

Gondwana reconstruction, finite rotation poles, models:

Plate Model CR25BAAD (Hotspot Reference Frame)

Africa versus hotspot reference frame

400	10.000	-40.880	139.310	1.950
400	20.000	-40.880	139.310	3.900
400	30.000	-40.880	139.310	5.850
400	40.000	-40.880	139.310	7.800
400	46.540	-40.880	139.310	9.000
400	72.500	-35.597	144.888	14.524
400	100.500	-32.108	141.884	20.008
400	155.000	-23.909	142.941	31.235
400	200.000	-18.935	142.314	40.264
400	270.000	-16.386	139.508	53.955
400	300.000	-19.513	132.929	61.352

CR25BAAD

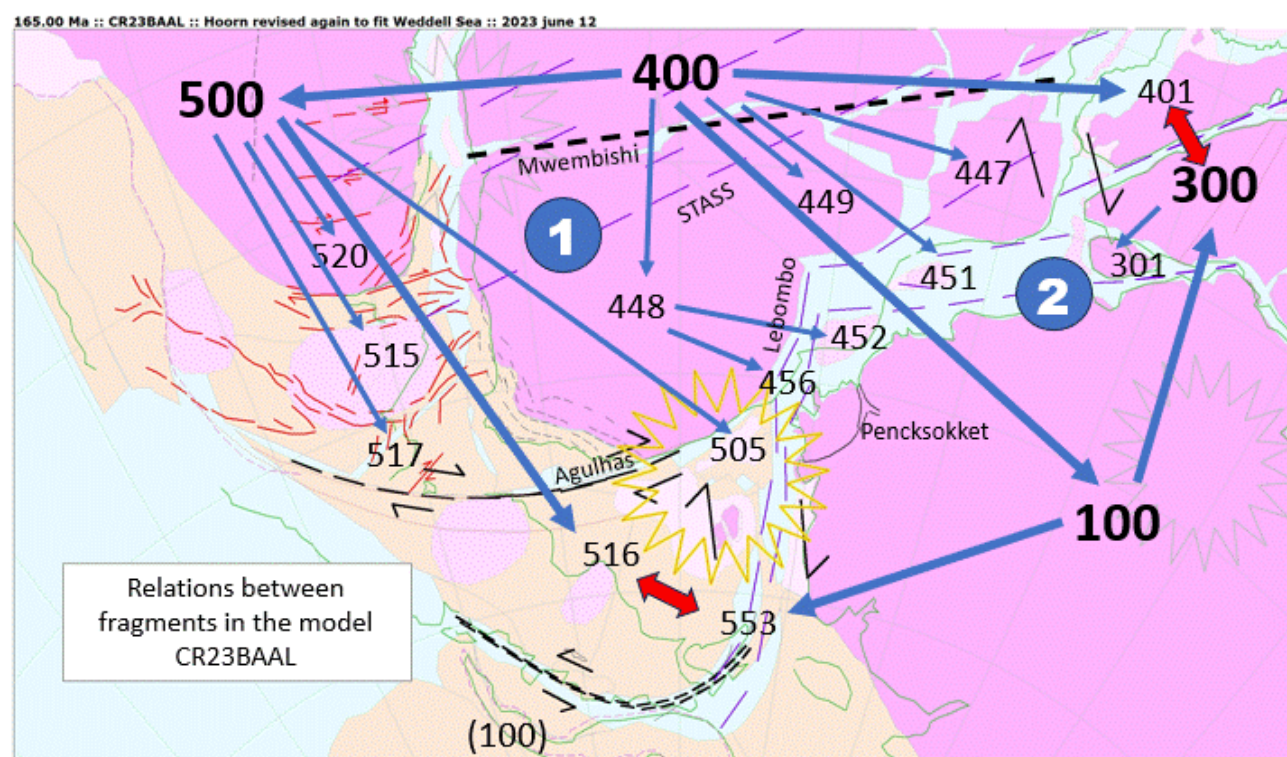


Figure 1. The structure of the plate model in two principal plate circuits, West Gondwana (1) and East Gondwana (2), that share the relation of Antarctica to Africa. The closure of each circuit is indicated in red. The motion of Africa with respect to a global reference frame is defined in the table at the head of this page. In all the subsequent tables, the motion of the fragments is presented with respect to a fixed Africa.

Plate model CR25AAAD (Africa fixed)

Plate Circuit 1: 553-100-448-400-500-516 (West Gondwana)

100 Antarctica versus Africa

100	22.000	5.520	-31.400	4.500	
100	38.000	5.520	-31.400	8.000	
100	53.000	4.421	-38.136	9.706	
100	67.000	1.452	-40.618	11.574	
100	70.000	0.080	-41.761	12.724	
100	83.640	-3.058	-37.546	18.455	C34
100	100.500	-1.001	-34.276	27.137	Base Cenomanian
100	113.200	-2.940	-31.903	34.461	Base Albian
100	121.400	-7.736	-28.348	40.553	M0 , base Aptian
100	124.700	-11.039	-25.466	43.956	M3/M2
100	127.500	-12.247	-24.299	46.188	M5/M4
100	130.680	-11.840	-24.771	47.606	M10
100	134.700	-11.322	-25.490	48.705	M11
100	137.700	-10.855	-26.136	49.745	M14
100	142.300	-10.322	-26.869	50.990	M18
100	154.940	-8.955	-28.724	54.496	base Kimmeridgian
100	184.200	-9.752	-31.387	57.808	base Toarcian
100	230.000	-9.752	-31.387	57.808	
100	300.000	-10.841	-31.681	57.956	CR25AAAD

448 Sub-Mwembishi Africa versus Africa

448	30.000	-23.330	13.870	0.150	
448	121.400	-23.330	13.870	0.150	
448	130.680	28.223	1.785	0.472	
448	178.000	28.223	1.785	0.472	
448	179.000	15.993	3.587	0.634	
448	230.000	15.993	3.587	0.634	
448	300.000	6.923	21.929	0.389	CR25AAAD

120 Mid-ocean ridge in Weddell Sea versus Africa

120	22.000	45.722	-33.509	5.805	
120	38.000	6.860	-29.032	10.626	
120	50.000	-4.524	-31.098	14.171	
120	53.000	-0.882	-31.584	14.251	
120	67.000	13.188	-32.747	15.469	
120	70.000	14.673	-34.088	16.477	
120	83.640	19.435	-32.784	22.002	
120	100.500	26.943	-33.662	29.170	
120	113.200	23.384	-31.736	35.074	
120	121.400	17.189	-28.525	39.340	
120	124.700	12.383	-25.680	41.839	

120	127.500	10.316	-24.546	43.697	
120	127.520	10.316	-24.549	43.705	
120	130.680	10.778	-24.475	45.102	
120	134.700	11.128	-25.086	46.187	
120	137.700	13.378	-25.605	46.867	
120	140.490	12.459	-25.430	47.914	
120	142.300	12.517	-25.487	48.457	
120	147.000	12.514	-26.549	49.693	
120	154.940	18.076	-28.499	49.779	
120	165.000	12.951	-27.180	52.100	
120	184.200	11.663	-29.452	53.640	
120	230.000	11.663	-29.452	53.640	
120	300.000	10.498	-29.713	53.401	CR25AAAD

500 South America versus Africa

500	22.000	61.850	-40.740	8.100	
500	43.960	63.127	-35.982	18.086	
500	48.000	63.252	-35.786	19.084	
500	53.000	63.465	-35.445	21.082	
500	67.000	63.754	-34.973	24.569	
500	71.900	63.924	-34.690	27.218	
500	83.640	64.157	-36.637	33.842	
500	100.500	58.780	-37.459	44.663	
500	113.200	54.590	-35.286	50.500	
500	124.700	50.566	-32.593	53.444	
500	142.300	46.802	-30.658	56.247	
500	555.000	46.802	-30.658	56.247	CR25AAAD

516 Hoorn versus Africa

516	22.000	61.850	-40.740	8.100	
516	43.960	63.127	-35.982	18.086	
516	48.000	63.252	-35.786	19.084	
516	53.000	63.465	-35.445	21.082	
516	67.000	63.754	-34.973	24.569	
516	71.900	63.924	-34.690	27.218	
516	83.640	64.157	-36.637	33.842	
516	100.500	58.780	-37.459	44.663	
516	113.200	54.590	-35.286	50.500	
516	121.400	45.330	-32.956	52.952	
516	124.700	42.763	-31.755	54.327	
516	130.680	36.214	-29.480	57.329	
516	134.700	33.960	-28.588	58.935	
516	137.700	31.802	-27.798	60.513	
516	142.300	29.827	-27.043	62.287	
516	154.940	24.878	-25.938	65.061	
516	165.000	22.545	-25.449	66.591	
516	555.000	22.545	-25.449	66.591	CR25AAAD

This plate circuit closes between the (conjectural) southern-and-eastern margin of the Malvinas Plateau (Hoorn, 516) and the Weddell Sea mid-ocean ridge (120). The objective has been to create a Weddell Sea mid-ocean ridge system that develops symmetrically about the ridge (120) initiated at 142.3 Ma. The elements of the plate circuit have been adjusted so as to minimise concertina-like growth of the ocean between Antarctica and 120.

Other fragments that make up the model in the area of the Bouvet triple junction are:

505 Maurice Ewing Bank versus Africa

505	22.000	61.850	-40.740	8.100	
505	43.960	63.127	-35.982	18.086	
505	48.000	63.252	-35.786	19.084	
505	53.000	63.465	-35.445	21.082	
505	67.000	63.754	-34.973	24.569	
505	71.900	63.924	-34.690	27.218	
505	83.640	64.157	-36.637	33.842	
505	100.500	58.780	-37.459	44.663	
505	113.200	54.590	-35.286	50.500	
505	121.400	55.845	-37.572	53.481	
505	124.700	52.938	-35.998	54.390	
505	130.680	47.174	-33.207	56.975	
505	134.700	44.253	-32.061	57.953	
505	142.300	41.497	-30.718	57.828	
505	555.000	41.497	-30.718	57.828	CR25AAAD

451 Beira High versus Africa

451	30.000	-23.330	13.870	0.150	
451	121.400	-23.330	13.870	0.150	
451	130.680	48.737	-16.807	0.564	
451	160.000	48.737	-16.807	0.564	
451	184.200	-23.686	32.121	18.045	
451	230.000	-23.686	32.121	18.045	
451	300.000	-24.362	32.797	17.956	CR25AAAD

452 Limpopia versus Africa

452	30.000	-23.330	13.870	0.150	
452	121.400	-23.330	13.870	0.150	
452	127.500	43.400	-127.090	1.714	
452	130.680	50.446	-115.096	2.200	
452	134.700	52.888	-107.920	2.797	
452	137.500	45.479	-88.603	3.269	
452	142.300	28.762	-76.795	4.497	
452	154.940	17.070	-68.550	8.091	
452	178.000	2.701	-67.670	10.468	

452	179.000	1.864	-66.658	10.631	
452	184.200	-0.407	-66.577	11.239	
452	230.000	-0.407	-66.577	11.239	
452	300.000	-2.206	-71.760	11.079	CR25AAAD

456 St Lucia fragment versus Africa

456	30.000	-23.330	13.870	0.150	
456	121.400	-23.330	13.870	0.150	
456	124.700	9.910	6.310	0.239	
456	130.680	-11.092	9.652	4.350	
456	134.700	-12.561	9.939	6.616	
456	178.000	-12.561	9.939	6.616	
456	179.000	-12.601	9.869	6.815	
456	230.000	-12.601	9.869	6.815	
456	300.000	-14.176	11.094	6.625	CR25AAAD

There are also three fragments between South America (500) and the Hoorn fragment (516):

520 Uruguay versus Africa

520	22.000	61.850	-40.740	8.100	
520	43.960	63.127	-35.982	18.086	
520	48.000	63.252	-35.786	19.084	
520	53.000	63.465	-35.445	21.082	
520	67.000	63.754	-34.973	24.569	
520	71.900	63.924	-34.690	27.218	
520	83.640	64.157	-36.637	33.842	
520	100.500	58.780	-37.459	44.663	
520	113.200	54.590	-35.286	50.500	
520	124.700	50.566	-32.593	53.444	
520	130.680	49.251	-31.882	54.371	
520	142.300	46.151	-30.272	56.852	CR25AAAD

515 South of BA No1 versus Africa

515	22.000	61.850	-40.740	8.100	
515	43.960	63.127	-35.982	18.086	
515	48.000	63.252	-35.786	19.084	
515	53.000	63.465	-35.445	21.082	
515	67.000	63.754	-34.973	24.569	
515	71.900	63.924	-34.690	27.218	
515	83.640	64.157	-36.637	33.842	
515	100.500	58.780	-37.459	44.663	
515	113.200	54.590	-35.286	50.500	
515	121.400	51.684	-33.289	52.573	
515	124.700	48.599	-32.291	53.473	
515	130.680	43.826	-31.132	54.680	
515	142.300	37.327	-28.460	58.269	CR25AAAD

517 South of BA No2 versus Africa

517	22.000	61.850	-40.740	8.100	
517	43.960	63.127	-35.982	18.086	
517	48.000	63.252	-35.786	19.084	
517	53.000	63.465	-35.445	21.082	
517	67.000	63.754	-34.973	24.569	
517	71.900	63.924	-34.690	27.218	
517	83.640	64.157	-36.637	33.842	
517	100.500	58.780	-37.459	44.663	
517	113.200	54.590	-35.286	50.500	
517	124.700	44.382	-32.053	53.773	
517	128.000	41.974	-31.545	54.541	
517	142.300	33.873	-28.549	59.709	
517	145.000	33.873	-28.549	59.709	
517	555.000	33.873	-28.549	59.709	CR24AAAR

Fragments 449 (Zimbabwe) and **447 (North Mozambique)** share the same movements as 448.

Plate Circuit 2: 401-400-448-100-300 (East Gondwana)

100 Antarctica versus Africa

100 Antarctica versus Africa

100	22.000	5.520	-31.400	4.500	
100	38.000	5.520	-31.400	8.000	
100	53.000	4.421	-38.136	9.706	
100	67.000	1.452	-40.618	11.574	
100	70.000	0.080	-41.761	12.724	
100	83.640	-3.058	-37.546	18.455	C34
100	100.500	-1.001	-34.276	27.137	Base Cenomanian
100	113.200	-2.940	-31.903	34.461	Base Albian
100	121.400	-7.736	-28.348	40.553	M0, base Aptian
100	124.700	-11.039	-25.466	43.956	M3/M2
100	127.500	-12.247	-24.299	46.188	M5/M4
100	130.680	-11.840	-24.771	47.606	M10
100	134.700	-11.322	-25.490	48.705	M11
100	137.700	-10.855	-26.136	49.745	M14
100	142.300	-10.322	-26.869	50.990	M18
100	154.940	-8.955	-28.724	54.496	base Kimmeridgian
100	184.200	-9.752	-31.387	57.808	base Toarcian
100	230.000	-9.752	-31.387	57.808	
100	300.000	-10.841	-31.681	57.956	CR25AAAD

401 Madagascar versus Africa

01	20.000	-23.330	13.870	0.300	
401	117.300	-23.330	13.870	0.300	
401	121.400	3.444	-89.178	1.146	
401	124.700	7.510	-98.917	5.122	
401	127.500	7.933	-99.963	8.169	
401	130.680	8.083	-100.337	10.368	
401	134.700	8.184	-100.589	12.667	
401	137.500	8.241	-100.731	14.467	
401	142.300	8.295	-100.868	16.767	
401	154.940	5.186	-93.093	19.841	
401	184.200	-2.104	-89.696	22.815	
401	230.000	-2.104	-89.696	22.815	
401	300.000	-4.838	-90.004	22.628	
401	555.000	-4.838	-90.004	22.628	CR25AAAD

India versus Africa

300	22.000	-13.511	-124.295	12.237	
300	33.430	-14.722	-123.790	18.577	
300	38.000	-15.738	-127.771	21.629	
300	42.860	-16.406	-132.036	25.418	
300	53.000	-16.140	-143.201	32.229	
300	67.000	-16.562	-152.795	42.323	
300	70.000	-17.288	-153.515	44.469	
300	72.500	-17.871	-154.239	45.818	
300	83.640	-20.747	-156.176	53.075	
300	89.000	-21.327	-157.661	57.716	
300	100.500	-21.431	-157.906	57.522	
300	113.200	-22.014	-158.094	56.845	
300	117.300	-22.395	-158.988	56.060	
300	121.400	-23.083	-158.699	55.873	
300	124.700	-23.445	-154.812	57.656	
300	127.500	-23.303	-151.502	59.666	
300	130.680	-23.514	-149.449	60.595	
300	134.700	-23.468	-147.568	61.826	
300	137.500	-23.771	-146.281	62.383	
300	137.700	-23.766	-146.167	62.468	
300	142.300	-23.436	-144.013	64.465	
300	154.940	-25.494	-140.548	64.883	
300	184.200	-28.554	-138.566	66.599	
300	230.000	-28.554	-138.566	66.599	
300	300.000	-29.290	-139.270	66.905	
300	555.000	-29.290	-139.270	66.905	CR25AAAD

448 Southern Kalahari versus Africa

448	30.000	-23.330	13.870	0.150	
448	121.400	-23.330	13.870	0.150	

448	130.680	28.223	1.785	0.472	
448	178.000	28.223	1.785	0.472	
448	179.000	15.993	3.587	0.634	
448	230.000	15.993	3.587	0.634	
448	300.000	6.923	21.929	0.389	
448	555.000	6.923	21.929	0.389	CR25AAAD

Fragments 449 (Zimbabwe) and **447 (North Mozambique)** share the same movements as 448.

This plate circuit closes between India and Madagascar. The movements of Madagascar against Africa and of India against Antarctica have been adjusted to minimise/eliminate relative movement between Madagascar and India before 130.68 Ma. The movement of India against Antarctica has been refined to ensure steady strike-slip movement of (Greater)India along (a) the long transform off Western Australia, 142.3 to 100.5 Ma and (b) the Davie Fracture Zone 142.3 to 130.68, i.e. while Madagascar is still fully attached to India.

200 Australia versus Africa

200	22.000	-15.236	-125.573	12.321	
200	33.430	-16.449	-125.079	18.701	
200	38.000	-16.861	-123.895	20.252	
200	42.860	-17.104	-124.193	22.311	
200	53.000	-13.515	-120.678	23.731	
200	67.000	-10.368	-116.252	25.695	
200	70.000	-10.374	-114.015	26.519	
200	83.640	-10.566	-102.690	28.800	
200	100.500	-10.454	-94.007	34.963	
200	113.200	-14.279	-83.460	37.991	
200	121.400	-20.591	-75.010	40.211	
200	124.700	-25.072	-69.880	41.183	
200	127.500	-26.934	-66.862	42.241	
200	130.680	-26.616	-65.739	43.529	
200	134.700	-26.079	-65.200	44.722	
200	137.700	-25.599	-64.723	45.847	
200	142.300	-25.054	-64.190	47.189	
200	154.940	-23.679	-62.869	50.945	
200	184.200	-24.435	-63.172	55.083	
200	230.000	-24.435	-63.172	55.083	
200	300.000	-25.532	-63.533	55.374	
200	555.000	-25.532	-63.533	55.374	CR25AAAD

Australia does not form part of either plate circuit. Rotations are included for completeness. The Australia-Antarctica poles are taken largely from published work supplemented with a closer fit to Antarctica in conformity with the principles adopted throughout our Gondwana reassembly.

301 Sri Lanka versus Africa

301	22.000	-13.511	-124.295	12.237	
301	33.430	-14.722	-123.790	18.577	
301	38.000	-15.738	-127.771	21.629	
301	42.860	-16.406	-132.036	25.418	
301	53.000	-16.140	-143.201	32.229	
301	67.000	-16.562	-152.795	42.323	
301	70.000	-17.288	-153.515	44.469	
301	72.500	-17.871	-154.239	45.818	
301	83.640	-20.747	-156.176	53.075	
301	89.000	-21.327	-157.661	57.716	
301	100.500	-21.431	-157.906	57.522	
301	112.000	-21.958	-158.076	56.908	
301	113.200	-20.298	-155.047	58.861	
301	115.200	-17.743	-150.844	62.121	
301	117.300	-14.427	-145.872	67.944	
301	121.400	-9.386	-137.863	81.511	
301	124.700	-11.418	-137.772	79.830	
301	127.500	-12.914	-137.498	78.380	
301	130.680	-13.661	-136.567	78.456	
301	134.700	-14.398	-135.839	78.501	
301	137.500	-15.181	-135.263	78.207	
301	137.700	-15.216	-135.211	78.235	
301	142.300	-15.828	-134.287	78.803	
301	154.940	-17.742	-131.780	79.825	
301	184.200	-20.441	-130.704	81.742	
301	230.000	-20.441	-130.704	81.742	
301	300.000	-21.025	-131.339	81.882	
301	555.000	-21.025	-131.339	81.882	CR25AAAD

Sri Lanka is confined between India and Antarctica, escaping first by growth of ocean between it and India, then between it and Antarctica.

CVR

Delft, 2025 February 19

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More details on the website: www.reeves.nl/gondwana