TABLE DR1. SUMMARY OF STATISTICAL ANALYSES COMPARING SEASONALLY UNDIFFERENTIATED PRE-ERUPTION AND POSTERUPTION REGRESSION MODELS

Basin	Period	Regression intercept	Regression slope	n	r^2	F value	Ratio F/F_{crit*}
Toutle (TOW)	Pre-eruption	-1.016	0.767	953	0.79		
	1980-1984	-0.652	0.797	91	0.84	30.57	6.63
	1985-1989	-0.898	0.770	88	0.78	4.40	0.95
	1990-1994	-1.00	0.787	102	0.81	0.38	0.08
	1995-2000	-0.839	0.812	122	0.86	5.63	1.22
North Fork Toutle (KID)	Pre-eruption	-0.849	0.876	32	0.71		
	1980-1984	-0.595	0.730	74	0.76	11.77	2.87
	1985-1987	-0.600	0.867	55	0.74	3.81	0.93
	1988-1994	-1.201	0.679	100	0.72	2.36	0.58
South Fork Toutle (SFT)	Pre-eruption	-0.588	0.779	283	0.81		
	1981-1984	-0.304	0.776	55	0.82	14.98	3.25
	1985-1989	-0.398	0.840	52	0.72	1.50	0.33
	1990-1994	-0.156	0.963	77	0.74	6.67	1.45
	1995-2000	-0.243	0.879	120	0.81	13.50	2.93
Green River (GRE)	Pre-eruption	-1.006	0.795	75	0.74		
	1980-1984	-0.793	0.711	73	0.75	13.77	3.51
	1985-1989	-0.902	0.801	76	0.72	0.92	0.23
	1990-1994	-0.805	0.841	77	0.79	1.94	0.49
Muddy River (MUD)	Pre-eruption	-0.854	0.702	273	0.54		
	1981-1984	-0.628	0.566	46	0.50	14.73	3.20
	1985-1989	-0.601	0.737	70	0.60	3.16	0.69
	1990-1994	-0.661	0.754	73	0.64	0.98	0.21
	1995-2000	-0.416	0.828	108	0.73	9.56	2.07
Speelyai Creek (SPE)	Pre-eruption	0.369	0.946	360	0.83		
	1980-1984	0.678	1.111	62	0.92	4.74	1.03
	1985-1989	0.701	1.106	78	0.88	4.38	0.95
	1990-1994	0.744	1.134	96	0.90	8.28	1.80
	1995-2000	0.470	1.042	98	0.90	2.86	0.62
Cispus River (CIS)	Pre-eruption	-1.592	0.551	322	0.33		
	1980-1984	-1.569	0.498	32	0.48	0.46	0.10
	1985-1989	-1.629	0.497	34	0.40	0.20	0.04
	1990-1994	-1.308	0.817	39	0.52	2.92	0.63
	1995-2000	-1.386	0.657	70	0.54	1.07	0.23
Tilton River (TIL)	Pre-eruption	-0.324	0.855	727	0.75		
	1980-1984	-0.169	0.898	81	0.83	1.54	0.33
	1985-1989	-0.342	0.814	103	0.77	1.38	0.30
	1990-1994	-0.148	0.915	99	0.80	1.41	0.31
	1995-2000	-0.126	0.948	122	0.86	2.64	0.57
Coweman River (COW)	Pre-eruption	-0.745	0.912	737	0.83		
	1981-1984	-0.590	0.948	61	0.93	1.77	0.59

*Owing to comparisons of multiple recovery periods against pre-eruption data, the overall level of significance is adjusted using Bonferroni's technique. For an overall significance level of 0.05, the p-value of each individual F test is adjusted as 1-0.05/(number of posteruption recovery periods). For the Green River, the critical F statistic is given by $F_{(1-0.05/3),2,\infty} \sim F_{.98,2,\infty} = 3.92$; for the North Fork Toutle River the critical F statistic is given by $F_{(1-0.05/3),2,83} \sim F_{.98,2,83} = 4.10$; for the Coweman River the critical F statistic is given by $F_{.95,2,\infty} = 3.00$; for all other basins, the critical F statistic is given by $F_{(1-0.05/4),2,\infty} \sim F_{.99,2,\infty} = 4.61$.

TABLE DR2. SUMMARY OF STATISTICAL ANALYSES COMPARING PRE-ERUPTION AND POSTERUPTION SEASONAL REGRESSION MODELS

Basin	Period	Regression intercept	Regression slope	n	r^2	F value	Ratio F/F_{crit*}
OCT-DEC							
Toutle (TOW)	Pre-eruption	-0.980	0.826	435	0.80		
	1980-1984	-0.482	0.817	38	0.84	34.10	7.40
	1985-1989	-0.848	0.788	41	0.77	6.15	1.33
	1990-1994	-1.039	0.804	41	0.83	0.06	0.01
	1995-2000	-0.767	0.914	54	0.91	2.77	0.60
N Fork Toutle (KID)	Pre-eruption	-0.519	1.627	14	0.75		
	1980-1984	-0.354	0.785	28	0.82	17.28	3.98
	1985-1987[†]	-0.686	0.775	26	0.63	7.31	1.67
	1988-1994	-1.241	0.683	42	0.72	3.12	0.74
S Fork Toutle (SFT)	Pre-eruption	-0.486	0.859	132	0.82		
	1981-1984	-0.091	0.842	24	0.73	13.29	2.88
	1985-1989	-0.670	0.676	28	0.55	3.53	0.77
	1990-1994	-0.438	0.912	33	0.75	0.50	0.11
	1995-2000	-0.139	0.985	53	0.84	6.16	1.34
Green River (GRE)	Pre-eruption	-0.933	0.836	42	0.72		
	1980-1984	-0.739	0.783	32	0.81	4.81	1.16
	1985-1989	-0.653	0.936	35	0.73	0.99	0.24
	1990-1994	-0.759	0.855	37	0.82	1.06	0.26
Muddy River (MUD)	Pre-eruption	-0.898	0.729	147	0.57		
	1981-1984	-0.091	0.723	17	0.52	17.26	3.64
	1985-1989	-0.381	0.845	31	0.78	4.31	0.91
	1990-1994	-1.018	0.683	37	0.66	0.14	0.03
	1995-2000	-0.499	0.890	51	0.82	3.78	0.80
Speelyai Creek (SPE)	Pre-eruption	0.377	0.914	163	0.82		
	1980-1984	0.637	1.070	25	0.92	1.81	0.38
	1985-1989	0.406	0.947	34	0.78	0.17	0.04
	1990-1994	0.912	1.179	38	0.89	7.17	1.52
	1995-2000	0.531	1.059	48	0.95	3.63	0.77
Cispus River (CIS)	Pre-eruption	-1.411	0.796	167	0.55		
	1980-1984	-1.429	0.537	15	0.47	3.43	0.73
	1985-1989	-1.364	0.760	18	0.67	1.84	0.39
	1990-1994	-1.729	0.684	18	0.52	0.83	0.18
	1995-2000	-1.129	0.882	36	0.74	2.14	0.45
Tilton River (TIL)	Pre-eruption	-0.340	0.831	323	0.71		
	1980-1984	-0.272	0.824	35	0.85	0.17	0.04
	1985-1989	-0.494	0.663	43	0.59	4.36	0.93
	1990-1994	0.098	0.987	41	0.80	2.45	0.52
	1995-2000	-0.097	0.975	55	0.93	2.41	0.52
Coweman River (COW)	Pre-eruption	-0.793	0.903	326	0.83		
	1981-1984	-0.474	0.984	26	0.95	2.71	0.90

[*]Owing to comparisons of multiple recovery periods against pre-eruption data, the overall level of significance is adjusted using Bonferroni's technique. For an overall significance level of 0.05, the p-value of each individual F test is adjusted as 1-0.05/(number of posteruption recovery periods). For the North Fork Toutle River and Green River, the critical F statistic is given by $F_{(1-0.05/3),2,m+n-4} \sim F_{.98,2,m+n-4}$; for the Coweman River the critical F statistic is given by $F_{.95,2,m+n-4}$; for all other basins, the critical F statistic is given by $F_{(1-0.05/4),2,m+n} \sim F_{0.99,2,m+n-4}$. n represents the sample size of the pre-eruption peak flows; m represents the sample size of the posteruption peak flows in a given time increment.

[†]Posteruption periods for the North Fork Toutle are divided at 1987 because a large sediment retention structure, which affected discharges, was closed off in 1988.

N.D. means the data are insufficient to conduct any meaningful analysis.

TABLE DR2 (Cont). SUMMARY OF STATISTICAL ANALYSES COMPARING PRE-ERUPTION AND POSTERUPTION SEASONAL REGRESSION MODELS

Basin	Period	Regression intercept	Regression slope	n	r^2	F value	Ratio F/F_{crit*}
JAN-MAR							
Toutle (TOW)	Pre-eruption	-0.935	0.815	354	0.77		
	1980-1984	-0.675	0.821	30	0.73	11.42	2.48
	1985-1989	-0.837	0.838	33	0.80	0.69	0.15
	1990-1994	-0.993	0.816	37	0.77	0.72	0.16
	1995-2000	-0.872	0.736	41	0.79	2.45	0.53
N Fork Toutle (KID)	Pre-eruption	-0.873	0.932	14	0.86		
	1980-1984	-0.461	0.910	29	0.79	7.08	1.63
	1985-1987	-0.592	0.937	18	0.84	2.63	0.58
	1988-1994	-0.950	0.895	35	0.73	0.09	0.02
S Fork Toutle (SFT)	Pre-eruption	-0.526	0.838	101	0.75		
	1981-1984	-0.249	0.859	18	0.91	4.56	0.95
	1985-1989	-0.273	0.905	18	0.79	1.73	0.36
	1990-1994	0.005	1.010	30	0.72	7.70	1.61
	1995-2000	-0.438	0.760	41	0.65	5.00	1.05
Green River (GRE)	Pre-eruption	-1.015	0.824	23	0.77		
	1980-1984	-0.619	0.884	20	0.73	3.60	0.83
	1985-1989	-0.850	0.957	22	0.80	0.46	0.11
	1990-1994	-0.569	1.069	24	0.79	1.64	0.38
Muddy River (MUD)	Pre-eruption	-0.871	0.576	88	0.35		
	1981-1984	-0.852	0.433	17	0.35	1.24	0.26
	1985-1989	-0.768	0.656	27	0.42	0.12	0.03
	1990-1994	-0.436	0.808	24	0.48	1.21	0.25
	1995-2000	-0.362	0.792	35	0.67	4.01	0.84
Speelyai Creek (SPE)	Pre-eruption	0.394	0.998	123	0.81		
	1980-1984	0.653	1.043	20	0.90	3.76	0.79
	1985-1989	0.814	1.152	26	0.84	4.28	0.90
	1990-1994	0.890	1.242	33	0.88	0.43	0.09
	1995-2000	0.259	0.895	29	0.86	0.62	0.13
Cispus River (CIS)	Pre-eruption	-1.572	0.646	102	0.24		
	1980-1984	-1.856	0.256	12	0.06	0.70	0.15
	1985-1989	-1.422	0.704	10	0.62	0.13	0.03
	1990-1994	-0.610	1.245	13	0.58	2.76	0.57
	1995-2000	-1.436	0.817	19	0.50	0.35	0.07
Tilton River (TIL)	Pre-eruption	-0.333	0.843	248	0.68		
	1980-1984	0.050	1.038	26	0.85	2.89	0.62
	1985-1989	-0.361	0.850	31	0.78	0.13	0.03
	1990-1994	-0.130	0.969	36	0.72	0.99	0.21
	1995-2000	-0.213	0.852	37	0.71	0.49	0.10
Coweman River (COW)	Pre-eruption	-0.732	0.826	235	0.76		
	1981-1984	-0.655	0.915	21	0.88	0.91	0.30

TABLE DR2 (cont). SUMMARY OF STATISTICAL ANALYSES COMPARING PRE-ERUPTION AND POSTERUPTION SEASONAL REGRESSION MODELS

Basin	Period	Regression intercept	Regression slope	n	r^2	F value	Ratio F/F_{crit*}
APR-JUN							
Toutle (TOW)	Pre-eruption	-1.328	0.520	106	0.61		
	1980-1984	-0.727	0.852	18	0.72	4.73	1.03
	1985-1989	-1.072	0.649	13	0.76	0.63	0.13
	1990-1994	-0.965	0.711	22	0.75	2.26	0.47
	1995-2000	-1.064	0.621	20	0.71	0.75	0.16
N Fork Toutle (KID)	Pre-eruption	N.D.	N.D.	N.D.	N.D.		
	1980-1984	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	1985-1987	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	1988-1994	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
S Fork Toutle (SFT)	Pre-eruption	-1.096	0.498	30	0.53		
	1981-1984	-0.749	0.669	8	0.88	0.44	0.08
	1985-1989	-0.286	1.000	4	0.85	1.98	0.37
	1990-1994	-0.064	0.935	13	0.71	4.88	0.94
	1995-2000	-0.300	0.806	19	0.70	3.31	0.65
Green River (GRE)	Pre-eruption	-1.865	0.222	7	0.10		
	1980-1984	-0.682	0.670	14	0.54	2.51	0.51
	1985-1989	-0.920	0.618	13	0.68	1.59	0.31
	1990-1994	-1.067	0.622	15	0.68	1.09	0.22
Muddy River (MUD)	Pre-eruption	-1.138	0.266	20	0.20		
	1981-1984	-1.774	0.174	6	0.19	3.43	0.60
	1985-1989	-0.787	0.503	10	0.69	1.28	0.23
	1990-1994	-0.231	0.801	10	0.85	4.93	0.89
	1995-2000	-0.061	0.762	14	0.66	3.40	0.63
Speelyai Creek (SPE)	Pre-eruption	0.468	1.040	37	0.74		
	1980-1984	-0.087	0.830	10	0.80	0.75	0.15
	1985-1989	1.039	1.316	8	0.95	0.69	0.13
	1990-1994	0.692	1.161	20	0.89	0.36	0.07
	1995-2000	0.722	1.183	17	0.78	0.08	0.02
Cispus River (CIS)	Pre-eruption	-1.669	0.207	44	0.13		
	1980-1984	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	1985-1989	-2.170	0.037	6	0.00	0.34	0.08
	1990-1994	-1.469	0.559	7	0.44	3.37	0.79
	1995-2000	-1.983	0.160	9	0.05	0.92	0.22
Tilton River (TIL)	Pre-eruption	-0.414	0.825	97	0.59		
	1980-1984	-0.075	1.024	15	0.60	0.51	0.11
	1985-1989	-0.176	0.931	18	0.79	0.55	0.11
	1990-1994	-0.459	0.799	18	0.74	0.36	0.07
	1995-2000	-0.243	0.931	22	0.78	0.39	0.08
Coweman River (COW)	Pre-eruption	-1.130	0.789	105	0.68		
	1981-1984	-0.797	0.884	11	0.82	0.55	0.18

TABLE DR2 (cont). SUMMARY OF STATISTICAL ANALYSES COMPARING PRE-ERUPTION AND POSTERUPTION SEASONAL REGRESSION MODELS

Basin	Period	Regression intercept	Regression slope	N	r^2	F value	Ratio F/F_{crit*}
JUL-SEP							
Toutle (TOW)	Pre-eruption	-2.128	0.397	58	0.39		
	1980-1984	-1.431	0.590	5	0.83	0.86	0.22
	1985-1989	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	1990-1994	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	1995-2000	-1.506	0.599	7	0.75	0.50	0.13
N Fork Toutle (KID)	Pre-eruption	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	1980-1984	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	1985-1987	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	1988-1994	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
S Fork Toutle (SFT)	Pre-eruption	-1.414	0.508	20	0.50		
	1981-1984	-1.296	0.435	5	0.91	0.94	0.20
	1985-1989	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	1990-1994	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	1995-2000	0.267	1.017	7	0.69	1.29	0.28
Green River (GRE)	Pre-eruption	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	1980-1984	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	1985-1989	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	1990-1994	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Muddy River (MUD)	Pre-eruption	-2.780	0.015	18	0.00		
	1981-1984	-2.352	0.099	6	0.16	0.28	0.06
	1985-1989	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	1990-1994	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	1995-2000	-1.355	0.565	8	0.28	1.18	0.27
Speelyai Creek (SPE)	Pre-eruption	0.141	0.887	37	0.52		
	1980-1984	1.211	1.318	7	0.78	1.09	0.21
	1985-1989	-0.026	0.942	10	0.62	1.53	0.30
	1990-1994	-2.162	0.322	5	0.35	1.02	0.19
	1995-2000	0.443	1.048	4	0.44	0.12	0.02
Cispus River (CIS)	Pre-eruption	-3.457	-0.070	9	0.01		
	1980-1984	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	1985-1989	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	1990-1994	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	1995-2000	-2.957	0.067	6	0.01	0.13	0.03
Tilton River (TIL)	Pre-eruption	-0.751	0.757	59	0.61		
	1980-1984	0.283	0.961	5	0.61	2.24	0.45
	1985-1989	-1.107	0.659	11	0.58	0.06	0.01
	1990-1994	1.288	1.253	4	0.74	0.79	0.16
	1995-2000	0.121	1.006	8	0.55	0.33	0.07
Coweman River (COW)	Pre-eruption	-1.726	0.638	71	0.55		
	1981-1984	-1.907	0.452	3	0.57	1.17	0.37

TABLE DR3. SUMMARY OF RANK-SUM ANALYSES OF SEASONALLY UNDIFFERENTIATED PRE-ERUPTION AND POSTERUPTION RISE TIMES (IN HOURS) TO HYDROGRAPH PEAKS FOR VARIOUS CATEGORIES OF WATER DISCHARGE

Basin	Period	$Q < Q_{mean}$			$Q_{mean} < Q < Q_{2\,yr}$			$Q > Q_{2\,yr}$		
		n	Median	P-value	n	Median	P-value	n	Median	P-value
Toutle (TOW)	1910-1979	229	11		1087	13		38	25	
	1980-1984	23	8	0.023	157	6.5	<0.001	16	5.4	<0.001
	1985-1989	16	6.8	0.002	119	9.8	<0.001	4	21.7	0.507[a]
	1990-1994	29	13.8	0.001	102	16.6	<0.001	3	43.8	0.154[a]
	1995-2000	20	15.3	0.004	172	16.4	<0.001	13	24.3	0.738[a]
North Fork Toutle (KID)	1930-1933	7	8		31	16		--	--	
	1981-1984	18	9.3	0.739[a]	115	6	<0.001	20	--	--
	1985-1987	9	8	1.000[a]	76	8.5	<0.001	6	--	--
	1988-1994	10	12.8	0.079[a]	122	17.8	<0.001	5	--	--
South Fork Toutle (SFT)	1940-1957	42	7		332	10.5		13	15.5	
	1981-1984	15	8	0.821[a]	66	14	0.018	4	11.1	0.533[a]
	1985-1989	8	10.3	0.031	57	11.5	0.239[a]	7	16.3	0.721[a]
	1990-1994	9	9	0.236[a]	78	14.6	<0.001	5	35	0.027
	1995-2000	15	11.3	<0.001	151	17.8	<0.001	17	16.3	0.503[a]
Muddy (MUD)	1950-1973	76	9		282	12.8		14	35.3	
	1982-1984	23	5.5	0.002	61	9	<0.001	6	20.9	0.483[a]
	1985-1989	26	6.5	0.007	76	10.4	0.024	5	29.5	0.611[a]
	1990-1994	38	7.8	0.318[a]	70	11.8	0.410[a]	6	25.8	0.351[a]
	1995-2000	31	16.6	<0.001	154	18.3	<0.001	20	30.4	0.336[a]
Green (GRE)	1947-1950	19	21		91	14.5		3	27	
	1981-1984	13	10	0.001	102	7	<0.001	7	12	0.033
	1985-1989	19	12	0.194[a]	85	12	<0.001	4	23.8	0.629[a]
	1990-1994	15	11.5	0.014	90	16	0.777[a]	1	--	--
Speelyai (SPE)	1960-1979	61	10.5		360	16		16	27.3	
	1980-1984	17	14.3	0.268[a]	67	27	<0.001	5	32	0.591[a]
	1985-1989	19	10	0.879[a]	73	20.9	0.007	3	24.3	0.615[a]
	1990-1994	28	9.3	0.572[a]	80	20.6	0.008	3	40.3	0.199[a]
	1995-2000	13	20.8	0.464[a]	110	22.1	<0.001	6	30.1	0.971[a]
Cispus (CIS)	1910-1979	42	11		366	20		37	25.8	
	1980-1984	2	--	--	40	18.3	0.472[a]	5	23.5	0.771[a]
	1985-1989	7	21	0.006	53	23.8	0.028	3	29	0.739[a]
	1990-1996	20	19.6	<0.001	76	28.9	<0.001	10	36	0.330[a]
Coweman (COW)	1951-1979	230	11		750	12		21	--	
	1980-1984	22	9	0.024	52	14	0.099[a]	--	--	--
Tilton (TIL)	1957-1979	123	13.3		561	16.8		16	24.5	
	1980-1984	20	9.6	0.025	100	14.1	<0.001	4	20.1	0.603[a]
	1985-1989	26	10.5	0.043	114	13.8	0.030	4	19.4	0.539[a]
	1990-1994	29	13	0.326[a]	114	16.3	0.440[a]	5	26	0.650[a]
	1995-2000	26	14.9	0.958[a]	163	17	0.778[a]	9	22.3	0.630[a]
East Fork Lewis (EFK)	1930-1979	381	9		1479	12		40	21.5	
	1980-1984	51	12	0.005	109	15	0.004	3	16.5	0.446[a]
	1985-1989	54	11.5	<0.001	114	16.8	<0.001	2	--	--
	1990-1994	47	9.8	0.245[a]	116	15.9	<0.001	--	--	--
	1995-2000	34	11.3	0.012	143	17.8	<0.001	11	19.5	0.314[a]

[a]The differences between median values of pre- and posteruption rise times to hydrograph peaks are not statistically significant at $\alpha = 0.05$.

-- The data are insufficient to make a comparative analysis.

TABLE DR4. SUMMARY OF RANK-SUM ANALYSES OF PRE-ERUPITON AND POSTERUPTION RISE TIMES (IN HOURS) TO SEASONAL HYDROGRAPH PEAKS FOR VARIOUS CATEGORIES OF WATER DISCHARGE

Basin	Period	$Q < Q_{mean}$			$Q_{mean} < Q < Q_{2\ yr}$			$Q > Q_{2\ yr}$		
		n	Median	P-value	n	Median	P-value	n	Median	P-value
Toutle (TOW)	1910-1979	130	11		456	13		27	25	
(Oct-Dec)	1980-1984	10	9.5	0.205	70	5	<0.001[a]	3	15	0.156
	1985-1989	10	6.8	0.013[a]	50	10	0.002[a]	2	--	--
	1990-1994	15	13	0.293	31	14	0.222	1	--	--
	1995-2000	9	22.5	0.005[a]	66	16.8	<0.001[a]	10	25	0.608
(Jan-Mar)	1910-1979	17	10		458	13.5		11	27	
	1980-1984	2	14.8	0.947	66	6.5	<0.001[a]	13	3.5	0.002[a]
	1985-1989	2	6.5	0.163	53	10	<0.001[a]	2	--	--
	1990-1994	3	13.5	0.672	43	20.3	0.003[a]	1	--	--
	1995-2000	--	--	--	67	15.8	0.058	3	21.3	1.00
(Apr-Jun)	1910-1979	12	8.5		148	11		--	--	
	1980-1984	7	11	0.735	19	12	0.600	--	--	--
	1985-1989	1	--	--	16	8.9	0.007[a]	--	--	--
	1990-1994	5	26.3	0.005[a]	28	20	0.001[a]	1	--	--
	1995-2000	3	13.3	0.097	37	18	0.022[a]	--	--	--
(Jul-Sep)	1910-1979	70	10		25	13		--	--	
	1980-1984	4	5.3	0.008[a]	2	--	--	--	--	--
	1985-1989	3	7	0.073	--	--	--	--	--	--
	1990-1994	6	20.4	0.014[a]	--	--	--	--	--	--
	1995-2000	8	11.4	0.479	2	--	--	--	--	--
North Fork Toutle (KID)	1931-1933	6	8.5		12	13.5		--	--	
(Oct-Dec)	1981-1984	4	10.3	0.762	54	4.5	<0.001[a]	5	7.8	--
	1985-1987	3	8	0.905	32	8.4	0.094	3	6.8	--
	1988-1994	6	13.3	0.310	45	15.3	0.137	2	--	--
(Jan-Mar)	1930-1933	--	--		16	18.3		--		
	1981-1984	--	--	--	35	7.5	<0.001[a]	15	3.5	--
	1985-1987	--	--	--	33	8.5	<0.001[a]	3	17.3	--
	1988-1994	--	--	--	48	18.8	0.625	2	--	--
(Apr-Jun)	1930-1933	1	--		3	9		--	--	--
	1981-1984	--	--	--	21	7	0.275	--	--	--
	1985-1987	--	--	--	11	12.8	1.00	--	--	--
	1988-1994	2	--	--	27	26	0.120	1	--	--
(Jul-Sep)	1930-1933	--	--		--	--		--	--	
	1981-1984	14	7.9	--	5	5	--	--	--	--
	1985-1987	6	8.5	--	--	--	--	--	--	--
	1988-1994	2	--	--	2	--	--	--	--	--
South Fork Toutle (SFT)	1940-1957	21	7		156	10		9	15.5	
(Oct-Dec)	1981-1984	11	6	0.077	37	12.3	0.044[a]	1	--	--
	1985-1989	5	10.3	0.298	27	11.3	0.936	1	--	--
	1990-1994	9	9	0.717	27	10.3	0.484	2	--	--
	1995-2000	6	12.6	0.102	53	16.3	<0.001[a]	12	16.5	0.414
(Jan-Mar)	1940-1957	4	7		124	12		4	15.3	
	1981-1984	--	--	--	15	16	0.279	3	8.5	0.629
	1985-1989	--	--	--	23	11.5	0.559	6	18.8	0.914
	1990-1994	--	--	--	34	15.3	0.015[a]	2	19.9	0.267
	1995-2000	--	--	--	64	16.8	<0.001[a]	5	14.8	0.905
(Apr-Jun)	1940-1957	2	--		42	10		--	--	
	1981-1984	--	--	--	11	12.8	0.423	--	--	--
	1985-1989	--	--	--	7	20.3	0.079	--	--	--
	1990-1994	--	--	--	16	21.5	0.004[a]	1	--	--
	1995-2000	2	--	--	31	31.8	<0.001[a]	--	--	--
(Jul-Sep)	1940-1957	15	6		10	10.3		--	--	
	1981-1984	4	12	0.007[a]	3	14.3	0.108	--	--	--
	1985-1989	3	10.3	0.033[a]	--	--	--	--	--	--
	1990-1994	--	--	--	1	--	--	--	--	--
	1995-2000	7	11.3	0.004[a]	3	13.5	0.272	--	--	--
Muddy (MUD)	1950-1973	55	9		139	12		7	27	
(Oct-Dec)	1982-1984	9	4.5	0.012[a]	27	7.8	<0.001[a]	2	--	--
	1985-1989	17	6	0.006[a]	28	10	0.434	1	--	--
	1990-1994	24	7.5	0.107	23	9.5	0.044[a]	2	--	--
	1995-2000	22	17.3	<0.001[a]	55	16.5	0.002[a]	13	33.3	0.428
(Jan-Mar)	1950-1973	3	14		104	16		7	57	
	1982-1984	1	--	--	23	12.5	0.065	4	19.3	0.164
	1985-1989	3	12	0.700	33	11	0.010[a]	4	32	0.164

TABLE DR4 (Cont.). SUMMARY OF RANK-SUM ANALYSES OF PRE-ERUPTION AND POSTERUPTION RISE TIMES (IN HOURS) TO SEASONAL HYDROGRAPH PEAKS FOR VARIOUS CATEGORIES OF WATER DISCHARGE

Basin	Period	$Q < Q_{mean}$			$Q_{mean} < Q < Q_{2\ yr}$			$Q > Q_{2\ yr}$		
		n	Median	P-value	n	Median	P-value	n	Median	P-value
Muddy (MUD)										
(Jan-Mar)	1990-1994	6	12.4	0.548	27	15	0.575	4	23.5	0.073
	1995-2000	--	--	--	62	18.4	0.077	5	24.5	0.202
(Apr-Jun)	1950-1973	--	--		34	13.5		--	--	
	1982-1984	1	--	--	10	14	0.845	--	--	--
	1985-1989	--	--	--	15	9.5	0.255	--	--	--
	1990-1994	4	8	--	19	15.8	0.282	--	--	--
	1995-2000	--	--	--	34	35.8	<0.001[a]	2	--	--
(Jul-Sep)	1950-1973	18	7		5	9		--	--	
	1982-1984	12	5.5	0.108	1	--	--	--	--	--
	1985-1989	6	3.8	0.117	--	--	--	--	--	--
	1990-1994	4	4.9	0.328	1	--	--	--	--	--
	1995-2000	9	16.8	0.054	3	4.8	0.571	--	--	--
Green (GRE)	1947-1950	8	19		47	13.5		3	27	
(Oct-Dec)	1981-1984	4	10.5	0.109	44	6.5	<0.001[a]	4	8	0.114
	1985-1989	9	16	0.885	38	12.5	0.279	2	--	--
	1990-1994	9	12.5	0.163	33	12.5	0.973	--	--	--
(Jan-Mar)	1947-1950	2	--		28	18.5		--	--	
	1981-1984	--	--	--	28	9.8	0.003[a]	3	12	--
	1985-1989	2	--	--	30	11	0.015[a]	2	--	--
	1990-1994	1	--	--	32	17.5	0.695	--	--	--
(Apr-Jun)	1947-1950	1	--		15	31		--	--	
	1981-1984	--	--	--	21	8	<0.001[a]	--	--	--
	1985-1989	1	--	--	17	12	0.012[a]	--	--	--
	1990-1994	1	--	--	24	26.4	0.231	1	--	--
(Jul-Sep)	1947-1950	8	21.8		1	--		--	--	
	1981-1984	9	7	0.014[a]	9	1	--	--	--	--
	1985-1989	7	12	0.152	--	--	--	--	--	--
	1990-1994	4	13.3	0.154	1	--	--	--	--	--
Speelyai (SPE)	1960-1979	23	7		148	15		10	31	
(Oct-Dec)	1980-1984	9	15	0.187	28	29	0.002[a]	1	--	--
	1985-1989	6	8.9	0.647	33	19	0.051	1	--	--
	1990-1994	13	7.3	0.610	28	18.8	0.314	2	--	--
	1995-2000	6	14.8	0.609	48	18.8	0.023[a]	4	30.1	0.777
(Jan-Mar)	1960-1979	2	--		140	16		6	22.8	
	1980-1984	--	--	--	25	30.1	<0.001[a]	4	36.8	0.257
	1985-1989	1	--	--	30	21.1	0.046[a]	2	--	--
	1990-1994	2	--	--	37	20	0.042[a]	1	--	--
	1995-2000	--	--	--	43	26	0.005[a]	2	--	--
(Apr-Jun)	1960-1979	7	6		45	20.5		--	--	
	1980-1984	2	--	--	11	18	0.926	--	--	--
	1985-1989	4	18.3	0.109	10	24.5	0.694	--	--	--
	1990-1994	6	12.3	0.073	15	23.5	0.544	--	--	--
	1995-2000	3	45	0.017[a]	16	35.4	0.048[a]	--	--	--
(Jul-Sep)	1960-1979	29	12		27	15		--	--	
	1980-1984	6	12	0.965	3	15.5	0.427	--	--	--
	1985-1989	8	10	0.245	1	--	--	--	--	--
	1990-1994	7	16.8	0.936	--	--	--	--	--	--
	1995-2000	4	7.3	0.160	3	37.5	0.240	--	--	--
Cispus (CIS)	1910-1979	23	11		158	17		24	24.5	
(Oct-Dec)	1980-1984	1	--	--	17	14	0.355	2	--	--
	1985-1989	5	16.3	0.082	16	17.3	0.545	1	--	--
	1990-1996	11	14.5	0.041[a]	25	21.3	0.031[a]	5	25	0.644
(Jan-Mar)	1910-1979	11	11		118	21		10	40.1	
	1980-1984	--	--	--	15	27.8	0.475	3	17.8	0.554
	1985-1989	2	--	--	15	22.3	0.486	2	--	--
	1990-1996	5	38.8	0.013[a]	26	31.8	0.003[a]	4	54.9	0.524
(Apr-Jun)	1910-1979	1	--		85	23		3	80	
	1980-1984	--	--	--	8	19.9	0.164	--	--	--
	1985-1989	--	--	--	22	33.5	0.197	--	--	--

TABLE DR4 (Cont.). SUMMARY OF RANK-SUM ANALYSES OF PRE-ERUPTION AND POSTERUPTION RISE TIMES (IN HOURS) TO SEASONAL HYDROGRAPH PEAKS FOR VARIOUS CATEGORIES OF WATER DISCHARGE

Basin	Period	$Q < Q_{mean}$			$Q_{mean} < Q < Q_{2\,yr}$			$Q > Q_{2\,yr}$		
		n	Median	P-value	n	Median	P-value	n	Median	P-value
Cispus (CIS)										
(Apr-Jun)	1990-1996	1	--	--	25	31	0.221	1	--	--
(Jul-Sep)	1910-1979	7	10.3		5	10.5		--	--	
	1980-1984	1	--	--	--	--	--	--	--	--
	1985-1989	--	--	--	--	--	--	--	--	--
	1990-1996	3	31.8	0.017[a]	--	--	--	--	--	--
Coweman (COW)	1951-1979	94	11		312	12		12	23.1	
(Oct-Dec)	1980-1984	11	8	0.004[a]	17	11	0.968	--	--	--
(Jan-Mar)	1951-1979	9	17		306	12		9	28	
	1980-1984	--	--	--	21	14	0.324	--	--	--
(Apr-Jun)	1951-1979	48	10.3		110	11		--	--	
	1980-1984	6	8.5	0.242	11	19	0.227	--	--	--
(Jul-Sep)	1951-1979	79	11		22	12		--	--	
	1980-1984	5	13.5	0.230	3	27	0.021[a]	--	--	--
Tilton (TIL)	1957-1979	48	10.9		234	15.6		9	22.5	
(Oct-Dec)	1980-1984	8	9.5	0.355	45	12.8	0.051	--	--	--
	1985-1989	8	11.3	0.963	50	13.5	0.038[a]	3	17.3	0.267
	1990-1994	11	11.5	0.540	45	13.5	0.174	2	--	--
	1995-2000	8	9.4	0.648	73	16.5	0.803	6	22.9	0.680
(Jan-Mar)	1957-1979	13	16.5		205	17.8		7	26.5	
	1980-1984	--	--	--	38	13.3	0.023[a]	4	20.1	0.648
	1985-1989	1	--	--	45	14.8	0.372	1	--	--
	1990-1994	4	14.3	0.571	44	19.9	0.681	2	--	--
	1995-2000	--	--	--	65	15.8	0.421	3	22.3	1.00
(Apr-Jun)	1957-1979	15	18		100	17.5		--	--	
	1980-1984	4	9.6	0.063	15	15	0.135	--	--	--
	1985-1989	4	14.3	0.457	19	22	0.647	--	--	--
	1990-1994	7	16.3	0.371	24	15.4	0.469	1	--	--
	1995-2000	8	18	0.913	22	24.6	0.687	--	--	--
(Jul-Sep)	1957-1979	49	14		22	18.9		--	--	
	1980-1984	8	10.3	0.211	2	--	--	--	--	--
	1985-1989	13	10.5	0.023[a]	--	--	--	--	--	--
	1990-1994	7	8.8	0.069	1	--	--	--	--	--
	1995-2000	10	14.9	0.785	3	11.5	0.738	--	--	--
East Fork Lewis (EFK)	1930-1979	144	8		597	11		25	20	
(Oct-Dec)	1980-1984	18	13	0.060	40	14.5	0.014[a]	2	--	--
	1985-1989	19	8.7	0.412	47	17	0.013[a]	--	--	--
	1990-1994	21	8	0.889	46	14.1	0.049[a]	--	--	--
	1995-2000	13	10.3	0.129	59	19	<0.001[a]	8	20.2	0.933
(Jan-Mar)	1930-1979	36	8.3		572	13.5		15	31	
	1980-1984	1	--	--	43	16	0.117	1	--	--
	1985-1989	1	--	--	44	20.3	0.002[a]	2	--	--
	1990-1994	5	7.5	0.735	46	18	0.010[a]	0	--	--
	1995-2000	--	--	--	53	16.3	0.040[a]	3	12.3	0.236
(Apr-Jun)	1930-1979	75	9		268	11		--	--	
	1980-1984	16	12	0.068	24	15.3	0.496	--	--	--
	1985-1989	13	13.5	0.038[a]	22	14	0.079	--	--	--
	1990-1994	12	11.1	0.382	24	15.8	0.011[a]	--	--	--
	1995-2000	11	16	0.097	26	25.4	<0.001[a]	--	--	--
(Jul-Sep)	1930-1979	126	9		42	11.8		--	--	
	1980-1984	16	9.3	0.551	2	--	--	--	--	--
	1985-1989	21	13	0.002[a]	1	--	--	--	--	--
	1990-1994	9	15.5	0.005[a]	--	--	--	--	--	--
	1995-2000	10	11.9	0.228	5	8	0.361	--	--	--

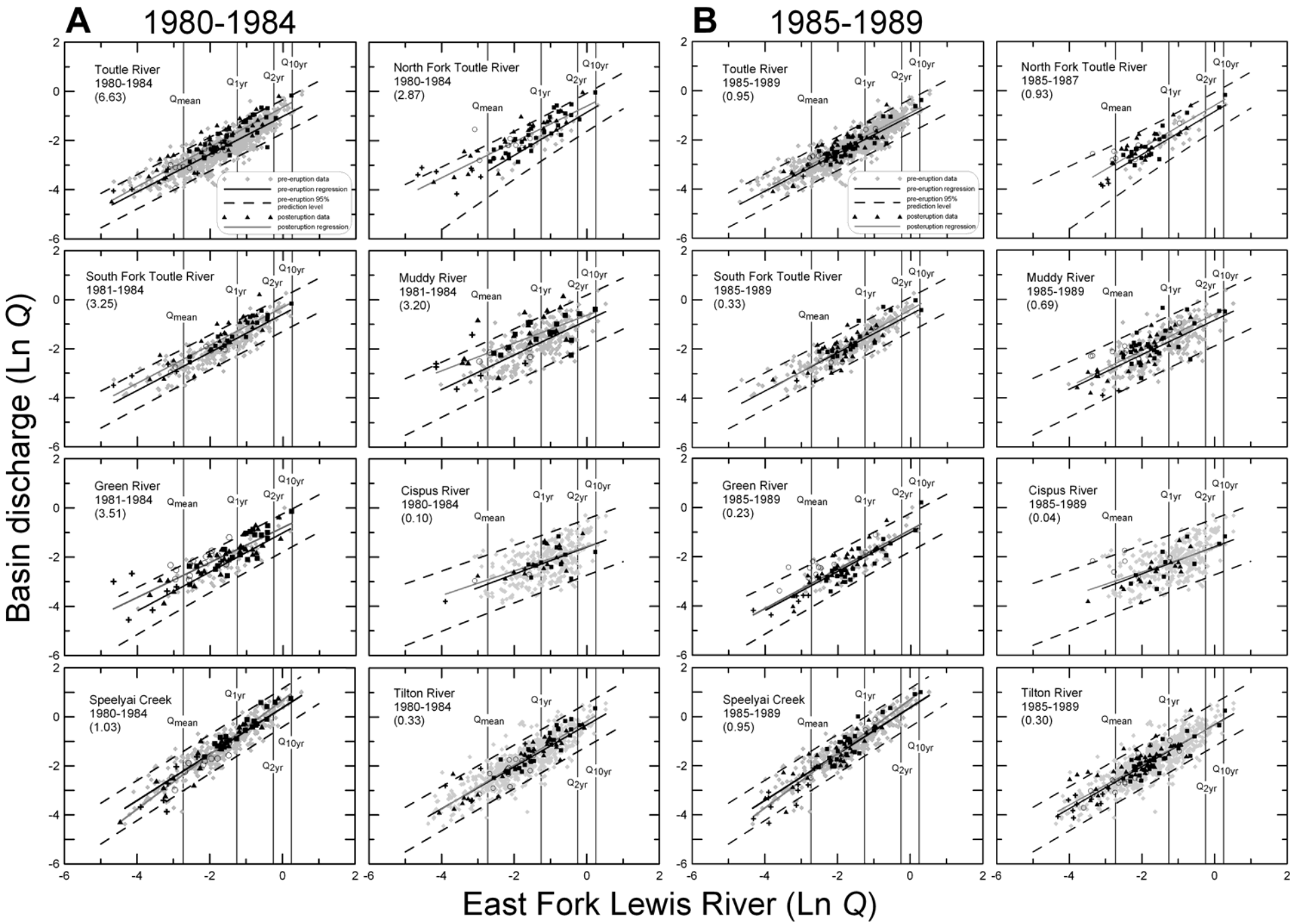
[a]Differences between median values of pre- and posteruption rise times to hydrograph peaks are statistically significant at $\alpha = 0.05$. In our analyses, however, we consider only those periods having n>3.

-- The data are insufficient to make a comparative analysis.

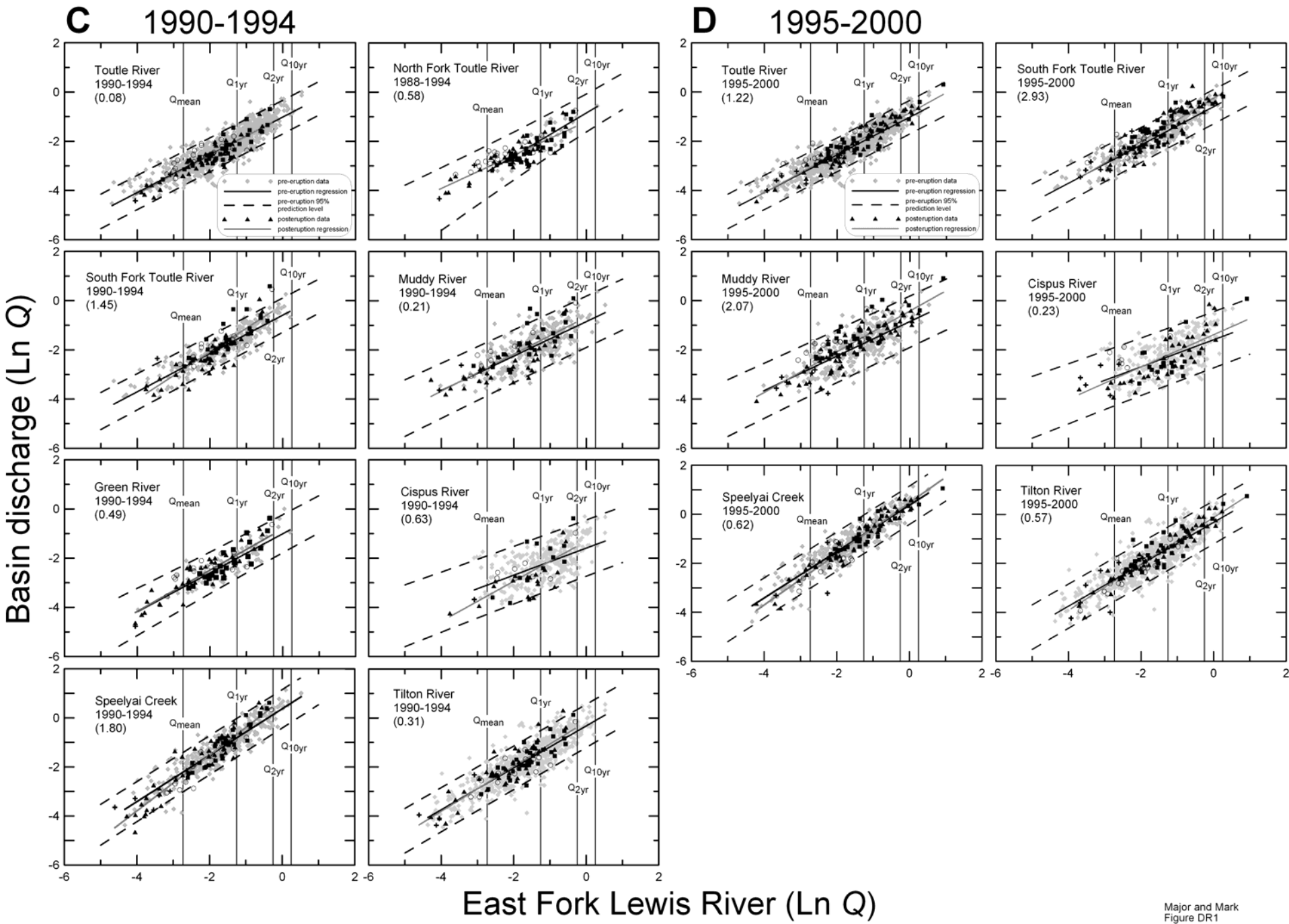
Major and Mark Peak flow responses to 1980 Mount St. Helens eruption

Figure DR1. Plots of logarithms of unit-area discharges of peak flows from Mount St. Helens and nearby basins paired with peak flows from the East Fork Lewis River (control) basin (cf. Fig. 1, Table 2). Seasonally undifferentiated regression models are fit to pre- and post-eruption paired discharges. Regression models for discharges from disturbed basins at Mount St. Helens from 1980-1984 are significantly different than pre-eruption regression models; after 1985, pre- and posteruption regression models generally are not significantly different (cf. Table DR1). Symbols delineate posteruption seasonal discharges: solid triangles, autumn (Oct-Dec); solid squares, winter (Jan-Mar); open circles, spring (Apr-Jun); crosses, summer (Jul-Sep). Units of discharge (*Q*) are (m^3 s^{-1} km^{-2}).

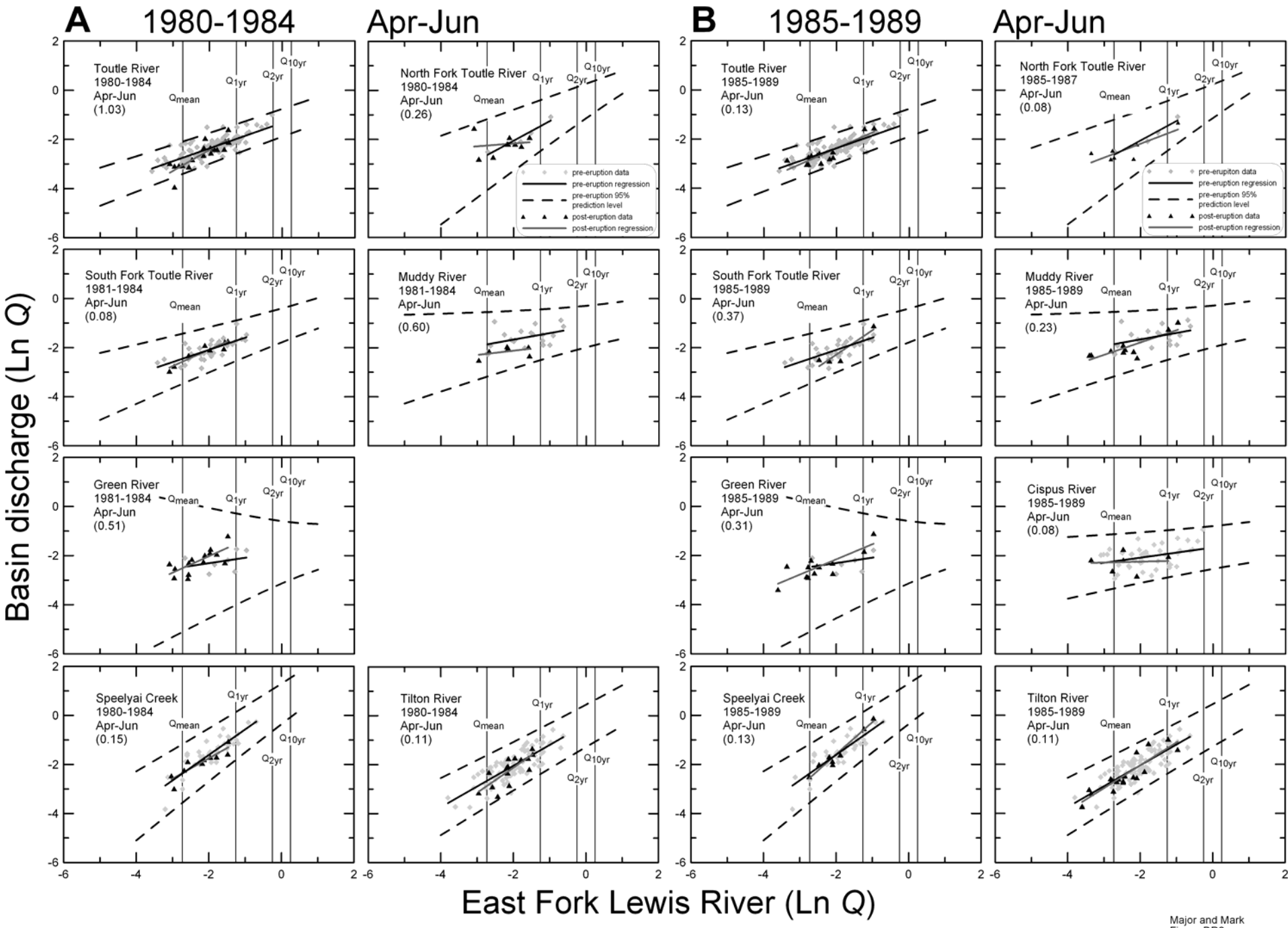
Figure DR2. Plots of logarithms of unit-area discharges of spring (Apr-Jun) and summer (Jul-Sep) peak flows from Mount St. Helens and nearby basins paired with peak flows from the East Fork Lewis River (control) basin (cf. Fig. 1, Table 2). Regression models are fit to pre- and posteruption paired discharges. Values in parentheses give ratio of F statistic to critical F value. Ratios less than 1 are not significant (cf. Table DR2). Units of discharge (*Q*) are (m^3 s^{-1} km^{-2}).



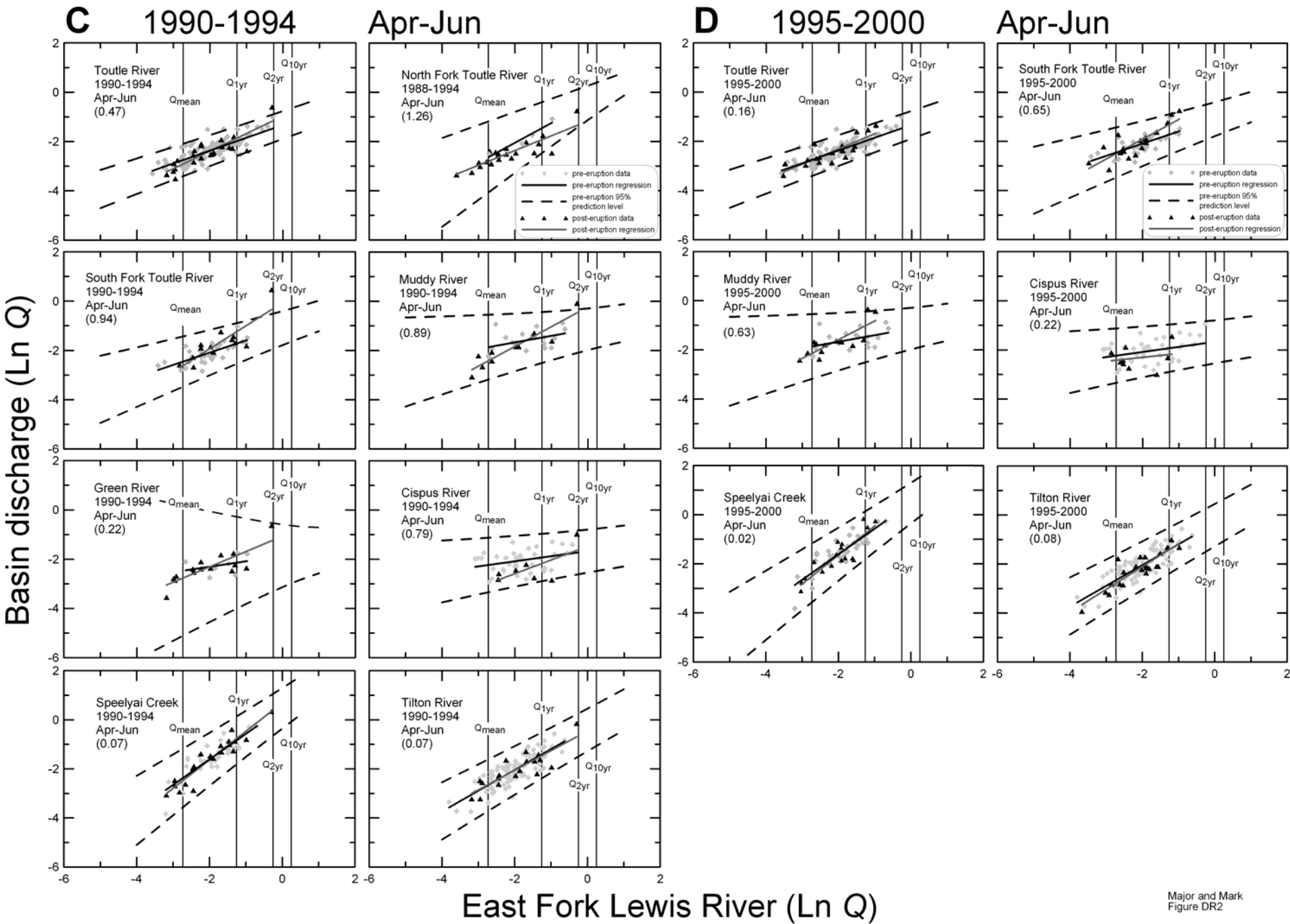
Major and Mark
Figure DR1



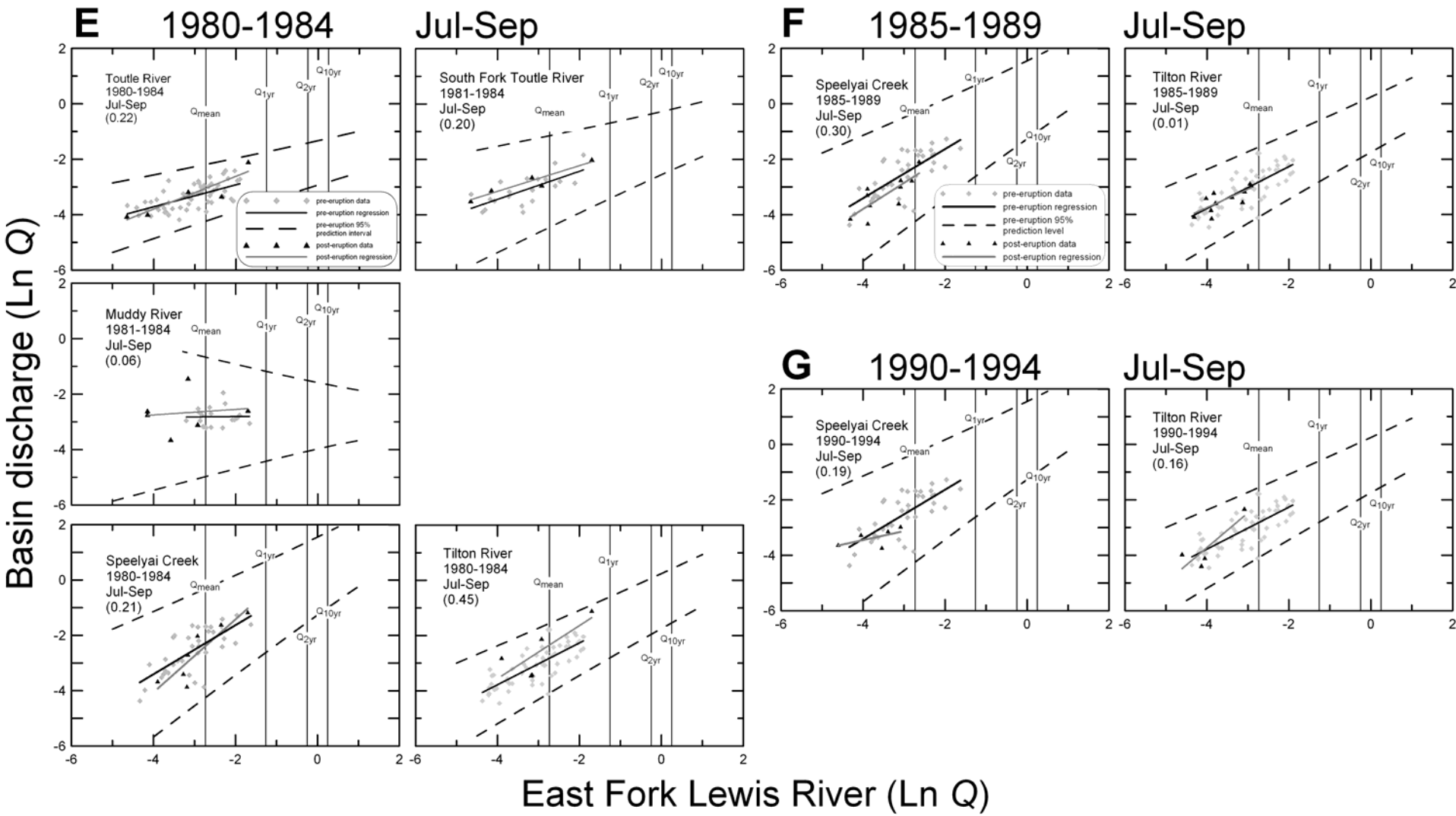
Major and Mark
Figure DR1



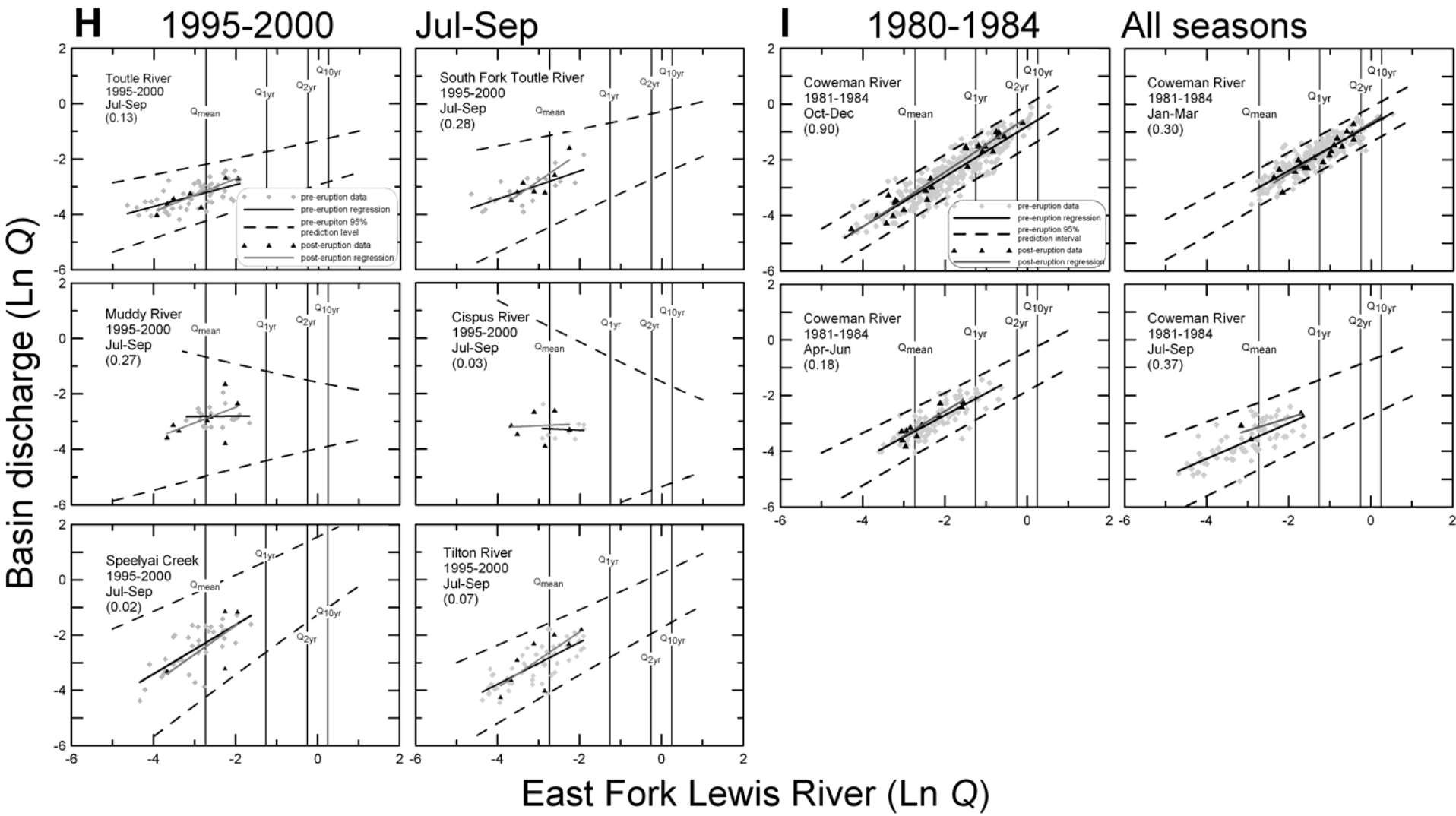
Major and Mark
Figure DR2



Major and Mark
Figure DR2



Major and Mark
Figure DR2



Major and Mark
Figure DR2