**Supplementary**

**Tables**

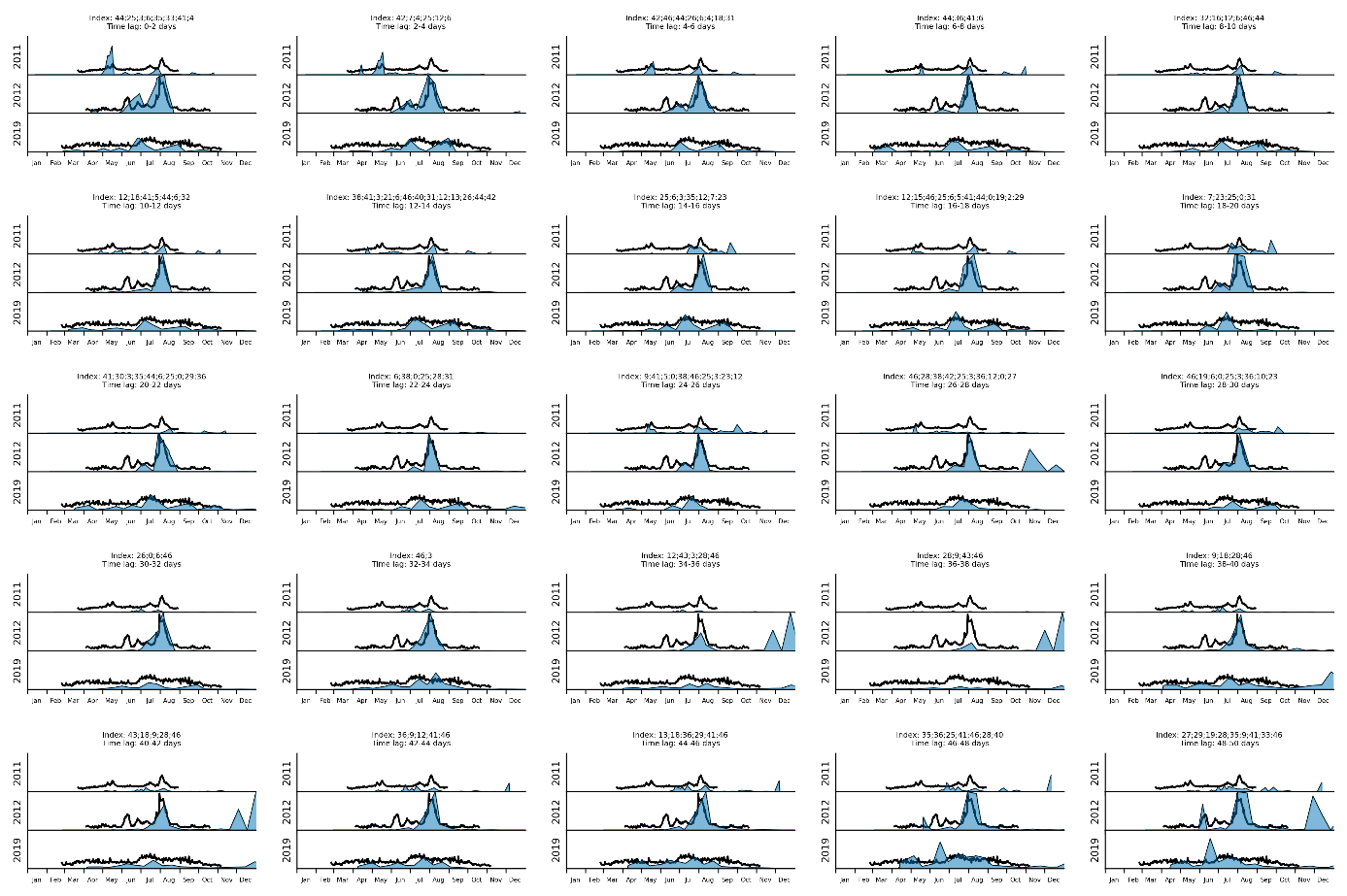
**Table S1.** Phytoplankton groups that were used in the first set of simulations including the years 2011, 2012 and 2019.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Identified phytoplankton group | Max. cell concentration in 2011  (cells L-1) | Max. cell concentration in 2012  (cells L-1) | Max. cell concentration in 2019  (cells L-1) |  | Index |  |  |
| *Alexandrium* spp. | 0 | 46,310 | 200 |  | 0 |  |  |
| *Cerataulina pelagica* | 190,900 | 0 | 7,000 |  | 1 |  |  |
| *Chaetoceros curvisetus* + *debilis* | 37,170 | 200 | 135,360 |  | 2 |  |  |
| *Chaetoceros danicus* | 0 | 4,000 | 4,560 |  | 3 |  |  |
| *Chaetoceros didymus* | 70,350 | 85,100 | 1,200 |  | 4 |  |  |
| *Chaetoceros pseudobrevis* | 17,110 | 0 | 0 |  | 5 |  |  |
| *Chaetoceros socialis* | 1,080 | 0 | 12,360 |  | 6 |  |  |
| *Chaetoceros* sp. (chains) | 0 | 46,310 | 0 |  | 7 |  |  |
| *Chaetoceros* spp. | 4,060,000 | 1,230,000 | 92,160 |  | 8 |  |  |
| *Coscinodiscus wailesii* | 400 | 44,310 | 0 |  | 9 |  |  |
| *Cyclotella* sp. | 26,180 | 10,100 | 0 |  | 10 |  |  |
| *Dactyliosolen fragilissimus* | 222,880 | 2,500 | 58,080 |  | 11 |  |  |
| *Diatoma vulgare* | 0 | 1,510 | 0 |  | 12 |  |  |
| *Dinophysis acuminata* | 1,500 | 120 | 200 |  | 13 |  |  |
| *Guinardia delicatula* | 129,900 | 302,100 | 166,080 |  | 14 |  |  |
| *Guinardia flaccida* | 3,000 | 2,300 | 42,000 |  | 15 |  |  |
| *Guinardia striata* | 1,250 | 500 | 7,200 |  | 16 |  |  |
| *Gymnodinium* spp. | 110,770 | 207,440 | 63,840 |  | 17 |  |  |
| *Gyrodinium* spp. | 1,200 | 26,180 | 1,560 |  | 18 |  |  |
| *Haslea wawrickae* | 1,750 | 1,760 | 0 |  | 19 |  |  |
| *Heterocapsa minima* | 292,000 | 47,330 | 14,560 |  | 20 |  |  |
| *Heterocapsa triqueta* | 3,250 | 0 | 240 |  | 21 |  |  |
| *Lauderia annulata* | 0 | 21,650 | 400 |  | 22 |  |  |
| *Lepidodinium chlorophorum* | 69,480 | 28,190 | 0 |  | 23 |  |  |
| *Leptocylindrus danicus* | 144,720 | 0 | 2,011,200 |  | 24 |  |  |
| *Leptocylindrus minimus* | 0 | 0 | 20,160 |  | 25 |  |  |
| *Lithodesmium undulatum* | 0 | 120 | 4,000 |  | 26 |  |  |
| *Minidiscus* sp. | 2,000 | 30,210 | 0 |  | 27 |  |  |
| *Navicula* spp. | 0 | 4,000 | 1,840 |  | 28 |  |  |
| *Naviculoides* spp. | 320 | 2,250 | 0 |  | 29 |  |  |
| *Nitzschia longissima* + *Cylindrotheca closterium* | 1,630 | 1,500 | 6,280 |  | 30 |  |  |
| *Nitzschia* spp. | 1,630 | 1,000 | 720 |  | 31 |  |  |
| *Prorocentrum micans* | 2,500 | 2,250 | 1,120 |  | 32 |  |  |
| *Prorocentrum minimum* + *cordatum* + *balticum* | 1,200 | 8,060 | 160 |  | 33 |  |  |
| *Prorocentrum triestinum* | 5,880 | 80 | 1,400 |  | 34 |  |  |
| *Protoperidinium bipes* | 1,000 | 5,000 | 6,240 |  | 35 |  |  |
| *Protoperidinium depressum* | 1,350 | 0 | 760 |  | 36 |  |  |
| *Pseudo-nitzschia delicatissima* | 22,610 | 5,750 | 2,760 |  | 37 |  |  |
| *Pseudo-nitzschia pungens* | 1,960 | 830 | 0 |  | 38 |  |  |
| *Pseudo-nitzschia seriata* | 7,540 | 45,130 | 2,360 |  | 39 |  |  |
| *Rhizosolenia imbricata* | 2,800 | 32,530 | 560 |  | 40 |  |  |
| *Rhizosolenia setigera* | 2,750 | 1,380 | 1,880 |  | 41 |  |  |
| *Scrippsiella* spp. + *Pentapharsodinium* spp. + *Ensiculifera* spp. | 20,270 | 3,500 | 2,920 |  | 42 |  |  |
| *Skeletonema marinoi* | 2,400 | 12,100 | 0 |  | 43 |  |  |
| *Thalassionema nitzschioides* | 12,560 | 51,350 | 13,000 |  | 44 |  |  |
| *Thalassiosira* spp. | 44,310 | 88,620 | 298,760 |  | 45 |  |  |
| *Tripos kofoidii* | 1,120 | 7,510 | 2,160 |  | 46 |  |  |

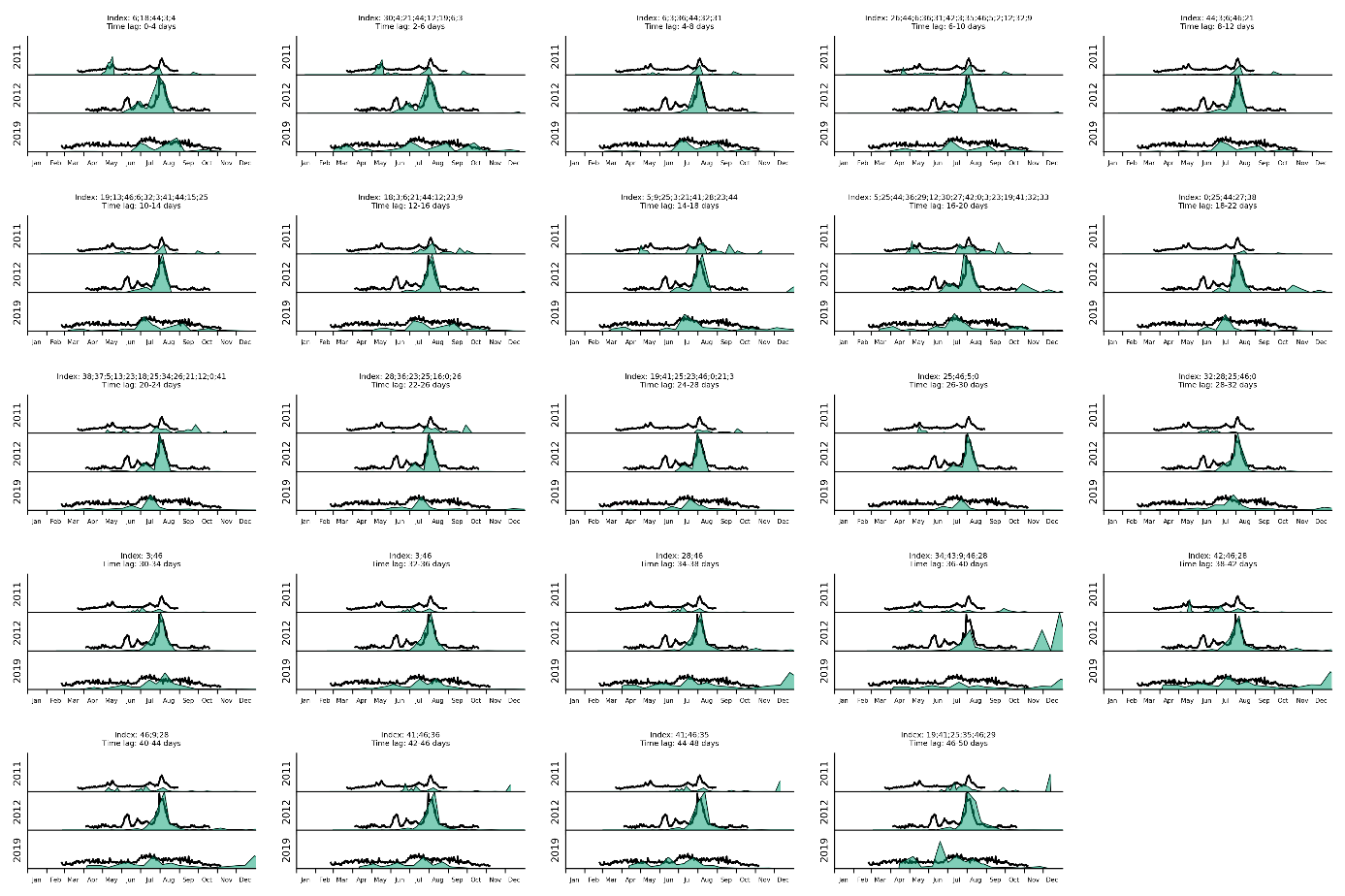
**Table S2.** Phytoplankton groups that were utilized in the second set of simulations including the years 2011 and 2012.

|  |  |  |  |
| --- | --- | --- | --- |
| Identified phytoplankton group | Max. cell concentration in 2011  (cells L-1) | Max. cell concentration in 2012  (cells L-1) | Index |
| *Alexandrium* spp. | 0 | 46,310 | 0 |
| *Cerataulina pelagica* | 190,900 | 0 | 1 |
| *Chaetoceros curvisetus* | 8,760 | 0 | 2 |
| *Chaetoceros danicus* | 0 | 4,000 | 3 |
| *Chaetoceros debilis* | 37,170 | 200 | 4 |
| *Chaetoceros didymus* | 70,350 | 85,100 | 5 |
| *Chaetoceros pseudobrevis* | 17,110 | 0 | 6 |
| *Chaetoceros socialis* | 1,080 | 0 | 7 |
| *Chaetoceros* sp. (chains) | 0 | 46,310 | 8 |
| *Chaetoceros* spp. | 4,060,000 | 1,230,000 | 9 |
| *Coscinodiscus wailesii* | 400 | 44,310 | 10 |
| *Cyclotella* sp. | 26,180 | 10,100 | 11 |
| *Cylindrotheca closterium* | 1,500 | 1,500 | 12 |
| *Dactyliosolen fragilissimus* | 222,880 | 2,500 | 13 |
| *Diatoma vulgare* | 0 | 1,510 | 14 |
| *Dinophysis acuminata* | 1,500 | 120 | 15 |
| *Guinardia delicatula* | 129,900 | 302,100 | 16 |
| *Guinardia flaccida* | 3,000 | 2,300 | 17 |
| *Guinardia striata* | 1,250 | 500 | 18 |
| *Gymnodinium* spp*.* <20 µm | 0 | 207,440 | 19 |
| *Gymnodinium* spp. >20 µm | 110,770 | 11,070 | 20 |
| *Gyrodinium flagellare* | 8,060 | 13,250 | 21 |
| *Gyrodinium* spp. | 1,200 | 26,180 | 22 |
| *Haslea wawrickae* | 1,750 | 1,760 | 23 |
| *Heterocapsa minima* | 292,000 | 47,330 | 24 |
| *Heterocapsa triqueta* | 3,250 | 0 | 25 |
| *Lauderia annulata* | 0 | 21,650 | 26 |
| *Lepidodinium chlorophorum* | 69,480 | 28,190 | 27 |
| *Leptocylindrus danicus* | 144,720 | 0 | 28 |
| *Minidiscus* sp. | 2,000 | 30,210 | 29 |
| *Navicula* sp. (8-10 µm) | 0 | 4,000 | 30 |
| *Naviculoides* spp. | 320 | 2,250 | 31 |
| *Nitzschia longissima* | 1,630 | 0 | 32 |
| *Nitzschia* spp. | 0 | 1,000 | 33 |
| *Prorocentrum balticum* | 1,200 | 8,060 | 34 |
| *Prorocentrum micans* | 2,500 | 2,250 | 35 |
| *Prorocentrum triestinum* | 5,880 | 80 | 36 |
| *Protoperidinium bipes* | 1,000 | 5,000 | 37 |
| *Protoperidinium depressum* | 1,350 | 0 | 38 |
| *Pseudo-nitzschia delicatissima* | 22,610 | 5,750 | 39 |
| *Pseudo-nitzschia pungens* | 1,960 | 830 | 40 |
| *Pseudo-nitzschia seriata* | 7,540 | 45,130 | 41 |
| *Rhizosolenia imbricata* | 2,800 | 32,530 | 42 |
| *Rhizosolenia setigera* | 1,750 | 1,380 | 43 |
| *Rhizosolenia setigera* (fine) | 1,000 | 0 | 44 |
| *Scrippssiella* sp. | 20,270 | 3,500 | 45 |
| *Skeletonema marinoi* | 2,400 | 12,100 | 46 |
| *Thalassionema nitzschioides* | 12,560 | 51,350 | 47 |
| *Thalassiosira* spp. | 44,310 | 88,620 | 48 |
| *Tripos kofoidii* | 1,120 | 7,510 | 49 |

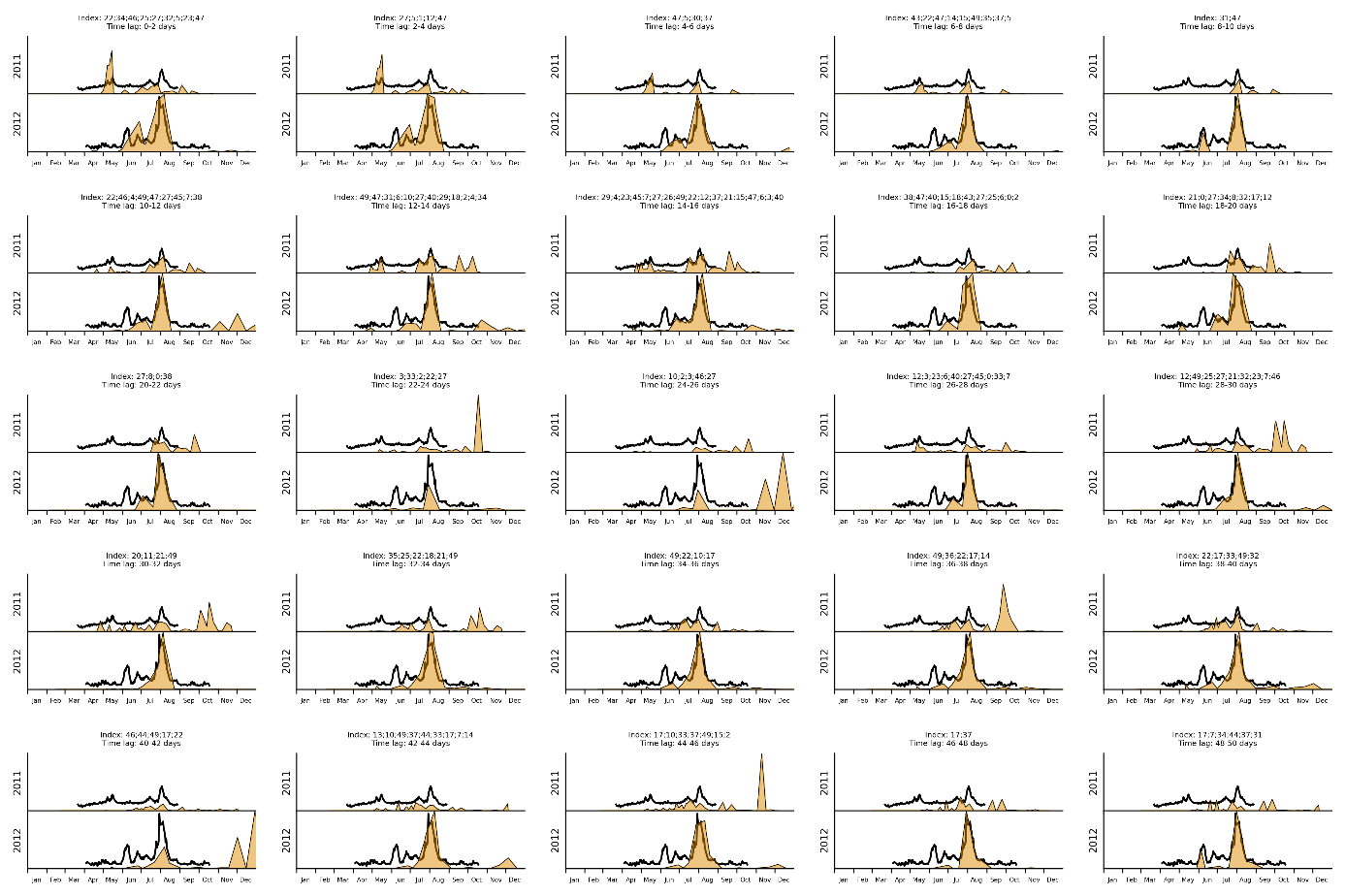
**Figures**

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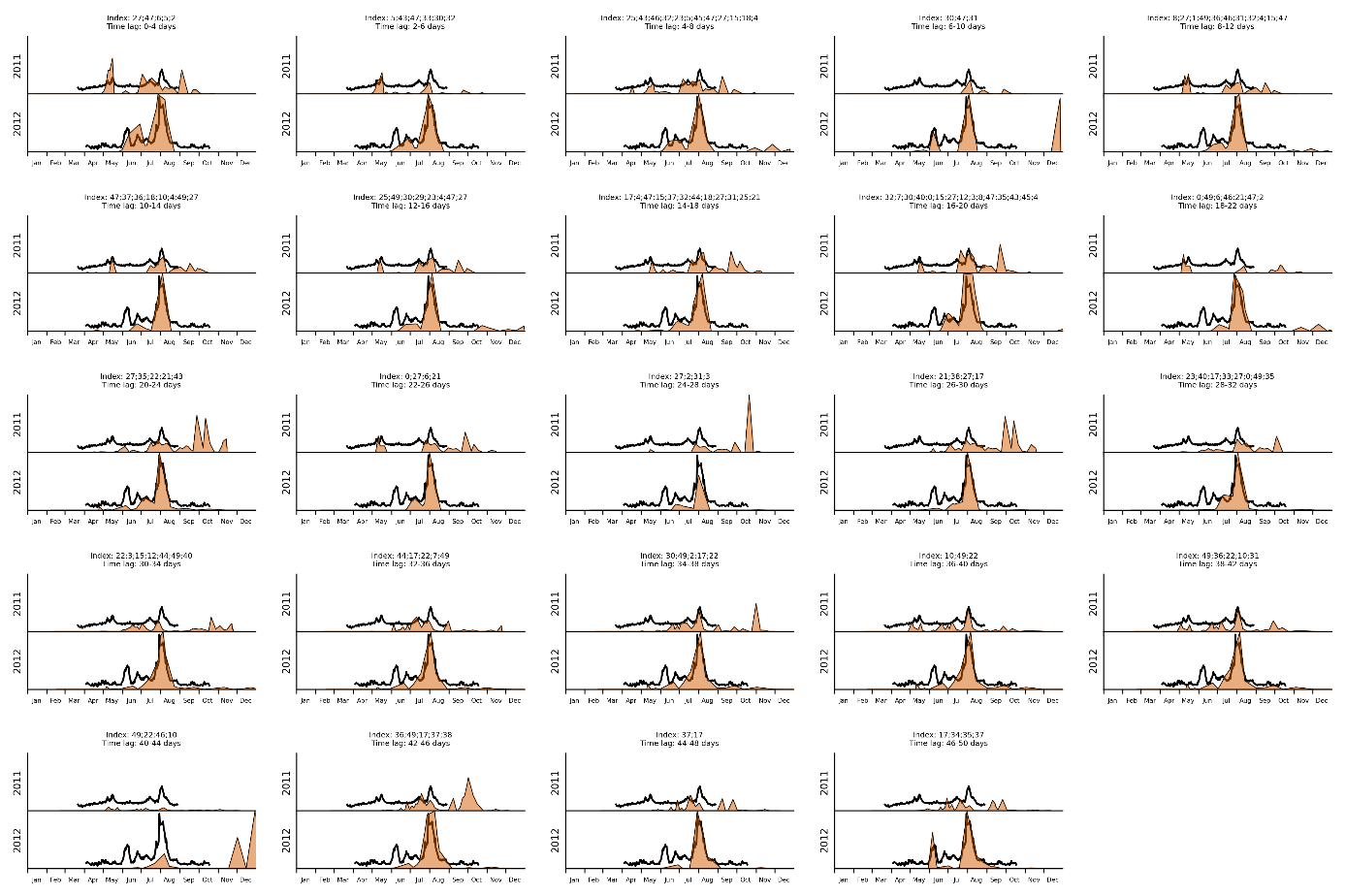
**Figure S1.** Ba/Cashell profiles Set1 – 3days interval.



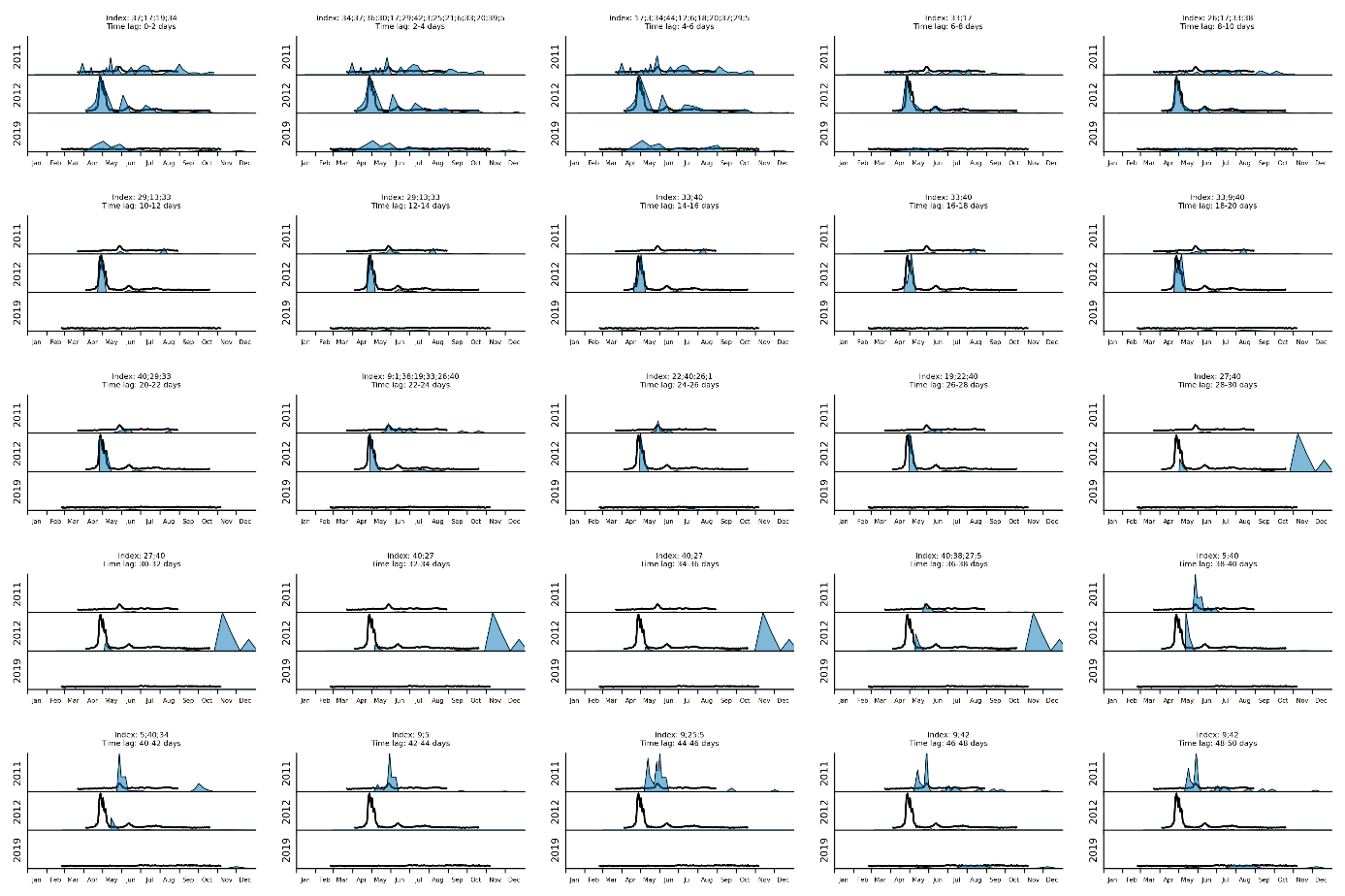
**Figure S2.** Ba/Cashell profiles Set1 – 5days interval.



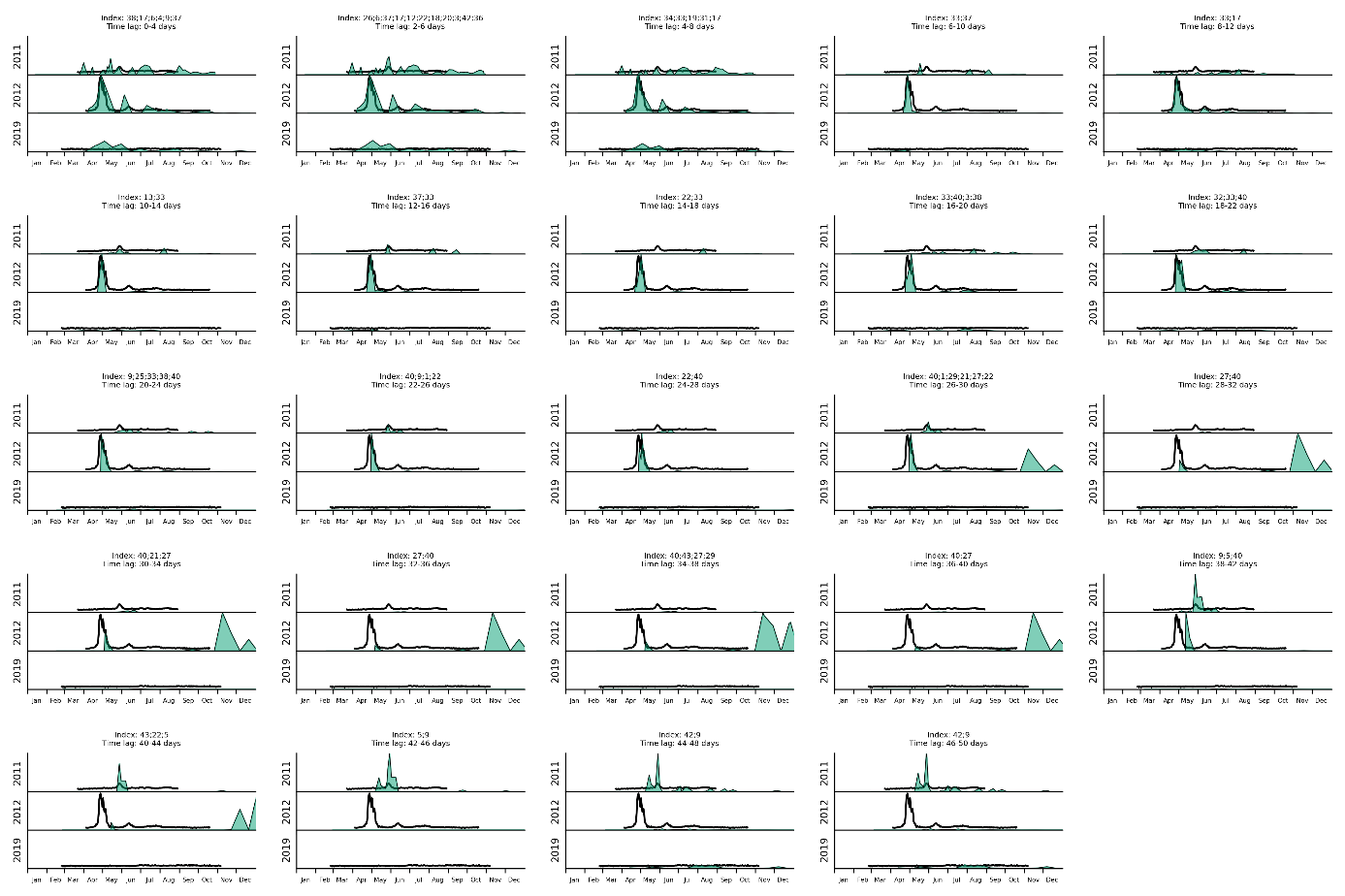
**Figure S3.** Ba/Cashell profiles Set2 – 3days interval.



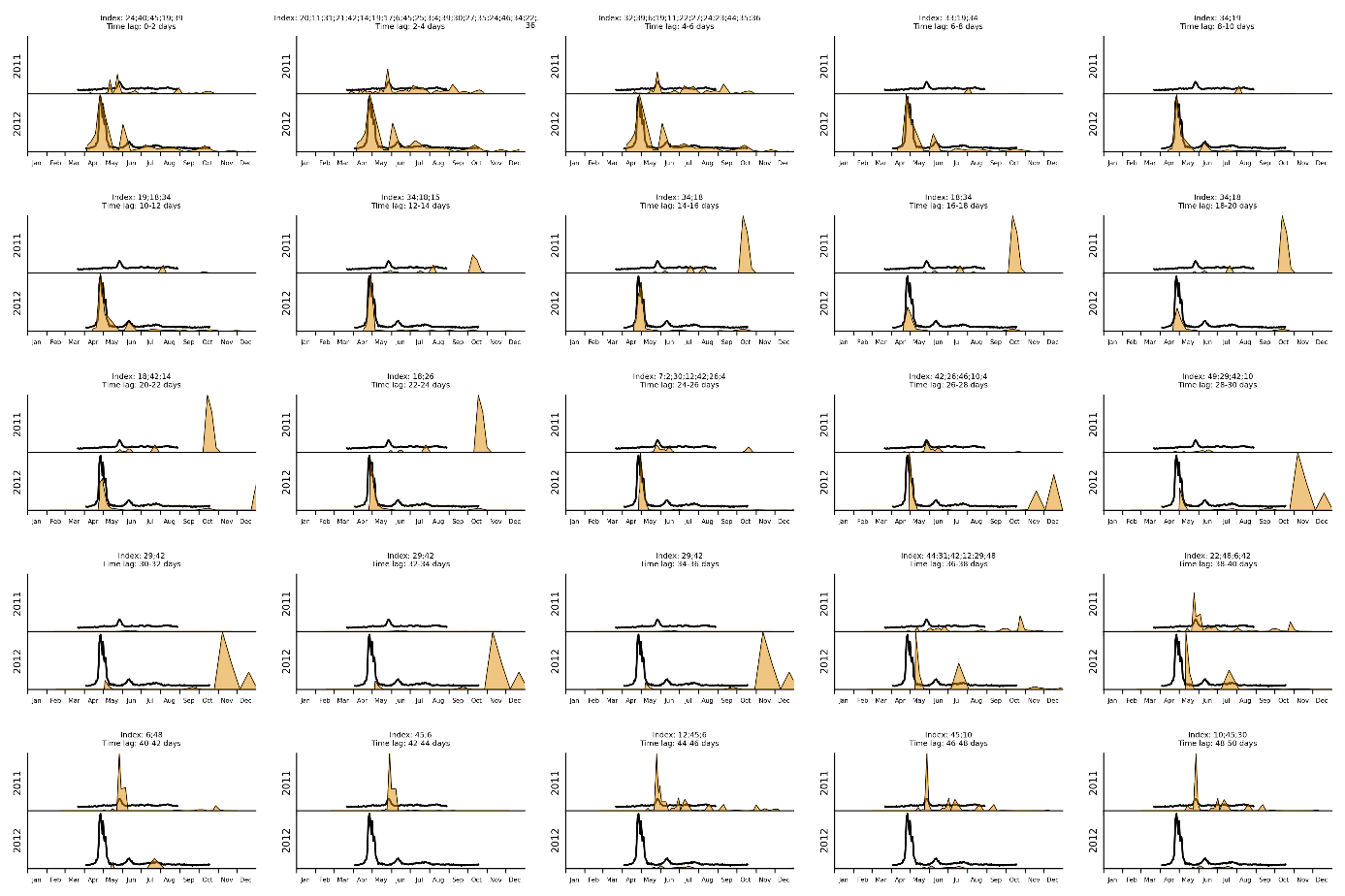
**Figure S4.** Ba/Cashell profiles Set2 – 5days interval.

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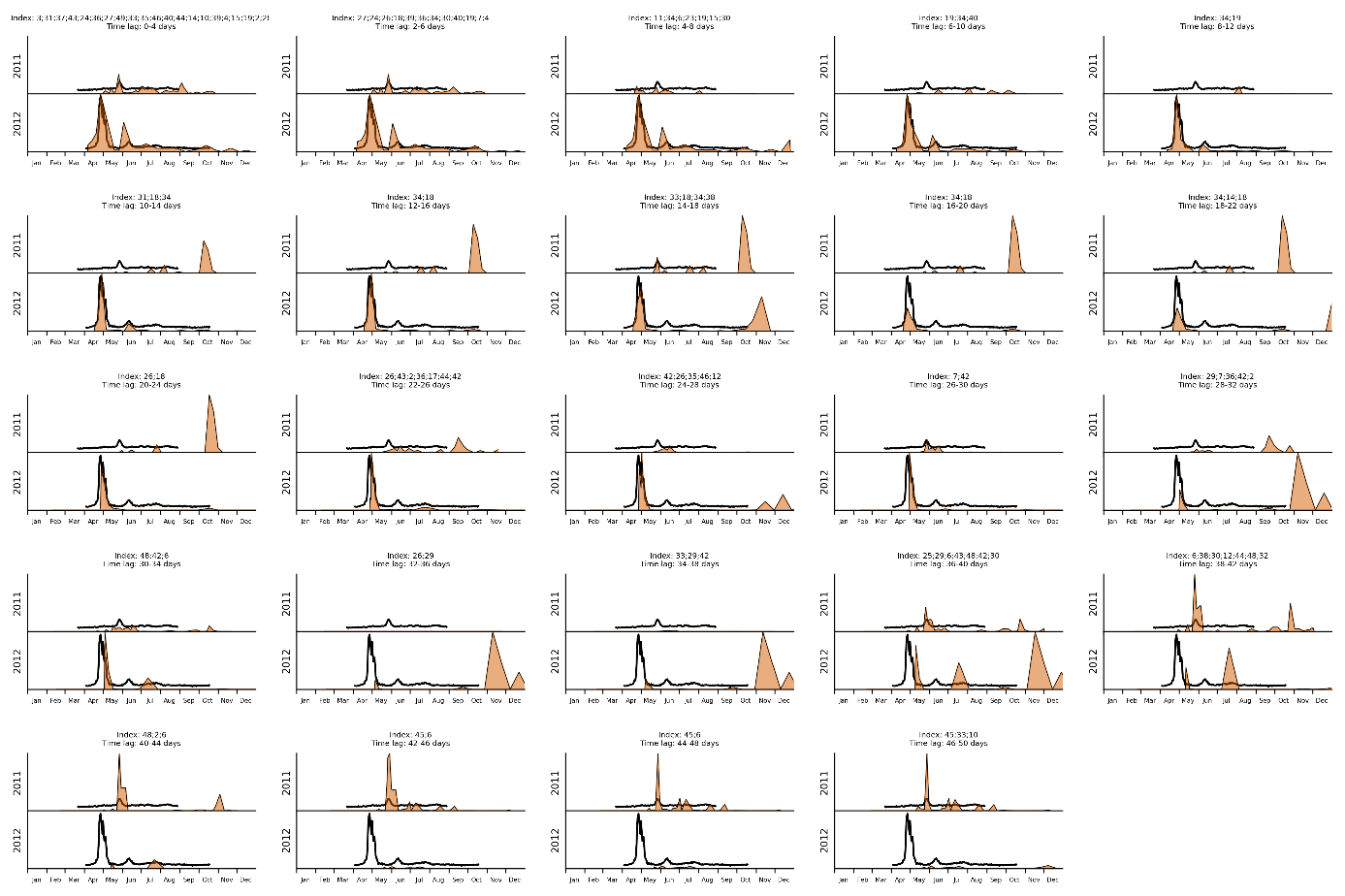
**Figure S5.** Mo/Cashell profiles Set1 – 3days interval.



**Figure S6.** Mo/Cashell profiles Set1 – 5days interval.



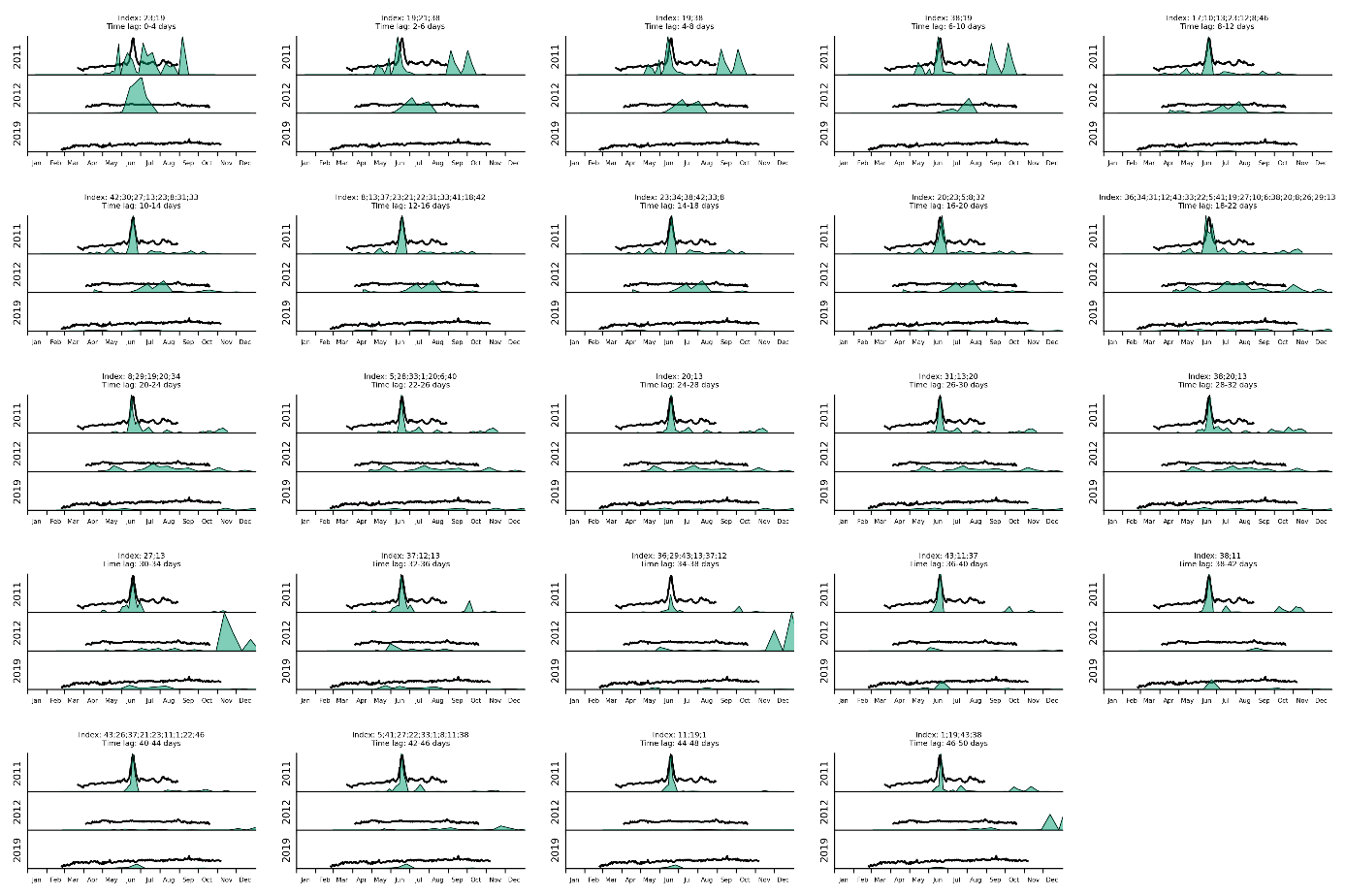
**Figure S7.** Mo/Cashell profiles Set2 – 3days interval.



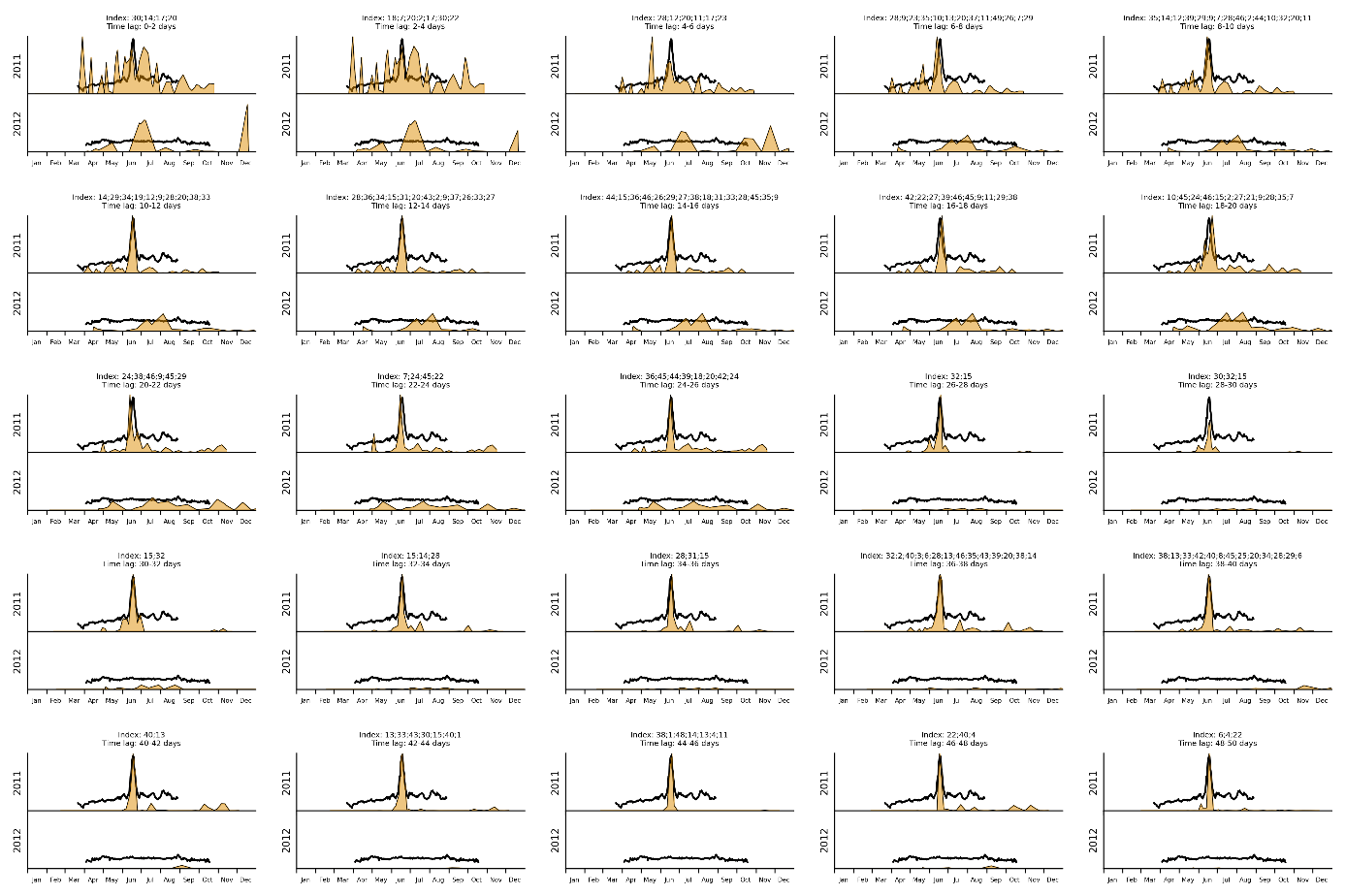
**Figure S8.** Mo/Cashell profiles Set2 – 5days interval.



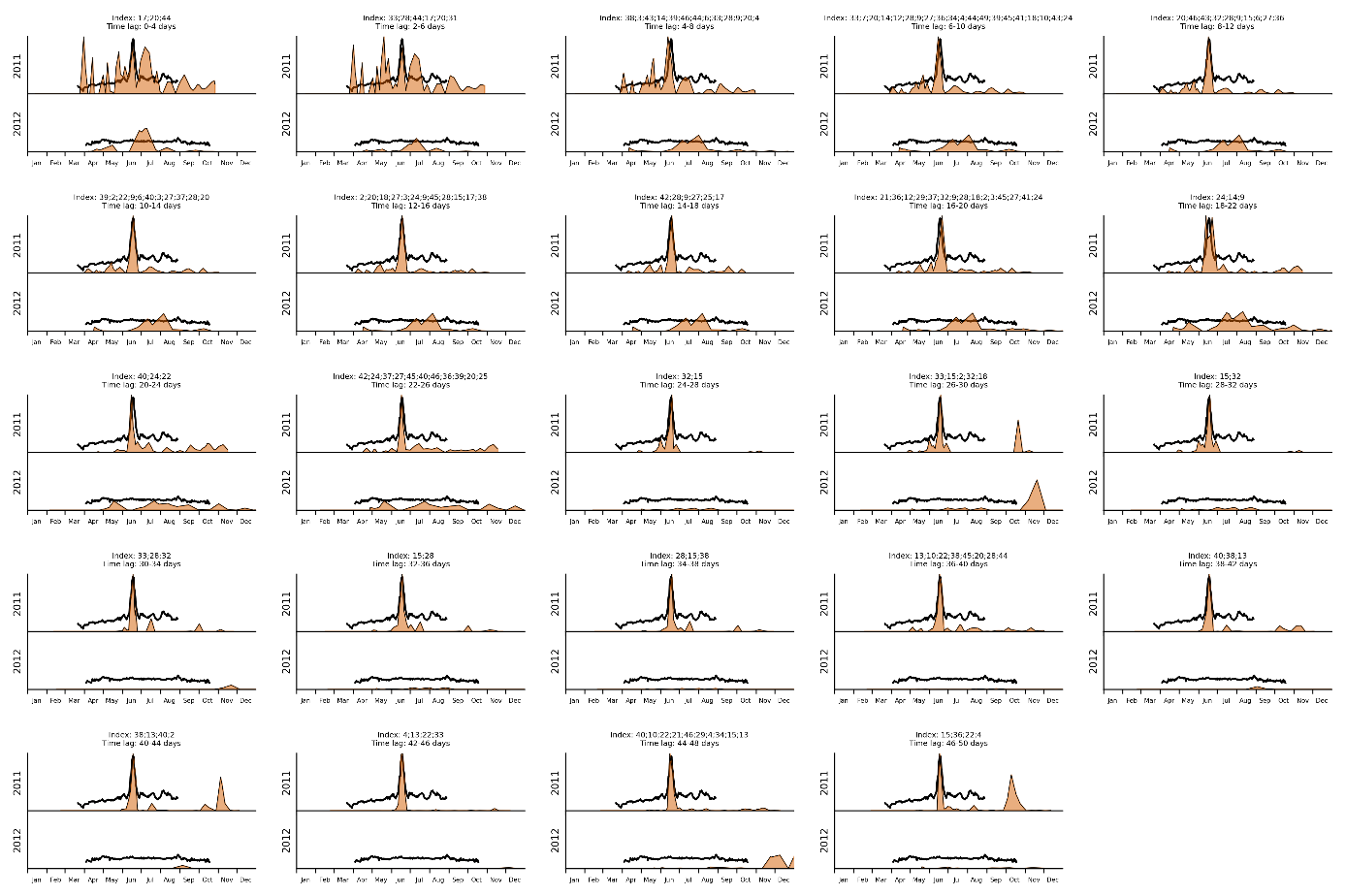
**Figure S9.** Li/Cashell profiles Set1 – 3days interval.



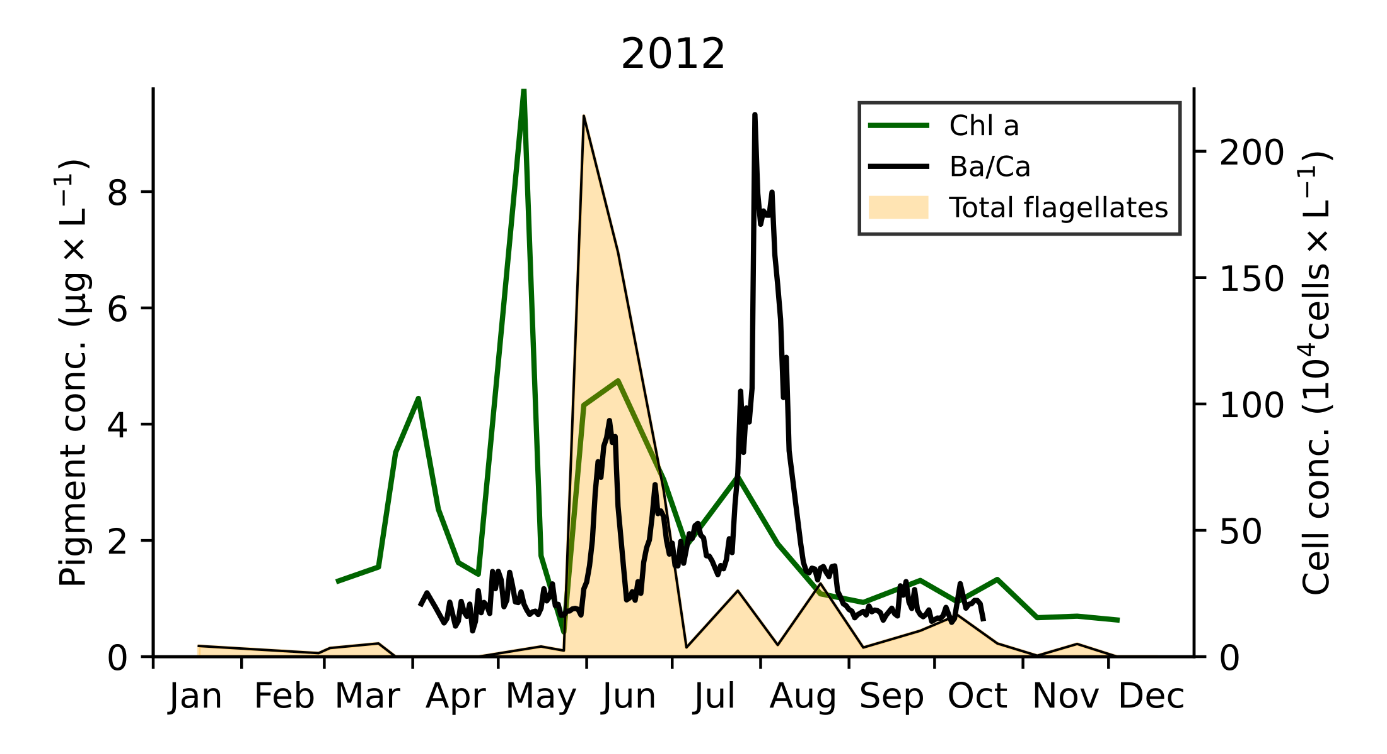
**Figure S10.** Li/Cashell profiles Set1 – 5days interval.



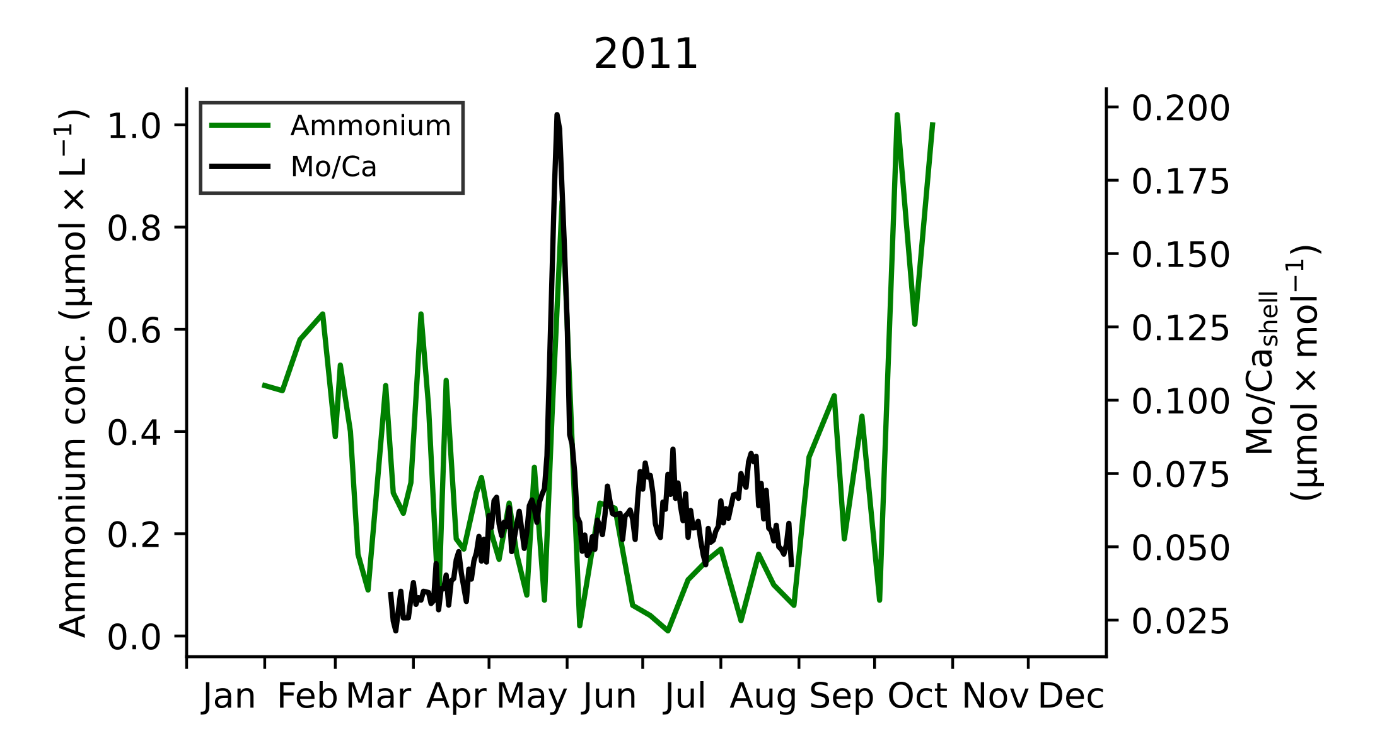
**Figure S11.** Li/Cashell profiles Set2 – 3days interval.



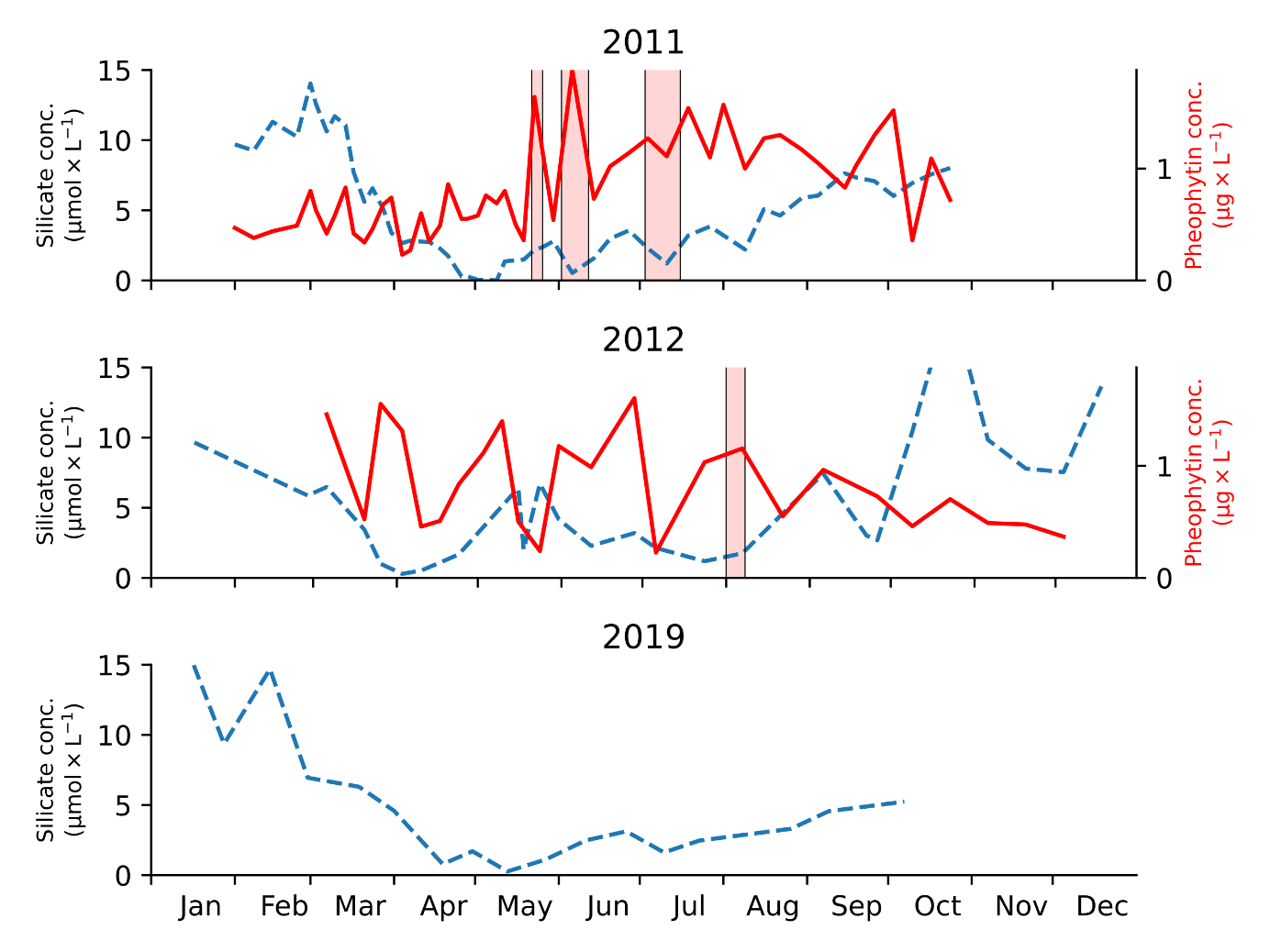
**Figure S12.** Li/Cashell profiles Set2 – 5days interval.

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**Figure S13.** Chlorophyll *a* pigment concentration and total flagellates cell concentration recorded in 2012 at the sampling site in Lanvéoc. Average Ba/Cashell profile (black graph) measured in three contemporaneous shells.

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**Figure S14.** Ammonium (NH4+) concentration in 2011 in relation to the average Mo/Cashell profile.

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**Figure S15.** Silicic acid (SiOH4) and pheophytin pigment concentrations in 2011, 2012 and 2019. No pheophytin pigments were recorded in 2019. Red vertical bars indicate periods (> 3 days) of high pheophytin levels (> 1.1 µg×L‑1) at contemporaneously low silicate levels (< 2.5 µmol×L‑1) in 2011 and 2012.