# Supplementary Material

**Supplementary Table S1: Species list of phytoplankton taxa per sampling site during the study period.**

| | Lafra | Lafrouda | Lagos | Palaia Koiti | Vis1 | Vis2 | Vis3 |
|---|---|---|---|---|---|---|---|
| **Cyanobacteria** | | | | | | | |
| *Aphanizomenon favaloroi* | | * | * | | * | * | * |
| Black filaments | * | * | * | | * | * | * |
| Cocoid cyanobacteria (big) | * | * | * | * | * | * | * |
| Cocoid cyanobacteria (small) | * | * | * | * | * | * | * |
| *Dolichospermum flos-aquae* | | | | | * | | * |
| *Limnothrix/Jaaginema* sp. | * | * | * | * | * | * | * |
| *Planktolyngbya limnetica* | | * | * | | * | * | * |
| *Pseudanabaena* sp. | * | * | * | * | * | * | * |
| **Bacillarophyceae** | | | | | | | |
| *Chaetoceros danicus* | | | | | | | * |
| *Chaetoceros peruviannus* | * | * | | * | | | * |
| *Chaetoceros* sp. | * | * | * | * | * | * | * |
| *Chaetoceros tenuisimus* | * | * | * | * | * | * | * |
| *Chaetoceros throdensii* | * | * | * | * | * | * | * |
| *Cyclostephanos* sp. | * | * | * | * | * | * | * |
| *Cylindrotheca closterium* | * | * | * | * | * | * | * |
| *Dactyliossolen blavyannus* | * | * | | * | | * | |
| *Dactyliossolen fragilissimus* | * | * | | * | | | * |
| *Ditylum breightweilli* | | | | * | | | |
| *Guinnardia delicatula* | | * | * | * | | * | * |
| *Hemiaulus hauckii* | * | * | | * | | * | * |
| *Leptocylindros danicus* | * | * | | * | * | * | |
| *Leptocylindros minimus* | | * | | * | | | |
| *Melosira* sp. | | | * | * | | | |
| *Meuniera membranacea* | | | | * | | | |
| *Nitzschia frigida* | * | * | * | * | * | * | * |
| *Nitzschia longissima* | * | * | * | * | * | * | * |
| *Navicula transitans* | * | * | * | * | * | * | |
| *Odontella aurita* | | | | * | | | |
| *Proboscia alata* | * | * | * | * | | * | * |
| *Pseudonitzschia pseudodelicatissima* | * | * | | * | | | * |
| *Pseudonitzschia pungens* | * | | | * | | * | * |
| *Rhizosolenia impricata* | | | | * | * | * | |
| *Rhizosolenia setigera* | * | * | * | * | * | * | * |
| *Striatella unipuncta* | | | * | * | | | |
| *Skeletonema* cf. *costatum* | * | * | * | * | | * | * |
| *Synedra* sp. | | | | | | | |
| *Thalassionema nitzschiodes* | * | * | * | * | * | | * |
| *Thalassiosira* sp. | | * | * | * | | | * |
| *Unidentified centric diatom* | | | | | * | * | |
| **Dinophyceae** | | | | | | | |
| *Alexandrium* sp. | * | * | * | * | * | * | * |
| *Ceratium fusus* | | * | * | | | | |
| *Dinophysis acuminata* | | | * | * | * | * | * |
| *Fragilidium* sp. | | | * | | | * | |
| *Gonyaulax fragilis* | * | * | | * | | | * |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| *Gonyaulax verior* | * | * | * | * | * | * | * |
| *Gymnodynium* sp.1 | * | * | * | * | * | | * |
| *Gymnodynium* sp.2 | * | * | * | * | * | * | * |
| *Heterocapsa triquerta* | * | | * | * | | | |
| *Heterocapsa rotundata* | * | | | * | | | |
| *Karenia* sp. | | | * | | | | * |
| *Karlodinium* sp. | | | * | | | | |
| *Katodinium glaucum* | * | * | * | * | * | * | * |
| *Prorocentrum lima* | * | | * | * | | | * |
| *Prorocentum micans* | * | * | * | * | * | * | * |
| *Prorocentum minimum* | * | * | * | * | * | * | * |
| *Scripsiella trochoidea* | * | * | * | * | * | | * |
| **Chlorophyceae** | | | | | | | |
| *Chlamydomonas* sp. | | | * | | * | * | * |
| *Crucigeniella* sp. | | | | | * | | * |
| *Dunaliella salina* | * | | | | | | * |
| *Kirchineriella* sp. | * | * | * | * | * | * | * |
| *Monoraphidium arcuatum* | * | | * | | * | * | * |
| *Monoraphidium contortum* | * | * | * | | * | * | * |
| *Monoraphidium minutum* | | | | | * | | |
| *Oocystis* sp. | | | | | * | | |
| *Scenedesmus* sp. | | | | | | * | |
| *Tetraedron minimum* | | | | | * | | * |
| **Cryptophyceae** | | | | | | | |
| *Cryptomonas* sp. | * | * | * | * | * | * | * |
| *Plagioselmis* sp. | * | * | * | * | * | * | * |
| *Rhodomonas* sp. | * | | | * | | * | * |
| *Teleaulax acuta* | * | * | * | * | * | * | * |
| **Haptophyceae** | | | | | | | |
| *Chrysochromulina* sp. | * | * | * | * | * | * | * |
| *Imantonia rotunda* | * | * | * | * | * | * | * |
| **Prymnesiophyceae** | | | | | | | |
| *Coccolithales* | | | * | * | | | |
| **Prasinophyceae** | | | | | | | |
| *Pyraminomonas aureus* | * | * | * | | * | * | |
| *Tetraselmis* sp. | * | * | * | * | * | * | * |
| **Euglenophyceae** | | | | | | | |
| *Eutreptiella sp.* | * | * | * | * | * | * | * |
| **Raphidophyceae** | | | | | | | |
| *Heterosigma* sp. | | | * | | | | |

**Supplementary Table S2: Species number, total phytoplankton biomass and alpha diversity indices per sample.**

| Sampling code | Species number (S) | Biomass (mg $L^{-1}$) | Shannon ($H$) | Eveness ($e^{H/S}$) |
|---|---|---|---|---|
| Lafra_Nov 2018 | 13 | 12.00 | 0.22 | 0.10 |
| Lafrouda_Nov 2018 | 9 | 1.89 | 0.54 | 0.19 |
| Lag_Nov 2018 | 8 | 3.38 | 1.08 | 0.37 |
| PK_Nov 2018 | 13 | 7.49 | 2.22 | 0.71 |
| Vis1_Nov 2018 | 15 | 8.15 | 1.96 | 0.47 |
| Vis2_Nov 2018 | 15 | 10.92 | 2.16 | 0.58 |
| Vis3_Nov 2018 | 16 | 15.12 | 1.33 | 0.24 |
| Lafra_Dec 2018 | 12 | 7.02 | 0.56 | 0.15 |
| Lafrouda_Dec 2018 | 7 | 0.17 | 1.03 | 0.40 |
| Lag_Dec 2018 | 13 | 2.38 | 1.62 | 0.39 |
| PK_Dec 2018 | 11 | 0.67 | 1.89 | 0.60 |
| Vis1_Dec 2018 | 11 | 51.32 | 0.92 | 0.23 |
| Vis2_Dec 2018 | 9 | 40.25 | 0.97 | 0.29 |
| Vis3_Dec 2018 | 10 | 36.87 | 0.98 | 0.27 |
| Lafrouda_Jan 2019 | 11 | 1.83 | 1.42 | 0.38 |
| Lag_Jan 2019 | 10 | 3.95 | 1.32 | 0.37 |
| PK_Jan 2019 | 16 | 0.63 | 1.77 | 0.37 |
| Vis1_Jan 2019 | 9 | 4.36 | 1.55 | 0.52 |
| Vis2_Jan 2019 | 9 | 2.59 | 1.19 | 0.36 |
| Vis3_Jan 2019 | 9 | 6.14 | 1.45 | 0.47 |
| Lag_Feb 2019 | 11 | 1.53 | 1.50 | 0.41 |
| PK_Feb 2019 | 14 | 0.94 | 2.16 | 0.62 |
| Vis2_Feb 2019 | 8 | 29.05 | 0.77 | 0.27 |
| Vis3 _Feb 2019 | 13 | 8.24 | 1.01 | 0.21 |
| Lafra_Mar 2019 | 13 | 0.86 | 2.04 | 0.59 |
| Lafrouda_Mar 2019 | 16 | 26.36 | 0.53 | 0.11 |
| Lag_Mar 2019 | 21 | 3.85 | 1.48 | 0.21 |
| PK_Mar 2019 | 23 | 2.30 | 1.01 | 0.12 |
| Vis1_Mar 2019 | 9 | 5.44 | 1.22 | 0.38 |
| Vis2_Mar 2019 | 13 | 6.34 | 1.36 | 0.30 |
| Vis3_Mar 2019 | 20 | 33.6 | 0.78 | 0.11 |
| Lafra_Apr 2019 | 17 | 4.41 | 1.67 | 0.31 |
| Lafrouda_Apr 2019 | 14 | 127.76 | 0.13 | 0.08 |
| Lag_Apr 2019 | 23 | 8.88 | 1.45 | 0.19 |
| PK_Apr 2019 | 28 | 1.72 | 2.06 | 0.28 |
| Vis1_Apr 2019 | 11 | 32.04 | 0.48 | 0.15 |
| Vis2_Apr 2019 | 13 | 20.20 | 0.52 | 0.13 |
| Vis3_Apr 2019 | 15 | 30.21 | 0.62 | 0.12 |
| Lafra_May 2019 | 18 | 15.37 | 1.33 | 0.21 |
| Lafrouda_May 2019 | 19 | 9.15 | 1.89 | 0.35 |
| Lag_May 2019 | 26 | 8.33 | 2.12 | 0.32 |
| PK_May 2019 | 19 | 3.25 | 2.17 | 0.46 |
| Vis1_May 2019 | 19 | 72.12 | 0.97 | 0.14 |
| Vis2_May 2019 | 21 | 8.80 | 1.43 | 0.20 |
| Vis3_May 2019 | 23 | 23.16 | 0.89 | 0.11 |
| Lafra_Jun 2019 | 18 | 12.04 | 1.64 | 0.29 |
| Lafrouda_Jun 2019 | 21 | 2.87 | 1.20 | 0.16 |
| Lag_Jun 2019 | 29 | 5.19 | 2.07 | 0.27 |

| | | | | |
|---|---|---|---|---|
| PK_Jun 2019 | 23 | 5.63 | 0.80 | 0.10 |
| Vis1_Jun 2019 | 19 | 21.26 | 1.49 | 0.23 |
| Vis2_Jun 2019 | 17 | 19.61 | 1.70 | 0.32 |
| Vis3_Jun 2019 | 19 | 12.10 | 1.89 | 0.35 |
| Lafra_Jul 2019 | 24 | 39.03 | 1.56 | 0.20 |
| Lafrouda_ Jul 2019 | 10 | 82.90 | 0.10 | 0.11 |
| Lag_ Jul 2019 | 18 | 12.41 | 1.37 | 0.22 |
| PK_Jul 2019 | 27 | 8.41 | 1.25 | 0.13 |
| Vis1_Jul 2019 | 18 | 23.27 | 0.89 | 0.14 |
| Vis2_Jul 2019 | 23 | 20.05 | 1.64 | 0.22 |
| Vis3_Jul 2019 | 26 | 11.93 | 1.54 | 0.18 |
| Lafra_Aug 2019 | 16 | 26.79 | 0.90 | 0.15 |
| Lafrouda_Aug 2019 | 11 | 3.50 | 0.74 | 0.19 |
| Lag_Aug 2019 | 21 | 10.02 | 1.57 | 0.23 |
| PK_ Aug 2019 | 20 | 2.03 | 1.13 | 0.15 |
| Vis1_Aug 2019 | 16 | 43.50 | 0.45 | 0.10 |
| Vis2_Aug 2019 | 21 | 33.02 | 0.88 | 0.11 |
| Vis3_Aug 2019 | 19 | 39.02 | 1.15 | 0.17 |
| Lafra_Sep 2019 | 19 | 2.98 | 1.92 | 0.36 |
| Lafrouda_Sep 2019 | 25 | 2.89 | 1.98 | 0.29 |
| Lag_Sep 2019 | 19 | 3.29 | 2.36 | 0.56 |
| PK_Sep 2019 | 23 | 0.73 | 2.25 | 0.41 |
| Vis1_Sep 2019 | 15 | 134.73 | 0.47 | 0.11 |
| Vis2_Sep 2019 | 15 | 7.93 | 0.99 | 0.18 |
| Vis3_Sep 2019 | 15 | 8.26 | 0.47 | 0.11 |
| Lafra_Oct 2019 | 16 | 2.68 | 1.48 | 0.27 |
| Lag_Oct 2019 | 17 | 5.10 | 1.30 | 0.22 |
| PK_Oct 2019 | 17 | 2.25 | 1.22 | 0.20 |
| Vis1_Oct 2019 | 20 | 37.24 | 1.10 | 0.15 |
| Vis2_Oct 2019 | 15 | 1.13 | 2.40 | 0.74 |
| Vis3_Oct 2019 | 18 | 3.27 | 1.91 | 0.38 |

**Supplementary Table S3: List of higher contributing phytoplankton species in communities' dissimilarity determined by SIMPER between site pairs.**

**a.** Lafra - Vistonis lagoons; .

| Taxon | Average dissimilarity | Contribution (%) | Cumulative (%) |
|---|---|---|---|
| | **Lafra - Vis1** | | |
| *Prorocentum minimum* | 29.25 | 32.00 | 32.00 |
| *Rhizosolenia setigera* | 11.96 | 13.08 | 45.08 |
| *Cyclostephanos* sp. | 9.31 | 10.18 | 55.26 |
| *Katodinium glaucum* | 7.448 | 8.15 | 63.41 |
| *Alexandrium* sp. | 7.147 | 7.82 | 71.23 |
| | **Lafra - Vis2** | | |
| *Prorocentum minimum* | 20.55 | 22.85 | 22.85 |
| *Cyclostephanos* sp. | 14.45 | 16.06 | 38.91 |
| *Alexandrium* sp. | 11.13 | 12.38 | 51.29 |
| *Katodinium glaucum* | 6.62 | 7.36 | 58.65 |
| Coccoid cyanobacteria | 5.47 | 6.09 | 64.73 |
| *Eutreptiella* sp. | 3.73 | 4.15 | 68.88 |
| *Gonyaulax verior* | 3.67 | 4.08 | 72.95 |
| **Lafra - Vis3** | | | |
| *Prorocentum minimum* | 22.60 | 24.81 | 24.81 |
| *Alexandrium* sp. | 10.57 | 11.60 | 36.41 |
| *Cyclostephanos* sp. | 10.34 | 11.35 | 47.76 |
| *Rhizosolenia setigera* | 7.36 | 8.08 | 55.83 |
| *Katodinium glaucum* | 6.75 | 7.41 | 63.24 |
| Coccoid cyanobacteria | 3.78 | 4.15 | 67.39 |
| *Chaetoceros* sp. | 3.57 | 3.92 | 71.31 |

**b.** Lafrouda - Vistonis lagoons.

| Taxon | Average dissimilarity | Contribution (%) | Cumulative (%) |
|---|---|---|---|
| **Lafrouda - Vis1** | | | |
| *Prorocentum minimum* | 35.01 | 38.05 | 38.05 |
| *Rhizosolenia setigera* | 11.90 | 12.94 | 50.99 |
| *Cyclostephanos* sp. | 9.85 | 10.71 | 61.70 |
| *Alexandrium* sp. | 7.13 | 7.75 | 69.44 |
| *Katodinium glaucum* | 6.67 | 7.25 | 76.69 |
| Coccoid cyanobacteria | 4.12 | 4.48 | 81.17 |
| **Lafrouda - Vis2** | | | |
| *Prorocentum minimum* | 28.05 | 30.19 | 30.19 |
| *Cyclostephanos* sp. | 15.03 | 16.17 | 46.36 |
| *Alexandrium* sp. | 10.69 | 11.51 | 57.87 |
| *Katodinium glaucum* | 5.63 | 6.06 | 63.93 |
| Coccoid cyanobacteria | 4.61 | 4.96 | 68.89 |
| *Rhizosolenia setigera* | 3.95 | 4.25 | 73.14 |

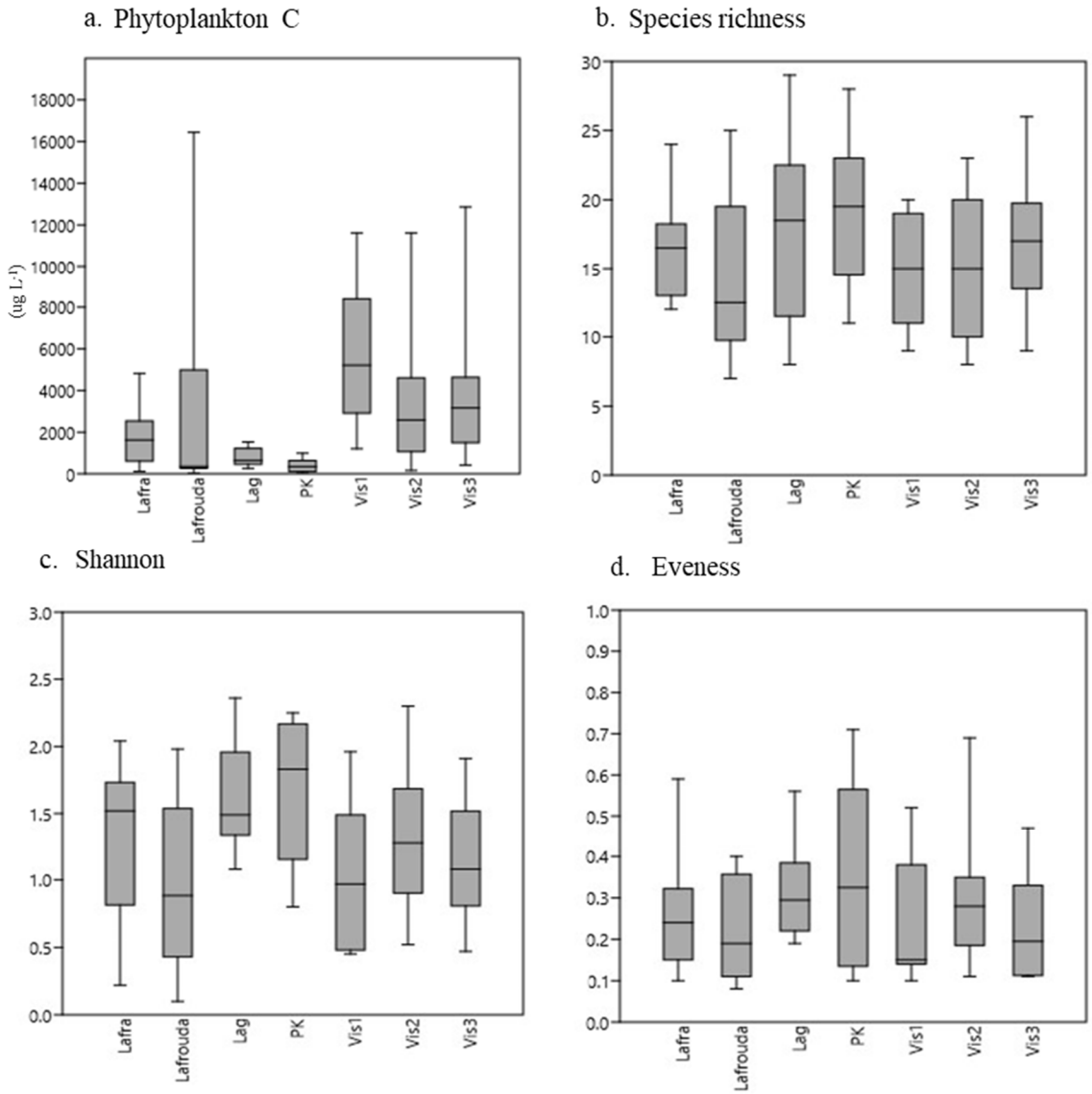
| | | | |
|---|---|---|---|
| **Lafrouda - Vis3** | | | |
| *Prorocentum minimum* | 28.56 | 30.90 | 30.90 |
| *Alexandrium* sp. | 10.86 | 11.75 | 42.65 |
| *Cyclostephanos* sp. | 10.85 | 11.73 | 54.38 |
| *Rhizosolenia setigera* | 7.55 | 8.17 | 62.55 |
| *Katodinium glaucum* | 6.01 | 6.50 | 69.05 |
| *Chaetoceros* sp. | 4.83 | 5.21 | 74.27 |

**c.** Lagos - Vistonis lagoons.

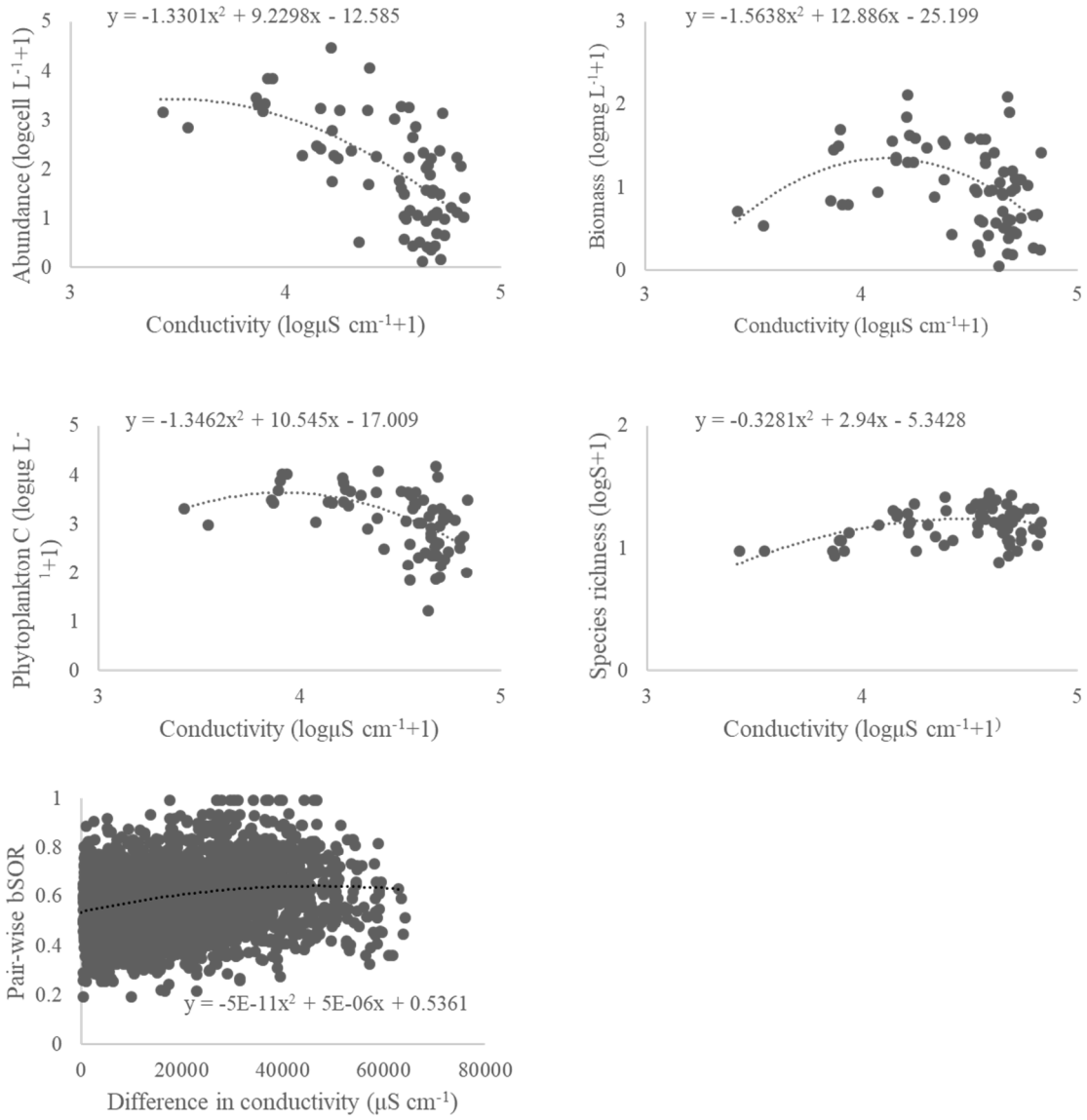
| Taxon | Average dissimilarity | Contribution (%) | Cumulative (%) |
|---|---|---|---|
| **Lag - Vis1** | | | |
| *Alexandrium* sp. | 11.69 | 13.33 | 13.33 |
| *Prorocentum minimum* | 10.15 | 11.57 | 24.91 |
| *Katodinium glaucum* | 5.87 | 6.69 | 31.60 |
| *Prorocentum micans* | 5.66 | 6.46 | 38.05 |
| Coccoid cyanobacteria | 5.19 | 5.92 | 43.98 |
| *Cylindrotheca closterium* | 4.98 | 5.68 | 49.65 |
| *Gonyaulax fragilis* | 4.52 | 5.15 | 54.81 |
| *Teleaulax acuta* | 3.77 | 4.30 | 59.10 |
| *Skeletonema* cf. *costatum* | 3.64 | 4.15 | 63.26 |
| *Gonyaulax verior* | 3.49 | 3.98 | 67.23 |
| *Heterosigma* sp. | 3.23 | 3.67 | 70.92 |
| **Lag - Vis2** | | | |
| *Prorocentum minimum* | 19.57 | 21.92 | 21.92 |
| *Cyclostephanos* sp. | 16.28 | 18.24 | 40.16 |
| *Katodinium glaucum* | 8.22 | 9.20 | 49.36 |
| *Alexandrium* sp. | 6.79 | 7.61 | 56.97 |
| Coccoid cyanobacteria | 5.56 | 6.23 | 63.20 |
| *Rhizosolenia setigera* | 3.59 | 4.03 | 67.23 |
| *Prorocentum micans* | 3.47 | 3.82 | 71.11 |
| **Lag - Vis3** | | | |
| *Prorocentum minimum* | 22.39 | 24.59 | 24.59 |
| *Cyclostephanos* sp. | 11.91 | 13.09 | 37.68 |
| *Katodinium glaucum* | 8.27 | 9.09 | 46.77 |
| *Rhizosolenia setigera* | 7.71 | 8.47 | 55.24 |
| *Alexandrium* sp. | 6.49 | 7.13 | 62.37 |
| *Chaetoceros* sp. | 4.00 | 4.40 | 66.77 |
| Coccoid cyanobacteria | 3.63 | 3.99 | 70.76 |

**d.** Palaia Koiti - Vistonis lagoons.

| Taxon | Average dissimilarity | Contribution (%) | Cumulative (%) |
|---|---|---|---|
| **PK - Vis1** | | | |
| *Prorocentum minimum* | 33.85 | 35.08 | 35.08 |
| *Rizosolenia setigera* | 14.17 | 14.69 | 49.77 |
| *Cyclostephanos* sp. | 12.82 | 13.28 | 63.05 |
| *Katodinium glaucum* | 8.45 | 8.76 | 71.81 |
| **PK - Vis2** | | | |
| *Prorocentum minimum* | 20.78 | 22.03 | 22.03 |
| *Cyclostephanos* sp. | 19.42 | 20.58 | 42.61 |
| *Katodinium glaucum* | 7.66 | 8.11 | 50.72 |
| Cocoid cyanobacteria | 6.15 | 6.52 | 57.25 |
| *Rhizosolenia setigera* | 5.98 | 6.33 | 63.58 |
| *Alexandrium* sp. | 5.65 | 5.99 | 69.57 |
| *Gonyaulax fragilis* | 2.97 | 3.15 | 72.72 |
| **PK - Vis3** | | | |
| *Prorocentum minimum* | 23.33 | 24.57 | 24.57 |
| *Cyclostephanos* sp. | 14.18 | 14.93 | 39.50 |
| *Rhizosolenia setigera* | 9.02 | 9.50 | 49.00 |
| *Katodinium glaucum* | 7.70 | 8.11 | 57.11 |
| *Alexandrium* sp. | 6.05 | 6.37 | 63.48 |
| *Chaetoceros* sp. | 4.83 | 5.09 | 68.57 |
| Coccoid cyanobacteria | 3.71 | 3.91 | 72.47 |




**Supplementary Figure S1: Boxplots of phytoplankton C (a), species richness (b), Shannon index (c) and Evenness (d) in Lafra, Lafrouda, Lagos (Lag), Palaia Koiti (PK) and Vistonis (Vis1, Vis2, Vis3) lagoons.**




**Supplementary Figure S2**: Scatter plots of conductivity and the different phytoplankton metrics.