

## MATERIAL SUPLEMENTARIO

del artículo

Microfacies y edades U–Pb en lutitas gasíferas del  
Cretácico Superior des las cuencas de Sabinas y Parras, noreste de México

por

**Aurea Yahaira González–Betancourt, Eduardo González-Partida,  
Alejandro Carrillo-Chávez y Alexander Iriondo**

*Publicado en Revista Mexicana de Ciencias Geológicas, v. 39, núm. 3, 2022, p. 230-247.*

DOI: <https://doi.org/10.22201/cgeo.20072902e.2022.3.1696>

Tabla S1. Datos de elementos menores promedio en cada columna estratigráfica del Cenomaniaco-Turoniano.

Ubicación	Elementos	Ca	Si	Fe	Al	K	Zr	Mn	Zn	Mo	Ni	V	
	Columna												
Peyotes Burro-Península	CSI	P	411599.844	18870.1703	4879.12625	3450.50436	2270.49825	12.2697368	209.736	41.287	5.80675	63.3685	79.5561765
		D.E.	24852.9162	10611.8067	7118.19043	1843.14147	2377.94245	7.22757949	28.4788128	8.73205683	2.31566061	14.4215826	37.9859287
		Coef.V.	0.06038126	0.56235882	1.45890679	0.53416581	1.04732186	0.58905742	0.13578409	0.21149652	0.39878772	0.22758283	0.47747303
		P/Al							0.07784323	0.01531674	0.0021035	0.02398656	0.03096816
Península	CSII	P	362518.02	46960.8732	3213.79585	4704.65293	2000.18561	17.1487805	206.10439	54.1090244	6.55707317	55.65425	135.516053
		D.E.	54923.1555	24994.5752	1622.83816	2274.36125	1783.27081	10.225281	91.2301363	21.7207271	2.47427287	13.3561615	108.532806
		Coef.V.	0.15150462	0.532224256	0.50495994	0.48342806	0.89155266	0.5962687	0.44264043	0.40142522	0.3773441	0.23998457	0.80088524
		P/Al						0.05977391	0.01275261	0.00171489	0.01554046	0.02860392	
Cuenca de Sabinsas	CSIII	P	302734.229	76447.1381	11779.9389	14762.6011	8307.89486	43.7721622	220.282703	83.4848649	4.38555556	49.3988235	85.0558333
		D.E.	44176.0535	19435.1825	4099.42576	3216.40405	3104.43526	16.3371299	44.7516049	18.4804267	0.95331136	11.5350609	24.5726369
		Coef.V.	0.14592355	0.25423035	0.3480006	0.21787516	0.37367291	0.37323105	0.20315533	0.2213626	0.21737528	0.23350882	0.28890008
		P/Al							0.0157308	0.00583213	0.00031987	0.00348101	0.00591288
Cuenca de Cauhula	CSIV	P	371923.998	52193.4353	4485.08026	7381.32921	2274.30158	16.9845946	190.233684	47.6997368	5.29736842	44.5110345	43.0646667
		D.E.	18973.4679	8700.08439	2089.02465	1339.5325	1410.87352	6.87607793	41.5928433	16.0294689	1.32984389	14.3082964	25.6201199
		Coef.V.	0.05101437	0.16668925	0.46577197	0.18147578	0.62035463	0.40484204	0.21864079	0.33604942	0.25103859	0.32145504	0.59492205
		P/Al							0.02667584	0.00648402	0.00074028	0.00609716	0.00572391
Cuenca de Cauhula	CSV	P	354114.494	47719.119	4859.92797	4884.74	2423.29814	17.4430508	172.804915	62.0038983	5.53847458	60.8988136	64.7887931
		D.E.	35178.3902	14859.436	2894.14522	1859.4431	1615.30043	6.07645321	33.0651881	23.4652006	2.52371703	14.9336842	42.6080638
		Coef.V.	0.09934185	0.31139376	0.59551196	0.38066368	0.66657107	0.34835954	0.19134403	0.37844718	0.45567006	0.24522127	0.65764559
		P/Al							0.04215012	0.01413571	0.00138042	0.01456414	0.01417672
Cuenca de Cauhula	CSVI	P	282557.851	77655.8082	10880.5464	8798.71455	5745.11182	37.9528571	176.191818	56.4045455	5.97227273	44.7155	89.8
		D.E.	68397.5472	28217.7956	7130.34077	3390.47995	2854.67887	11.9051683	108.433956	21.134142	2.51199585	13.4273125	41.0976329
		Coef.V.	0.24206564	0.36337006	0.65532929	0.3853381	0.4968883	0.31368306	0.61543128	0.37468863	0.4206097	0.30028318	0.45765738
		P/Al							0.0264716	0.00750316	0.00091519	0.0057637	0.01000438
Bloque de Cauhula	CSVII	P	359469.859	36269.56	1735.22091	3403.27393	2323.7603	10.699697	145.757143	29.5153571	5.28225806	45.8903846	47.936
		D.E.	37187.9689	11888.7933	932.088698	1221.59974	1088.39959	4.54256844	31.5730323	5.24979328	1.41682205	10.7924527	24.7746066
		Coef.V.	0.10345226	0.32778984	0.53715852	0.3589484	0.4683786	0.42455113	0.21661396	0.1778665	0.2682228	0.23517896	0.51682674
		P/Al							0.04679864	0.00941837	0.00175652	0.01443748	0.01523512
Bloque de Cauhula	CSVIII	P	397499.143	15368.878	2361.72745	2896.07526	3352.9683	10.8048936	176.722326	30.50325	4.374	55.535	33.5947619
		D.E.	28051.9726	7928.15558	3863.38708	1581.13864	3315.55633	8.82647497	38.7849021	4.14516919	1.55925594	14.8527853	25.6306267
		Coef.V.	0.07057115	0.5158578	1.63583105	0.5459591	0.98884213	0.81689605	0.21946804	0.13589271	0.35648284	0.26744909	0.76293521
		P/Al							0.07646663	0.01328397	0.00216321	0.02284461	0.01173758
Cuenca de Parrays	CSIX	P	265919.578	89592.6224	11580.3997	8424.668	5423.38237	35.4533333	297.163818	98.4917778	7.72535571	53.7969565	112.975833
		D.E.	64429.6853	28576.477	9061.1947	4924.21881	3962.99009	31.394033	255.906683	41.5065322	7.19507355	12.4714709	58.2655058
		Coef.V.	0.24229012	0.31896016	0.78245958	0.58450004	0.73072297	0.885503	0.86116367	0.42142129	0.93133652	0.23182484	0.51573424
		P/Al							0.04198313	0.01617215	0.00168767	0.00900554	0.01829831
PROMEDIO TOTAL			345370.779	51230.8449	6197.30707	6522.95103	3791.2668	22.503234	199.444089	55.9443839	5.65992091	52.6410292	76.9209019
PROMEDIO TOTAL/AL			-	-	-	-	-	-	0.04598821	0.01121098	0.01285785	0.015629	

Leyenda: P=promedio, P/Al= promedio de datos normalizados con aluminio, D.E.= desviación estándar, Coef. V.= coeficiente de variación, FE=Formación Eagle Ford, FI= Formación Indidura.

Tabla S2. Edades U–Pb obtenidos por LA–ICPMS en granos de circon de tobas volcánicas intercaladas en lutitas gasíferas de Coahuila, NE de México.

Análisis/Circon U <sup>+</sup> (ppm)	Th <sup>+</sup> (ppm)	Th/U	$^{207}\text{Pb}/^{206}\text{Pb} \pm 2s$ $^{235}\text{U}^{\dagger}$	$^{207}\text{Pb}/^{235}\text{U} \pm 2s$ $^{238}\text{U}^{\ddagger}$	$^{206}\text{Pb}/^{238}\text{U} \pm 2s$ $^{238}\text{U}^{\ddagger}$	$^{208}\text{Pb}/^{232}\text{Th} \pm 2s$ $^{232}\text{Th}^{\ddagger}$	$\pm 2s$ Rho <sup>**</sup>	% disc <sup>***</sup> $^{206}\text{Pb}/^{238}\text{U}$	$^{207}\text{Pb}/^{235}\text{U} \pm 2s$ $^{235}\text{U}$	$\pm 2s$ $^{207}\text{Pb}/^{206}\text{Pb}$	$\pm 2s$ $^{206}\text{Pb}$	Mejor edad (Ma)	$\pm 2s$		
<b>Muestra CSVII-3; Toba volcánica; Miembro Inferior Fm. Indidura en localidad El Hundido, cuenca de Sabinas; (Probeta ICGEO-94)</b>															
CSVII-3-5	320	178	0.56	0.064	7.2	0.1124	6.7	0.0129	2.8	0.0051	5.1	0.418	23	82.6	2.3
CSVII-3-19	544	246	0.45	0.0714	7.1	0.1245	8	0.0129	6	0.0064	5.9	0.743	30	82.6	4.9
CSVII-3-1	185	83	0.45	0.0595	8.4	0.1174	8.3	0.0145	2.8	0.0055	8.4	0.342	17	92.7	2.6
CSVII-3-14	543	345	0.64	0.0546	4.6	0.109	5	0.0145	1.8	0.0052	4.2	0.362	13	92.7	1.7
CSVII-3-12	986	730	0.74	0.0556	4.3	0.1121	4.9	0.0145	1.9	0.0048	4.4	0.393	14	92.9	1.8
CSVII-3-23	970	503	0.52	0.0512	4.5	0.1021	4.7	0.0146	1.7	0.0046	3.3	0.365	5	93.1	1.6
CSVII-3-24	295	125	0.42	0.0705	9.5	0.1142	10.6	0.0148	3.1	0.0061	9.3	0.295	29	94.6	2.9
CSVII-3-18	565	260	0.46	0.0554	6.7	0.1151	7.2	0.0148	2.2	0.0051	5.5	0.299	14	95	2.1
CSVII-3-6	567	267	0.47	0.052	4.8	0.1048	4.6	0.015	2.1	0.0048	4.4	0.45	5	96.2	2
CSVII-3-9	185	159	0.86	0.0583	8.4	0.1213	7.8	0.0151	2.9	0.0052	5.4	0.372	16	96.7	2.8
CSVII-3-4	362	154	0.43	0.0516	7.6	0.1079	7.6	0.0152	2	0.0049	5.1	0.259	6	97.4	1.9
CSVII-3-17	410	177	0.43	0.0607	4.9	0.1261	5	0.0152	2.1	0.0057	5.6	0.421	19	97.5	2
CSVII-3-7	758	263	0.35	0.0518	4.4	0.1103	4.4	0.0153	2	0.0049	4.5	0.451	8	97.8	1.9
CSVII-3-22	689	297	0.43	0.0578	5.2	0.1215	6.5	0.0153	2.3	0.0057	4.7	0.352	15	98.2	2.3
CSVII-3-16	223	107	0.48	0.054	9.3	0.1114	8.8	0.0154	2.5	0.0056	6.8	0.289	10	98.3	2.5
CSVII-3-25	903	1190	1.32	0.049	3.7	0.105	4.1	0.0154	1.8	0.0048	3.3	0.429	3	98.3	1.7
CSVII-3-3	338	158	0.47	0.0606	8.1	0.129	7.8	0.0154	2.2	0.0053	5.4	0.285	20	98.4	2.2
CSVII-3-10	455	447	0.98	0.0501	5.8	0.1068	5.7	0.0154	1.9	0.0047	4.2	0.34	4	98.7	1.9
CSVII-3-2	624	443	0.71	0.0525	4.8	0.111	5.2	0.0155	1.9	0.0052	3.7	0.358	7	99.1	1.8
CSVII-3-15	36	17	0.46	0.087	18.4	0.172	18	0.0155	5.6	0.0067	19.4	0.311	36	99.2	5.5
CSVII-3-8	444	342	0.77	0.0502	4.6	0.1096	5.4	0.0155	2.8	0.0048	5.2	0.515	6	99.3	2.7
CSVII-3-21	475	276	0.58	0.053	5.1	0.1154	5.5	0.0156	2	0.0053	4.7	0.358	10	99.8	2.0
CSVII-3-20	414	209	0.5	0.0545	5.3	0.122	5.9	0.016	2.1	0.0059	5.6	0.35	12	102.3	2.1
CSVII-3-11	256	146	0.57	0.139	11.5	0.357	13.2	0.0179	3.4	0.0122	9.8	0.259	62	114.5	3.8
n = 24													<b>Edad <math>^{206}\text{Pb}/^{238}\text{U}</math> media ponderada =</b>	<b>98.2 ± 0.9</b>	
<i>(2-sigma, MSWD = 2.5; n = 15)</i>															
<b>Muestra CSVIII-30; Toba volcánica; Miembro Intermedio Fm. Indidura en localidad San Pedro, cuenca de Sabinas; (Probeta ICGEO-98)</b>															
CSVIII-30-8	172	19	0.11	0.086	19.8	0.085	24.7	0.0079	16.5	0.0108	14.8	0.666	40	50.7	8.5
CSVIII-30-6	34	8	0.22	0.108	21.3	0.187	20.3	0.0128	8.6	0.0144	15.3	0.423	51	82.1	6.7
CSVIII-30-13	25	8	0.3	0.115	15.7	0.228	17.1	0.0139	7.2	0.0134	24.6	0.421	57	88.8	6.5
CSVIII-30-12	88	69	0.79	0.0556	14.2	0.118	13.6	0.0147	4.8	0.0047	7.7	0.352	16	93.8	4.5
CSVIII-30-4	16	6	0.36	0.12	29.2	0.218	26.1	0.0147	9.5	0.0094	29.8	0.364	50	94.2	9
CSVIII-30-9	33	11	0.35	0.089	20.2	0.155	18.1	0.0147	8.2	0.0075	22.7	0.452	34	94.3	7.9
CSVIII-30-1	34	9	0.26	0.082	23.2	0.163	21.5	0.015	6.4	0.0088	19.3	0.299	37	95.7	6.1
CSVIII-30-10	429	313	0.73	0.052	6.3	0.1078	7.1	0.0151	2.4	0.005	4	0.338	7	96.6	2.3
CSVIII-30-2	59	30	0.5	0.069	17.4	0.147	17.7	0.0154	6.5	0.0065	14.7	0.367	28	98.4	6.6
CSVIII-30-11	20	5	0.28	0.084	27.4	0.175	26.9	0.0157	8.3	0.0099	24.2	0.308	37	100.3	8
CSVIII-30-7	23	7	0.28	0.105	20	0.237	20.3	0.0166	6.6	0.0138	18.8	0.327	50	105.9	7.2
CSVIII-30-3	50	23	0.46	0.07	13.3	0.166	13.9	0.0167	4.9	0.0067	14.7	0.354	30	106.9	5.2
n = 12													<b>Edad <math>^{206}\text{Pb}/^{238}\text{U}</math> media ponderada =</b>	<b>97.7 ± 3.2</b>	
<i>(2-sigma, MSWD = 3.0; n = 9)</i>															

continúa

Tabla S2 (cont.). Edades U–Pb obtenidos por LA–ICPMS en granos de circón de tobas volcánicas intercaladas en lutitas gasíferas de Coahuila, NE de México.

Analisis/CircónU <sup>r</sup> (ppm)	Th <sup>#</sup> (ppm)	Th/U	<sup>207</sup> Pb/ <sup>206</sup> Pb <sup>†</sup>	±2s	<sup>207</sup> Pb/ <sup>235</sup> U <sup>†</sup>	±2s	<sup>206</sup> Pb/ <sup>238</sup> U <sup>†</sup>	±2s	<sup>208</sup> Pb/ <sup>232</sup> Th <sup>†</sup>	±2s	Rho <sup>**</sup>	% disc <sup>***</sup>	<sup>206</sup> Pb/ <sup>238</sup> U	±2s	<sup>207</sup> Pb/ <sup>235</sup> U	±2s	<sup>206</sup> Pb/ <sup>206</sup> Pb	±2s	Mejor edad (Ma)	± 2s	
<b>Muestra CSVIII–19; Toba volcánica; Miembro superior Fm. Indidura en localidad San Pedro, cuenca de Sabinas; (Probeta ICGEO–98)</b>																					
CSVIII–19–2	549	329	0.6	0.0551	9.4	0.0403	9.9	0.0052	3.3	0.002	6.5	0.329	16	33.5	1.1	40.1	3.9	582	190	33.5	± 1.1
CSVIII–19–1	364	139	0.38	0.0502	7	0.1057	7.1	0.0151	2.4	0.0055	6.2	0.345	5	96.8	2.3	101.8	6.9	371	140	96.8	± 2.3
CSVIII–19–3	405	196	0.48	0.0556	6.8	0.1177	6.5	0.0151	2.4	0.0053	5.3	0.368	14	96.8	2.3	112.6	6.9	480	130	96.8	± 2.3
<b>Edad <sup>206</sup>Pb/<sup>238</sup>U de un único circón = 96.8 ± 2.3</b>																					
<b>Muestra CSVII–34; Toba volcánica; Miembro Intermedio Fm. Indidura (4 m debajo de la muestra CSVIII–30) en localidad El Hundido, cuenca de Sabinas; (Probeta ICGEO–94)</b>																					
CSVII–34–8	1325	1169	0.88	0.0815	3.4	0.1065	3.9	0.0096	3.1	0.0039	3.6	0.796	40	61.4	1.9	102.7	3.9	1228	65	61.4	± 1.9
CSVII–34–3	333	229	0.69	0.0917	7.5	0.16	7.5	0.013	3.8	0.0069	6.8	0.512	44	83.4	3.2	150	10	1420	140	83.4	± 3.2
CSVII–34–6	196	146	0.75	0.104	9.6	0.181	9.4	0.0134	6.2	0.0068	5.9	0.662	49	85.4	5.3	167	15	1680	200	85.4	± 5.3
CSVII–34–9	320	246	0.77	0.0665	7.2	0.1241	7.3	0.014	3.8	0.0052	6.2	0.515	24	89.8	3.4	118.4	8.2	750	150	89.8	± 3.4
CSVII–34–25	417	460	1.1	0.0555	6.5	0.1102	6.6	0.0147	1.9	0.0047	4	0.288	11	93.8	1.8	105.9	6.7	498	130	93.8	± 1.8
CSVII–34–23	383	203	0.53	0.0567	6.9	0.1179	6.5	0.0148	2.1	0.0051	5.5	0.321	16	94.6	2	112.8	7	612	140	94.6	± 2.0
CSVII–34–15	498	213	0.43	0.058	5.7	0.1196	6.2	0.0148	2.4	0.0053	5.8	0.393	17	94.7	2.3	114.4	6.7	569	120	94.7	± 2.3
CSVII–34–22	1022	1505	1.47	0.0557	4.1	0.1143	4.1	0.0148	1.9	0.0047	3	0.459	13	95	1.8	109.8	4.3	443	85	95	± 1.8
CSVII–34–12	41	13	0.32	0.084	20.2	0.176	18.8	0.0149	5.7	0.0098	15.3	0.301	43	95.1	5.3	168	27	1480	390	95.1	± 5.3
CSVII–34–2	955	633	0.66	0.051	4.5	0.1049	4.8	0.015	1.9	0.0046	3.9	0.405	5	96	1.8	101.2	4.6	295	96	96	± 1.8
CSVII–34–1	423	307	0.73	0.0609	9.4	0.119	9.2	0.015	3	0.0054	5.8	0.324	15	96.2	2.9	113.3	10	640	190	96.2	± 2.9
CSVII–34–10	176	117	0.66	0.0738	8.3	0.15	10	0.0151	3.7	0.006	8	0.365	32	96.3	3.5	141	13	1040	150	96.3	± 3.5
CSVII–34–16	193	94	0.48	0.0539	10.2	0.11	10	0.0151	3.2	0.0051	9.6	0.325	10	96.5	3.1	107	10	370	200	96.5	± 3.1
CSVII–34–24	551	315	0.57	0.0515	7	0.1068	6.6	0.0151	2	0.005	5.2	0.299	6	96.6	1.9	102.8	6.5	390	140	96.6	± 1.9
CSVII–34–21	490	468	0.96	0.0509	5.7	0.107	5.5	0.0151	2.3	0.0048	4.1	0.408	6	96.7	2.2	103	5.4	317	100	96.7	± 2.2
CSVII–34–4	382	306	0.8	0.0535	10.5	0.111	10.8	0.0152	2.3	0.0049	4.9	0.214	8	97	2.2	106	11	428	210	97	± 2.2
CSVII–34–13	304	158	0.52	0.0551	6.4	0.1149	6	0.0152	2.3	0.0054	5.9	0.383	12	97.3	2.2	110.2	6.3	506	130	97.3	± 2.2
CSVII–34–17	357	376	1.05	0.0559	8.4	0.1167	8.2	0.0152	2	0.005	4.8	0.248	13	97.3	1.9	111.6	8.8	524	180	97.3	± 1.9
CSVII–34–11	235	235	1	0.0581	8.3	0.123	8.9	0.0154	2.5	0.005	5.4	0.277	15	98.3	2.4	115.5	8.9	560	170	98.3	± 2.4
CSVII–34–18	453	475	1.05	0.0566	5.8	0.1199	6.2	0.0154	2.5	0.0051	4.3	0.401	14	98.3	2.4	114.7	6.7	507	130	98.3	± 2.4
CSVII–34–20	214	103	0.48	0.0533	9.9	0.112	8.9	0.0154	3.8	0.0053	7.5	0.43	9	98.3	3.7	107.6	9.5	460	200	98.3	± 3.7
CSVII–34–14	172	142	0.83	0.0593	10.5	0.129	11.6	0.0154	3.6	0.0054	8.3	0.307	19	98.5	3.5	122	13	710	200	98.5	± 3.5
CSVII–34–7	171	102	0.6	0.0596	8.4	0.13	8.5	0.0155	3	0.006	6.5	0.351	20	98.9	2.9	123.1	9.9	685	170	98.9	± 2.9
CSVII–34–19	520	363	0.7	0.0619	5	0.1325	5.1	0.0156	1.9	0.0055	4	0.375	21	99.7	1.9	126.1	6.1	670	110	99.7	± 1.9
CSVII–34–5	179	179	1	0.0484	8.3	0.1155	8.7	0.0168	3.3	0.0053	6	0.377	3	107.6	3.5	110.5	9	357	150	107.6	± 3.5
<b>Edad <sup>206</sup>Pb/<sup>238</sup>U media ponderada = 96.6 ± 0.9</b>																					
<b>n = 25</b>																					
<b>(2–sigma, MSWD = 2.4; n = 18)</b>																					
<b>Muestra CSVII–14; Toba volcánica; Miembro Intermedio Fm. Indidura en localidad El Hundido, cuenca de Sabinas; (Probeta ICGEO–94)</b>																					
CSVII–14–16	482	432	0.9	0.0702	10.1	0.133	8.3	0.0142	2.5	0.0062	9.7	0.307	28	90.8	2.3	126	9.7	900	200	90.8	± 2.3
CSVII–14–15	274	307	1.12	0.0571	7.9	0.1124	7.3	0.0145	2.8	0.0051	4.5	0.379	14	92.6	2.6	107.8	7.4	550	160	92.6	± 2.6
CSVII–14–21	310	329	1.06	0.0639	7	0.1287	7.5	0.0145	2.5	0.005	5	0.372	24	92.6	2.3	122.3	9.1	739	160	92.6	± 2.3
CSVII–14–9	364	396	1.09	0.0578	5.9	0.1139	5.8	0.0146	2.3	0.005	4.4	0.422	15	93.1	2.2	109.3	5.7	564	130	93.1	± 2.2
CSVII–14–12	676	265	0.39	0.0497	4.4	0.0999	4.9	0.0146	1.9	0.0048	5.5	0.378	3	93.3	1.7	96.6	4.5	275	91	93.3	± 1.7
CSVII–14–24	670	253	0.38	0.0496	4.6	0.0998	5.1	0.0146	1.6	0.0049	5.1	0.322	3	93.3	1.5	96.4	4.7	272	99	93.3	± 1.5
CSVII–14–4	229	123	0.54	0.0543	9.8	0.108	10.2	0.0147	2.5	0.005	7.8	0.247	9	94.3	2.3	103.8	9.7	414	190	94.3	± 2.3

continúa

Tabla S2 (cont.). Edades U–Pb obtenidos por LA–ICPMS en granos de circon de tobas volcánicas intercaladas en lutitas gasíferas de Coahuila, NE de México.

Analisis/CirconU# (ppm)	Th# (ppm)	Th/U	<sup>207</sup> Pb/ <sup>206</sup> Pb	$\pm 2s$	<sup>207</sup> Pb/ <sup>235</sup> U	$\pm 2s$	<sup>208</sup> Pb/ <sup>232</sup> Th	$\pm 2s$	Rho <sup>**</sup>	% disc <sup>***</sup>	<sup>206</sup> Pb/ <sup>238</sup> U	$\pm 2s$	<sup>207</sup> Pb/ <sup>206</sup> Pb	$\pm 2s$	Mejor edad (Ma)	$\pm 2s$					
<b>Muestra CSVII-14 (continuación); Toba volcánica; Miembro Intermedio Fm. Indidura en localidad El Hundido, cuenca de Sabinas; (Probeta ICGEO-94)</b>																					
CSVII-14-2	199	166	0.84	0.053	10.9	0.108	11.1	0.0148	3.6	0.0047	5.3	0.323	8	94.6	3.4	103	11	560	220	94.6	$\pm 3.4$
CSVII-14-18	258	190	0.74	0.0677	8.9	0.139	8.6	0.0148	2.5	0.0056	6	0.29	28	94.6	2.3	132	10	970	180	94.6	$\pm 2.3$
CSVII-14-28	547	194	0.36	0.0534	5.2	0.1072	5.2	0.0148	2.3	0.005	6.5	0.44	8	94.7	2.2	103.2	5.1	451	110	94.7	$\pm 2.2$
CSVII-14-8	206	123	0.6	0.069	8	0.1399	7.1	0.0149	2.7	0.0057	7.4	0.376	28	95.2	2.5	132.4	9.1	840	160	95.2	$\pm 2.5$
CSVII-14-14	337	479	1.42	0.0514	7.8	0.1052	8.1	0.0149	2.4	0.0046	3.7	0.299	7	95.2	2.3	102.5	8	378	160	95.2	$\pm 2.3$
CSVII-14-3	252	213	0.85	0.0495	7.5	0.0955	8.7	0.0149	3	0.0048	5	0.347-3	7	95.3	2.8	92.3	7.7	300	150	95.3	$\pm 2.8$
CSVII-14-22	544	191	0.35	0.0518	5	0.1063	5.5	0.015	2	0.0049	5.8	0.368	7	95.7	1.9	102.4	5.3	302	110	95.7	$\pm 1.9$
CSVII-14-29	609	254	0.42	0.0513	4.9	0.1039	4.9	0.015	2	0.0047	4.9	0.407	4	96.2	1.9	100.2	4.7	308	100	96.2	$\pm 1.9$
CSVII-14-26	239	233	0.97	0.0591	8	0.1216	7.2	0.0151	2.5	0.0051	4.9	0.34	17	96.3	2.3	116.2	7.9	611	160	96.3	$\pm 2.3$
CSVII-14-7	251	209	0.84	0.0507	8.7	0.1045	7.6	0.0151	2.4	0.0052	5.7	0.316	4	96.5	2.3	100.7	7.3	460	170	96.5	$\pm 2.3$
CSVII-14-10	617	430	0.7	0.0526	4.6	0.1095	4.7	0.0151	2.1	0.0049	5.3	0.433	8	96.5	2	105.4	4.8	364	95	96.5	$\pm 2.0$
CSVII-14-20	375	447	1.19	0.0507	6.1	0.105	6.3	0.0151	2	0.0048	4.2	0.316	5	96.5	1.9	101.2	6	265	130	96.5	$\pm 1.9$
CSVII-14-23	462	442	0.96	0.0539	6.3	0.1118	6.5	0.0151	2.2	0.0051	4.1	0.335	10	96.6	2.1	107.3	6.7	443	130	96.6	$\pm 2.1$
CSVII-14-30	360	151	0.42	0.0536	6.5	0.1114	6.5	0.0151	2.5	0.0055	5.6	0.379	10	96.6	2.4	106.9	6.6	431	130	96.6	$\pm 2.4$
CSVII-14-25	265	259	0.98	0.0579	7.4	0.1178	7.3	0.0152	2.8	0.0052	4.6	0.388	14	97.2	2.7	112.7	7.9	555	150	97.2	$\pm 2.7$
CSVII-14-1	845	239	0.28	0.0496	4	0.1045	4.4	0.0153	1.9	0.0053	4.9	0.431	4	97.8	1.8	101.4	4.4	254	93	97.8	$\pm 1.8$
CSVII-14-11	215	191	0.89	0.0533	9.2	0.1097	8.9	0.0153	3	0.005	6	0.337	7	97.8	2.9	105.2	9	473	180	97.8	$\pm 2.9$
CSVII-14-17	328	352	1.07	0.0523	6.7	0.1081	6.8	0.0153	2.5	0.0049	4.7	0.377	6	98	2.4	103.9	6.6	419	140	98	$\pm 2.4$
CSVII-14-19	152	79	0.52	0.0593	9.8	0.129	9.3	0.0154	3.6	0.0055	6.4	0.39	20	98.6	3.6	12.3	10	675	190	98.6	$\pm 3.6$
CSVII-14-27	169	144	0.85	0.0598	10.5	0.123	9.8	0.0155	2.8	0.0056	6.6	0.292	15	98.9	2.8	11.7	11	760	210	98.9	$\pm 2.8$
CSVII-14-5	1320	501	0.38	0.0514	3.3	0.1176	3.7	0.0167	1.8	0.0052	3.4	0.48	5	106.8	1.9	112.8	4	269	73	106.8	$\pm 1.9$
CSVII-14-13	880	137	0.16	0.0508	3.7	0.1689	4	0.024	1.7	0.0086	4.9	0.42	3	153.1	2.5	158.3	5.8	300	78	153.1	$\pm 2.5$
n = 29																Edad <sup>206</sup> Pb/ <sup>238</sup> U media ponderada =	95.7 ± 0.8				
(2-sigma, MSWD = 2.2; n = 18)																					
<b>Muestra CSVIII-8; Ceniza volcánica (Toba); Miembro superior Fm. Indidura en localidad San Pedro, cuenca de Sabinas; (Probeta ICGEO-98)</b>																					
CSVIII-8-11	3710	4600	1.24	0.0578	2.6	0.0876	3	0.011	2.7	0.0036	3.7	0.923	18	70.2	1.9	85.2	2.4	515	54	70.2	$\pm 1.9$
CSVIII-8-1	690	660	0.96	0.0548	5.3	0.0984	5.8	0.0133	2.8	0.0049	3.9	0.48	10	85.2	2.3	95.1	5.2	403	110	85.2	$\pm 2.3$
CSVIII-8-15	281	202	0.72	0.0531	7.7	0.1028	7.6	0.0135	2.6	0.0044	5.7	0.342	14	86.4	2.2	100.2	6.9	503	150	86.4	$\pm 2.2$
CSVIII-8-2	410	222	0.54	0.0526	6.7	0.0989	6.8	0.0136	2.3	0.0047	4.9	0.337	9	86.8	1.9	95.5	6.2	484	140	86.8	$\pm 1.9$
CSVIII-8-27	1154	256	0.22	0.0476	4.8	0.0902	5.4	0.0136	1.9	0.0049	4.7	0.353	1	86.9	1.6	87.6	4.5	199	100	86.9	$\pm 1.6$
CSVIII-8-14	488	325	0.67	0.0498	6.2	0.0954	6.5	0.0137	2.2	0.0046	4.6	0.337	6	87.7	1.9	93.2	5.5	330	130	87.7	$\pm 1.9$
CSVIII-8-21	1298	572	0.44	0.0503	4	0.0967	4.9	0.0139	1.5	0.0046	3.9	0.31	5	89.2	1.3	93.6	4.4	317	85	89.2	$\pm 1.3$
CSVIII-8-17	257	145	0.56	0.0523	10.5	0.104	9.6	0.014	3.1	0.0048	7.2	0.319	10	89.9	2.7	100.4	9.5	600	200	89.9	$\pm 2.7$
CSVIII-8-19	340	231	0.68	0.0507	6.7	0.0972	6.5	0.0143	2.5	0.0047	5.5	0.378	4	91.3	2.2	95.1	6.1	334	140	91.3	$\pm 2.2$
CSVIII-8-9	333	200	0.6	0.0508	6.1	0.1009	6.6	0.0143	2.4	0.0047	5.8	0.359	6	91.4	2.2	97.4	6.2	328	120	91.4	$\pm 2.2$
CSVIII-8-26	820	113	0.14	0.0501	5.2	0.098	5	0.0143	2.1	0.0048	8.4	0.42	4	91.5	1.9	95.5	4.7	262	110	91.5	$\pm 1.9$
CSVIII-8-20	1024	230	0.22	0.046	4.8	0.0919	5.1	0.0143	2	0.0047	6	0.382-3	8	91.7	1.8	89.2	4.4	264	90	91.7	$\pm 1.8$
CSVIII-8-8	272	149	0.55	0.0525	7.4	0.103	7.2	0.0143	2.9	0.0047	5.7	0.398	8	91.8	2.6	99.3	6.8	444	140	91.8	$\pm 2.6$
CSVIII-8-16	253	131	0.52	0.0511	7.6	0.1016	8.3	0.0144	2.7	0.005	7.3	0.328	6	92	2.5	97.9	7.7	425	160	92	$\pm 2.5$
CSVIII-8-24	359	250	0.7	0.052	6.5	0.1032	6.6	0.0144	3	0.0053	5.3	0.454	8	92	2.7	100.4	6	407	120	92	$\pm 2.7$
CSVIII-8-28	828	320	0.39	0.0472	4.4	0.0962	4.5	0.0144	1.9	0.0048	5	0.42	1	92	1.7	93.2	3.9	155	88	92	$\pm 1.7$

continúa

Tabla S2 (cont.). Edades U–Pb obtenidos por LA–ICPMS en granos de circon de tobas volcánicas intercaladas en lutitas gasíferas de Coahuila, NE de México.

Análisis/Circonción <sup>#</sup> (ppm)	Th <sup>#</sup> (ppm)	Th/U	<sup>207</sup> Pb/ <sup>206</sup> Pb ± 2s	<sup>207</sup> Pb/ <sup>235</sup> U ± 2s	<sup>206</sup> Pb/ <sup>238</sup> U ± 2s	<sup>87</sup> Pb/ <sup>235</sup> U ± 2s	<sup>207</sup> Pb/ <sup>235</sup> U ± 2s	<sup>207</sup> Pb/ <sup>238</sup> U ± 2s	% disc <sup>***</sup> <sup>206</sup> Pb/ <sup>238</sup> U	Rho <sup>**</sup>	<sup>232</sup> Th <sup>†</sup>	<sup>206</sup> Pb/ <sup>232</sup> Th ± 2s	± 2s	Mejor edad (Ma)	± 2s	
<b>Muestra CSVIII-8 (continuación); Ceniza volcánica (Toba); Miembro superior Fm. Indidura en localidad San Pedro, cuenca de Sabinas; (Probeta ICGEO-98)</b>																
CSVIII-8-13	236	140	0.59	0.0503	8	0.0992	7.8	0.0144	2.8	0.0049	7.4	0.367	4	92.2	2.6	± 2.6
CSVIII-8-22	192	26	0.14	0.0529	9.3	0.104	10.6	0.0145	2.9	0.0048	18.5	0.274	8	92.8	2.7	± 2.7
CSVIII-8-3	1255	323	0.26	0.0473	4.4	0.0957	4.8	0.0146	4.5	0.0046				93.3	1.6	± 1.6
CSVIII-8-4	416	206	0.5	0.0535	6.5	0.1069	6.7	0.0146	2.1	0.0047	4.9	0.304	9	93.6	1.9	± 1.9
CSVIII-8-5	428	298	0.7	0.0492	6.5	0.1038	6.7	0.0147	3.5	0.0051	7	0.514	6	94.2	3.3	± 3.3
CSVIII-8-18	248	79	0.32	0.0508	8.9	0.1052	8.4	0.0155	3.1	0.0053	8.2	0.37	2	99.2	3.0	± 3.0
CSVIII-8-25	278	22	0.08	0.0515	7.4	0.1198	7.8	0.0165	2.8	0.0067	13.2	0.366	8	105.7	3.0	± 3.0
CSVIII-8-12	240	112	0.47	0.0521	9.8	0.124	9.7	0.0171	2.7	0.0064	5.3	0.284	7	109.5	3.0	± 3.0
CSVIII-8-10	529	331	0.63	0.0528	6.8	0.1355	7.2	0.0185	1.8	0.0065	6	0.247	8	118	2.1	± 2.1
CSVIII-8-23	481	65	0.13	0.0513	4.5	0.1739	4.8	0.0246	1.9	0.008	7.4	0.388	5	156.3	2.9	± 2.9
CSVIII-8-6	195	68	0.35	0.0536	7.6	0.184	13.6	0.0249	10.8	0.0082	11.7	0.798	9	158	1.7	± 1.7
CSVIII-8-7	646	104	0.16	0.0614	2.4	0.847	8.4	0.0994	6.5	0.0331	8.5	0.78	2	609	38	± 38.0
n = 28 <b>Edad <sup>206</sup>Pb/<sup>238</sup>U media ponderada = 91.7 ± 0.8</b>																
<b>Muestra CSIX-60; Muestra detritica (arenisca); Miembro superior Fm. Indidura en localidad Huariche, cuenca de Parras; (Probeta ICGEO-98)</b>																
CSIX-60-19	268	120	0.45	0.0729	7	0.1397	6.5	0.014	3.3	0.0058	6.7	0.505	32	89.6	2.9	± 2.9
CSIX-60-25	392	200	0.51	0.0563	8	0.1138	7.6	0.0144	2.5	0.0048	6.5	0.33	15	92.4	2.3	± 2.3
CSIX-60-4	301	197	0.65	0.0565	7.1	0.1172	7.7	0.015	2.5	0.0051	5.9	0.33	14	96	2.4	± 2.4
CSIX-60-22	252	151	0.6	0.0567	6.7	0.1186	6.7	0.015	2.8	0.0057	5.9	0.42	15	96.1	2.7	± 2.7
CSIX-60-12	622	499	0.8	0.0516	4.7	0.113	5.4	0.0162	2.3	0.0054	6	0.424	5	103.4	2.4	± 2.4
CSIX-60-24	729	750	1.03	0.0485	4.1	0.1219	4.6	0.0186	1.8	0.0059	3.2	0.399	0	118.6	2.1	± 2.1
CSIX-60-16	191	262	1.37	0.0568	10	0.175	10.3	0.0224	2.8	0.0071	5.4	0.273	12	142.9	3.9	± 3.9
CSIX-60-23	568	257	0.45	0.0536	4.1	0.1701	4.2	0.0233	2	0.008	4.4	0.474	7	148.2	2.9	± 2.9
CSIX-60-8	854	824	0.96	0.0659	4.2	0.219	5	0.0248	1.7	0.0089	3.3	0.329	22	157.9	2.6	± 2.6
CSIX-60-20	605	671	1.11	0.0543	3.5	0.1891	3.5	0.0253	2	0.0082	3.2	0.568	8	161.3	3.2	± 3.2
CSIX-60-21	206	128	0.62	0.0573	6.3	0.201	6.5	0.0259	2.7	0.0081	5.7	0.425	11	164.5	4.4	± 4.4
CSIX-60-9	445	390	0.88	0.052	5	0.1825	5	0.0259	2.1	0.0084	3.1	0.413	4	165.1	3.4	± 3.4
CSIX-60-13	841	621	0.74	0.0578	4.3	0.2111	4.3	0.0274	1.9	0.009	3.4	0.437	10	174	3.2	± 3.2
CSIX-60-2	457	327	0.72	0.0573	3.3	0.2247	4	0.0281	1.8	0.0095	3.3	0.459	13	178.4	3.2	± 3.2
CSIX-60-18	608	355	0.58	0.0534	3.7	0.287	4.2	0.039	1.7	0.0125	3.5	0.417	4	246.8	4.2	± 4.2
CSIX-60-1	456	318	0.7	0.056	3.4	0.336	3.9	0.0439	1.8	0.0144	3.3	0.453	6	277.1	4.7	± 4.7
CSIX-60-7	206	104	0.5	0.063	3.7	0.638	4.5	0.0748	1.6	0.0261	3.8	0.353	7	464.7	7.5	± 7.5
CSIX-60-14	278	75	0.27	0.0599	3.7	0.637	3.9	0.0775	1.7	0.0274	4	0.428	4	480.9	8.1	± 8.1
CSIX-60-6	221	39	0.17	0.0586	3.8	0.694	3.7	0.0866	1.7	0.031	5.8	0.462	0	535.6	9	± 9.0
CSIX-60-17	235	85	0.36	0.0624	3.7	0.851	3.8	0.1014	1.7	0.0316	3.8	0.446	1	622.4	8	± 8.8
CSIX-60-15	309	86	0.28	0.0672	2.7	1.17	3.8	0.1292	2.1	0.0442	4.1	0.543	0	783	15	± 15.0
CSIX-60-10	463	160	0.35	0.0891	1.9	2.45	4.9	0.2	3.3	0.0275	12.4	0.664	6	1410	35	± 36.0
CSIX-60-5	611	114	0.19	0.1044	1.3	4.061	2.3	0.2849	1.7	0.0871	3.6	0.736	2	1712	27	± 27.0
CSIX-60-11	567	351	0.62	0.1055	1.2	4.419	2.7	0.306	2.1	0.0865	3.5	0.782	0	1726	22	± 22.0
n = 24 <b>Edad máxima de deposición (EMD) = 103.2 ± 2</b>																

NOTA: Ver el pie de Tabla en la página siguiente.

Notas para la Tabla S2:

#Las concentraciones de U y Th (ppm) fueron calculadas con relación al análisis del vidrio estándar NIST 610 para elementos traza.

†Relaciones isotópicas corregidas con relación a los zircones estándar de edad conocida (91500 de ~1065 Ma; Wiedenbeck *et al.*, 1995; PLE, Plešovice de ~337 Ma; Sláma *et al.*, 2008) por el fraccionamiento de masa y deriva instrumental. Las relaciones

$^{207}\text{Pb}/^{206}\text{Pb}$ , edades y errores son calculados como en Patón *et al.* (2010).

\*Los errores en las relaciones isotópicas están reportados en porcentaje y los de las edades en absoluto y ambos están reportados a nivel 2 sigma, incluida la edad  $^{206}\text{Pb}/^{238}\text{U}$  media ponderada que es reportada también a nivel 2 sigma. Estas incertidumbres, a 2 sigma, han sido propagadas según la metodología de Patón *et al.* (2010).

\*\*Rho es el valor de correlación de errores definido como el cociente de los errores (en porcentaje) de las relaciones isotópicas de  $^{206}\text{Pb}/^{238}\text{U}$  y  $^{207}\text{Pb}/^{235}\text{U}$ .

\*\*\*Porcentaje de discordancia obtenido usando la siguiente ecuación  $(100 * [(edad\ ^{207}\text{Pb}/^{235}\text{U}) - (edad\ ^{206}\text{Pb}/^{238}\text{U})] / edad\ ^{207}\text{Pb}/^{235}\text{U})$  propuesta por Ludwig (2001). Valores positivos y negativos indican discordancias normales y discordancias inversas, respectivamente.

---