

Supplementary Table 1.
Shortening estimates used in
the reconstruction of the
Andes. See Figure 1 for section
locations.

Structure/Region	Transect	Type of data	Sense	Amount	Plate ID	Age	Reference	
Subandes	1	Shortening	e-w	11 km	2551	15-0 Ma	1	
	2	Shortening	e-w	20 km	2551	15-0 Ma	2, 3	
	3	Shortening	ne-sw	84 km	2553	24-0 Ma	4, 5	
	4	Shortening	ne-sw	95 km	2553	24-0 Ma	5	
	5	Shortening	ne-sw	24,7 km	2552	24-0 Ma	5, 6	
	6	Shortening	ne-sw	40 km	2546	24-0 Ma	3, 5, 7	
	7	Shortening	ne-sw	42,3 km	2546	24-0 Ma	5, 6	
	8	Shortening	ne-sw	56 km	2593	15-0 Ma	4, 8	
	9	Shortening	ne-sw	17 km	2544	15-0 Ma	9	
	10	Shortening	ne-sw	40 km	2544	15-0 Ma	1, 9	
	11	Shortening	ne-sw	20 km	2544	15-0 Ma	3, 9, 10	
	12	Shortening	ne-sw	105 km	2539	15-0 Ma	11, 12, 13	
	13	Shortening	ne-sw	135 km	2539	15-0 Ma	13, 14	
	14	Shortening	ne-sw	66 km	2536	15-0 Ma	13	
	15	Shortening	ne-sw	74 km	2536	15-0 Ma	13, 15	
	16	Shortening	ne-sw	72 km	2533	10-0 Ma	16, 17	
	18	Shortening	ene- wsw	86 km	2530	15-0 Ma	18	
	19	Shortening	e-w	67 km	2523	15-0 Ma	16, 19	
	21	Shortening	e-w	60-78 km	2519	15-0 Ma	20, 21	
	22	Shortening	e-w	60 km	2519	9-0 Ma	22	
			Rotation	ccw	13 degrees	2530, 36, 39	15-0 Ma	23
			Rotation	ccw	13 degrees	2533	10-0 Ma	23
		Rotation	cw	13 degrees	2519, 23, 28	15-0 Ma	23	

Eastern Cordillera	4	Shortening	ne-sw	47 km	2549	30-23 Ma	5
	5	Shortening	ne-sw	26 km	2547	30-20 Ma	5, 6
	7	Shortening	ne-sw	46 km	2554	30-20 Ma	5, 6
	9	Shortening	ne-sw	91 km	2596	45-20 Ma	9
	10	Shortening	ne-sw	81 km	2596	45-20 Ma	1, 9
	14	Shortening	ne-sw	123 km	2538	50-25 Ma	13, 24
	16	Shortening	ne-sw	142 km	2535	50-25 Ma	16, 17
	17	Shortening	ene- sw	136 km	2532	50-25 Ma	18
	19	Shortening	e-w	122 km	2525	40-20 Ma	16, 19
	21	Shortening	e-w	95 km	2522	40-20 Ma	25, 26, 27
	27	Shortening	e-w	70 km	2594	40-20 Ma	28, 29, 30
Interandes	14	Shortening	ne-sw	48 km	2537	45-25 Ma	13, 24
	16	Shortening	ne-sw	39 km	2534	20-10 Ma	16, 17
	18	Shortening	ene- sw	43 km	2529.2531	45-15 Ma	18
	19	Shortening	e-w	96 km	2524	25-15 Ma	16, 19
	21	Shortening	e-w	62 km	2520	20-10 Ma	25, 26, 27
Altiplano	9	Shortening	ne-sw	15 km	2597	15-0 Ma	9
	14	Shortening	ne-sw	40 km	2542	15-0 Ma	13
	16	Shortening	ne-sw	47 km	2587.2598	15-0 Ma	16
	19	Shortening	ne-sw	41 km	2526	15-0 Ma	16
	20	Shortening	e-w	24 km	2526	33-27 Ma	31
	20	Shortening	e-w	41 km	2526	15-0 Ma	31
Precordillera	29	Shortening	e-w	95 km	2505	13-0 Ma	32, 33
	31	Shortening	e-w	88 km	2505	13-0 Ma	33, 34
Principal Cordillera	29	Shortening	e-w	<30 km	2513	20-8,6 Ma	32, 35
	32	Shortening	e-w	55-60 km	2511	20-8,6 Ma	35, 36
	33	Shortening	e-w	55-60 km	2512	20-8,6 Ma	35, 36
	38	Shortening	e-w	73 km	2507	20-8,6 Ma	35, 36

	39	Shortening	e-w	29,5 km	2591	11,6-0 Ma	37
	39	Extension	e-w	3 km	2591	33,9-16 Ma	37
	40.41	Shortening	e-w	5,9-12,5 km	2589	100,5-56 Ma	37
	40.41	Extension	e-w	0,8-1 km	2589	56-11,6 Ma	37
	40.41	Shortening	e-w	5,3-13,2 km	2589	11,6-0 Ma	37
	42	Shortening	e-w	24 km	2502	11,6-0 Ma	37, 38
Frontal Cordillera	30	Shortening	e-w	8 km	2518	8,5-4 Ma	39, 40
	32.33	Shortening	e-w	18 km	2510	8,5-4 Ma	39, 40
	34.35	Shortening	e-w	15-23 km	2509	8,5-4 Ma	40, 41
	36.37	Shortening	e-w	8 km	2506	7,7-4 Ma	41
Santa Barbara System	23	Shortening	e-w	30 km	2517	26,7 Ma	27, 42
	24	Shortening	e-w	21 km	2517	26,7 Ma	27, 28
	25	Shortening	e-w	21 km	2517	26,7 Ma	27, 42
Puna	26	Shortening	e-w	37 km	2522	37,8-0 Ma	43
Patagonian Cordillera	43	Shortening	e-w	35 km	2586	11,6-5,3 Ma	44
	44	Shortening	e-w	29 km	2585	11,6-5,3 Ma	45
	45	Shortening	ne-sw	27 km	2584	88-74 Ma	46
	45	Shortening	ne-sw	6.1 km	2584	74-27 Ma	46
	45	Shortening	ne-sw	3.4 km	2584	27-21 Ma	46
	45	Shortening	ne-sw	2.2 km	2584	21-18 Ma	46
	45	Shortening	ne-sw	0.9 km	2584	18-0 Ma	46
	46	Shortening	ne-sw	~23 km	2583	84-33,9 Ma	47
	47	Shortening	ne-sw	~23 km	2584	84-33,9 Ma	47
	48	Shortening	ne-sw	~23 km	2585	84-33,9 Ma	47
	49	Shortening	ne-sw	50-83 km	2580	66-0 Ma	48
	50	Shortening	n-s	50-83 km	2581	66-0 Ma	38
Sierras Pampeanas	28	Shortening	e-w	20 km	2504	10-0 Ma	49, 50, 51

	29	Shortening	e-w	10-20 km	2504	10-0 Ma	36, 51
Magallanes-Fagnano Fault system		Strike slip	left lateral	50 km		8-0 Ma	52
Western Cordillera and coastal belt	5	Shortening	ne-sw	52,5 km	2555	50-0 Ma	6
	7	Shortening	ne-sw	80 km	2548	50-0 Ma	6
Subduction erosion	Between 22-27	Subduction erosion		~31 km	2527, 2516	20-0 Ma	53, 54
	Between 22-28	Subduction erosion		~31 km	2527, 2516	20-0 Ma	55
	29	Subduction erosion		~40 km	2514	15-0 Ma	56
	33	Subduction erosion		~40 km	2512	10-0 Ma	53
	41	Subduction erosion		~10 km	2503	11-3 Ma	53

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