

Climate-dependent Sediment Composition and Transport of the Mountainous Rivers in Tectonically Stable, Subtropical East Asia

Xing Jian¹, Wei Zhang¹, Shouye Yang², Shuh-Ji Kao¹

¹ State Key Laboratory of Marine Environmental Science, College of Ocean and Earth Sciences, Xiamen University, Xiamen 361102, PR China

² State Key Laboratory of Marine Geology, Tongji University, Shanghai 200092, PR China

Contents of this file

Tables S1 to S4

Introduction

The supporting information includes four supporting tables (Table S1–S4). Table S1 shows sample information in this study and Tables S2–S4 show raw data of Sr-Nd isotopes, petrography, and heavy minerals. Sr-Nd isotopes were analyzed using a Neptune plus MC-ICP-MS at Tongji University. The 63–500 μm fractions of river sands were impregnated with araldite, cut into standard thin sections for petrography analysis and heavy minerals were separated by heavy liquid tribromomethane from the 63–250 μm fractions of the river sands. All the point-counting data were obtained under a Leica polarizing microscope at Xiamen University.

Samples	Type	Lithology in the field	Location on Fig. 2	Information	latitude (N)	longitude (E)
SK-01	riverbed	mud	SK-01	Downstream	26°18'22.83"	118°48'18.24"
16MJ-01	riverbed	medium sand	01	Dazhangxi	25°51'21.87"	118°58'37.57"
16MJ-04	riverbed	coarse sand	04	Downstream	26°5'32.13"	119°12'23.94"
16MJ-05	riverbed	medium sand	05	Downstream	26°5'42.62"	119°12'39.92"
16MJ-06	riverbed	medium sand	06	Downstream	26°7'58.29"	119°8'49.15"
16MJ-08	riverbed	medium sand	08	Downstream	26°3'3.81"	119°33'40.90"
16MJ-09	riverbed	mud	09	Downstream	25°57'38.58"	119°26'23.03"
16MJ-10	riverbed	medium sand	09	Downstream	25°57'38.58"	119°26'23.03"
16MJ-12	riverbed	muddy sand	12	Downstream	25°57'16.91"	119°24'28.13"
16MJ-14	riverbed	fine sand	15	Downstream	25°58'25.74"	119°20'33.45"
16MJ-15	riverbed	mud	15	Downstream	25°58'25.74"	119°20'33.45"
16MJ-16	riverbed	coarse sand	16	Shaxi	26°32'2.96"	117°59'0.30"
16MJ-18	riverbed	fine sand	18	Shaxi-Futunxi	26°35'40.20"	118°7'45.55"
16MJ-19	riverbed	medium sand	18	Shaxi-Futunxi	26°35'40.20"	118°7'45.55"
16MJ-20	riverbed	coarse sand	20	Jianxi	26°38'47.16"	118°10'43.92"
16MJ-21	riverbed	mud	21	Jianxi	26°39'35.01"	118°10'3.04"
16MJ-22	riverbed	coarse sand	22	Upstream	26°34'43.33"	118°17'23.06"
16MJ-23	riverbed	coarse sand	23	Youxi	26°22'3.52"	118°23'10.30"
16MJ-24	riverbed	medium sand	24	Downstream	26°22'20.85"	118°43'55.45"
16MJ-25	riverbed	fine sand	26	Meixi	26°13'27.23"	118°51'8.48"
16MJ-26	riverbed	mud	26	Meixi	26°13'27.23"	118°51'8.48"
16MJ-29	riverbed	medium sand	29	Downstream	26°12'17.32"	118°53'24.68"
16MJ-31	riverbed	fine sand	31	Downstream	26°13'15.51"	118°56'29.70"
16MJS-01	suspended		S01	Dazhangxi	25°57'42.04"	119°14'37.87"
16MJS-02	suspended		S02	Downstream	26°5'42.62"	119°12'39.92"
16MJS-04	suspended		S04	Downstream	26°1'29.34"	119°13'39.98"
16MJS-05	suspended		S05	Downstream	26°3'6.98"	119°34'13.84"
16MJS-06	suspended		S06	Downstream	26°1'48.21"	119°30'17.73"
16MJS-07	suspended		S07	Downstream	25°58'25.74"	119°20'33.45"
16MJS-08	suspended		S08	Shaxi	26°31'51.95"	117°58'58.75"
16MJS-09	suspended		S09	Futunxi	26°36'10.15"	118°0'28.63"
16MJS-10	suspended		S10	Shaxi-Futunxi	26°35'40.20"	118°7'45.55"
16MJS-11	suspended		S11	Jianxi	26°38'47.16"	118°10'43.92"
16MJS-13	suspended		S13	Youxi	26°21'47.24"	118°23'21.10"
16MJS-14	suspended		S14	Meixi	26°13'27.23"	118°51'8.48"
16MJS-15	suspended		S15	Downstream	26°12'17.32"	118°53'24.68"
SS-01	suspended		S04	2016.10.15	26°1'29.34"	119°13'39.98"
SS-02	suspended		S04	2016.10.29		
SS-03	suspended		S04	2016.11.11		
SS-04	suspended		S04	2016.11.30		
SS-05	suspended		S04	2016.12.10		
SS-06	suspended		S04	2016.12.23		
SS-07	suspended		S04	2017.01.12		
SS-08	suspended		S04	2017.02.20		
SS-09	suspended		S04	2017.03.05		
SS-10	suspended		S04	2017.03.18		
SS-11	suspended		S04	2017.04.01		
SS-12	suspended		S04	2017.04.14		
SS-13	suspended		S04	2017.04.28		
SS-14	suspended		S04	2017.05.13		
SS-15	suspended		S04	2017.05.26		
SS-16	suspended		S04	2017.06.10		
SS-17	suspended		S04	2017.06.21		
SS-18	suspended		S04	2017.06.23		
SS-19	suspended		S04	2017.07.08		
SS-20	suspended		S04	2017.07.22		
SS-21	suspended		S04	2017.08.05		
SS-22	suspended		S04	2017.08.19		

SS-23	suspended	S04	2017.09.03
SS-24	suspended	S04	2017.09.16
SS-25	suspended	S04	2017.10.02

Table S1. Sample descriptions.

Sample	Rb (ppm)	Sr (ppm)	⁸⁷ Sr/ ⁸⁶ Sr	2SE	Sm (ppm)	Nd (ppm)	¹⁴³ Nd/ ¹⁴⁴ Nd	2SE	εNd(0)
16MJS-01	204.9	59.9	0.726314	0.000013	9.1	55.0	0.512092	0.000007	-10.7
16MJS-02	204.0	58.6	0.728642	0.000011	9.1	54.1	0.512041	0.000010	-11.6
16MJS-04	187.0	61.4	0.725755	0.000019	8.8	52.5	0.512051	0.000008	-11.4
16MJS-05	200.5	70.5	0.726166	0.000019	9.2	52.3	0.512088	0.000008	-10.7
16MJS-06	186.4	60.2	0.725929	0.000016	8.8	51.5	0.512104	0.000007	-10.4
16MJS-07	203.0	72.4	0.724699	0.000018	12.3	71.3	0.512106	0.000011	-10.4
16MJS-08	264.2	75.7	0.739471	0.000019	19.5	108.6	0.511956	0.000009	-13.3
16MJS-09	254.3	52.0	0.743911	0.000021	15.1	85.0	0.511933	0.000009	-13.8
16MJS-10	241.7	54.9	0.740335	0.000016	13.5	77.5	0.511963	0.000009	-13.2
16MJS-11	246.5	77.0	0.729896	0.000021	13.7	76.2	0.512005	0.000008	-12.3
16MJS-13	218.0	45.2	0.735607	0.000019	12.3	71.0	0.512012	0.000009	-12.2
16MJS-14	208.3	78.7	0.723071	0.000020	11.2	67.8	0.512083	0.000009	-10.8
16MJS-15	198.0	52.3	0.729398	0.000016	9.0	52.4	0.511991	0.000007	-12.6
SS-01	187.0	61.4	0.725755	0.000019	8.8	52.5	0.512051	0.000008	-11.4
SS-02	194.1	88.8	0.721590	0.000011	10.6	63.1	0.512110	0.000007	-10.3
SS-03	196.2	97.7	0.721710	0.000014	11.0	63.9	0.512065	0.000010	-11.2
SS-04	170.8	54.5	0.722602	0.000017	7.4	44.2	0.512085	0.000007	-10.8
SS-05	220.7	110.5	0.722737	0.000018	13.6	78.4	0.512048	0.000008	-11.5
SS-06	107.5	51.2	0.721888	0.000011	4.6	26.6	0.512053	0.000006	-11.4
SS-07	161.2	94.5	0.720415	0.000017	9.1	52.7	0.512092	0.000006	-10.6
SS-08	172.4	105.2	0.720079	0.000017	8.6	49.8	0.512067	0.000007	-11.1
SS-09	102.4	55.8	0.715859	0.000015	7.4	41.7	0.512095	0.000009	-10.6
SS-10	192.6	117.3	0.714792	0.000025	8.8	51.0	0.512053	0.000010	-11.4
SS-11	155.9	54.6	0.718951	0.000016	7.1	41.5	0.512037	0.000006	-11.7
SS-12	176.9	66.1	0.717147	0.000013	7.2	42.2	0.512046	0.000007	-11.6
SS-13	169.2	93.7	0.722073	0.000010	9.2	53.1	0.512075	0.000009	-11.0
SS-14	149.8	77.9	0.722070	0.000012	9.3	54.0	0.512054	0.000009	-11.4
SS-15	121.8	64.0	0.716916	0.000018	8.5	47.9	0.512078	0.000009	-10.9
SS-16	225.4	88.8	0.719789	0.000020	11.1	64.0	0.512032	0.000011	-11.8
SS-17	183.9	53.7	0.718715	0.000016	7.0	41.6	0.512061	0.000007	-11.3
SS-18	265.9	80.2	0.725939	0.000018	12.9	74.1	0.512015	0.000011	-12.1
SS-19	200.6	65.7	0.720406	0.000019	7.2	43.5	0.512030	0.000007	-11.9
SS-20	193.3	89.4	0.723044	0.000018	9.9	57.9	0.512077	0.000010	-10.9
SS-21	194.3	96.6	0.722553	0.000021	8.7	52.1	0.512065	0.000008	-11.2
SS-22	154.4	69.6	0.722779	0.000011	6.4	36.3	0.512075	0.000009	-11.0
SS-23	87.6	58.0	0.719035	0.000017	4.6	25.6	0.512089	0.000008	-10.7
SS-24	102.3	56.7	0.720946	0.000019	5.7	31.8	0.512081	0.000007	-10.9
SS-25	99.0	56.7	0.725606	0.000018	4.4	24.0	0.512116	0.000010	-10.2
SK-01	220.8	68.5	0.734140	0.000019	15.0	85.8	0.511980	0.000008	-12.8
16MJ-05	171.4	50.7			8.4	48.9	0.511984	0.000007	-12.8
16MJ-09	157.8	68.0			8.8	51.2	0.512162	0.000006	-9.3
16MJ-15	151.3	58.7			8.4	50.9	0.512183	0.000006	-8.9
16MJ-18	167.5	53.6			11.6	66.2	0.511887	0.000005	-14.6
16MJ-21	166.6	62.0			10.4	58.8	0.511957	0.000005	-13.3
16MJ-26	145.1	69.7			5.8	34.2	0.512085	0.000005	-10.8

Table S2. Sr and Nd isotopes of the analyzed SPM and riverbed sediment samples.

Samples	Raw point-counting data										Q-F-L volume percentage calculation		
	Qm	Qp	Kfs	Pl	Ms	Bt	Lm	Lv	Ls	Others	Q	F	L
16MJ-01	143	0	30	108	0	5	3	22	33	13	42.2	40.7	17.1
16MJ-04	268	7	12	44	2	0	1	15	17	15	75.5	15.4	9.1
16MJ-05	269	4	17	44	0	1	3	12	25	8	73.0	16.3	10.7
16MJ-08	290	8	22	60	0	6	3	3	6	6	76.0	20.9	3.1
16MJ-10	293	5	12	47	0	5	5	22	26	4	72.7	14.4	12.9
16MJ-12	232	3	22	64	0	4	5	28	60	0	56.8	20.8	22.5
16MJ-14	226	3	36	80	4	4	1	30	17	3	58.3	29.5	12.2
16MJ-16	220	12	27	38	1	1	9	11	20	8	68.8	19.3	11.9
16MJ-19	189	4	26	76	7	12	17	5	15	5	58.1	30.7	11.1
16MJ-20	242	1	30	42	0	9	2	19	17	3	68.8	20.4	10.8
16MJ-22	229	6	37	40	2	0	11	23	51	7	59.2	19.4	21.4
16MJ-23	251	0	26	45	1	0	7	23	19	4	67.7	19.1	13.2
16MJ-24	161	3	33	61	1	4	5	30	36	4	49.8	28.6	21.6
16MJ-25	166	3	37	123	0	3	3	11	27	5	45.7	43.2	11.1
16MJ-29	150	2	35	117	0	11	5	12	24	5	44.1	44.1	11.9
16MJ-31	260	3	15	57	6	1	2	15	28	4	69.2	18.9	11.8

Qm: monocrystalline quartz; Qp: polycrystalline quartz; Kfs: K-feldspar; Pl: plagioclase; Ms: muscovite; Bt: biotite; Lm: metamorphic lithic fragment; Lv: igneous lithic fragment; Ls: sedimentary lithic fragment.

Table S3. Petrography results of the riverbed sand sediments from the Minjiang River catchment.

Samples	Zircon	Tourmaline	Garnet	Epidote	Hornblende	Augite	Apatite	Chlorite	Rutile	Titanite	Others	ZTR index
16MJ-04	8	20	18	12	18	8	2	4	0	2	8	28.0
16MJ-06	12	20	15	12	17	7	5	7	0	0	5	31.7
16MJ-08	14	11	31	14	9	6	3	3	0	0	9	25.7
16MJ-10	7	10	11	10	19	21	13	3	0	1	4	17.1
16MJ-12	3	15	8	10	26	13	10	7	0	3	5	18.0
16MJ-16	12	9	27	12	12	6	9	3	3	0	6	24.2
16MJ-19	6	19	22	16	17	9	4	4	1	0	1	26.1
16MJ-23	4	20	24	13	13	9	7	2	0	0	9	23.9
16MJ-24	14	10	15	10	23	14	6	5	0	1	2	24.1
16MJ-25	14	5	5	11	32	14	7	5	0	0	9	18.2
16MJ-29	34	4	7	15	22	5	4	4	0	1	3	38.4
16MJ-31	22	11	19	14	12	4	7	4	1	1	5	34.6

ZTR index: the ratio of Zircon, Tourmaline and Rutile contents with the content of all the transparent heavy minerals.

Table S4. Heavy mineral analysis results of the riverbed sand sediments from the Minjiang River catchment.