

# Biogeography and lake morphometry drive diatom and chironomid assemblages' composition in lacustrine surface sediments of oceanic islands

## Hydrobiologia

Cátia Lúcio Pereira<sup>1\*</sup>, Pedro Miguel Raposeiro<sup>1</sup>, Ana Cristina Costa<sup>1</sup>, Roberto Bao<sup>2</sup>, Santiago Giralt<sup>3</sup> and Vítor Gonçalves<sup>1</sup>

<sup>1</sup>CIBIO, Centro de Investigação em Biodiversidade e Recursos Genéticos, InBIO Laboratório Associado, Pólo dos Açores – Departamento de Biologia da Universidade dos Açores, 9501-801 Ponta Delgada, Portugal

<sup>2</sup>Faculty of Sciences, University of A Coruña, Campus da Zapateira s/n, 15071 A Coruña, Spain

<sup>3</sup>Institute of Earth Sciences Jaume Almera CSIC, Sedimentary Geology, Lluís Solé I Sabaris s/n, E-08028 Barcelona, Spain

\*email: [catiaalpereira@gmail.com](mailto:catiaalpereira@gmail.com)

### Online Resource 1

**Table 1** Location and main characteristics (spatial, hydromorphological, physicochemical and impacte) of the studied Azorean lakes

Lake Full Name	Typology	Spatial Variables		Hydromorphological Variables					Physicochemical Variables										Impacte Variables				
		Lat (UTM)	Long (UTM)	Alt (m)	LA (km <sup>2</sup> )	Zmax (m)	Temp (°C)	July T (°C)	pH	Cond (µS/cm)	Alk (CaCO <sub>3</sub> /L)	TP (µg P/L)	TN (mg N/L)	N <sub>Ki</sub> (mg N/L)	NO <sub>3</sub> (mg NO <sub>3</sub> /L)	NO <sub>2</sub> (mg NO <sub>2</sub> /L)	TN/TP	Si (mg SiO <sub>2</sub> /L)	Z <sub>SD</sub> (m)	Chla (µg/L)	%Agr (%)	%Oth (%)	%Flo (%)
Areiro	Shallow	4180720.06	638559.61	630	0.0045	2.70	11.10	16.60	5.60	39.80	4.00	9.00	0.15	0.10	0.15	0.05000	0.0167	2.80	2.70	1.65	0.00	0.00	100.00
Caldeirão Norte	Shallow	4186995.33	609962.58	770	0.0018	0.40	11.20	15.00	5.90	32.80	3.00	6.00	0.15	0.10	0.15	0.05000	0.0250	1.05	0.40	1.45	0.00	20.00	80.00
Caldeirão Sul	Shallow	4186942.06	609997.65	770	0.0039	0.80	11.10	15.00	7.00	37.40	4.00	11.00	0.15	0.10	0.15	0.05000	0.0136	1.05	0.80	8.24	0.00	5.88	94.12
Canário	Shallow	4188336.28	609147.63	750	0.0178	2.30	14.50	14.60	6.46	37.83	3.13	22.75	0.15	0.13	0.03	0.00005	0.0066	0.58	1.28	11.40	0.00	2.80	97.20
Canas	Shallow	4185821.54	612069.25	570	0.0019	2.40	22.80	16.60	6.30	34.80	7.00	16.00	0.30	0.30	0.20	0.05000	0.0188	1.05	2.40	2.71	75.00	0.00	25.00
Carvão	Shallow	4187053.71	610729.10	680	0.0115	0.40	19.80	15.50	7.50	37.60	12.00	15.00	0.15	0.10	0.15	0.05000	0.0100	6.60	0.40	1.74	0.00	26.44	73.56
Congro	Deep	4179982.69	640241.90	420	0.0370	17.73	16.30	18.00	8.47	91.70	22.50	31.00	0.43	0.23	0.17	0.00005	0.0137	9.50	2.13	30.12	25.74	36.14	38.12
Empadadas Norte	Shallow	4187226.07	610176.10	740	0.0175	3.30	14.10	15.00	6.62	33.88	3.63	19.50	0.16	0.13	0.03	0.00005	0.0083	1.27	1.68	11.17	0.00	3.90	96.10
Empadadas Sul	Shallow	4187091.70	610274.94	750	0.0048	2.45	13.70	15.20	6.95	49.40	7.25	18.25	0.19	0.13	0.04	0.00005	0.0103	1.41	2.08	4.89	0.00	2.90	97.10
Fogo	Deep	4180740.35	633514.96	574	1.4366	24.20	12.63	16.80	7.59	49.35	7.25	8.63	0.18	0.15	0.03	0.00005	0.0203	2.20	3.63	4.08	0.00	5.13	94.87
Fogo 2	Shallow	4181112.88	633673.39	574	0.0481	1.98	12.00	17.00	7.00	27.30	3.00	32.00	0.15	0.10	0.15	0.05000	0.0047	2.60	1.00	23.54	0.00	5.13	94.87
Furnas	Deep	4180143.86	647150.83	280	1.9257	11.50	17.13	19.20	8.22	128.75	48.00	60.25	0.43	0.33	0.05	0.00001	0.0071	15.60	0.85	38.54	44.68	4.83	51.03
Pau-Pique	Shallow	4187922.20	610393.20	690	0.0025	4.50	11.10	16.20	6.80	36.10	4.00	380.00	0.15	0.10	0.15	0.05000	0.0004	0.70	1.50	9.93	0.00	0.00	100.00
Peixe	Shallow	4186450.13	611231.69	620	0.0035	1.50	22.70	16.40	7.20	60.40	23.00	40.00	0.15	0.10	0.15	0.05000	0.0038	2.10	0.70	17.16	9.84	4.92	85.25
Pico d'El Rei 1	Shallow	4181900.00	642085.00	627	0.0010	1.10	10.90	15.80	8.85	68.30	19.00	251.00	0.80	0.80	0.15	0.05000	0.0032	4.40	0.50	205.94	0.00	0.00	100.00
Pico d'El Rei 2	Shallow	4181654.00	641700.00	648	0.0014	0.60	10.00	15.40	6.43	47.10	13.00	168.00	0.15	0.10	0.15	0.05000	0.0009	4.40	0.60	58.04	0.00	0.00	100.00
Pico d'El Rei 3	Shallow	4181849.65	641566.88	593	0.0041	1.00	10.20	16.00	7.55	55.80	17.00	385.00	0.15	0.10	0.15	0.05000	0.0004	5.10	0.30	465.43	0.00	0.00	100.00
Rasa da Serra Devassa	Shallow	4187131.44	609876.37	765	0.0331	0.80	10.83	14.80	6.65	46.73	2.50	7.13	0.16	0.13	0.03	0.00005	0.0228	1.05	0.80	2.89	0.00	3.36	96.64
Rasa das Sete Cidades	Shallow	4189125.49	607359.61	545	0.0393	4.53	14.73	16.40	6.07	34.15	2.50	2.50	0.16	0.13	0.03	0.00005	0.0650	0.39	3.98	2.15	2.00	0.00	98.00
Santiago	Deep	4189551.18	607989.45	360	0.2535	28.75	15.60	18.00	8.50	118.75	33.75	21.50	0.19	0.13	0.05	0.00005	0.0087	2.73	2.58	7.70	0.00	0.00	100.00
São Brás	Shallow	4184056.94	640013.62	610	0.0582	2.05	15.33	16.20	6.91	35.85	6.25	126.75	0.55	0.53	0.03	0.00005	0.0043	1.78	0.40	33.35	50.00	3.85	46.15
Azul	Deep	4192417.68	608243.52	260	3.5868	25.35	16.48	18.70	7.83	94.55	23.25	9.50	0.19	0.15	0.03	0.00005	0.0197	0.70	2.20	5.35	42.34	7.56	52.36
Verde	Deep	4189071.90	606553.94	260	0.8563	23.50	15.78	19.20	8.61	118.50	32.75	28.50	0.43	0.33	0.06	0.00005	0.0149	1.33	1.25	26.19	18.09	2.04	80.06
Negro	Shallow	4287768.57	476631.37	540	0.0044	1.20	11.10	18.20	5.93	40.30	4.00	32.00	0.15	0.10	0.15	0.05000	0.0047	1.05	1.20	14.16	33.96	2.83	63.21
Lagoínha da Serreta	Shallow	4289038.42	471211.26	777	0.0045	1.60	10.80	20.40	5.41	40.60	1.50	11.00	0.15	0.10	0.15	0.05000	0.0136	2.80	1.60	3.09	0.00	0.00	100.00
Vale Fundo	Shallow	4287629.87	483224.69	660	0.0005	1.40	11.80	16.40	6.02	51.10	11.00	296.00	0.15	0.10	0.40	0.05000	0.0005	3.60	0.40	88.56	0.00	0.00	100.00
Caiado	Shallow	4257155.56	390879.19	810	0.0545	4.60	13.73	16.60	6.50	28.53	3.75	12.67	0.20	0.18	0.04	0.01217	0.0158	1.33	1.53	2.17	64.39	7.58	28.03

**Table 1** Location and main characteristics (spatial, hydromorphological, physicochemical and impacte) of the studied Azorean lakes (continuation)

Lake Full Name	Typology	Spatial Variables		Hydromorphological Variables			Physicochemical Variables											Impacte Variables					
		Lat (UTM)	Long (UTM)	Alt (m)	LA (km <sup>2</sup> )	Zmax (m)	Temp (°C)	July T (°C)	pH	Cond (µS/cm)	Alk (CaCO <sub>3</sub> /L)	TP (µg P/L)	TN (mg N/L)	N <sub>Ki</sub> (mg N/L)	NO <sub>3</sub> (mg NO <sub>3</sub> /L)	NO <sub>2</sub> (mg NO <sub>2</sub> /L)	TN/TP	Si (mg SiO <sub>2</sub> /L)	Z <sub>SD</sub> (m)	Chla (µg/L)	%Agr (%)	%Oth (%)	%Flo (%)
Capitão	Shallow	4260771.00	384929.00	790	0.0266	4.03	13.68	16.10	6.30	28.63	3.38	31.75	0.26	0.21	0.03	0.01217	0.0083	0.88	0.53	25.40	79.19	2.01	18.79
Landroal	Shallow	4257351.47	389402.63	790	0.0064	2.40	13.20	17.20	6.82	32.80	5.00	14.00	0.15	0.10	0.10	0.05000	0.0107	2.10	2.40	4.12	58.70	2.17	39.13
Paul	Shallow	4253986.85	392391.68	790	0.0166	2.90	15.73	16.50	6.06	28.67	3.67	20.50	0.20	0.17	0.03	0.01319	0.0098	1.05	2.00	1.44	16.04	0.09	83.87
Peixinho	Shallow	4254694.99	397515.26	870	0.0133	7.80	13.83	15.80	6.92	31.88	7.75	33.75	0.63	0.55	0.08	0.01217	0.0185	3.15	0.30	49.43	99.31	0.69	0.00
Rosada	Shallow	4254495.18	396507.34	900	0.0114	7.10	14.20	15.60	6.90	29.60	3.25	12.50	0.20	0.18	0.03	0.01217	0.0160	0.70	1.57	3.13	98.90	1.10	0.00
Lagoinha do Paul	Shallow	4254080.06	403566.06	510	0.0011	1.70	16.20	18.20	6.48	40.40	7.00	81.00	0.20	0.20	0.15	0.05000	0.0025	1.60	1.70	30.10	92.00	0.00	8.00
Branca	Shallow	4368098.78	652638.77	570	0.0475	1.60	13.60	17.60	6.02	48.00	5.00	11.00	0.15	0.10	0.15	0.05000	0.0136	2.10	1.60	1.03	0.00	0.00	100.00
Comprida	Deep	4367232.41	652998.76	650	0.0544	14.30	14.13	17.80	7.42	71.80	13.50	10.25	0.20	0.18	0.03	0.13694	0.0195	1.25	2.53	1.86	0.00	1.65	98.35
Funda	Deep	4363277.32	653537.56	360	0.3547	31.90	16.33	19.20	8.71	100.38	34.75	28.75	0.28	0.18	0.09	0.47927	0.0096	7.95	0.84	53.35	15.20	0.04	84.76
Lomba	Deep	4365545.02	655906.77	650	0.0205	15.27	14.53	16.30	7.34	52.48	7.00	9.63	0.18	0.13	0.03	0.13694	0.0182	0.93	2.80	2.41	61.04	20.78	18.18
Negra	Deep	4367314.87	652675.72	530	0.1107	115.00	15.23	17.90	8.33	123.75	39.75	62.25	0.23	0.13	0.09	0.13694	0.0036	12.85	1.75	12.05	0.00	0.00	100.00
Rasa	Deep	4363624.99	652868.90	530	0.1031	16.80	15.50	17.90	6.62	54.43	3.00	7.75	0.18	0.13	0.03	0.02396	0.0226	0.63	2.13	4.92	0.00	3.61	96.39
Caldeirão	Shallow	4397541.94	661871.49	410	0.2307	0.20	14.30	18.70	6.91	75.83	4.50	33.25	0.19	0.15	0.03	0.01369	0.0056	0.21	0.20	7.70	70.38	3.37	26.25
Caldeirão 2	Shallow	4397519.58	662390.83	410	0.0852	2.20	13.80	18.80	6.01	78.20	1.50	94.00	0.90	0.10	3.80	0.05000	0.0096	2.20	1.00	9.58	70.38	3.37	26.25