Paleoceanography and Paleoclimatology

Supporting Information for

Long-period astronomical forcing of westerlies' strength in Central Asia during Miocene climate cooling

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Introduction

The supplementary files include Tera Wasserburg plots for all samples anlyzed by laser ablation U-Pb dating, following the approach mentioned in the methods part of the main manuscript (Fig. S1). Additionally two tables are given. Table S1 reports the plain magnetostratigraphic age model for the Aktau succession as published in Verestek et al. (2018). Table S2 summarizes the integrated age model for the Aktau succession as a result of orbital tuning (see main manuscript for details).

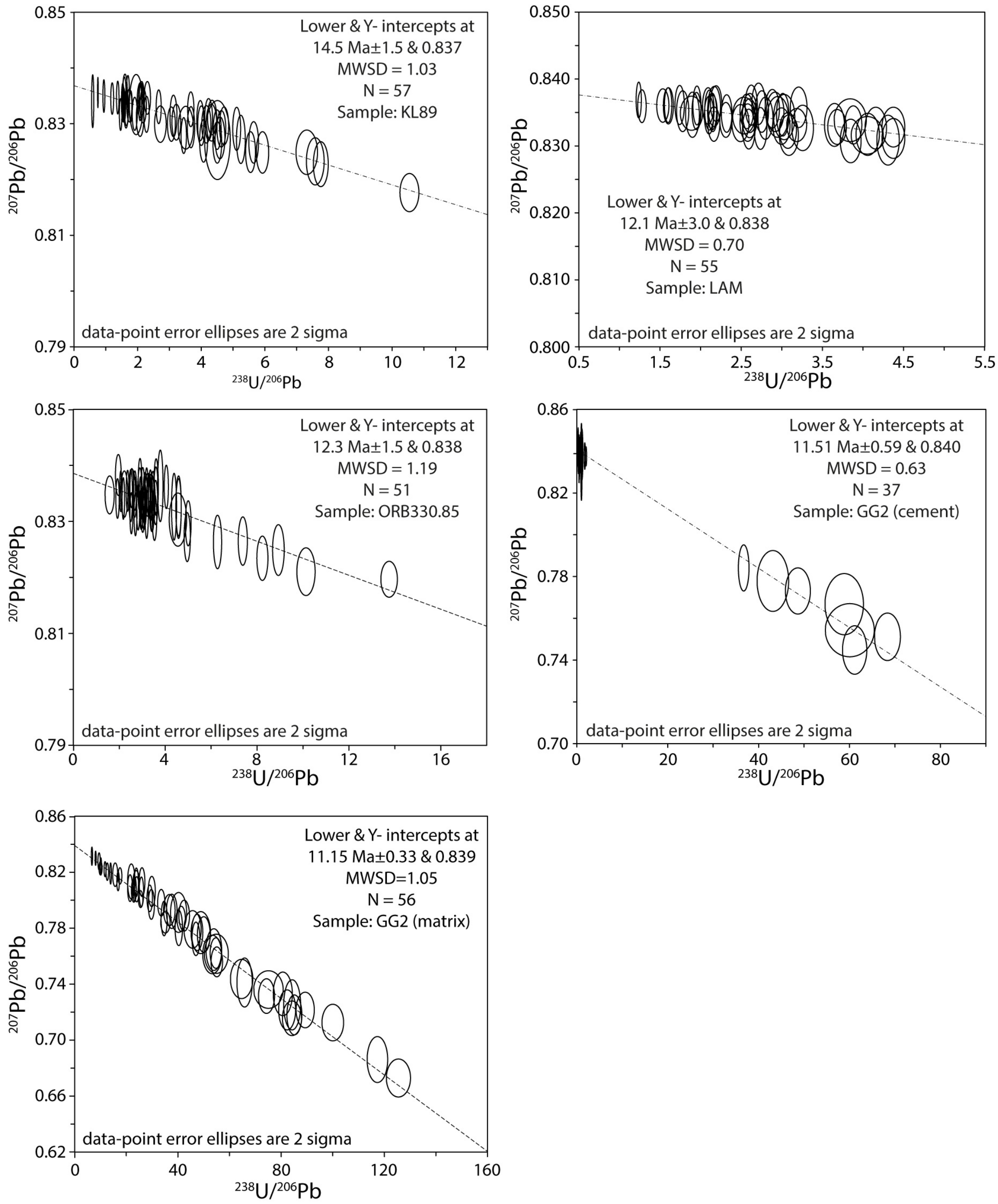

Figure S1. Tera-Wasserburg plots of U-Pb analyses. Abbreviations: MWSD=Mean Square Weighted Deviation, N=Number of analyses.

Height [m]	Age [Ma]	Sedimentation rate [cm ka^{-1}]	Base of Chron
12.45	15.160		C5Bn.2n
16.34	15.032	3.0	C5Bn.1r
30.10	14.87	8.5	C5Bn.1n
35.00	14.775	5.2	C5ADr
39.48	14.609	2.7	C5ADn
74.00	14.163	7.7	C5ACr
80.83	14.070	7.3	C5ACn

Table S1. Magnetostratigraphy and the resulting paleomagnetic age model for the Bastau Fm published in Verestek et al. (2018).

Tie point	Height [m]	Tuning	Age [Ma]	Sedimentation rate [cm/ka]	Proxy record and cycle length
Mag	12.45		15.160		
Mag	16.34		15.032	3.0	
Mag	30.10		14.870	8.5	
Mag	35.00		14.775	5.2	
Mag	39.48		14.609	2.7	
Min	75.12	ECC_{Min_1}	14.180	8.3	$CaSO_4$ (48.2 m)
Max	99.44	ECC_{Max_1}	13.980	12.2	$CaSO_4$ (48.2 m)
Min (48.2 m) Mean Min (25.8 m)	121.86 122.43 123.00	ECC_{Min_2}	13.775	11.2	$CaSO_4$ (48.2 m; 25.8 m)
Max	135.92	ECC_{Max_2}	13.575	6.7	$CaSO_4$ (25.8 m)
Min	149.22	ECC_{Min_3}	13.375	6.7	$CaSO_4$ (25.8 m)
Max	162.14	ECC_{Max_3}	13.170	6.3	$CaSO_4$ (25.8 m)
Min	175.44	ECC_{Min_4}	12.970	6.7	$CaSO_4$ (25.8 m)
Max ($\delta^{13}C$) Mean Max ($CaSO_4$)	186.18 187.27 188.36	ECC_{Max_4}	12.765	5.8	$\delta^{13}C$ (38.1 m) $CaSO_4$ (25.8 m)
Min	200.58	ECC_{Min_5}	12.560	6.5	$\delta^{13}C$ (38.1 m)
Max	215.58	ECC_{Max_5}	12.360	7.5	$\delta^{13}C$ (38.1 m)
Min	232.38	ECC_{Min_6}	12.155	8.2	$\delta^{13}C$ (38.1 m)
Max	251.58	ECC_{Max_6}	11.955	9.6	$\delta^{13}C$ (38.1 m)
Max	295.00	ECC_{Min_7}	11.345	7.1	WL (40.0 m)
Min	316.50	ECC_{Max_7}	11.145	10.7	WL (40.0 m)
Max	336.00	ECC_{Min_8}	11.940	9.5	WL (40.0 m)
Min	355.25	ECC_{Max_8}	10.740	9.6	WL (40.0 m)

Table S2. Tie points and phase relation of the integrated cyclostratigraphic and magnetostratigraphic age model. In case of segment overlaps, the position of the final tie point was calculated as the mean of the two coeval tie points from each time series. Abbreviations: Mag=Paleomagnetic reversal**.**