

Dynamics of the Gibraltar Arc System:

A complex interaction between plate convergence, slab pull and mantle flow

Chiara Civiero^{1,2}, Susana Custódio², João C. Duarte^{2,3,4}, Virgílio B. Mendes², Claudio Faccenna⁵

¹ Dublin Institute for Advanced Studies (DIAS), Geophysics Section, 5 Merrion Square, Dublin D02 Y006, Ireland

² Instituto Dom Luiz (IDL), Faculdade de Ciências, Universidade de Lisboa, Lisboa 1749-016, Portugal

³ Departamento de Geologia, Faculdade de Ciências, Universidade de Lisboa, Lisboa 1749-016, Portugal

⁴ School of Earth, Atmosphere and Environment, Monash University, Melbourne, VIC 3800, Australia

⁵ Dipartimento di Scienze Geologiche, Università di Roma Tre, Rome, Italy

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Introduction

The Supporting Information contains additional figures and tables to show:

- the model of the Glacial Isostatic Adjustment (GIA) in the Gibraltar Arc System (Figure S1).
- the GPS vertical motion before and after GIA correction (Figure S2).
- difference between the residual topography computed using the PRISM3D model and:
 - DCRUST model (Figure S3a);
 - EPCRUST (Figure S3b).
- previous tomographic models of the region (Figure S4).
- two additional profiles crossing Rif and Betics to compare the seismic structure with the Moho depth, topography and residual topography trends (Figure S5).
- information on GPS stations and their velocities for a Nubia-fixed frame (Table T1) and for a Eurasia-fixed frame (Table T2).
- the initial models used to build the PRISM3D V_p (and V_s) model (Table T3) and the Moho depth (Table T4). More information about the method is in the Supplementary Information of Civiero et al., (2018) and Arroucau et al., (2017, EGU abstract). The related work is under review in GJI journal.

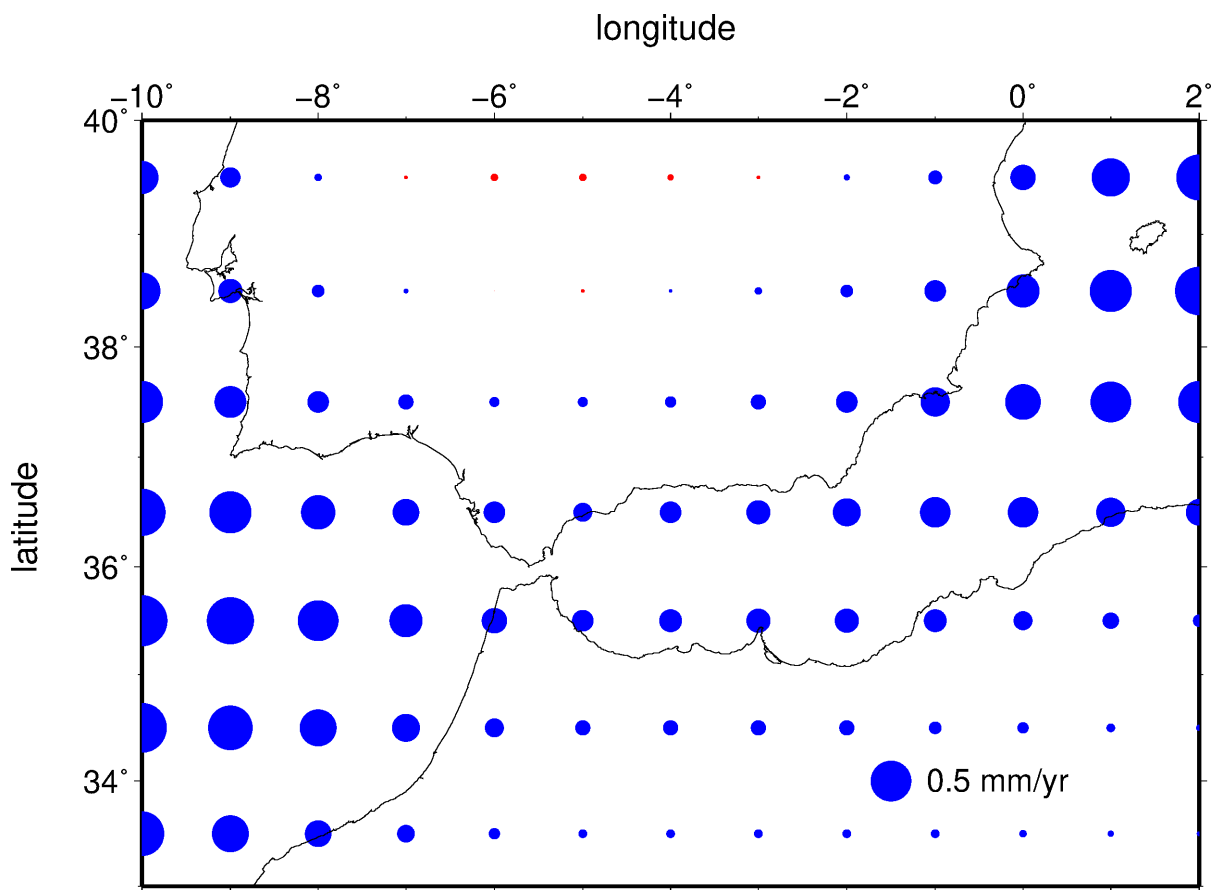


Figure S1. The ICE5G model of the glacial isostatic adjustment (GIA) in the Gibraltar Arc System from Peltier, (2004). Positive (red) is upward, and negative (blue) is downward motion.

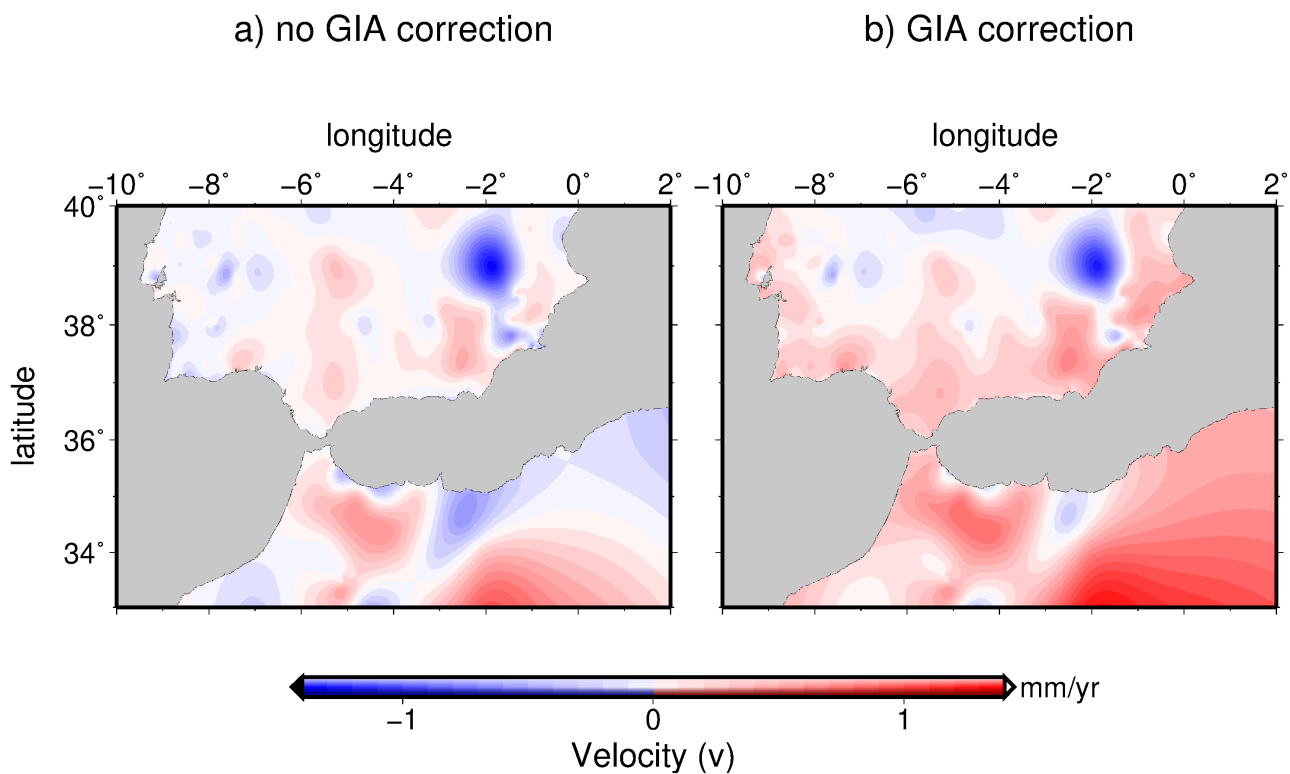
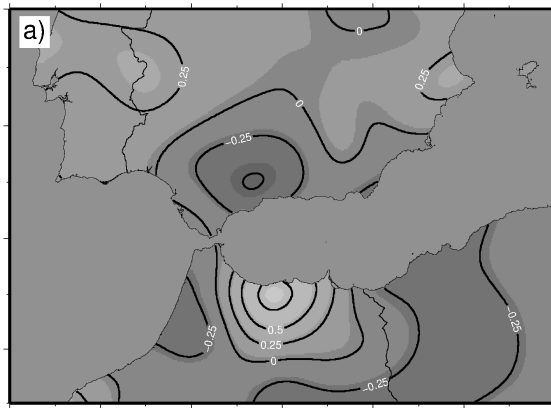


Figure S2. GPS vertical velocities without GIA corrections (a) and with GIA corrections from Figure S1 (b). Note the increase of surface uplift around Betics and Rif after the GIA corrections.

Difference between a) and b)



Difference between a) and c)

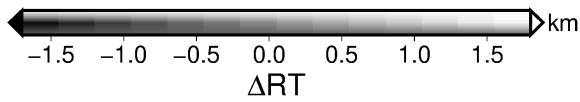
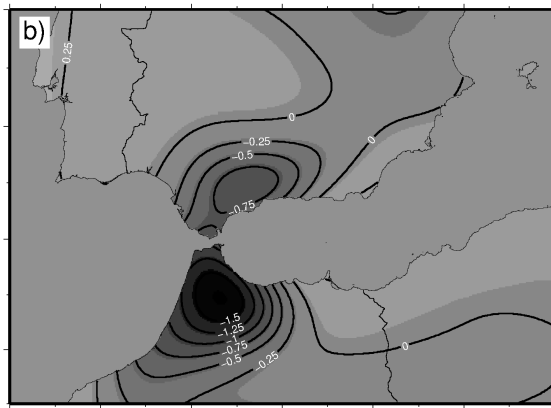


Figure S3. a) Difference between the residual topography for PRISM3D (panel a in Fig. 5) and residual topography for DCRUST (panel b in Fig. 5). b) Difference between the residual topography for PRISM3D (panel a in Fig. 5) and the residual topography for EPCRUST (panel c in Fig. 5)

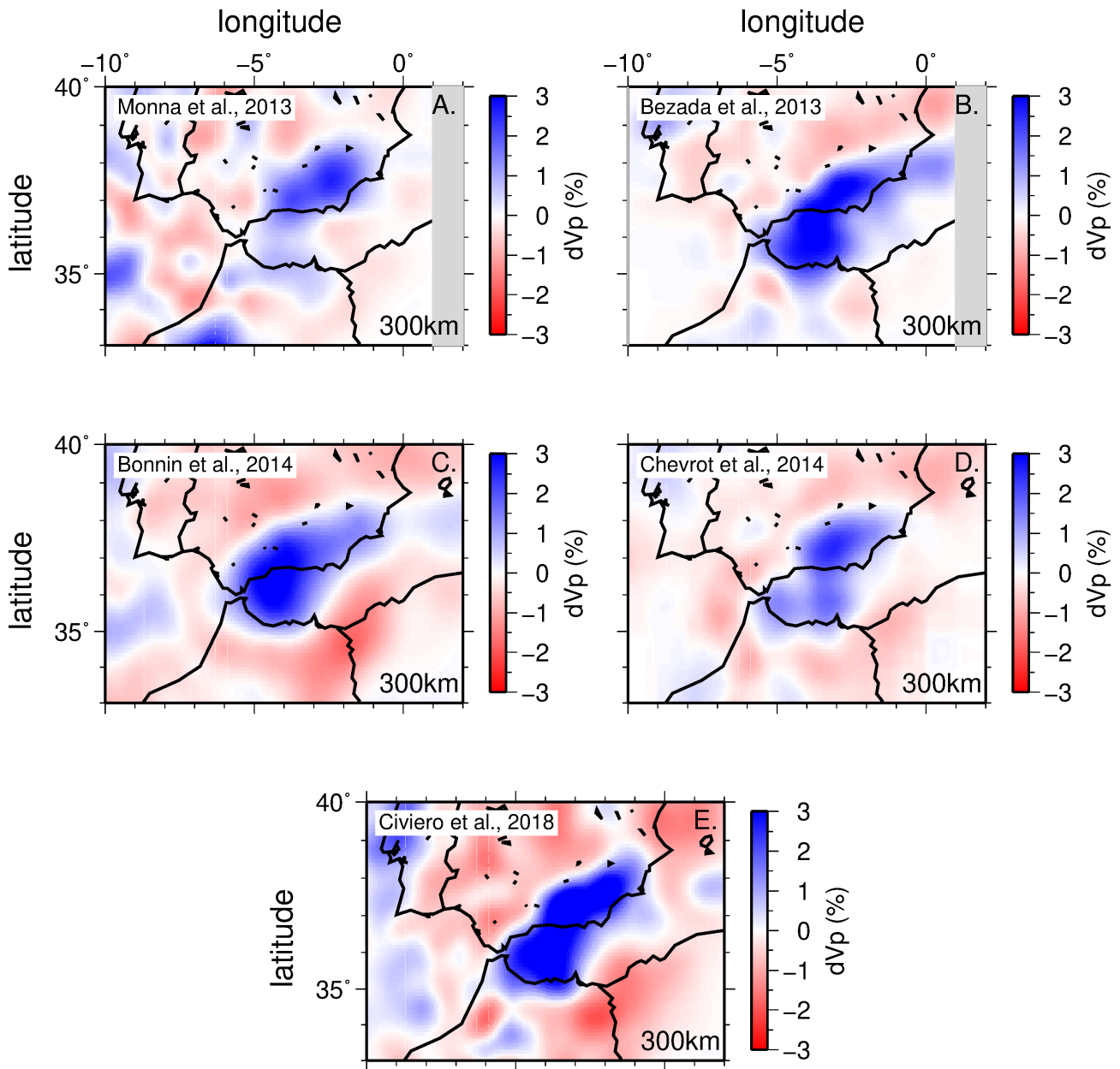


Figure S4. Recently published P-wave travel-time models, all shown at 300 km depth. P-wave model of: (A) Monna et al., (2013); (B) Bezada et al., (2013); (C) Bonnin et al., (2014); (D) Chevrot et al., (2014); (E) Civiero et al., (2018). Regions which are not included in previous models are shaded grey. Due to increased P-wave data coverage in IBEMP18, the model shows a clear improvement in resolution over previous models, allowing the imaging of smaller-scale upper-mantle structures below the Gibraltar Arc System region. Note that the velocities in panel E. are plotted with respect to the laterally averaged version of PRISM3D and LNLL models and expressed in %.

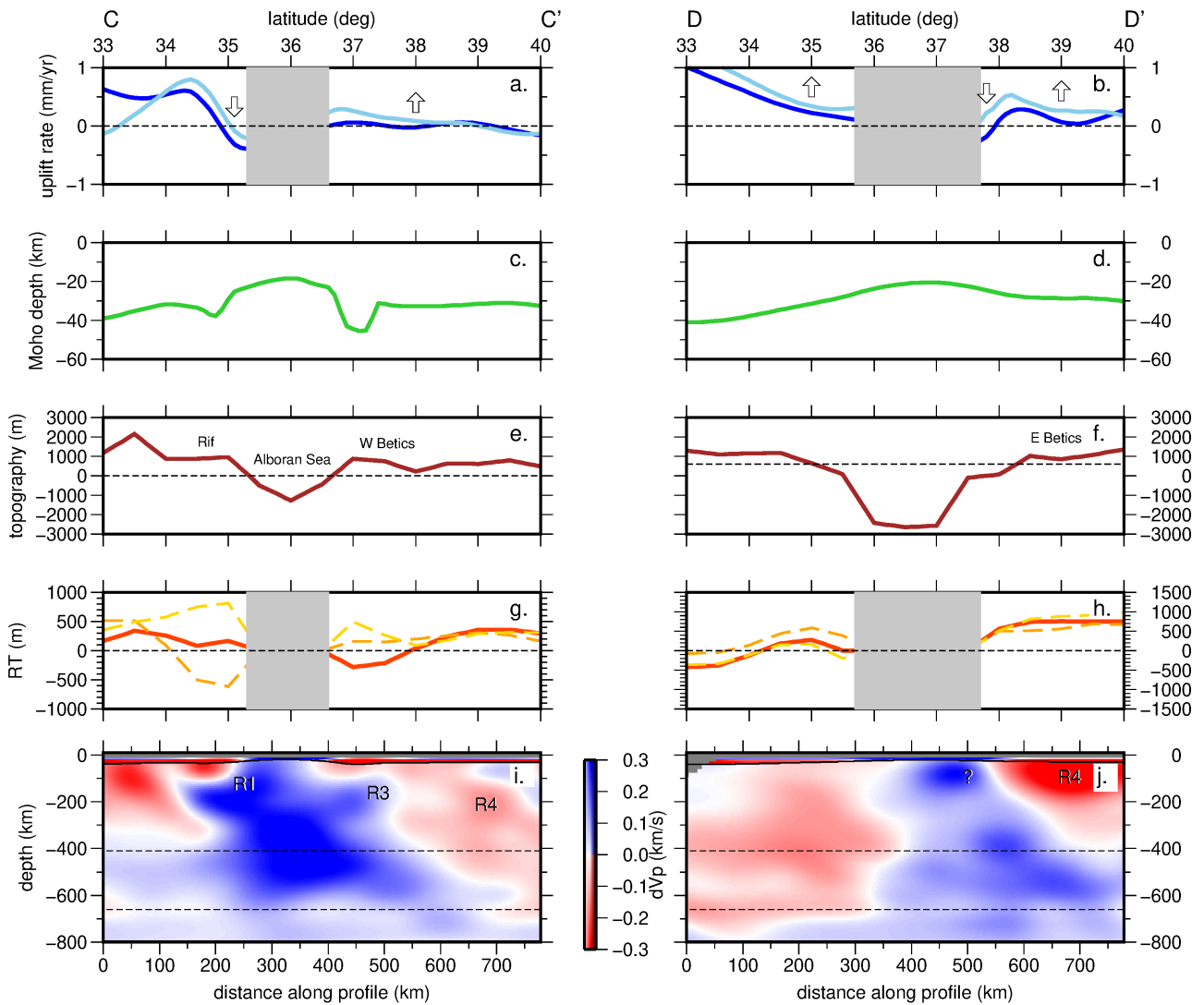


Figure S5. Cross-sections comparing geodetic vertical velocity, Moho depth, topography, and mantle structure along two representative profiles CC' and DD' through the Betics and the Rif. The orientation of the profiles is shown in Fig. 6b. a, b) Smoothed vertical GPS velocities without (dark blue line) and with GIA correction model ICE-5G (light blue line) applied. The sea domains are masked in grey due to the lack of data. c, d) Moho depth from Arroucau et al., (2017). e, f) Topography profiles (expressed in m) from SRTM30+ (Smith & Sandwell, 1997) e. g, h) Residual topography (expressed in m) using the PRISM3D (red line), DCRUST (orange) and EPCRUST (yellow line) crustal thickness. The sea domains are masked in gray. i, j) Seismic mantle structure from the P-wave tomographic model of Civiero et al., (2018). The regions discussed in the text are identified in each profile. Regions with no piercing points are shaded gray.

Sta	Long (°)	Lat (°)	E (mm/yr)	N (mm/yr)	σ_E (mm/yr)	σ_N (mm/yr)	ρ_{EN}
ABAN	358.94632	38.17506	3.96	-1.08	0.11	0.11	-0.01
AION	357.46745	34.58794	0.7	0.38	0.9	0.89	0.006
AIRM	358.87139	37.80652	3.56	-2.14	0.26	0.21	-0.002
ALAC	359.51877	38.33892	4.31	-1.81	0.1	0.09	-0.012
ALBA	358.1436	38.97792	3.46	-2.05	0.11	0.1	-0.01
ALBO	356.96576	35.93984	3.02	0.23	0.78	0.48	0
ALC1	359.52645	38.69799	3.98	-1.64	0.15	0.13	-0.005
ALCA	359.1392	37.73077	4.19	-1.03	0.12	0.12	-0.008
ALCO	351.12706	38.78532	3.64	-1.07	0.16	0.09	-0.015
ALGC	354.55582	36.11104	0.91	-0.77	0.21	0.16	-0.006
ALHA	358.55327	37.80424	5.14	-4.21	0.25	0.19	-0.002
ALME	357.54055	36.85253	3.06	-2.14	0.06	0.08	-0.035
ALMO	355.81975	38.70551	3.36	-0.98	0.19	0.36	-0.002
ALMR	357.55912	36.86267	3.38	-1.58	0.23	0.19	-0.003
AMAR	352.77212	38.2087	3.54	-0.95	0.07	0.07	-0.042
ANDU	355.96969	38.04038	3.86	-1.25	0.15	0.14	-0.007
ARAC	353.43459	37.89388	3.1	-0.86	0.25	0.13	-0.005
ARRA	351.0389	38.49276	3.53	-1.25	0.08	0.07	-0.039
AVIN	350.92056	38.98289	4.18	-0.96	0.26	0.21	-0.004
AVIS	352.11051	39.05661	3.73	-1.11	0.15	0.14	-0.009
AYOR	358.94079	39.06134	3.8	-2.53	0.11	0.11	-0.008
BADJ	353.01074	38.89369	3.68	-0.54	0.14	0.15	-0.008
BEJ0	352.12715	38.01288	3.47	-0.68	0.07	0.07	-0.047
BEJE	352.1346	37.99824	3.84	-1.27	0.09	0.21	-0.011
BENA	351.87331	37.23237	2.89	-1.27	0.08	0.11	-0.026
BMTR	357.96731	33.9864	0.94	0.59	0.45	0.43	0
BORB	352.53748	38.81032	4.91	-1.33	0.16	0.1	-0.012
BORR	359.91679	39.90518	4.84	-2.27	0.16	0.1	-0.005
CAAL	357.45239	37.22109	2.52	-2.57	0.28	0.28	-0.002
CABO	359.3016	37.63086	4.54	-1.11	0.34	0.27	-0.001
CABR	355.57576	37.46796	3.22	-1.28	0.09	0.09	-0.021
CARA	358.03232	38.04588	3.47	-2.41	0.21	0.2	-0.003
CARG	359.02615	37.5966	3.5	-0.25	0.33	0.24	-0.001
CASC	350.58148	38.69341	4.02	-0.99	0.06	0.06	-0.004
CATU	354.46121	38.73043	3.75	-1.38	0.07	0.07	-0.03
CAZA	354.24022	37.93788	3.29	-0.94	0.16	0.09	-0.013
CBRA	352.48782	39.81899	4.1	-1.09	0.14	0.13	-0.009
CCEX	353.62208	39.4723	3.15	-3.25	0.17	0.07	-0.013
CERC	351.28682	37.78978	3.39	-0.85	0.11	0.07	-0.028
CEU1	354.69361	35.89197	0.24	-1.03	0.15	0.13	-0.01
CIEZ	358.61913	38.23316	3.94	-1.22	0.1	0.14	-0.008
COBA	355.27889	37.91561	3.37	-1.5	0.1	0.12	-0.015
CORI	353.48036	39.98162	4.26	-1.09	0.09	0.12	-0.014
CRAI	350.86672	39.39418	4.08	-1.15	0.09	0.07	-0.031

CRDB	355.21217	37.8774	3.43	-1.62	0.15	0.09	-0.013
CRNH	350.86459	39.40701	3.78	-1.19	0.31	0.28	-0.002
CRTG	359.02071	37.60663	4.25	0.33	0.31	0.27	-0.001
CRVC	358.13136	38.11458	4.65	-2.6	0.32	0.48	0
DEBD	356.94464	33.91874	1.26	-0.05	0.47	0.44	0
DENI	0.10366	38.83478	4.03	-2.29	0.21	0.16	-0.002
ENTR	351.52609	39.47119	4.09	-0.79	0.25	0.24	-0.003
ESTR	352.4146	38.8466	2.57	-1.1	0.17	0.09	-0.013
EVOR	352.09564	38.5681	3.8	-0.85	0.07	0.08	-0.037
FARO	352.06249	37.0164	2.81	-1.1	0.07	0.07	-0.047
FCUL	350.84313	38.75647	3.98	-1.05	0.07	0.06	-0.051
FVFI	351.67949	38.7205	3.85	-0.02	0.17	0.24	-0.005
GRA1	356.4036	37.1899	2.69	-2.29	0.23	0.12	-0.005
GRIB	351.35827	39.04045	3.88	-0.78	0.09	0.09	-0.024
HEBR	354.86883	33.33268	0.84	-0.26	0.63	0.62	-0.001
HERR	354.94997	39.18144	3.84	-1.68	0.07	0.11	-0.019
HUEL	353.0797	37.19998	2.67	-0.76	0.05	0.06	-0.04
HULV	353.08646	37.28029	3.23	-0.89	0.09	0.16	-0.015
HUOV	358.05788	37.40156	4.15	-1.42	0.09	0.09	-0.018
IBIZ	1.44896	38.91125	4.67	-2.38	0.12	0.09	-0.006
IFR1	354.87447	33.51393	0.78	-0.91	0.12	0.11	-0.019
IFRN	354.89153	33.53962	0.82	-0.81	0.13	0.13	-0.015
IGP0	350.84148	38.72603	3.15	-1.84	0.12	0.11	-0.016
JERE	353.22057	38.32004	3.42	-1.11	0.08	0.11	-0.021
JUM3	358.67284	38.47122	4.45	-2.28	0.32	0.31	-0.001
JUMI	358.67435	38.50207	4.1	-1.92	0.12	0.11	-0.008
LAGO	351.33162	37.09894	3.42	-0.35	0.05	0.12	0.055
LAOU	354.84473	35.39494	-0.93	-1.9	0.63	0.62	0.007
LEIR	351.19467	39.72728	3.67	-1.02	0.1	0.08	-0.026
LLER	353.98929	38.23678	3.45	-1.27	0.13	0.07	-0.02
LRIA	351.2052	39.73153	4.07	-1.05	0.07	0.08	-0.035
MAFR	350.6739	38.93449	3.45	-1.57	0.09	0.12	-0.019
MALA	355.60647	36.72611	1.54	-2.2	0.22	0.18	-0.005
MAZA	358.68951	37.59344	3.96	-0.2	0.13	0.12	-0.007
MDAR	356.46783	34.97012	1.98	0.73	0.43	0.41	0.005
MELI	357.04835	35.28119	1.38	0.71	0.15	0.13	-0.009
MELR	351.86958	39.69484	4.12	-1	0.07	0.07	-0.035
MERT	352.33995	37.64654	3.53	-0.56	0.14	0.14	-0.011
MESS	351.75531	37.83463	3.49	-0.84	0.1	0.07	-0.03
MLGA	355.56459	36.7156	1.35	-2.5	0.09	0.14	-0.015
MOFR	354.53761	37.12072	2.58	-1.19	0.27	0.24	-0.002
MORA	358.00118	38.24753	4.11	-1.97	0.25	0.28	-0.001
MOTA	357.12999	39.50321	3.66	-2.23	0.19	0.18	-0.003
MOTR	356.47948	36.75476	1.65	-3.22	0.19	0.16	-0.005
MOUR	351.90554	39.50215	4.24	-1.24	0.16	0.17	-0.007
MSLA	355.8156	34.43172	0.53	-0.81	0.43	0.42	0.004

MULA	358.55116	38.04111	3.71	-1.94	0.23	0.21	-0.002
MUR2	358.87532	37.99216	4.32	-0.64	0.79	0.91	0.001
MURC	358.87748	37.99016	4.08	-1.48	0.13	0.08	-0.012
NAVA	354.45488	39.89485	4.07	-1.55	0.07	0.11	-0.019
OALN	350.81291	38.71056	4.17	-1.1	0.25	0.19	-0.005
ODEM	351.36875	37.59866	3.53	-0.39	0.15	0.14	-0.011
OSUN	354.90483	37.23231	2.92	-1.94	0.11	0.11	-0.013
OUZ1	354.46084	34.85042	-0.98	-1.53	0.68	0.69	0.011
PACO	350.70509	38.69434	3.5	-1.35	0.12	0.09	-0.021
PAIA	351.54848	39.53724	4.2	-1.13	0.18	0.18	-0.006
PALC	357.0676	37.70234	2.69	-2.4	0.15	0.09	-0.011
PMEL	351.09655	38.57146	3.71	-1.35	0.1	0.13	-0.017
PORT	352.56711	39.29094	3.97	-1.11	0.07	0.07	-0.036
POZO	355.15067	38.38347	3.56	-1.85	0.16	0.1	-0.01
ROAP	353.79373	36.46427	1.41	-1.09	0.3	0.3	-0.002
ROND	354.85652	36.75404	1.38	-1.5	0.45	0.44	-0.001
RRMT	353.0804	33.9582	0	-0.96	0.72	0.7	-0.014
SAGR	351.04036	37.02201	2.83	-0.47	0.09	0.1	-0.027
SALI	359.22147	37.8349	3.9	-1.56	0.32	0.26	-0.001
SALM	351.38054	33.1624	0.41	0.51	0.43	0.43	0.008
SCAC	351.3074	38.01878	3.33	-0.95	0.14	0.13	-0.012
SEVI	354.02844	37.34571	2.96	-0.91	0.25	0.11	-0.007
SFER	353.79435	36.46434	1.19	-0.9	0.14	0.12	-0.013
SMAM	352.64044	39.31324	4.15	-0.99	0.09	0.08	-0.025
SMAN	352.24801	38.45922	4.27	-0.94	0.15	0.12	-0.012
SMGR	351.70634	39.42278	3.86	-1.75	0.08	0.09	-0.027
SONS	356.03603	39.67535	4.04	-1.99	0.08	0.08	-0.02
TALR	354.76461	39.03508	4.19	-1.2	0.23	0.22	-0.001
TARI	354.39738	36.00851	1.09	-0.41	0.21	0.17	-0.006
TETN	354.63699	35.56164	-0.31	-1.41	0.08	0.06	-0.045
TNDR	357.99699	33.03131	0.94	-0.11	0.6	0.53	0.004
TNIN	354.04161	35.35076	0.84	-0.53	0.42	0.41	0.005
TOR1	359.31911	37.97532	4.02	-1.38	0.06	0.09	-0.019
TRRA	351.78082	38.29084	3.76	-1.09	0.24	0.23	-0.004
TRUJ	354.1444	39.47982	2.93	-1.02	0.07	0.11	-0.02
TVRA	352.35909	37.1323	3.14	-0.77	0.16	0.13	-0.01
UCA1	353.78814	36.53172	2.08	-1.27	0.32	0.32	0
UCAD	353.7895	36.53167	1.85	-0.88	0.46	0.45	-0.001
UJAE	356.21827	37.78776	3.42	-2.23	0.19	0.19	-0.004
UTIE	358.79141	39.56868	4.24	-2.24	0.16	0.13	-0.005
VALC	352.75172	39.40761	3.74	-1.35	0.14	0.13	-0.009
VALE	359.66235	39.48083	4.57	-2.08	0.12	0.1	-0.007
VIAR	356.98752	38.16764	3.36	-2.39	0.16	0.14	-0.006
VICA	356.91714	38.11764	3.34	-1.89	0.25	0.2	-0.002
VNOV	351.54298	38.67862	3.85	-0.87	0.09	0.08	-0.031
VRSA	352.58613	37.1918	2.77	-1.12	0.25	0.2	-0.003

ZAGO	354.46873	34.15795	0.46	-1.26	0.64	0.62	0.008
ZFRA	353.58996	38.42601	3.81	-1.5	0.13	0.11	-0.013
ELVA	352.84059	38.87937	4.3	-1.17	0.1	0.12	-0.016
MEDA	353.65144	38.91628	3.7	-0.98	0.13	0.07	-0.017
RABT	353.14571	33.9981	0.56	-0.17	0.07	0.07	-0.062

Table T1. List of GPS stations and their velocities for a Nubia-fixed frame used in this study (Sta= station code, Long= longitude, Lat= latitude, E= east velocity component, N= north velocity component, s_E = uncertainty for E, s_N = uncertainty for N, at the one-sigma level, s_{EN} = correlation between E and N).

Sta	Long (°)	Lat (°)	E (mm/yr)	N (mm/yr)	σ_E (mm/yr)	σ_N (mm/yr)	ρ_{EN}
ABAN	358.94632	38.17506	-0.14	0.8	0.11	0.11	-0.01
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ALC1	359.52645	38.69799	-0.14	0.29	0.15	0.13	-0.005
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AVIN	350.92056	38.98289	-0.11	0.12	0.26	0.21	-0.004
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BEJE	352.1346	37.99824	-0.37	-0.07	0.09	0.21	-0.011
BENA	351.87331	37.23237	-1.27	-0.09	0.08	0.11	-0.026
BMTR	357.96731	33.9864	-2.89	2.37	0.45	0.43	0
BORB	352.53748	38.81032	0.66	-0.08	0.16	0.1	-0.012
BORR	359.91679	39.90518	0.64	-0.3	0.16	0.1	-0.005
CAAL	357.45239	37.22109	-1.55	-0.84	0.28	0.28	-0.002
CABO	359.3016	37.63086	0.48	0.8	0.34	0.27	-0.001
CABR	355.57576	37.46796	-0.89	0.27	0.09	0.09	-0.021
CARA	358.03232	38.04588	-0.64	-0.62	0.21	0.2	-0.003
CARG	359.02615	37.5966	-0.56	1.64	0.33	0.24	-0.001
CASC	350.58148	38.69341	-0.25	0.06	0.06	0.06	-0.004
CATU	354.46121	38.73043	-0.47	0.06	0.07	0.07	-0.03
CAZA	354.24022	37.93788	-0.88	0.48	0.16	0.09	-0.013
CBRA	352.48782	39.81899	-0.23	0.16	0.14	0.13	-0.009
CCEX	353.62208	39.4723	-1.13	-1.89	0.17	0.07	-0.013
CERC	351.28682	37.78978	-0.81	0.27	0.11	0.07	-0.028
CEU1	354.69361	35.89197	-3.78	0.43	0.15	0.13	-0.01
CIEZ	358.61913	38.23316	-0.17	0.62	0.1	0.14	-0.008
COBA	355.27889	37.91561	-0.78	0.01	0.1	0.12	-0.015
CORI	353.48036	39.98162	-0.06	0.25	0.09	0.12	-0.014
CRAI	350.86672	39.39418	-0.23	-0.07	0.09	0.07	-0.031
CRDB	355.21217	37.8774	-0.72	-0.11	0.15	0.09	-0.013

CRNH	350.86459	39.40701	-0.54	-0.11	0.31	0.28	-0.002
CRTG	359.02071	37.60663	0.19	2.21	0.31	0.27	-0.001
CRVC	358.13136	38.11458	0.54	-0.8	0.32	0.48	0
DEBD	356.94464	33.91874	-2.58	1.64	0.47	0.44	0
DENI	0.10366	38.83478	-0.09	-0.3	0.21	0.16	-0.002
ENTR	351.52609	39.47119	-0.23	0.35	0.25	0.24	-0.003
ESTR	352.4146	38.8466	-1.69	0.13	0.17	0.09	-0.013
EVOR	352.09564	38.5681	-0.44	0.35	0.07	0.08	-0.037
FARO	352.06249	37.0164	-1.32	0.1	0.07	0.07	-0.047
FCUL	350.84313	38.75647	-0.29	0.03	0.07	0.06	-0.051
FVFI	351.67949	38.7205	-0.4	1.14	0.17	0.24	-0.005
GRA1	356.4036	37.1899	-1.39	-0.66	0.23	0.12	-0.005
GRIB	351.35827	39.04045	-0.4	0.35	0.09	0.09	-0.024
HEBR	354.86883	33.33268	-2.99	1.22	0.63	0.62	-0.001
HERR	354.94997	39.18144	-0.4	-0.19	0.07	0.11	-0.019
HUEL	353.0797	37.19998	-1.47	0.54	0.05	0.06	-0.04
HULV	353.08646	37.28029	-0.91	0.41	0.09	0.16	-0.015
HUOV	358.05788	37.40156	0.08	0.37	0.09	0.09	-0.018
IBIZ	1.44896	38.91125	0.58	-0.26	0.12	0.09	-0.006
IFR1	354.87447	33.51393	-3.07	0.57	0.12	0.11	-0.019
IFRN	354.89153	33.53962	-3.02	0.67	0.13	0.13	-0.015
IGP0	350.84148	38.72603	-1.12	-0.76	0.12	0.11	-0.016
JERE	353.22057	38.32004	-0.79	0.2	0.08	0.11	-0.021
JUM3	358.67284	38.47122	0.32	-0.43	0.32	0.31	-0.001
JUMI	358.67435	38.50207	-0.02	-0.07	0.12	0.11	-0.008
LAGO	351.33162	37.09894	-0.73	0.77	0.05	0.12	0.055
LAOU	354.84473	35.39494	-4.91	-0.42	0.63	0.62	0.007
LEIR	351.19467	39.72728	-0.66	0.09	0.1	0.08	-0.026
LLER	353.98929	38.23678	-0.74	0.12	0.13	0.07	-0.02
LRIA	351.2052	39.73153	-0.26	0.06	0.07	0.08	-0.035
MAFR	350.6739	38.93449	-0.84	-0.51	0.09	0.12	-0.019
MALA	355.60647	36.72611	-2.53	-0.65	0.22	0.18	-0.005
MAZA	358.68951	37.59344	-0.11	1.66	0.13	0.12	-0.007
MDAR	356.46783	34.97012	-1.94	2.36	0.43	0.41	0.005
MELI	357.04835	35.28119	-2.56	2.4	0.15	0.13	-0.009
MELR	351.86958	39.69484	-0.2	0.18	0.07	0.07	-0.035
MERT	352.33995	37.64654	-0.65	0.66	0.14	0.14	-0.011
MESS	351.75531	37.83463	-0.71	0.33	0.1	0.07	-0.03
MLGA	355.56459	36.7156	-2.71	-0.95	0.09	0.14	-0.015
MOFR	354.53761	37.12072	-1.53	0.25	0.27	0.24	-0.002
MORA	358.00118	38.24753	-0.02	-0.19	0.25	0.28	-0.001
MOTA	357.12999	39.50321	-0.56	-0.53	0.19	0.18	-0.003
MOTR	356.47948	36.75476	-2.4	-1.59	0.19	0.16	-0.005
MOUR	351.90554	39.50215	-0.07	-0.06	0.16	0.17	-0.007
MSLA	355.8156	34.43172	-3.37	0.76	0.43	0.42	0.004
MULA	358.55116	38.04111	-0.39	-0.1	0.23	0.21	-0.002

MUR2	358.87532	37.99216	0.23	1.23	0.79	0.91	0.001
MURC	358.87748	37.99016	-0.01	0.39	0.13	0.08	-0.012
NAVA	354.45488	39.89485	-0.22	-0.11	0.07	0.11	-0.019
OALN	350.81291	38.71056	-0.1	-0.03	0.25	0.19	-0.005
ODEM	351.36875	37.59866	-0.66	0.74	0.15	0.14	-0.011
OSUN	354.90483	37.23231	-1.19	-0.46	0.11	0.11	-0.013
OUZ1	354.46084	34.85042	-4.93	-0.09	0.68	0.69	0.011
PACO	350.70509	38.69434	-0.77	-0.29	0.12	0.09	-0.021
PAIA	351.54848	39.53724	-0.11	0.02	0.18	0.18	-0.006
PALC	357.0676	37.70234	-1.42	-0.71	0.15	0.09	-0.011
PMEL	351.09655	38.57146	-0.55	-0.25	0.1	0.13	-0.017
PORT	352.56711	39.29094	-0.31	0.14	0.07	0.07	-0.036
POZO	355.15067	38.38347	-0.63	-0.35	0.16	0.1	-0.01
ROAP	353.79373	36.46427	-2.66	0.28	0.3	0.3	-0.002
ROND	354.85652	36.75404	-2.7	-0.02	0.45	0.44	-0.001
RRMT	353.0804	33.9582	-3.9	0.34	0.72	0.7	-0.014
SAGR	351.04036	37.02201	-1.32	0.63	0.09	0.1	-0.027
SALI	359.22147	37.8349	-0.18	0.35	0.32	0.26	-0.001
SALM	351.38054	33.1624	-3.45	1.64	0.43	0.43	0.008
SCAC	351.3074	38.01878	-0.88	0.17	0.14	0.13	-0.012
SEVI	354.02844	37.34571	-1.17	0.48	0.25	0.11	-0.007
SFER	353.79435	36.46434	-2.88	0.47	0.14	0.12	-0.013
SMAM	352.64044	39.31324	-0.13	0.27	0.09	0.08	-0.025
SMAN	352.24801	38.45922	0.04	0.27	0.15	0.12	-0.012
SMGR	351.70634	39.42278	-0.44	-0.59	0.08	0.09	-0.027
SONS	356.03603	39.67535	-0.21	-0.4	0.08	0.08	-0.02
TALR	354.76461	39.03508	-0.04	0.26	0.23	0.22	-0.001
TARI	354.39738	36.00851	-2.94	1.02	0.21	0.17	-0.006
TETN	354.63699	35.56164	-4.31	0.04	0.08	0.06	-0.045
TNDR	357.99699	33.03131	-2.82	1.67	0.6	0.53	0.004
TNIN	354.04161	35.35076	-3.15	0.86	0.42	0.41	0.005
TOR1	359.31911	37.97532	-0.06	0.53	0.06	0.09	-0.019
TRRA	351.78082	38.29084	-0.47	0.08	0.24	0.23	-0.004
TRUJ	354.1444	39.47982	-1.35	0.38	0.07	0.11	-0.02
TVRA	352.35909	37.1323	-1	0.45	0.16	0.13	-0.01
UCA1	353.78814	36.53172	-2	0.1	0.32	0.32	0
UCAD	353.7895	36.53167	-2.23	0.49	0.46	0.45	-0.001
UJAE	356.21827	37.78776	-0.71	-0.62	0.19	0.19	-0.004
UTIE	358.79141	39.56868	0.04	-0.38	0.16	0.13	-0.005
VALC	352.75172	39.40761	-0.55	-0.08	0.14	0.13	-0.009
VALE	359.66235	39.48083	0.39	-0.13	0.12	0.1	-0.007
VIAR	356.98752	38.16764	-0.78	-0.7	0.16	0.14	-0.006
VICA	356.91714	38.11764	-0.79	-0.21	0.25	0.2	-0.002
VNOV	351.54298	38.67862	-0.41	0.28	0.09	0.08	-0.031
VRSA	352.58613	37.1918	-1.37	0.13	0.25	0.2	-0.003
ZAGO	354.46873	34.15795	-3.44	0.18	0.64	0.62	0.008

ZFRA	353.58996	38.42601	-0.4	-0.15	0.13	0.11	-0.013
ELVA	352.84059	38.87937	0.04	0.11	0.1	0.12	-0.016
MEDA	353.65144	38.91628	-0.55	0.38	0.13	0.07	-0.017
RABT	353.14571	33.9981	-3.34	1.14	0.07	0.07	-0.062

Table T2. Same as Table T1, for a Eurasia- fixed reference frame.

Reference	Type of study	Depth (km)
Crust		
Molinari & Morelli (2011)	Compilation of previous studies (Vp, Vs)	0-Moho
Macquet et al. (2014)	Ambient noise tomography (Vs)	0-60
Gaudot (2016)	Ambient noise tomography (Vs)	0-100
Silveira et al. (2016)	Ambient noise tomography (Vs)	0-50
Palomeras et al. (2017)	Surface wave tomography (Vs)	0-250
Lbadaoui et al. (2012)	Local earthquake tomography (Vp, Vs)	0-50
El Moudnib et al. (2015)	Local earthquake tomography (Vp)	0-100
Veludo et al. (2017)	Local earthquake tomography (Vp, Vs)	0-35
Afilhado et al. (2008)	Deep seismic sounding (Vp)	0-25
Sallarès et al. (2011)	Deep seismic sounding (Vp)	0-25
Martínez-Lorient et al. (2014)	Deep seismic sounding (Vp)	0-25
Pasyanos et al. (2014)	Surface wave traveltimes tomography (Vp, Vs)	0-400
Bezada et al. (2014)	Teleseismic P-wave traveltimes tomography (Vp)	0-700
Bonnin et al. (2014)	Teleseismic P-wave traveltimes tomography (Vp)	0-700
Theunissen et al. (2017)	Geological model (Vp, Vs)	0-60
Mantle		
Díaz et al. (2013)	Pn and Sn wave tomography (Vp, Vs)	sub-Moho
Pasyanos et al. (2014)	Surface wave traveltimes tomography (Vp, Vs)	0-400
Palomeras et al. (2014)	Surface wave tomography (Vs)	0-250
Chevrot et al. (2014)	Teleseismic P-wave traveltimes tomography (Vp)	0-500
Monna et al. (2013)	Teleseismic P-wave traveltimes tomography (Vp)	0-600
Bezada et al. (2014)	Teleseismic P-wave traveltimes tomography (Vp)	0-700
Bonnin et al. (2014)	Teleseismic P-wave traveltimes tomography (Vp)	0-700
Villaseñor et al. (2015)	Teleseismic P-wave traveltimes tomography (Vp)	0-700
Hall & Spakman (2015)	Teleseismic P-wave traveltimes tomography (Vp)	5-2815
Schivardi & Morelli (2011)	Teleseismic surface-wave traveltimes tomography (Vs)	70-490

Table T3. Input models to build the PRISM3D Vp and Vs structure from Arroucau et al. (2017).

Reference	Type of study
Molinari & Morelli (2011)	Integration of previous models
Díaz & Gallart (2009)	Integration of deep seismic soundings
Salah et al. (2011)	Receiver functions
Chevrot et al. (2015)	Receiver functions
Mancilla & Díaz (2015)	Receiver functions
Dünder et al. (2016)	Receiver functions
Afilhado et al. (2008)	Deep seismic sounding
Sallarès et al. (2011)	Deep seismic sounding
Martínez-Loriente et al. (2014)	Deep seismic sounding

Table T4. Input models to build the PRISM3D crust-mantle boundary (Moho) from Arroucau et al. (2017).