Variation of the Water Level in the Yangtze River in Response to Natural and Anthropogenic Changes

Jinxin Liu [1], Jinyun Deng [1,2], Yuanfang Chai [1,2,3], Yunping Yang [2,4]*, Boyuan Zhu [5] and Sixuan Li [1]

[1] StateKey Laboratory of Water Resources and Hydropower Engineering Science, Wuhan University, Wuhan 430072, China;
[2] Changjiang River Scientific Research Institute, Changjiang Water Resources Commission, Whuhan, China
[3] Department of Earth Sciences, Vrije Universiteit Amsterdam, Boelelaan 1085, 1081 HV Amsterdam, The Netherlands
[4] Key Laboratory of Engineering Sediment, Tianjin Research Institute for Water Transport Engineering, Ministry of Transport, Tianjin 300456, China
[5] Key Laboratory of Water-Sediment Sciences and Water Disaster Prevention of Hunan Province, School of Hydraulic Engineering, Changsha University of Science & Technology, Changsha 410114, China; 15871435411@163.com

Predicted	measured	Prediction (water level / m)	Errors of prediction (water level / m)	Relative errors of prediction (%)

Table S1. Error estimation for predicted water level at Zhutuo station using the regression relationship between the measured water level and predicted runoff during dry season.

	Q/ $m^3.s^{-1}$	Water level / m	Regression of uneven year	Regression of even year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year
1961	3730	197.77	197.49	197.53		-0.3		-0.2		-0.1		-0.1
1962	3434	197.45	197.05	197.55	-0.4		0.1		0.0		0.0	
1963	3487	197.41	197.13	197.55		-0.3		0.1		-0.1		0.1
1964	3528	197.76	197.19	197.55	-0.6		-0.2		-0.3		-0.1	
1965	3593	197.90	197.29	197.54		-0.6		-0.4		-0.3		-0.2
1966	3417	197.58	197.03	197.55	-0.5		0.0		-0.3		0.0	
1967	3541	197.67	197.21	197.54		-0.5		-0.1		-0.2		-0.1
1968	3598	197.78	197.29	197.54	-0.5		-0.2		-0.2		-0.1	
1969	3424	197.29	197.04	197.55		-0.3		0.3		-0.1		0.1
1970	3627	197.58	197.34	197.54	-0.2		0.0		-0.1		0.0	
1971	3480	197.52	197.12	197.55		-0.4		0.0		-0.2		0.0
1972	3602	197.20	197.30	197.54	0.1		0.3		0.1		0.2	
1973	3599	197.29	197.30	197.54		0.0		0.3		0.0		0.1
1974	3600	197.64	197.30	197.54	-0.3		-0.1		-0.2		-0.1	
1975	3598	197.81	197.29	197.54		-0.5		-0.3		-0.3		-0.1
1976	3636	197.40	197.35	197.54	-0.1		0.1		0.0		0.1	
1977	3702	197.72	197.45	197.53		-0.3		-0.2		-0.1		-0.1
1978	3529	197.32	197.19	197.55	-0.1		0.2		-0.1		0.1	
1979	3424	197.31	197.04	197.55		-0.3		0.2		-0.1		0.1
1980	3557	197.68	197.23	197.54	-0.4		-0.1		-0.2		-0.1	
A±K	/				-0.3±0.2	-0.30±0.2	0.0±0.2	0.0±0.2	-0.1±0.1	-0.2±0.1	0.0±0.1	0.0±0.1

Regression of uneven year: H=0.0015Q+192.33;

Regression of even year: H=-0.000061Q+197.76;

Error of prediction: The difference between predicted and measured value.

Relative error of prediction (%): (Predicted value －Measured value) *100/ Measured value. A: average; K: Standard deviation.

Table S2. Error estimation for predicted at Zhutuo station using the regression relationship between the measured water level and predicted

Predicted	measured	Prediction (water level / m)	Errors of prediction (water level / m)	Relative errors of prediction (%)

runoff during flood season

	Q/ $m^3.s^{-1}$	Water level / m	Regression of uneven year	Regression of even year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year
1961	13786	202.70	202.59	203.00		-0.11		0.30		0		0
1962	13598	203.43	202.53	202.92	-0.90		-0.51		0		0	
1963	13180	202.33	202.40	202.75		0.07		0.42		0		0
1964	13364	203.34	202.46	202.83	-0.88		-0.51		0		0	
1965	14664	203.99	202.86	203.35		-1.14		-0.65		-1		0
1966	15276	203.52	203.04	203.59	-0.48		0.07		0		0	
1967	9822	202.15	201.38	201.41		-0.78		-0.74		0		0
1968	12728	203.80	202.27	202.57	-1.54		-1.23		-1		-1	
1969	12027	201.42	202.05	202.29		0.64		0.88		0		0
1970	12792	202.36	202.28	202.60	-0.07		0.24		0		0	
1971	13102	201.83	202.38	202.72		0.55		0.90		0		0
1972	11607	201.40	201.92	202.13	0.52		0.72		0		0	
1973	13247	202.04	202.42	202.78		0.38		0.74		0		0
1974	14576	203.84	202.83	203.31	-1.01		-0.53		0		0	
1975	13118	202.12	202.38	202.73		0.26		0.60		0		0
1976	12726	202.21	202.26	202.57	0.05		0.36		0		0	
1977	12208	202.04	202.11	202.37		0.06		0.32		0		0
1978	14027	202.51	202.66	203.09	0.15		0.58		0		0	
1979	12723	202.21	202.26	202.57		0.05		0.36		0		0
1980	14769	202.61	202.89	203.39	0.28		0.78		0		0	
A±K	/				-0.39±0.67	0.00±0.56	0.00±0.66	0.31±0.57	-0.15±0.32	0.00±0.28	0.02±0.32	0.16±0.28

Regression of uneven year: H=0.0003Q+198.38;

Regression of even year: H=0.00040Q+197.49;

Error of prediction: The difference between predicted and measured value.

Relative error of prediction (%): (Predicted value －Measured value) *100/ Measured value. A: average; K: Standard deviation.

Table S3. Error estimation for predicted water level at Cuntan station using the regression relationship between the measured water level and

Predicted	measured	Prediction (water level / m)	Errors of prediction (water level / m)	Relative errors of prediction (%)

predicted runoff during dry season

	Q/ $m^3.s^{-1}$	Water level / m	Regression of uneven year	Regression of even year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year
1961	4771	160.56	160.49	160.17		-0.1		-0.4		0.0		-0.2
1962	4103	159.91	159.71	159.89	-0.2		0.0		0.0		0.0	
1963	4325	159.87	159.97	159.99		0.1		0.1		0.1		0.1
1964	4494	160.61	160.17	160.06	-0.4		-0.6		-0.3		-0.3	
1965	4476	160.52	160.15	160.05		-0.4		-0.5		-0.2		-0.3
1966	4000	159.90	159.59	159.85	-0.3		0.0		-0.2		0.0	
1967	4485	160.44	160.16	160.05		-0.3		-0.4		-0.2		-0.2
1968	4527	160.62	160.21	160.07	-0.4		-0.5		-0.3		-0.3	
1969	4169	159.84	159.79	159.92		0.0		0.1		0.0		0.1
1970	4567	160.04	160.25	160.09	0.2		0.0		0.1		0.0	
1971	4198	159.91	159.82	159.93		-0.1		0.0		-0.1		0.0
1972	4495	159.50	160.17	160.06	0.7		0.6		0.4		0.3	
1973	4546	159.56	160.23	160.08		0.7		0.5		0.4		0.3
1974	4434	160.06	160.10	160.03	0.0		0.0		0.0		0.0	
1975	4480	160.41	160.15	160.05		-0.3		-0.4		-0.2		-0.2
1976	4663	159.88	160.36	160.12	0.5		0.2		0.3		0.2	
1977	4714	160.34	160.42	160.15		0.1		-0.2		0.1		-0.1
1978	4329	159.60	159.97	159.99	0.4		0.4		0.2		0.2	
1979	4072	159.52	159.67	159.88		0.2		0.4		0.1		0.2
1980	4360	160.08	160.01	160.00	-0.1		-0.1		0.0		-0.1	
A±K	/				0.0±0.4	0.0±0.3	0.0±0.4	-0.1±0.3	0.0±0.2	0.0±0.2	0.0±0.2	0.0±0.2

Regression of uneven year: H=0.00117Q+154.9;

Regression of even year: H=0.00041Q+158.2;

Error of prediction: The difference between predicted and measured value.

Relative error of prediction (%): (Predicted value －Measured value) *100/ Measured value. A: average; K: Standard deviation.

Table S4. Error estimation for predicted water level at Cuntan station using the regression relationship between the measured water level and

Predicted	measured	Prediction (water level / m)	Errors of prediction (water level / m)	Relative errors of prediction (%)

predicted runoff during flood season

	Q/ $m^3.s^{-1}$	Water level / m	Regression of uneven year	Regression of even year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year
1961	18811	168.06	167.90	168.47		-0.16		0.42		0		0
1962	18099	168.55	167.65	168.12	-0.90		-0.44		0		0	
1963	18080	167.92	167.64	168.11		-0.28		0.18		0		0
1964	18224	169.25	167.69	168.18	-1.56		-1.08		-1		-1	
1965	19384	169.38	168.09	168.76		-1.29		-0.62		-1		0
1966	19605	168.48	168.17	168.87	-0.31		0.39		0		0	
1967	13834	167.71	166.18	165.98		-1.52		-1.73		-1		-1
1968	17438	169.49	167.42	167.79	-2.07		-1.71		-1		-1	
1969	15683	165.68	166.82	166.91		1.14		1.23		1		1
1970	16644	167.22	167.15	167.39	-0.07		0.16		0		0	
1971	16876	166.33	167.23	167.50		0.90		1.17		1		1
1972	15202	165.83	166.65	166.66	0.82		0.83		0		1	
1973	18559	167.37	167.81	168.35		0.44		0.98		0		1
1974	20023	169.42	168.31	169.08	-1.11		-0.34		-1		0	
1975	18165	167.54	167.67	168.15		0.14		0.61		0		0
1976	16517	167.13	167.11	167.32	-0.02		0.19		0		0	
1977	15922	166.58	166.90	167.02		0.33		0.45		0		0
1978	17844	167.12	167.56	167.99	0.44		0.87		0		1	
1979	16897	166.91	167.24	167.51		0.33		0.61		0		0
1980	20026	167.92	168.31	169.08	0.39		1.16		0		1	
A±K	/				-0.44±0.94	0.00±0.86	0.00±0.91	0.33±0.90	-0.21±0.55	0.00±0.51	0.03±0.53	0.20±0.54

Regression of uneven year: H=0.00034Q+161.42;

Regression of even year: H=0.00050Q+159.04;

Error of prediction: The difference between predicted and measured value.

Relative error of prediction (%): (Predicted value －Measured value) *100/ Measured value. A: average; K: Standard deviation.

Table S5. Error estimation for predicted water level at Yichang station using the regression relationship between the measured water level and

Predicted	measured	Prediction (water level / m)	Errors of prediction (water level / m)	Relative errors of prediction (%)

predicted runoff during dry season

	Q/ $m^3.s^{-1}$	Water level / m	Regression of uneven year	Regression of even year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year
1961	6589	42.59	42.50	42.14		-0.1		-0.5		-0.2		-1.1
1962	5352	41.95	41.61	41.76	-0.3		-0.2		0.0		0.0	
1963	5875	41.98	41.99	41.92		0.0		-0.1		0.0		-0.1
1964	5948	42.90	42.04	41.94	-0.9		-1.0		-2.0		-2.2	
1965	5858	42.43	41.98	41.92		-0.5		-0.5		-1.1		-1.2
1966	4994	41.66	41.36	41.65	-0.3		0.0		-0.7		0.0	
1967	5985	42.22	42.07	41.96		-0.2		-0.3		-0.4		-0.6
1968	6108	42.51	42.16	41.99	-0.4		-0.5		-0.8		-1.2	
1969	5381	41.65	41.63	41.77		0.0		0.1		0.0		0.3
1970	6032	41.88	42.10	41.97	0.2		0.1		0.5		0.2	
1971	5512	42.02	41.73	41.81		-0.3		-0.2		-0.7		-0.5
1972	6019	41.46	42.09	41.97	0.6		0.5		1.5		1.2	
1973	6007	41.64	42.08	41.96		0.4		0.3		1.1		0.8
1974	5839	41.92	41.96	41.91	0.0		0.0		0.1		0.0	
1975	5947	42.24	42.04	41.94		-0.2		-0.3		-0.5		-0.7
1976	6324	41.64	42.31	42.06	0.7		0.4		1.6		1.0	
1977	6543	42.10	42.47	42.13		0.4		0.0		0.9		0.1
1978	5590	41.02	41.78	41.83	0.8		0.8		1.9		2.0	
1979	5123	41.02	41.45	41.69		0.4		0.7		1.0		1.6
1980	5623	41.97	41.81	41.84	-0.2		-0.1		-0.4		-0.3	
A±K	/				0.0±0.5	0.0±0.3	0.0±0.5	-0.1±0.4	0.2±1.2	0.0±0.7	0.1±1.2	-0.1±0.9

Regression of uneven year: H=0.000718Q+37.77;

Regression of even year: H=0.00031Q+40.1;

Error of prediction: The difference between predicted and measured value.

Relative error of prediction (%): (Predicted value －Measured value) *100/ Measured value. A: average; K: Standard deviation.

Table S6. Error estimation for predicted water level at Yichang station using the regression relationship between the measured water level and

Predicted measured	Prediction (water level / m)	Errors of prediction (water level / m)	Relative errors of prediction (%)

predicted runoff during flood season

	Q/ $m^3.s^{-1}$	Water level / m	Regression of uneven year	Regression of even year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year
1961	21975	47.01	47.12	47.26		0.11		0.25		0		1
1962	22198	47.58	47.16	47.33	-0.42		-0.24		0		0	
1963	22527	47.54	47.22	47.43		-0.32		-0.11		-1		0
1964	22687	48.46	47.25	47.48	-1.21		-0.97		-2		-2	
1965	23676	48.16	47.43	47.79		-0.73		-0.37		-2		-1
1966	22503	46.95	47.21	47.43	0.26		0.47		1		1	
1967	18132	47.37	46.40	46.07		-0.97		-1.30		-2		-3
1968	21664	48.22	47.06	47.17	-1.16		-1.05		-2		-2	
1969	20175	45.89	46.78	46.70		0.89		0.81		2		2
1970	21022	46.96	46.94	46.97	-0.02		0.01		0		0	
1971	20838	46.55	46.90	46.91		0.35		0.36		1		1
1972	19222	45.95	46.61	46.41	0.65		0.45		1		1	
1973	22934	47.24	47.29	47.56		0.05		0.32		0		1
1974	24522	48.26	47.59	48.05	-0.67		-0.21		-1		0	
1975	22044	47.14	47.13	47.28		-0.02		0.14		0		0
1976	20419	46.71	46.83	46.78	0.11		0.07		0		0	
1977	20088	46.69	46.77	46.68		0.07		-0.02		0		0
1978	21476	46.38	47.02	47.11	0.64		0.73		1		2	
1979	21624	46.56	47.05	47.15		0.49		0.59		1		1
1980	25195	47.51	47.71	48.26	0.21		0.75		0		2	
A±K	/				-0.16±0.68	-0.01±0.55	0.00±0.64	0.07±0.59	-0.23±1.41	0.00±1.17	0.07±1.33	0.15±1.25

Regression of uneven year: H=0.000185Q+43.05;

Regression of even year: H=0.00031Q+40.45;

Error of prediction: The difference between predicted and measured value.

Relative error of prediction (%): (Predicted value －Measured value) *100/ Measured value. A: average; K: Standard deviation.

Table S7. Error estimation for predicted water level at Shashi station using the regression relationship between the measured water level and

Predicted	measured	Prediction (water level / m)	Errors of prediction (water level / m)	Relative errors of prediction (%)

predicted runoff during dry season

	Q/ $m^3.s^{-1}$	Water level / m	Regression of uneven year	Regression of even year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year
1961	6516	34.93	34.72	34.12		-0.2		-0.8		-0.6		-2.3
1962	5330	34.58	33.84	34.09	-0.7		-0.5		0.0		0.0	
1963	5807	34.44	34.19	34.10		-0.2		-0.3		-0.7		-1.0
1964	5876	35.17	34.24	34.10	-0.9		-1.1		-2.6		-3.0	
1965	5785	34.85	34.18	34.10		-0.7		-0.7		-1.9		-2.2
1966	4932	34.45	33.55	34.08	-0.9		-0.4		-2.6		-1.1	
1967	5936	34.89	34.29	34.10		-0.6		-0.8		-1.7		-2.3
1968	6028	34.98	34.36	34.11	-0.6		-0.9		-1.8		-2.5	
1969	5290	34.30	33.81	34.09		-0.5		-0.2		-1.4		-0.6
1970	5937	34.31	34.29	34.10	0.0		-0.2		-0.1		-0.6	
1971	5423	34.25	33.91	34.09		-0.3		-0.2		-1.0		-0.5
1972	5933	33.89	34.29	34.10	0.4		0.2		1.2		0.6	
1973	5918	33.61	34.28	34.10		0.7		0.5		2.0		1.5
1974	5732	33.56	34.14	34.10	0.6		0.5		1.7		1.6	
1975	5874	33.99	34.24	34.10		0.3		0.1		0.7		0.3
1976	6265	33.57	34.53	34.11	1.0		0.5		2.9		1.6	
1977	6509	34.04	34.71	34.12		0.7		0.1		2.0		0.2
1978	5516	32.98	33.98	34.09	1.0		1.1		3.0		3.4	
1979	5058	32.67	33.64	34.08		1.0		1.4		3.0		4.3
1980	5521	33.48	33.98	34.09	0.5		0.6		1.5		1.8	
A±K	/				0.0±0.8	0.0±0.6	0.0±0.7	-0.1±0.7	0.3±2.1	0.0±1.8	0.2±2	-0.2±2

Regression of uneven year: H=0.000736Q+29.92;

Regression of even year: H=0.000026Q+33.95;

Error of prediction: The difference between predicted and measured value.

Relative error of prediction (%): (Predicted value －Measured value) *100/ Measured value. A: average; K: Standard deviation.

Table S8. Error estimation for predicted water level at Shashi station using the regression relationship between the measured water level and

Predicted	measured	Prediction (water level / m)	Errors of prediction (water level / m)	Relative errors of prediction (%)

predicted runoff during flood season

	Q/ $m^3.s^{-1}$	Water level / m	Regression of uneven year	Regression of even year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year
1961	19032	38.98	38.98	39.01		0.00		0.03		0		0
1962	19446	39.67	39.02	39.12	-0.64		-0.55		0		0	
1963	19848	39.60	39.07	39.22		-0.53		-0.38		-1		-1
1964	20048	40.43	39.10	39.27	-1.33		-1.15		-3		-3	
1965	20631	40.03	39.16	39.42		-0.86		-0.60		-2		-2
1966	19290	39.00	39.01	39.07	0.01		0.07		0		0	
1967	15665	39.51	38.58	38.13		-0.93		-1.38		-2		-4
1968	18855	39.93	38.95	38.96	-0.98		-0.97		-2		-2	
1969	17719	38.38	38.82	38.66		0.44		0.29		1		1
1970	18319	39.16	38.89	38.82	-0.26		-0.33		-1		-1	
1971	18160	38.37	38.87	38.78		0.50		0.41		1		1
1972	16446	37.71	38.67	38.33	0.96		0.63		3		2	
1973	20260	38.91	39.12	39.33		0.21		0.41		1		1
1974	21351	39.37	39.25	39.61	-0.12		0.25		0		1	
1975	19356	38.78	39.01	39.09		0.23		0.31		1		1
1976	17469	38.39	38.79	38.60	0.40		0.21		1		1	
1977	17266	38.46	38.77	38.55		0.31		0.09		1		0
1978	18552	37.93	38.92	38.88	0.99		0.95		3		3	
1979	18870	38.30	38.96	38.96		0.66		0.67		2		2
1980	22568	39.15	39.39	39.93	0.25		0.78		1		2	
A±K	/				-0.07±0.77	0.00±0.57	-0.01±0.72	-0.02±0.61	0.01±1.89	0.03±1.46	0.14±1.78	-0.02±1.56

Regression of uneven year: H=0.00018Q+36.73;

Regression of even year: H=0.000261Q+34.04;

Error of prediction: The difference between predicted and measured value.

Relative error of prediction (%): (Predicted value －Measured value) *100/ Measured value. A: average; K: Standard deviation.

Table S9. Error estimation for predicted water level at Jianli station using the regression relationship between the measured water level and

Predicted	measured	Prediction (water level / m)	Errors of prediction (water level / m)	Relative errors of prediction (%)

predicted runoff during dry season

	Q/ $m^3.s^{-1}$	Water level / m	Regression of uneven year	Regression of even year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year
1961	6602	26.22	26.02	25.33		-0.2		-0.9		-0.8		-3.4
1962	5211	25.75	25.01	25.36	-0.7		-0.4		0.0		0.0	
1963	5764	25.40	25.41	25.35		0.0		-0.1		0.0		-0.2
1964	5858	26.66	25.48	25.35	-1.2		-1.3		-4.4		-4.9	
1965	5762	25.84	25.41	25.35		-0.4		-0.5		-1.7		-1.9
1966	4727	25.47	24.66	25.37	-0.8		-0.1		-3.2		-0.4	
1967	5946	26.01	25.54	25.35		-0.5		-0.7		-1.8		-2.6
1968	6003	26.13	25.58	25.34	-0.6		-0.8		-2.1		-3.0	
1969	5142	25.52	24.96	25.36		-0.6		-0.2		-2.2		-0.6
1970	5910	25.07	25.51	25.35	0.4		0.3		1.8		1.1	
1971	5319	24.35	25.09	25.36		0.7		1.0		3.0		4.1
1972	5913	24.28	25.52	25.35	1.2		1.1		5.1		4.4	
1973	5881	24.80	25.49	25.35		0.7		0.5		2.8		2.2
1974	5659	24.28	25.33	25.35	1.1		1.1		4.3		4.4	
1975	5860	25.59	25.48	25.35		-0.1		-0.2		-0.4		-0.9
1976	6316	25.37	25.81	25.34	0.4		0.0		1.7		-0.1	
1977	6622	25.73	26.03	25.33		0.3		-0.4		1.2		-1.5
1978	5415	24.91	25.16	25.36	0.2		0.4		1.0		1.8	
1979	4870	24.66	24.76	25.37		0.1		0.7		0.4		2.9
1980	5439	25.62	25.17	25.36	-0.4		-0.3		-1.7		-1.0	
A±K	/				0.0±0.8	0.0±0.5	0.0±0.8	-0.1±0.6	0.2±3.1	0.1±1.8	0.2±2.9	-0.2±2.5

Regression of uneven year: H=0.000725Q+21.23;

Regression of even year: H=-0.000021Q+25.47;

Error of prediction: The difference between predicted and measured value.

Relative error of prediction (%): (Predicted value －Measured value) *100/ Measured value. A: average; K: Standard deviation.

Table S10. Error estimation for predicted water level at Jianli station using the regression relationship between the measured water level and

Predicted	measured	Prediction (water level / m)	Errors of prediction (water level / m)	Relative errors of prediction (%)

predicted runoff during flood season

	Q/ $m^3.s^{-1}$	Water level / m	Regression of uneven year	Regression of even year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year
1961	16951	30.34	31.10	30.87		0.76		0.53		3		2
1962	17230	31.42	31.22	31.10	-0.20		-0.32		0		0	
1963	17376	30.73	31.28	31.23		0.56		0.50		2		2
1964	17619	32.30	31.39	31.43	-0.91		-0.87		-3		-3	
1965	17849	31.70	31.48	31.62		-0.22		-0.09		-1		0
1966	17070	30.39	31.15	30.97	0.77		0.59		3		2	
1967	15112	31.37	30.33	29.36		-1.04		-2.01		-3		-6
1968	16867	32.10	31.07	30.81	-1.04		-1.30		-3		-4	
1969	16325	30.55	30.84	30.36		0.29		-0.19		1		-1
1970	16624	31.34	30.97	30.60	-0.38		-0.74		-1		-2	
1971	16455	29.56	30.89	30.47		1.33		0.90		4		3
1972	15520	28.51	30.50	29.69	1.99		1.18		7		4	
1973	17769	33.10	31.45	31.55		-1.65		-1.55		-5		-5
1974	18223	31.36	31.64	31.92	0.28		0.56		1		2	
1975	17183	31.27	31.20	31.07		-0.06		-0.20		0		-1
1976	16106	30.56	30.75	30.18	0.19		-0.38		1		-1	
1977	15999	30.97	30.70	30.09		-0.27		-0.88		-1		-3
1978	16668	29.88	30.98	30.64	1.11		0.76		4		3	
1979	16938	30.73	31.10	30.86		0.37		0.14		1		0
1980	19067	32.09	32.00	32.62	-0.09		0.53		0		2	
A±K	/				0.17±0.92	0.01±0.87	0.00±0.83	-0.28±0.93	0.71±3.1	0.09±2.8	0.17±2.7	-0.86±3.0

Regression of uneven year: H=0.000422Q+23.95;

Regression of even year: H=0.000825Q+16.89;

Error of prediction: The difference between predicted and measured value.

Relative error of prediction (%): (Predicted value －Measured value) *100/ Measured value. A: average; K: Standard deviation.

Table S11. Error estimation for predicted water level at Luoshan station using the regression relationship between the measured water level and

Predicted	measured	Prediction (water level / m)	Errors of prediction (water level / m)	Relative errors of prediction (%)

predicted runoff during dry season

	Q/ $m^3.s^{-1}$	Water level / m	Regression of uneven year	Regression of even year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year
1961	12665	20.42	20.57	20.82		0.1		0.4		0.7		1.9
1962	9385	19.35	19.41	19.41	0.1		0.1		0.0		0.0	
1963	10561	18.95	19.83	19.91		0.9		1.0		4.6		5.1
1964	10790	21.21	19.91	20.01	-1.3		-1.2		-6.1		-5.6	
1965	10726	19.84	19.89	19.98		0.0		0.1		0.2		0.7
1966	8899	19.47	19.24	19.20	-0.2		-0.3		-1.2		-1.4	
1967	10577	20.24	19.83	19.92		-0.4		-0.3		-2.0		-1.6
1968	10838	20.34	19.93	20.03	-0.4		-0.3		-2.0		-1.5	
1969	8524	19.61	19.11	19.04		-0.5		-0.6		-2.5		-2.9
1970	10997	20.05	19.98	20.10	-0.1		0.0		-0.4		0.2	
1971	9105	19.35	19.31	19.28		0.0		-0.1		-0.2		-0.4
1972	10875	19.21	19.94	20.05	0.7		0.8		3.8		4.4	
1973	10591	20.08	19.84	19.92		-0.2		-0.2		-1.2		-0.8
1974	9498	18.89	19.45	19.45	0.6		0.6		3.0		3.0	
1975	11242	20.28	20.07	20.20		-0.2		-0.1		-1.1		-0.4
1976	11785	19.90	20.26	20.44	0.4		0.5		1.8		2.7	
1977	11296	20.25	20.09	20.23		-0.2		0.0		-0.8		-0.1
1978	9464	19.19	19.44	19.44	0.2		0.2		1.3		1.3	
1979	8425	18.56	19.08	18.99		0.5		0.4		2.8		2.3
1980	10750	20.50	19.89	19.99	-0.6		-0.5		-2.9		-2.5	
A±K	/				-0.1±0.6	0.0±0.4	0.0±0.6	0.1±0.4	-0.3±3	0.1±2.2	0.1±3	0.4±2.3

Regression of uneven year: H=0.000352Q+16.11;

Regression of even year: H=0.00043Q+15.37;

Error of prediction: The difference between predicted and measured value.

Relative error of prediction (%): (Predicted value －Measured value) *100/ Measured value. A: average; K: Standard deviation.

Table S12. Error estimation for predicted water level at Luoshan station using the regression relationship between the measured water level and predicted runoff during flood season

Predicted	measured	Prediction (water level / m)	Errors of prediction (water level / m)	Relative errors of prediction (%)

	Q/ $m^3.s^{-1}$	Water level / m	Regression of uneven year	Regression of even year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year
1961	30080	25.77	26.76	26.73		0.98		0.95		4		4
1962	32064	27.36	27.14	27.68	-0.22		0.32		0		0	
1963	28746	26.16	26.50	26.09		0.34		-0.07		1		0
1964	30594	28.19	26.85	26.98	-1.34		-1.22		-5		-4	
1965	31373	27.31	27.00	27.35		-0.31		0.04		-1		0
1966	28758	25.49	26.50	26.09	1.01		0.61		4		2	
1967	25720	27.09	25.91	24.63		-1.18		-2.46		-4		-9
1968	29529	27.79	26.65	26.46	-1.15		-1.33		-4		-5	
1969	30919	26.38	26.92	27.13		0.54		0.75		2		3
1970	30929	27.63	26.92	27.14	-0.71		-0.50		-3		-2	
1971	28323	25.49	26.42	25.88		0.93		0.40		4		2
1972	26544	24.34	26.07	25.03	1.73		0.69		7		3	
1973	33604	28.20	27.44	28.42		-0.77		0.22		-3		1
1974	31506	27.44	27.03	27.41	-0.41		-0.02		-1		0	
1975	31162	27.53	26.96	27.25		-0.57		-0.29		-2		-1
1976	28956	26.34	26.54	26.19	0.19		-0.16		1		-1	
1977	29611	27.12	26.66	26.50		-0.46		-0.62		-2		-2
1978	28422	25.21	26.44	25.93	1.23		0.72		5		3	
1979	30105	26.39	26.76	26.74		0.37		0.35		1		1
1980	34979	28.28	27.70	29.08	-0.58		0.80		-2		3	
A±K	/				-0.02±1.0	-0.01±0.74	-0.01±0.79	-0.07±0.96	0.17±3.99	0.02±2.79	-0.07±2.88	-0.23±3.57

Regression of uneven year: H=0.000193Q+20.95;

Regression of even year: H=0.000481Q+12.26;

Error of prediction: The difference between predicted and measured value.

Relative error of prediction (%): (Predicted value －Measured value) *100/ Measured value. A: average; K: Standard deviation.

Table S13. Error estimation for predicted water level at Hankou station using the regression relationship between the measured water level and

Predicted	measured	Prediction (water level / m)	Errors of prediction (water level / m)	Relative errors of prediction (%)

predicted runoff during dry season

	Q/ $m^3.s^{-1}$	Water level / m	Regression of uneven year	Regression of even year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year
1961	14026	16.29	16.31	16.40		0.0		0.1		0.1		0.7
1962	10547	15.22	14.88	15.04	-0.3		-0.2		0.0		0.0	
1963	11746	14.74	15.38	15.51		0.6		0.8		4.3		5.3
1964	12160	17.01	15.55	15.67	-1.5		-1.3		-8.6		-7.9	
1965	12048	15.56	15.50	15.63		-0.1		0.1		-0.4		0.4
1966	9797	14.96	14.58	14.75	-0.4		-0.2		-2.5		-1.4	
1967	12345	15.73	15.62	15.74		-0.1		0.0		-0.7		0.1
1968	12065	15.84	15.51	15.64	-0.3		-0.2		-2.1		-1.3	
1969	9708	15.39	14.54	14.72		-0.8		-0.7		-5.5		-4.4
1970	12270	15.75	15.59	15.72	-0.2		0.0		-1.0		-0.2	
1971	10332	15.12	14.80	14.96		-0.3		-0.2		-2.1		-1.1
1972	12345	15.18	15.62	15.74	0.4		0.6		2.9		3.7	
1973	12237	16.04	15.58	15.70		-0.5		-0.3		-2.9		-2.1
1974	10527	14.78	14.88	15.04	0.1		0.3		0.7		1.7	
1975	12615	16.24	15.73	15.85		-0.5		-0.4		-3.1		-2.4
1976	13340	15.60	16.03	16.13	0.4		0.5		2.8		3.4	
1977	12985	15.47	15.88	15.99		0.4		0.5		2.7		3.4
1978	10481	14.35	14.86	15.02	0.5		0.7		3.5		4.7	
1979	9510	13.54	14.46	14.64		0.9		1.1		6.8		8.1
1980	11988	15.63	15.47	15.61	-0.2		0.0		-1.0		-0.2	
A±K	/				-0.1±0.6	0.0±0.5	0.0±0.6	0.1±0.6	-0.5±3.5	-0.1±3.7	0.3±3.6	0.8±3.8

Regression of uneven year: H=0.00041Q+10.56;

Regression of even year: H=0.00039Q+10.93;

Error of prediction: The difference between predicted and measured value.

Relative error of prediction (%): (Predicted value －Measured value) *100/ Measured value. A: average; K: Standard deviation.

Table S14. Error estimation for predicted water level at Hankou station using the regression relationship between the measured water level and

Predicted	measured	Prediction (water level / m)	Errors of prediction (water level / m)	Relative errors of prediction (%)

predicted runoff during flood season

	Q/ $m^3.s^{-1}$	Water level / m	Regression of uneven year	Regression of even year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year
1961	32226	21.32	22.07	21.89		0.75		0.58		4		3
1962	34665	22.69	22.49	22.81	-0.20		0.12		0		0	
1963	31798	21.69	22.00	21.73		0.31		0.04		1		0
1964	34858	23.57	22.53	22.88	-1.04		-0.69		-4		-3	
1965	33685	22.54	22.32	22.44		-0.22		-0.10		-1		0
1966	29798	20.81	21.66	20.98	0.85		0.18		4		1	
1967	27766	22.37	21.31	20.22		-1.07		-2.15		-5		-10
1968	31983	23.01	22.03	21.80	-0.98		-1.21		-4		-5	
1969	33459	21.91	22.28	22.36		0.37		0.45		2		2
1970	34158	23.08	22.41	22.62	-0.67		-0.46		-3		-2	
1971	31318	20.84	21.92	21.55		1.08		0.72		5		3
1972	28339	19.77	21.40	20.44	1.63		0.67		8		3	
1973	37002	23.60	22.89	23.69		-0.71		0.08		-3		0
1974	34618	22.63	22.48	22.79	-0.15		0.16		-1		1	
1975	34473	23.14	22.46	22.74		-0.68		-0.40		-3		-2
1976	30731	21.67	21.82	21.33	0.14		-0.34		1		-2	
1977	31984	22.57	22.03	21.80		-0.54		-0.77		-2		-3
1978	30304	20.27	21.74	21.17	1.47		0.91		7		4	
1979	33534	21.52	22.30	22.39		0.78		0.87		4		4
1980	39343	23.70	23.30	24.56	-0.40		0.86		-2		4	
A±K	/				0.07±0.96	0.01±0.75	0.02±0.69	-0.07±0.89	0.63±4.52	0.14±3.41	0.13±3.13	-0.24±4.03

Regression of uneven year: H=0.000172Q+16.53;

Regression of even year: H=0.000375Q+9.81;

Error of prediction: The difference between predicted and measured value.

Relative error of prediction (%): (Predicted value －Measured value) *100/ Measured value. A: average; K: Standard deviation.

Table S15. Error estimation for predicted water level at Datong station using the regression relationship between the measured water level and

Predicted	measured	Prediction (water level / m)	Errors of prediction (water level / m)	Relative errors of prediction (%)

predicted runoff during dry season

	Q/ $m^3.s^{-1}$	Water level / m	Regression of uneven year	Regression of even year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year
1961	18492	6.67	6.76	6.58		0.1		-0.1		1.4		-1.3
1962	14144	5.75	5.58	5.76	-0.2		0.0		0.0		0.0	
1963	14831	5.17	5.76	5.89		0.6		0.7		11.6		14.0
1964	15562	7.03	5.96	6.03	-1.1		-1.0		-15.2		-14.3	
1965	16455	5.89	6.21	6.20		0.3		0.3		5.4		5.2
1966	13990	5.73	5.54	5.73	-0.2		0.0		-3.4		-0.1	
1967	16130	5.91	6.12	6.13		0.2		0.2		3.5		3.8
1968	15578	5.91	5.97	6.03	0.1		0.1		1.1		2.1	
1969	13388	6.08	5.37	5.61		-0.7		-0.5		-11.7		-7.7
1970	16701	6.45	6.27	6.24	-0.2		-0.2		-2.7		-3.2	
1971	13203	5.61	5.32	5.58		-0.3		0.0		-5.1		-0.6
1972	16461	5.89	6.21	6.20	0.3		0.3		5.5		5.3	
1973	16774	6.86	6.29	6.26		-0.6		-0.6		-8.3		-8.8
1974	13963	5.54	5.53	5.72	0.0		0.2		-0.3		3.2	
1975	17966	7.07	6.62	6.48		-0.5		-0.6		-6.4		-8.3
1976	18586	6.29	6.79	6.60	0.5		0.3		7.9		5.0	
1977	16701	5.89	6.27	6.24		0.4		0.4		6.5		6.0
1978	14006	5.33	5.54	5.73	0.2		0.4		4.0		7.6	
1979	13202	4.85	5.32	5.58		0.5		0.7		9.6		14.9
1980	16696	6.30	6.27	6.24	0.0		-0.1		-0.4		-0.9	
A±K	/				-0.1±0.4	0.0±0.5	0.0±0.4	0.1±0.5	-0.4±6.3	0.6±8	0.5±6.1	1.7±8.6

Regression of uneven year: H=0.000272Q+1.73;

Regression of even year: H=0.00019Q+3.07;

Error of prediction: The difference between predicted and measured value.

Relative error of prediction (%): (Predicted value －Measured value) *100/ Measured value. A: average; K: Standard deviation.

Table S16. Error estimation for predicted water level at Datong station using the regression relationship between the measured water level and

Predicted	measured	Prediction (water level / m)	Errors of prediction (water level / m)	Relative errors of prediction (%)

predicted runoff during flood season

	Q/ $m^3.s^{-1}$	Water level / m	Regression of uneven year	Regression of even year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year
1961	39604	10.55	11.01	10.92		0.46		0.37		4		3
1962	43732	11.75	11.60	11.77	-0.15		0.02		0		0	
1963	36478	10.38	10.57	10.27		0.18		-0.11		2		-1
1964	41273	11.86	11.25	11.26	-0.61		-0.60		-5		-5	
1965	39064	11.01	10.94	10.81		-0.08		-0.21		-1		-2
1966	33688	9.78	10.17	9.69	0.39		-0.08		4		-1	
1967	32362	11.02	9.98	9.42		-1.04		-1.60		-9		-15
1968	38040	11.46	10.79	10.59	-0.67		-0.86		-6		-8	
1969	42418	11.07	11.42	11.50		0.34		0.43		3		4
1970	43548	12.04	11.58	11.73	-0.46		-0.30		-4		-3	
1971	36452	9.81	10.56	10.27		0.76		0.46		8		5
1972	34385	9.03	10.27	9.84	1.23		0.81		14		9	
1973	47267	12.47	12.11	12.50		-0.36		0.03		-3		0
1974	41356	11.23	11.26	11.28	0.04		0.05		0		0	
1975	44106	12.09	11.66	11.85		-0.43		-0.24		-4		-2
1976	37347	10.75	10.69	10.45	-0.06		-0.30		-1		-3	
1977	40470	11.73	11.14	11.10		-0.60		-0.64		-5		-5
1978	33672	9.24	10.17	9.69	0.92		0.45		10		5	
1979	38996	10.26	10.93	10.79		0.66		0.53		6		5
1980	48556	12.07	12.29	12.77	0.23		0.70		2		6	
A±K	/				0.09±0.63	-0.01±0.59	-0.01±0.54	-0.10±0.65	1.45±6.3	0.16±5.5	0.13±5.1	-0.75±6.0

Regression of uneven year: H=0.00143Q+5.35;

Regression of even year: H=0.000207Q+2.72;

Error of prediction: The difference between predicted and measured value.

Relative error of prediction (%): (Predicted value －Measured value) *100/ Measured value. A: average; K: Standard deviation.

Table S17. Error estimation for predicted seasonal runoff at Zhutuo station using the regression relationship between the precipitation and runoff during dry season

	Measured		Prediction (runoff / $m^3.s^{-1}$)		Errors of prediction (runoff / $m^3.s^{-1}$)				Relative errors of prediction (%)			
	P/ mm	Q / $m^3.s^{-1}$	Regression of uneven year	Regression of even year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year
1961	85	3858	3874	3391		17		-466		0.4		-12.1
1962	43	3407	3402	3533	-5		126		0.0		0.0	
1963	50	3376	3486	3508		110		132		3.3		3.9
1964	56	3792	3551	3488	-241		-304		-6.4		-8.0	
1965	66	4026	3656	3457		-370		-569		-9.2		-14.1
1966	40	3506	3374	3541	-132		35		-3.8		1.0	
1967	58	3653	3572	3482		-80		-171		-2.2		-4.7
1968	49	3582	3474	3511		-108		-71		-3.0		-2.0
1969	67	3059	3669	3453	611		394		20.0		12.9	
1970	67	3164	3665	3454		501		290		15.8		9.2
1971	67	3667	3667	3453	0		-214		0.0		-5.8	
1972	66	3840	3662	3455		-177		-385		-4.6		-10.0
1973	72	3351	3724	3436	373		85		11.1		2.5	
1974	81	3796	3829	3405		32		-392		0.8		-10.3
1975	57	3352	3554	3487	201		135		6.0		4.0	
1976	41	3311	3386	3538		75		227		2.3		6.9
1977	60	3730	3598	3474	-132		-256		-3.5		-6.9	
1978	85	3858	3874	3391		17		-466		0.4		-12.1
1979	43	3407	3402	3533	-5		126		0.0		0.0	
1980	50	3376	3486	3508		110		132		3.3		3.9
A±K	/				84±290	0±239	0±239	-156±318	2.9±8.9	0.4±6.9	0.0±6.9	-3.7±8.7

Regression of uneven year: Q=11.107P+2926;

Regression of even year: Q=-3.337P+3676;

Error of prediction: The difference between predicted and measured value.

Relative error of prediction (%): (Predicted value －Measured value) *100/ Measured value. A: average; K: Standard deviation.

Table S18. Error estimation for predicted seasonal runoff at Zhutuo station using the regression relationship between the precipitation and runoff during flood season

Measured	Prediction (runoff / $m^3.s^{-1}$)	Errors of prediction (runoff / $m^3.s^{-1}$)	Relative errors of prediction (%)

	P/ mm	Q / $m^3.s^{-1}$	Regression of uneven year	Regression of even year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year
1961	601	13573	13336	13972		-237		398		-1.7		2.9
1962	593	15283	13209	13719	-2073		-1564		-0.1		-0.1	
1963	575	12585	12928	13156		343		571		2.7		4.5
1964	583	14906	13051	13403	-1855		-1503		-12.4		-10.1	
1965	639	16531	13927	15152		-2604		-1379		-15.8		-8.3
1966	666	15852	14340	15977	-1512		125		-9.5		0.8	
1967	428	11982	10666	8637		-1316		-3345		-11.0		-27.9
1968	571	11229	12875	13051		1645		1821		14.7		16.2
1969	506	10176	11868	11039	1692		864		16.6		8.5	
1970	578	11804	12973	13246		1169		1442		9.9		12.2
1971	636	16424	13868	15035	-2555		-1389		-15.6		-8.5	
1972	572	12140	12886	13073		746		933		6.1		7.7
1973	555	12213	12622	12544	409		332		3.3		2.7	
1974	532	11882	12273	11848		391		-34		3.3		-0.3
1975	612	13124	13498	14295	374		1171		2.9		8.9	
1976	555	12763	12620	12541		-143		-222		-1.1		-1.7
1977	644	13328	13998	15295	671		1967		5.0		14.8	
1978	601	13573	13336	13972		-237		398		-1.7		2.9
1979	593	15283	13209	13719	-2073		-1564		-0.1		-0.1	
1980	575	12585	12928	13156		343		571		2.7		4.5
A±K	/				-606±1569	-1±1299	0±1349	21±1577	-1.2±10.7	0.8±9.6	2.1±8.6	0.6±13

Regression of uneven year: Q=15.458P+4042;

Regression of even year: Q=30.877P+4593;

Error of prediction: The difference between predicted and measured value.

Relative error of prediction (%): (Predicted value －Measured value) *100/ Measured value. A: average; K: Standard deviation.

Table S19. Error estimation for predicted seasonal runoff at Cuntan station using the regression relationship between the precipitation and runoff

	Measured		Prediction (runoff / $m^3.s^{-1}$)		Errors of prediction (runoff / $m^3.s^{-1}$)				Relative errors of prediction (%)			
	P/ mm	Q / $m^3.s^{-1}$	Regression of uneven year	Regression of even year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year
1961	112	5115	4979	4497		-136.0		-617.9		-2.7		-12.1
1962	64	4337	4004	4231	-333.1		-106.5		-0.1		0.0	
1963	80	4235	4328	4319		92.6		83.8		2.2		2.0
1964	92	5027	4574	4386	-452.9		-640.8		-9.0		-12.7	
1965	91	4974	4549	4379		-425.9		-595.0		-8.6		-12.0
1966	56	4180	3854	4190	-325.6		10.0		-7.8		0.2	
1967	91	4814	4561	4383		-253.2		-431.6		-5.3		-9.0
1968	94	4953	4623	4400	-330.7		-553.6		-6.7		-11.2	
1969	69	4195	4101	4257		-94.6		61.9		-2.3		1.5
1970	97	4407	4682	4416	274.3		8.4		6.2		0.2	
1971	71	4208	4143	4269		-64.4		61.0		-1.5		1.5
1972	92	3771	4576	4387	805.2		615.9		21.4		16.3	
1973	96	3924	4650	4407		726.4		483.1		18.5		12.3
1974	88	4322	4487	4363	165.0		40.4		3.8		0.9	
1975	91	4749	4555	4381		-194.0		-367.6		-4.1		-7.7
1976	104	4188	4821	4454	632.5		265.4		15.1		6.3	
1977	108	4744	4896	4474		151.8		-269.6		3.2		-5.7
1978	80	3869	4334	4321	465.0		451.9		12.0		11.7	
1979	62	3770	3959	4218		188.4		448.1		5.0		11.9
1980	82	4426	4380	4333	-46.0		-92.3		-1.0		-2.1	
A±K	/				85.4±451	-0.9±318	-0.1±393	-114.4±401	3.4±10.3	0.5±7.5	1.0±9	-1.7±9

during dry season

Regression of uneven year: Q=20.3465P+2705;

Regression of even year: Q=5.556P+3876;

Error of prediction: The difference between predicted and measured value.

Relative error of prediction (%): (Predicted value －Measured value) *100/ Measured value. A: average; K: Standard deviation.

Table S20. Error estimation for predicted seasonal runoff at Cuntan station using the regression relationship between the precipitation and runoff

Measured	Prediction (runoff / $m^3.s^{-1}$)	Errors of prediction (runoff / $m^3.s^{-1}$)	Relative errors of prediction (%)

during flood season

	P/ mm	Q / $m^3.s^{-1}$	Regression of uneven year	Regression of even year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year
1961	649	18554	18006	19354		-548		801		-3.0		4.3
1962	627	19790	17455	18559	-2335		-1231		-0.1		-0.1	
1963	627	17563	17440	18538		-122		975		-0.7		5.6
1964	631	20654	17552	18699	-3102		-1955		-15.0		-9.5	
1965	667	21396	18450	19995		-2946		-1401		-13.8		-6.5
1966	674	19612	18621	20241	-991		629		-5.1		3.2	
1967	496	17172	14156	13798		-3015		-3373		-17.6		-19.6
1968	607	21907	16944	17821	-4963		-4086		-22.7		-18.6	
1969	553	13715	15587	15863		1872		2148		13.6		15.7
1970	583	16131	16330	16935	198		804		1.2		5.0	
1971	590	14481	16509	17194		2028		2713		14.0		18.7
1972	538	13799	15215	15326	1416		1527		10.3		11.1	
1973	641	16998	17811	19073		814		2076		4.8		12.2
1974	686	21675	18943	20707	-2731		-968		-12.6		-4.5	
1975	629	16770	17506	18633		736		1863		4.4		11.1
1976	579	16364	16231	16793	-132		429		-0.8		2.6	
1977	560	15067	15771	16129		704		1062		4.7		7.0
1978	619	16159	17258	18275	1099		2115		6.8		13.1	
1979	590	16051	16525	17217		474		1166		3.0		7.3
1980	686	17976	18945	20710	970		2734		5.4		15.2	
A±K	/				-1057±2139	0±1752	0±2068	803±1848	-3.3±10.5	0.9±10.3	1.8±10.5	5.6±11.3

Regression of uneven year: Q=25.209P+1642;

Regression of even year: Q=36.383P-4263;

Error of prediction: The difference between predicted and measured value.

Relative error of prediction (%): (Predicted value －Measured value) *100/ Measured value. A: average; K: Standard deviation.

Table S21. Error estimation for predicted seasonal runoff at Yichang station using the regression relationship between the precipitation and runoff during flood season

Measured	Prediction (runoff / $m^3.s^{-1}$)	Errors of prediction (runoff / $m^3.s^{-1}$)	Relative errors of prediction (%)

	P/ mm	Q / $m^3.s^{-1}$	Regression of uneven year	Regression of even year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year
1961	144	6832	6881	6134		49		-698		0.7		-10.2
1962	89	5831	5207	5531	-623		-300		-0.1		-0.1	
1963	112	5795	5914	5786		119		-9		2.1		-0.2
1964	115	6885	6013	5821	-872		-1063		-12.7		-15.4	
1965	111	6170	5892	5778		-278		-392		-4.5		-6.4
1966	73	5237	4722	5356	-515		119		-9.8		2.3	
1967	117	6323	6063	5839		-260		-484		-4.1		-7.7
1968	122	6810	6230	5899	-580		-911		-8.5		-13.4	
1969	90	5473	5245	5545		-228		72		-4.2		1.3
1970	119	5636	6127	5862	491		227		8.7		4.0	
1971	96	5884	5423	5609		-461		-275		-7.8		-4.7
1972	118	5313	6109	5856	796		543		15.0		10.2	
1973	118	5212	6094	5850		882		638		16.9		12.2
1974	110	5511	5865	5768	355		258		6.4		4.7	
1975	115	6172	6012	5821		-161		-352		-2.6		-5.7
1976	132	5382	6522	6005	1139		622		21.2		11.6	
1977	142	6921	6819	6112		-102		-809		-1.5		-11.7
1978	99	5099	5529	5647	430		548		8.4		10.7	
1979	79	4460	4896	5419		436		959		9.8		21.5
1980	101	5705	5573	5663	-131		-42		-2.3		-0.7	
A±K	/				49±685	0±398	0±593	-135±565	2.6±11.2	0.5±7.5	1.4±9.4	-1.1±10.5

Regression of uneven year: Q=30.596P+2485;

Regression of even year: Q=11.025P+4550;

Error of prediction: The difference between predicted and measured value.

Relative error of prediction (%): (Predicted value －Measured value) *100/ Measured value. A: average; K: Standard deviation.

Table S22. Error estimation for predicted seasonal runoff at Yichang station using the regression relationship between the precipitation and

Measured	Prediction (runoff / $m^3.s^{-1}$)	Errors of prediction (runoff / $m^3.s^{-1}$)	Relative errors of prediction (%)

runoff during flood season

	P/ mm	Q / $m^3.s^{-1}$	Regression of uneven year	Regression of even year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year
1961	655	20920	21408	22320		488		1400		2.3		6.7
1962	661	23476	21552	22587	-1923		-888		-0.1		0.0	
1963	669	22733	21766	22983		-967		250		-4.3		1.1
1964	674	25974	21870	23176	-4104		-2798		-15.8		-10.8	
1965	700	24908	22513	24364		-2395		-544		-9.6		-2.2
1966	669	21906	21751	22954	-155		1048		-0.7		4.8	
1967	554	22084	18911	17701		-3172		-4383		-14.4		-19.8
1968	647	25688	21206	21946	-4483		-3743		-17.4		-14.6	
1969	608	17669	20239	20156		2570		2488		14.5		14.1
1970	630	20834	20788	21174	-45		340		-0.2		1.6	
1971	625	18706	20669	20952		1963		2247		10.5		12.0
1972	583	17212	19620	19011	2408		1800		14.0		10.5	
1973	680	21855	22031	23472		176		1617		0.8		7.4
1974	722	26090	23062	25381	-3027		-709		-11.6		-2.7	
1975	657	21025	21453	22403		428		1378		2.0		6.6
1976	614	20383	20397	20449	13		66		0.1		0.3	
1977	605	19789	20182	20051		393		263		2.0		1.3
1978	642	19541	21084	21720	1543		2179		7.9		11.1	
1979	646	20659	21180	21898		520		1239		2.5		6.0
1980	740	23473	23500	26190	26		2717		0.1		11.6	
A±K	/				-975±2321	0±1766	1±2101	595±1982	-2.4±9.9	0.6±8.5	1.2±8.9	3.3±9.9

Regression of uneven year: Q=24.716P+5222;

Regression of even year: Q=45.729P-7627;

Error of prediction: The difference between predicted and measured value.

Relative error of prediction (%): (Predicted value －Measured value) *100/ Measured value. A: average; K: Standard deviation.

Table S23. Error estimation for predicted seasonal runoff at Zhicheng station using the regression relationship between the precipitation and runoff during flood season

Measured	Prediction (runoff / $m^3.s^{-1}$)	Errors of prediction (runoff / $m^3.s^{-1}$)	Relative errors of prediction (%)

	P/ mm	Q / $m^3.s^{-1}$	Regression of uneven year	Regression of even year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year
1961	148	7150	7187	6431		37		-719		0.5		-10.1
1962	117	5987	6151	5959		164		-28		2.7		-0.5
1963	119	7120	6225	5993	-895		-1127		-12.6		-15.8	
1964	115	6351	6099	5935		-253		-416		-4.0		-6.5
1965	77	5384	4844	5364	-540		-20		-10.0		-0.4	
1966	121	6619	6310	6031		-309		-588		-4.7		-8.9
1967	126	7058	6479	6108	-580		-950		-8.2		-13.5	
1968	93	5632	5380	5608		-252		-24		-4.5		-0.4
1969	122	5809	6340	6045	532		237		9.2		4.1	
1970	99	6079	5570	5694		-509		-385		-8.4		-6.3
1971	122	5551	6329	6040	778		489		14.0		8.8	
1972	121	5390	6308	6030		917		640		17.0		11.9
1973	113	5602	6041	5909	439		307		7.8		5.5	
1974	119	6420	6239	5999		-181		-421		-2.8		-6.6
1975	137	5599	6819	6263	1221		665		21.8		11.9	
1976	147	7250	7162	6419		-88		-830		-1.2		-11.5
1977	103	5284	5712	5759	429		476		8.1		9.0	
1978	82	4553	5024	5446		471		893		10.4		19.6
1979	103	5843	5717	5762	-125		-81		-2.1		-1.4	
1980	148	7150	7187	6431		37		-719		0.5		-10.1
A±K	/				140±709	0±424	-1±636	-188±568	3.1±11.9	0.5±7.7	0.9±9.8	-1.9±10.1

Regression of uneven year: Q=33.028P+2301;

Regression of even year: Q=15.039P+4206;

Error of prediction: The difference between predicted and measured value.

Relative error of prediction (%): (Predicted value －Measured value) *100/ Measured value. A: average; K: Standard deviation.

Table S24. Error estimation for predicted seasonal runoff at Zhicheng station using the regression relationship between the precipitation and runoff during flood season

Measured	Prediction (runoff / $m^3.s^{-1}$)	Errors of prediction (runoff / $m^3.s^{-1}$)	Relative errors of prediction (%)

	P/ mm	Q / $m^3.s^{-1}$	Regression of uneven year	Regression of even year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year
1961	658	21255	21953	22704		697		1449		3.3		6.8
1962	683	23520	22540	23838		-980		318		-4.2		1.4
1963	685	26749	22602	23958	-4147		-2791		-15.5		-10.4	
1964	704	25413	23045	24814		-2368		-599		-9.3		-2.4
1965	669	22223	22210	23201	-14		977		-0.1		4.4	
1966	564	22799	19665	18284		-3134		-4515		-13.7		-19.8
1967	653	26501	21830	22467	-4672		-4035		-17.6		-15.2	
1968	620	18460	21024	20910		2564		2450		13.9		13.3
1969	638	21490	21450	21734	-39		244		-0.2		1.1	
1970	634	19468	21370	21578		1902		2110		9.8		10.8
1971	588	17635	20249	19412	2614		1777		14.8		10.1	
1972	689	22709	22702	24151		-7		1442		0.0		6.4
1973	725	26713	23574	25837	-3139		-877		-11.8		-3.3	
1974	667	21807	22153	23092		346		1284		1.6		5.9
1975	617	20868	20948	20762	80		-106		0.4		-0.5	
1976	611	20362	20812	20501		450		138		2.2		0.7
1977	646	19994	21657	22133	1663		2139		8.3		10.7	
1978	653	21299	21824	22456		525		1157		2.5		5.4
1979	754	24476	24255	27152	-221		2676		-0.9		10.9	
1980	658	21255	21953	22704		697		1449		3.3		6.8
A±K	/				-875±2541	-1±1753	1±2257	524±1993	-2.5±10.7	0.6±8.2	0.9±9.4	2.8±9.2

Regression of uneven year: Q=24.171P+6039;

Regression of even year: Q=46.071P-8043;

Error of prediction: The difference between predicted and measured value.

Relative error of prediction (%): (Predicted value －Measured value) *100/ Measured value. A: average; K: Standard deviation.

Table S25. Error estimation for predicted seasonal runoff at Shashi station using the regression relationship between the precipitation and runoff during flood season

Measured	Prediction (runoff / $m^3.s^{-1}$)	Errors of prediction (runoff / $m^3.s^{-1}$)	Relative errors of prediction (%)

	P/ mm	Q / $m^3.s^{-1}$	Regression of uneven year	Regression of even year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year
1961	150	6783	6786	6020		3		-763		0.0		-11.3
1962	96	5668	5184	5502	-483		-165		-0.1		0.0	
1963	118	5475	5829	5710		354		235		6.5		4.3
1964	121	6553	5921	5740	-633		-813		-9.7		-12.4	
1965	117	5980	5798	5701		-182		-279		-3.0		-4.7
1966	78	5242	4646	5328	-596		86		-11.4		1.6	
1967	123	6208	6002	5766		-206		-441		-3.3		-7.1
1968	128	6364	6126	5807	-238		-558		-3.7		-8.8	
1969	94	5288	5130	5485		-158		196		-3.0		3.7
1970	100	5758	5309	5543		-449		-216		-7.8		-3.7
1971	123	5284	5998	5765	714		481		13.5		9.1	
1972	123	5233	5978	5759		745		526		14.2		10.0
1973	114	5420	5727	5678	308		258		5.7		4.8	
1974	121	6247	5918	5739		-329		-507		-5.3		-8.1
1975	138	5455	6447	5910	992		455		18.2		8.3	
1976	149	6867	6776	6017		-91		-850		-1.3		-12.4
1977	104	5197	5435	5583	239		387		4.6		7.4	
1978	84	4508	4817	5383		308		875		6.8		19.4
1979	105	5719	5442	5586	-277		-134		-4.8		-2.3	
1980	150	6783	6786	6020		3		-763		0.0		-11.3
A±K	/				3±588	0±364	0±458	-122±565	1.4±10.1	0.4±6.7	0.9±7.6	-1.0±10.2

Regression of uneven year: Q=29.847P+2318;

Regression of even year: Q=9.645P+4576;

Error of prediction: The difference between predicted and measured value.

Relative error of prediction (%): (Predicted value －Measured value) *100/ Measured value. A: average; K: Standard deviation.

Table S26. Error estimation for predicted seasonal runoff at Shashi station using the regression relationship between the precipitation and runoff

Measured	Prediction (runoff / $m^3.s^{-1}$)	Errors of prediction (runoff / $m^3.s^{-1}$)	Relative errors of prediction (%)

during flood season

	P/ mm	Q / $m^3.s^{-1}$	Regression of uneven year	Regression of even year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year
1961	660	17658	18676	19245		1018		1587		5.8		9.0
1962	671	19670	18953	19735	-717		65		0.0		0.0	
1963	682	20147	19223	20212		-924		65		-4.6		0.3
1964	688	22784	19358	20449	-3427		-2335		-15.0		-10.2	
1965	704	21769	19749	21141		-2020		-628		-9.3		-2.9
1966	667	18592	18848	19550	257		958		1.4		5.2	
1967	566	18967	16414	15249		-2553		-3718		-13.5		-19.6
1968	655	22339	18556	19034	-3783		-3306		-16.9		-14.8	
1969	623	15935	17794	17686		1859		1752		11.7		11.0
1970	635	16547	18090	18210		1543		1663		9.3		10.1
1971	588	14946	16939	16176	1993		1230		13.3		8.2	
1972	694	19150	19500	20701		350		1551		1.8		8.1
1973	724	22752	20233	21996	-2519		-756		-11.1		-3.3	
1974	669	19055	18893	19628		-163		573		-0.9		3.0
1975	616	17272	17626	17389	353		117		2.0		0.7	
1976	611	16829	17489	17149		661		320		3.9		1.9
1977	646	16775	18353	18674	1578		1900		9.4		11.3	
1978	655	18337	18566	19051		229		714		1.2		3.9
1979	758	21307	21050	23440	-257		2133		-1.2		10.0	
1980	660	17658	18676	19245		1018		1587		5.8		9.0
A±K	/				-725±2089	0±1452	1±1856	388±1647	-2.0±10.4	0.6±7.9	0.8±9	2.5±9

Regression of uneven year: Q=24.177P+2729;

Regression of even year: Q=42.716P-8930;

Error of prediction: The difference between predicted and measured value.

Relative error of prediction (%): (Predicted value －Measured value) *100/ Measured value. A: average; K: Standard deviation.

Table S27. Error estimation for predicted seasonal runoff at Luoshan station using the regression relationship between the precipitation and

Measured	Prediction (runoff / $m^3.s^{-1}$)	Errors of prediction (runoff / $m^3.s^{-1}$)	Relative errors of prediction (%)

runoff during flood season

	P/ mm	Q / $m^3.s^{-1}$	Regression of uneven year	Regression of even year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year
1961	255	13665	12904	12159		-761		-1506		-5.6		-11.0
1962	164	10257	9262	9609	-995		-648		-0.1		-0.1	
1963	196	9247	10567	10523		1320		1276		14.3		13.8
1964	203	13521	10821	10701	-2699		-2820		-20.0		-20.9	
1965	201	10181	10750	10651		569		470		5.6		4.6
1966	150	9725	8721	9230	-1004		-495		-10.3		-5.1	
1967	197	11278	10585	10535		-693		-742		-6.1		-6.6
1968	204	11922	10875	10738	-1047		-1184		-8.8		-9.9	
1969	140	9648	8305	8938		-1344		-710		-13.9		-7.4
1970	209	10930	11052	10862	122		-68		1.1		-0.6	
1971	156	9448	8950	9390		-498		-57		-5.3		-0.6
1972	205	10098	10916	10767	818		669		8.1		6.6	
1973	197	11269	10600	10546		-669		-723		-5.9		-6.4
1974	167	8407	9387	9696	980		1290		11.7		15.3	
1975	215	10559	11324	11053		765		494		7.2		4.7
1976	230	9906	11927	11475	2020		1569		20.4		15.8	
1977	217	11262	11383	11094		121		-167		1.1		-1.5
1978	166	8382	9348	9669	966		1287		11.5		15.4	
1979	137	7009	8195	8862		1186		1853		16.9		26.4
1980	202	10280	10777	10670	496		389		4.8		3.8	
A±K	/				-34±1385	0±921	-1±1350	19±1022	1.8±12.1	0.8±10	2.0±12	1.6±11.4

Regression of uneven year: Q=39.997P+2712;

Regression of even year: Q=28.01P+5022;

Error of prediction: The difference between predicted and measured value.

Relative error of prediction (%): (Predicted value －Measured value) *100/ Measured value. A: average; K: Standard deviation.

Table S28. Error estimation for predicted seasonal runoff at Luoshan station using the regression relationship between the precipitation and runoff during flood season

Measured	Prediction (runoff / $m^3.s^{-1}$)	Errors of prediction (runoff / $m^3.s^{-1}$)	Relative errors of prediction (%)

	P/ mm	Q / $m^3.s^{-1}$	Regression of uneven year	Regression of even year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year
1961	700	27569	29727	30319		2158		2750		7.8		10.0
1962	742	32526	30729	33066	-1797		540		-0.1		0.0	
1963	672	28244	29052	28472		809		229		2.9		0.8
1964	711	34371	29986	31030	-4385		-3341		-12.8		-9.7	
1965	728	32395	30380	32109		-2015		-286		-6.2		-0.9
1966	672	27734	29058	28488	1324		754		4.8		2.7	
1967	607	31501	27523	24283		-3978		-7219		-12.6		-22.9
1968	688	34707	29448	29556	-5259		-5151		-15.2		-14.8	
1969	718	28614	30150	31480		1536		2866		5.4		10.0
1970	718	32321	30156	31495	-2165		-826		-6.7		-2.6	
1971	663	25791	28839	27887		3048		2096		11.8		8.1
1972	625	22805	27940	25423	5135		2618		22.5		11.5	
1973	775	34136	31507	35198		-2628		1062		-7.7		3.1
1974	730	33347	30447	32293	-2900		-1054		-8.7		-3.2	
1975	723	30333	30273	31817		-60		1484		-0.2		4.9
1976	676	28518	29158	28763	641		245		2.2		0.9	
1977	690	28892	29489	29669		597		777		2.1		2.7
1978	665	24987	28889	28023	3902		3036		15.6		12.2	
1979	701	29206	29739	30354		533		1147		1.8		3.9
1980	804	33924	32202	37102	-1721		3179		-5.1		9.4	
A±K	/				-723±3411	0±2221	0±2720	491±2892	-0.3±12.1	0.5±7.5	0.6±8.8	2.0±9.5

Regression of uneven year: Q=23.753P+13097;

Regression of even year: Q=65.076P-15241;

Error of prediction: The difference between predicted and measured value.

Relative error of prediction (%): (Predicted value －Measured value) *100/ Measured value. A: average; K: Standard deviation.

Table S29. Error estimation for predicted seasonal runoff at Hankou station using the regression relationship between the precipitation and runoff

Measured	Prediction (runoff / $m^3.s^{-1}$)	Errors of prediction (runoff / $m^3.s^{-1}$)	Relative errors of prediction (%)

during flood season

	P/ mm	Q / $m^3.s^{-1}$	Regression of uneven year	Regression of even year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year
1961	249	14804	14101	13841		-703		-963		-4.8		-6.5
1962	166	11445	10337	10776	-1108		-669		-0.1		-0.1	
1963	194	10423	11634	11832		1211		1409		11.6		13.5
1964	204	15516	12082	12197	-3434		-3319		-22.1		-21.4	
1965	202	11377	11961	12098		584		721		5.1		6.3
1966	148	10422	9525	10115	-896		-306		-8.6		-2.9	
1967	209	12111	12283	12360		172		250		1.4		2.1
1968	202	13033	11980	12114	-1054		-920		-8.1		-7.1	
1969	146	10926	9429	10037		-1496		-888		-13.7		-8.1
1970	207	11967	12201	12294	234		327		2.0		2.7	
1971	161	10915	10104	10587		-811		-328		-7.4		-3.0
1972	209	11348	12282	12360	934		1012		8.2		8.9	
1973	206	12453	12166	12265		-287		-187		-2.3		-1.5
1974	165	9962	10315	10758	353		796		3.5		8.0	
1975	215	12913	12575	12598		-338		-314		-2.6		-2.4
1976	232	11901	13360	13237	1459		1336		12.3		11.2	
1977	224	12608	12975	12924		368		317		2.9		2.5
1978	164	9332	10265	10718	933		1386		10.0		14.8	
1979	141	7921	9215	9863		1293		1941		16.3		24.5
1980	200	11697	11896	12045	199		349		1.7		3.0	
A±K	/				-238±1432	-1±896	-1±1414	196±944	-0.1±10.4	0.7±8.9	1.7±10.5	2.7±9.9

Regression of uneven year: Q=45.462P+2797;

Regression of even year: Q=37.016P+4637;

Error of prediction: The difference between predicted and measured value.

Relative error of prediction (%): (Predicted value －Measured value) *100/ Measured value. A: average; K: Standard deviation.

Table S30. Error estimation for predicted seasonal runoff at Hankou station using the regression relationship between the precipitation and runoff

Measured	Prediction (runoff / $m^3.s^{-1}$)	Errors of prediction (runoff / $m^3.s^{-1}$)	Relative errors of prediction (%)

during flood season

	P/ mm	Q / $m^3.s^{-1}$	Regression of uneven year	Regression of even year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year
1961	684	29723	32257	32279		2535		2556		8.5		8.6
1962	728	35275	33312	35456	-1963		181		-0.1		0.0	
1963	676	32208	32072	31721		-136		-487		-0.4		-1.5
1964	731	40073	33395	35707	-6678		-4366		-16.7		-10.9	
1965	710	35486	32888	34179		-2598		-1307		-7.3		-3.7
1966	640	28796	31208	29117	2412		321		8.4		1.1	
1967	603	33454	30330	26470		-3124		-6984		-9.3		-20.9
1968	679	37644	32153	31963	-5491		-5681		-14.6		-15.1	
1969	706	31601	32790	33885		1189		2284		3.8		7.2
1970	719	35587	33092	34795	-2495		-792		-7.0		-2.2	
1971	667	28592	31865	31097		3273		2504		11.4		8.8
1972	613	24440	30577	27215	6137		2775		25.1		11.4	
1973	770	36200	34322	38501		-1878		2301		-5.2		6.4
1974	727	34807	33292	35395	-1516		588		-4.4		1.7	
1975	724	34143	33229	35206		-915		1063		-2.7		3.1
1976	657	30190	31611	30332	1422		142		4.7		0.5	
1977	679	32257	32153	31964		-104		-293		-0.3		-0.9
1978	649	26788	31427	29776	4639		2988		17.3		11.2	
1979	707	31063	32823	33983		1760		2921		5.7		9.4
1980	813	37712	35334	41550	-2378		3838		-6.3		10.2	
A±K	/				-591±4617	0±2174	-1±3052	456±3013	0.7±13.4	0.4±6.9	0.8±8.9	1.6±9.2

Regression of uneven year: Q=23.805P+15983;

Regression of even year: Q=71.735P-16763;

Error of prediction: The difference between predicted and measured value.

Relative error of prediction (%): (Predicted value －Measured value) *100/ Measured value. A: average; K: Standard deviation.

Table S31. Error estimation for predicted seasonal runoff at Datong station using the regression relationship between the precipitation and runoff

Measured	Prediction (runoff / $m^3.s^{-1}$)	Errors of prediction (runoff / $m^3.s^{-1}$)	Relative errors of prediction (%)

during flood season

	P/ mm	Q / $m^3.s^{-1}$	Regression of uneven year	Regression of even year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year
1961	304	19212	18990	17653		-222		-1560		-1.2		-8.1
1962	207	14784	13796	14616	-988		-168		-0.1		0.0	
1963	222	12528	14617	15096		2089		2567		16.7		20.5
1964	239	20082	15490	15606	-4593		-4476		-22.9		-22.3	
1965	259	15391	16556	16229		1166		839		7.6		5.5
1966	204	14943	13612	14508	-1331		-435		-8.9		-2.9	
1967	252	15885	16168	16002		283		117		1.8		0.7
1968	239	15754	15510	15618	-244		-136		-1.5		-0.9	
1969	190	15506	12893	14088		-2613		-1418		-16.8		-9.1
1970	264	17278	16851	16401	-427		-876		-2.5		-5.1	
1971	186	13634	12672	13959		-962		324		-7.1		2.4
1972	259	15162	16563	16234	1401		1071		9.2		7.1	
1973	266	19117	16938	16452		-2180		-2665		-11.4		-13.9
1974	203	13006	13580	14489	574		1483		4.4		11.4	
1975	293	19275	18362	17285		-913		-1990		-4.7		-10.3
1976	306	16174	19103	17718	2929		1545		18.1		9.5	
1977	264	15202	16851	16402		1649		1200		10.8		7.9
1978	204	12496	13631	14519	1135		2023		9.1		16.2	
1979	186	10969	12671	13958		1702		2989		15.5		27.2
1980	264	16432	16845	16398	412		-34		2.5		-0.2	
A±K	/				-113±2008	0±1660	0±1852	40±1923	0.7±11.2	1.1±11.4	1.3±10.8	2.3±13.6

Regression of uneven year: Q=53.419P+2733;

Regression of even year: Q=31.23P+8148;

Error of prediction: The difference between predicted and measured value.

Relative error of prediction (%): (Predicted value －Measured value) *100/ Measured value. A: average; K: Standard deviation.

Table S32. Error estimation for predicted seasonal runoff at Datong station using the regression relationship between the precipitation and runoff

Measured	Prediction (runoff / $m^3.s^{-1}$)	Errors of prediction (runoff / $m^3.s^{-1}$)	Relative errors of prediction (%)

during flood season

	P/ mm	Q / $m^3.s^{-1}$	Regression of uneven year	Regression of even year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year	uneven-year regression for even year	uneven-year regression for uneven year	even-year regression for even year	even-year regression for uneven year
1961	725	37211	39606	39634		2395		2424		6.4		6.5
1962	781	44618	42830	44412	-1787		-206		0.0		0.0	
1963	682	36090	37165	36018		1075		-72		3.0		-0.2
1964	748	45467	40910	41566	-4557		-3901		-10.0		-8.6	
1965	718	39884	39184	39010		-700		-875		-1.8		-2.2
1966	644	34052	34985	32789	933		-1263		2.7		-3.7	
1967	626	40203	33950	31255		-6253		-8948		-15.6		-22.3
1968	704	43792	38385	37825	-5408		-5967		-12.3		-13.6	
1969	763	39665	41804	42891		2139		3226		5.4		8.1
1970	778	45315	42687	44199	-2629		-1117		-5.8		-2.5	
1971	682	32616	37144	35987		4528		3371		13.9		10.3
1972	654	28895	35530	33595	6635		4701		23.0		16.3	
1973	829	48762	45591	48502		-3171		-260		-6.5		-0.5
1974	749	39984	40975	41662	991		1679		2.5		4.2	
1975	786	44382	43123	44845		-1259		463		-2.8		1.0
1976	694	36987	37843	37023	856		36		2.3		0.1	
1977	737	42539	40283	40637		-2256		-1901		-5.3		-4.5
1978	644	30255	34973	32770	4717		2515		15.6		8.3	
1979	717	35627	39132	38932		3504		3304		9.8		9.3
1980	847	46470	46599	49994	129		3524		0.3		7.6	
A±K	/				-12±3786	0±3343	0±3289	73±3701	1.8±10.8	0.7±8.7	0.8±8.7	0.6±9.5

Regression of uneven year: Q=57.475P+2057;

Regression of even year: Q=85.149P-22089;

Error of prediction: The difference between predicted and measured value.

Relative error of prediction (%): (Predicted value －Measured value) *100/ Measured value. A: average; K: Standard deviation.