SITE	Position		Velocity			Uncertainties			r
	Lon.	Lat.	Vlon	Vlat	Vup	σ_{lon}	σ_{lat}	σ_{up}	
AGUA	289.193	-30.982	21.91	6.16	-1.13	1.33	1.33	3.78	0.000
ANDA	288.930	-30.278	19.53	9.81	5.94	1.01	1.01	2.78	0.000
AZUL	300.119	-36.767	2.46	0.83	5.75	2.14	2.12	5.62	0.003
BSJL	288.662	-30.687	22.83	8.09	-3.94	1.22	1.22	3.5	-0.001
BTON*	288.513	-30.263	19.53	8.55	2.61	1.48	1.48	3.9	0.000
CENT	288.793	-30.962	21.84	7.97	8.92	1.01	1.01	2.82	0.000
CFAG*	291.767	-31.602	8.44	2.17	1.75	1.01	1.00	2.66	0.000
CHAN	288.972	-30.897	20.45	8.68	0.10	1.01	1.01	2.82	0.000
CHAP	289.500	-29.853	16.74	7.12	-	1.01	1.01	-	-0.001
CHIN	288.877	-31.488	19.43	6.32	-	1.70	1.70	-	0.004
CHIP	288.786	-31.115	24.00	8.58	5.61	1.08	1.08	2.98	0.000
CMBA*	289.001	-31.188	18.91	9.31	-	1.69	1.69	-	0.001
CMOR	289.204	-30.205	19.50	9.98	-	1.25	1.24	-	0.002
CNBA	288.542	-31.398	23.55	7.51	4.04	1.48	1.48	3.82	0.000
CNFL	288.711	-31.672	24.73	6.57	-	1.68	1.68	-	0.000
COGO	289.025	-31.153	21.93	7.64	7.55	1.07	1.07	2.98	0.000
CONS*	287.588	-35.331	35.96	11.74	-0.39	1.02	1.02	5.64	0.001
CONZ*	286.975	-36.844	34.50	10.45	-0.10	0.91	0.90	2.9	0.000
COP0*	289.662	-27.385	23.55	8.89	-	1.64	1.63	-	0.000
CORD	295.530	-31.528	4.85	5.06	-	2.72	2.67	-	0.001
CTAL	288.330	-30.929	27.01	9.59	-	1.14	1.13	-	0.000
DGF1*	289.338	-33.457	22.10	5.93	6.36	1.13	1.13	3	0.001
EALM	288.570	-31.413	22.83	7.68	1.31	1.08	1.08	3.08	0.001
EMAN	288.815	-30.175	18.49	9.04	3.61	1.01	1.01	2.8	0.000
EMAT*	288.337	-31.147	29.41	8.55	-	1.01	1.01	-	0.001
ESAU	288.316	-30.511	23.00	7.74	1.96	1.01	1.01	2.74	0.000
ESPI	288.545	-31.220	24.76	8.99	2.25	1.01	1.01	2.82	0.000
FUND	289.149	-30.383	17.27	9.35	4.53	1.01	1.01	2.86	0.000
HERA	288.621	-29.998	19.16	9.17	2.12	1.02	1.01	2.86	0.000
JUNT*	289.906	-29.977	18.42	7.78	-	2.23	2.18	-	0.000
LCAN	288.560	-30.789	23.40	8.30	-	1.08	1.08	-	0.000
LHCL	294.405	-38.003	1.02	0.35	3.73	1.03	1.03	3.02	0.000
LISL	288.989	-31.061	21.43	6.94	-	1.51	1.49	-	0.005
LMOL	289.542	-30.742	18.07	8.14	3.94	1.01	1.01	2.84	0.000
LPER	288.749	-30.365	17.93	10.32	6.88	1.01	1.01	2.82	0.000
LPGS	302.068	-34.907	1.62	1.22	4.00	0.87	0.87	2.92	0.000
LSCH*	288.754	-29.908	19.10	9.52	0.73	1.48	1.47	3.76	0.000
LVIL*	288.486	-31.909	24.61	8.03	3.19	1.01	1.01	2.72	0.000
MAUL*	289.179	-35.810	20.87	4.92	2.50	1.07	1.07	2.92	0.000
MECO	301.924	-29.185	3.83	1.07	6.45	1.48	1.47	3.78	-0.001
MPAT	288.987	-30.702	21.29	9.40	2.53	1.02	1.02	2.88	-0.001
MZAC*	291.124	-32.895	10.92	3.16	1.58	1.13	1.13	2.94	0.000
MZAE*	291.850	-33.255	10.98	1.48	3.63	2.11	2.11	5.58	0.000
MZAS*	291.665	-34.615	6.78	0.94	4.43	1.67	1.66	4.28	0.000
NIPA	288.534	-30.469	20.80	9.37	4.74	1.33	1.33	3.66	0.000
OVEJ	288.806	-31.293	21.38	8.81	6.76	1.01	1.01	2.84	0.000
OVLL*	288.796	-30.604	21.11	9.65	3.87	1.01	1.00	2.64	0.000
PACH	288.405	-30.457	21.01	8.60	-2.78	1.08	1.07	2.9	0.000
PEDR*	289.311	-30.839	20.09	10.20	0.99	1.48	1.48	3.94	0.000
PFRJ*	288.365	-30.675	23.90	7.97	3.01	1.48	1.48	3.82	0.000
PIDN	288.786	-30.815	22.74	8.61	4.27	1.01	1.01	2.88	0.000
POBR	288.496	-30.591	20.95	9.22	4.32	1.01	1.01	2.8	0.000
PORT*	289.870	-32.835	18.71	6.48	6.65	1.01	1.01	2.72	0.000
PTOM	288.428	-31.532	25.09	8.07	1.20	1.04	1.03	3.02	0.003
SANT*	289.331	-33.150	20.77	6.79	3.22	0.91	0.90	2.72	0.000
SGER	289.087	-29.892	19.19	5.16	-	1.68	1.68	-	-0.001
SJAV*	288.267	-35.595	30.68	7.24	2.84	1.07	1.07	2.92	0.000
SLMC*	289.037	-31.777	22.23	10.35	5.16	1.10	1.08	2.86	0.001
SPED	288.606	-31.015	23.80	8.60	3.81	1.01	1.01	2.78	0.000
TAHU	288.958	-30.477	18.97	8.86	4.11	1.01	1.01	2.82	0.000
TOLO*	289.194	-30.170	18.17	9.71	-	1.13	1.13	-	0.000
TONG	288.498	-30.249	20.93	8.42	3.84	1.10	1.09	3.22	0.009
TUCU	294.770	-26.843	5.10	0.89	-1.53	1.00	1.00	2.56	0.000
UCOR	295.806	-31.435	6.19	0.10	1.60	1.13	1.13	3.24	0.001
UNRO	299.372	-32.959	2.82	1.15	6.62	1.14	1.13	3	0.001
UNSJ	291.423	-31.541	12.86	3.78	0.41	1.66	1.66	4.12	0.000
VALN*	288.365	-33.028	28.48	9.82	-	1.14	1.13	-	0.001
VARI	289.250	-30.741	17.30	9.25	-	1.33	1.33	-	0.000
VBCA	297.731	-38.701	3.67	1.50	4.08	1.16	1.15	3.22	0.001
VNEV*	289.751	-33.354	19.50	6.15	-	1.01	1.01	-	0.000
ANTC*	288.468	-37.339	15.90	0.74	2.72	1.02	1.02	2.9	0.001

Table S1. Horizontal and vertical velocities in mm/yr obtained from our own calculation on LiA-Central network measured from May 2004 to December 2008. Those velocities are relative to the fixed South America reference frame defined by NNR-Nuvel1A. Sites marked with star are permanent stations.

SITE	Position		Velocity	Uncertainties
	Lon.	Lat.	Vup	σ_{up}
BAT0	288.038	-35.307	4.98	1.28
CAP0	286.728	-37.245	-8.24	5.27
CHL0	287.795	-36.639	7.16	2.34
CLM0	287.188	-36.236	-13.90	1.78
CO20	287.509	-35.412	-4.34	2.06
CO40	287.374	-35.586	-5.65	1.78
CO70	287.361	-35.843	-2.74	1.92
CO80	287.256	-35.949	-2.77	2.18
CT20	287.745	-35.464	0.68	1.92
CT30	287.914	-35.558	3.05	1.75
CT40	288.223	-35.616	6.55	2.25
CT60	288.931	-35.709	-1.36	1.15
CT70	289.166	-35.815	2.04	1.35
CT80	289.601	-35.991	1.74	1.35
LAJ0	287.303	-37.255	2.18	1.78
LLA0	288.656	-37.369	-3.33	1.44
LTA0	286.858	-37.059	-9.44	2.01
MIR0	288.250	-37.330	-2.82	1.72
MRC0	288.045	-37.411	3.84	1.28
NIN0	287.563	-36.410	-7.27	1.16
PTU0	287.731	-35.172	-0.43	1.58
PUN0	288.043	-35.750	-1.87	0.98
QLA0	287.875	-36.085	1.74	0.85
RAQ0	286.564	-37.256	-12.80	4.10
SANT	289.331	-33.150	2.39	0.71
SLT0	287.616	-37.216	-0.33	1.70
UCO0	286.965	-36.829	-5.80	3.17

Table S2. Vertical velocities (in mm/yr) on the LiA South network that were published in *Ruegg et al.* [2009]. We excluded several sites on different criteria to enhance the robustness of the data set. Uncertainties are original published uncertainties, before scaling procedure.

Set	Reference	Time span	Area	ITRF	Reference frame	$\langle\sigma\rangle$ mm/yr	obs.
CAP-South	[*Brooks et al.*, 2003]	93-01	26-36° S	97	SOAM GPS1	3.2	68
CAP-North	[*Bevis et al.*, 1999]	93-97	10-40° S	97	SOAM GPS2	1.5	6
SAGA-Central-1	[*Klotz et al.*, 2001]	94-96	22-42° S	97	SOAM GPS3	3.9	66
SAGA-Central-2	[*Khazaradze*, 2003]	94-97	17-42° S	97	SOAM GPS4	2.9	2
SAGA-South	[*Moreno et al.*, 2008]	02-07	36-39° S	00	ITRF00	3.0	19
LiA-MdB-South	[*Ruegg et al.*, 2009]	96-02	35-37° S	05	SOAM N1A	1.8	37
LiA-MdB-Central	[*this study*]	04-08	30-32° S	05	SOAM N1A	1.2	71

Table S3. Previously published data-sets used in our global compilation. The time span corresponds to the measurement period, the ITRF and reference frame columns correspond to the ITRF used in the calculation process and to the reference frame in which the data were effectively published respectively. "SOAM GPSX" means that authors published their data in an unclear South America-fixed reference frame formed by minimization procedure of fiducial cratonic stations, whereas "SOAM N1A" is the Nuvel1A model inspired reference frame defined by [*DeMets Gordon*, 1994] using the "no net rotation" hypothesis. The SAGA-South data-set was published in an unspecified SOAM reference frame, but the authors provided us with the ITRF00 solution. The mean uncertainty after scaling up for modelling purpose is indicated and last column presents the number of observation points in central Chile (40 to 24° S) for each data-set.

Set	Minimized stations	Applied pole lat-lon-° /Myr	mean residual mm/yr
CAP-South	TUCU-COPO-CFAG-SANR	$-48.53, -31.90, 0.04$	0.13
CAP-North	FORT-SANT-KOUR-LHCL-COPO CFAG-TUCU-BRAZ-LPGS	$-46.19, 42.42, 0.026$	0.17
SAGA-Central-1	BSJL-CONS-LISL-CMOR MAUL-PTOM-TONG	$-36.57, -68.85, 0.50$	0.28
SAGA-Central-2	LCHU/AR90-ZAHU/AR70 PATI/CO50-TOPI/TO10	$7.16, 104.4, 0.36$	0.24
SAGA-South	-	$-25.4, -124.6, 0.11$	-

Table S4. Rotation applied to individual data-sets to map them in the same reference frame. data-sets (first column), name of stations used to infer the rotation (second column), position (degree) and angular velocities (°/Myr) of applied rotations (third column), average residual (mm/yr) computed over the minimization stations (fourth column). The pairs of stations indicated for the rotation of the SAGA-North set are close enough to make the reasonable assumption that their velocities must be the same (supposing that the interseismic loading rate is constant).

Set	scaling factor	rescaled $\langle\sigma\rangle$
CAP-South	4	3.2
CAP-North	3	1.5
SAGA-Central-1	1	3.9
SAGA-Central-2	2	2.9
LiA-MdB-South	3	1.8
LiA-MdB-North	1	1.2

Table S5. Details of the rescaling procedure. Data-sets (first column), applied scaling coefficient f (second column), average σ after rescaling in mm/yr (third column).