

LA-ICP-MS elemental composition data supplement

<u>Isotopic mass</u>	<u>Eumeralla plesiosaur tooth</u>						
	<u>MgO</u>	<u>Al₂O₃</u>	<u>SiO₂</u>	<u>CaO</u>	<u>TiO₂</u>	<u>MnO</u>	<u>FeO</u>
	<u>24</u>	<u>27</u>	<u>29</u>	<u>43</u>	<u>49</u>	<u>55</u>	<u>57</u>
	<u>wt%</u>	<u>wt%</u>	<u>wt%</u>	<u>wt%</u>	<u>wt%</u>	<u>wt%</u>	<u>wt%</u>
Inner enamel	0.0359	0.00239	<0.128	53,00	0.00072	0.0744	0.115
Inner enamel	0.0328	0.00212	<0.0872	53,00	0.00089	0.0648	0.0984
EDJ	0.272	0.0108	<0.0855	53,00	0.00142	0.146	0.25
Dentine	0.429	0.0197	<0.104	53,00	0.0302	0.137	0.224
Dentine	0.415	0.0237	<0.0974	53,00	0.058	0.133	0.217
Dentine	0.436	0.0251	<0.112	53,00	0.0844	0.144	0.221
Dentine	0.459	0.0262	<0.0957	53,00	0.0859	0.136	0.213
Dentine	0.419	0.027	<0.0925	53,00	0.0838	0.127	0.211
Dentine	0.417	0.0295	<0.140	53,00	0.0891	0.14	0.204
Dentine	0.422	0.0412	<0.137	53,00	0.0871	0.139	0.211
Dentine	0.405	0.0442	<0.112	53,00	0.0576	0.141	0.205
Dentine	0.382	0.0688	<0.122	53,00	0.0421	0.14	0.182
Outer enamel	0.0488	0.0211	0.111	53,00	0.0725	0.196	0.487
Inner enamel	0.0439	0.00216	<0.0847	53,00	0.00127	0.0694	0.103
Inner enamel	0.0467	0.00181	<0.109	53,00	0.00092	0.0593	0.0733
Inner enamel	0.189	0.0106	<0.0911	53,00	0.00303	0.151	0.236

Supplemental Table 1: Elemental composition data for the Eumeralla Plesiosaur tooth (Eu-PL-1122A) obtained via LA-ICP-MS.

	Wonthaggi plesiosaur tooth						
	MgO	Al₂O₃	SiO₂	CaO	TiO₂	MnO	FeO
Isotopic mass	24	27	29	43	49	55	57
Tissue	wt%	wt%	wt%	wt%	wt%	wt%	wt%
Outer enamel	0.108	0.0256	0.128	53,00	0.00585	0.147	0.136
Inner enamel	0.0534	0.0177	0.112	53,00	0.00201	0.0798	0.114
Inner enamel	0.13	0.0141	0.157	53,00	0.00335	0.303	0.221
EDJ	0.191	0.0194	0.167	53,00	0.00748	0.341	0.243
Dentine	0.205	0.0139	0.113	53,00	0.00454	0.324	0.237
Dentine	0.191	0.0152	0.131	53,00	0.00486	0.315	0.247
Dentine	0.178	0.0153	0.121	53,00	0.00556	0.325	0.26
Outer enamel	0.104	0.0141	0.187	53,00	0.00176	0.104	0.134
Inner enamel	0.061	0.0138	0.146	53,00	0.00176	0.0938	0.133
EDJ	0.171	0.0198	0.137	53,00	0.00464	0.332	0.226
Dentine	0.174	0.0155	0.137	53,00	0.00422	0.33	0.249
Dentine	0.178	0.0162	0.166	53,00	0.00414	0.336	0.259
Dentine	0.182	0.0169	0.12	53,00	0.00416	0.369	0.273
Dentine	0.182	0.0174	0.12	53,00	0.00424	0.348	0.259
Dentine	0.204	0.0432	0.156	53,00	0.00477	0.325	0.241

Supplemental Table 2: Elemental composition data for the Wonthaggi Plesiosaur tooth (Eu-PL-1123A) obtained via LA-ICP-MS.

	Wonthaggi lungfish dental plate						
	MgO	Al₂O₃	SiO₂	CaO	TiO₂	MnO	FeO
	24	27	29	43	49	55	57
Isotopic mass	wt%	wt%	wt%	wt%	wt%	wt%	wt%
Dental plate	0.217	0.0283	<0.0994	53,00	0.0643	0.188	0.211
Dental plate	0.201	0.0257	0.0985	53,00	0.0553	0.186	0.208
Dental plate	0.0664	0.0414	0.304	53,00	0.0164	0.16	0.291
Dental plate	0.0503	0.0063	<0.105	53,00	0.00437	0.138	0.201
Dental plate	0.0431	0.00658	0.148	53,00	0.00748	0.105	0.137
Dental plate	0.046	0.00754	0.182	53,00	0.00988	0.107	0.15
Dental plate	0.0462	0.00645	0.271	53,00	0.00379	0.0901	0.111
Dental plate	0.0431	0.00401	0.129	53,00	0.00358	0.09	0.11
Dental plate	0.0469	0.00453	<0.109	53,00	0.00443	0.104	0.137
Dental plate	0.048	0.00597	0.15	53,00	0.00351	0.0964	0.136
Dental plate	0.159	0.0205	0.0841	53,00	0.0284	0.166	0.204
Dental plate	0.188	0.0267	0.162	53,00	0.0463	0.165	0.202
Plate Close to Cracks	0.211	0.0288	0.0964	53,00	0.0483	0.171	0.207
Plate Close to Cracks	0.214	0.0257	0.0949	53,00	0.0488	0.168	0.211
Dental plate	0.189	0.0259	0.145	53,00	0.0674	0.169	0.2
Plate Close to Cracks	0.192	0.0263	0.132	53,00	0.0635	0.161	0.199

Supplemental Table 3: Elemental composition data for the Wonthaggi lungfish plate (Wtg-PL-1123D) obtained via LA-ICP-MS.

	Gråkammen ?chondrichthyan scale						
	MgO	Al₂O₃	SiO₂	CaO	TiO₂	MnO	FeO
	24	27	29	43	49	55	57
Isotopic mass	wt%	wt%	wt%	wt%	wt%	wt%	wt%
Enameloid	0.233	0.00641	0.0826	53	0.00049	0.0596	0.0535
Enameloid	0.198	0.0244	0.095	53	0.00134	0.0634	0.0659
Enameloid	0.174	0.00956	0.0955	53	0.00064	0.0614	0.061
Dentine	0.213	0.0165	0.0805	53	0.00064	0.0707	0.069
Dentine	0.223	0.00729	0.1	53	0.00059	0.0703	0.0588
Dentine	0.237	0.00902	0.0958	53	0.0004	0.0705	0.055
Dentine	0.206	0.307	0.432	53	0.00339	0.0912	0.23
Dentine	0.104	0.0974	0.125	53	0.00416	0.152	0.243

Supplemental Table 4: Elemental composition data for the Gråkammen Chondrichthyan scale obtained via LA-ICP-MS.

	Gråkammen thelodont scale						
	MgO	Al₂O₃	SiO₂	CaO	TiO₂	MnO	FeO
	24	27	29	43	49	55	57
Isotopic mass	wt%	wt%	wt%	wt%	wt%	wt%	wt%
Dentine	10.2	13.6	20.5	53	0.0161	0.0722	3.29
Enameloid	0.0936	0.00974	0.545	53	0.00067	0.0433	0.0922
Enameloid	0.125	0.00786	2.05	53	0.00084	0.0449	0.152
Pulp Cavity	1.42	1.95	2.41	53	0.00149	0.0332	0.973

Supplemental Table 5: Elemental composition data for the Gråkammen thelodont scale obtained via LA-ICP-MS.

	Tavlefjellet thelodont scale						
	MgO	Al₂O₃	SiO₂	CaO	TiO₂	MnO	FeO
<u>Isotopic mass</u>	24	27	29	43	49	55	57
<u>Tissue</u>	wt%	wt%	wt%	wt%	wt%	wt%	wt%
Enameloid	0.201	0.0215	0.147	53	0.00135	0.204	0.0808
Basal Dentine	0.181	0.0245	0.0953	53	0.00121	0.398	0.114
Enameloid	0.23	0.0878	0.129	53	0.00195	0.21	0.0857
Enameloid	0.225	0.0518	0.121	53	0.00172	0.198	0.0882
Dentine	0.188	0.0104	0.108	53	0.00158	0.277	0.1
Basal dentine	0.159	0.0173	0.116	53	0.00155	0.341	0.112
Basal Dentine	0.16	0.0297	0.138	53	0.00153	0.331	0.124

Supplemental Table 6: Metal oxide composition data for the Tavlefjellet thelodont scale obtained via LA-ICP-MS.

LA-ICP-MS Elemental composition supplement (PPM).

A)	Eumeralla Plesiosaur tooth														
	V	Cr	Co	Ni	Cu	Zn	Rb	Sr	Y	Zr	Ba	Hf	Pb	Th	U
Isotopic Mass	51	52	59	60	65	66	85	88	89	90	137	177	208	232	238
	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Inner enamel	0.26	<4.54	0.21	0.72	<1.19	50.20	<0.162	959.00	25.80	0.79	385.00	<0.167	<0.232	<0.0493	<0.0412
Inner enamel	0.14	<3.10	<0.153	<0.622	1.48	39.30	<0.106	842.00	24.90	0.99	326.00	<0.190	0.44	<0.0484	0.03
EDJ	3.31	<3.35	0.37	1.26	<1.23	17.00	<0.131	2400.00	1380.00	57.90	808.00	0.31	0.38	0.90	9.39
Dentine	12.9	<4.04	0.39	3.63	2.06	12.90	<0.145	2230.00	1860.00	109.00	714.00	0.67	2.25	5.59	26.40
Dentine	14.9	<4.33	0.44	3.16	1.68	13.20	0.14	2270.00	2180.00	148.00	693.00	1.11	2.53	6.28	31.20
Dentine	16.0	<3.88	0.66	4.07	2.08	9.89	<0.135	2200.00	2090.00	230.00	675.00	1.60	3.49	3.58	26.90
Dentine	14.0	4.78	0.51	2.95	2.55	8.29	0.17	2120.00	2280.00	267.00	651.00	1.73	3.69	4.03	29.20
Dentine	15.7	4.63	0.25	2.68	1.56	9.43	<0.147	2200.00	2370.00	291.00	660.00	2.15	3.88	3.87	28.30
Dentine	16.4	<4.74	0.28	4.82	2.05	10.30	<0.139	2460.00	2650.00	330.00	658.00	2.71	4.55	5.94	34.20
Dentine	15.5	4.73	0.28	4.79	2.02	9.62	<0.175	2250.00	2660.00	331.00	609.00	2.85	4.29	7.62	36.40
Dentine	12.4	4.96	0.71	6.82	4.24	8.76	0.14	2550.00	3250.00	320.00	640.00	1.60	4.85	17.30	44.90
Dentine	14.2	<4.05	0.93	6.23	5.21	10.60	<0.184	2250.00	2860.00	283.00	570.00	1.50	5.10	36.10	50.20
Outer enamel	12.5	5.30	106.00	26.80	9.85	64.90	<0.109	1250.00	571.00	205.00	519.00	1.81	333.00	54.30	8.60
Inner enamel	0.21	<4.13	0.18	<0.634	<1.09	59.60	<0.161	972.00	56.60	1.09	392.00	<0.184	0.39	<0.0423	<0.0434
Inner enamel	0.28	<4.57	0.20	<0.423	<1.08	70.20	<0.133	940.00	20.90	0.79	383.00	<0.280	0.41	<0.0434	0.03
Inner enamel	4.29	<4.15	0.35	0.68	<0.889	13.90	<0.125	2190.00	1360.00	53.90	764.00	0.47	0.86	4.15	11.20

B)	Eumeralla plesiosaur tooth													
	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
Isotopic Mass	139	140	141	145	147	151	157	159	163	165	167	169	173	175
	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Inner enamel	6.44	7.39	0.67	2.33	<0.284	0.20	1.08	0.22	1.49	0.34	1.34	0.23	1.31	0.26
Inner enamel	5.96	7.01	0.68	2.38	0.42	0.26	0.94	0.19	1.76	0.39	1.45	0.18	0.85	0.13
EDJ	1460.00	2270.00	244.00	915.00	181.00	54.50	205.00	28.50	174.00	32.30	77.30	9.09	43.40	5.98
Dentine	2300.00	3630.00	390.00	1510.00	276.00	92.10	329.00	44.10	267.00	51.50	124.00	13.80	66.30	9.06
Dentine	2350.00	3890.00	414.00	1640.00	302.00	103.00	364.00	45.90	286.00	56.90	130.00	13.70	82.30	11.00
Dentine	2250.00	3470.00	410.00	1640.00	293.00	98.50	351.00	44.30	279.00	54.00	132.00	13.70	74.40	11.30
Dentine	2400.00	3840.00	418.00	1690.00	308.00	104.00	388.00	50.60	321.00	61.50	138.00	17.10	89.70	12.90
Dentine	2610.00	4040.00	446.00	1840.00	322.00	107.00	395.00	50.30	310.00	61.80	146.00	16.40	93.00	12.90
Dentine	2850.00	4650.00	511.00	2080.00	382.00	130.00	475.00	61.80	372.00	74.40	179.00	19.20	106.00	16.00
Dentine	2940.00	4600.00	532.00	2180.00	393.00	125.00	468.00	61.60	369.00	73.80	171.00	20.60	113.00	16.10
Dentine	3660.00	6120.00	686.00	2750.00	520.00	158.00	570.00	71.80	449.00	79.70	196.00	23.20	122.00	17.00
Dentine	3190.00	5320.00	601.00	2490.00	466.00	141.00	529.00	66.30	398.00	74.30	186.00	21.10	113.00	16.30
Outer enamel	529.00	1190.00	146.00	626.00	134.00	28.20	129.00	17.60	102.00	19.90	50.80	6.63	38.00	5.64
Inner enamel	19.30	28.40	2.75	12.00	2.16	1.11	3.15	0.68	5.11	1.00	2.94	0.37	2.79	0.34
Inner enamel	5.38	8.25	0.80	3.42	0.65	0.23	1.09	0.16	1.52	0.36	1.14	0.14	0.98	0.17
Inner enamel	1430.00	2230.00	230.00	954.00	170.00	54.70	201.00	28.60	179.00	35.10	82.70	9.40	47.00	6.62

Supplemental table 7: Trace (A) and rare earth element (B) composition data for the Eumeralla Plesiosaur tooth (Eu-PL-1122A) obtained via LA-ICP-MS.

A)	Wonthaggi Plesiosaur tooth														
	V	Cr	Co	Ni	Cu	Zn	Rb	Sr	Y	Zr	Ba	Hf	Pb	Th	U
Isotopic Mass:	51	52	59	60	65	66	85	88	89	90	137	177	208	232	238
	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Outer enamel	1.74	<3.79	0.57	0.54	0.90	81.10	0.10	1090.00	771.00	6.76	179.00	<0.171	3.78	7.90	2.49
Inner enamel	0.15	<4.24	0.30	<0.518	<0.907	51.70	<0.186	1000.00	443.00	0.60	129.00	<0.148	0.24	<0.0376	0.14
Inner enamel	0.48	<3.88	0.35	<0.524	<0.962	23.90	<0.119	2500.00	1350.00	0.52	445.00	<0.188	0.59	2.31	0.34
EDJ	3.79	<6.16	1.26	<0.771	<1.23	21.40	<0.194	2890.00	2130.00	6.37	605.00	<0.283	3.99	20.80	1.55
Dentine	2.64	<4.60	0.65	0.67	<0.943	16.90	<0.135	2780.00	2070.00	3.71	580.00	0.19	1.17	5.44	1.25
Dentine	2.94	<4.01	0.32	0.50	<0.886	13.70	<0.111	2910.00	2280.00	4.45	604.00	<0.214	0.76	4.90	1.76
Dentine	3.15	<3.61	0.34	<0.484	<1.07	12.70	<0.136	2800.00	2010.00	3.05	571.00	<0.242	0.59	7.00	1.54
Outer enamel	0.66	<3.43	0.33	<0.532	<1.01	78.40	0.14	1080.00	517.00	0.33	164.00	<0.143	0.48	0.24	0.16
Inner enamel	0.27	<3.59	0.28	<0.465	<0.936	34.90	<0.121	1100.00	466.00	0.30	148.00	<0.143	<0.163	<0.0364	0.12
EDJ	1.38	<3.21	0.23	0.73	<1.04	23.40	<0.133	2710.00	1690.00	1.88	524.00	<0.171	0.92	9.27	1.03
Dentine	1.61	<3.82	0.29	<0.558	<0.970	23.10	<0.141	2810.00	1860.00	2.16	586.00	<0.241	1.14	4.54	0.90
Dentine	2.87	<4.91	0.33	<0.783	<0.922	12.60	0.20	3130.00	2370	3.70	662.00	0.38	0.74	2.32	1.62
Dentine	3.65	<3.84	0.38	<0.392	<1.08	12.90	<0.133	3170.00	2700	5.32	645.00	0.22	0.62	0.77	1.71
Dentine	2.59	<3.60	0.20	0.70	<1.14	14.70	<0.129	3350.00	2690	2.90	658.00	0.35	0.42	0.89	2.03
Dentine	3.34	<3.17	0.73	<0.581	<0.916	12.20	0.12	3030.00	2400	5.27	586.00	0.32	0.68	10.90	2.51

B)	Wonthaggi plesiosaur tooth													
	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
Isotopic Mass	139	140	141	145	147	151	157	159	163	165	167	169	173	175
	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Outer enamel	700.00	1440.00	157.00	693.00	160.00	41.00	181.00	23.10	138.00	24.40	54.60	6.62	35.30	4.49
Inner enamel	473.00	801.00	79.50	319.00	70.10	21.20	80.30	11.00	66.30	11.60	26.40	3.22	16.80	2.12
Inner enamel	2360.00	5150.00	625.00	2770.00	594.00	139.00	522.00	59.20	290.00	44.10	84.10	8.39	40.90	4.88
EDJ	3610.00	7630.00	938.00	4560.00	1040.00	226.00	945.00	103.00	491.00	75.00	145.00	15.50	67.60	9.00
Dentine	3130.00	6730.00	859.00	3990.00	922.00	218.00	858.00	97.30	485.00	72.70	145.00	14.20	67.10	8.11
Dentine	3480.00	7800.00	976.00	4660.00	1110.00	257.00	1040.00	114.00	548.00	83.40	162.00	15.80	71.30	9.02
Dentine	3330.00	7500.00	935.00	4420.00	993.00	230.00	895.00	99.80	504.00	72.10	144.00	13.90	62.90	7.97
Outer enamel	662.00	1310.00	134.00	575.00	114.00	28.00	118.00	15.40	85.20	14.20	30.90	3.37	18.70	1.87
Inner enamel	514.00	917.00	91.00	373.00	70.60	19.90	74.20	9.86	61.40	10.90	24.20	3.01	16.50	1.78
EDJ	2920.00	6340.00	772.00	3490.00	821.00	182.00	753.00	82.10	421.00	61.10	121.00	11.90	52.70	6.19
Dentine	3060.00	6430.00	797.00	3730.00	823.00	185.00	776.00	84.10	410.00	61.40	119.00	11.60	53.90	6.49
Dentine	3660.00	7920.00	1020.00	4700.00	1130.00	267.00	1060.00	121.00	595.00	87.60	167.00	16.80	74.60	8.46
Dentine	3530.00	7430.00	947.00	4420.00	1060.00	244.00	980.00	113.00	559.00	86.70	164.00	17.10	77.00	9.53
Dentine	3890.00	8620.00	1110.00	5340.00	1230.00	301.00	1210.00	134.00	656.00	96.20	187.00	18.00	80.50	9.38
Dentine	3810.00	8760.00	1070.00	5270.00	1200.00	279.00	1080.00	117.00	559.00	85.70	166.00	17.20	73.80	8.85

Supplemental table 8: Trace (A) and rare earth element (B) composition data for the Wonthaggi Plesiosaur tooth (Eu-PL-1123A) obtained via LA-ICP-MS.

A)	Wonthaggi lungfish dental plate														
	V	Cr	Co	Ni	Cu	Zn	Rb	Sr	Y	Zr	Ba	Hf	Pb	Th	U
Isotopic Mass	51	52	59	60	65	66	85	88	89	90	137	177	208	232	238
	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	Ppm
Dental plate	9.13	<3.51	3.10	9.39	10.40	43.30	<0.159	2280.00	2410.00	228.00	740.00	1.93	6.27	7.60	40.00
Dental plate	7.85	3.75	2.18	7.09	9.94	55.80	0.16	2360.00	2320.00	220.00	712.00	1.53	5.99	9.26	38.00
Dental plate	4.04	<2.79	2.23	1.33	3.29	213.00	<0.139	1370.00	616.00	47.40	495.00	0.43	6.18	7.08	4.30
Dental plate	1.13	<3.10	0.30	<0.729	<1.24	240.00	<0.136	1360.00	380.00	12.50	488.00	<0.205	1.30	3.99	1.72
Dental plate	2.12	<2.44	0.22	0.57	<1.18	212.00	<0.125	1530.00	423.00	35.40	456.00	0.28	1.01	6.87	4.18
Dental plate	2.37	<2.70	0.19	<0.628	<1.07	218.00	0.14	1430.00	463.00	41.50	470.00	0.30	0.84	6.08	4.10
Dental plate	0.76	<2.64	0.23	0.87	1.33	164.00	0.14	1390.00	303.00	12.40	418.00	<0.157	0.76	3.28	1.86
Dental plate	0.64	3.04	0.25	0.51	<1.30	195.00	<0.126	1360.00	351.00	14.60	475.00	0.25	0.34	3.40	2.04
Dental plate	1.14	<3.39	0.25	0.60	<0.977	215.00	<0.115	1490.00	370.00	15.10	491.00	<0.231	0.58	4.00	2.23
Dental plate	0.65	<3.06	0.42	<0.629	<1.03	213.00	<0.129	1220.00	358.00	14.30	441.00	<0.206	1.37	5.13	2.26
Dental plate	7.13	<2.59	1.54	2.05	1.95	23.70	0.16	2580.00	1710.00	86.20	896.00	0.49	2.31	2.07	14.20
Dental plate	9.31	3.66	1.56	3.91	4.66	27.60	0.13	2350.00	1740.00	101.00	775.00	0.84	3.26	3.68	19.80
Plate Close to Cracks	8.97	<2.91	2.25	5.74	4.18	27.10	<0.0968	2420.00	1810.00	111.00	860.00	0.97	4.07	4.42	20.50
Plate Close to Cracks	9.50	<3.39	2.41	5.42	5.58	21.10	0.18	2480.00	1850.00	112.00	788.00	0.65	3.80	5.73	23.10
Dental plate	12.20	<2.87	1.99	3.70	5.11	21.50	0.18	2340.00	1950.00	137.00	827.00	0.95	4.42	3.03	21.20
Plate Close to Cracks	10.30	<2.81	1.98	4.46	4.09	26.20	<0.111	2690.00	2090.00	140.00	872.00	1.09	4.02	4.72	21.70

B)	Wonthaggi plesiosaur tooth													
	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
Isotopic Mass	139	140	141	145	147	151	157	159	163	165	167	169	173	175
	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Dental plate	2560.00	5230.00	668.00	2910.00	569.00	137.00	594.00	77.90	437.00	77.80	179.00	20.00	111.00	14.50
Dental plate	2480.00	5110.00	631.00	2650.00	549.00	133.00	574.00	72.30	412.00	72.60	160.00	18.70	98.70	13.30
Dental plate	474.00	1060.00	125.00	507.00	109.00	28.30	121.00	16.90	99.60	18.20	40.40	4.64	25.30	3.20
Dental plate	345.00	752.00	91.10	365.00	75.20	19.60	76.10	11.60	68.60	9.93	25.10	2.47	10.10	1.29
Dental plate	424.00	920.00	108.00	446.00	93.80	23.50	97.20	14.40	82.00	13.40	31.20	3.36	16.10	2.10
Dental plate	445.00	943.00	117.00	459.00	92.40	24.90	100.00	14.10	82.80	14.00	30.70	3.30	17.50	2.23
Dental plate	312.00	710.00	82.30	322.00	64.10	17.90	68.70	10.20	58.40	9.66	21.30	2.13	10.40	1.32
Dental plate	352.00	820.00	91.50	359.00	76.80	20.20	78.90	11.60	66.20	10.50	22.20	2.21	10.90	1.13

Dental plate	390.00	851.00	102.00	396.00	83.80	21.90	90.00	12.70	75.40	11.70	24.40	2.46	12.40	1.45
Dental plate	343.00	742.00	90.30	351.00	74.20	19.10	80.10	11.10	63.00	10.60	21.10	2.45	10.90	1.35
Dental plate	1970.00	4050.00	481.00	1970.00	389.00	97.40	403.00	52.00	297.00	50.40	105.00	11.50	55.60	7.06
Dental plate	1890.00	4120.00	502.00	2040.00	409.00	105.00	417.00	54.50	312.00	50.40	115.00	12.70	62.90	8.53
Plate Close to Cracks	2100.00	4610.00	563.00	2330.00	469.00	115.00	496.00	62.60	358.00	60.00	127.00	12.80	64.90	9.05
Plate Close to Cracks	2060.00	4610.00	549.00	2270.00	470.00	115.00	468.00	62.30	352.00	58.30	127.00	13.70	65.90	8.82
Dental plate	2030.00	4270.00	549.00	2230.00	455.00	113.00	470.00	61.10	344.00	60.40	134.00	13.90	69.40	9.94
Plate Close to Cracks	2210.00	5130.00	590.00	2440.00	501.00	119.00	488.00	64.20	375.00	63.90	135.00	15.10	73.40	10.10

Supplemental table 9: Trace (A) and rare earth element (B) composition data ppm for the Wonthaggi Lungfish dental plate (Eu-PL-1123D) obtained via LA-ICP-MS.

A)	Gråkammen ?chondrichthyan scale														
	V	Cr	Co	Ni	Cu	Zn	Rb	Sr	Y	Zr	Ba	Hf	Pb	Th	U
Isotopic Mass	51	52	59	60	65	66	85	88	89	90	137	177	208	232	238
	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Enameloid	9.89	3.54	0.122	0.402	6.66	21.8	0.101	2150	565	2.14	199	0.153	96	4.41	48.7
Enameloid	12.1	4.1	0.14	1.32	20.3	27.8	0.144	2040	580	4.55	205	0.191	122	5.13	66.6
Enameloid	14.4	3.91	0.233	0.826	5.32	20	0.163	2000	631	2.71	201	0.104	123	5.06	71.6
Dentine	18.9	3.47	0.326	0.966	6.07	18.4	0.154	2260	750	3.6	214	0.202	118	5.58	79.5
Dentine	15.8	4.37	0.401	0.742	5.3	24.5	0.177	2090	597	2.34	189	0.163	96.3	4.88	66.2
Dentine	12.7	3.85	0.14	0.575	4.9	28.1	0.182	2110	539	2.36	173	0.179	71	3.96	50.9
Dentine	27.1	6.51	1.01	2.97	59.3	15.1	0.534	1440	874	10.1	169	0.229	146	6.18	192
Dentine	34.8	5.16	0.806	1892.32	78.2	16.7	0.215	1330	804	19.7	182	0.349	146	5.28	145

B)	Gråkammen ?chondrichthyan scale													
	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
Isotopic Mass	139	140	141	145	147	151	157	159	163	165	167	169	173	175
	Ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Enameloid	135.0	525.0	109.0	694.0	223.0	31.5	205.0	24.4	119.0	17.6	36.6	3.76	16.6	2.16
Enameloid	138.0	512.0	107.0	696.0	230.0	33.8	210.0	24.9	125.0	18.7	37.2	3.77	18.1	2.17
Enameloid	147.0	557.0	115.0	736.0	247.0	37.4	229.0	25.2	127.0	19.6	40.7	3.75	18.6	2.13
Dentine	171.0	644.0	135.0	881.0	289.0	45.6	250.0	28.9	144.0	21.4	44.4	4.39	19.6	2.36
Dentine	139.0	517.0	108.0	723.0	227.0	35.2	208.0	24.8	120.0	18.5	38.3	3.82	18.2	2.16
Dentine	126.0	470.0	92.4	603.0	202.0	29.0	181.0	20.7	103.0	15.3	32.3	3.17	15.5	1.75
Dentine	184.0	630.0	138.0	960.0	339.0	62.6	317.0	35.1	169.0	24.5	54.3	5.25	24.5	3.48
Dentine	152.0	593.0	126.0	879.0	316.0	59.8	287.0	33.7	155.0	24.0	47.2	4.92	24.0	3.32

Supplemental Table 10: Trace (A) and rare earth element (B) composition data the Gråkammen Chondrichthyan scale obtained via LA-ICP-MS.

A)	Gråkammen thelodont scale														
	V	Cr	Co	Ni	Cu	Zn	Rb	Sr	Y	Zr	Ba	Hf	Pb	Th	U
Isotopic Mass	51	52	59	60	65	66	85	88	89	90	137	177	208	232	238
	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Dentine	117.0	28.5	54.9	140.0	161.0	1540.0	4.37	1810.0	93.5	15.7	489.0	0.342	158	12.5	14.5
Enameloid	2.52	4.84	13.0	6.89	82.6	1150.0	0.14	1760.0	92.7	14.1	413.0	0.177	126	14	16.8
Enameloid	2.05	4.16	28.5	20.4	94.6	1090.0	0.143	1800.0	96.5	13.4	370.0	0.221	163	11.9	14.8
Pulp Cavity	18.2	4.63	57	62.5	199.0	1280.0	0.179	2030	136.0	17.0	339	0.278	499	18.2	22.3

B)	Gråkammen thelodont scale													
	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
Isotopic Mass	139	140	141	145	147	151	157	159	163	165	167	169	173	175
	Ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Dentine	121.0	205.0	18.7	79.6	11.4	6.71	11.5	1.87	11.0	2.33	6.89	1.13	6.23	0.984
Enameloid	114.0	190.0	19.3	71.5	11.4	7.16	12.3	1.68	12.1	2.51	6.7	1.04	6.74	0.913
Enameloid	104.0	157.0	16.1	57.8	8.72	5.5	9.12	1.24	9.76	2	5.14	0.875	4.98	0.712
Pulp Cavity	153.0	273.0	30.0	112.0	20.9	11.1	21.5	2.83	18.4	3.7	11.6	1.51	7.9	1.07

Supplemental Table 11: Trace (A) and rare earth element (B) composition data for the Gråkammen thelodont scale obtained via LA-ICP-MS.

A)	Tavlefjellet thelodont scale														
	V	Cr	Co	Ni	Cu	Zn	Rb	Sr	Y	Zr	Ba	Hf	Pb	Th	U
Isotopic Mass	51	52	59	60	65	66	85	88	89	90	137	177	208	232	238
	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Enameloid	0.47	2.46	0.251	3.46	3.31	18.5	0.118	2430.0	976.0	15.3	1740.0	0.253	134.0	3.5	3.43
Basal Dentine	1.07	2.63	0.331	1.1	11.2	82.2	0.137	3230.0	2310.0	83.9	2490.0	0.438	737.0	2.79	13.4
Enameloid	0.495	5.04	0.459	1.29	4.46	26.3	0.158	2590.0	1030.0	14.7	1920.0	0.19	108.0	7.52	3.18
Enameloid	0.498	5.25	0.302	1.29	5.9	29.7	0.137	2360.0	1050.0	9.6	1950.0	0.188	103.0	5.68	2.96
Dentine	0.475	4.21	0.268	0.735	4.83	35.1	0.16	3220.0	1030.0	2.33	2130.0	0.196	53.3	6.65	2.96
Basal dentine	1.04	5.97	0.59	0.945	13.3	49.6	0.171	2830.0	2290.0	88.9	2220.0	0.413	700.0	1.99	13.6
Basal Dentine	1.01	4.22	0.898	1.6	19.4	42.3	0.161	2850.0	2450.0	102.0	2080.0	0.553	845.0	2.38	15.7

B)	Tavlefjellet thelodont scale													
	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
Isotopic Mass	139	140	141	145	147	151	157	159	163	165	167	169	173	175
	Ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Enameloid	308.0	973.0	135.0	625.0	149.0	74.4	171.0	25.6	166.0	31.0	71.9	7.58	39.6	4.44
Basal Dentine	680.0	980.0	297.0	1380.0	326.0	154.0	413.0	59.9	381.0	68.9	162.0	17.7	82.2	10.4
Enameloid	321.0	1000.0	155.0	676.0	158.0	77.4	188.0	27.4	179.0	32.2	72	7.89	39.0	4.32
Enameloid	334.0	1010.0	149.0	696.0	170.0	79.3	203.0	28.9	177.0	31.7	73.5	8.15	37.7	4.63
Dentine	309.0	999.0	138.0	630.0	142.0	68.8	170.0	25.2	162.0	28.6	67.2	7.36	31.8	3.71
Basal dentine	633.0	1780.0	269.0	1360.0	307.0	148.0	393.0	56.5	368.0	68.5	158.0	16.1	80.8	9.76
Basal dentine	679.0	1960.0	294.0	1470.0	350.0	174.0	455.0	65.2	427.0	79.6	186.0	19.2	99.0	11.3

Supplemental Table 12: Trace (A) and rare earth element (B) composition data for the Tavlefjellet thelodont scale obtained via LA-ICP-MS.