



Supporting Online Material for

Major Australian-Antarctic Plate Reorganization at Hawaiian-Emperor Bend Time

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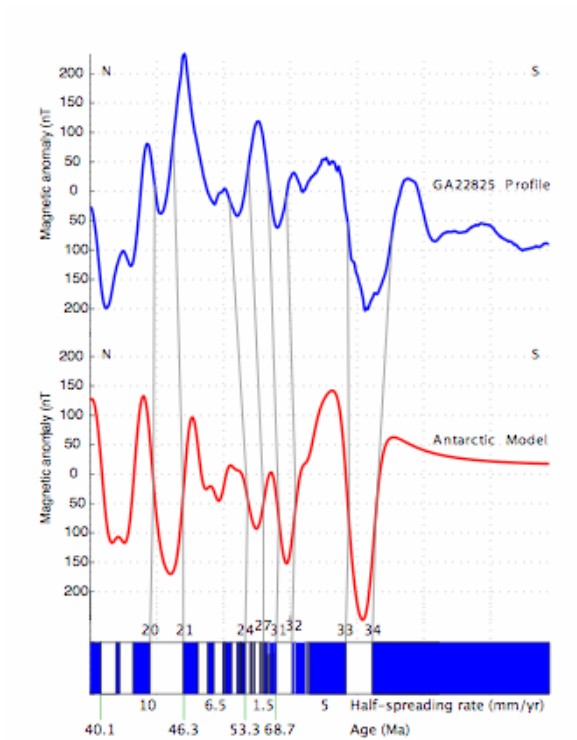


Figure S1: Spreading rate model from Tikku and Cande (*S1*) for the Southeast Indian Ridge, profile GA-22825 on the East Antarctic ridge flank (see Figure 1 for location). Magnetic anomalies identified on the model are 20o, 21y, 24o, 27y, 31o, 32y, 33o and 34y ('y' 'o' – young and old sides respectively of the magnetic anomaly chron eg 20o means the older side of magnetic anomaly chron 20) following the identification method of Tikku and Cande (*S1*). Synthetic magnetic anomaly profile computed using Modmag (*S2*) with the following input model parameters; top of magnetic source layer is 6.0 km, bottom of magnetic source layer is 6.5 km, remanent inclination = -81.2° , and remanent declination = 0.0° . Dashed vertical gridlines are at 50 km along profile spacing.

Table S1: Fracture zone identifications.

Margin	Fault	Lat	Long	Chron
Ant	1	-59.1647	107.5773	18
Ant	2	-59.1165	120.8755	18
Ant	1	-61.6597	106.1909	20
Ant	2	-61.3283	120.0833	20
Ant	1	-61.8450	106.1198	21
Ant	2	-61.5135	120.0367	21
Ant	1	-62.1521	106.6530	24
Ant	2	-61.8408	120.3321	24
Ant	1	-62.2766	106.9308	27
Ant	2	-61.9770	120.5521	27
Ant	1	-62.3716	107.1041	31
Ant	2	-62.1355	120.8298	31
Ant	1	-62.5505	107.4297	32
Ant	2	-62.2206	120.9898	32
Ant	1	-62.7386	107.7851	33
Ant	2	-62.5629	121.6207	33
Ant	1	-62.9884	108.2527	34
Ant	2	-62.9762	122.3361	34
Ant	1	-63.4574	108.9992	QZB
Ant	2	-63.6792	123.6803	QZB
Aus	1	-40.0173	117.2496	18
Aus	2	-39.6235	125.7909	18
Aus	1	-38.3646	117.8362	20
Aus	2	-37.6723	126.1553	20
Aus	1	-38.2315	117.8895	21
Aus	2	-37.5132	126.1508	21
Aus	1	-37.8522	117.4595	24
Aus	2	-37.1264	125.9286	24
Aus	1	-37.7394	117.3173	27
Aus	2	-36.9768	125.8042	27
Aus	1	-37.6546	117.1929	31
Aus	2	-36.8769	125.7020	31
Aus	1	-37.5981	117.1218	32
Aus	2	-36.7912	125.6043	32
Aus	1	-37.4565	116.9263	33
Aus	2	-36.5191	125.2799	33
Aus	1	-37.3289	116.8018	34
Aus	2	-36.2928	124.9911	34
Aus	1	-37.2194	116.6720	QZB
Aus	2	-36.0478	124.6912	QZB

Table S2: Magnetic anomaly identifications. Magnetic anomaly identifications were made using new high quality magnetic data in the Bruce Rise area (90°-115°E) collected by Russian Antarctic Expeditions 49 and 50 in 2004-2005. The total magnetic field was recorded in these surveys by a differential magnetometer to 0.01 nT accuracy. New magnetic anomaly identifications were also made for data collected during Geoscience Australia cruises 228 and 229 (S3-S6). Our new identifications were integrated with earlier identifications of Tikku and Cande (SI).

Side	Chron	Latitude	Longitude	Source
Ant	C20o	-57.7970	88.2870	Tikku and Cande (SI)
Ant	C20o	-58.2320	89.7220	Tikku and Cande (SI)
Ant	C20o	-58.6640	90.0560	Tikku and Cande (SI)
Ant	C20o	-58.8590	90.4310	Tikku and Cande (SI)
Ant	C20o	-58.9560	90.7470	Tikku and Cande (SI)
Ant	C20o	-59.3280	91.5680	Tikku and Cande (SI)
Ant	C20o	-59.4930	92.1130	Tikku and Cande (SI)
Ant	C20o	-59.5570	92.3590	Tikku and Cande (SI)
Ant	C20o	-60.4030	101.2300	Tikku and Cande (SI)
Ant	C20o	-60.6130	102.3440	Tikku and Cande (SI)
Ant	C20o	-61.5240	104.0334	GA-22815
Ant	C20o	-61.3460	104.1890	Tikku and Cande (SI)
Ant	C20o	-61.4390	104.6260	Tikku and Cande (SI)
Ant	C20o	-61.6340	105.2370	Tikku and Cande (SI)
Ant	C20o	-61.7040	105.6330	Tikku and Cande (SI)
Ant	C20o	-61.7041	105.7170	GA-22917
Ant	C20o	-61.7447	107.3997	GA-22817
Ant	C20o	-61.6973	108.1544	RAE-5003
Ant	C20o	-61.6420	109.0840	GA-22915
Ant	C20o	-61.4770	110.7667	GA-22818
Ant	C20o	-61.3930	112.0200	Tikku and Cande (SI)
Ant	C20o	-61.3946	112.4500	GA-22913
Ant	C20o	-61.4040	113.2790	Tikku and Cande (SI)
Ant	C20o	-61.4416	114.1371	GA-22819
Ant	C20o	-61.4870	114.5000	Tikku and Cande (SI)
Ant	C20o	-61.5516	115.8160	GA-22912
Ant	C20o	-61.5200	117.0000	Tikku and Cande (SI)
Ant	C20o	-61.4980	117.2800	Tikku and Cande (SI)
Ant	C20o	-61.4912	117.4998	GA-22820
Ant	C20o	-61.4770	118.0000	Tikku and Cande (SI)
Ant	C20o	-61.4346	119.1839	GA-22911
Ant	C20o	-61.3600	120.1180	Tikku and Cande (SI)
Ant	C20o	-61.3620	120.1790	Tikku and Cande (SI)
Ant	C20o	-61.3200	120.7120	Tikku and Cande (SI)
Ant	C20o	-61.2887	120.8676	GA-22910
Ant	C20o	-61.2930	121.0960	Tikku and Cande (SI)
Ant	C20o	-61.2682	122.5490	GA-22908
Ant	C20o	-61.2860	122.7110	Tikku and Cande (SI)
Ant	C20o	-61.3334	124.2350	GA-22909
Ant	C20o	-61.3190	124.9930	Tikku and Cande (SI)
Ant	C20o	-61.3945	125.9160	GA-22823
Ant	C20o	-61.4340	126.3350	Tikku and Cande (SI)
Ant	C20o	-61.4280	126.6880	Tikku and Cande (SI)
Ant	C20o	-61.4323	127.6003	GA-22824
Ant	C20o	-61.4330	128.5460	Tikku and Cande (SI)
Ant	C20o	-61.3881	129.2833	GA-22825
Ant	C20o	-61.4080	129.8450	Tikku and Cande (SI)
Ant	C20o	-61.2940	131.9830	Tikku and Cande (SI)
Ant	C20o	-61.2810	132.0170	Tikku and Cande (SI)
Ant	C20o	-60.9750	134.8390	Tikku and Cande (SI)
Ant	C20o	-60.9900	136.5670	Tikku and Cande (SI)
Ant	C20o	-60.9580	137.0720	Tikku and Cande (SI)

Ant	C20o	-61.0220	138.4790	Tikku and Cande (SI)
Ant	C20o	-60.9390	138.5790	Tikku and Cande (SI)
Ant	C20o	-60.7730	140.4220	Tikku and Cande (SI)
Aus	C20o	-31.0000	93.0870	Tikku and Cande (SI)
Aus	C20o	-31.0440	93.3390	Tikku and Cande (SI)
Aus	C20o	-31.6860	94.9560	Tikku and Cande (SI)
Aus	C20o	-32.5060	97.6070	Tikku and Cande (SI)
Aus	C20o	-33.2610	101.1840	Tikku and Cande (SI)
Aus	C20o	-33.2610	101.5040	Tikku and Cande (SI)
Aus	C20o	-35.8730	105.0720	Tikku and Cande (SI)
Aus	C20o	-36.3480	105.9530	Tikku and Cande (SI)
Aus	C20o	-36.6410	106.7610	Tikku and Cande (SI)
Aus	C20o	-37.0340	107.3980	Tikku and Cande (SI)
Aus	C20o	-37.2080	108.0800	Tikku and Cande (SI)
Aus	C20o	-37.4380	108.6440	Tikku and Cande (SI)
Aus	C20o	-37.6120	109.2650	Tikku and Cande (SI)
Aus	C20o	-37.6700	109.6900	Tikku and Cande (SI)
Aus	C20o	-37.5390	110.0540	Tikku and Cande (SI)
Aus	C20o	-37.5440	110.2740	Tikku and Cande (SI)
Aus	C20o	-37.5500	110.3550	Tikku and Cande (SI)
Aus	C20o	-37.4700	111.6610	Tikku and Cande (SI)
Aus	C20o	-37.4500	111.7460	Tikku and Cande (SI)
Aus	C20o	-37.4780	112.0760	Tikku and Cande (SI)
Aus	C20o	-37.3130	113.1890	Tikku and Cande (SI)
Aus	C20o	-37.1650	113.8050	Tikku and Cande (SI)
Aus	C20o	-37.2160	114.1170	Tikku and Cande (SI)
Aus	C20o	-37.2620	114.5250	Tikku and Cande (SI)
Aus	C20o	-37.6600	115.3740	Tikku and Cande (SI)
Aus	C20o	-38.0390	115.9810	Tikku and Cande (SI)
Aus	C20o	-38.2980	117.0870	Tikku and Cande (SI)
Aus	C20o	-38.4360	118.1340	Tikku and Cande (SI)
Aus	C20o	-38.4370	118.4170	Tikku and Cande (SI)
Aus	C20o	-38.3480	118.8260	Tikku and Cande (SI)
Aus	C20o	-38.1950	119.2410	Tikku and Cande (SI)
Aus	C20o	-37.8520	122.6020	Tikku and Cande (SI)
Aus	C20o	-37.8500	122.7230	Tikku and Cande (SI)
Aus	C20o	-37.7390	125.6480	Tikku and Cande (SI)
Aus	C20o	-37.7100	125.7580	Tikku and Cande (SI)
Aus	C20o	-37.6560	126.7140	Tikku and Cande (SI)
Aus	C20o	-37.6490	128.0040	Tikku and Cande (SI)
Aus	C20o	-37.9480	130.6820	Tikku and Cande (SI)
Aus	C20o	-37.8860	131.2260	Tikku and Cande (SI)
Aus	C20o	-37.8990	131.5000	Tikku and Cande (SI)
Aus	C20o	-37.9800	132.1130	Tikku and Cande (SI)
Aus	C20o	-38.0000	132.6360	Tikku and Cande (SI)
Aus	C20o	-37.9980	132.7980	Tikku and Cande (SI)
Aus	C20o	-37.8010	134.1210	Tikku and Cande (SI)
Aus	C20o	-37.8810	134.5960	Tikku and Cande (SI)
Aus	C20o	-37.8400	135.2130	Tikku and Cande (SI)
Ant	C21y	-60.6680	102.0110	Tikku and Cande (SI)
Ant	C21y	-61.6581	104.0334	GA-22815
Ant	C21y	-61.5380	104.2450	Tikku and Cande (SI)
Ant	C21y	-61.7510	104.6740	Tikku and Cande (SI)
Ant	C21y	-61.7320	104.9270	Tikku and Cande (SI)
Ant	C21y	-61.8218	105.6490	GA-22917
Ant	C21y	-61.8470	105.7550	Tikku and Cande (SI)
Ant	C21y	-61.8440	107.3999	GA-22817
Ant	C21y	-61.8148	108.1644	RAE-5003
Ant	C21y	-61.7554	109.0840	GA-22915
Ant	C21y	-61.5688	110.7667	GA-22828

Ant	C21y	-61.5800	112.0000	Tikku and Cande (SI)
Ant	C21y	-61.5420	112.4510	GA-22913
Ant	C21y	-61.5020	113.1620	Tikku and Cande (SI)
Ant	C21y	-61.5897	114.1387	GA-22819
Ant	C21y	-61.6300	114.5000	Tikku and Cande (SI)
Ant	C21y	-61.7044	115.4640	RAE-50067
Ant	C21y	-61.8500	115.8900	GA-22912
Ant	C21y	-61.6660	117.0000	Tikku and Cande (SI)
Ant	C21y	-61.6299	117.4998	GA-22820
Ant	C21y	-61.6200	118.0000	Tikku and Cande (SI)
Ant	C21y	-61.6140	118.0640	Tikku and Cande (SI)
Ant	C21y	-61.5632	119.1830	GA-22911
Ant	C21y	-61.5090	120.1100	Tikku and Cande (SI)
Ant	C21y	-61.4540	120.5760	Tikku and Cande (SI)
Ant	C21y	-61.4121	120.8670	GA-22910
Ant	C21y	-61.4070	121.0860	Tikku and Cande (SI)
Ant	C21y	-61.3860	122.4490	Tikku and Cande (SI)
Ant	C21y	-61.3850	122.5499	GA-22908
Ant	C21y	-61.4453	124.2330	GA-22822
Ant	C21y	-61.4690	124.7480	Tikku and Cande (SI)
Ant	C21y	-61.5120	125.9161	GA-22823
Ant	C21y	-61.5500	126.4010	Tikku and Cande (SI)
Ant	C21y	-61.5460	126.7150	Tikku and Cande (SI)
Ant	C21y	-61.5703	127.6004	GA-22824
Ant	C21y	-61.5910	127.7850	Tikku and Cande (SI)
Ant	C21y	-61.5750	128.2440	Tikku and Cande (SI)
Ant	C21y	-61.5269	129.2833	GA-22825
Ant	C21y	-61.5530	129.8310	Tikku and Cande (SI)
Ant	C21y	-61.4760	131.9830	Tikku and Cande (SI)
Ant	C21y	-61.4790	132.0130	Tikku and Cande (SI)
Ant	C21y	-61.2410	134.2200	Tikku and Cande (SI)
Ant	C21y	-61.2030	136.5670	Tikku and Cande (SI)
Ant	C21y	-61.1450	137.0000	Tikku and Cande (SI)
Ant	C21y	-61.1930	137.5730	Tikku and Cande (SI)
Ant	C21y	-61.2030	138.3860	Tikku and Cande (SI)
Ant	C21y	-61.1200	138.5720	Tikku and Cande (SI)
Ant	C21y	-61.1160	138.7760	Tikku and Cande (SI)
Ant	C21y	-61.1280	140.2090	Tikku and Cande (SI)
Aus	C21y	-37.7060	122.5950	Tikku and Cande (SI)
Aus	C21y	-37.7630	122.8490	Tikku and Cande (SI)
Aus	C21y	-37.6140	125.5840	Tikku and Cande (SI)
Aus	C21y	-37.5700	125.8730	Tikku and Cande (SI)
Aus	C21y	-37.4840	126.6750	Tikku and Cande (SI)
Aus	C21y	-37.4570	127.9830	Tikku and Cande (SI)
Aus	C21y	-37.5570	129.4100	Tikku and Cande (SI)
Aus	C21y	-37.7550	130.7100	Tikku and Cande (SI)
Aus	C21y	-37.7290	131.5080	Tikku and Cande (SI)
Aus	C21y	-37.7420	131.5970	Tikku and Cande (SI)
Aus	C21y	-37.8020	132.1110	Tikku and Cande (SI)
Aus	C21y	-37.8290	132.5240	Tikku and Cande (SI)
Aus	C21y	-37.8250	132.3630	Tikku and Cande (SI)
Aus	C21y	-37.8290	132.7990	Tikku and Cande (SI)
Aus	C21y	-37.7110	134.2200	Tikku and Cande (SI)
Aus	C21y	-37.6650	134.6450	Tikku and Cande (SI)
Aus	C21y	-37.6970	135.2940	Tikku and Cande (SI)
Ant	C24o	-61.7294	104.0333	GA-22815
Ant	C24o	-61.9408	104.8557	RAE-5002
Ant	C24o	-61.9959	105.0869	GA-22917
Ant	C24o	-62.1650	107.3013	GA-22817
Ant	C24o	-61.9571	108.1773	RAE-5003

Ant	C24o	-61.9483	109.0840	GA-22915
Ant	C24o	-61.8290	110.7668	GA-22818
Ant	C24o	-61.7760	112.0000	Tikku and Cande (SI)
Ant	C24o	-61.8400	112.5630	GA-22913
Ant	C24o	-61.8820	112.7130	Tikku and Cande (SI)
Ant	C24o	-61.7846	113.0221	RAE-5005
Ant	C24o	-61.9566	114.1430	GA-22819
Ant	C24o	-62.0260	114.5000	Tikku and Cande (SI)
Ant	C24o	-61.9847	114.8197	RAE-5006
Ant	C24o	-61.9821	115.4475	RAE-50067
Ant	C24o	-62.0221	116.1480	GA-22912
Ant	C24o	-62.0240	117.0000	Tikku and Cande (SI)
Ant	C24o	-61.9152	117.4999	GA-22820
Ant	C24o	-62.0230	118.0000	Tikku and Cande (SI)
Ant	C24o	-61.8096	119.1840	GA-22911
Ant	C24o	-61.8820	119.3990	Tikku and Cande (SI)
Ant	C24o	-61.8940	120.1650	Tikku and Cande (SI)
Ant	C24o	-61.8529	120.8680	GA-22910
Ant	C24o	-61.7660	121.1080	Tikku and Cande (SI)
Ant	C24o	-61.7040	121.6960	Tikku and Cande (SI)
Ant	C24o	-61.6004	122.5500	GA-22908
Ant	C24o	-61.8740	124.0860	Tikku and Cande (SI)
Ant	C24o	-61.8283	124.2332	GA-22822
Ant	C24o	-61.9673	125.9161	GA-22823
Ant	C24o	-61.9490	126.6500	Tikku and Cande (SI)
Ant	C24o	-61.9030	126.8300	Tikku and Cande (SI)
Ant	C24o	-61.9140	126.8980	Tikku and Cande (SI)
Ant	C24o	-61.9568	127.6001	GA-22824
Ant	C24o	-61.9700	127.7620	Tikku and Cande (SI)
Ant	C24o	-61.9039	129.2832	GA-22825
Ant	C24o	-61.8630	129.7810	Tikku and Cande (SI)
Ant	C24o	-61.9500	131.9760	Tikku and Cande (SI)
Ant	C24o	-61.9850	132.0330	Tikku and Cande (SI)
Ant	C24o	-61.7200	134.6900	Tikku and Cande (SI)
Ant	C24o	-61.6480	135.6690	Tikku and Cande (SI)
Ant	C24o	-61.7150	136.5670	Tikku and Cande (SI)
Ant	C24o	-61.6270	136.8140	Tikku and Cande (SI)
Ant	C24o	-61.5570	137.7970	Tikku and Cande (SI)
Ant	C24o	-61.5500	138.2090	Tikku and Cande (SI)
Ant	C24o	-61.4950	138.5640	Tikku and Cande (SI)
Ant	C24o	-61.4250	138.9270	Tikku and Cande (SI)
Ant	C24o	-61.5590	140.0350	Tikku and Cande (SI)
Aus	C24o	-37.4260	120.7320	Tikku and Cande (SI)
Aus	C24o	-37.3560	121.1570	Tikku and Cande (SI)
Aus	C24o	-37.3870	122.0740	Tikku and Cande (SI)
Aus	C24o	-37.3460	122.5870	Tikku and Cande (SI)
Aus	C24o	-37.4240	123.3160	Tikku and Cande (SI)
Aus	C24o	-37.2210	125.3900	Tikku and Cande (SI)
Aus	C24o	-37.1450	126.2210	Tikku and Cande (SI)
Aus	C24o	-37.0840	127.9730	Tikku and Cande (SI)
Aus	C24o	-37.1990	129.4180	Tikku and Cande (SI)
Aus	C24o	-37.1530	130.8380	Tikku and Cande (SI)
Aus	C24o	-37.2780	131.6830	Tikku and Cande (SI)
Aus	C24o	-37.2660	132.0780	Tikku and Cande (SI)
Aus	C24o	-37.1820	132.1140	Tikku and Cande (SI)
Aus	C24o	-37.3410	132.5080	Tikku and Cande (SI)
Aus	C24o	-37.4440	132.8170	Tikku and Cande (SI)
Aus	C24o	-37.3260	134.6510	Tikku and Cande (SI)
Aus	C24o	-37.3600	135.4790	Tikku and Cande (SI)
Ant	C27y	-61.8006	104.0303	GA-22815

Ant	C27y	-62.0318	104.8472	RAE-5002
Ant	C27y	-62.0404	104.9677	GA-22917
Ant	C27y	-62.1109	107.3241	GA-22817
Ant	C27y	-62.2663	108.2057	RAE-5003
Ant	C27y	-62.1635	109.0830	GA-22915
Ant	C27y	-62.0305	110.2528	RAE-5004
Ant	C27y	-62.0509	110.7668	GA-22818
Ant	C27y	-62.0010	110.8350	Tikku and Cande (SI)
Ant	C27y	-61.9740	112.0000	Tikku and Cande (SI)
Ant	C27y	-62.0350	112.5250	Tikku and Cande (SI)
Ant	C27y	-62.0161	113.0443	RAE-5005
Ant	C27y	-62.0849	113.2663	GA-22913
Ant	C27y	-62.0400	113.5000	Tikku and Cande (SI)
Ant	C27y	-62.1260	114.1448	GA-22819
Ant	C27y	-62.1600	114.2910	Tikku and Cande (SI)
Ant	C27y	-62.2920	114.4990	Tikku and Cande (SI)
Ant	C27y	-62.2685	114.7939	RAE-5006
Ant	C27y	-62.2439	115.4320	RAE-50067
Ant	C27y	-62.2920	115.9990	Tikku and Cande (SI)
Ant	C27y	-62.2452	116.4880	GA-22912
Ant	C27y	-62.2070	117.0000	Tikku and Cande (SI)
Ant	C27y	-62.0925	117.4999	GA-22820
Ant	C27y	-62.2040	118.0000	Tikku and Cande (SI)
Ant	C27y	-62.0740	119.0490	GA-22911
Ant	C27y	-62.1270	119.9600	Tikku and Cande (SI)
Ant	C27y	-62.0300	120.0510	Tikku and Cande (SI)
Ant	C27y	-62.0152	120.8671	GA-22821
Ant	C27y	-61.9300	121.0990	Tikku and Cande (SI)
Ant	C27y	-61.9260	121.1740	Tikku and Cande (SI)
Ant	C27y	-61.9043	122.5500	GA-22908
Ant	C27y	-62.0370	123.8820	Tikku and Cande (SI)
Ant	C27y	-62.0262	124.2330	GA-22822
Ant	C27y	-62.1220	125.8030	Tikku and Cande (SI)
Ant	C27y	-62.1436	125.9161	GA-22823
Ant	C27y	-62.0970	126.7390	Tikku and Cande (SI)
Ant	C27y	-62.1070	126.8200	Tikku and Cande (SI)
Ant	C27y	-62.1294	127.6003	GA-22824
Ant	C27y	-62.1430	127.7870	Tikku and Cande (SI)
Ant	C27y	-62.0295	129.2831	GA-22825
Ant	C27y	-62.1970	130.5950	Tikku and Cande (SI)
Ant	C27y	-62.3000	131.9660	Tikku and Cande (SI)
Ant	C27y	-62.2120	132.0480	Tikku and Cande (SI)
Aus	C27y	-37.3440	120.6470	Tikku and Cande (SI)
Aus	C27y	-37.2530	121.1130	Tikku and Cande (SI)
Aus	C27y	-37.2100	121.4500	Tikku and Cande (SI)
Aus	C27y	-37.1820	121.6190	Tikku and Cande (SI)
Aus	C27y	-37.2480	122.5880	Tikku and Cande (SI)
Aus	C27y	-37.2850	123.3300	Tikku and Cande (SI)
Aus	C27y	-37.2700	123.5060	Tikku and Cande (SI)
Aus	C27y	-37.0690	125.3120	Tikku and Cande (SI)
Aus	C27y	-36.9560	126.3630	Tikku and Cande (SI)
Aus	C27y	-36.9040	126.4620	Tikku and Cande (SI)
Aus	C27y	-36.7740	127.9660	Tikku and Cande (SI)
Aus	C27y	-36.8770	129.0510	Tikku and Cande (SI)
Aus	C27y	-36.9370	129.4320	Tikku and Cande (SI)
Aus	C27y	-36.9050	129.6070	Tikku and Cande (SI)
Aus	C27y	-36.9960	130.8590	Tikku and Cande (SI)
Aus	C27y	-36.9580	132.0710	Tikku and Cande (SI)
Aus	C27y	-37.2130	132.7730	Tikku and Cande (SI)
Aus	C27y	-37.1760	132.8000	Tikku and Cande (SI)

Aus	C27y	-37.2050	132.8520	Tikku and Cande (SI)
Aus	C27y	-36.9100	134.0680	Tikku and Cande (SI)
Ant	C31o	-61.8544	104.0128	GA-22815
Ant	C31o	-62.0897	104.8115	GA-22917
Ant	C31o	-62.1039	104.8586	RAE-5002
Ant	C31o	-62.1705	107.2990	GA-22817
Ant	C31o	-62.4147	108.2180	RAE-5003
Ant	C31o	-62.4364	108.3978	GA-22915
Ant	C31o	-62.2020	110.2650	RAE-5004
Ant	C31o	-62.1733	110.7669	GA-22818
Ant	C31o	-62.1720	110.8330	Tikku and Cande (SI)
Ant	C31o	-62.1030	111.9990	Tikku and Cande (SI)
Ant	C31o	-62.1250	112.4130	Tikku and Cande (SI)
Ant	C31o	-62.1464	113.0579	RAE-5005
Ant	C31o	-62.1541	113.4680	GA-22913
Ant	C31o	-62.2220	113.9750	Tikku and Cande (SI)
Ant	C31o	-62.2741	114.1466	GA-22819
Ant	C31o	-62.3835	114.7837	RAE-5006
Ant	C31o	-62.3614	115.4233	RAE-50067
Ant	C31o	-62.3940	115.9990	Tikku and Cande (SI)
Ant	C31o	-62.4164	116.7520	GA-22912
Ant	C31o	-62.3161	117.5000	GA-22820
Ant	C31o	-62.3300	118.0000	Tikku and Cande (SI)
Ant	C31o	-62.2657	118.6971	GA-22911
Ant	C31o	-62.2600	119.8430	Tikku and Cande (SI)
Ant	C31o	-62.2480	120.4120	Tikku and Cande (SI)
Ant	C31o	-62.1632	120.8673	GA-22821
Ant	C31o	-62.1100	121.1050	Tikku and Cande (SI)
Ant	C31o	-62.0549	122.6309	GA-22908
Ant	C31o	-62.1360	123.8690	Tikku and Cande (SI)
Ant	C31o	-62.1730	124.2329	GA-22822
Ant	C31o	-62.2360	125.0980	Tikku and Cande (SI)
Ant	C31o	-62.2391	125.9161	GA-22823
Ant	C31o	-62.2530	126.8130	Tikku and Cande (SI)
Ant	C31o	-62.2460	126.8230	Tikku and Cande (SI)
Ant	C31o	-62.2605	127.6003	GA-22824
Ant	C31o	-62.2730	127.7730	Tikku and Cande (SI)
Ant	C31o	-62.1618	129.2832	GA-22825
Ant	C31o	-62.2840	130.5340	Tikku and Cande (SI)
Ant	C31o	-62.4330	131.9820	Tikku and Cande (SI)
Ant	C31o	-62.3790	132.0390	Tikku and Cande (SI)
Aus	C31o	-37.2720	120.5560	Tikku and Cande (SI)
Aus	C31o	-37.1330	121.0620	Tikku and Cande (SI)
Aus	C31o	-37.0900	121.4280	Tikku and Cande (SI)
Aus	C31o	-37.0550	121.7750	Tikku and Cande (SI)
Aus	C31o	-37.1630	122.5890	Tikku and Cande (SI)
Aus	C31o	-37.1880	123.4420	Tikku and Cande (SI)
Aus	C31o	-37.1280	123.6840	Tikku and Cande (SI)
Aus	C31o	-36.9750	125.2640	Tikku and Cande (SI)
Aus	C31o	-36.8070	126.3550	Tikku and Cande (SI)
Aus	C31o	-36.8070	126.3970	Tikku and Cande (SI)
Aus	C31o	-36.7690	126.4980	Tikku and Cande (SI)
Aus	C31o	-36.6810	127.9690	Tikku and Cande (SI)
Aus	C31o	-36.7740	128.9680	Tikku and Cande (SI)
Aus	C31o	-36.7740	129.4350	Tikku and Cande (SI)
Aus	C31o	-36.8060	129.6170	Tikku and Cande (SI)
Aus	C31o	-36.8240	130.8800	Tikku and Cande (SI)
Aus	C31o	-36.9240	132.2490	Tikku and Cande (SI)
Aus	C31o	-37.0880	132.6060	Tikku and Cande (SI)
Aus	C31o	-37.0630	132.7960	Tikku and Cande (SI)

Aus	C31o	-36.7150	134.4360	Tikku and Cande (SI)
Ant	C32y	-61.9911	103.9680	GA-22815
Ant	C32y	-62.1404	104.6700	GA-22917
Ant	C32y	-62.2613	104.8829	RAE-5002
Ant	C32y	-62.2950	107.2462	GA-22817
Ant	C32y	-62.6003	107.7154	GA-22915
Ant	C32y	-62.5982	108.2578	RAE-5003
Ant	C32y	-62.3234	110.2747	RAE-5004
Ant	C32y	-62.3264	110.7667	GA-22818
Ant	C32y	-62.3440	110.8340	Tikku and Cande (SI)
Ant	C32y	-62.2340	111.9980	Tikku and Cande (SI)
Ant	C32y	-62.3120	112.1900	Tikku and Cande (SI)
Ant	C32y	-62.4110	112.9950	Tikku and Cande (SI)
Ant	C32y	-62.3274	113.0754	RAE-5005
Ant	C32y	-62.4130	113.5000	Tikku and Cande (SI)
Ant	C32y	-62.5832	114.3213	GA-22819
Ant	C32y	-62.6000	114.5000	Tikku and Cande (SI)
Ant	C32y	-62.5322	114.7707	RAE-5006
Ant	C32y	-62.5217	115.4150	RAE-5006
Ant	C32y	-62.5990	116.0000	Tikku and Cande (SI)
Ant	C32y	-62.4690	117.0000	Tikku and Cande (SI)
Ant	C32y	-62.6156	117.0482	GA-22912
Ant	C32y	-62.4240	117.4998	GA-22820
Ant	C32y	-62.5250	117.9990	Tikku and Cande (SI)
Ant	C32y	-62.5302	118.2362	GA-22911
Ant	C32y	-62.4600	119.6750	Tikku and Cande (SI)
Ant	C32y	-62.4460	119.9260	Tikku and Cande (SI)
Ant	C32y	-62.3600	120.0040	Tikku and Cande (SI)
Ant	C32y	-62.3315	120.8672	GA-22821
Ant	C32y	-62.2320	121.0920	Tikku and Cande (SI)
Ant	C32y	-62.4346	123.1990	GA-22908
Ant	C32y	-62.3690	123.8310	Tikku and Cande (SI)
Ant	C32y	-62.3772	124.2329	GA-22822
Ant	C32y	-62.2930	124.7230	Tikku and Cande (SI)
Ant	C32y	-62.4300	125.9163	GA-22823
Ant	C32y	-62.4020	126.8460	Tikku and Cande (SI)
Ant	C32y	-62.4300	126.9190	Tikku and Cande (SI)
Ant	C32y	-62.3916	127.6003	GA-22824
Ant	C32y	-62.3890	127.7470	Tikku and Cande (SI)
Ant	C32y	-62.2808	129.2833	GA-22825
Ant	C32y	-62.5650	130.8330	Tikku and Cande (SI)
Ant	C32y	-62.4870	130.3990	Tikku and Cande (SI)
Ant	C32y	-62.5470	131.9930	Tikku and Cande (SI)
Ant	C32y	-62.4820	132.0340	Tikku and Cande (SI)
Aus	C32y	-37.6280	117.4840	Tikku and Cande (SI)
Aus	C32y	-37.6250	117.5990	Tikku and Cande (SI)
Aus	C32y	-37.7530	118.1710	Tikku and Cande (SI)
Aus	C32y	-37.6710	118.5840	Tikku and Cande (SI)
Aus	C32y	-37.5220	119.3440	Tikku and Cande (SI)
Aus	C32y	-37.4360	119.6630	Tikku and Cande (SI)
Aus	C32y	-37.1930	120.4530	Tikku and Cande (SI)
Aus	C32y	-37.0450	121.0250	Tikku and Cande (SI)
Aus	C32y	-37.2000	120.4950	Tikku and Cande (SI)
Aus	C32y	-36.9240	121.9290	Tikku and Cande (SI)
Aus	C32y	-36.9660	123.5510	Tikku and Cande (SI)
Aus	C32y	-36.9100	123.9570	Tikku and Cande (SI)
Aus	C32y	-36.8870	125.2140	Tikku and Cande (SI)
Aus	C32y	-36.7030	126.2400	Tikku and Cande (SI)
Aus	C32y	-36.7000	126.3950	Tikku and Cande (SI)
Aus	C32y	-36.4780	127.1490	Tikku and Cande (SI)

Aus	C32y	-36.5480	127.9740	Tikku and Cande (SI)
Aus	C32y	-36.6450	128.8850	Tikku and Cande (SI)
Aus	C32y	-36.6390	129.4360	Tikku and Cande (SI)
Aus	C32y	-36.6320	129.6190	Tikku and Cande (SI)
Aus	C32y	-36.5920	130.9020	Tikku and Cande (SI)
Aus	C32y	-36.6590	132.0360	Tikku and Cande (SI)
Aus	C32y	-36.8760	132.5250	Tikku and Cande (SI)
Aus	C32y	-36.8310	132.5420	Tikku and Cande (SI)
Aus	C32y	-36.9590	132.8050	Tikku and Cande (SI)
Ant	C33o	-62.0445	103.9503	GA-22815
Ant	C33o	-62.1896	104.4910	GA-22917
Ant	C33o	-62.3662	104.8998	RAE-5002
Ant	C33o	-62.4415	107.1888	GA-22817
Ant	C33o	-62.7450	108.0110	Tikku and Cande (SI)
Ant	C33o	-62.8326	108.2580	RAE-5003
Ant	C33o	-62.7090	109.5010	Tikku and Cande (SI)
Ant	C33o	-62.5663	110.2921	RAE-5004
Ant	C33o	-62.5330	110.7666	GA-22818
Ant	C33o	-62.5690	110.8330	Tikku and Cande (SI)
Ant	C33o	-62.6150	111.7400	Tikku and Cande (SI)
Ant	C33o	-62.6270	111.8280	Tikku and Cande (SI)
Ant	C33o	-62.5090	112.0010	Tikku and Cande (SI)
Ant	C33o	-62.5736	113.0990	RAE-5005
Ant	C33o	-62.6830	113.5000	Tikku and Cande (SI)
Ant	C33o	-62.8370	114.5000	Tikku and Cande (SI)
Ant	C33o	-62.8566	114.7394	RAE-5006
Ant	C33o	-62.9550	114.8248	GA-22819
Ant	C33o	-62.8475	115.3931	RAE-50067
Ant	C33o	-62.9330	116.0010	Tikku and Cande (SI)
Ant	C33o	-62.8580	117.0000	Tikku and Cande (SI)
Ant	C33o	-62.8267	117.3500	GA-22912
Ant	C33o	-62.7787	117.5000	GA-22820
Ant	C33o	-62.7456	117.7754	GA-22911
Ant	C33o	-62.7800	118.0010	Tikku and Cande (SI)
Ant	C33o	-62.8280	119.2110	Tikku and Cande (SI)
Ant	C33o	-62.7860	119.9440	Tikku and Cande (SI)
Ant	C33o	-62.6545	120.8672	GA-22821
Ant	C33o	-62.5920	121.0950	Tikku and Cande (SI)
Ant	C33o	-62.5990	122.4310	Tikku and Cande (SI)
Ant	C33o	-62.5695	123.4057	GA-22908
Ant	C33o	-62.6310	123.8990	Tikku and Cande (SI)
Ant	C33o	-62.5879	124.2331	GA-22822
Ant	C33o	-62.6356	125.9164	GA-22823
Ant	C33o	-62.7170	126.9010	Tikku and Cande (SI)
Ant	C33o	-62.8600	127.1790	Tikku and Cande (SI)
Ant	C33o	-62.6608	127.6002	GA-22824
Ant	C33o	-62.6980	127.7480	Tikku and Cande (SI)
Ant	C33o	-62.7041	129.2833	GA-22825
Ant	C33o	-62.6860	130.2670	Tikku and Cande (SI)
Ant	C33o	-62.8100	132.0170	Tikku and Cande (SI)
Ant	C33o	-63.0090	132.0950	Tikku and Cande (SI)
Aus	C33o	-37.4990	117.3800	Tikku and Cande (SI)
Aus	C33o	-37.5350	117.5190	Tikku and Cande (SI)
Aus	C33o	-37.5210	117.9220	Tikku and Cande (SI)
Aus	C33o	-37.5410	118.4350	Tikku and Cande (SI)
Aus	C33o	-37.4200	119.1080	Tikku and Cande (SI)
Aus	C33o	-37.3570	119.5780	Tikku and Cande (SI)
Aus	C33o	-37.1160	120.3520	Tikku and Cande (SI)
Aus	C33o	-36.8680	120.9500	Tikku and Cande (SI)
Aus	C33o	-36.9590	120.7270	Tikku and Cande (SI)

Aus	C33o	-36.7830	122.1210	Tikku and Cande (SI)
Aus	C33o	-36.8170	123.5830	Tikku and Cande (SI)
Aus	C33o	-36.7830	124.1210	Tikku and Cande (SI)
Aus	C33o	-36.5610	125.0470	Tikku and Cande (SI)
Aus	C33o	-36.5030	126.0300	Tikku and Cande (SI)
Aus	C33o	-36.3990	126.3810	Tikku and Cande (SI)
Aus	C33o	-36.1650	127.0780	Tikku and Cande (SI)
Aus	C33o	-36.1750	127.9830	Tikku and Cande (SI)
Aus	C33o	-36.2340	128.6370	Tikku and Cande (SI)
Aus	C33o	-36.2420	129.4220	Tikku and Cande (SI)
Aus	C33o	-36.3620	129.6040	Tikku and Cande (SI)
Aus	C33o	-36.3110	130.9550	Tikku and Cande (SI)
Aus	C33o	-36.3430	131.6180	Tikku and Cande (SI)
Aus	C33o	-36.2440	131.7340	Tikku and Cande (SI)
Aus	C33o	-36.3870	132.2550	Tikku and Cande (SI)
Aus	C33o	-36.5630	132.8020	Tikku and Cande (SI)
Aus	C33o	-36.5920	133.2220	Tikku and Cande (SI)
Aus	C33o	-36.7500	133.5610	Tikku and Cande (SI)
Ant	C34y	-61.6723	102.3500	GA-22919
Ant	C34y	-62.0864	103.9365	GA-22815
Ant	C34y	-62.2383	104.3330	GA-22817
Ant	C34y	-62.2613	104.8829	RAE-5002
Ant	C34y	-63.0320	108.0010	Tikku and Cande (SI)
Ant	C34y	-63.0242	108.2770	RAE-5003
Ant	C34y	-62.8660	109.4990	Tikku and Cande (SI)
Ant	C34y	-62.8086	110.3090	RAE-5004
Ant	C34y	-62.9130	110.3170	Tikku and Cande (SI)
Ant	C34y	-62.8350	110.8330	Tikku and Cande (SI)
Ant	C34y	-62.8270	110.9913	GA-22818
Ant	C34y	-62.9540	111.3600	Tikku and Cande (SI)
Ant	C34y	-63.0810	112.6660	Tikku and Cande (SI)
Ant	C34y	-63.0801	113.1517	RAE-5005
Ant	C34y	-63.1070	113.5000	Tikku and Cande (SI)
Ant	C34y	-63.2030	114.5000	Tikku and Cande (SI)
Ant	C34y	-63.2216	114.7044	RAE-5006
Ant	C34y	-63.2059	115.1733	GA-22819
Ant	C34y	-63.1948	115.3702	RAE-50067
Ant	C34y	-63.2390	116.0000	Tikku and Cande (SI)
Ant	C34y	-63.1290	117.0000	Tikku and Cande (SI)
Ant	C34y	-63.1562	117.4897	GA-22820
Ant	C34y	-63.1430	118.0000	Tikku and Cande (SI)
Ant	C34y	-63.1380	118.8690	Tikku and Cande (SI)
Ant	C34y	-63.1750	118.9510	Tikku and Cande (SI)
Ant	C34y	-63.1260	119.8940	Tikku and Cande (SI)
Ant	C34y	-62.9842	120.8670	GA-22821
Ant	C34y	-62.9460	123.9810	Tikku and Cande (SI)
Ant	C34y	-62.9382	123.9816	GA-22908
Ant	C34y	-62.8943	124.2332	GA-22822
Ant	C34y	-62.9000	125.9164	GA-22823
Ant	C34y	-63.0450	127.0510	Tikku and Cande (SI)
Ant	C34y	-63.1100	127.3390	Tikku and Cande (SI)
Ant	C34y	-63.1054	127.6549	GA-22824
Ant	C34y	-63.0960	127.7820	Tikku and Cande (SI)
Ant	C34y	-62.9842	129.3701	GA-22825
Ant	C34y	-63.1920	130.4990	Tikku and Cande (SI)
Ant	C34y	-63.2530	131.9140	Tikku and Cande (SI)
Ant	C34y	-63.2670	132.2300	Tikku and Cande (SI)
Aus	C34y	-37.2940	117.6760	Tikku and Cande (SI)
Aus	C34y	-37.2720	118.1200	Tikku and Cande (SI)
Aus	C34y	-37.3360	118.7920	Tikku and Cande (SI)

Aus	C34y	-37.3050	119.0760	Tikku and Cande (SI)
Aus	C34y	-37.2260	119.4350	Tikku and Cande (SI)
Aus	C34y	-36.9530	120.1840	Tikku and Cande (SI)
Aus	C34y	-36.7650	120.9120	Tikku and Cande (SI)
Aus	C34y	-36.6990	121.0110	Tikku and Cande (SI)
Aus	C34y	-36.6010	122.0250	Tikku and Cande (SI)
Aus	C34y	-36.5620	122.4540	Tikku and Cande (SI)
Aus	C34y	-36.5700	123.1480	Tikku and Cande (SI)
Aus	C34y	-36.5360	123.5670	Tikku and Cande (SI)
Aus	C34y	-36.5050	124.2670	Tikku and Cande (SI)
Aus	C34y	-36.3370	124.9130	Tikku and Cande (SI)
Aus	C34y	-36.2260	125.7390	Tikku and Cande (SI)
Aus	C34y	-35.9920	126.3550	Tikku and Cande (SI)
Aus	C34y	-36.0100	126.7850	Tikku and Cande (SI)
Aus	C34y	-36.0460	126.9040	Tikku and Cande (SI)
Aus	C34y	-36.0120	127.2400	Tikku and Cande (SI)
Aus	C34y	-35.9400	127.9360	Tikku and Cande (SI)
Aus	C34y	-36.0030	128.4990	Tikku and Cande (SI)
Aus	C34y	-35.9470	129.3570	Tikku and Cande (SI)
Aus	C34y	-35.9960	129.5470	Tikku and Cande (SI)
Aus	C34y	-35.9660	130.7300	Tikku and Cande (SI)
Aus	C34y	-36.0710	131.0040	Tikku and Cande (SI)
Aus	C34y	-36.0790	131.2700	Tikku and Cande (SI)
Ant	QZB	-62.8140	102.7073	Gravity
Ant	QZB	-62.9762	103.6671	Gravity
Ant	QZB	-63.2339	104.7690	Gravity
Ant	QZB	-63.3778	106.2620	Gravity
Ant	QZB	-63.4892	107.8617	Gravity
Ant	QZB	-63.4256	109.3547	Gravity
Ant	QZB	-63.4733	110.6344	Gravity
Ant	QZB	-63.5210	112.1629	Gravity
Ant	QZB	-63.5686	113.7981	Gravity
Ant	QZB	-63.7266	114.9001	Gravity
Ant	QZB	-63.7580	116.5352	Gravity
Ant	QZB	-63.6792	118.4903	Gravity
Ant	QZB	-63.6160	120.3388	Gravity
Ant	QZB	-63.6002	121.6896	Gravity
Ant	QZB	-63.6076	121.8335	Gravity
Ant	QZB	-63.6240	122.1739	Gravity
Ant	QZB	-63.6403	122.5744	Gravity
Ant	QZB	-63.6477	122.8982	Gravity
Ant	QZB	-63.6625	123.2887	Gravity
Ant	QZB	-63.6950	123.8358	Gravity
Ant	QZB	-63.7124	124.1004	Gravity
Ant	QZB	-63.7275	124.3229	Gravity
Ant	QZB	-63.7382	124.4763	Gravity
Ant	QZB	-63.7423	124.5334	Gravity
Ant	QZB	-63.8209	126.3819	Gravity
Ant	QZB	-63.7895	127.5549	Gravity
Ant	QZB	-63.7580	128.8702	Gravity
Ant	QZB	-63.6160	129.8655	Gravity
Ant	QZB	-63.6477	131.8206	Gravity
Ant	QZB	-63.7423	133.9535	Gravity
Ant	QZB	-63.8837	136.7617	Gravity
Ant	QZB	-64.1177	139.0012	Gravity
Ant	QZB	-64.2263	140.6364	Gravity
Ant	QZB	-64.5034	142.3071	Gravity
Ant	QZB	-64.7930	143.8712	Gravity
Ant	QZB	-65.1991	145.7908	Gravity
Ant	QZB	-65.4517	147.3904	Gravity

Ant	QZB	-65.6579	148.8479	Gravity
Ant	QZB	-65.7896	149.8787	Gravity
Aus	QZB	-37.1228	117.3528	Gravity
Aus	QZB	-36.9804	117.9927	Gravity
Aus	QZB	-37.1228	118.7747	Gravity
Aus	QZB	-36.8948	119.3790	Gravity
Aus	QZB	-36.7233	120.1255	Gravity
Aus	QZB	-36.5227	120.7298	Gravity
Aus	QZB	-36.3503	121.5119	Gravity
Aus	QZB	-36.1200	122.1873	Gravity
Aus	QZB	-36.2064	122.7205	Gravity
Aus	QZB	-36.2352	123.2537	Gravity
Aus	QZB	-36.1776	124.0357	Gravity
Aus	QZB	-36.0045	124.9244	Gravity
Aus	QZB	-35.7731	125.5998	Gravity
Aus	QZB	-35.6281	126.4174	Gravity
Aus	QZB	-35.4829	127.0217	Gravity
Aus	QZB	-35.4247	127.5549	Gravity
Aus	QZB	-35.3956	128.5147	Gravity
Aus	QZB	-35.4829	129.9011	Gravity
Aus	QZB	-35.5410	130.5765	Gravity
Aus	QZB	-35.6861	131.9628	Gravity
Aus	QZB	-35.9467	133.3492	Gravity
Aus	QZB	-36.1488	134.5578	Gravity
Aus	QZB	-36.3791	135.3754	Gravity
Aus	QZB	-36.7233	136.2996	Gravity
Aus	QZB	-37.0089	137.1528	Gravity
Aus	QZB	-37.2650	137.7215	Gravity

Table S3: Finite rotations for East Antarctica-Australia (Antarctica fixed). Finite rotations were computed following the methods of Hellinger (S7) and Royer and Chang (S8). Parameters: r , misfit; $\hat{\kappa}$, estimated quality factor; dF , degrees of freedom; N , number of data points; s , number of great circle segments; the uncertainty of fracture zone is $\sigma = 5.0$ km following Müller et al. (S9), magnetic anomaly identifications is $\sigma = 5.5$ km for chrons 20-31 and $\sigma = 9.0$ km for chrons 32-34, and gravity anomaly identifications (QZB – Quiet Zone Boundary) is $\sigma = 15$ km; ages are after Cande and Kent (S10) timescale.

Chron	Age Ma	Latitude +°N	Longitude °E	Angle °	r (km)	$\hat{\kappa}$	dF	N	s
20o	43.79	14.92	32.50	24.51	55.37	0.74	41	58	7
21y	46.26	13.60	33.60	24.64	8.83	3.06	27	42	6
24o	53.35	9.01	36.00	25.06	36.26	0.99	36	53	7
27y	60.92	5.51	38.57	25.30	44.92	0.73	33	48	6
31o	68.74	3.97	39.11	25.51	25.21	1.19	34	49	6
32y	71.07	1.04	40.65	25.85	47.21	0.83	53	72	8
33o	79.08	-3.54	42.94	26.58	79.80	0.58	62	79	7
34y	83.00	-7.69	44.79	27.49	48.36	0.79	48	67	8
QZB	96.00	-12.69	46.58	29.06	45.45	1.03	47	66	8

Table S4: Covariance matrices for finite rotations in Table S3.
 The covariance matrix is given by the formula

$$\frac{1}{\hat{\kappa}} * \begin{pmatrix} a & b & c \\ b & d & e \\ c & e & f \end{pmatrix} \times 10^{-8} \text{ where the values of a-f are given in radians squared.}$$

Chron	$\hat{\kappa}$	a	b	c	d	e	f	g
20o	0.74	0.63	-0.10	1.68	1.87	-3.10	6.76	6
21y	3.06	2.96	-4.16	9.41	6.19	-13.70	32.21	6
24o	0.99	1.35	-1.92	3.43	3.00	-5.54	12.88	6
27y	0.73	2.76	-4.03	9.38	6.20	-14.58	41.14	6
31o	1.19	3.68	-5.41	12.75	8.26	-19.41	53.67	6
32y	0.83	2.88	-4.50	8.96	7.82	-16.47	47.01	6
33o	0.58	1.67	-2.87	5.78	5.58	-11.62	30.02	6
34y	0.79	2.61	-4.23	8.12	7.52	-14.86	33.00	6
QZB	1.03	3.53	-4.06	8.19	6.09	-13.50	35.71	6

Table S5: Plate reconstructions before Izanagi-Pacific Ridge subduction involve recreating the now entirely subducted Izanagi oceanic plate. Our reconstructions (Figure 4) utilise the following assumptions:

Assumption	Explanation
Symmetrical Spreading	Subduction of the Izanagi plate at eastern Asian subduction zones means the only record of Izanagi spreading is contained in Pacific oceanic crust. Lacking the Izanagi oceanic flank we have assumed symmetrical spreading about the Izanagi-Pacific ridge. This is a reasonable assumption given that Müller et al. (<i>S11</i>) found the maximum observable cumulative ridge asymmetry to be approximately 10% globally.
Steady spreading rate	Due to the lack of magnetic reversals during the Cretaceous Quiet Zone the spreading rate of the Izanagi-Pacific plate pair from 118 Ma to 83 Ma cannot be determined directly. However, Late Jurassic to Early Cretaceous M-series magnetic anomalies in the west-central Pacific Ocean show no variation in spreading rate for at least 10 million years prior to the Cretaceous Normal Superchron (<i>S12</i>). With no other evidence for a change in spreading rate from the Pacific-Farallon or Pacific-Phoenix plate pairs, or other data, we have assumed that the Izanagi-Pacific M-sequence spreading rate continued throughout the Cretaceous Normal Superchron.

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