, Ill.	37.15 N	88.73 W	525770	1928-1984
Oranje	Aliwal North	30.68 S	26.71 E	37075	1964-1986
Orinoco	Puente Angostura	08.15 S	63.59 W	836000	1923-1989
Parana	Guaria	24.07 S	54.25 W	802200	1920-1979

River	Station	Coordinates		Catchment Area	Availability of Data
Parana	Corrientes	27.97 S	58.85 W	1950000	1904-1984
Po	Pontelagoscuro	44.88 N	11.65 E	70091	1918-1979
Red River	Emerson	49.00 N	97.22 W	104000	1912-1983
Rhein	Rees	51.78 N	06.58 W		1935-1984
Rhone	La Mulatiere	45.75 N	04.83 E	50200	1900-1972
Rhone	Givors	45.75 N	04.83 E	51080	1973-1979
Sao Francisco	Juazeiro	09.42 S	40.52 W	510800	1929-1979
Seine	Paris	48.83 N	02.27 E	44300	1928-1979
Senegal	Bakel	14.90 N	12.45 E	218000	1904-1984
Snake	Clarkston, Wash.	46.43 N	117.17 W	267300	1915-1972
S. Saskatchewan	Saskatoon	52.13 N	106.65 W	141000	1911-1984
St. Lawrence	Ogdensburg, N.Y.	44.70 N	75.50 W	764600	1860-1972
St. Lawrence	Cornwall, Ont.	45.00 N	74.78 W	774410	1973-1984
Susquehanna	Harrisburg, Pa.	40.25 N	76.88 W	62419	1890-1987
Ural	Kushum	50.85 N	51.28 E	190000	1915-1984
Volga	Volgograd	48.77 N	44.72 E	1360000	1879-1984
Vuoksi	Imatra	61.15 N	28.77 E	61275	1847-1987
Wisla	Tczew	54.10 N	18.82 E	194376	1900-1987
Yenisei	Igarka	67.48 N	86.50 E	2440000	1936-1984
Zaire	Kinshasa	04.30 S	15.30 E	3475000	1903-1983
Zambeze	Matundo-Cais	16.15 S	33.58 E	940000	1976-1979

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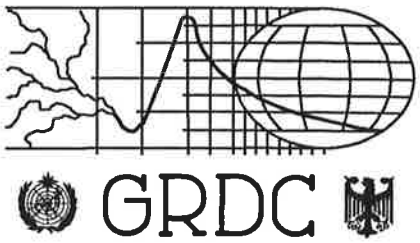

Time series

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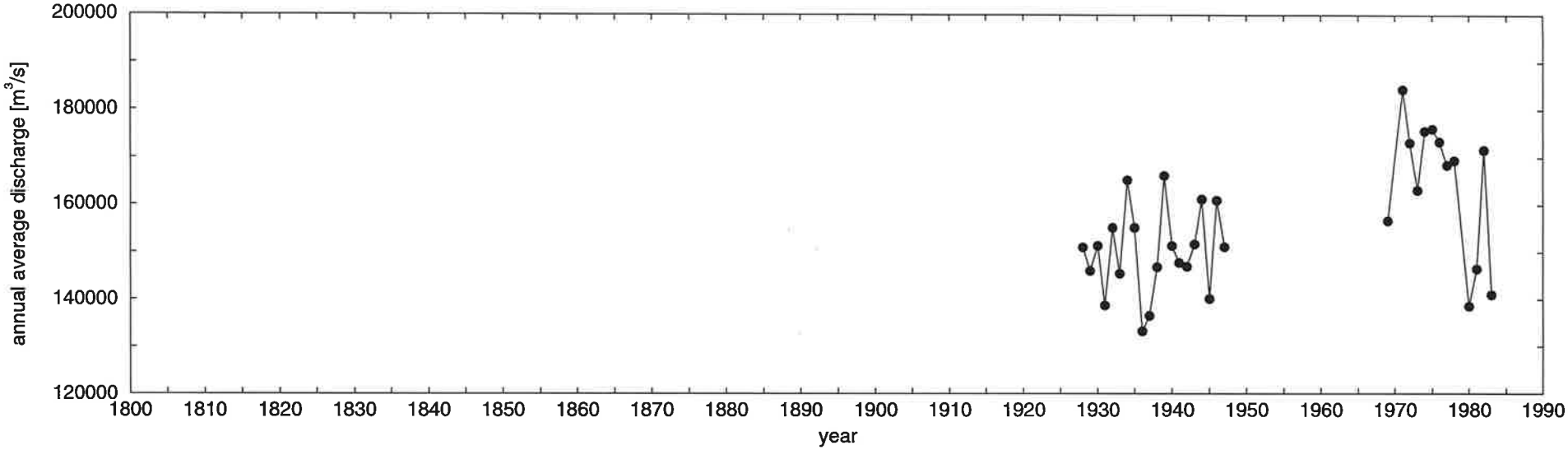
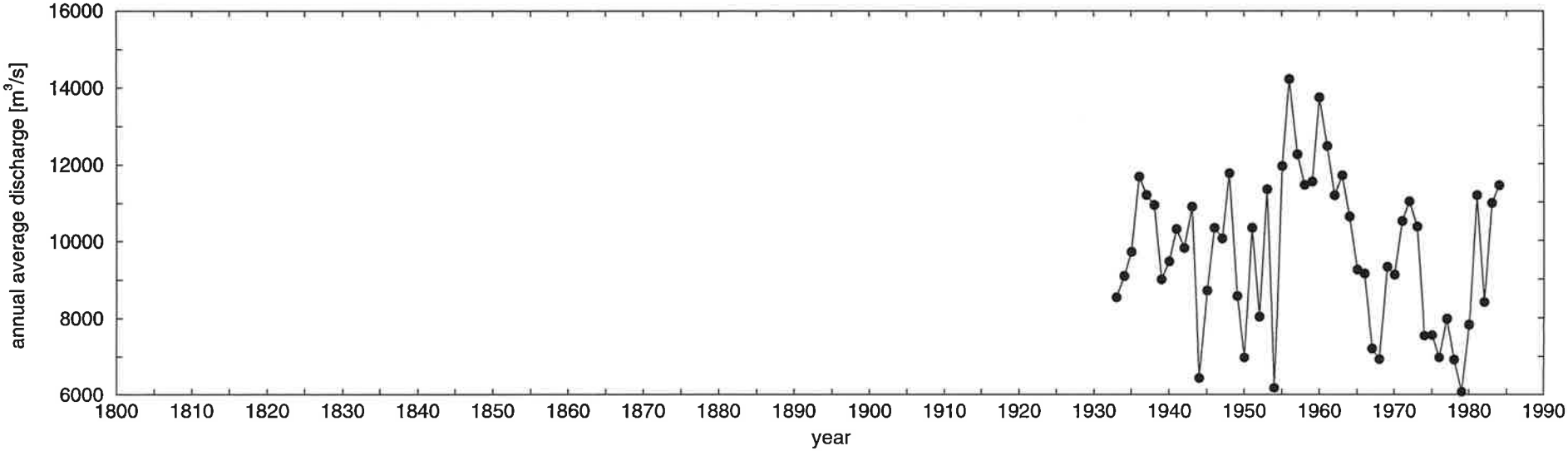


AMUR (KOMSOMOLSK)



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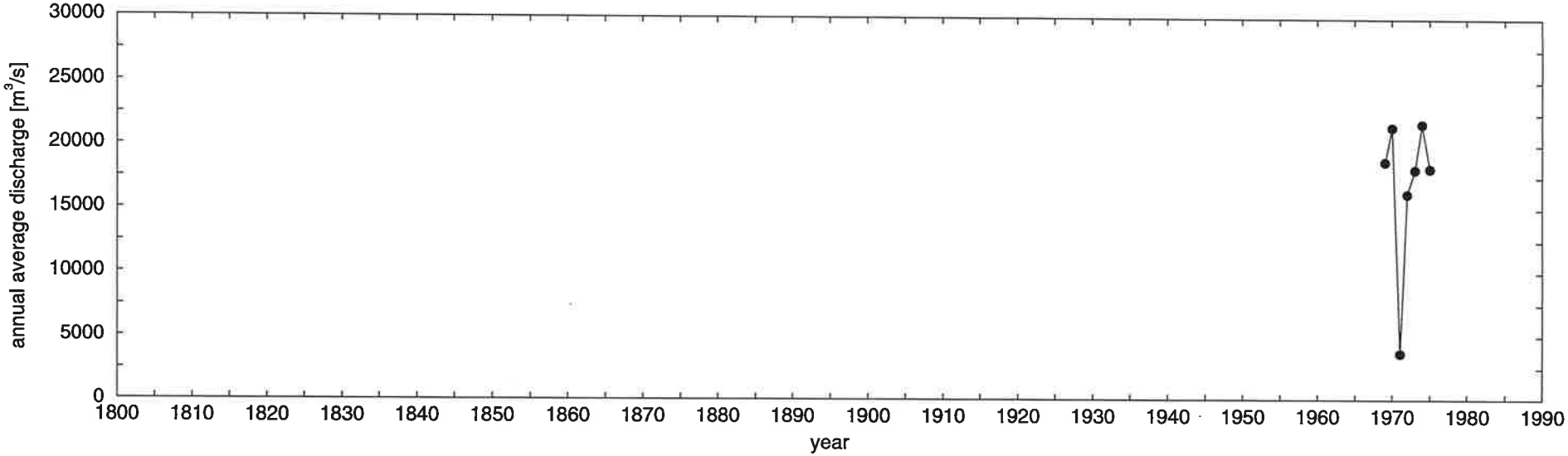

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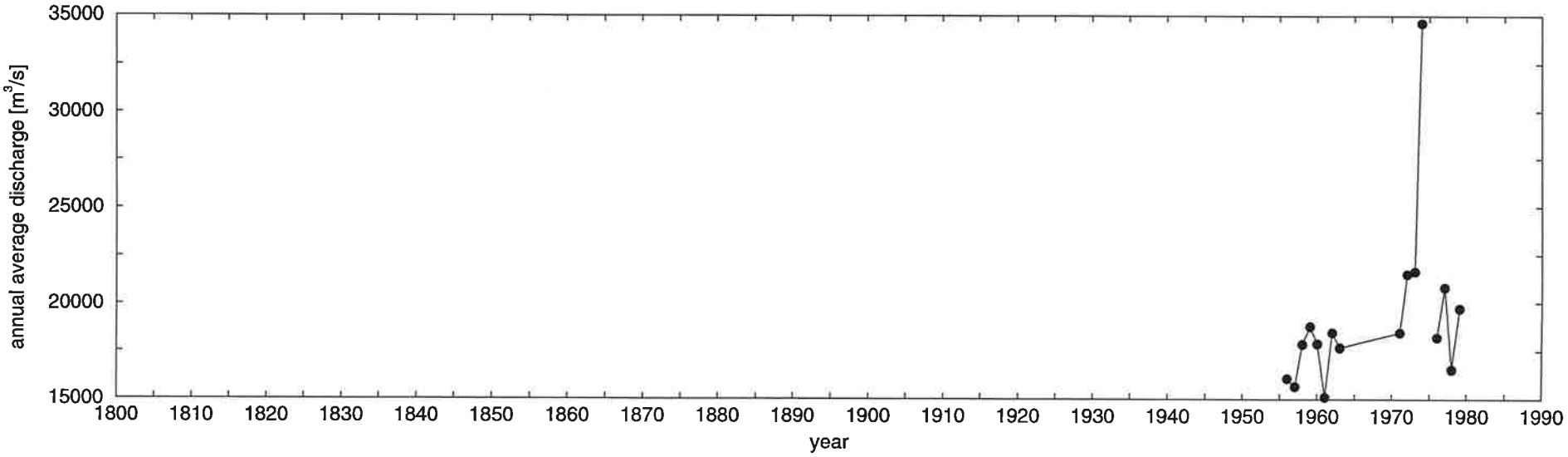

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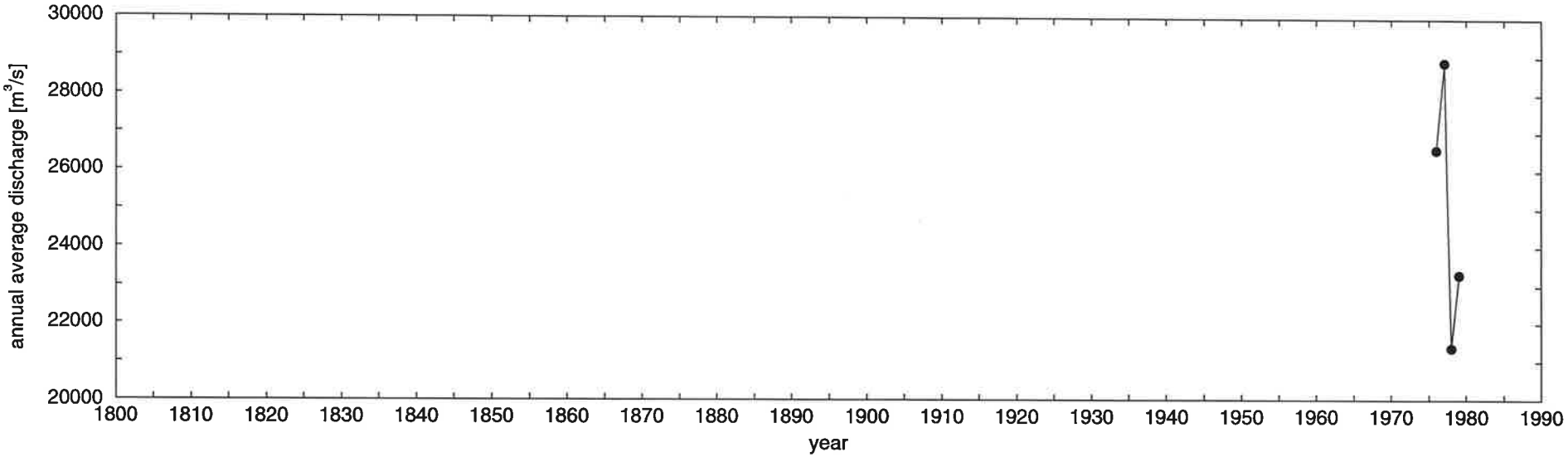

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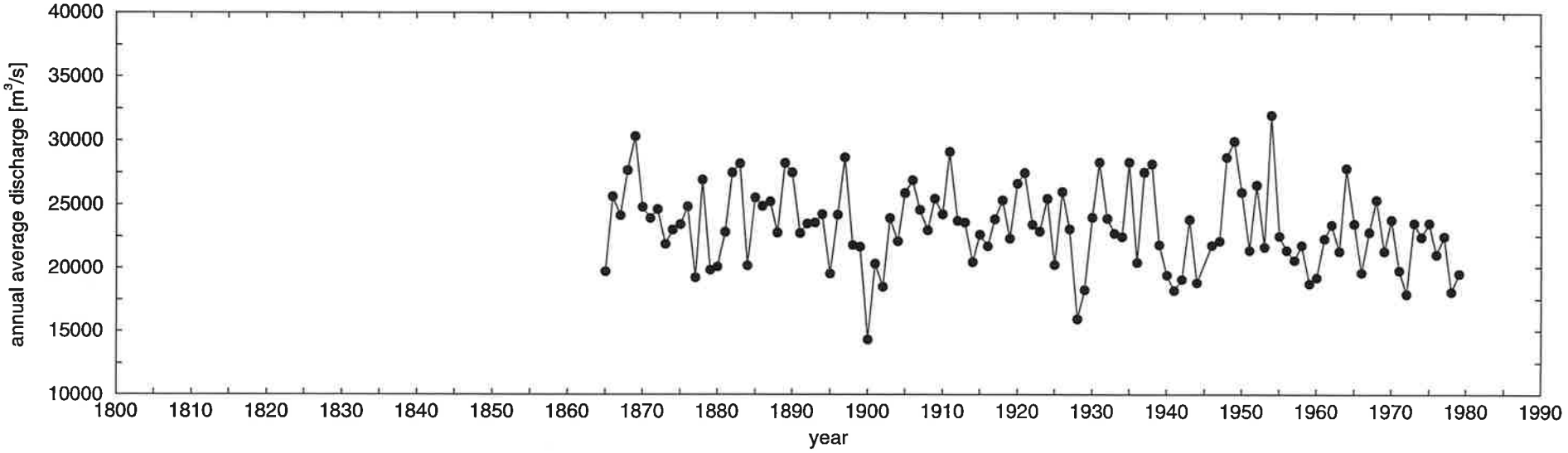

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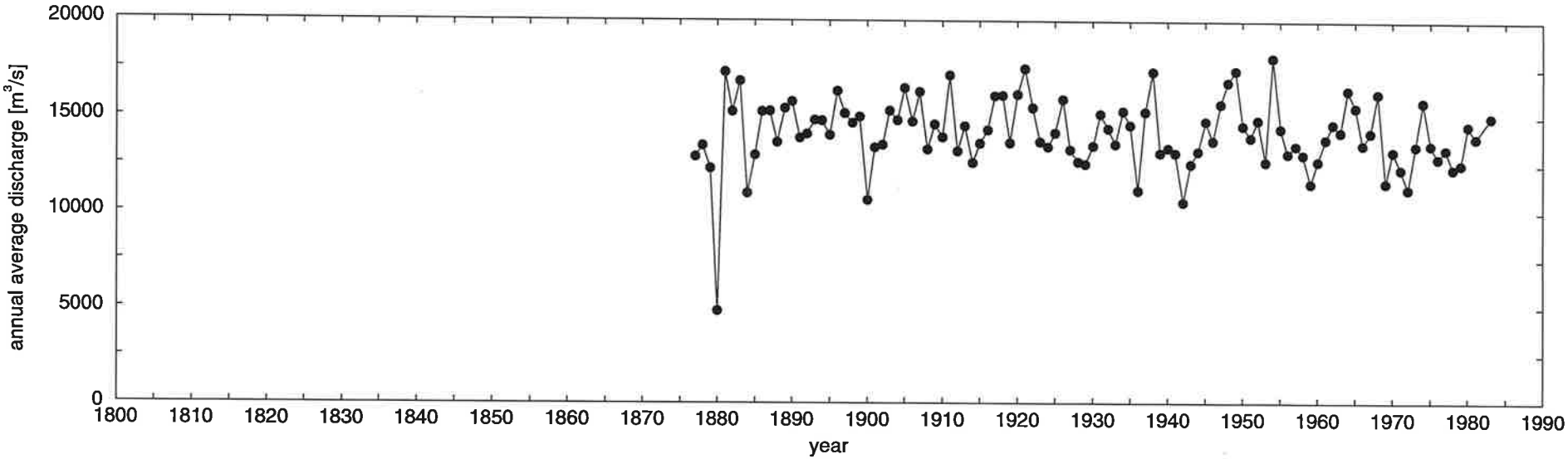

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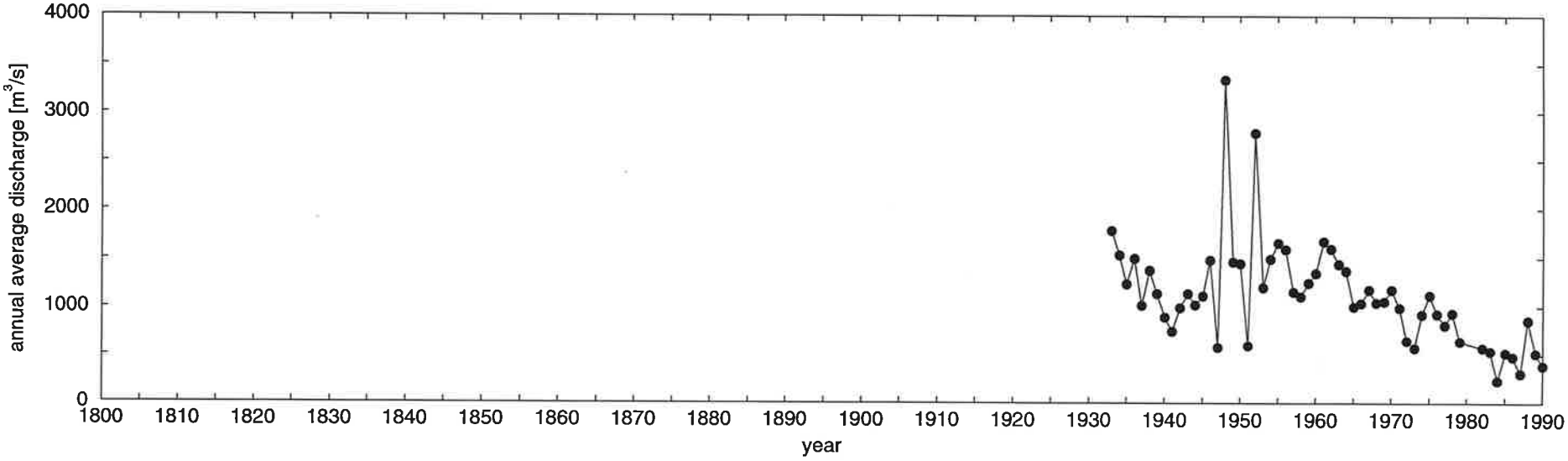
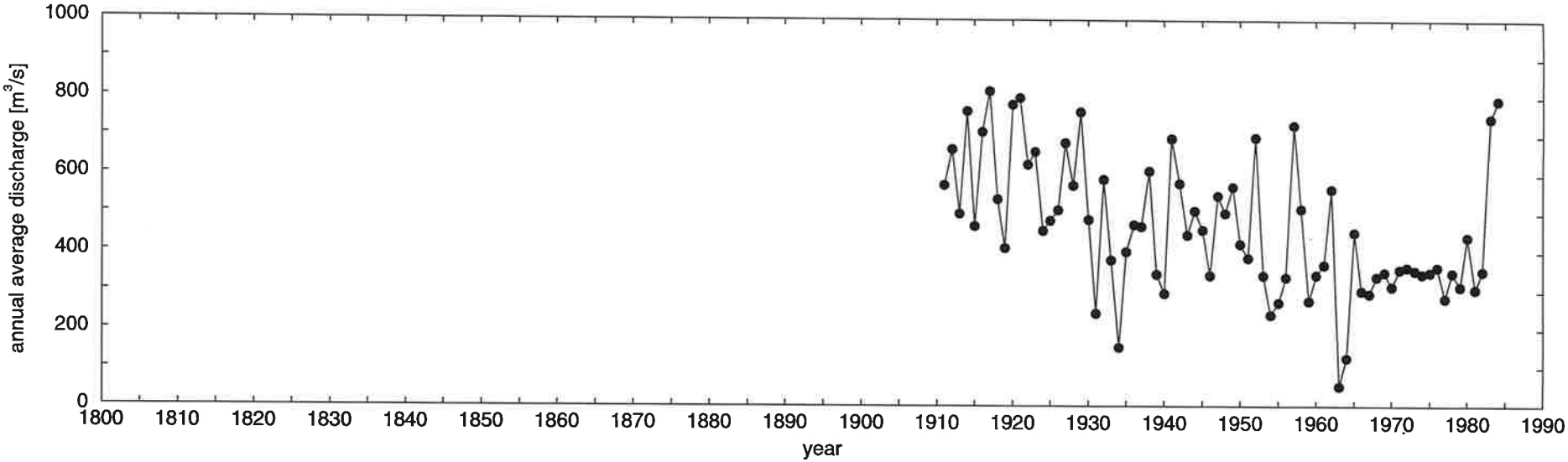


COLORADO (LEES FERRY, ARIZ.)



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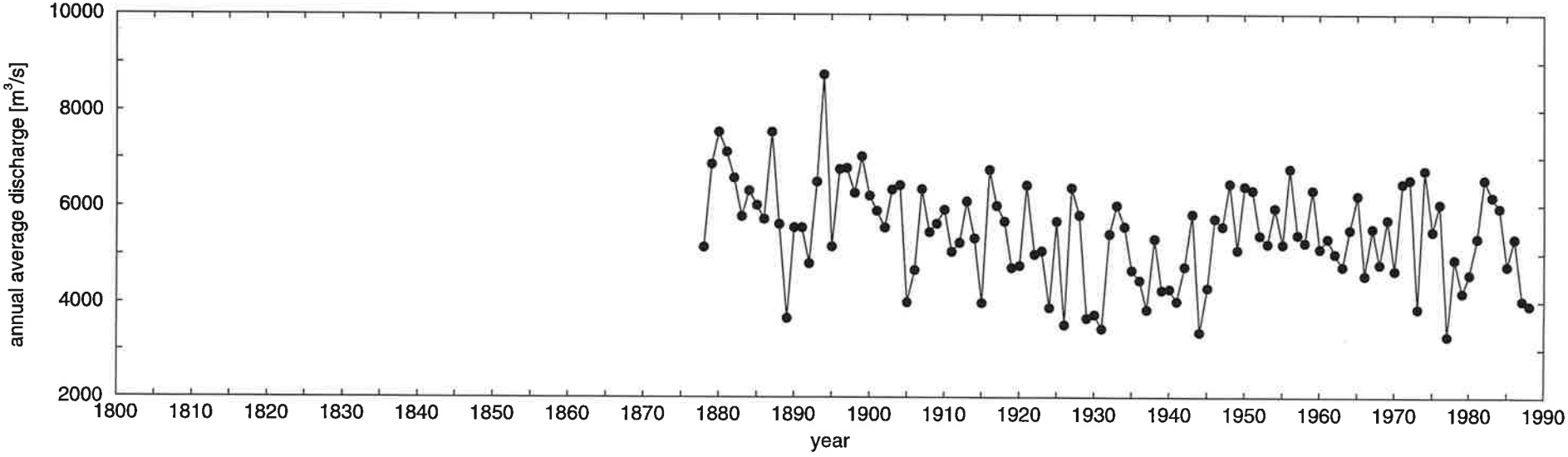
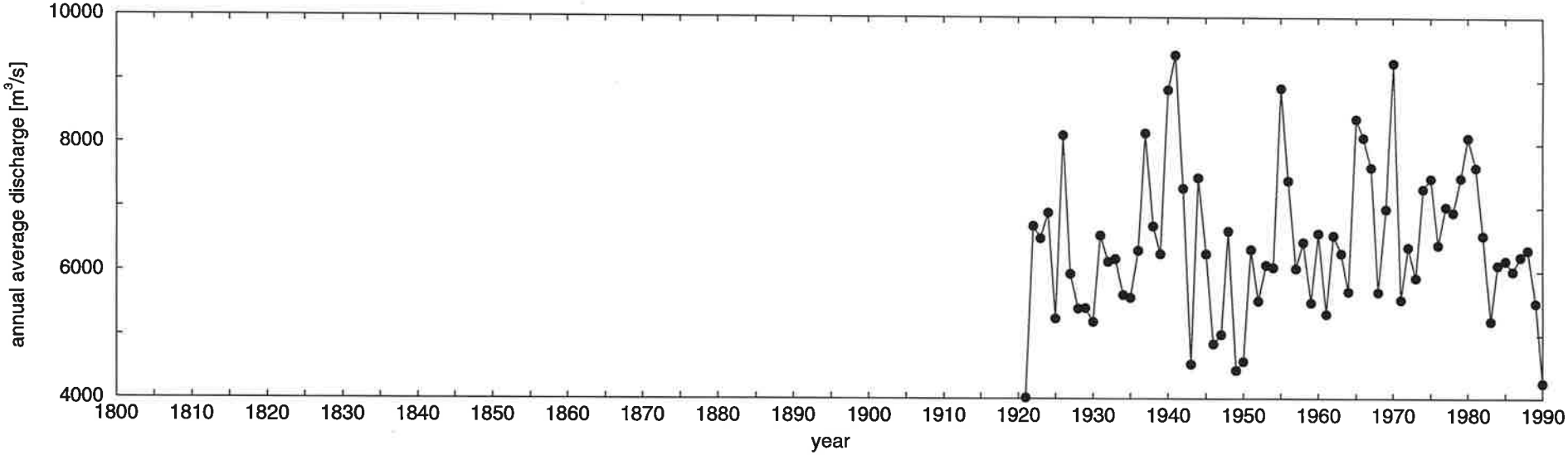


DANUBE (CEATAL IZMAIL)



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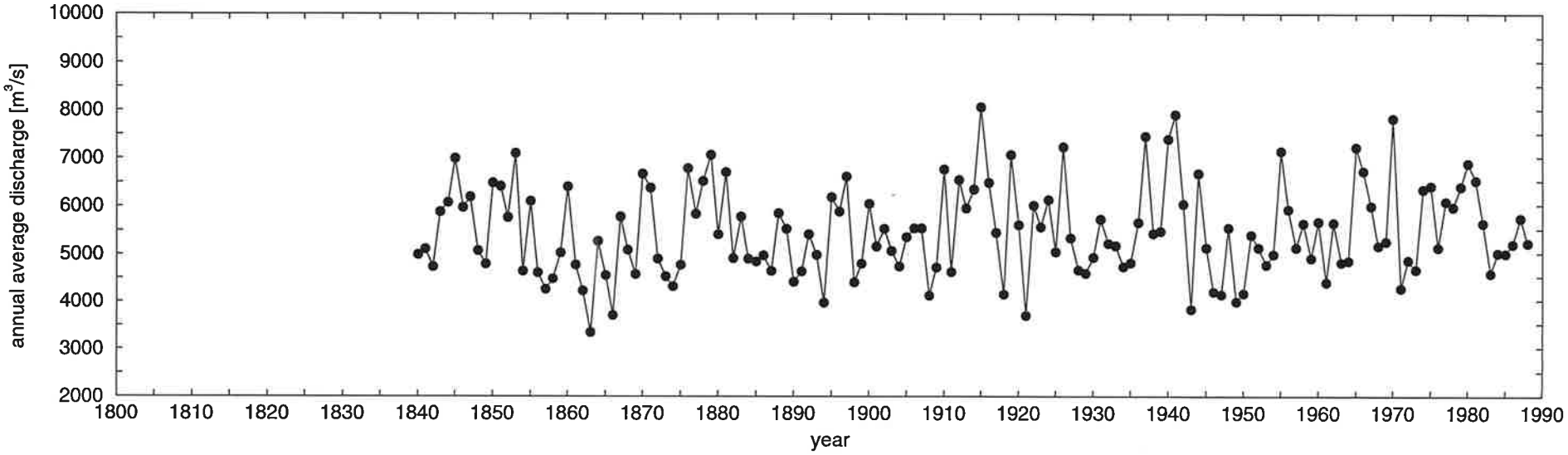

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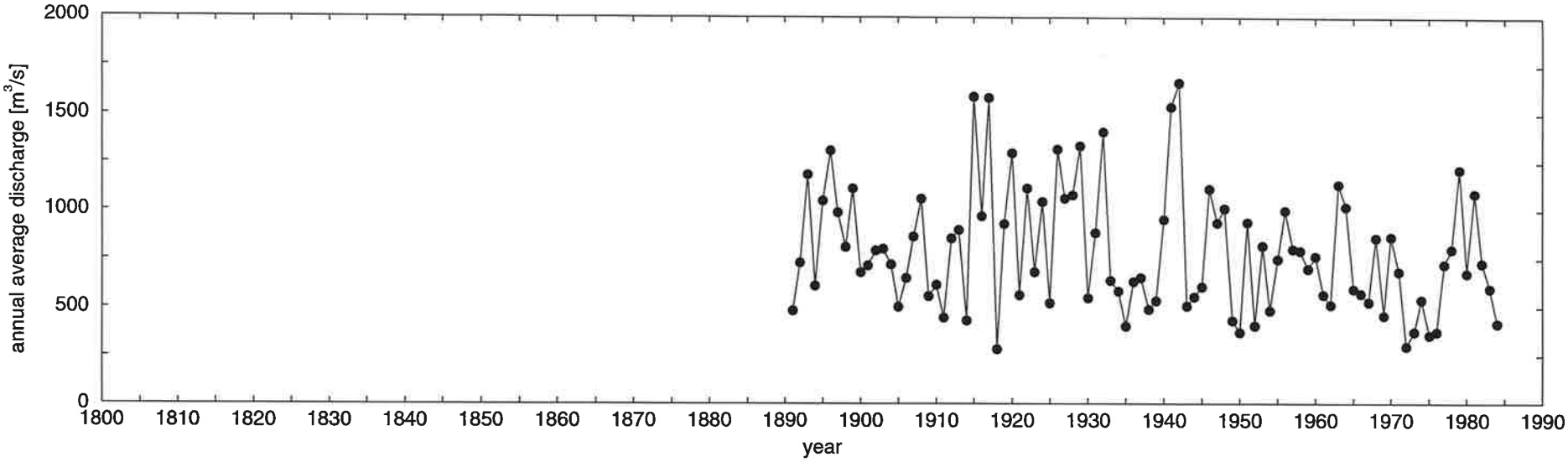
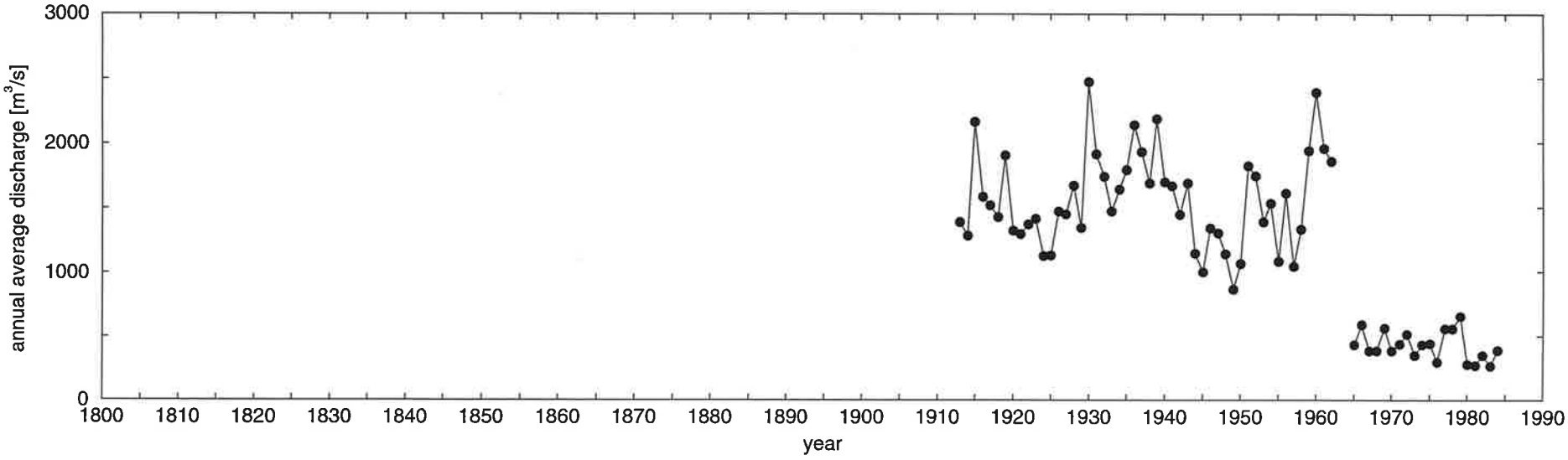
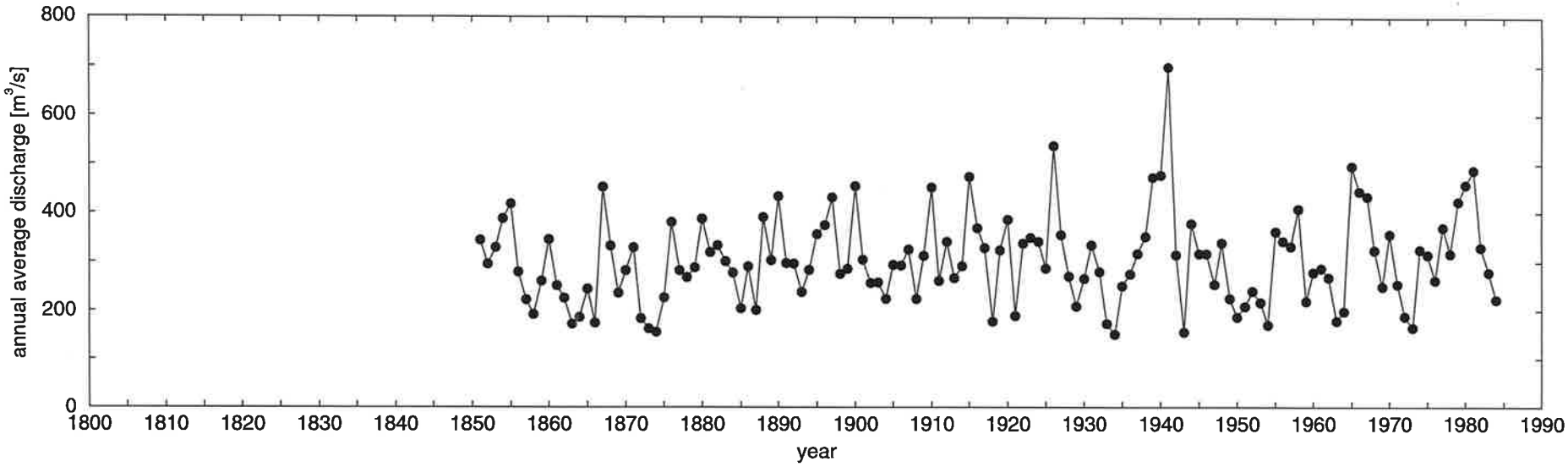


EBRO (TORTOSA)



ELBE (LABE) (DECIN)



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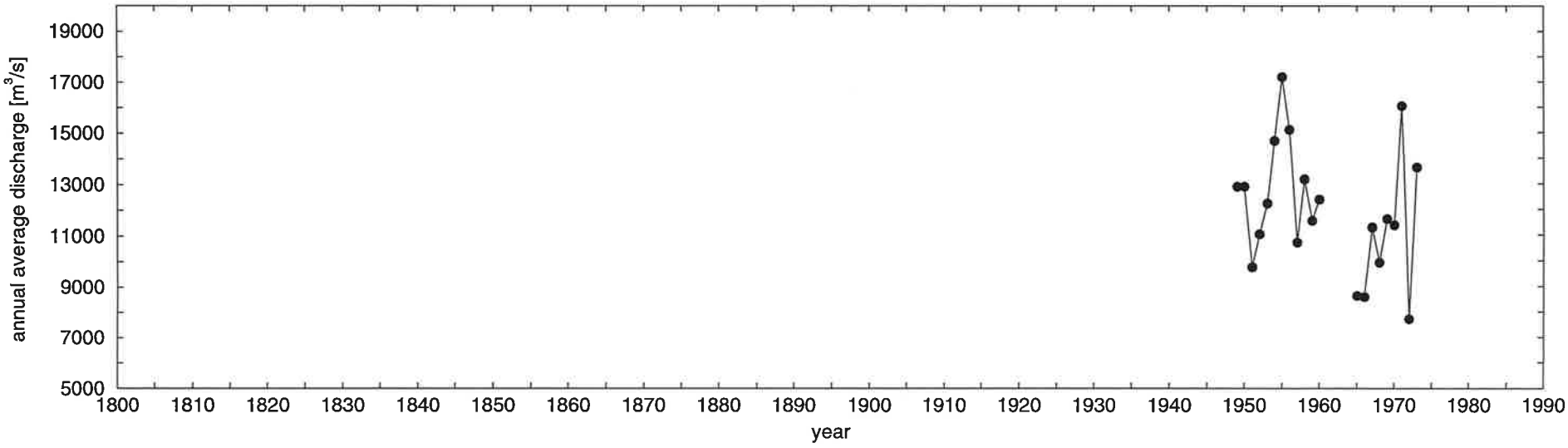

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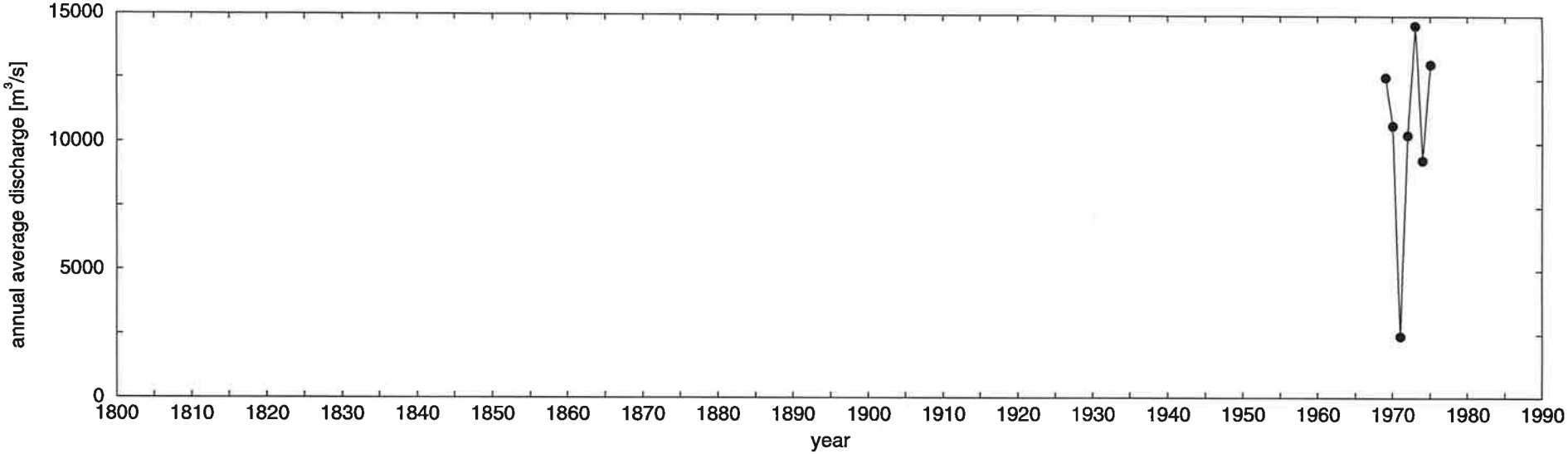

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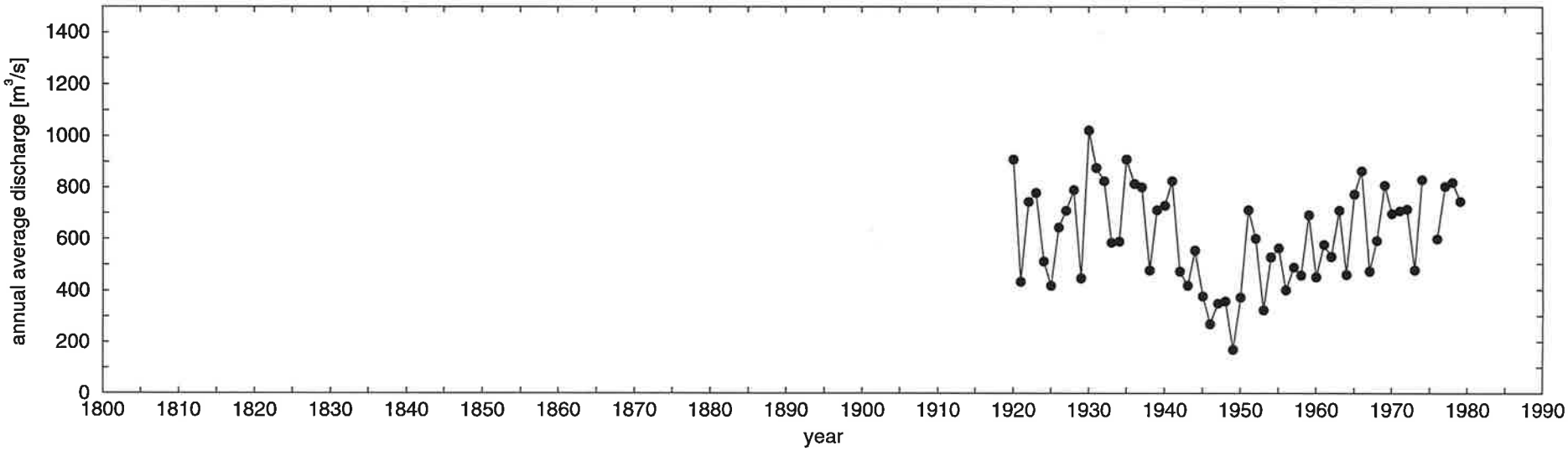

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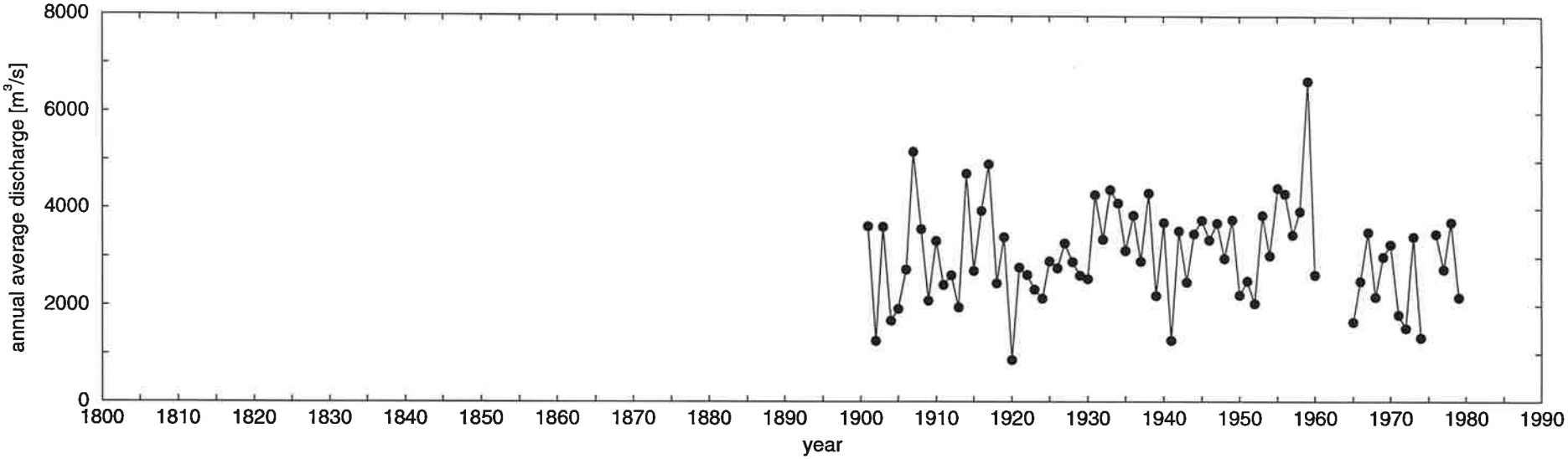

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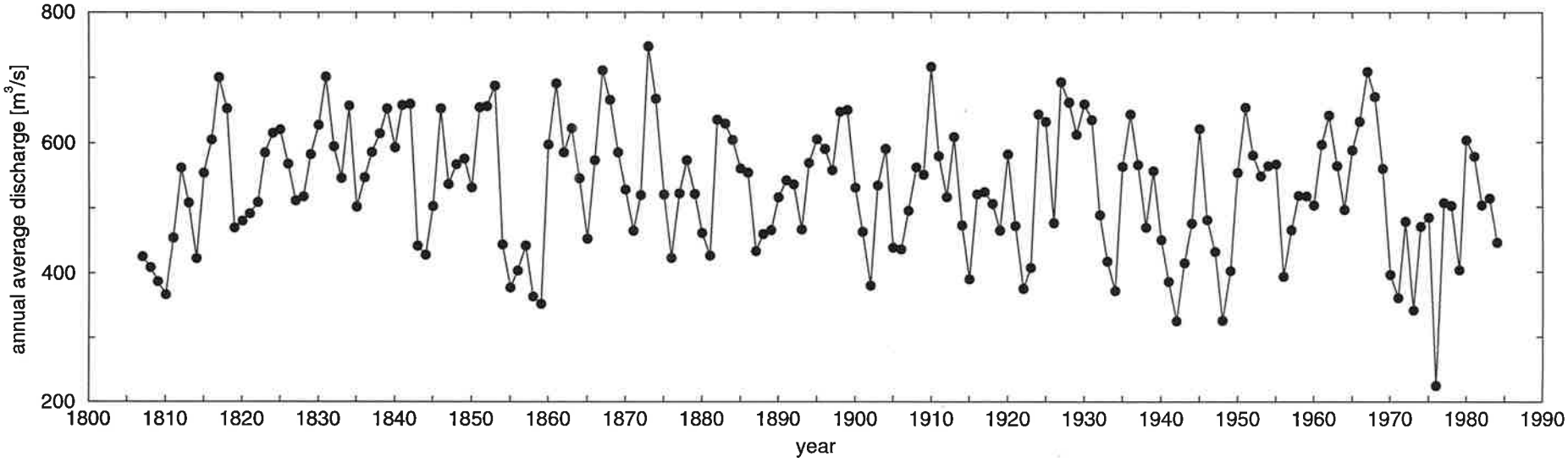
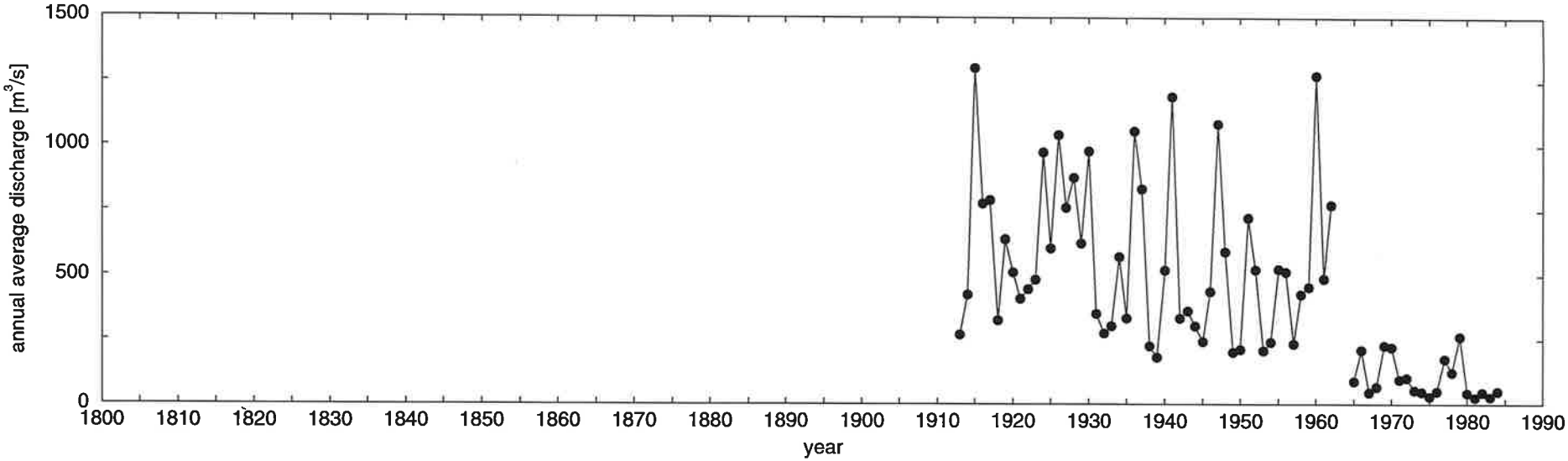


GUADALQUIVIR (ALCALA DEL RIO)



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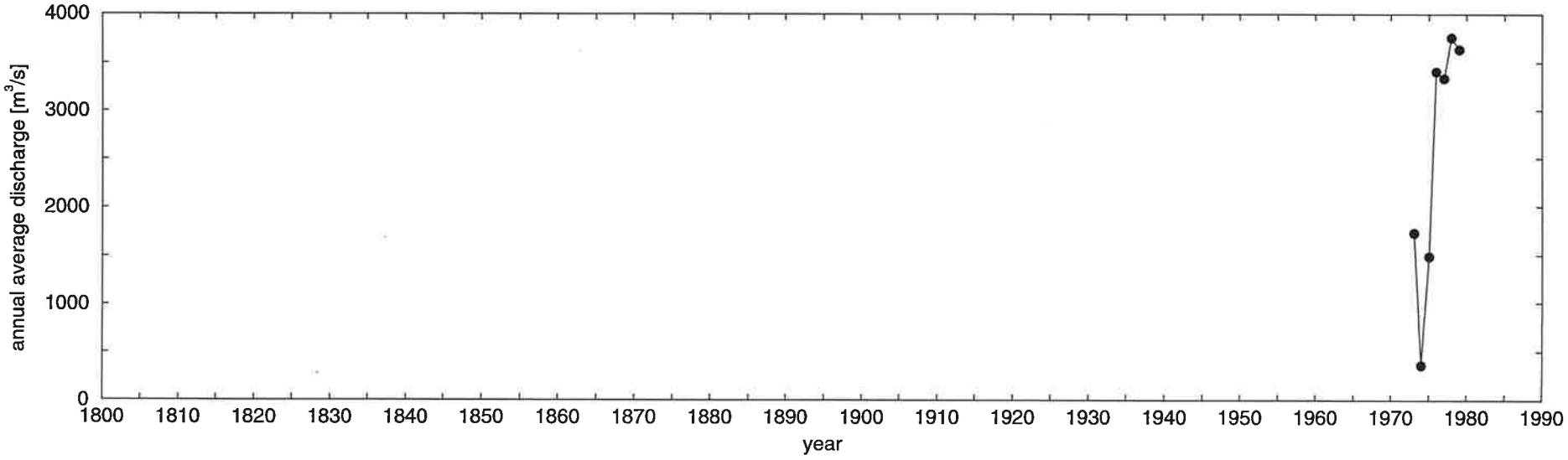

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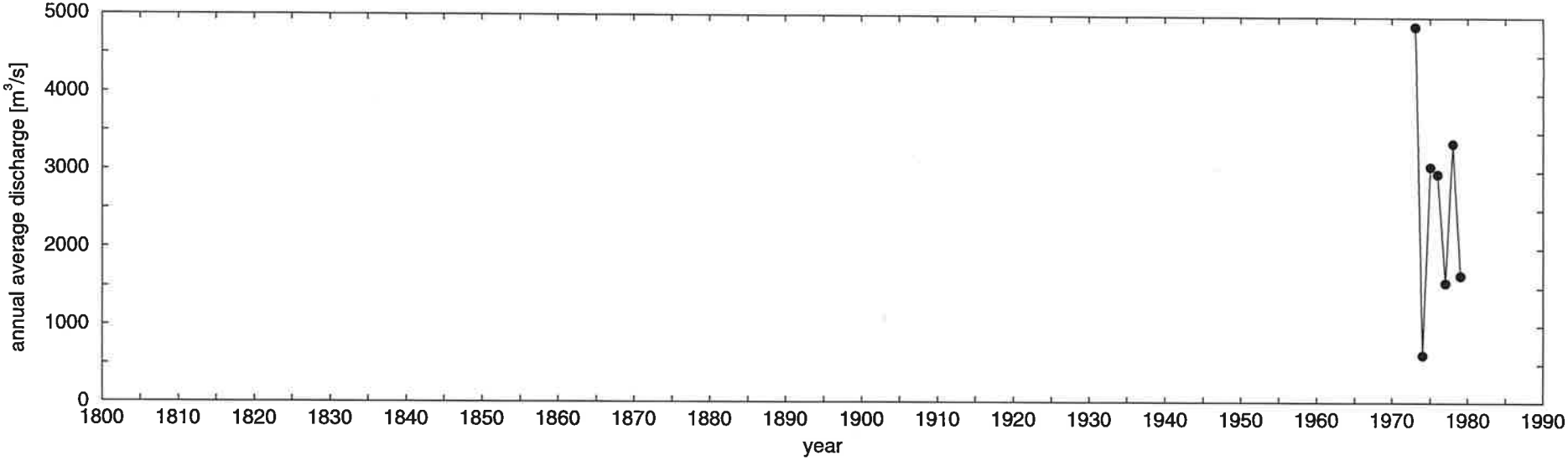
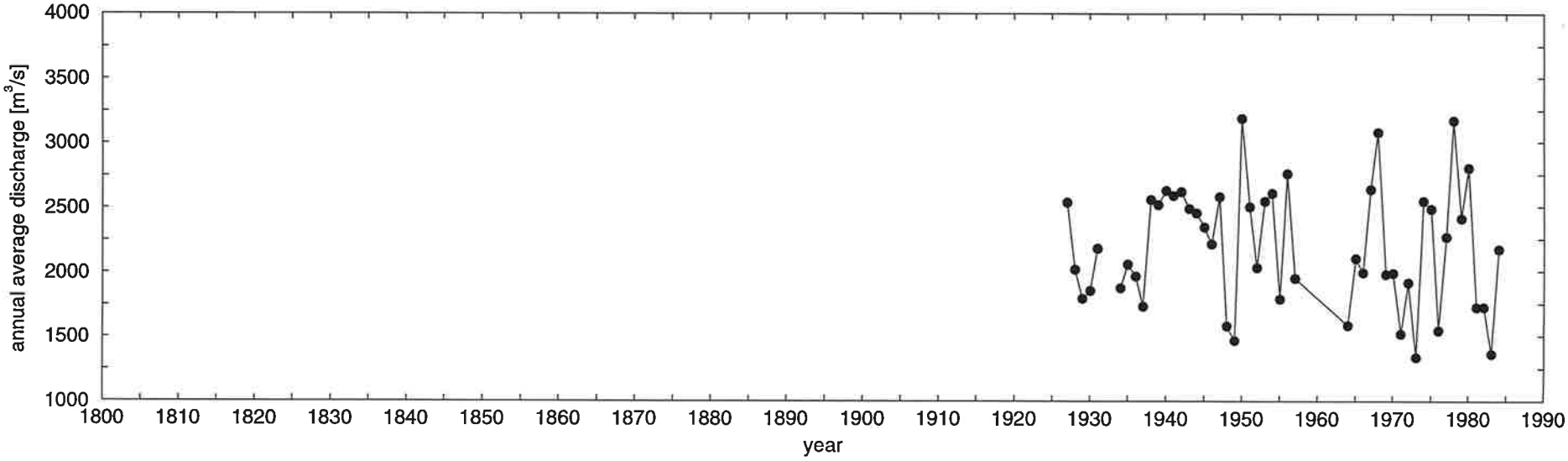
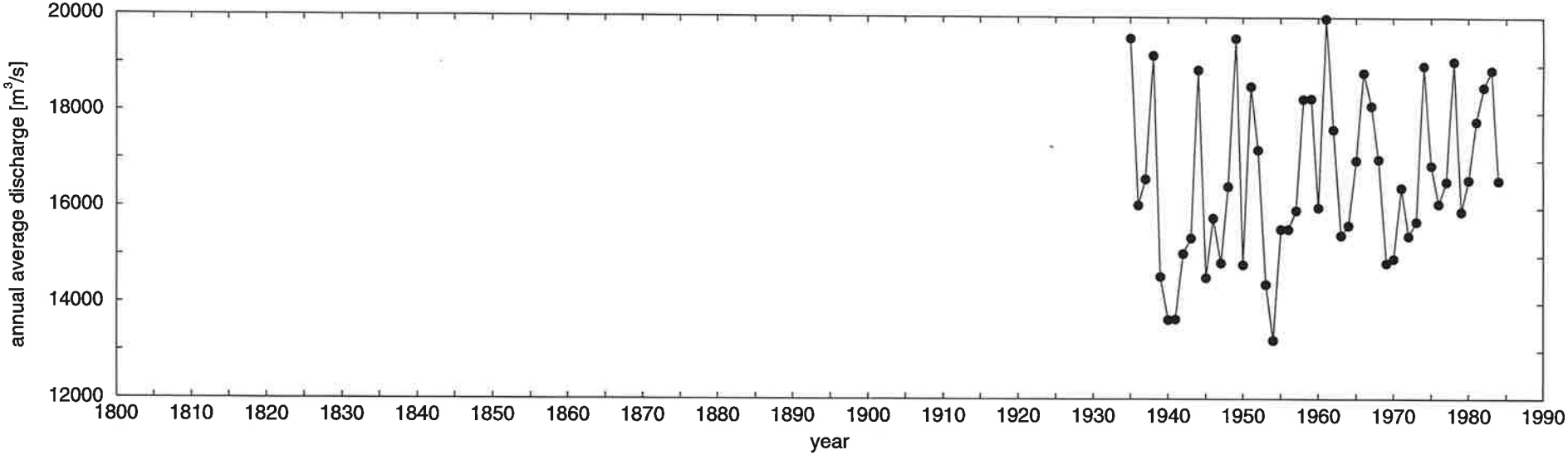


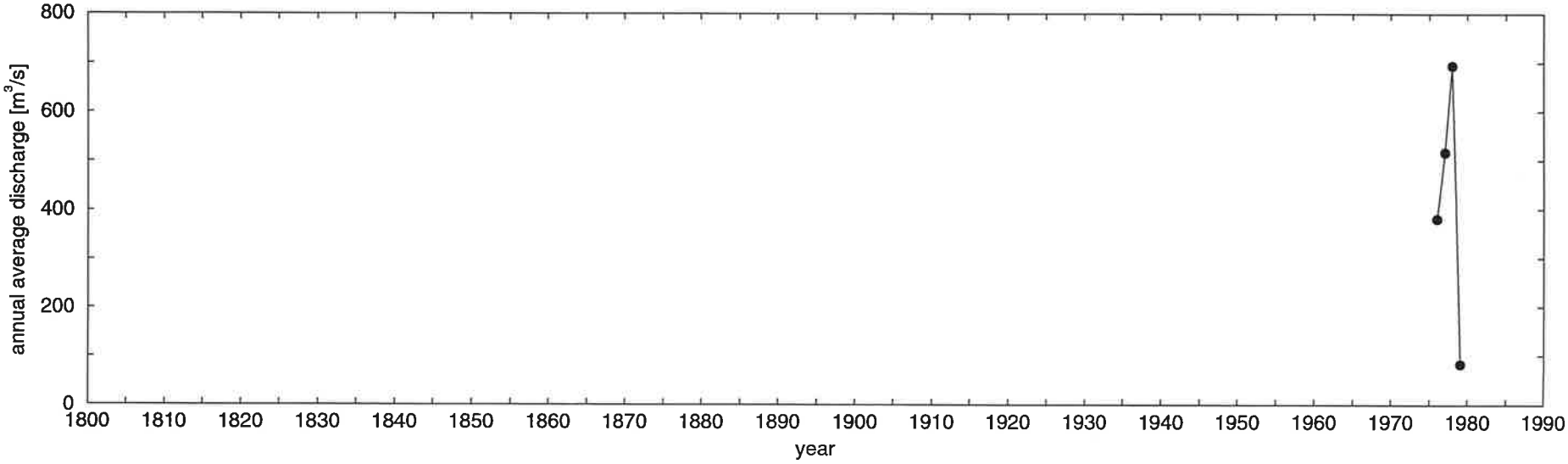
KOLYMA (SREDNE-KOLYMSK)



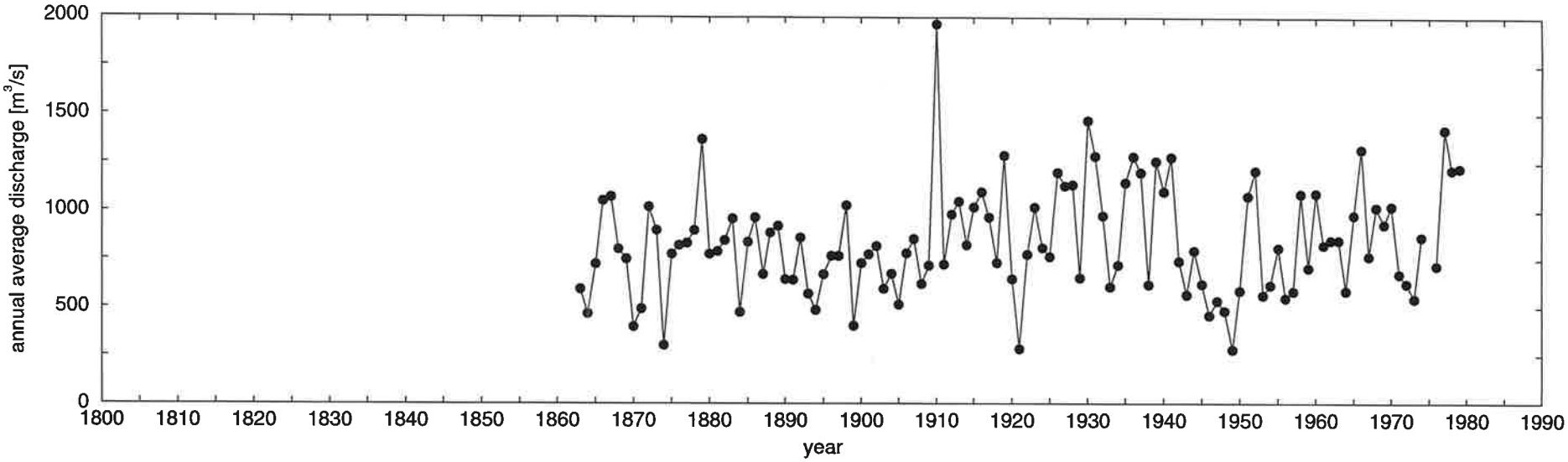
LENA (KUSUR)



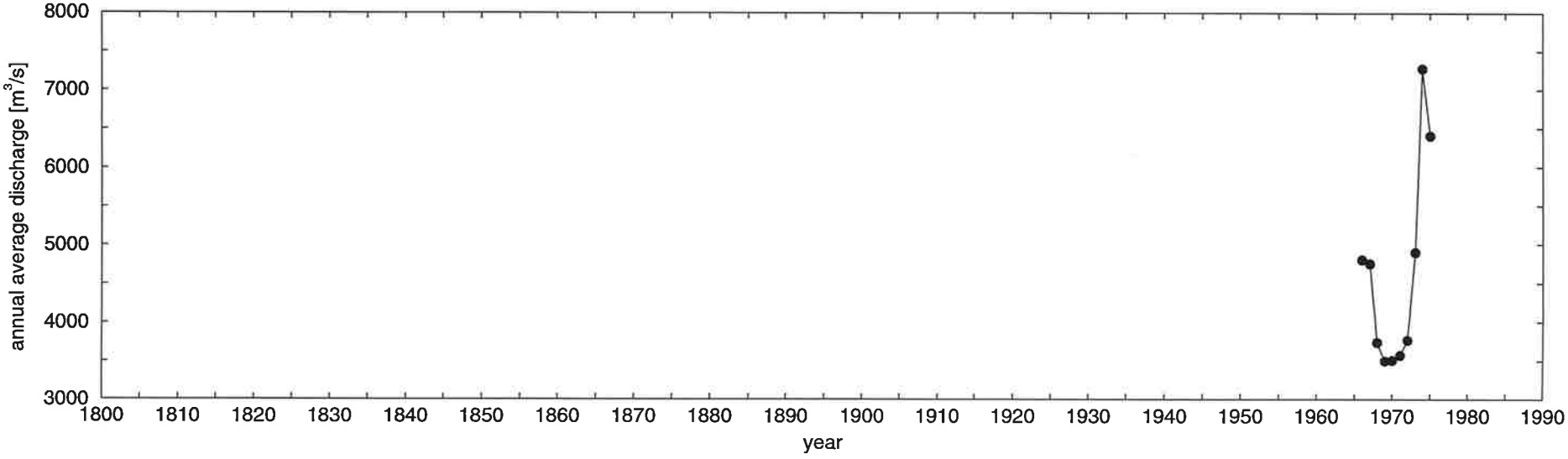
LIMPOPO (CHOKWE)



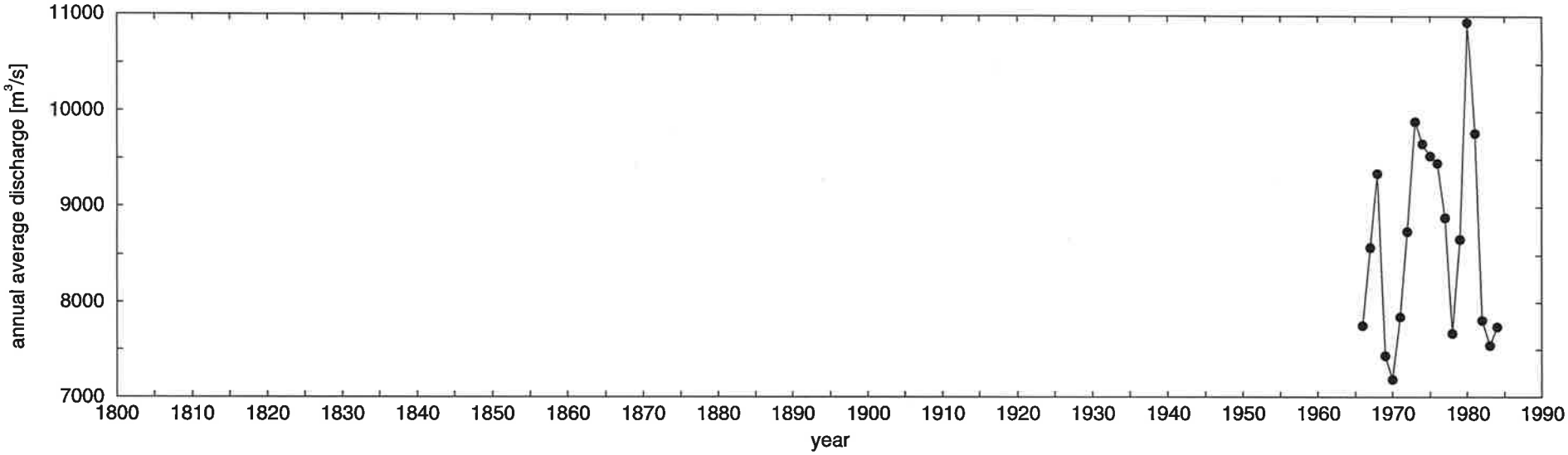
LOIRE (MONTJEAN)



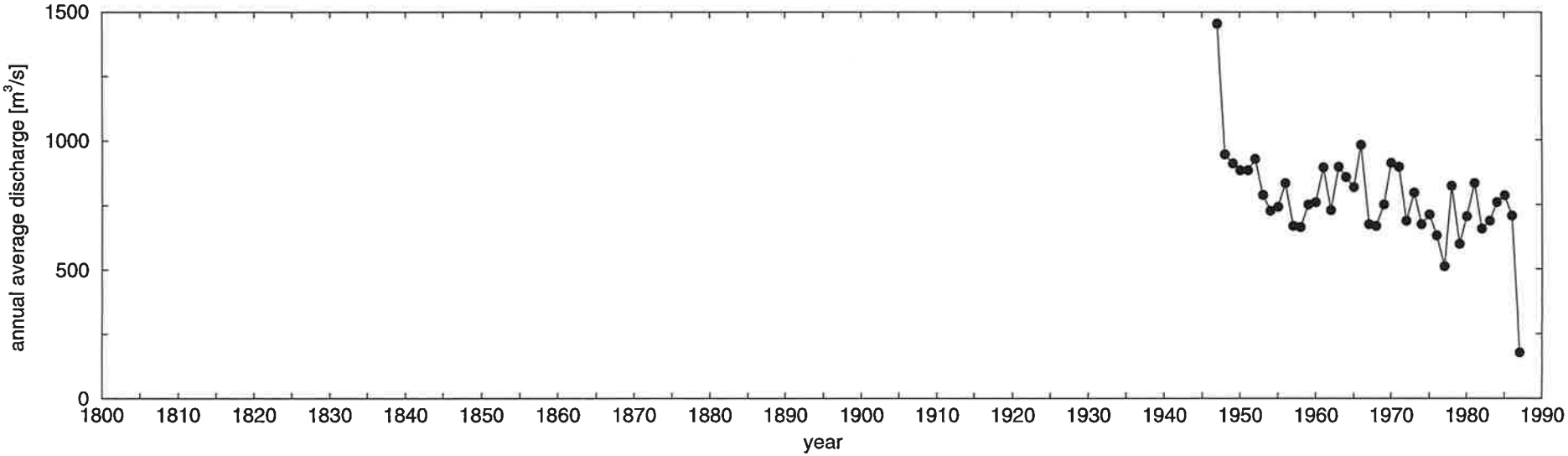
MACKENZIE RIVER (NEAR FORT PROVIDENCE)



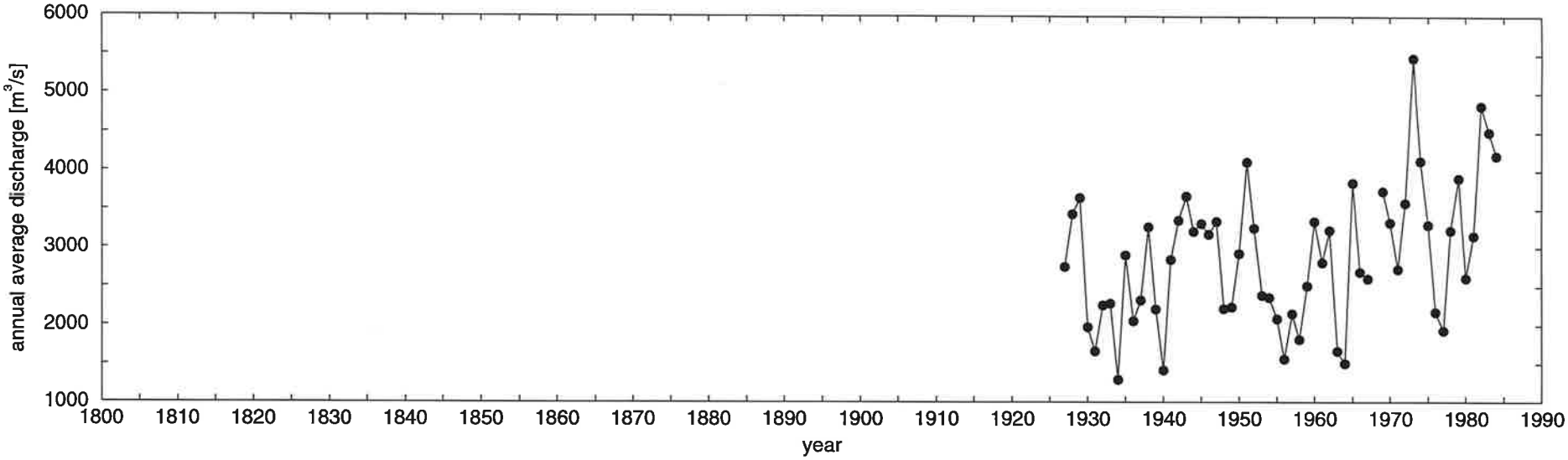
MACKENZIE RIVER (NORMAN WELLS)



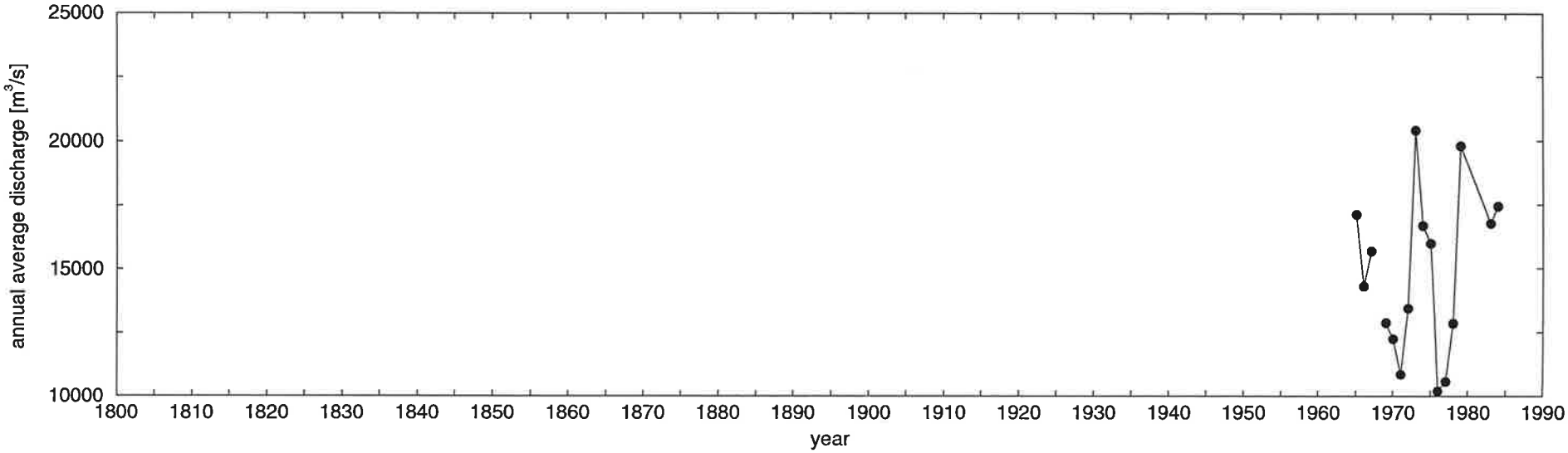
MEKONG (MUKDAHAN)



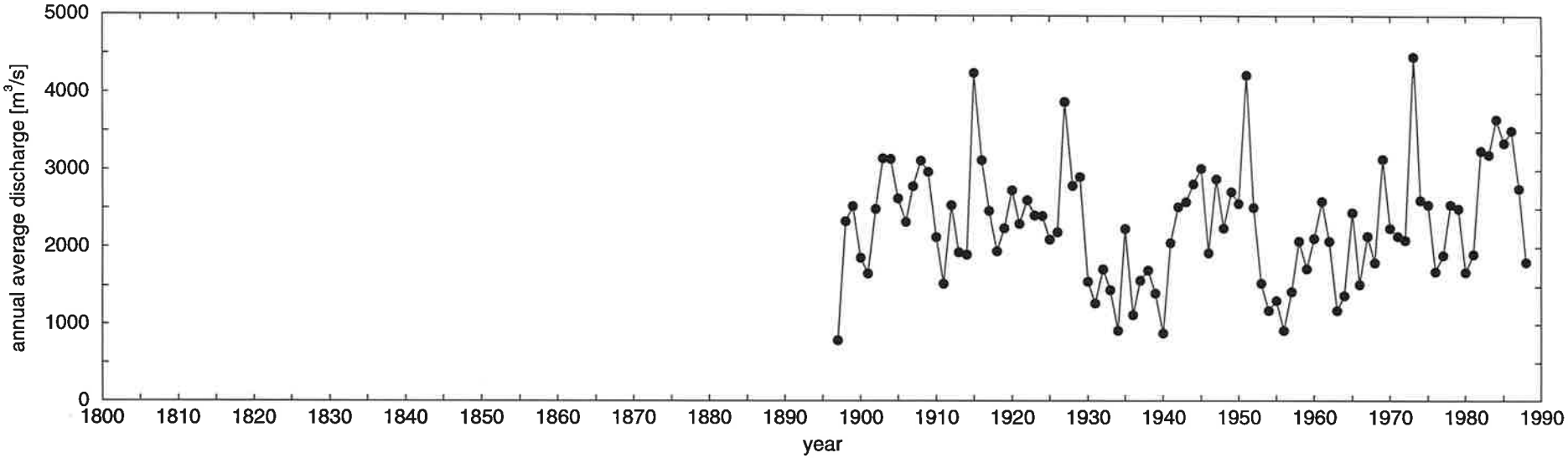
MISSISSIPPI (ALTON, ILL.)



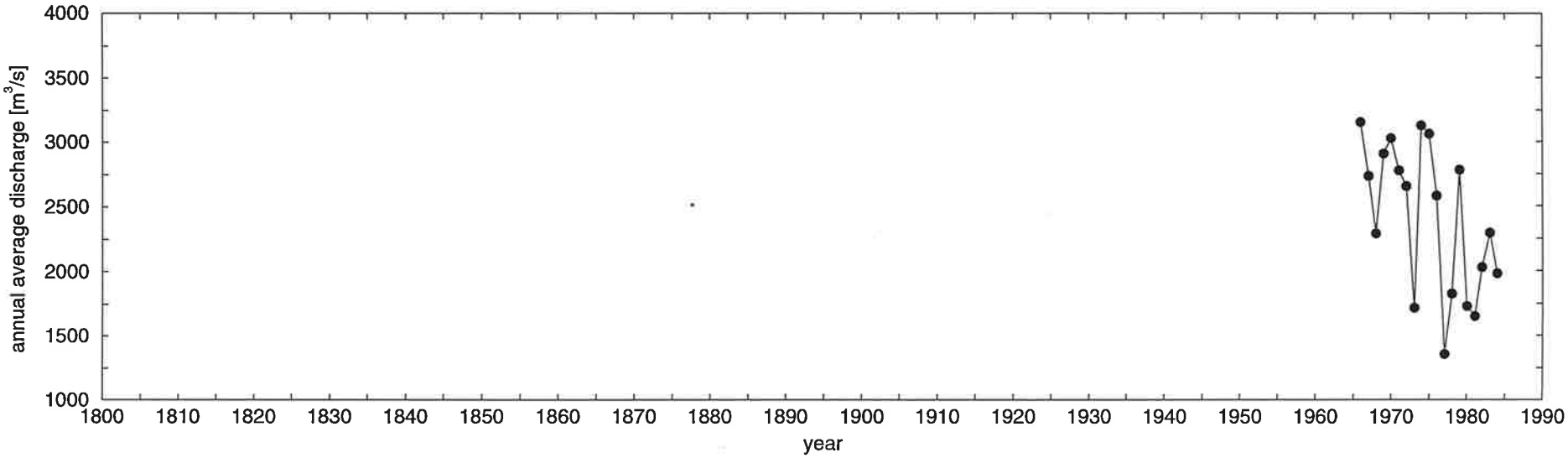
MISSISSIPPI (TARBERT LANDING, MISS.)



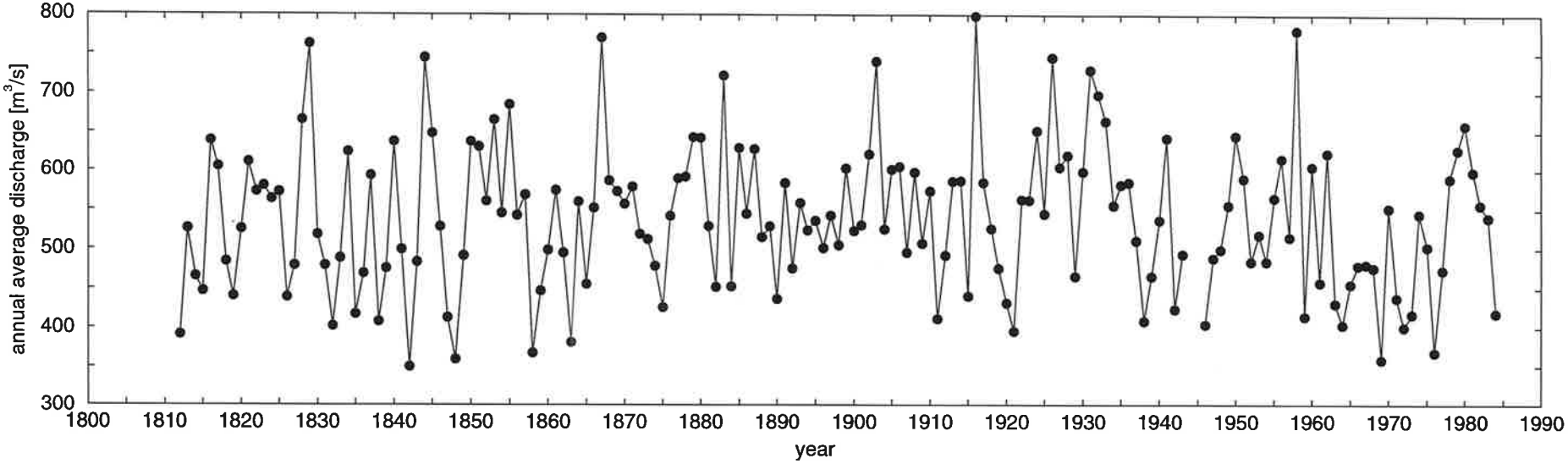
MISSOURI (HERMANN, MO.)



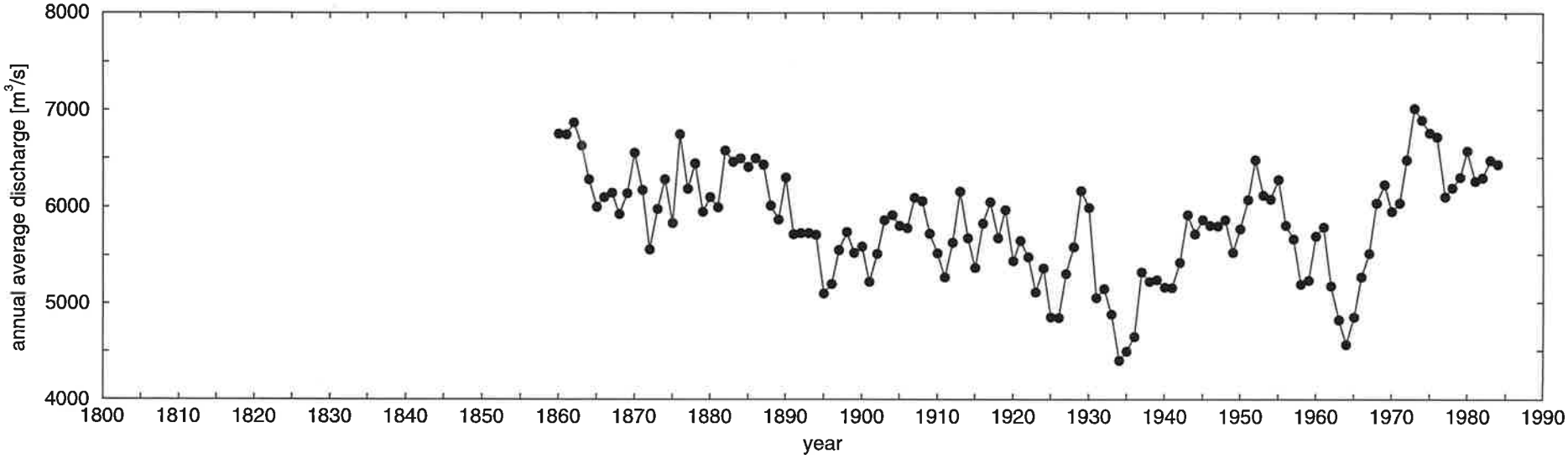
NELSON RIVER (ABOVE BLADDER RAPIDS)



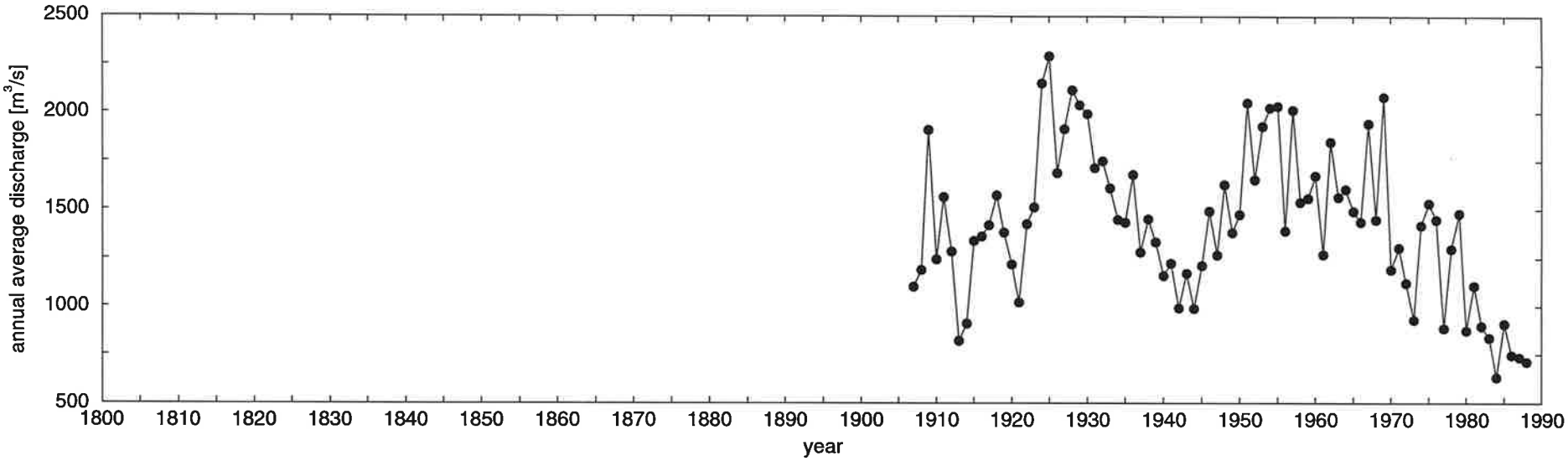
NEMAN (SMALININKAI)



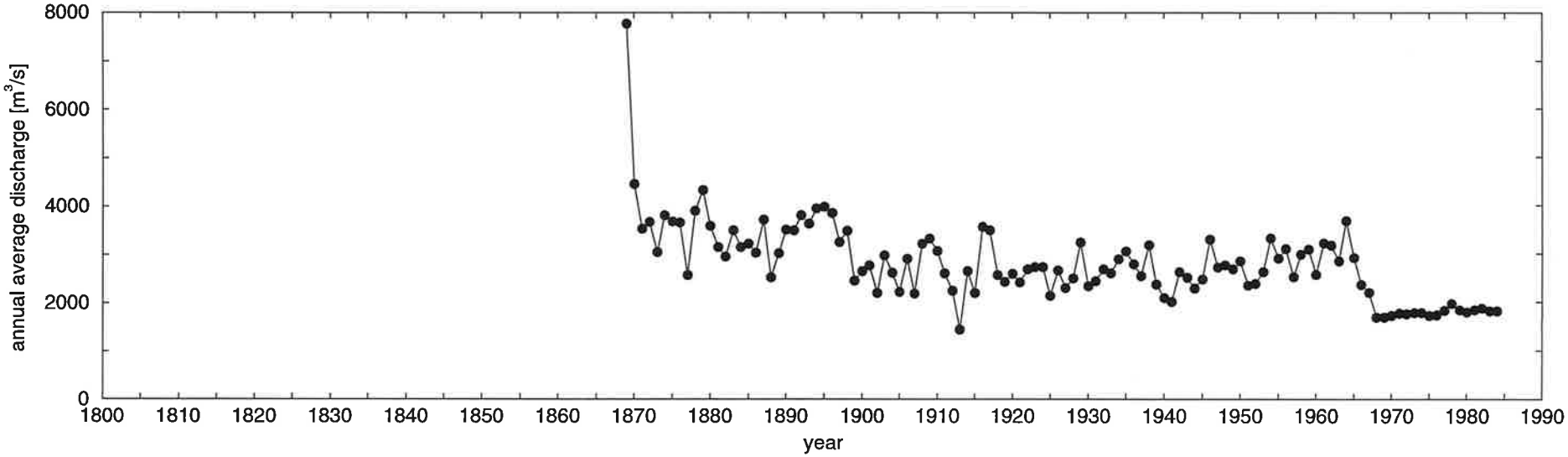
NIAGARA (QUEENSTON)



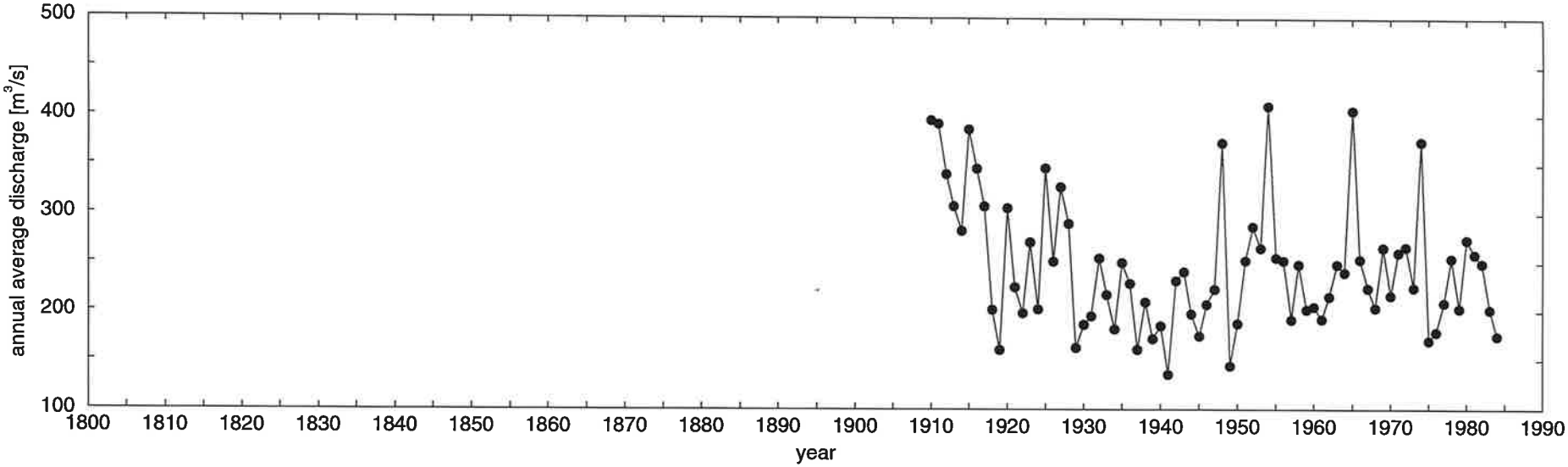
NIGER (KOULIKORO)



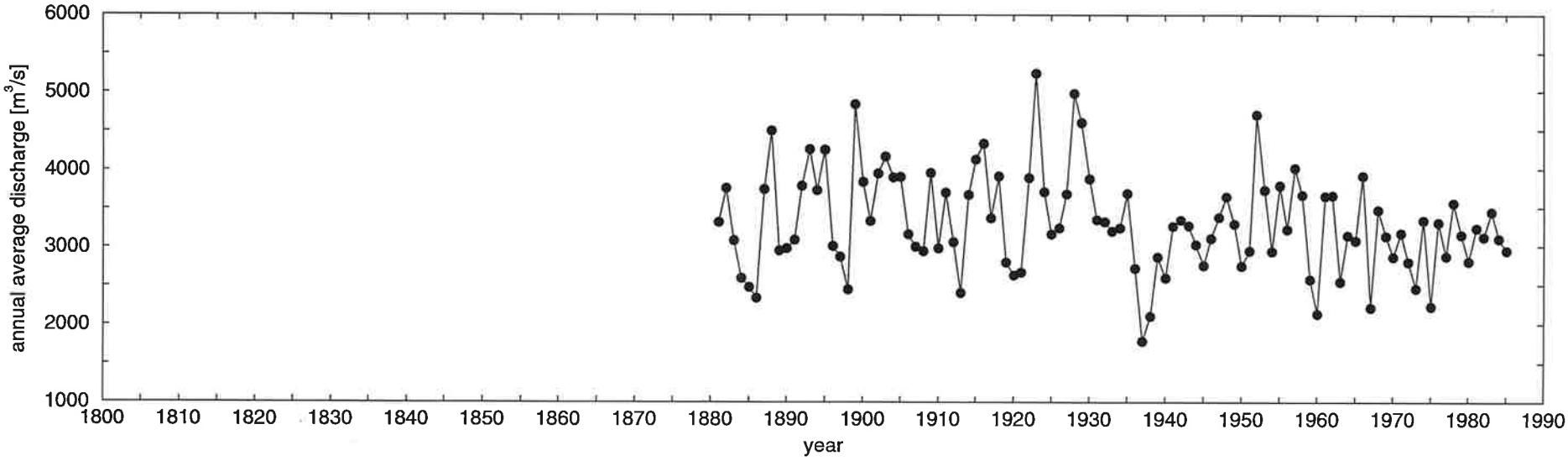
NILE (ASWAN DAM)



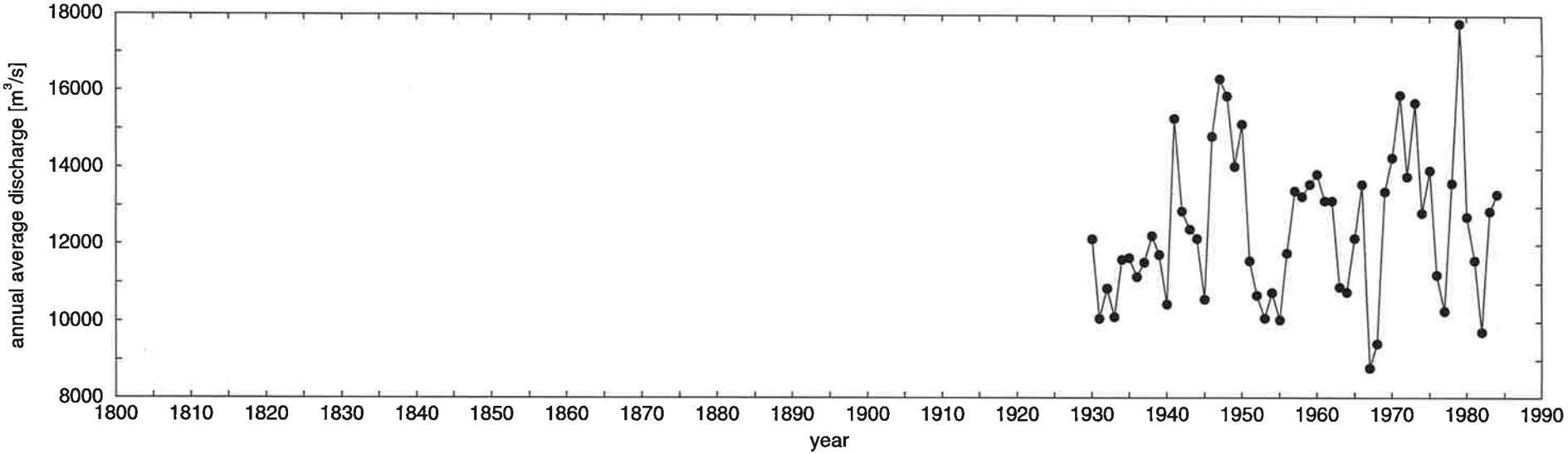
NORTH SASKATCHEWAN (PRINCE ALBERT)



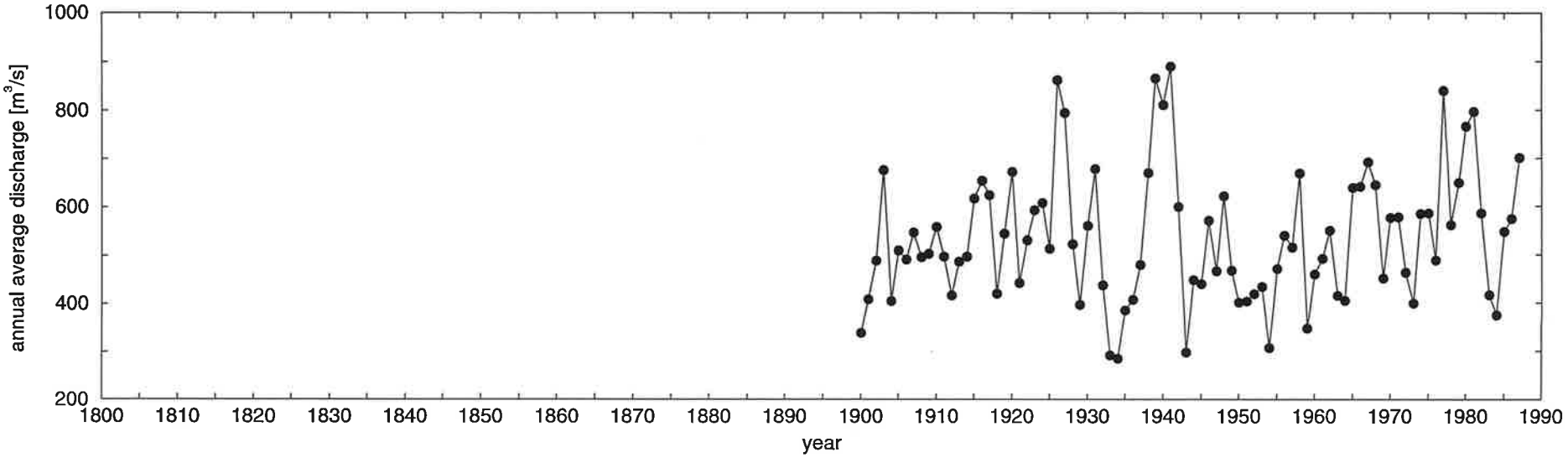
NORTHERN DVINA(SEVERNAYA DVINA) (UST-PINEGA)



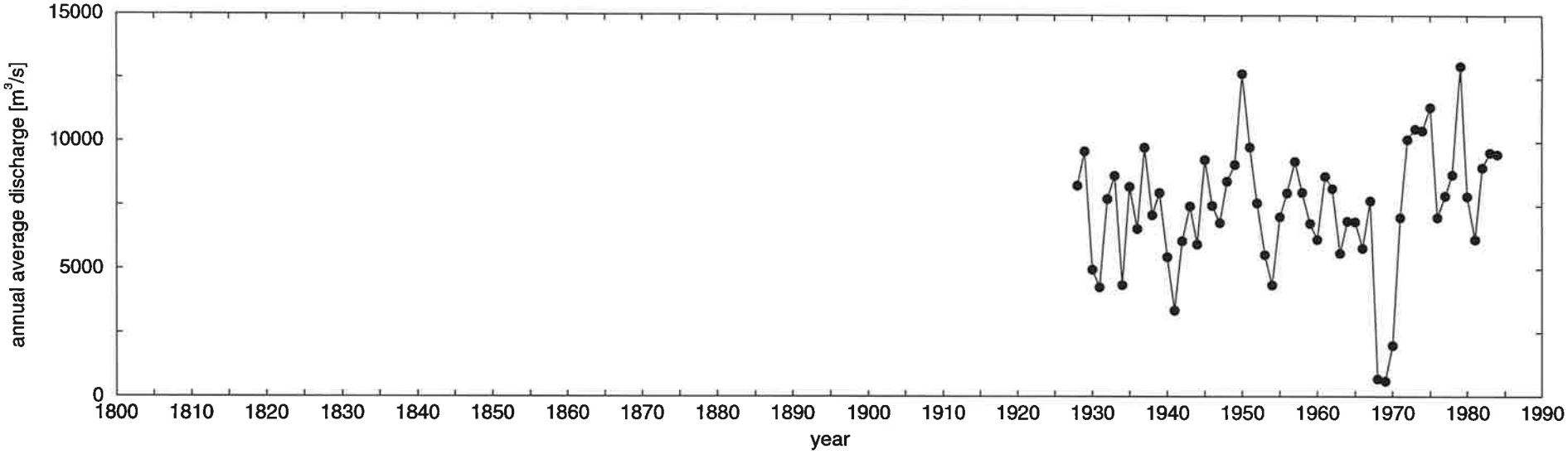
OB (SALEKHARD)



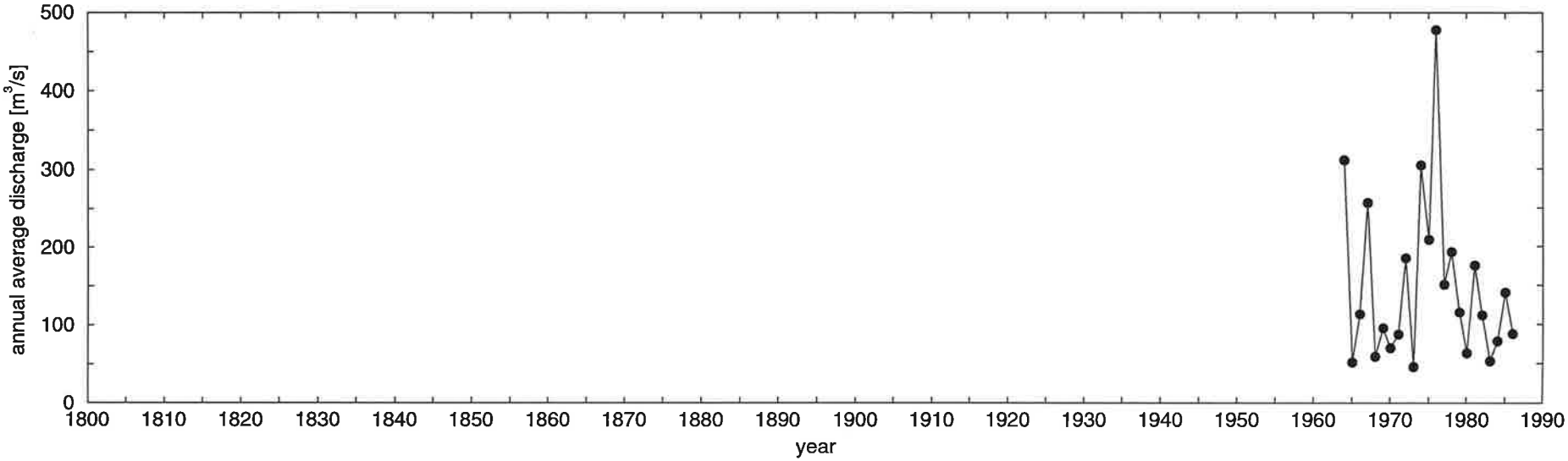
ODRA (GOZDOWICE)



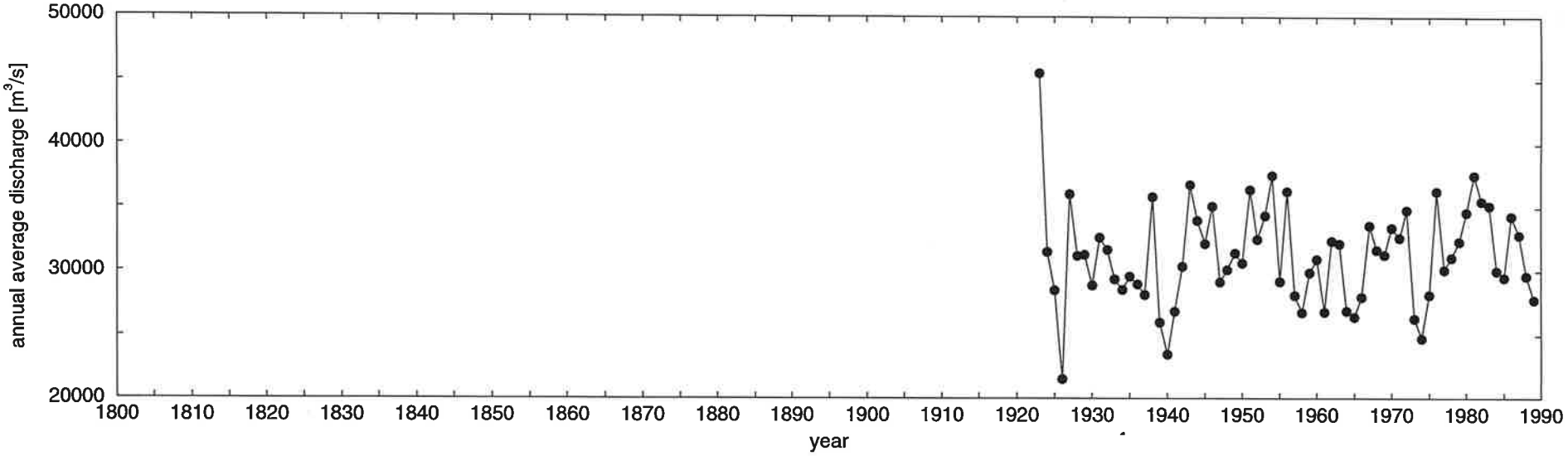
OHIO (METROPOLIS, ILL.)



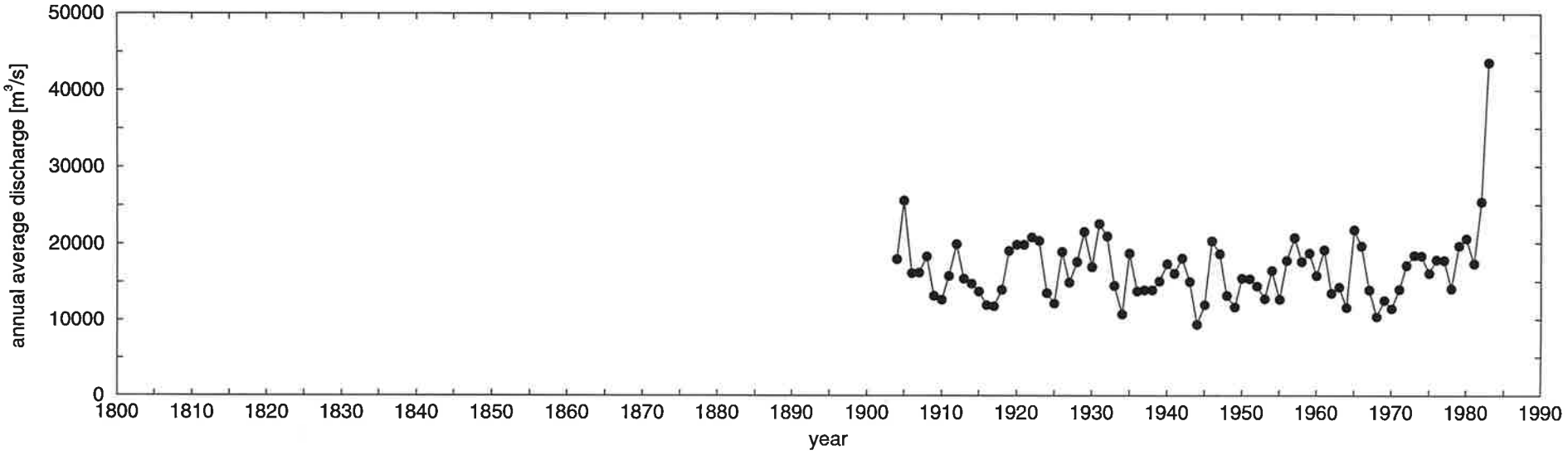
ORANJE (ALIWAL NOORD)



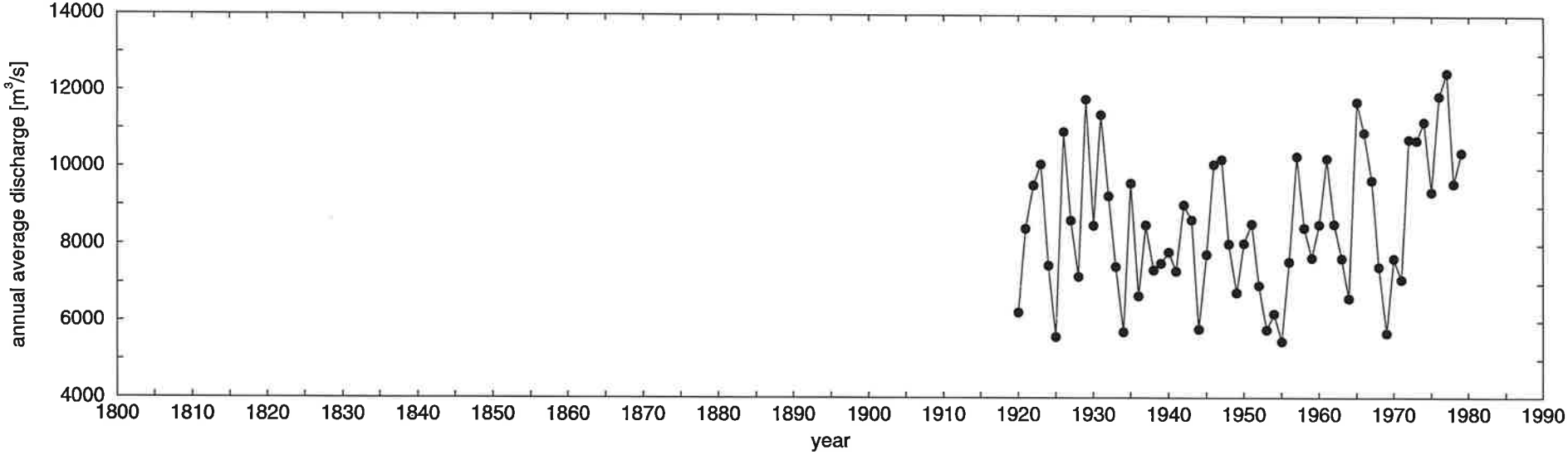
ORINOCO (PUENTE ANGOSTURA)



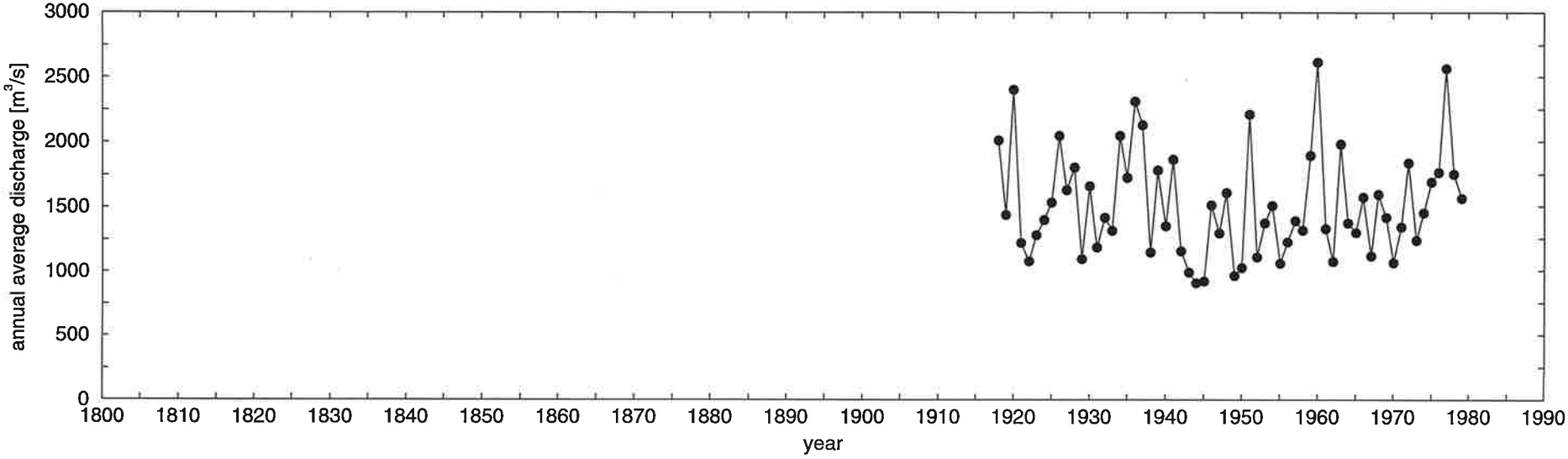
PARANA (CORRIENTES)



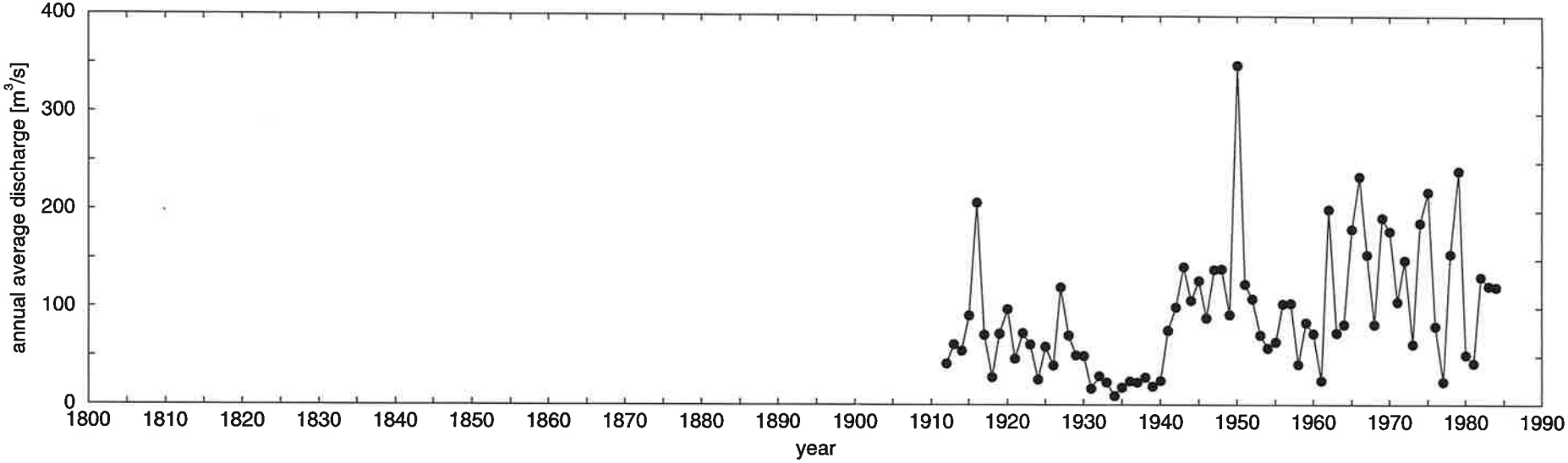
PARANA (GUAIRA)



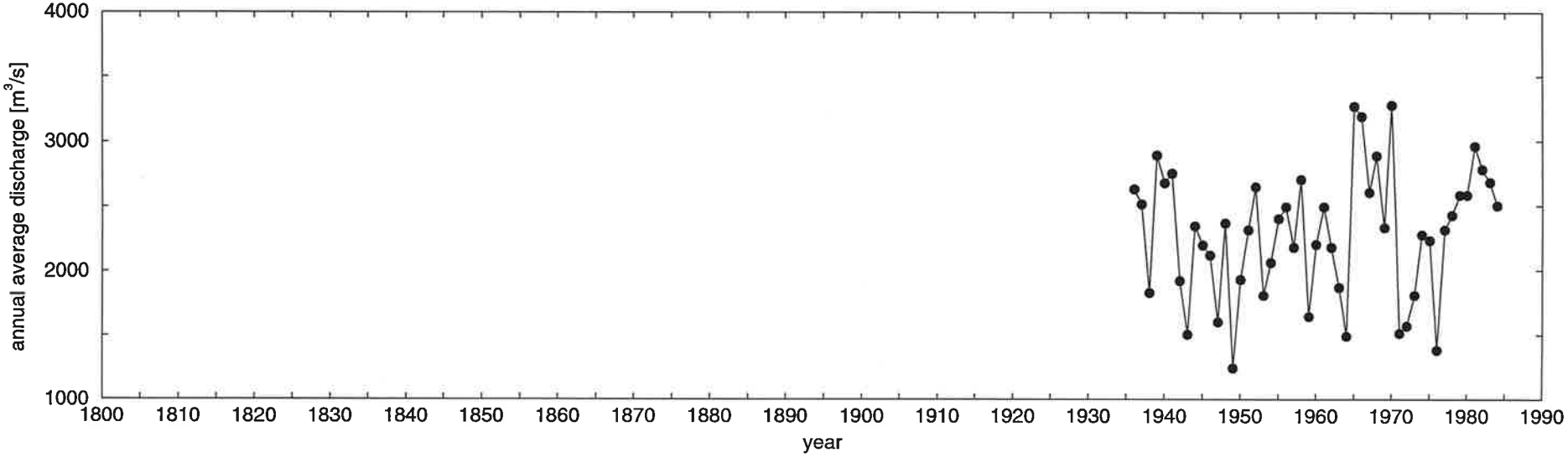
PO (PONTELAGOSCURO)



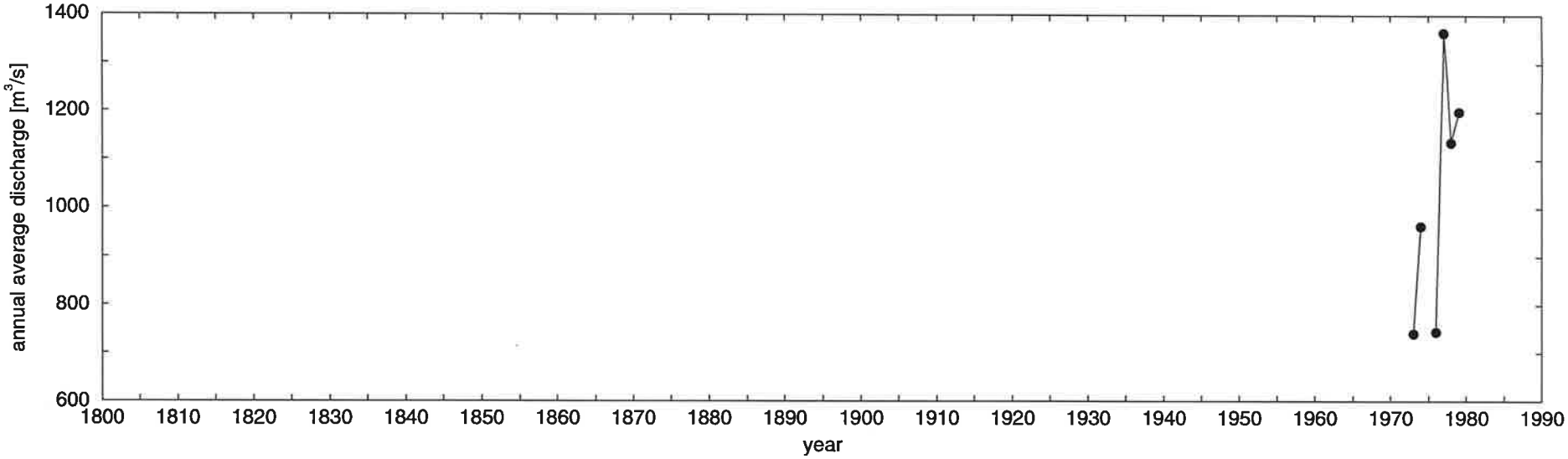
RED (EMERSON)



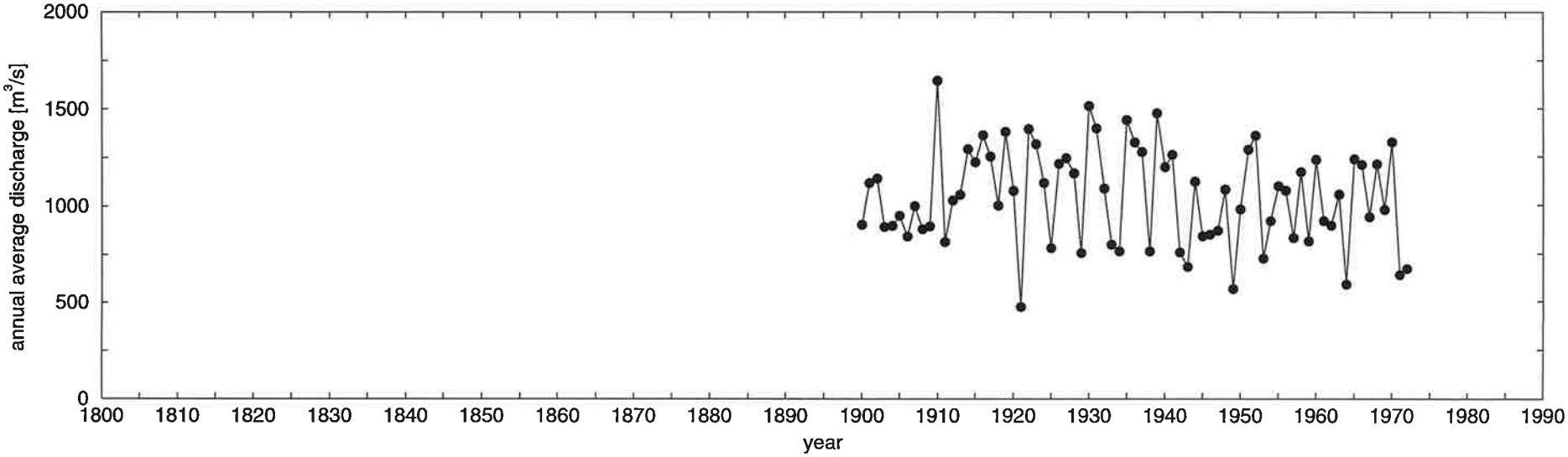
RHEIN (REES)



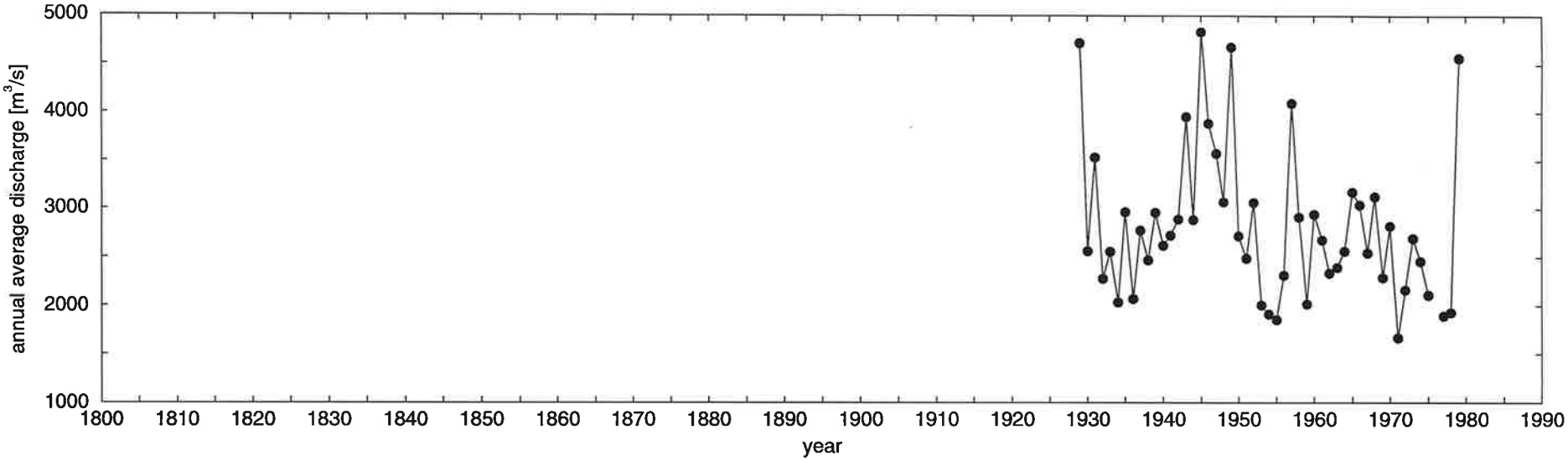
RHONE (GIVORS)



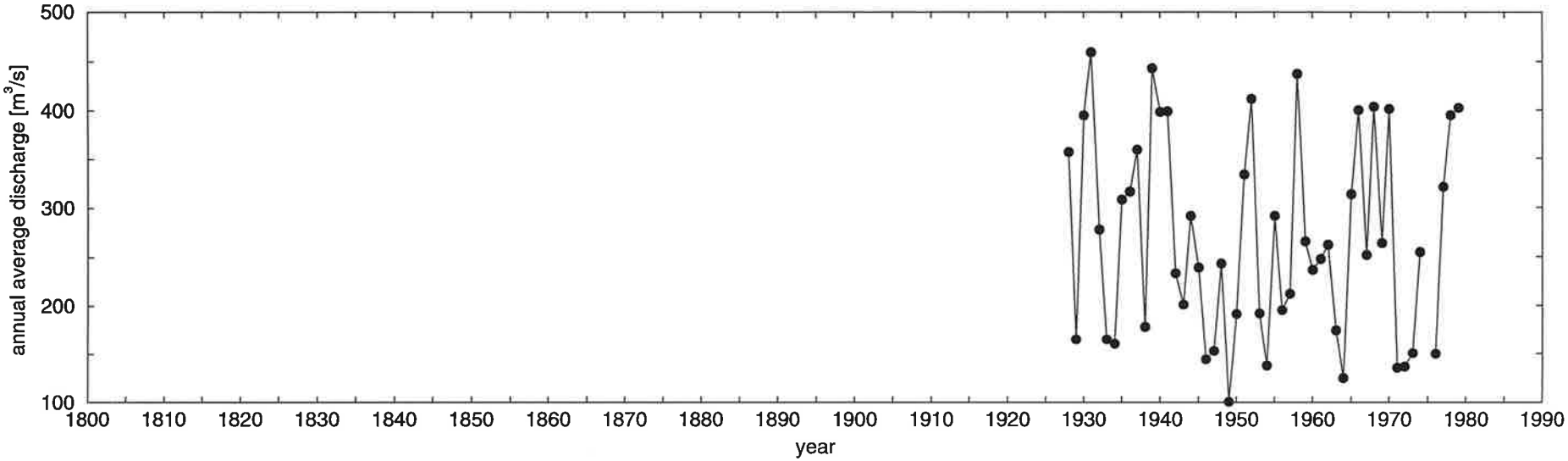
RHONE (LA MULATIERE)



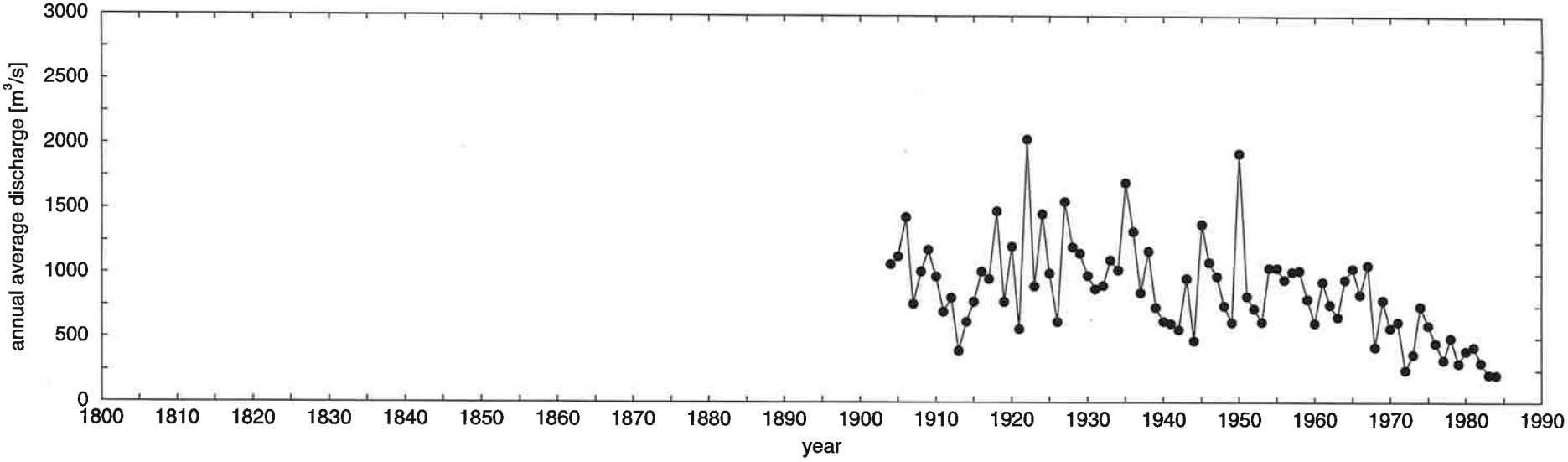
SAO FRANCISCO (JUAZEIRO)



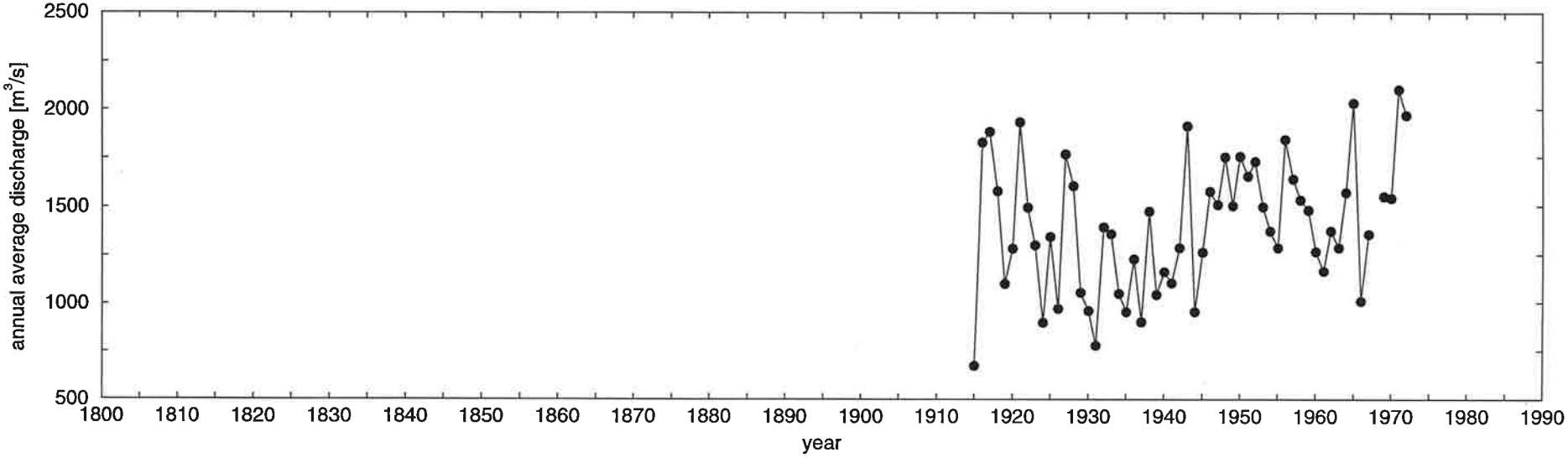
SEINE (PARIS)



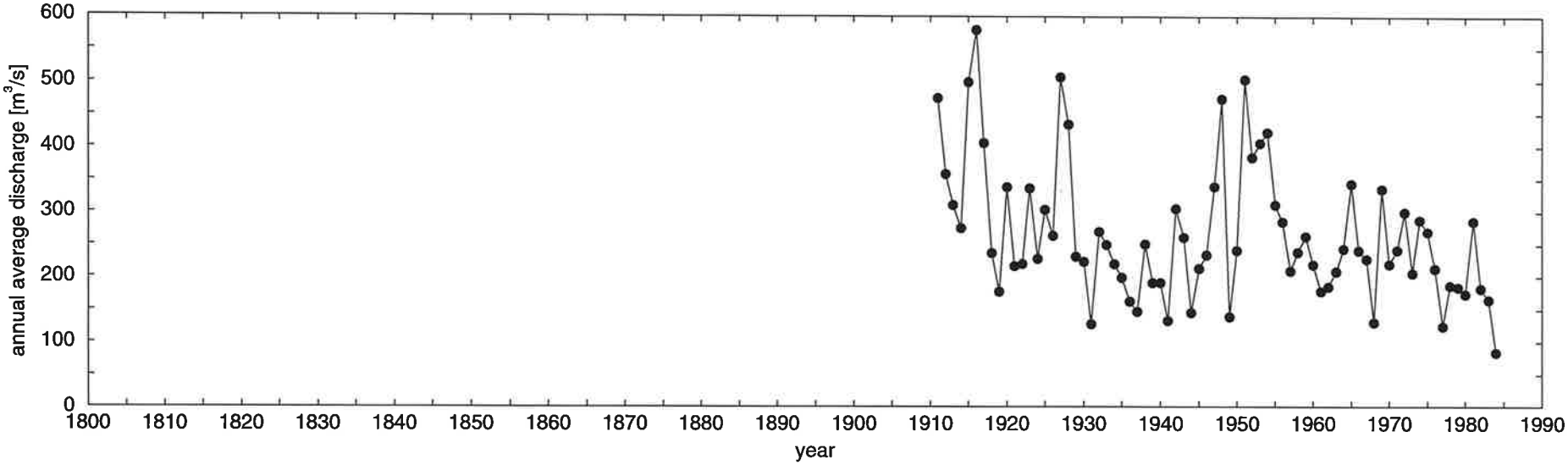
SENEGAL (BAKEL)



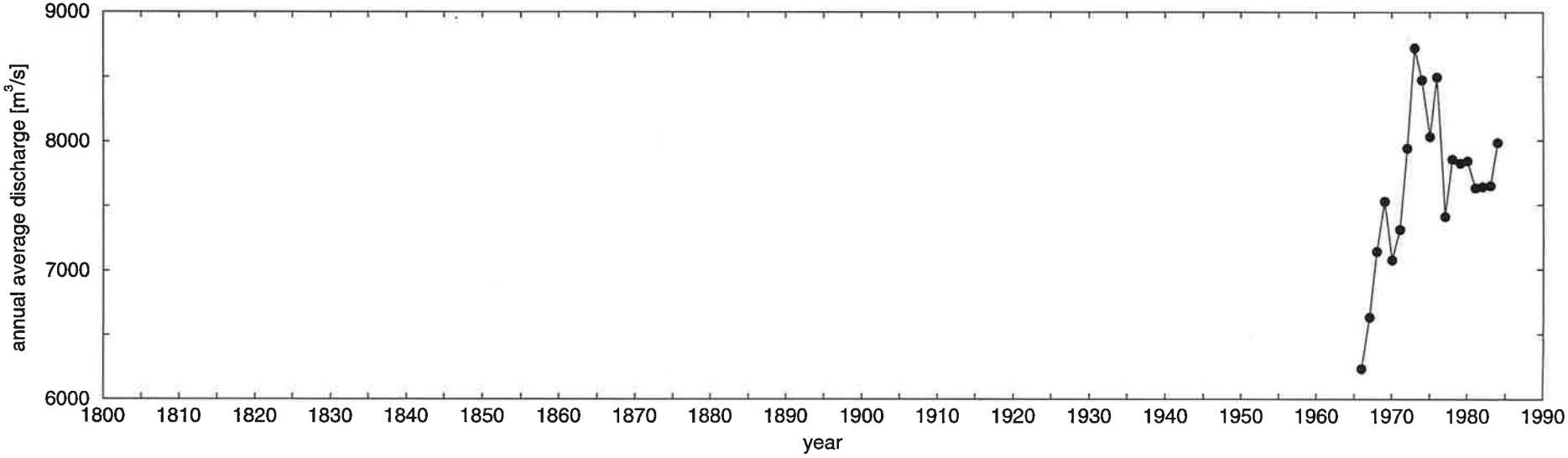
SNAKE (CLARKSTON, WASH.)



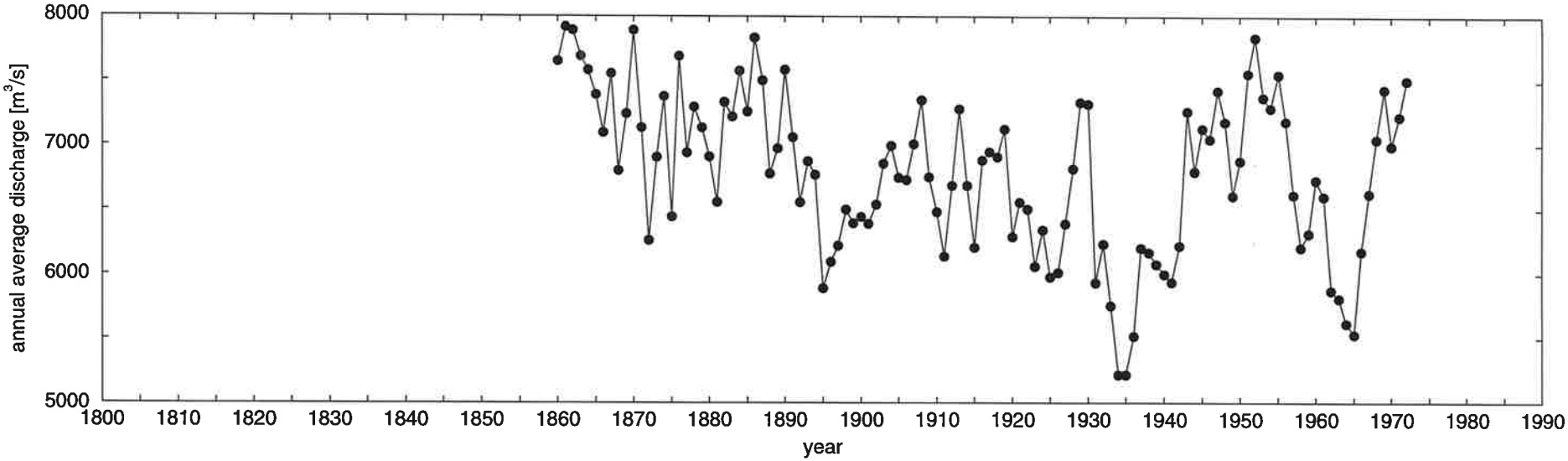
SOUTH SASKATCHEWAN (SASKATOON)



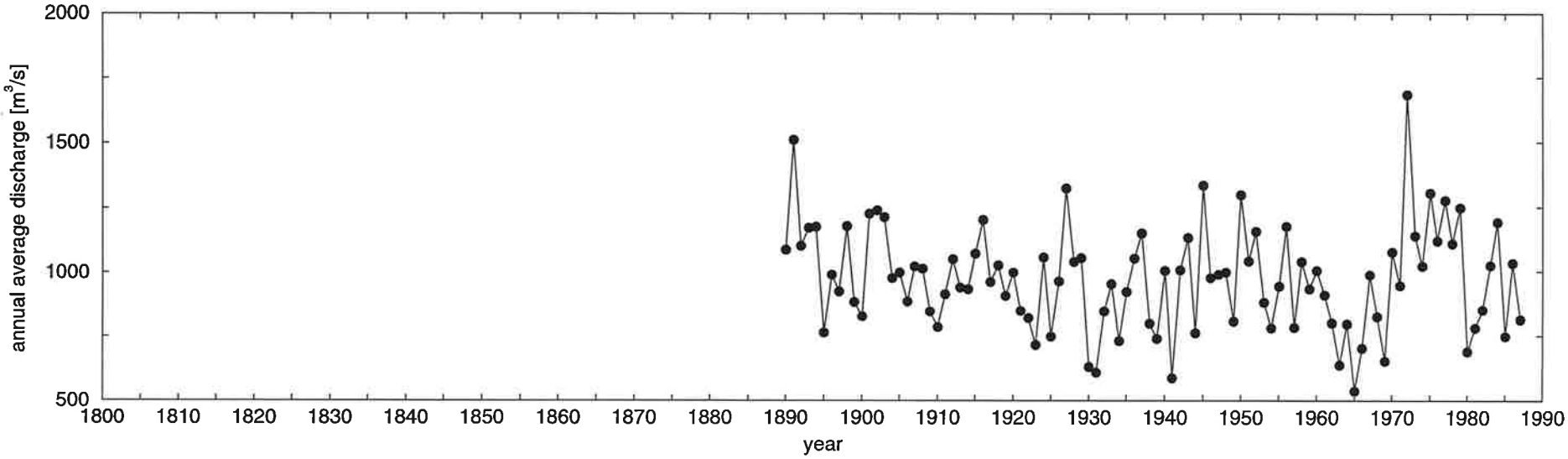
ST. LAWRENCE RIVER (CORNWALL)



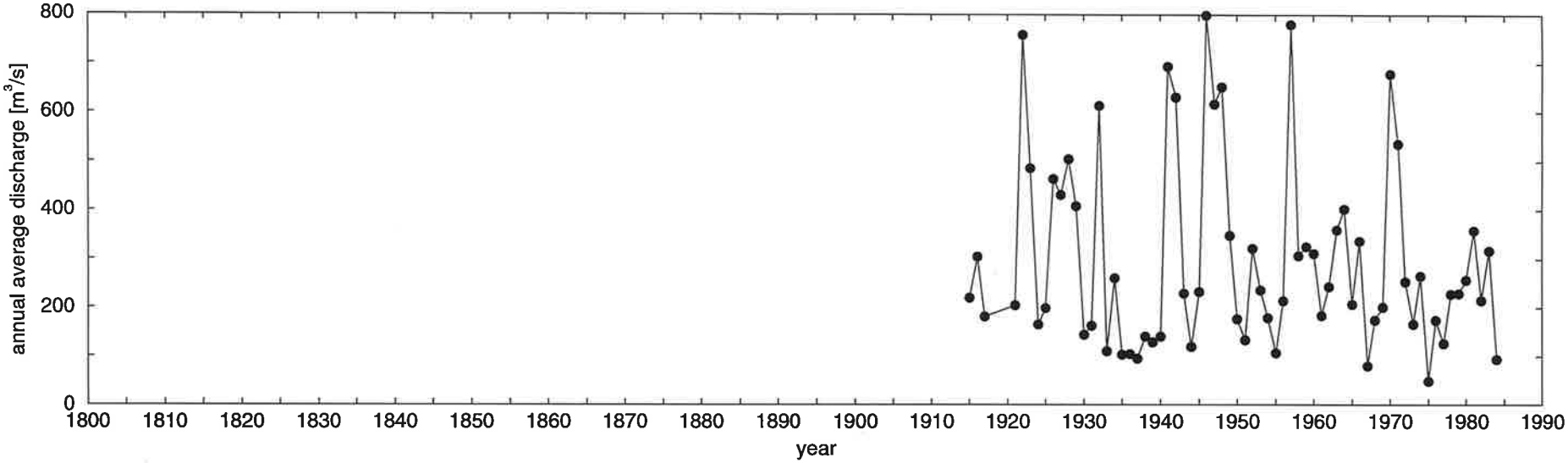
ST.LAWRENCE (OGDENSBURG, N.Y.)



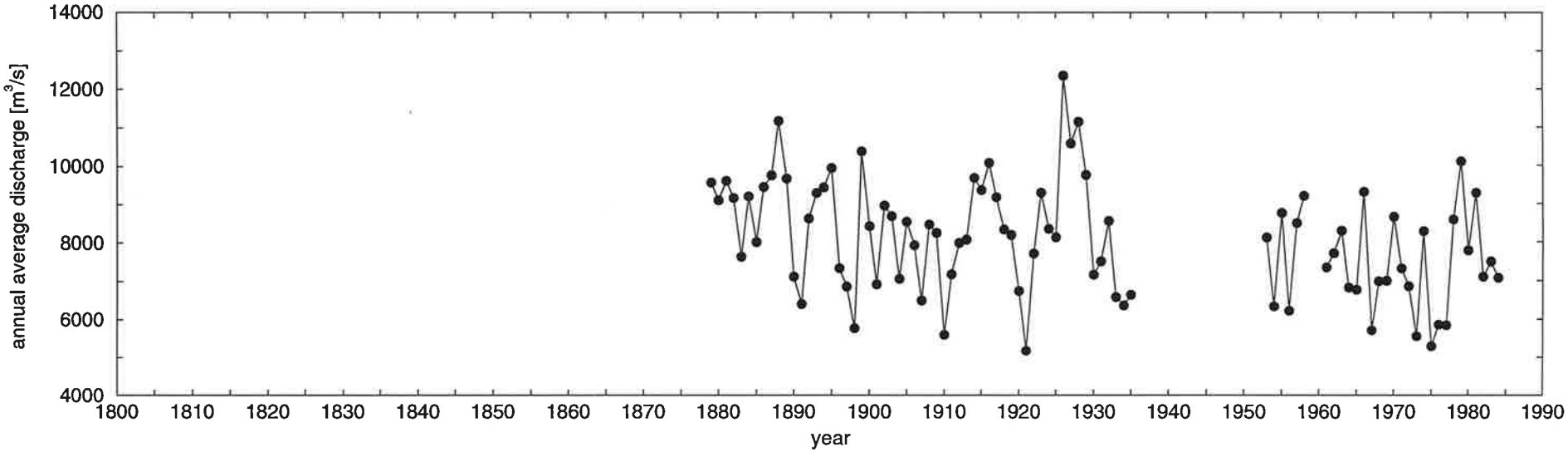
SUSQUEHANNA (HARRISBURG ,PA.)



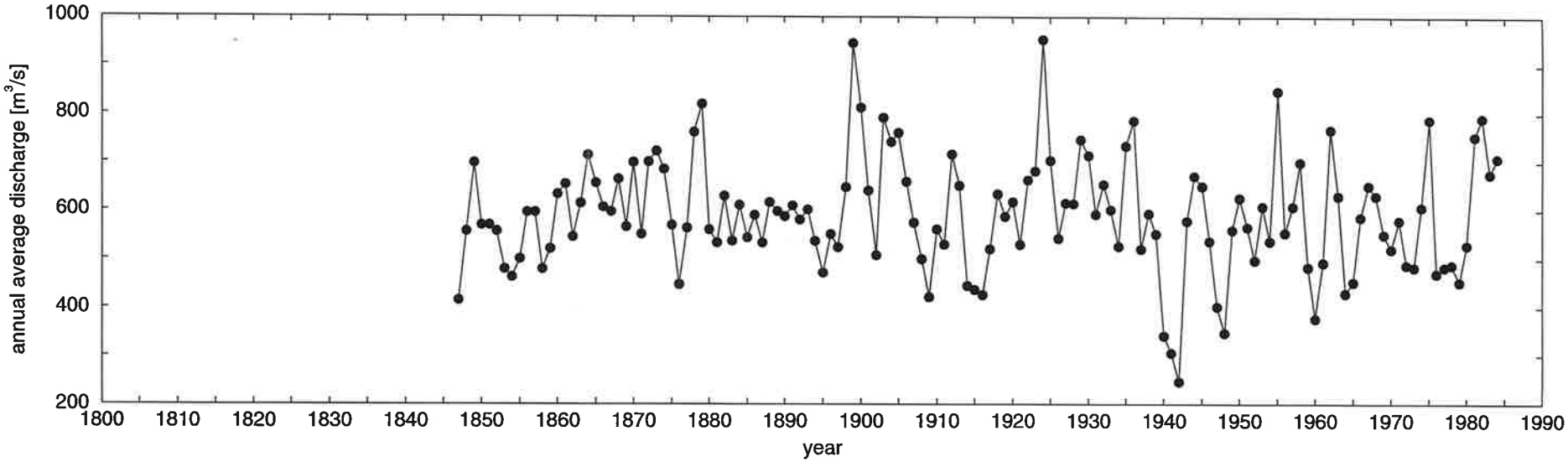
URAL (KUSHUM)



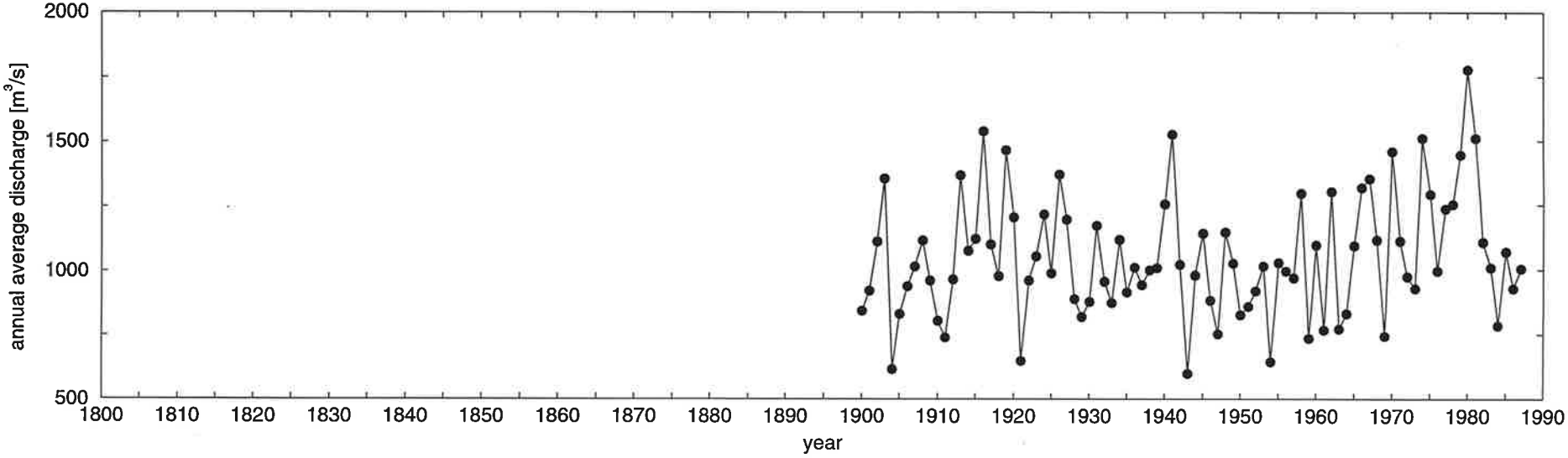
VOLGA (VOLGOGRAD POWER PLANT)



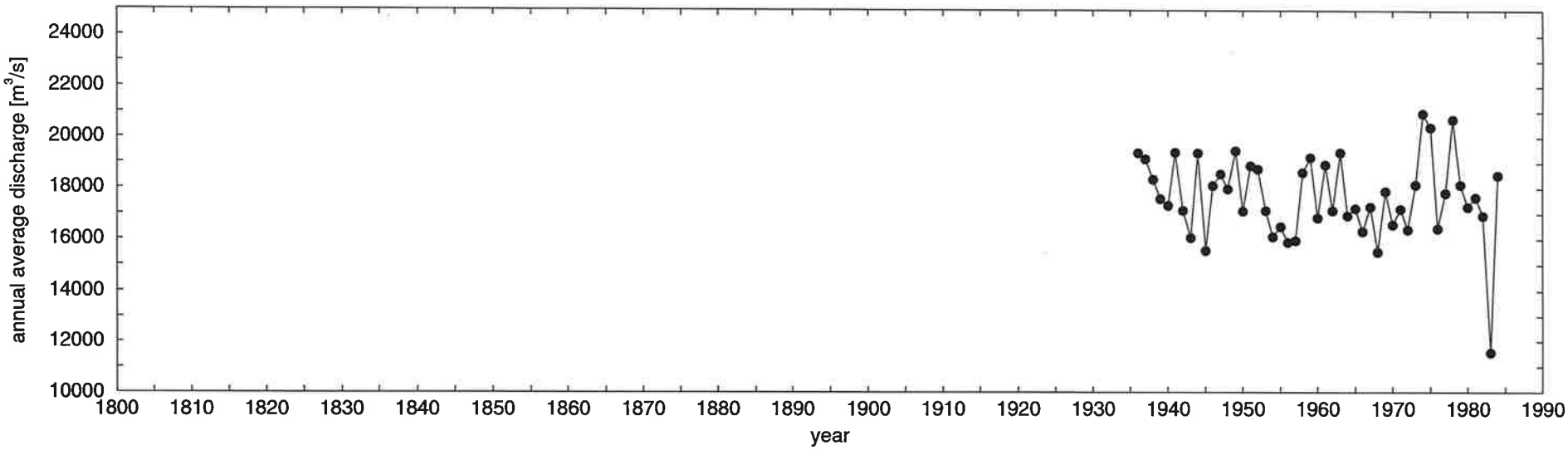
VUOKSI (IMATRA)



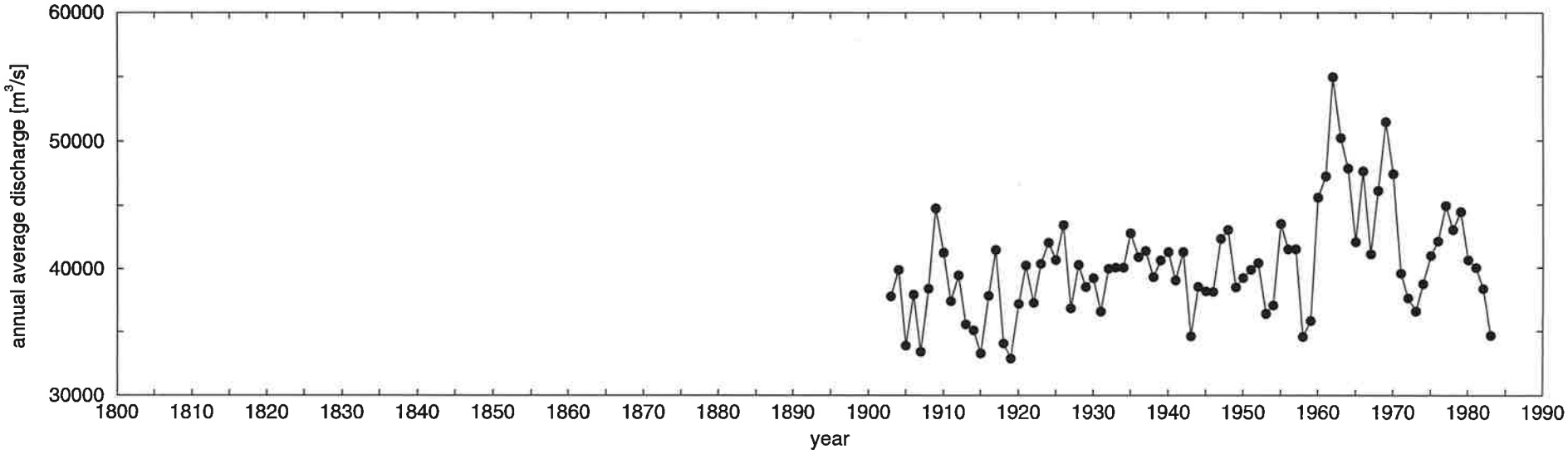
WISLA (TCZEW)



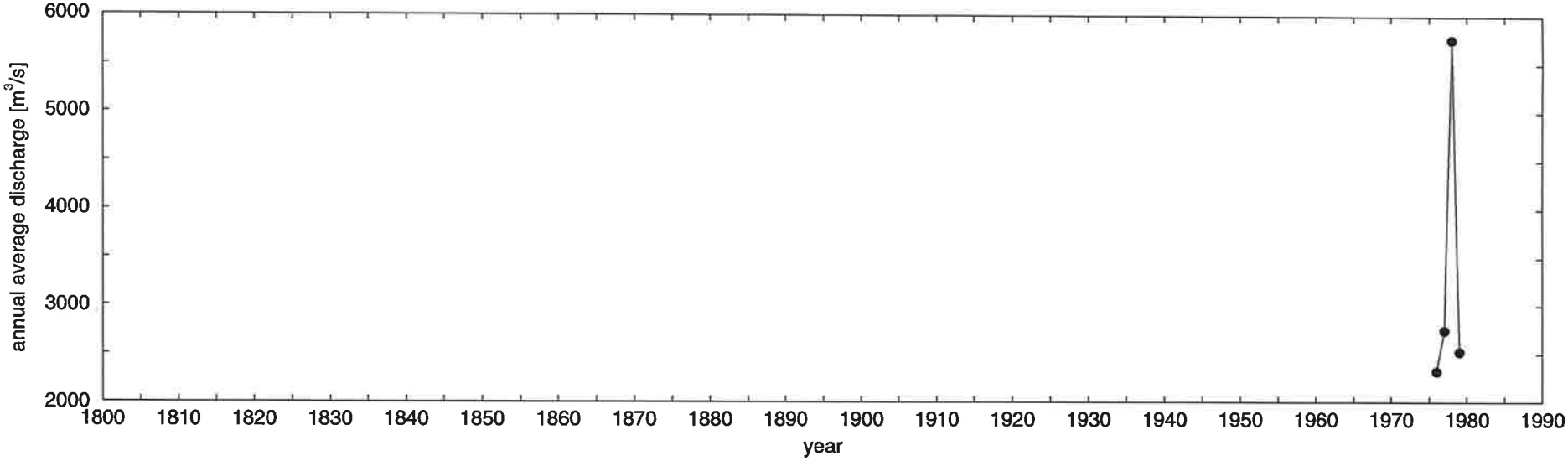
YENISEI (IGARKA)



ZAIRE (KINSHASA)



ZAMBEZE (MATUNDO-CAIS)



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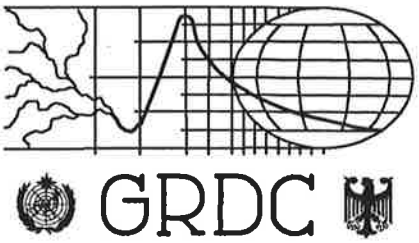
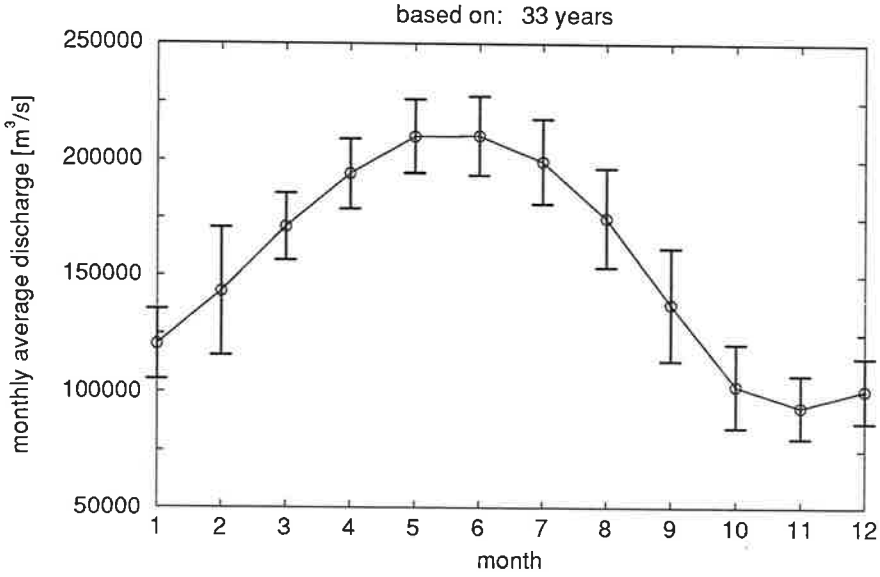
für Meteorologie

&

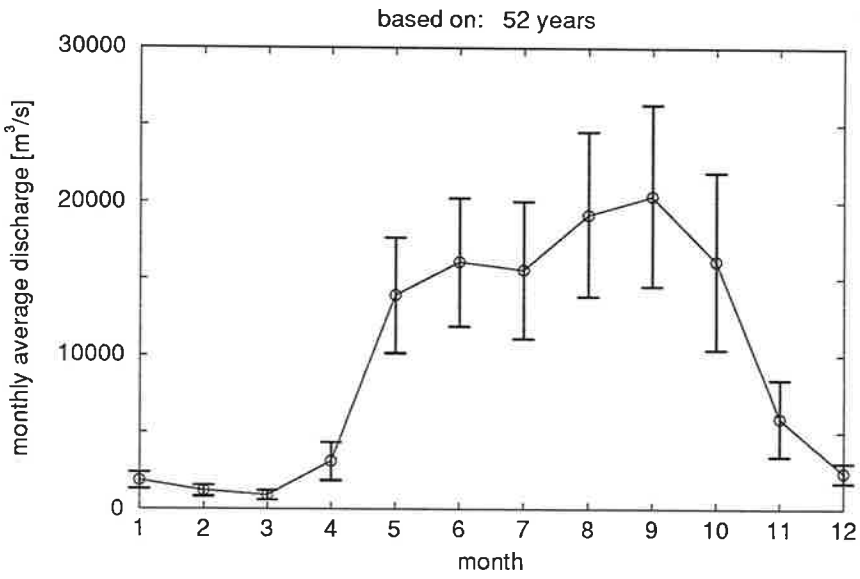


Long time averages

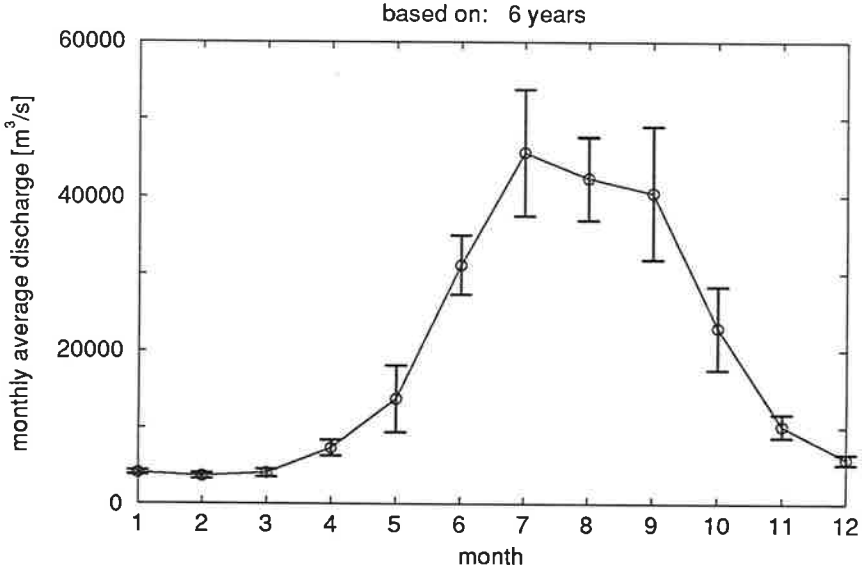
AMAZONAS (OBIDOS)



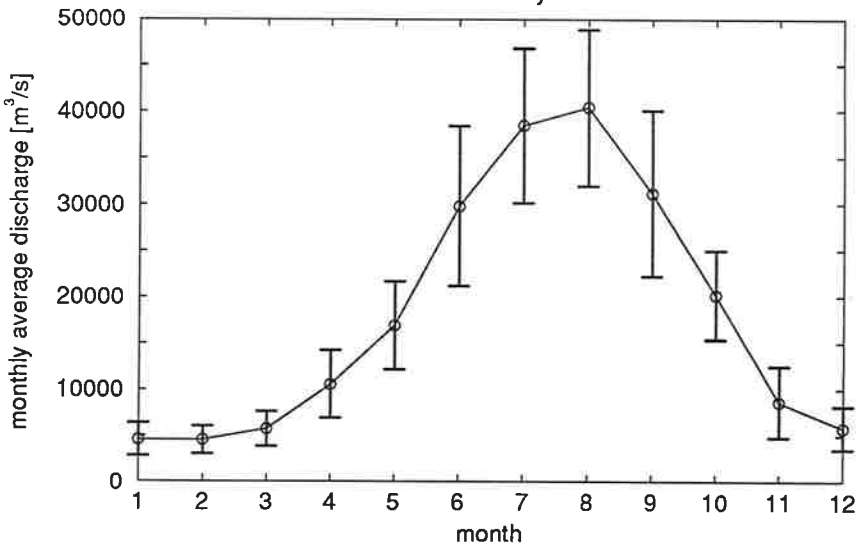
AMUR (KOMSOMOLSK)



BRAHMAPUTRA (BAHADURABAD)

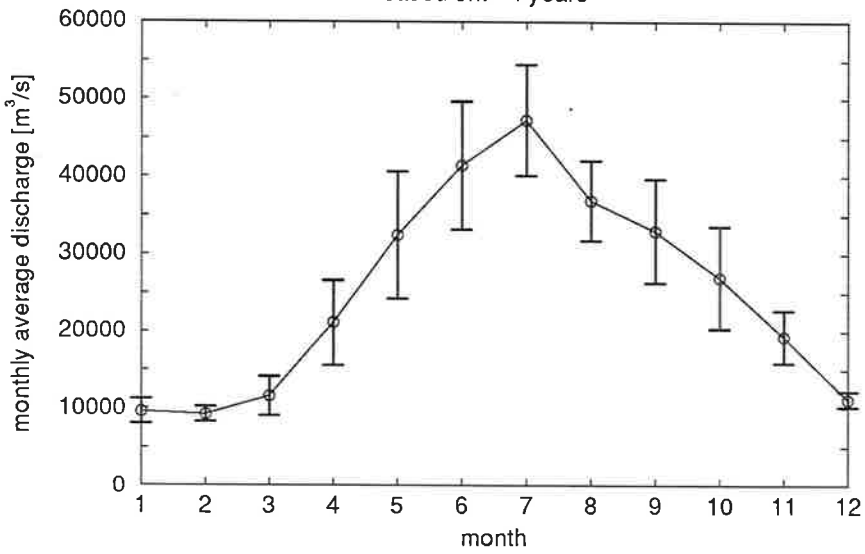


BRAHMAPUTRA (PANDU)



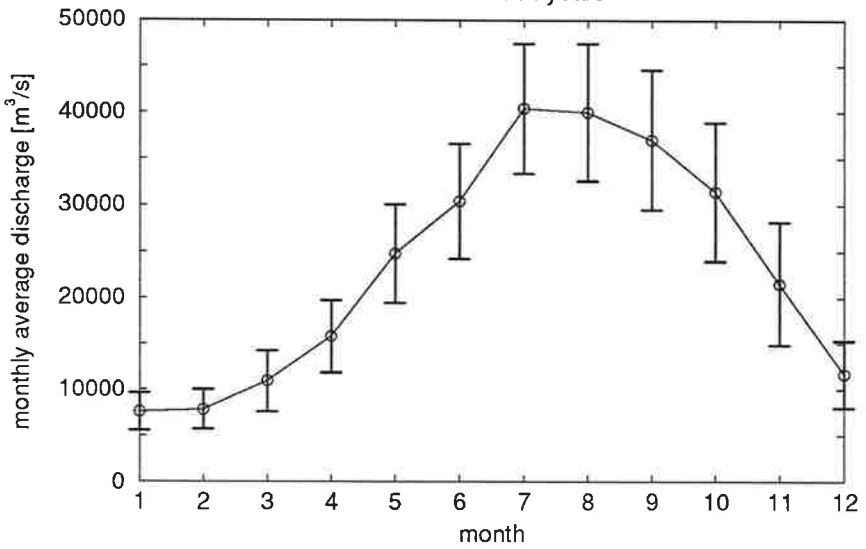
CHANGJIANG (DATONG)

based on: 4 years



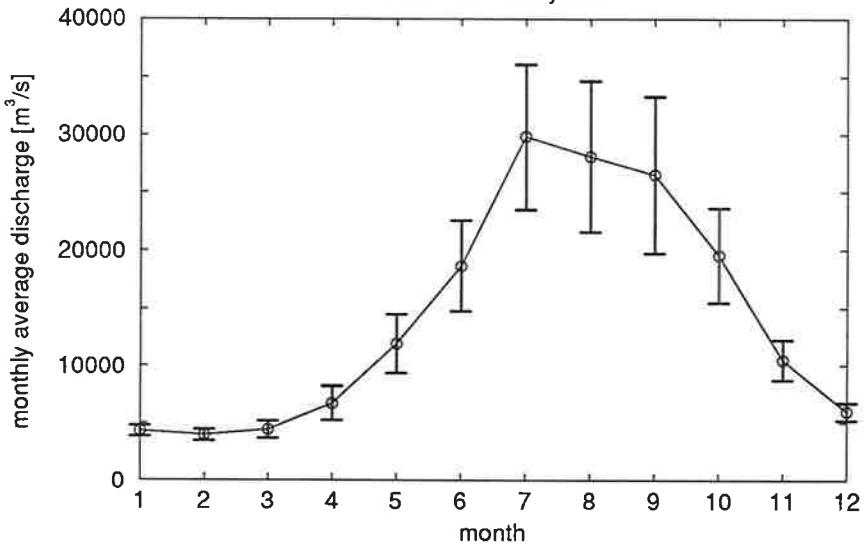
CHANGJIANG (HANKOU)

based on: 114 years



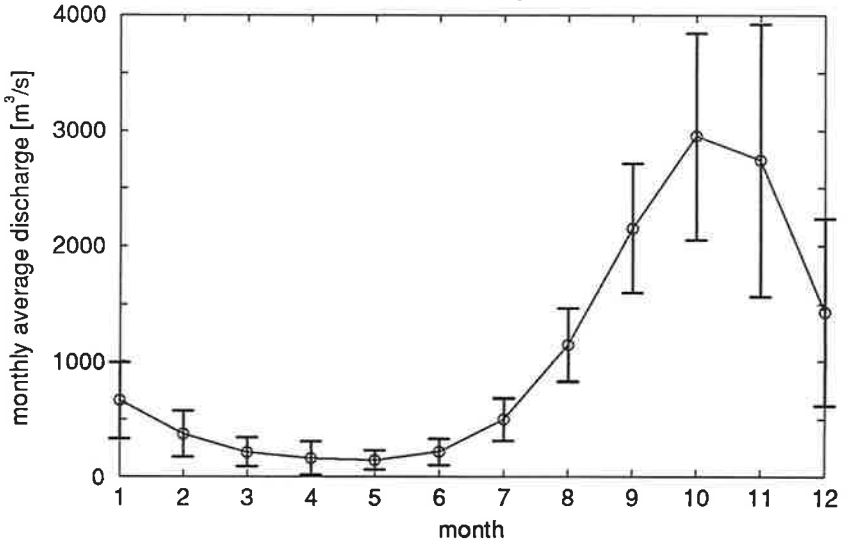
CHANGJIANG (YICHANG)

based on: 105 years



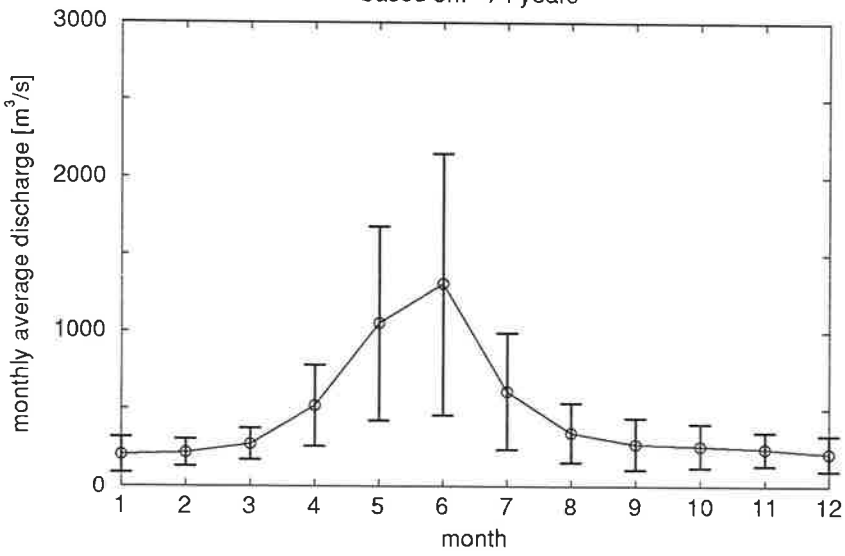
CHARI (NDJAMENA(FORT LAMY))

based on: 53 years



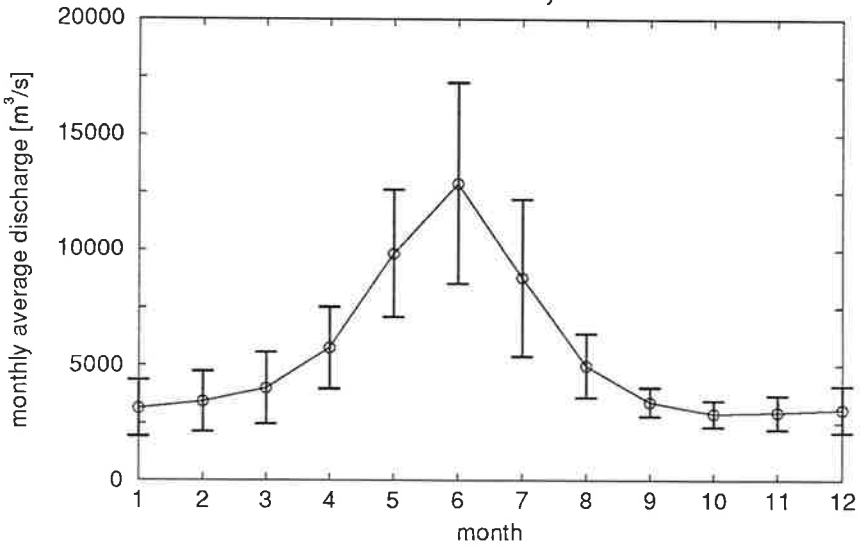
COLORADO (LEES FERRY, ARIZ.)

based on: 74 years



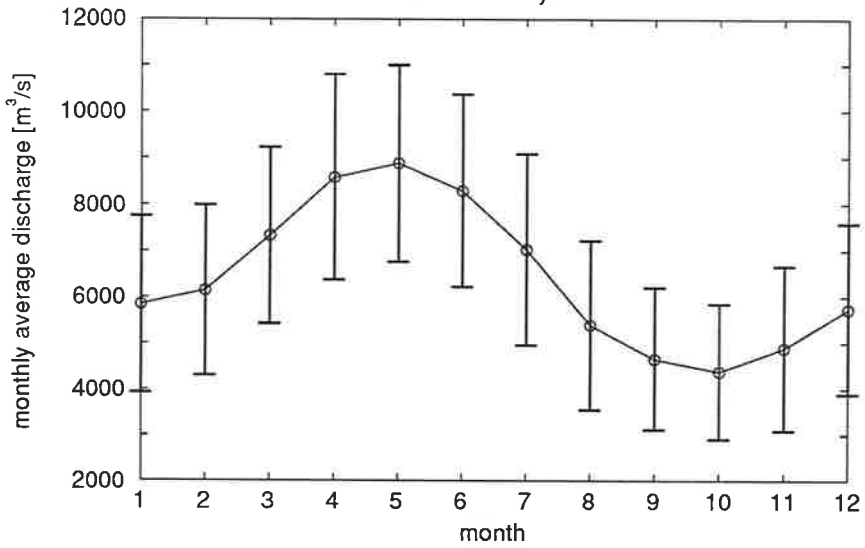
COLUMBIA (THE DALLES, OREG.)

based on: 111 years



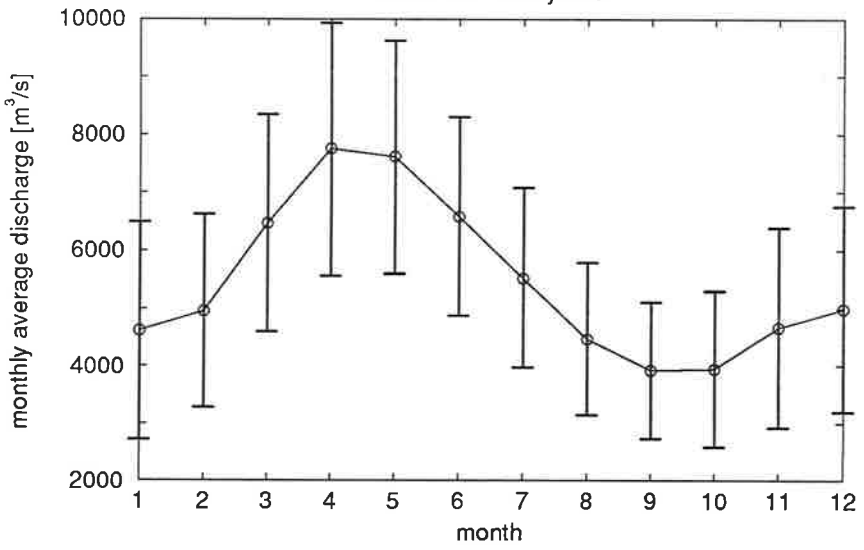
DANUBE (CEATAL IZMAIL)

based on: 70 years



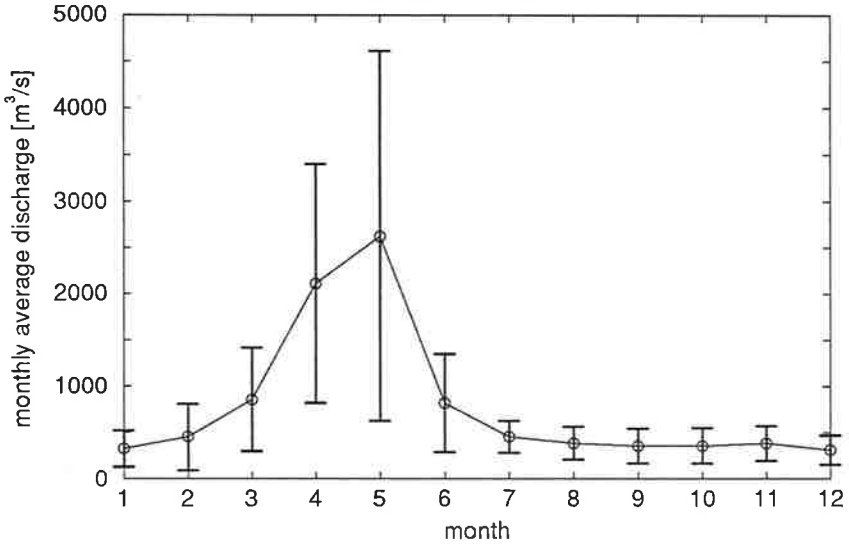
DANUBE (ORSOVA (1971:DROBATA-TURNU SEVERIN))

based on: 149 years



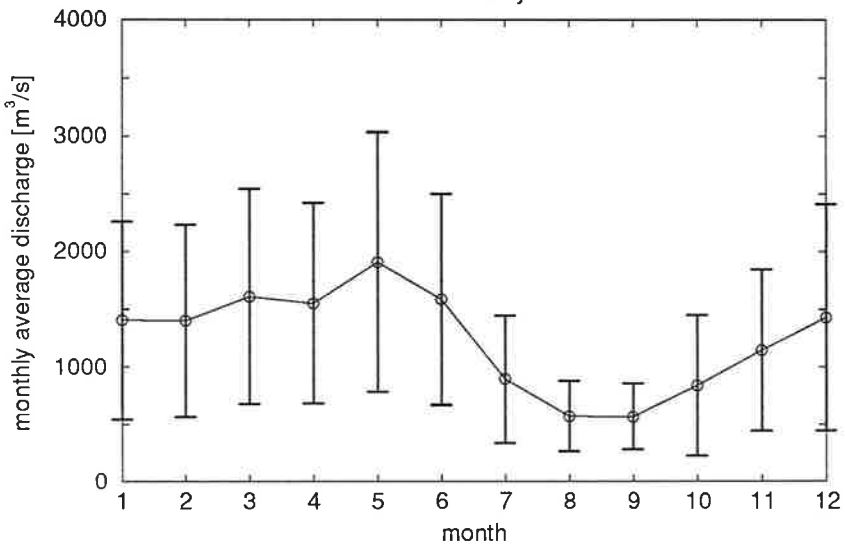
DON (RAZDORSKAYA)

based on: 94 years



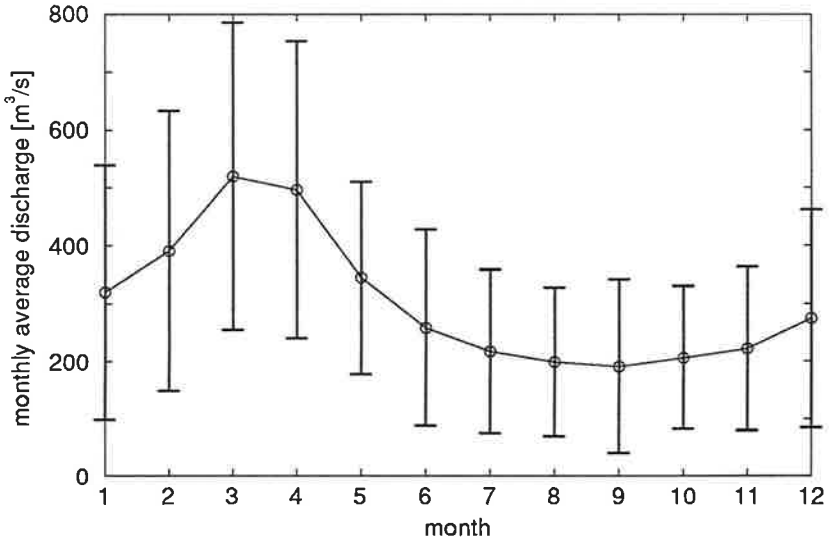
EBRO (TORTOSA)

based on: 70 years



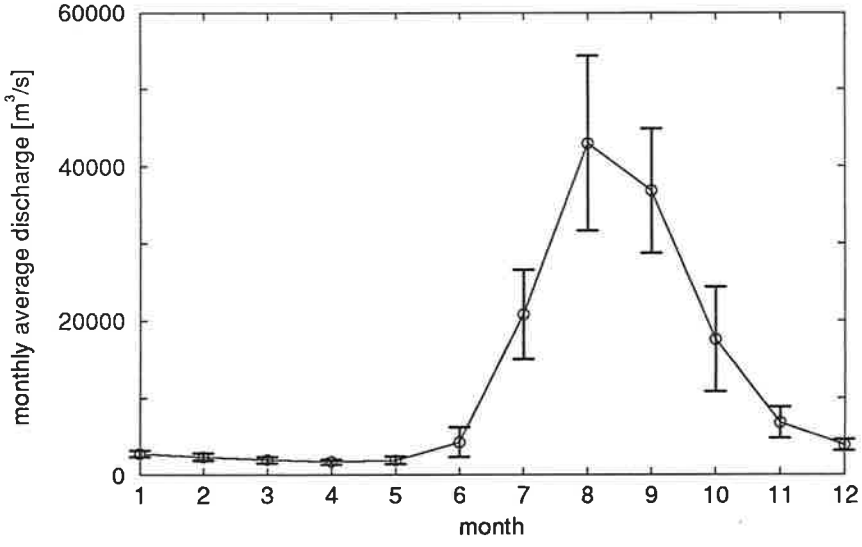
ELBE (LABE) (DECIN)

based on: 134 years



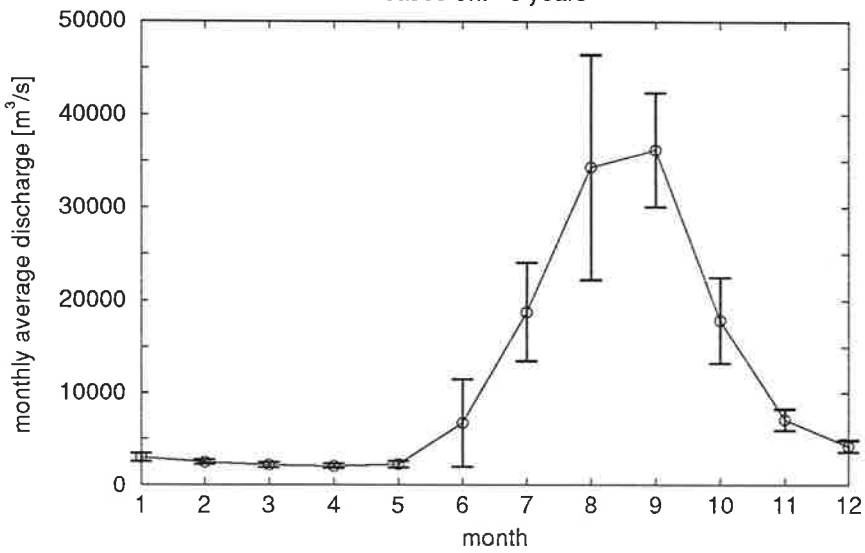
GANGA (FARAKKA)

based on: 21 years



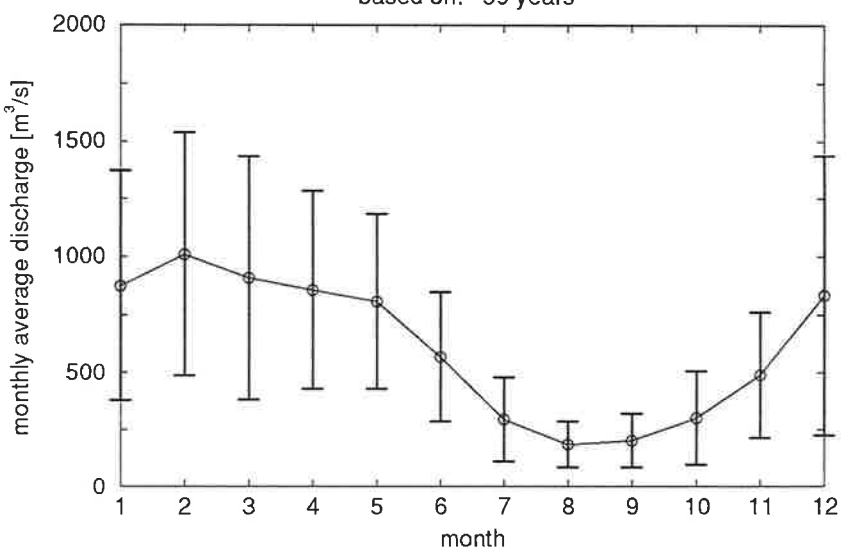
GANGES (PAKSEY)

based on: 6 years



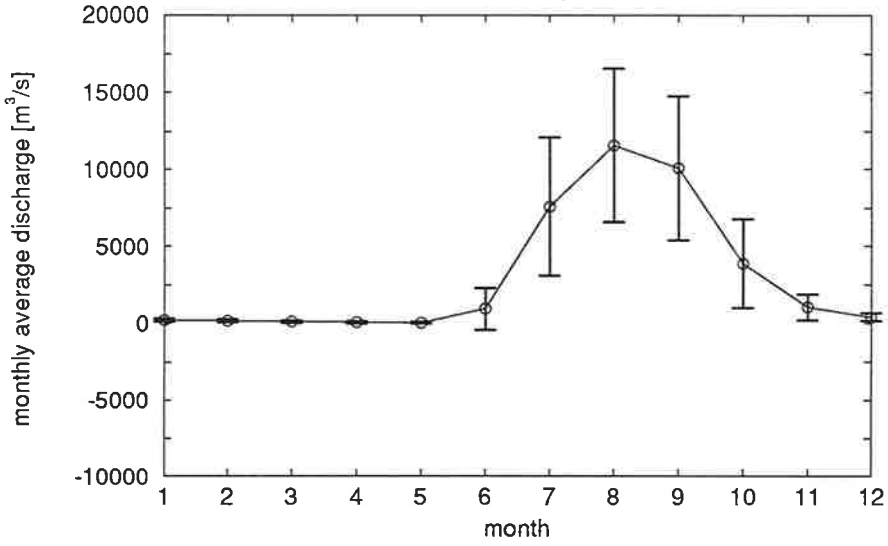
GARONNE (MAS-D'AGENAIS)

based on: 59 years



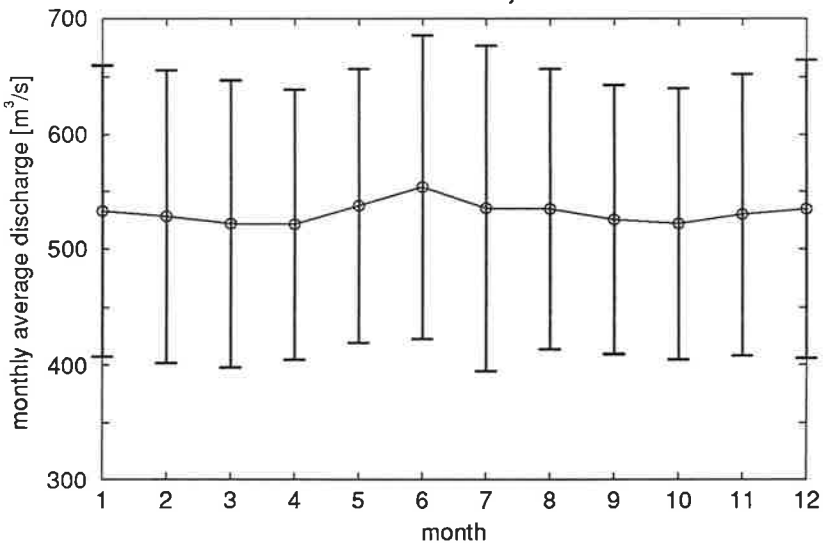
GODAVARI (POLAVARAM)

based on: 74 years



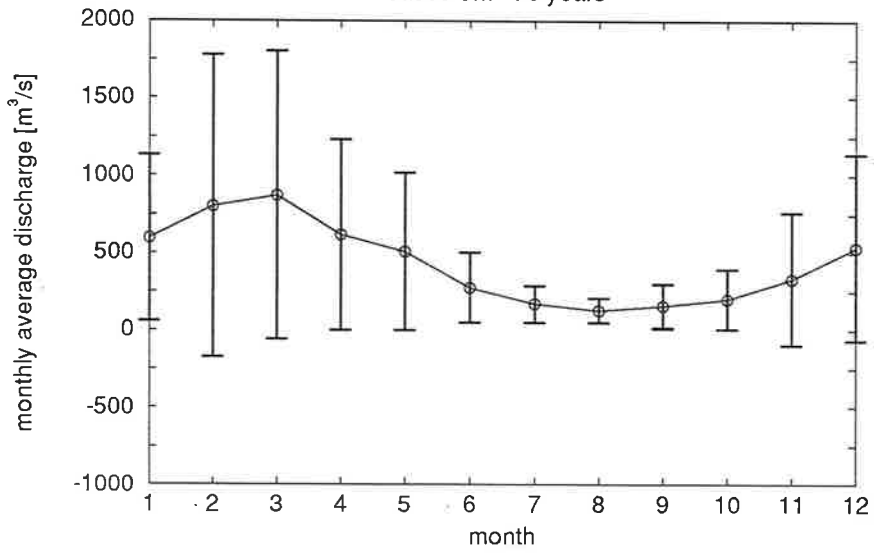
GOETA-VAENERN (VAENERSBORG)

based on: 178 years



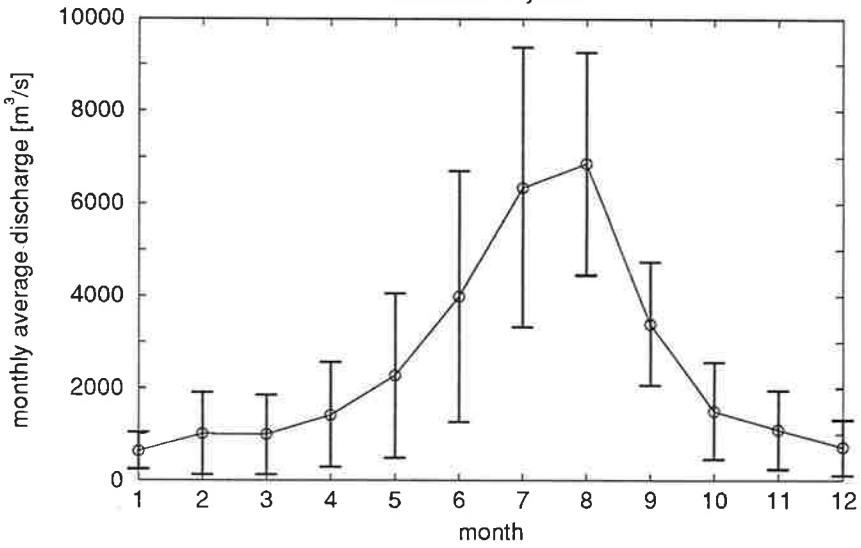
GUADALQUIVIR (ALCALA DEL RIO)

based on: 70 years



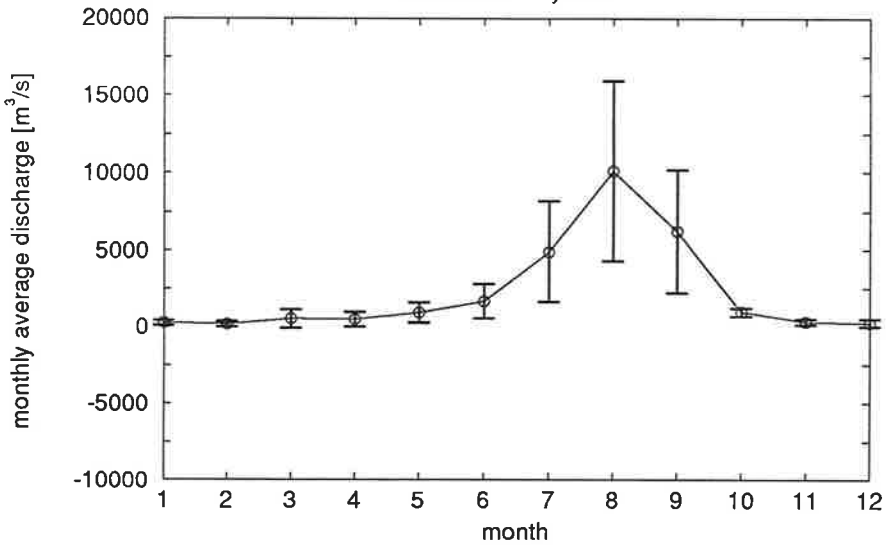
INDUS (ATTOCK)

based on: 7 years



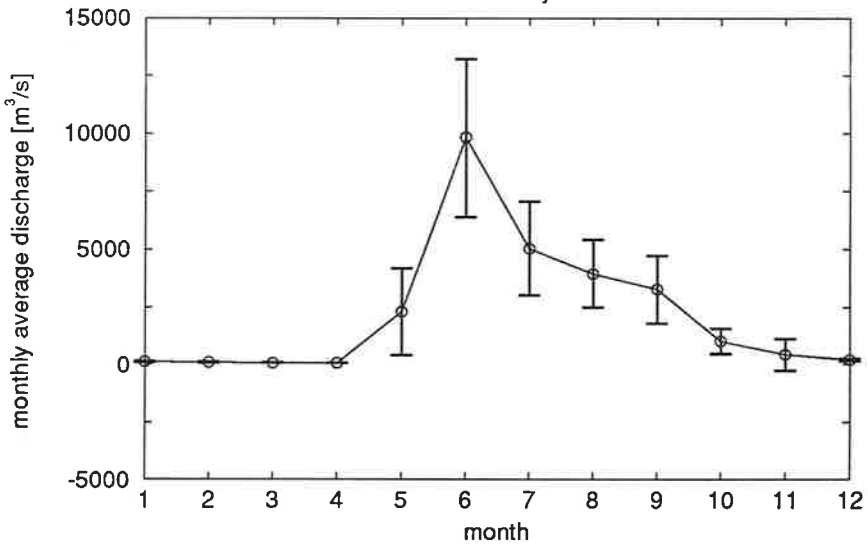
INDUS (KOTRI)

based on: 7 years



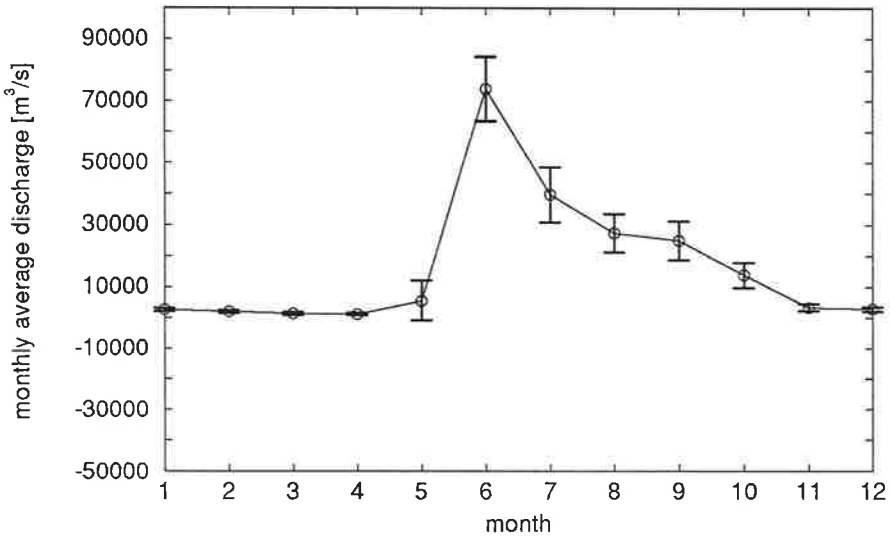
KOLYMA (SREDNE-KOLYMSK)

based on: 50 years



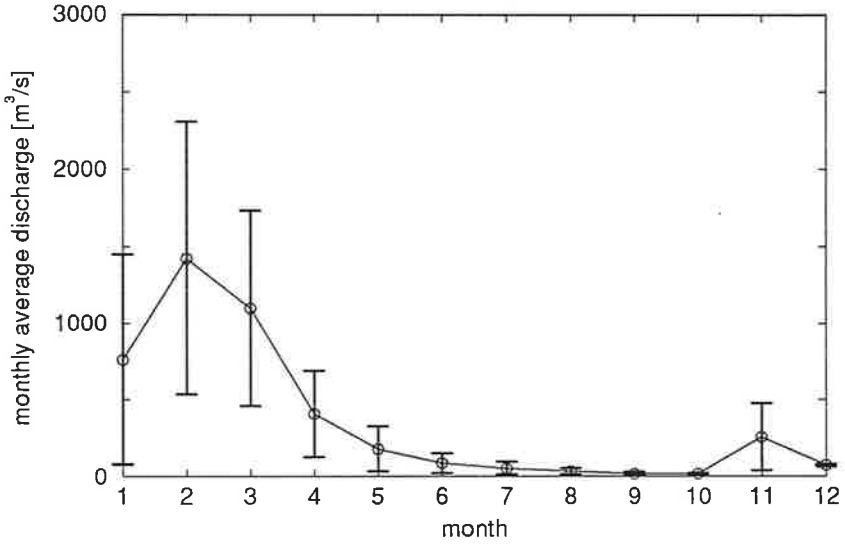
LENA (KUSUR)

based on: 50 years



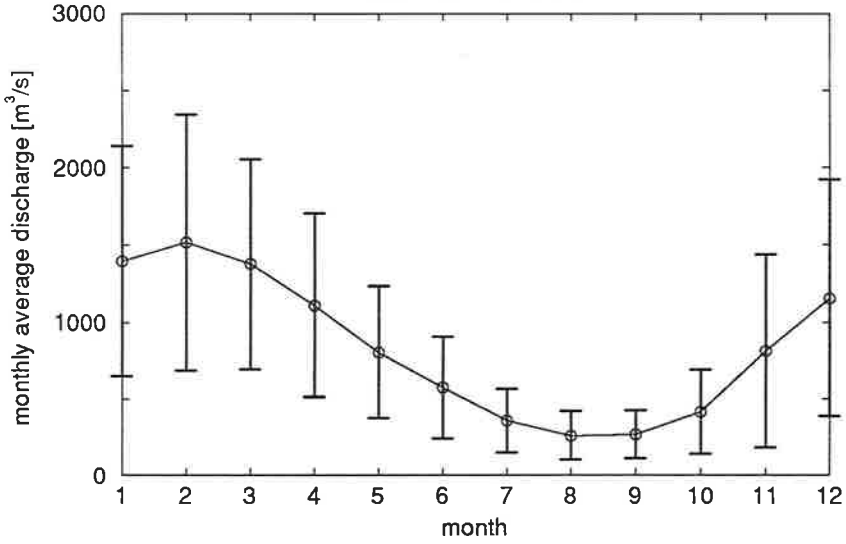
LIMPOPO (CHOKWE)

based on: 4 years



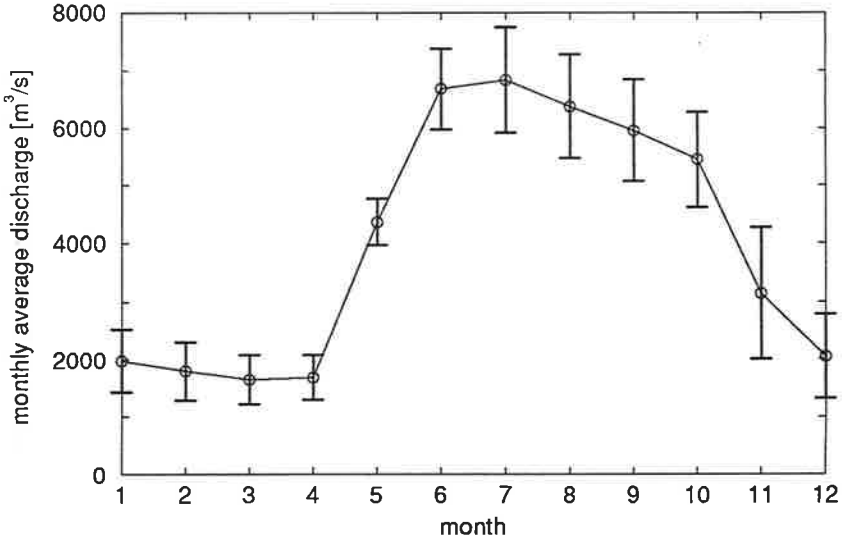
LOIRE (MONTJEAN)

based on: 116 years



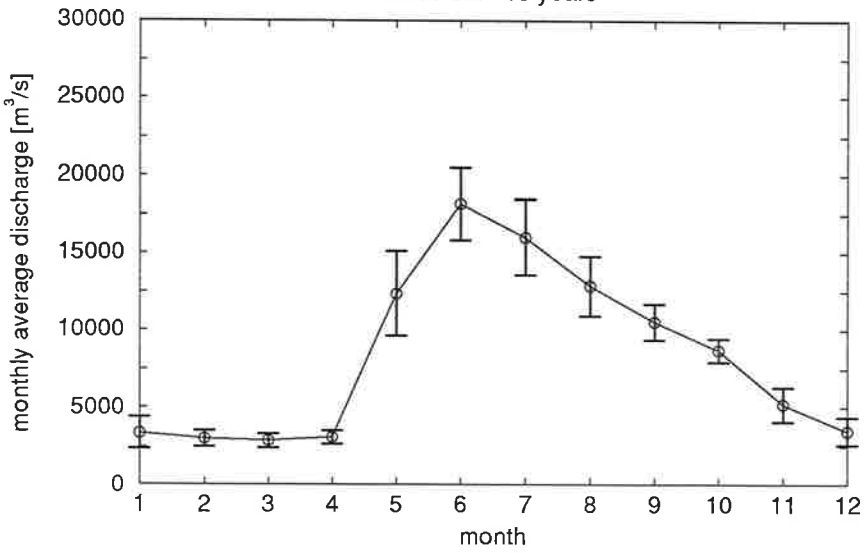
MACKENZIE RIVER (NEAR FORT PROVIDENCE)

based on: 10 years



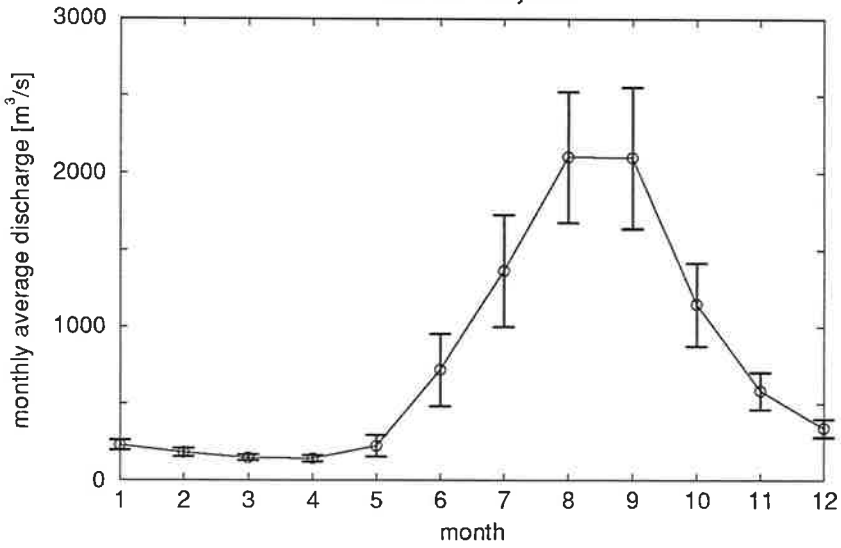
MACKENZIE RIVER (NORMAN WELLS)

based on: 19 years



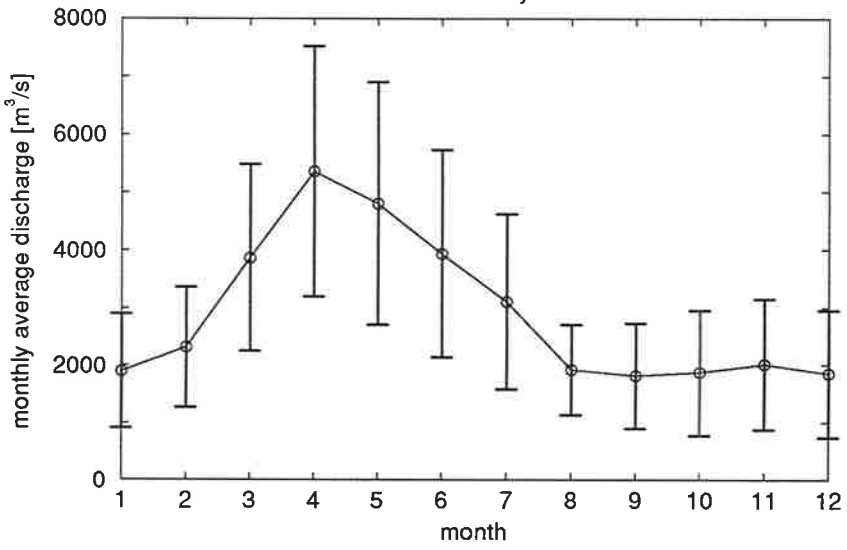
MEKONG (MUKDAHAN)

based on: 40 years



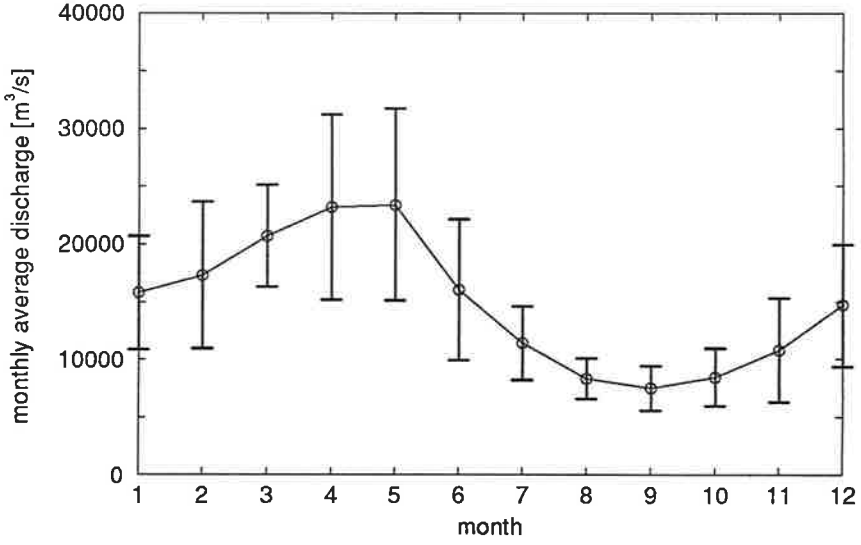
MISSISSIPPI (ALTON, ILL.)

based on: 57 years



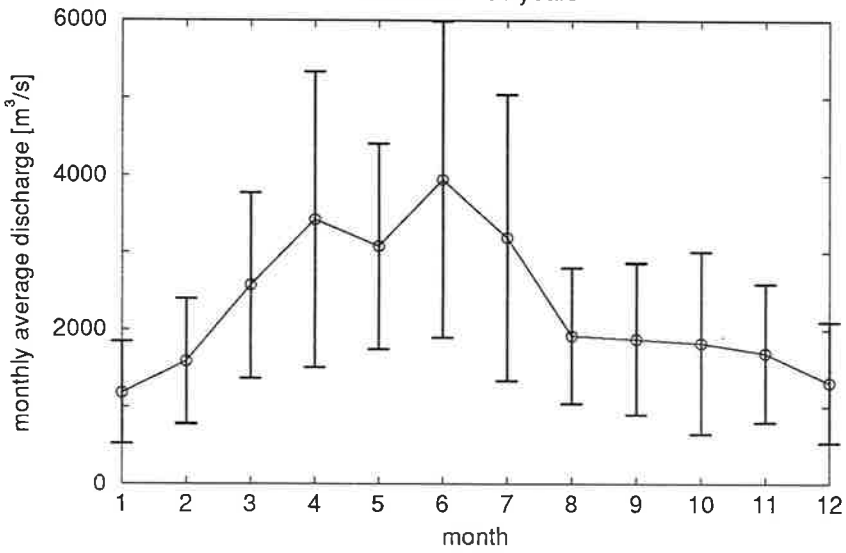
MISSISSIPPI (TARBERT LANDING, MISS.)

based on: 16 years



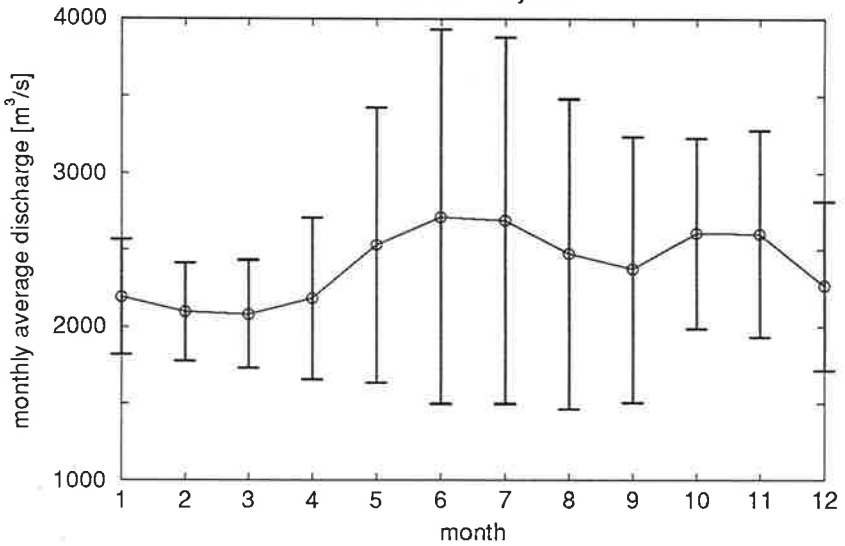
MISSOURI (HERMANN, MO.)

based on: 91 years



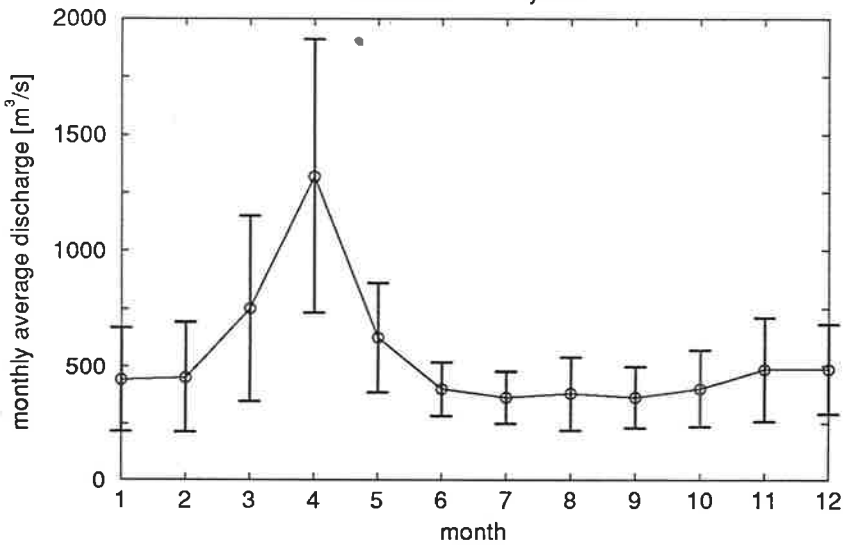
NELSON RIVER (ABOVE BLADDER RAPIDS)

based on: 19 years



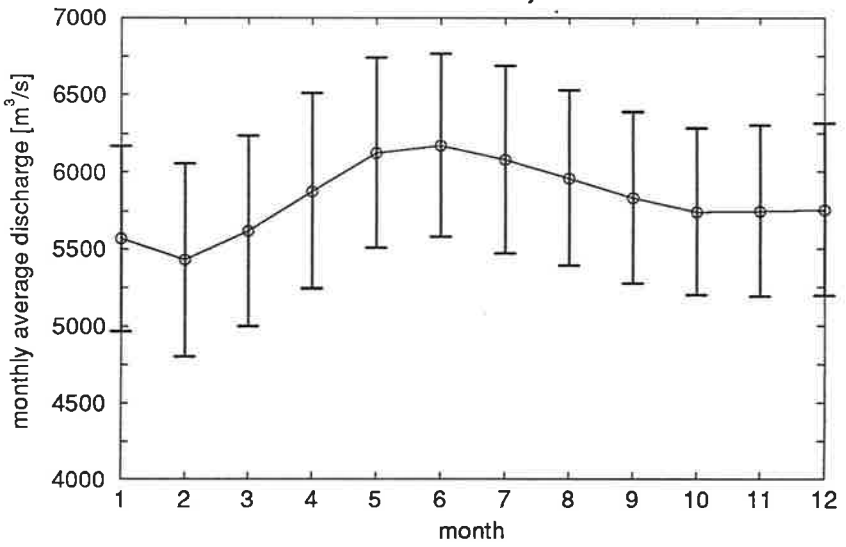
NEMAN (SMALININKAI)

based on: 171 years



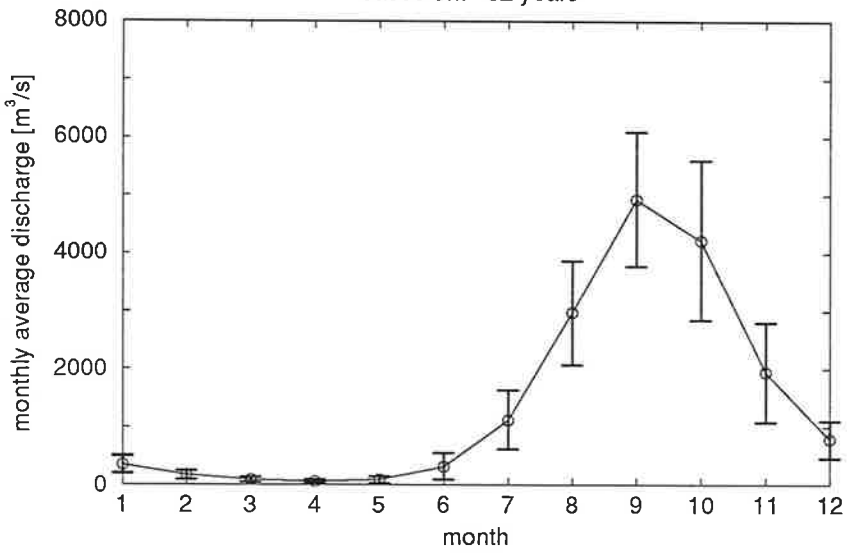
NIAGARA (QUEENSTON)

based on: 125 years



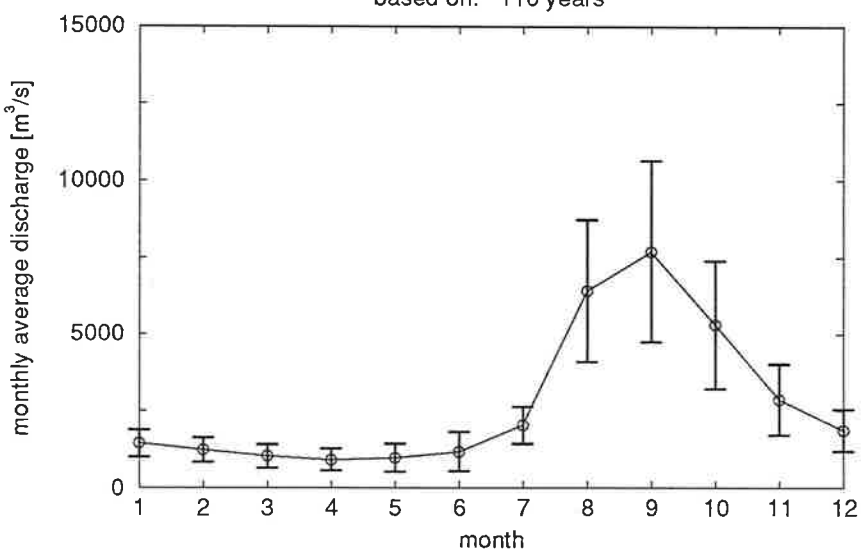
NIGER (KOULIKORO)

based on: 82 years



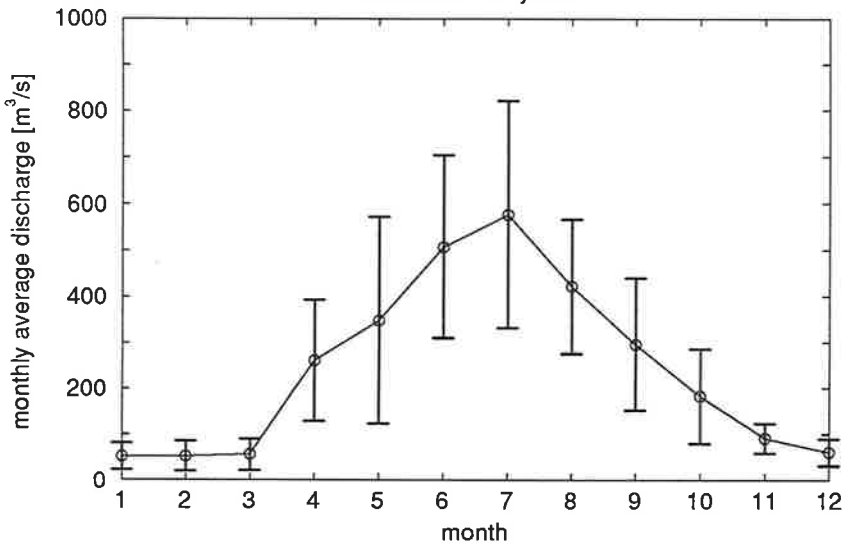
NILE (ASWAN DAM)

based on: 116 years



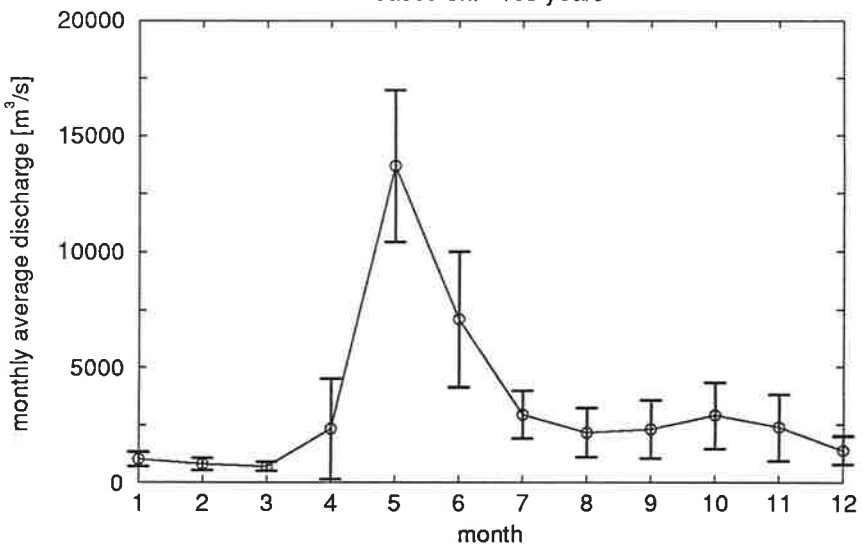
NORTH SASKATCHEWAN (PRINCE ALBERT)

based on: 74 years

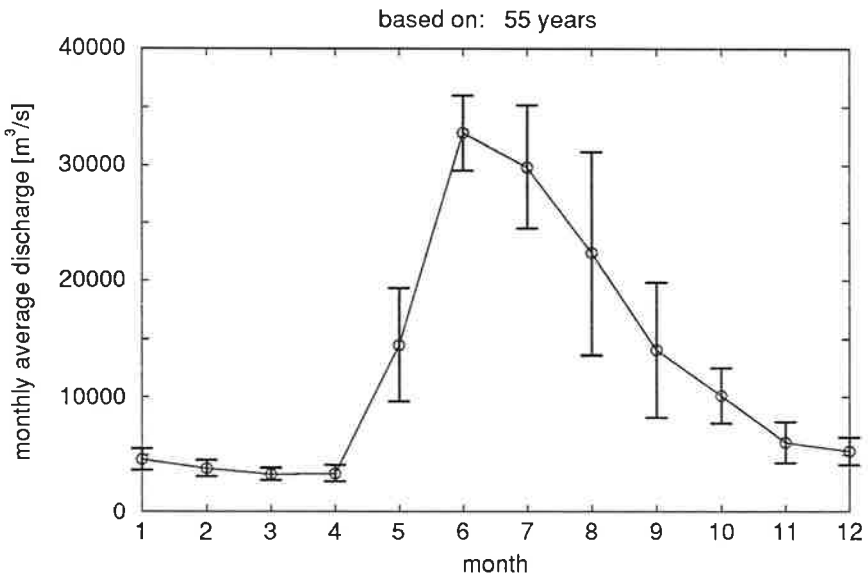


NORTHERN DVINA(SEVERNAYA DVINA) (UST-PINEGA)

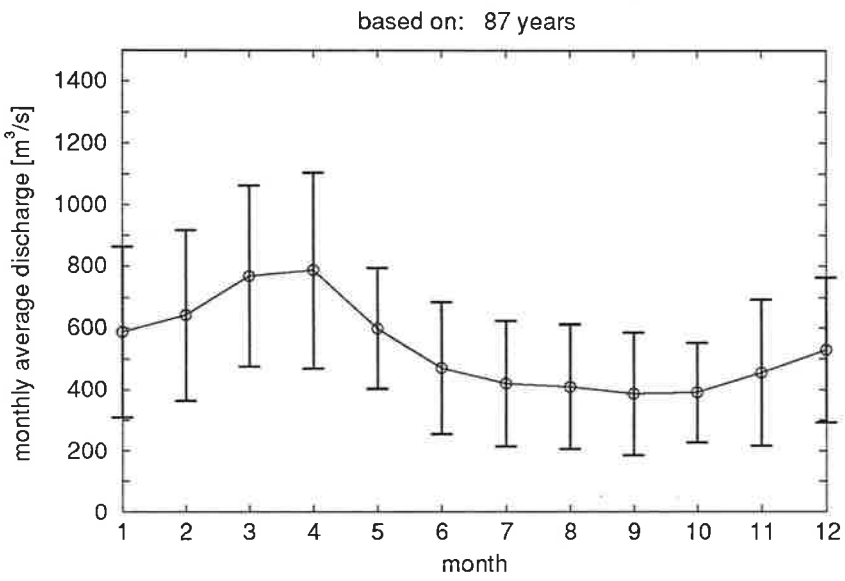
based on: 105 years



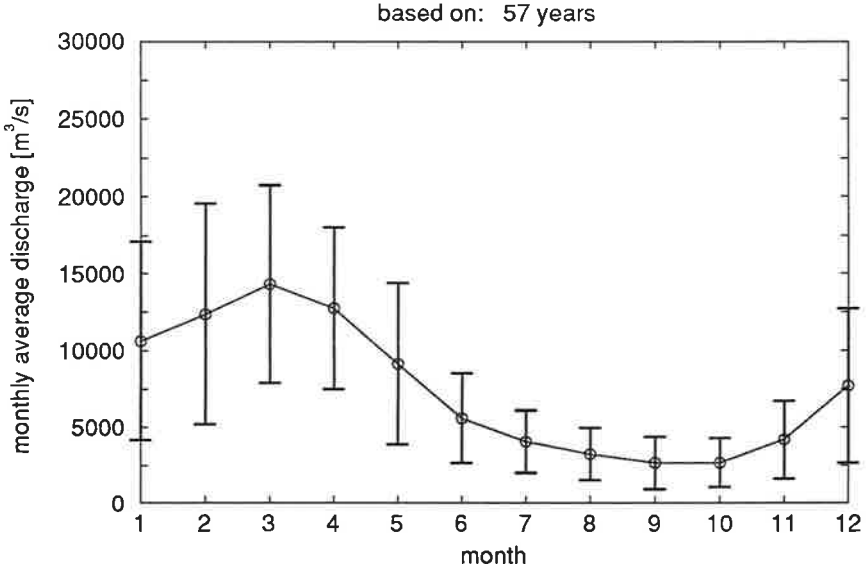
OB (SALEKHARD)



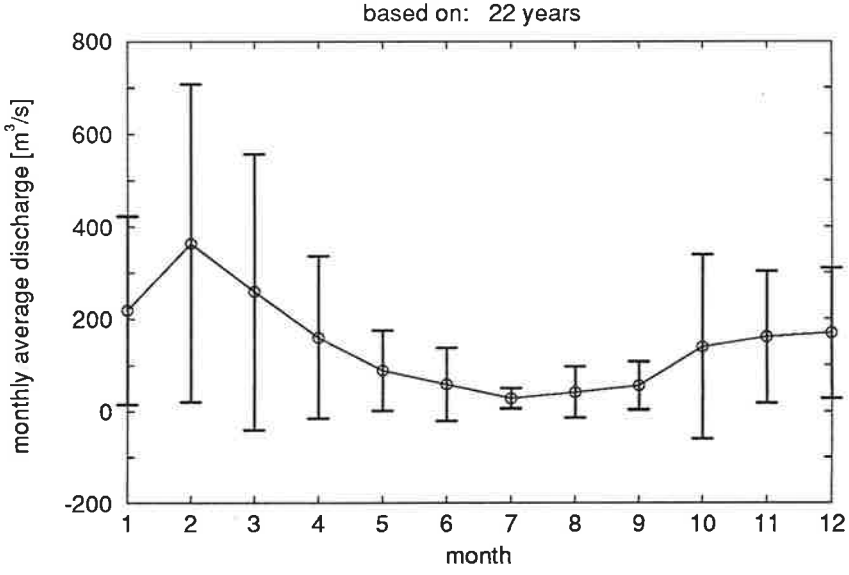
ODRA (GOZDOWICE)



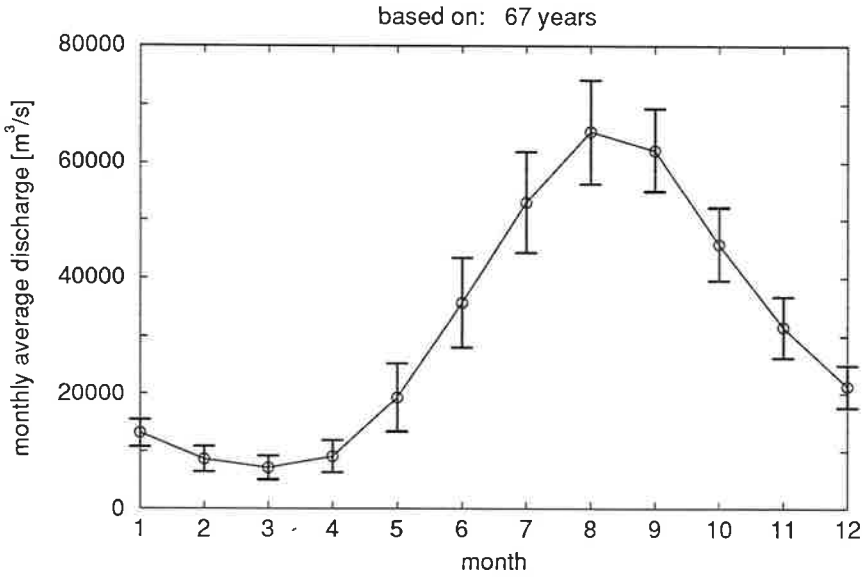
OHIO (METROPOLIS, ILL.)



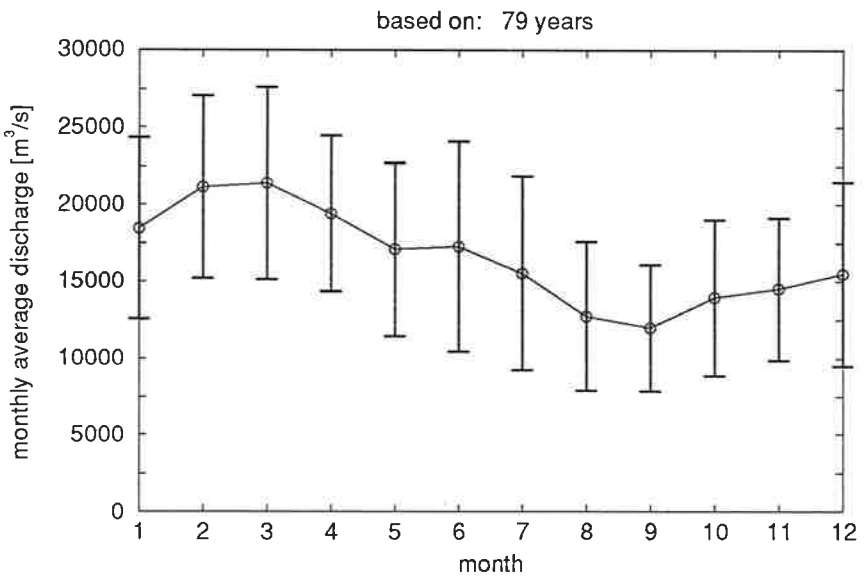
ORANJE (ALIWAL NOORD)



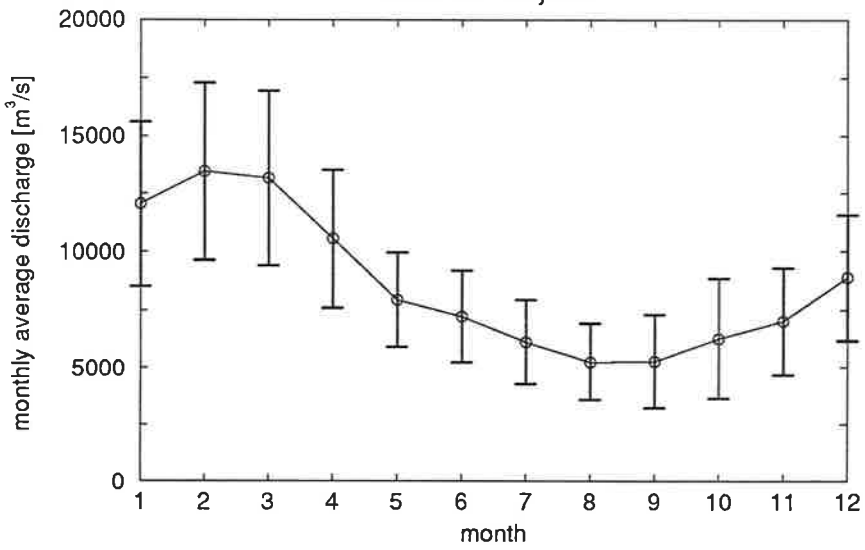
ORINOCO (PUENTE ANGOSTURA)



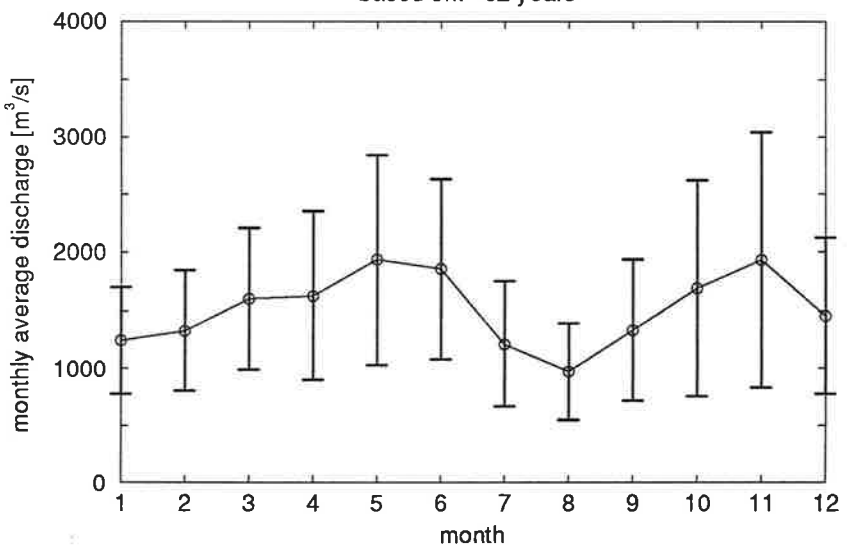
PARANA (CORRIENTES)



PARANA (GUAIRA)

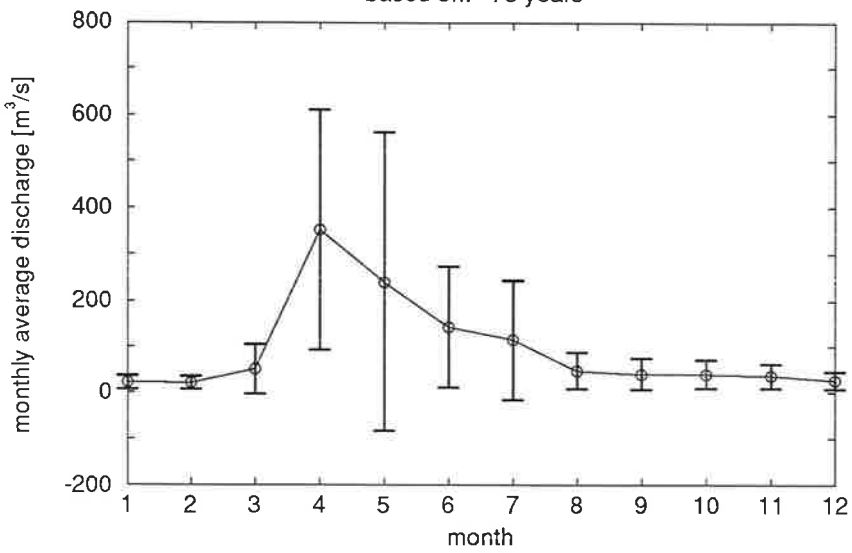


PO (PONTELAGOSCURO)



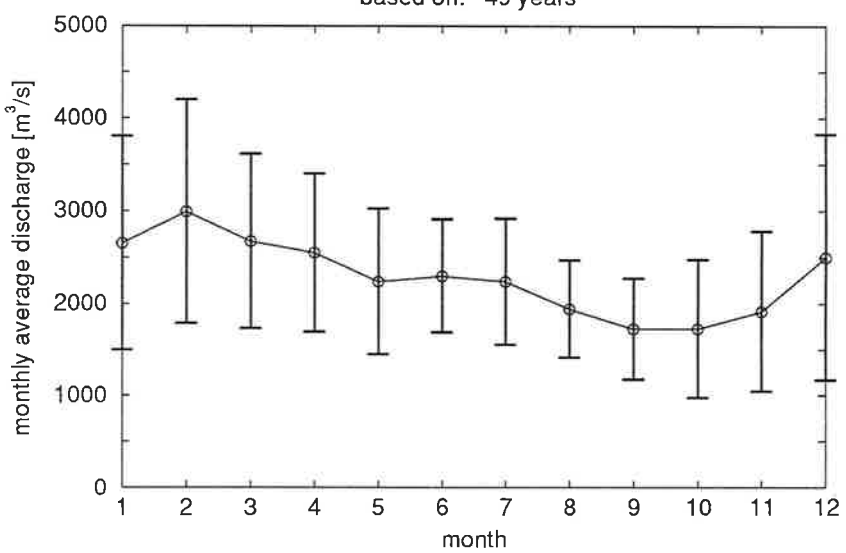
RED (EMERSON)

based on: 73 years



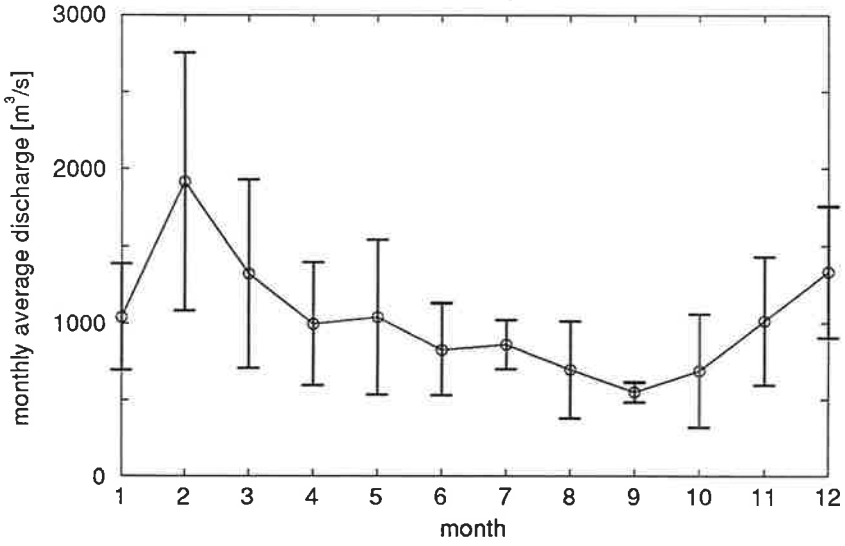
RHEIN (REES)

based on: 49 years



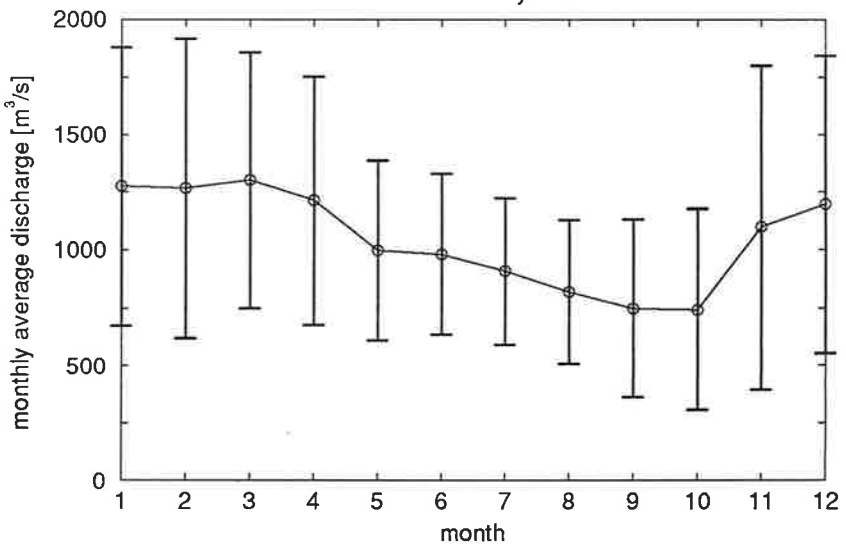
RHONE (GIVORS)

based on: 6 years



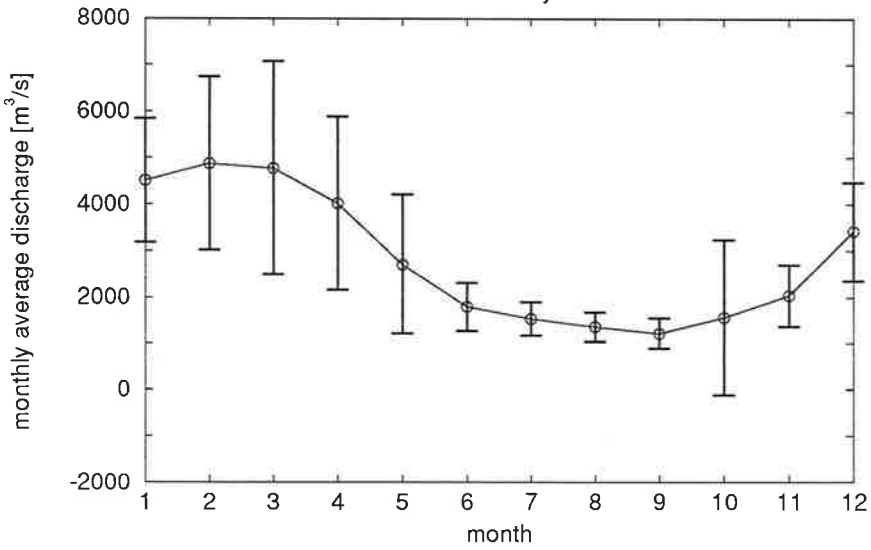
RHONE (LA MULATIERE)

based on: 73 years



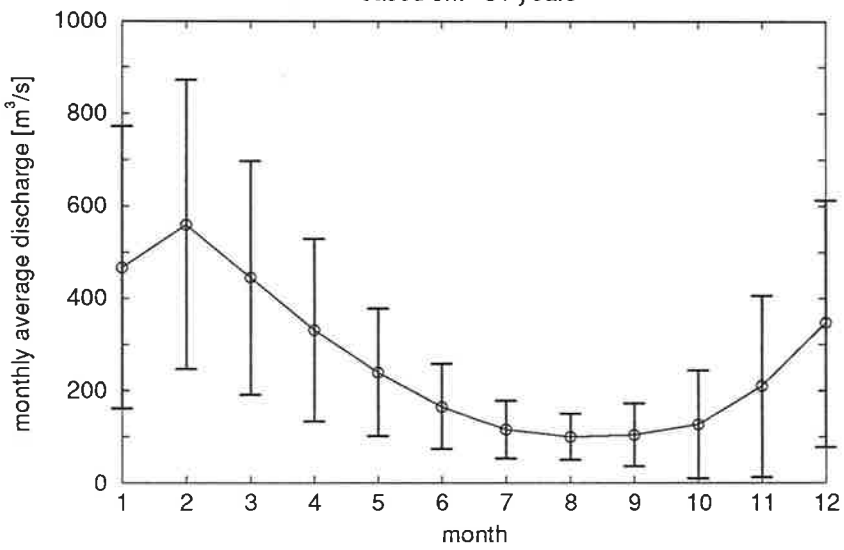
SAO FRANCISCO (JUAZEIRO)

based on: 50 years



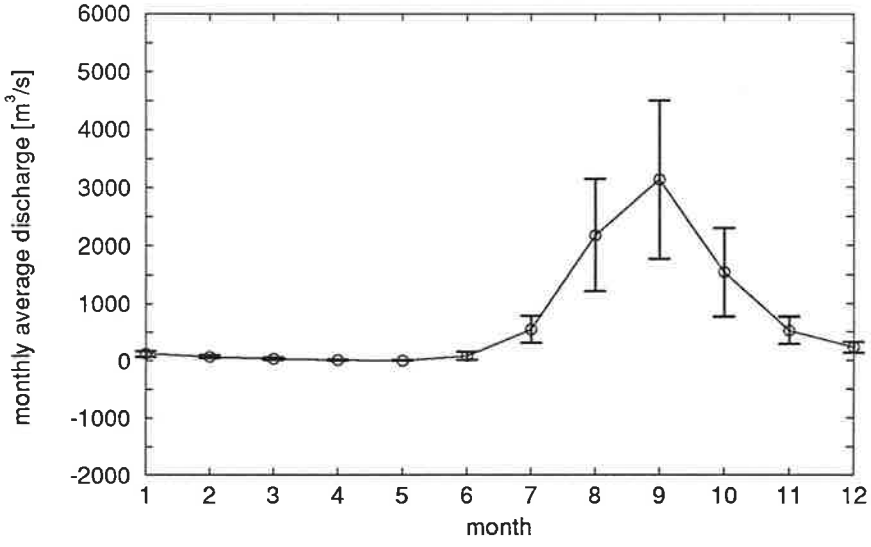
SEINE (PARIS)

based on: 51 years



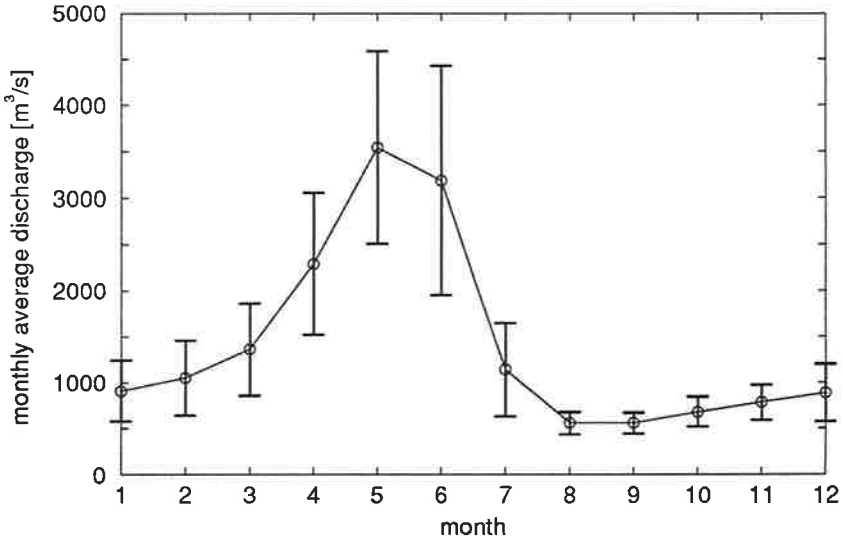
SENEGAL (BAKEL)

based on: 81 years



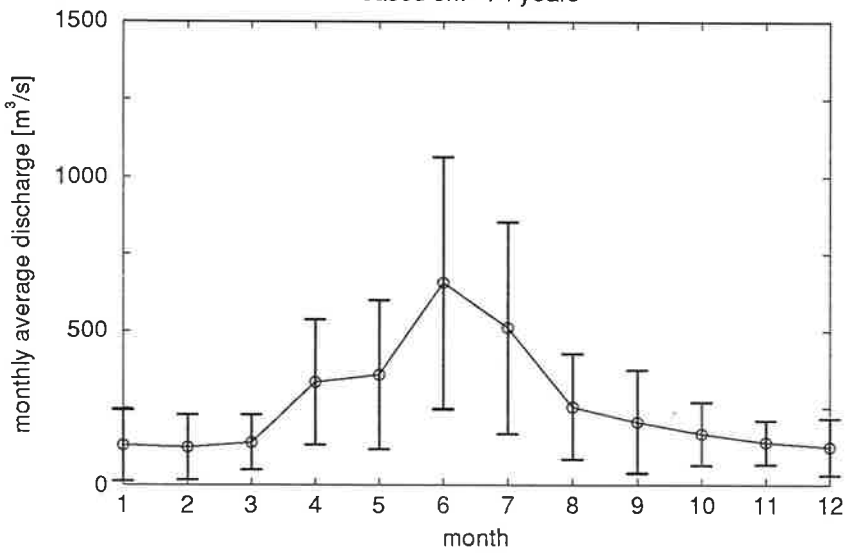
SNAKE (CLARKSTON, WASH.)

based on: 57 years



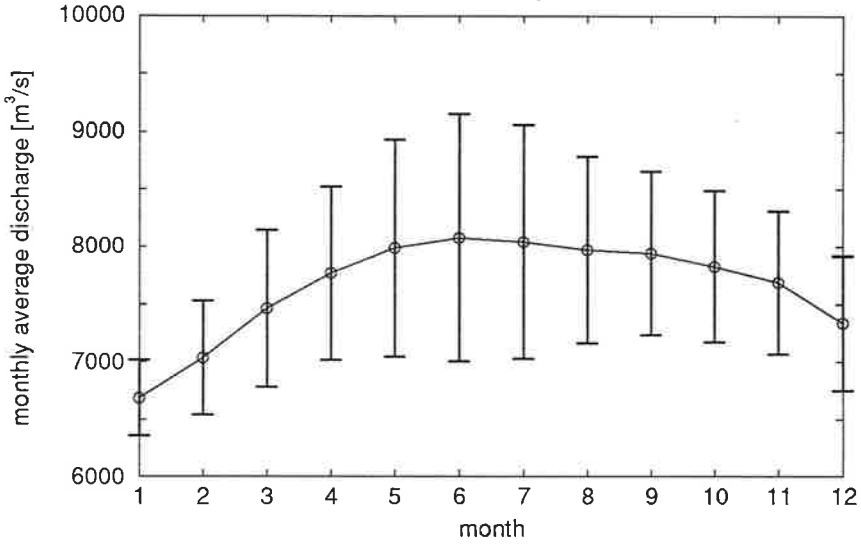
SOUTH SASKATCHEWAN (SASKATOON)

based on: 74 years



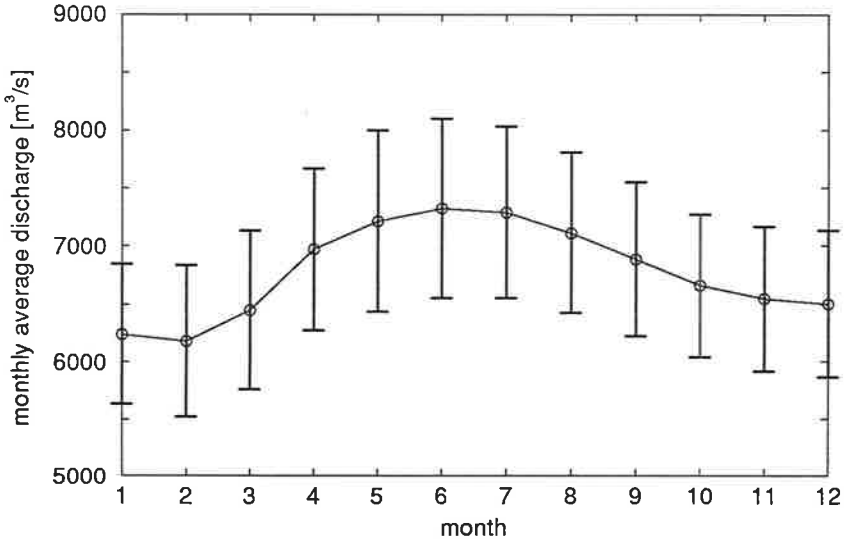
ST. LAWRENCE RIVER (CORNWALL)

based on: 19 years



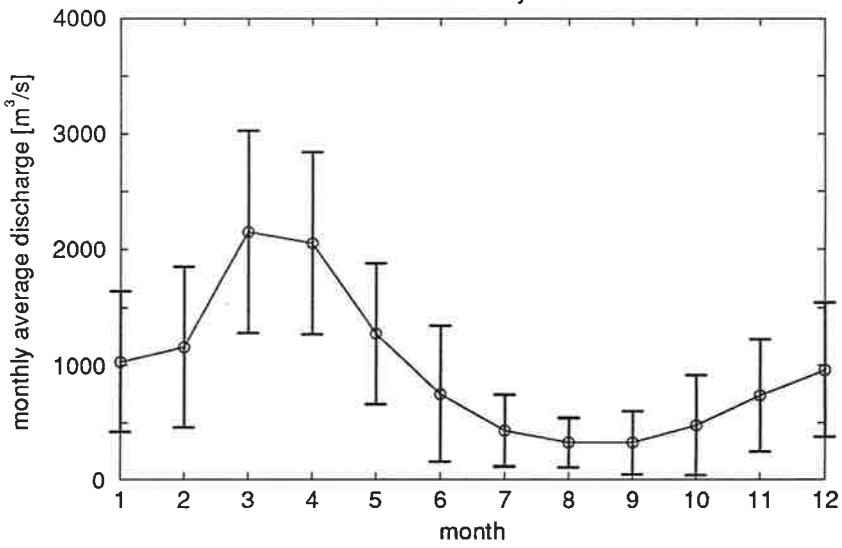
ST.LAWRENCE (OGDENSBURG, N.Y.)

based on: 113 years



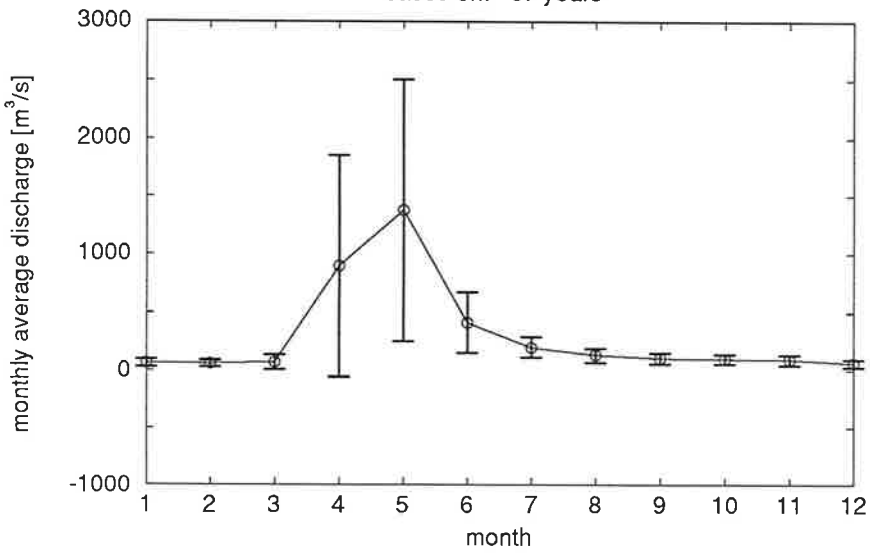
SUSQUEHANNA (HARRISBURG ,PA.)

based on: 97 years



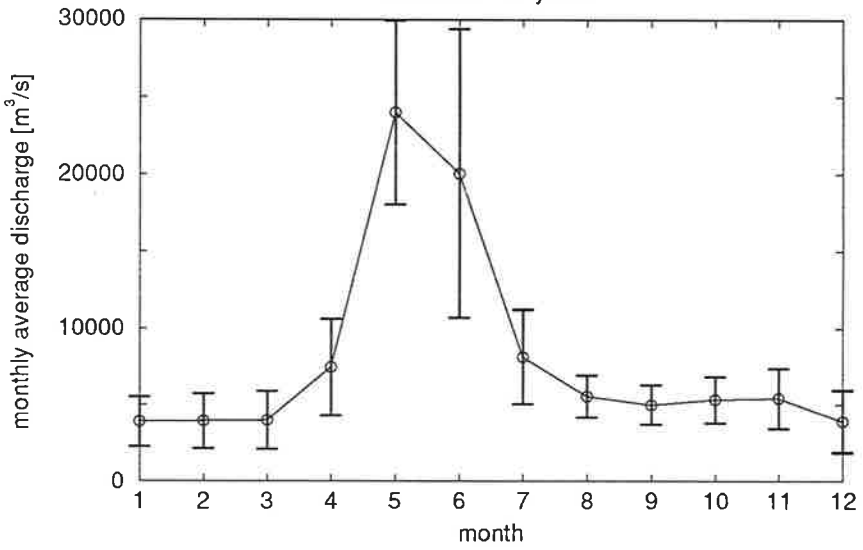
URAL (KUSHUM)

based on: 67 years



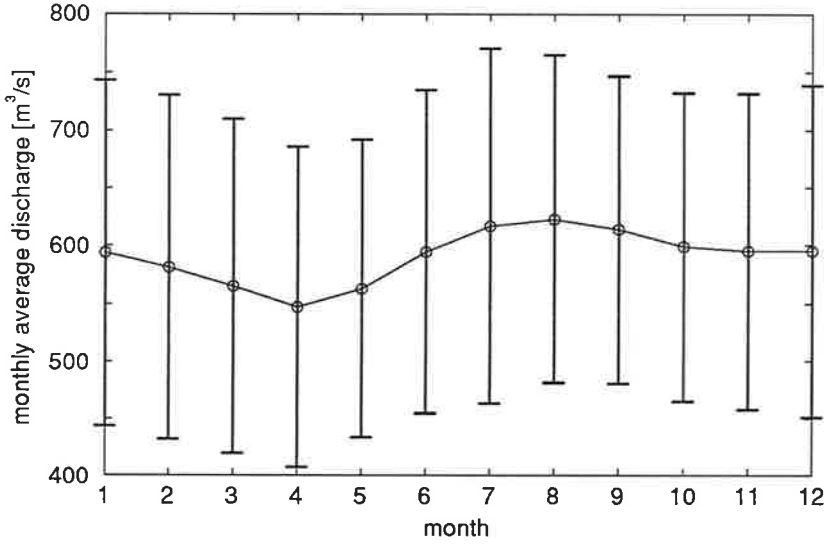
VOLGA (VOLGOGRAD POWER PLANT)

based on: 87 years



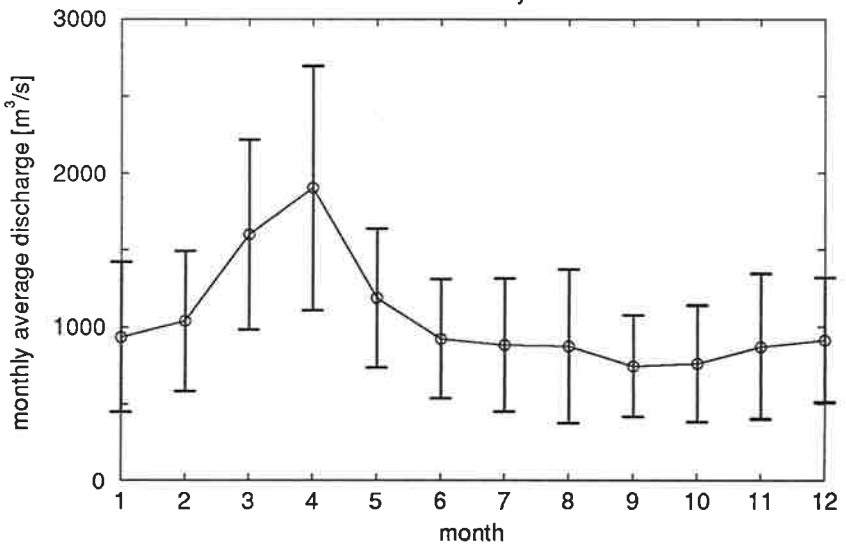
VUOKSI (IMATRA)

based on: 138 years

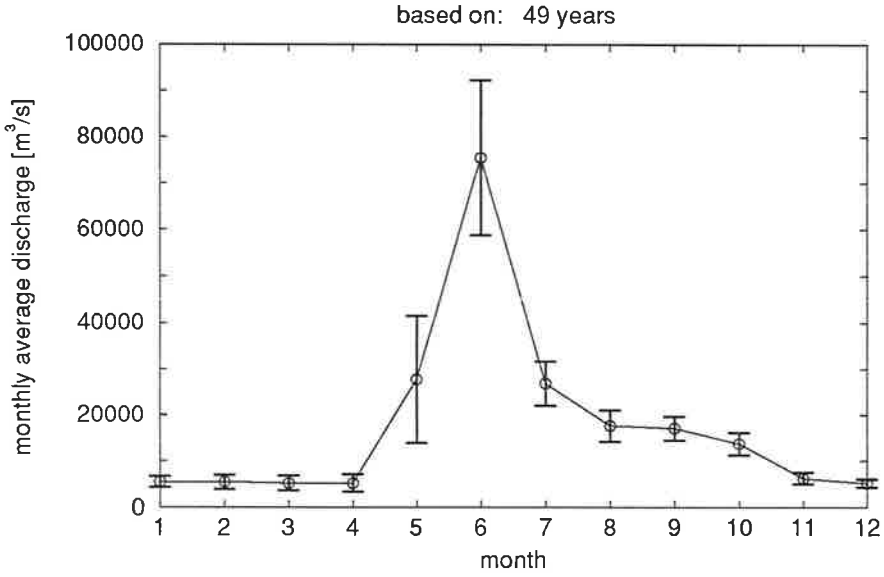


WISLA (TCZEW)

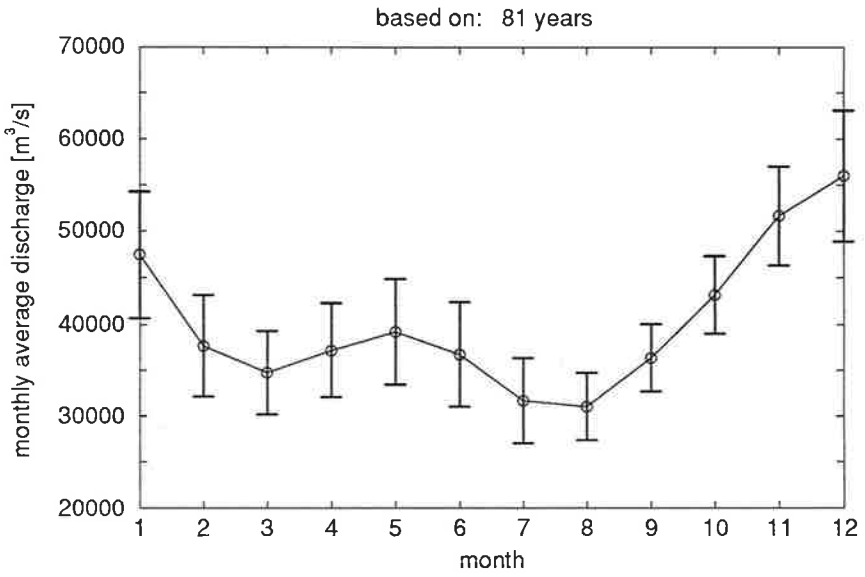
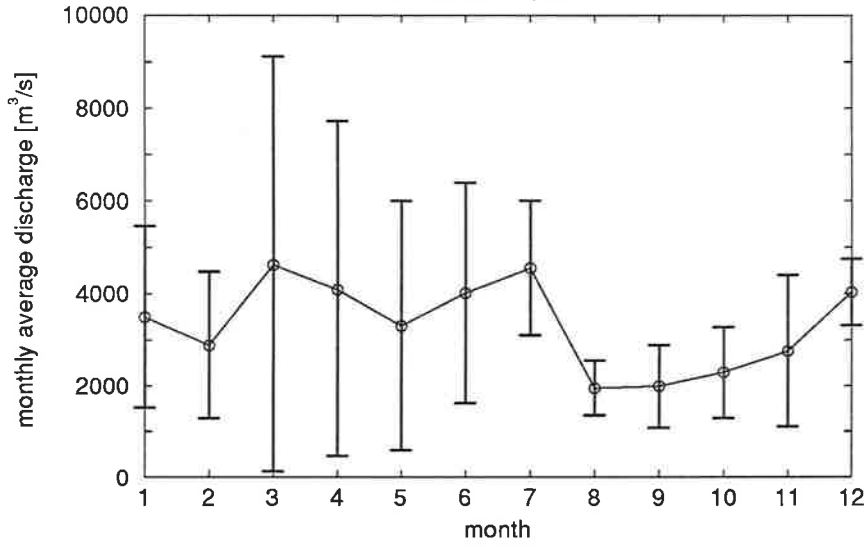
based on: 87 years



YENISEI (IGARKA)



ZAIRE (KINSHASA)



ZAMBEZE (MATUNDO-CAIS)