Geochemistry Geophysics Geosystems

Supporting Information for

Provenance of Cenozoic sediments in the Xining Basin revealed by Nd and Pb isotopic evidence: Implications for tectonic uplift of the NE Tibetan Plateau

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Additional Supporting Information (Files uploaded separately)

Introduction

In the supporting information we include a figure (Figure S1) with the morphology of quartz grains surface in fraction 16-63 μm from the Xijigou-Tashan section in the Xining Basin. We also present 4 tables (Table S1- S4). Table S1 for the Nd-Pb isotopic compositions of the sediment samples from the Xijigou-Tashan section which is used in the Figure 3 and 4; Table S2 for the Nd-Pb isotopic compositions of potential sediment sources which is used in the Figure 4; Table S3 for the Nd-Pb isotopic compositions and elemental concentrations of the Qilian Shan and Laji Shan to calculate the mixing estimate in the Figure 4; and Table S4 for major element concentrations (wt %) of the sediment samples from the XG-TS section to calculate the Index of Compositional Variability (ICV).

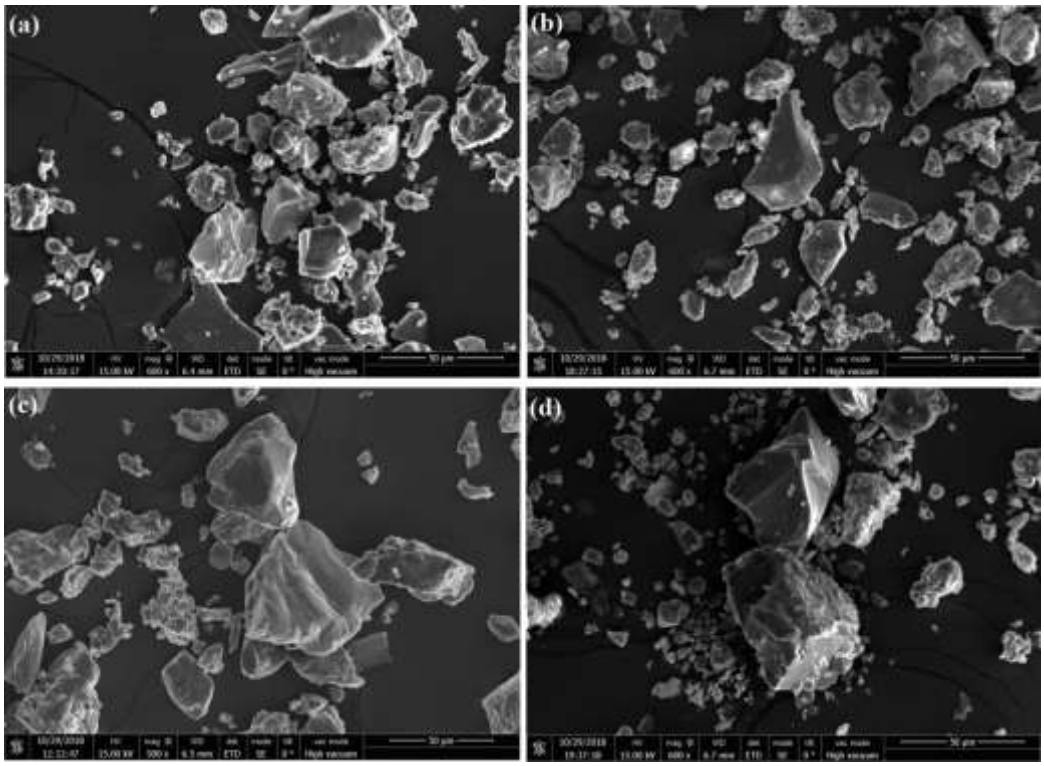

Figure S1. Morphology of quartz grains surface in fraction 16-63 μm from the Xijigou-Tashan section in the Xining Basin. (a) The sample at the depth of ~100 m (~18.3 Ma) from the Tashan section; (b) the sample at the depth of ~305 m (~27.4 Ma) from the Tashan section; (c) the sample at the depth of ~521 m (~34.4 Ma) from the Tashan section; (d) the sample at the depth of ~166 m (~41.3 Ma) from the Xijigou section. Scanning electron microscopy analysis was conducted using Nova NanoSEM 450 FSEM at the Institute of Geology and Geophysics, Chinese Academy of Sciences.

Table S1 Nd-Pb isotopic compositions of sediment samples from the Xijigou-Tashan section

Table S2 Nd-Pb isotopic compositions of potential sediment sources

Table S3 Nd-Pb isotopic compositions and elemental concentrations of the Qilian Shan and the Laji Shan

End-member	Nd (ppm)	Pb (ppm)	ε_{Nd}	$^{206}Pb/^{204}Pb$	$^{207}Pb/^{204}Pb$	$^{208}Pb/^{204}Pb$
Qilian Shan	32.9 [a]	28.8 [a]	-12.03	18.977	15.694	39.124
Laji Shan	20.4 [b]	9.6 [b]	-7.19	18.487	15.654	38.789

Note: [a] Mean value calculated from Huang et al. (2015); [b] mean value calculated from Hou et al. (2005).

Table S4 Major element concentrations (wt %) of the sediment samples from the Xijigou-Tashan section

Sample	**Age (Ma)**	**Si_2O**	**Al_2O_3**	**Fe_2O_3**	**CaO**	**MgO**	**K_2O**	**Na_2O**	**P_2O_5**	**MnO**	**TiO_2**	**LOI**	**ICV**
XN-01	~15.9	52.68	9.77	4.24	8.35	7.25	1.9	1.41	0.25	0.07	0.70	14.94	1.84
XN-03	~17	30.43	8.43	3.86	18.02	16.81	1.63	0.4	0.13	0.15	0.39	19.91	3.04
XN-05	~18.2	57.16	18.06	7.58	0.85	4.49	3.96	1.16	0.22	0.09	0.80	6.52	1.1
XN-07	~19.7	62.27	12.15	4.8	3.86	2.72	2.28	1.73	0.19	0.05	0.79	5.66	1.24
XN-09	~19.9	55.59	18.24	7.54	1.13	4.4	3.78	1.03	0.20	0.08	0.76	7.31	1.08
XN-11	~21.8	62.73	16.26	6.46	0.78	3.18	3.23	1.57	0.14	0.06	0.72	5.17	1.04
XN-13	~23.3	52.82	18.15	7.46	2.01	5.46	3.92	0.92	0.19	0.09	0.69	8.57	1.13
XN-15	~25.1	54.07	17.97	7.39	1.49	4.65	3.98	0.97	0.17	0.07	0.76	7.80	1.11
XN-17	~26	59.06	17.15	6.86	0.72	3.41	3.6	1.38	0.15	0.07	0.78	5.44	1.05
XN-19	~26.9	70.06	12.58	4.41	1.94	1.93	2.46	1.71	0.16	0.07	0.74	4.17	1.04
XN-21	~28.8	57.9	18.42	7.37	0.63	3.27	3.84	1.24	0.16	0.10	0.78	5.81	1.02
XN-23	~30	58.32	18.1	7.13	0.62	3.54	3.86	1.2	0.16	0.09	0.76	5.54	1.02
XN-25	~30.9	58.56	18.04	7.03	0.63	3.64	3.94	1.16	0.14	0.07	0.73	5.76	1.02
XN-26	~31.5	66.82	12.53	3.38	1.23	2.25	2.26	2	0.12	0.04	0.65	4.69	0.89
XN-27	~32.4	45.65	12.45	4.78	7.91	3	2.82	0.96	0.11	0.05	0.53	10.86	1.39
XN-29	~33.6	61.83	16.32	6.55	0.78	3.93	3.72	1.16	0.12	0.07	0.72	5.96	1.08
XN-31	~34.3	71.31	11.29	3.93	0.55	3.66	2.45	1.6	0.10	0.03	0.62	3.46	1.07
XN-33	~35.5	53.35	19.6	7.31	0.52	4.61	4.89	1.01	0.13	0.06	0.75	7.06	1.02
XN-35	~36.2	64.83	13.81	4.85	0.69	3.23	3.05	1.82	0.13	0.04	0.71	4.89	1.03
XN-37	~37.5	55.73	18.06	7.16	0.77	4.87	4.51	0.96	0.12	0.05	0.73	6.98	1.09
XN-39	~38.8	61.15	14.45	5.2	2.33	2.69	3.11	2.12	0.12	0.04	0.70	5.90	1.09
XN-41	~42.7	22.18	7.86	3.39	18.27	1.48	1.59	0.74	0.07	0.02	0.28	16.29	2.39
XN-43	~45.6	40.24	13.86	5.07	9.21	2.09	2.65	2.05	0.13	0.03	0.49	14.63	1.34
XN-45	~48	53.17	19.58	7.24	0.46	3.39	3.47	2.97	0.09	0.05	0.67	8.02	0.98
XN-47	~50.4	54.14	17.63	8	0.52	3.06	2.89	3.39	0.08	0.05	0.76	6.88	1.14

Major element abundances were measured by X-ray fluorescence spectrometry (XRF) using a Panalytical spectrometer at the Institute of Geology and Geophysics, Chinese Academy of Sciences. Weight-loss on ignition (LOI) was determined by weighing before and after heating to 950 °C for 1 h. The Index of Compositional Variability (ICV) = (Fe_2O_3 + K_2O + Na_2O + CaO + MgO + TiO_2) /Al_2O_3.