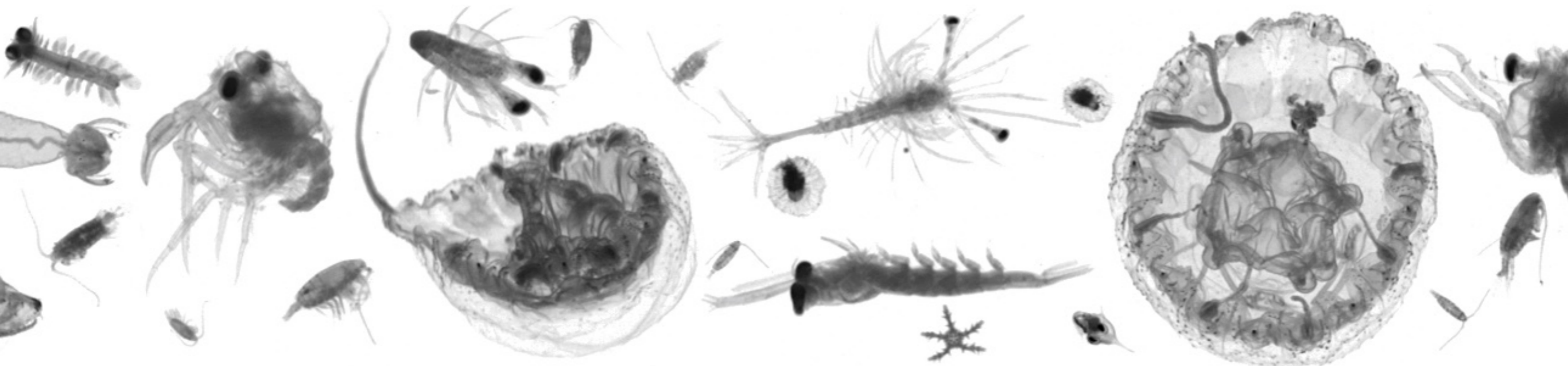


2018-10-24, SFEcologie2018

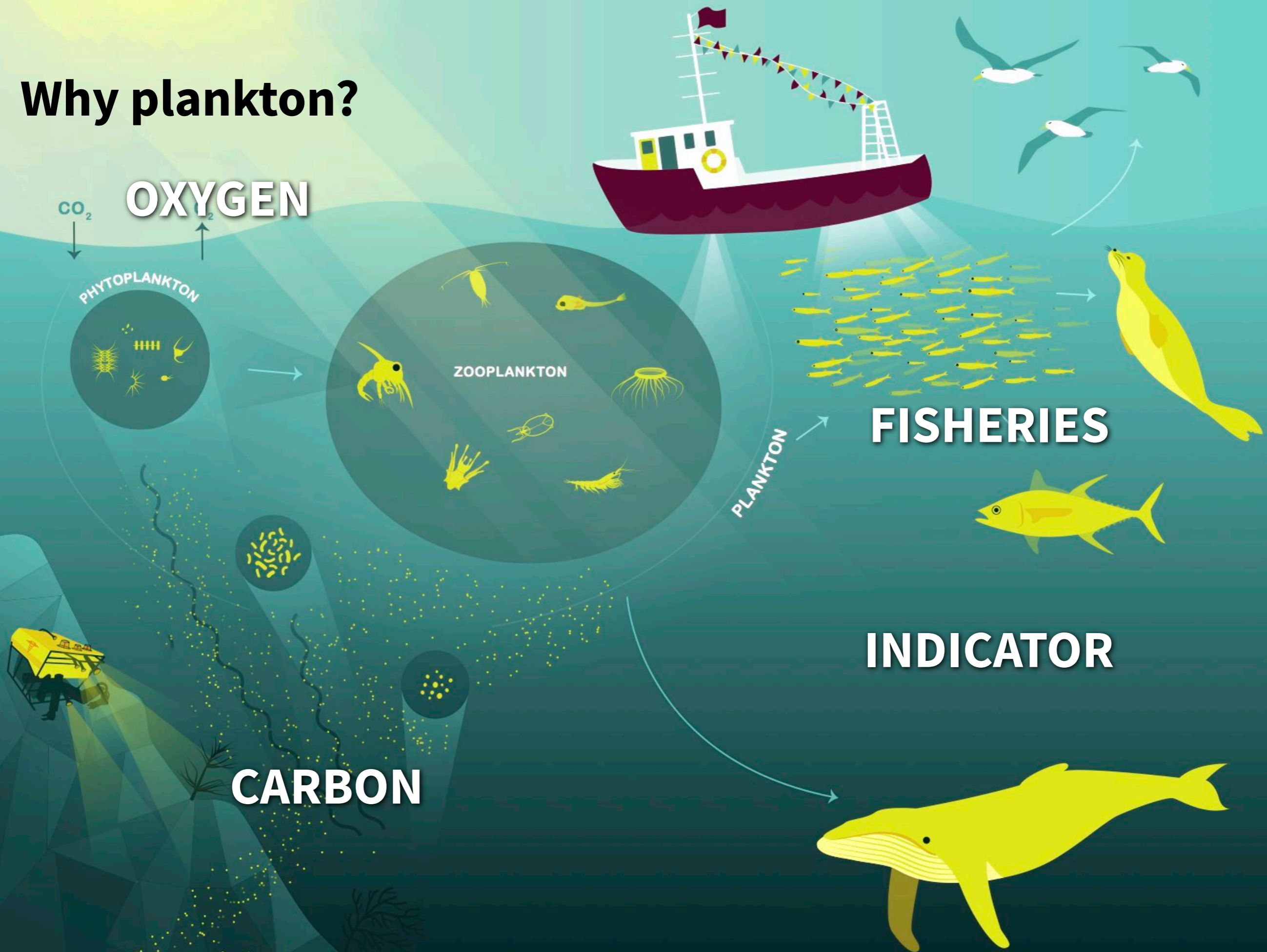
Cailleton, Desnos, Jalabert, Elineau, Stemmann, Ayata, Irisson

Morphological diversity increases with oligotrophy along a zooplankton time series

Villefranche-sur-Mer, NW Mediterranean Sea



Why plankton?



Why morphological diversity of plankton?

Diversity can be **taxonomic, phylogenetic, functional**

Plankton is particularly **diverse** taxonomically (Hutchinson 1961)

Its **morphology** often has **functional** consequences

It can be measured quantitatively at **high throughput**



Plankton sampling in Villefranche-sur-mer

Historical site for plankton
observation (dating back to Haeckel)

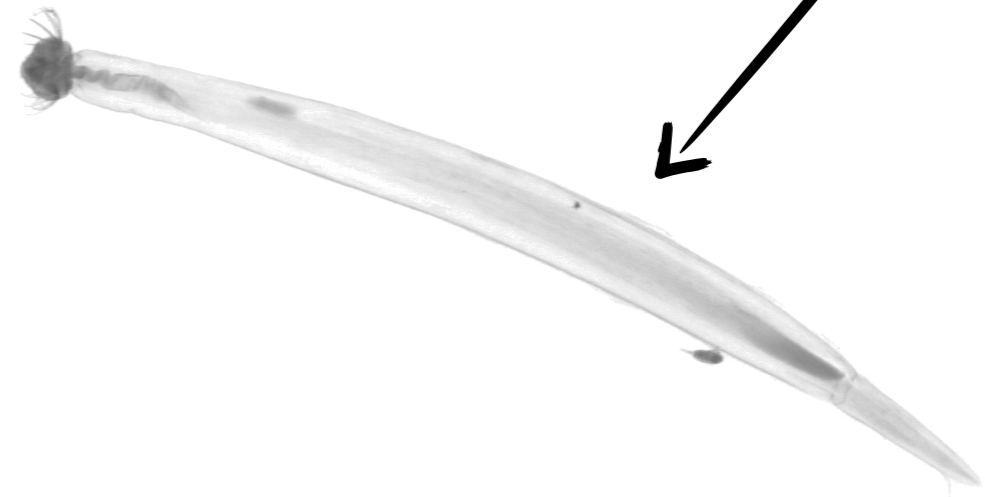
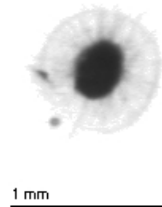
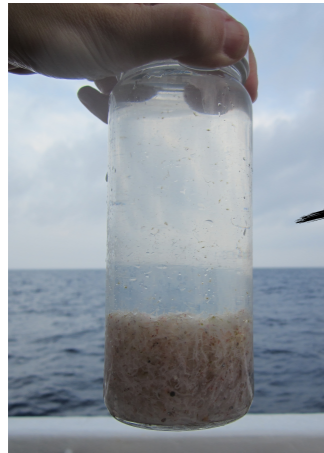
Two samples per day

Pooled per **week** for analysis

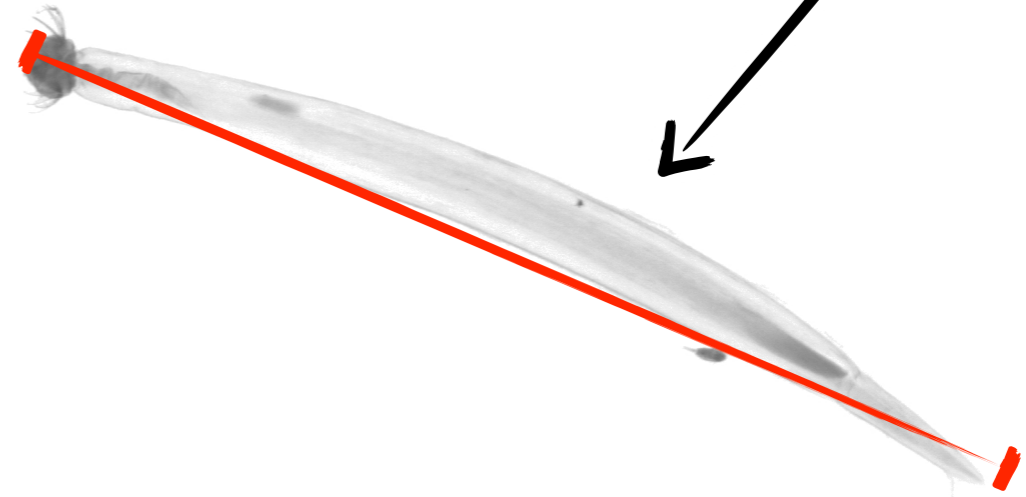
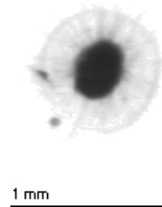
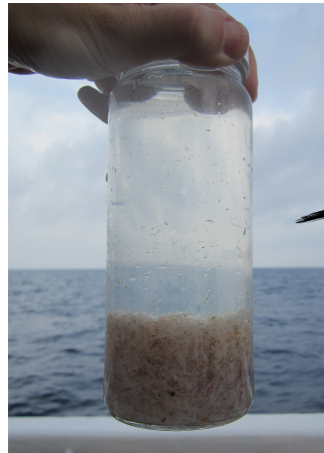
2009-2017 analysed here (but regular
sampling started in 1966)



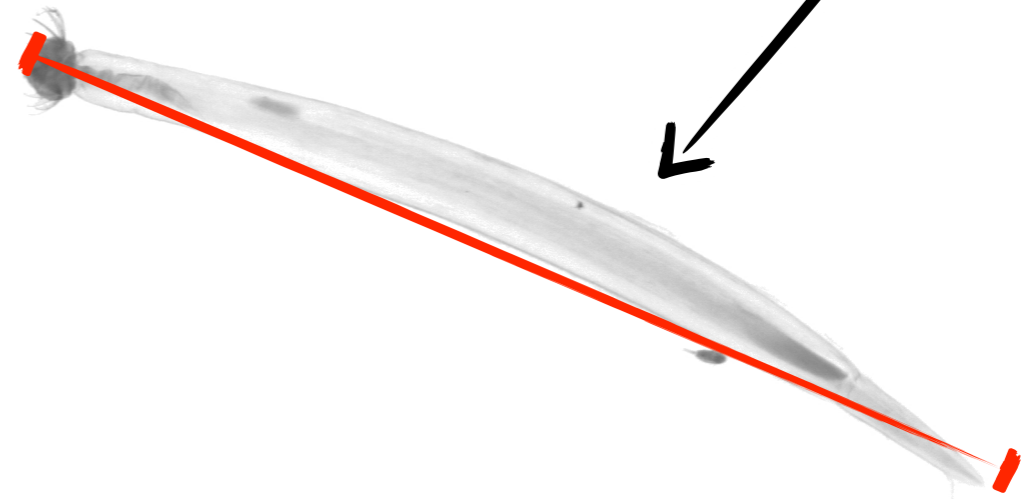
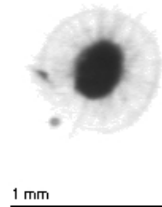
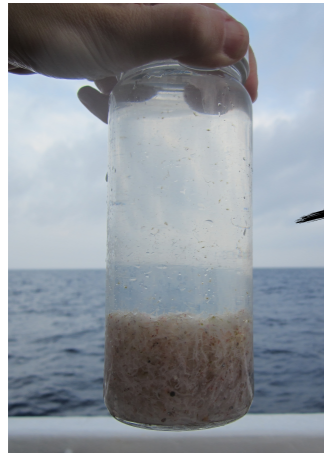
Automatic extraction of morphological features



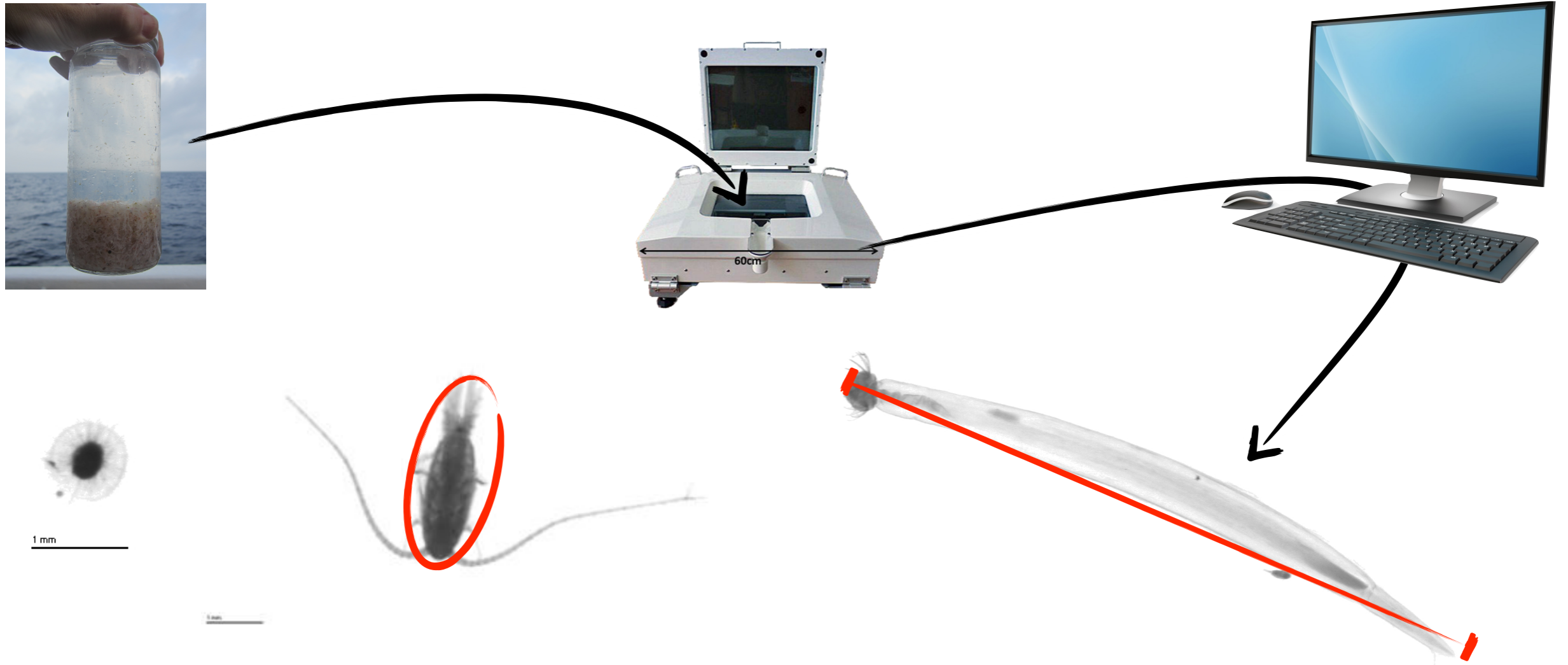
Automatic extraction of morphological features



Automatic extraction of morphological features

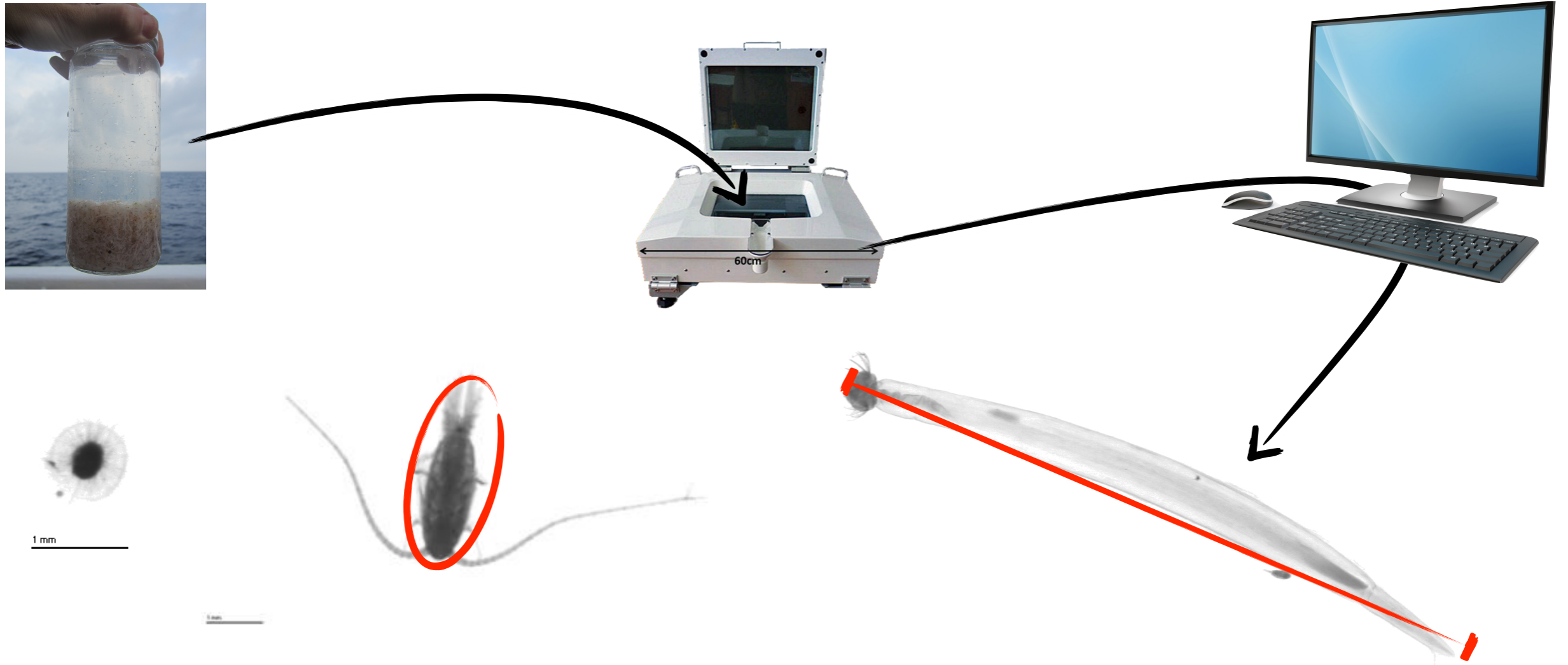


Automatic extraction of morphological features



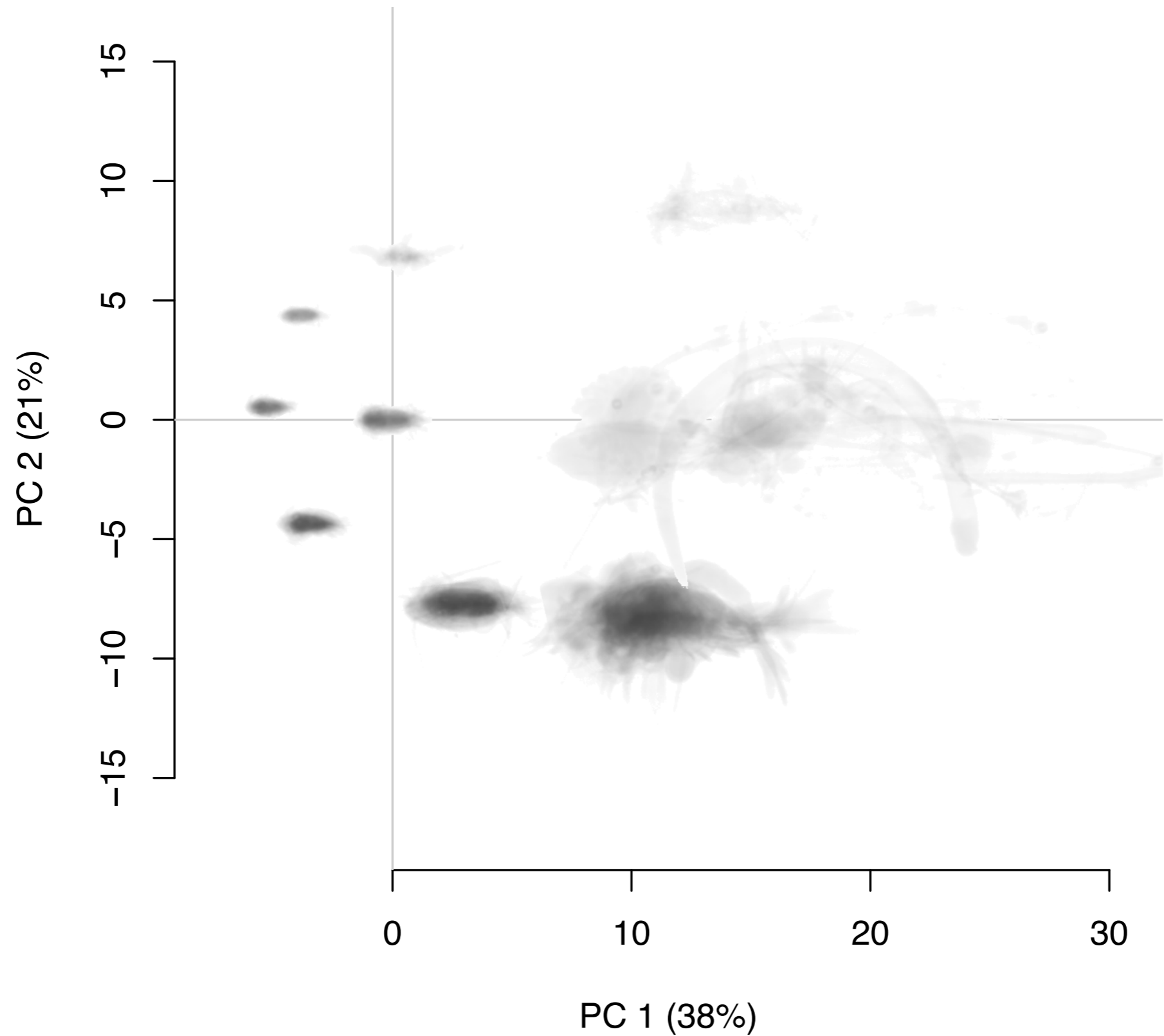
	feature 1	...	feature m
ind 1			
ind 2			
ind 3			
ind 4			

Automatic extraction of morphological features

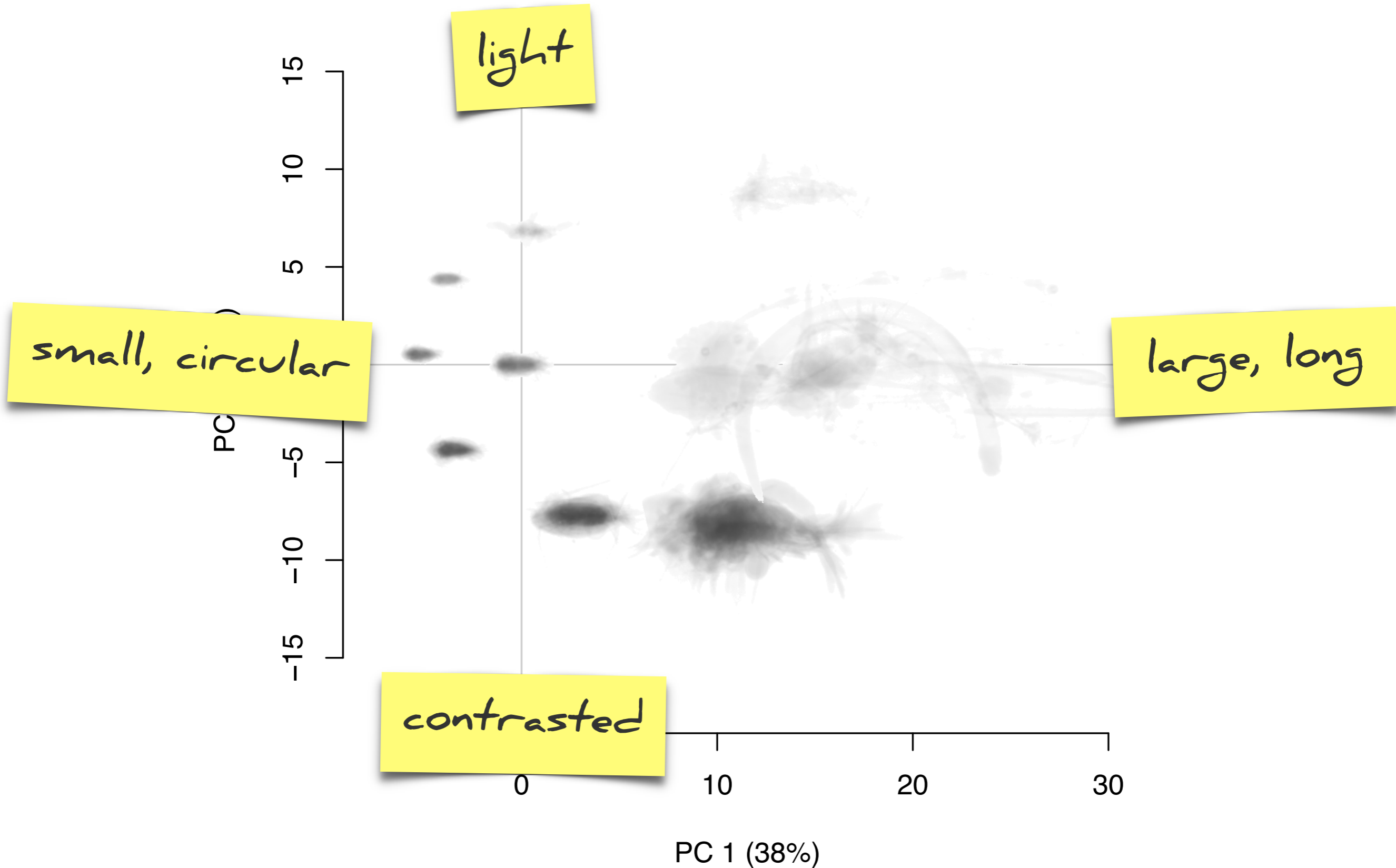


	feature 1	...	feature m
ind 1			
ind 2	587,059 x 45		
ind 3			
ind 4			

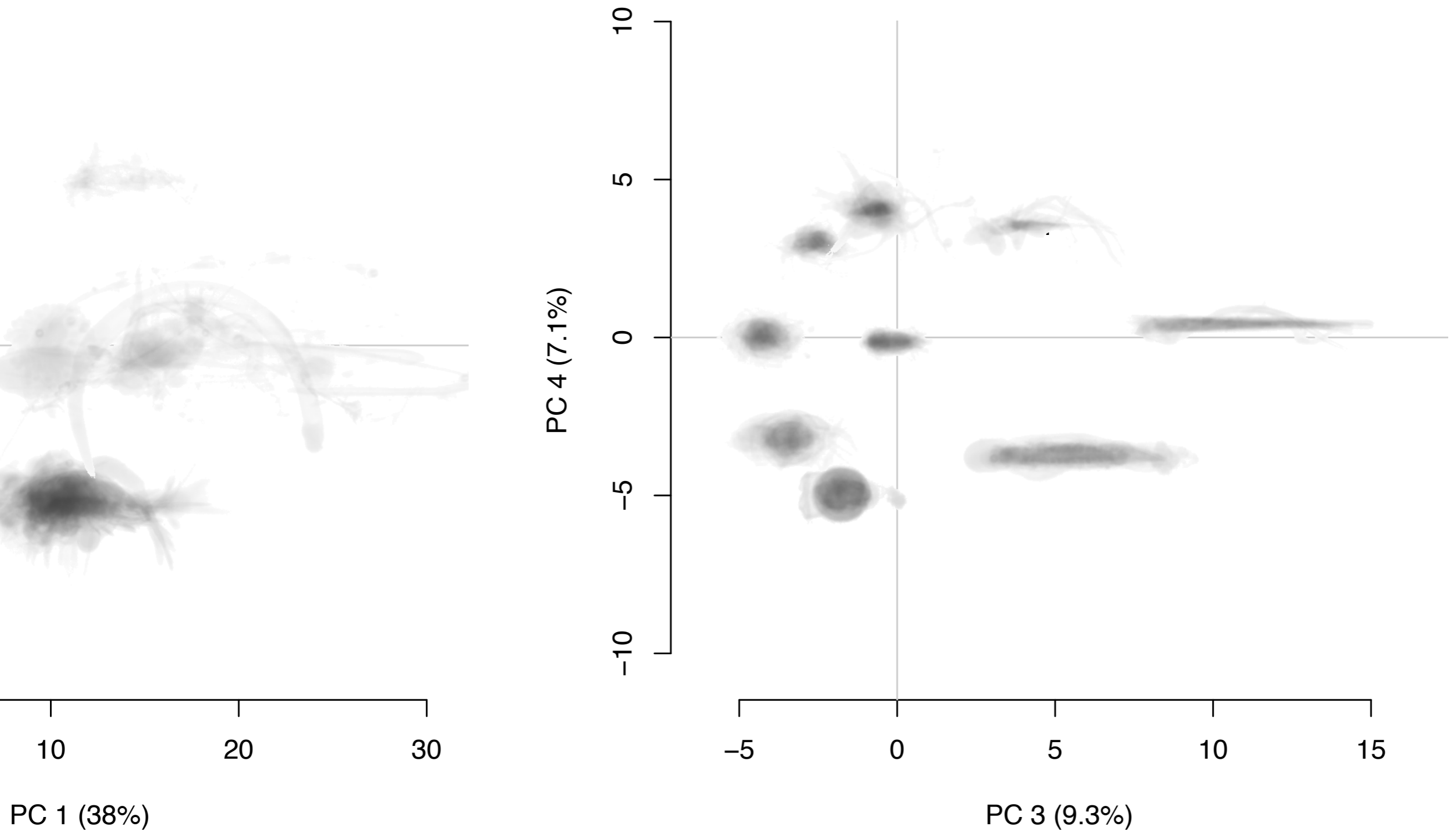
Plankton in morphological space



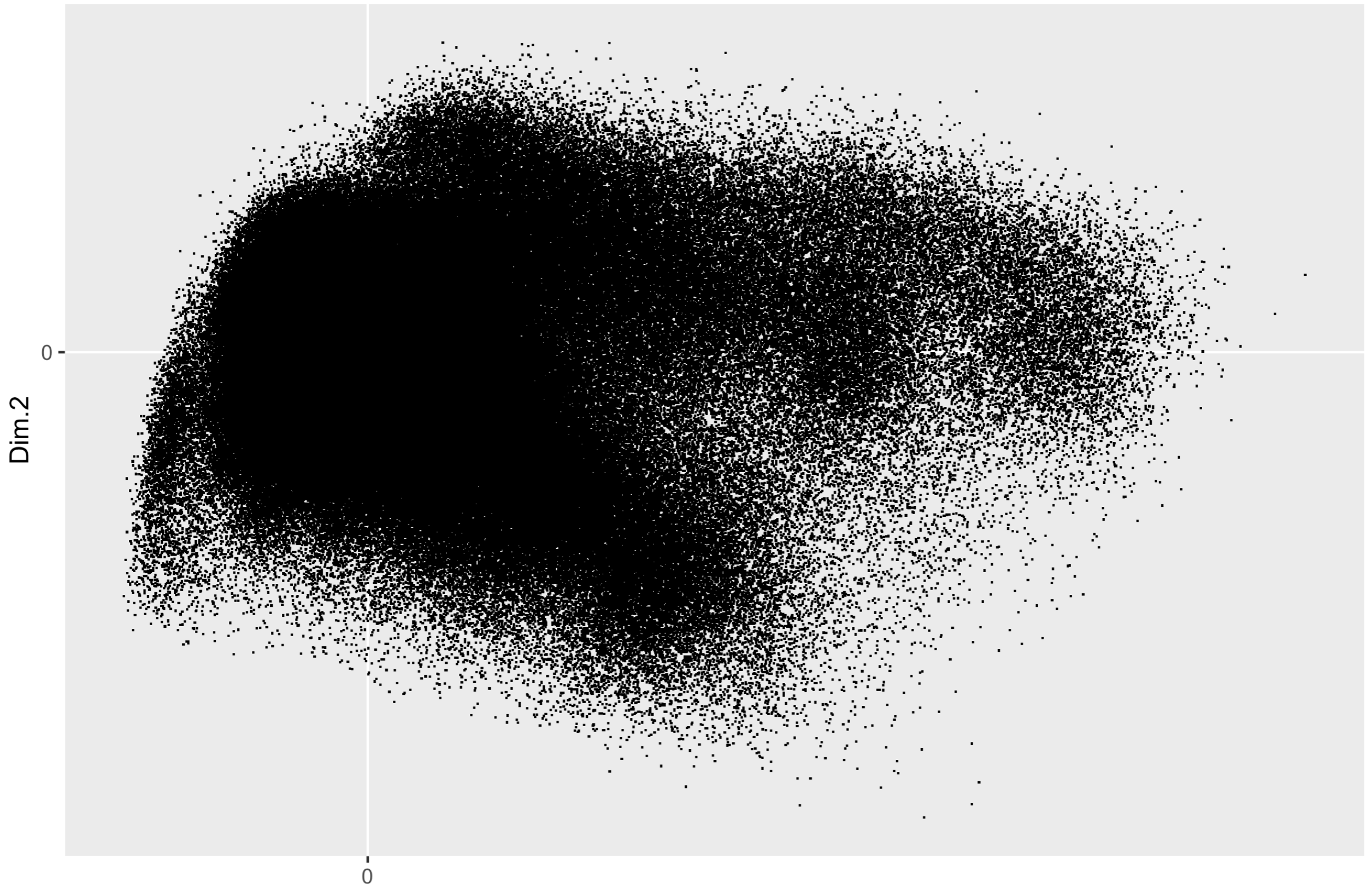
Plankton in morphological space



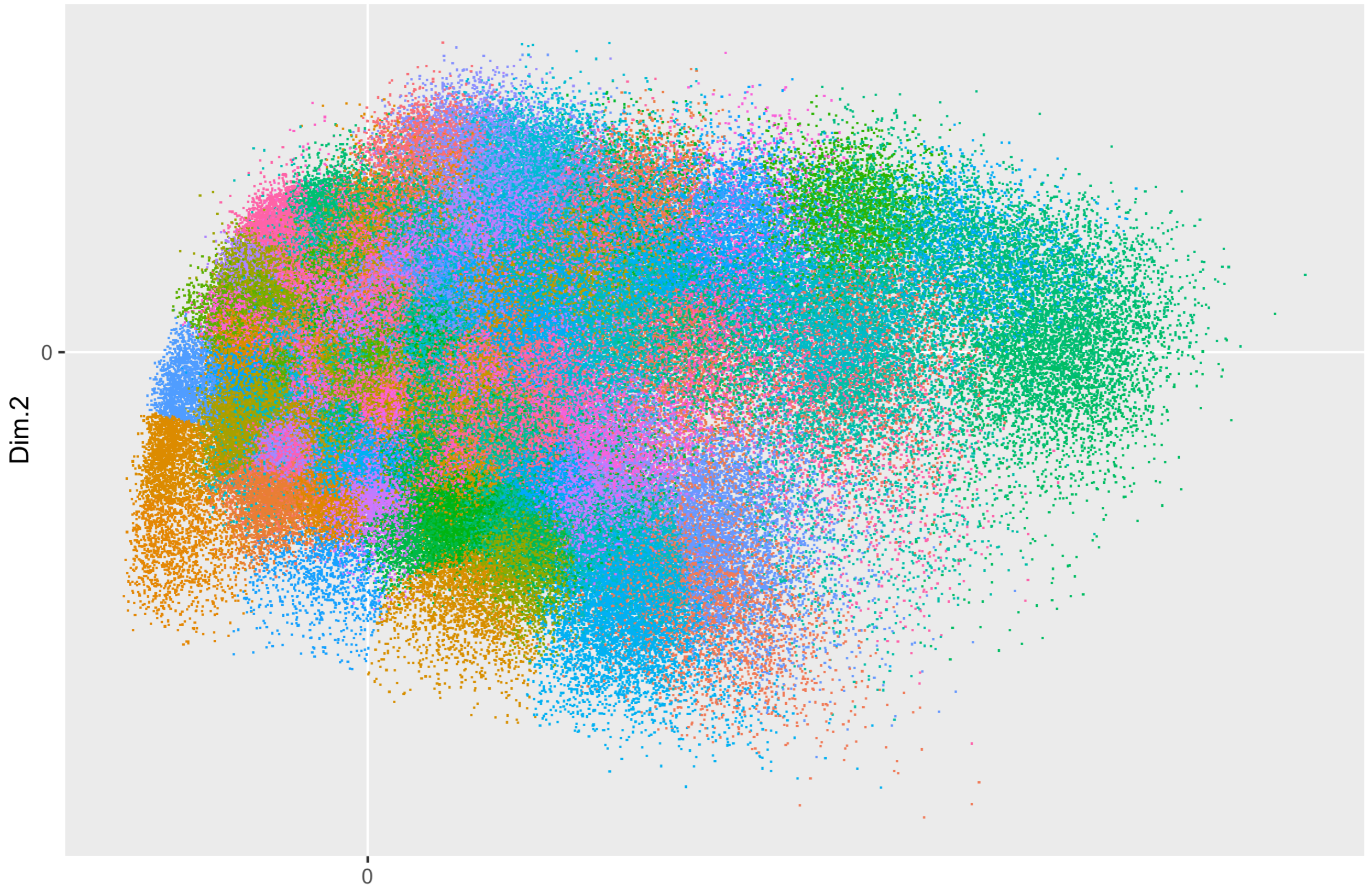
Plankton in morphological space



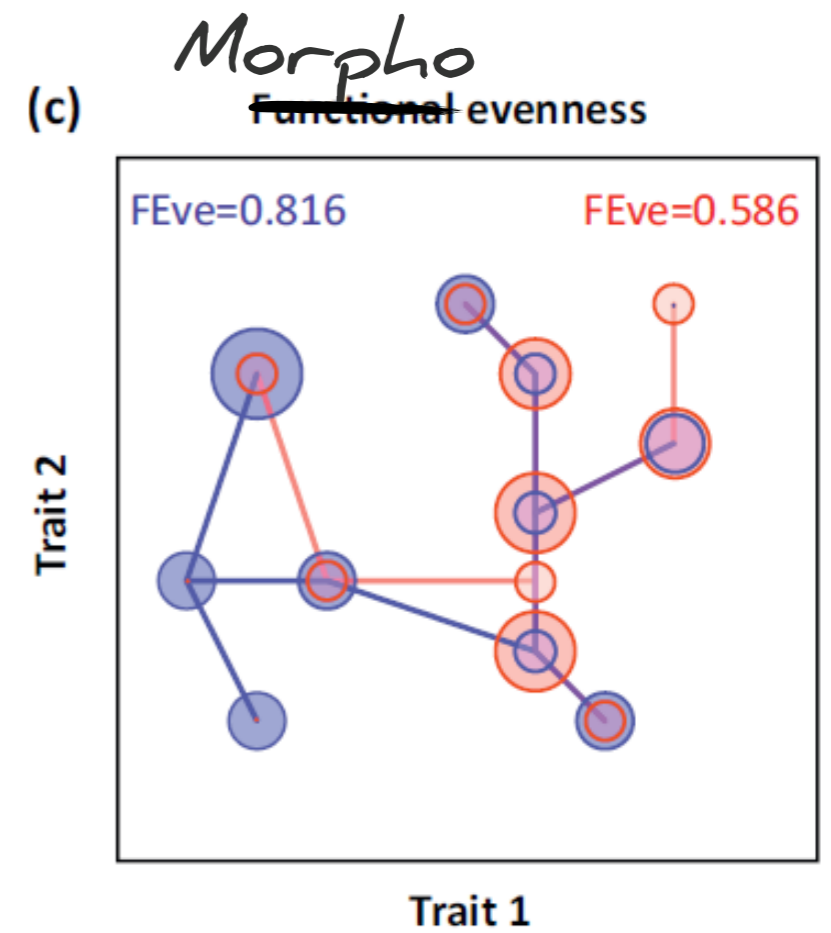
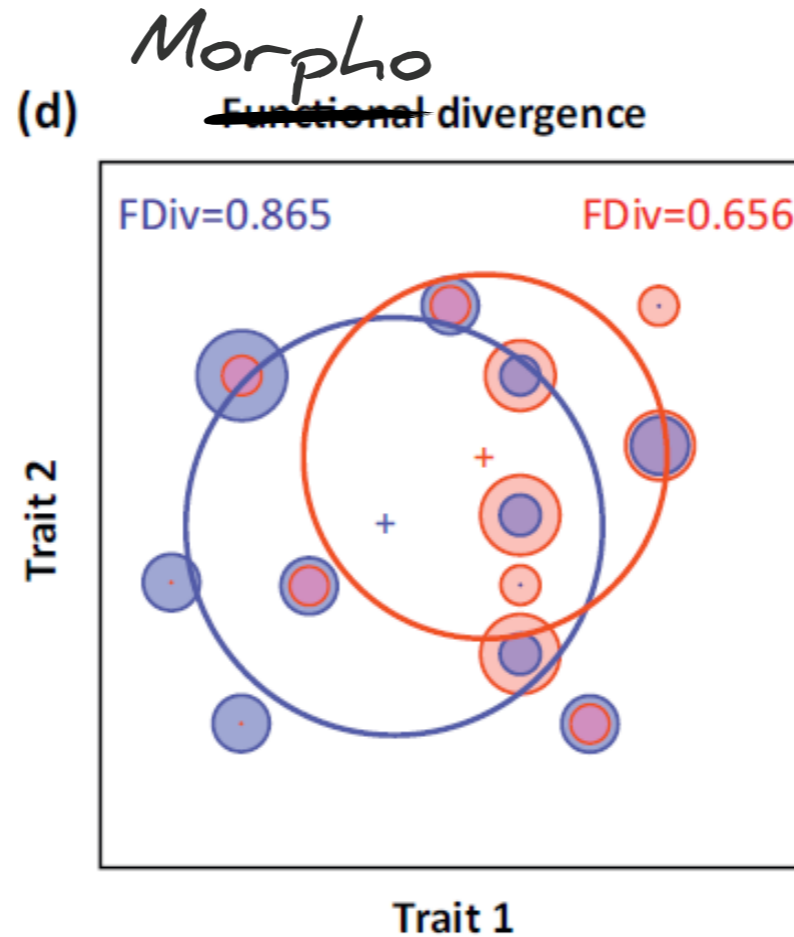
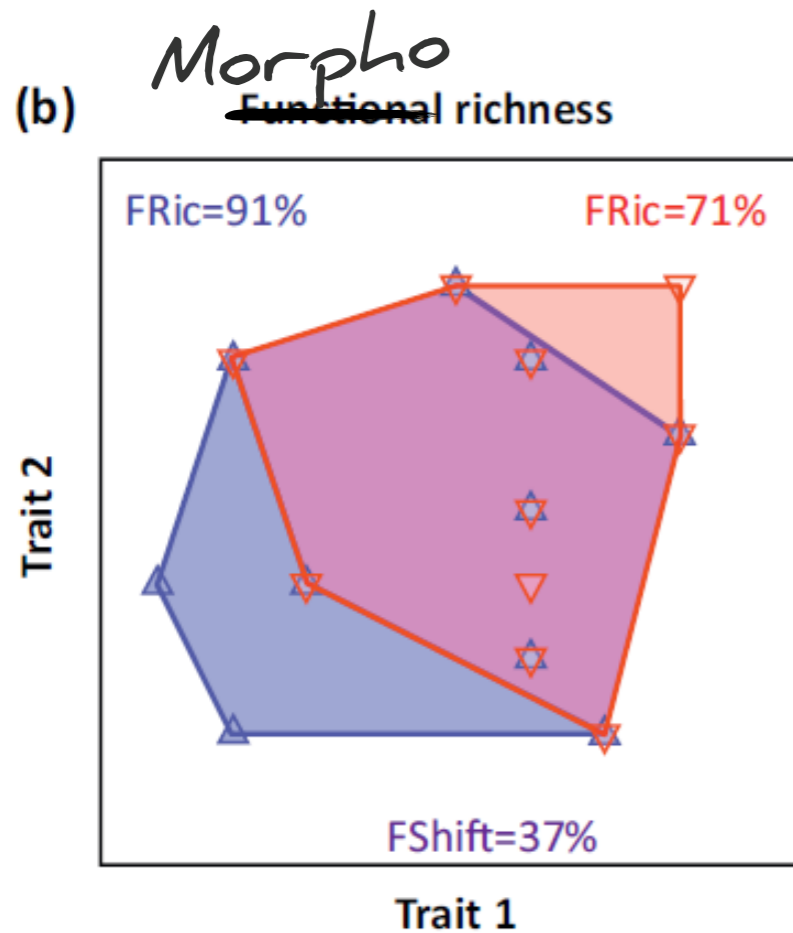
Define “morphs” (through objective clustering)



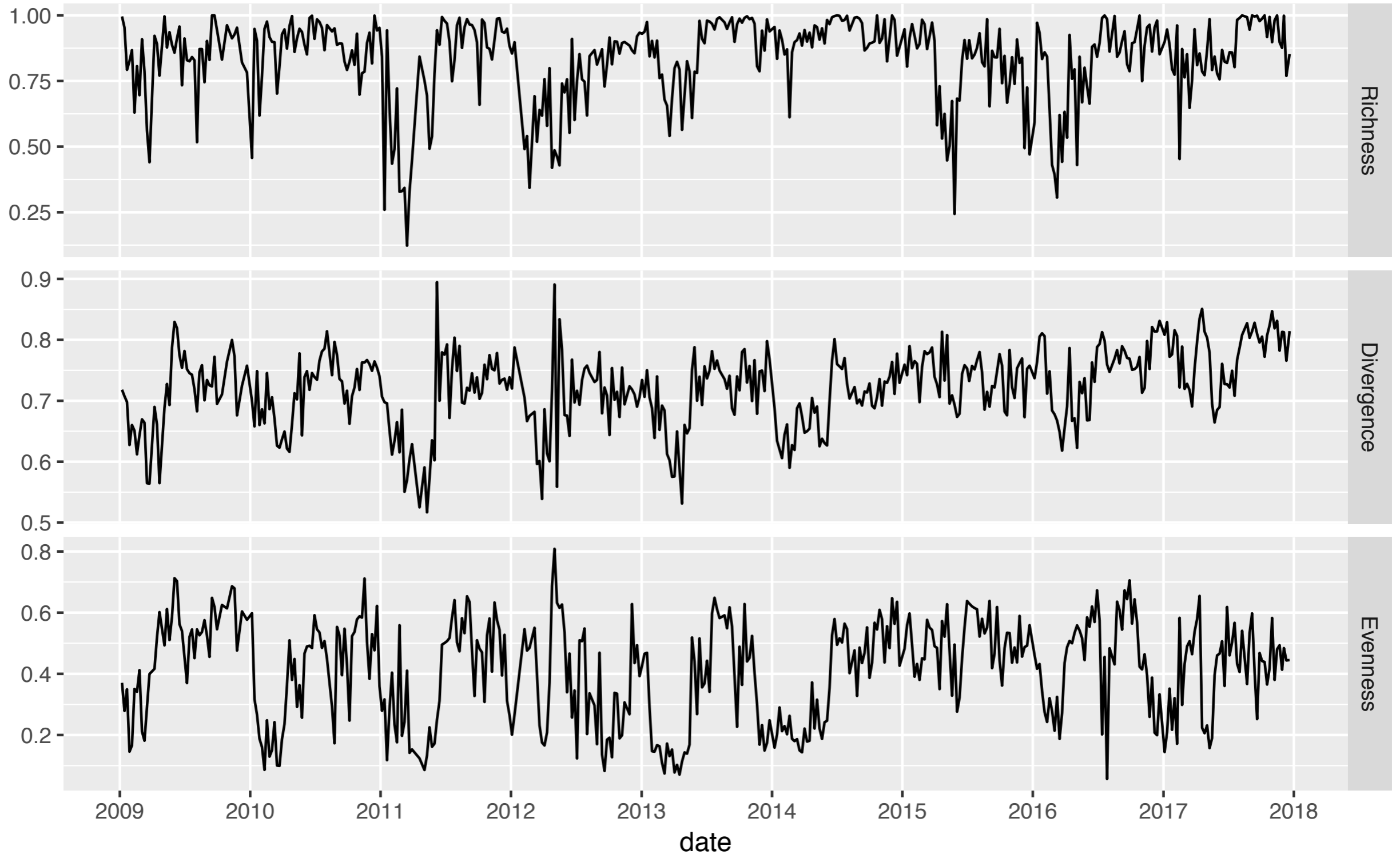
Define “morphs” (through objective clustering)



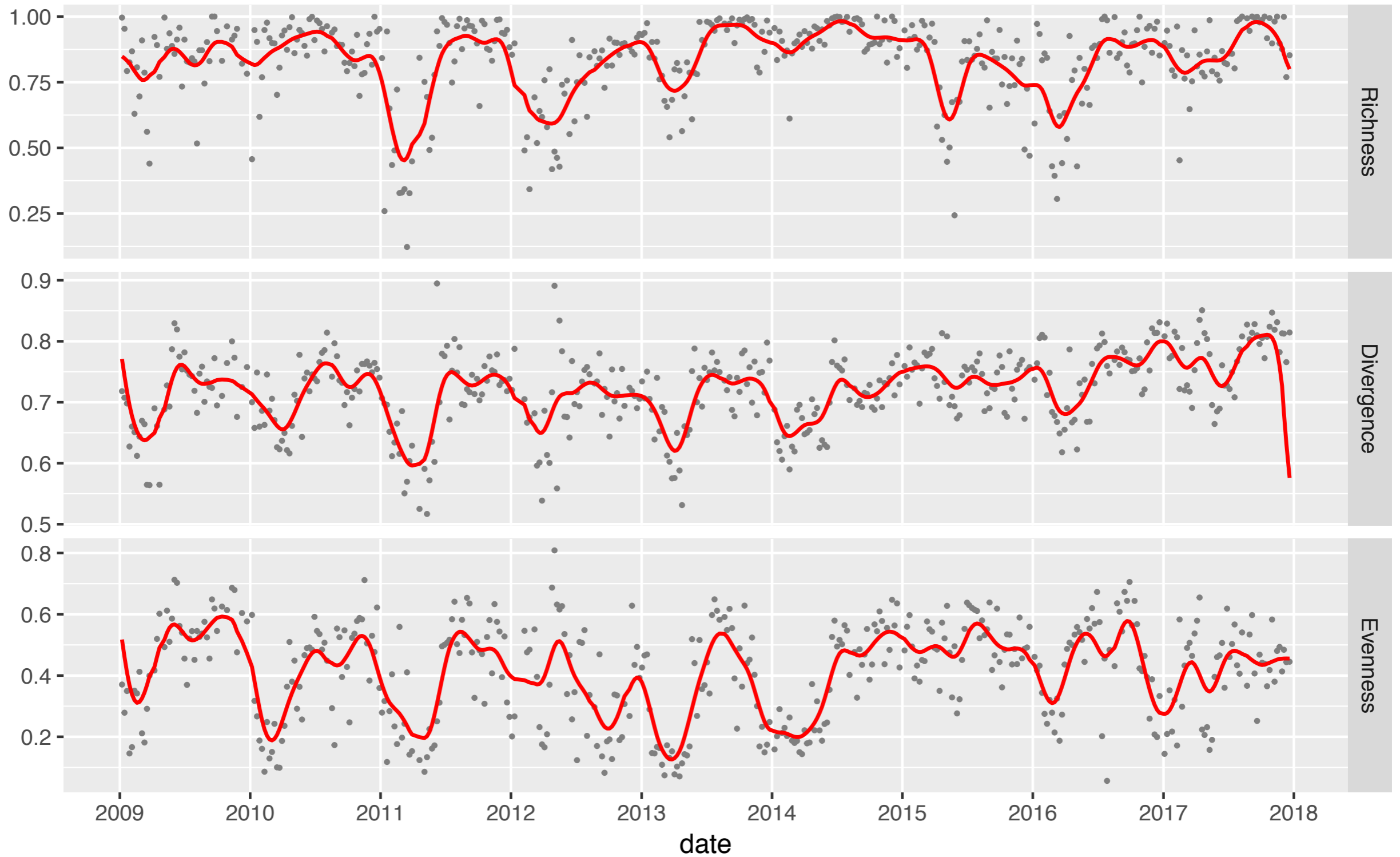
Compute morphological diversity indices (based on functional ones)



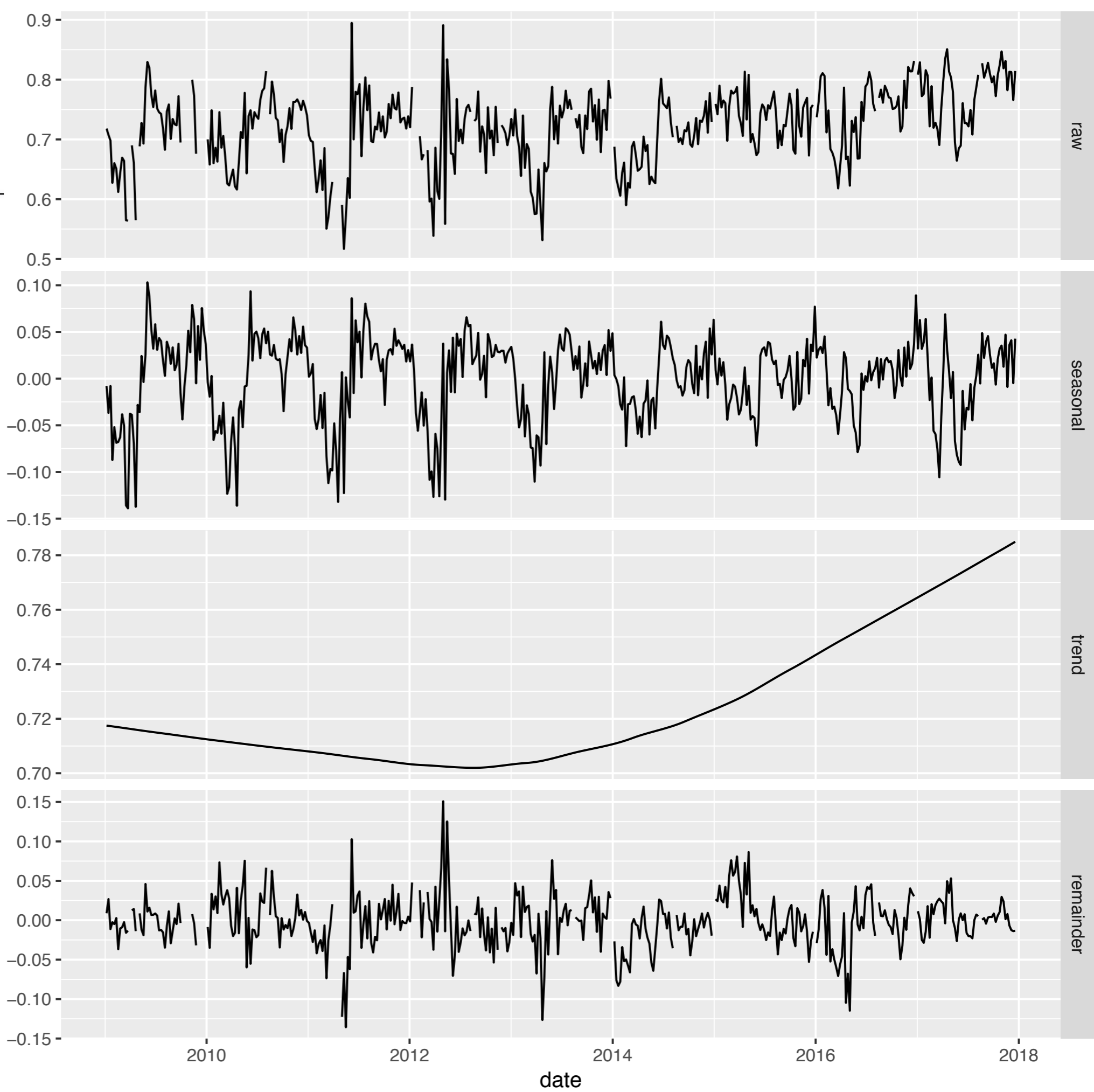
Weekly time series of indices



Weekly time series of indices



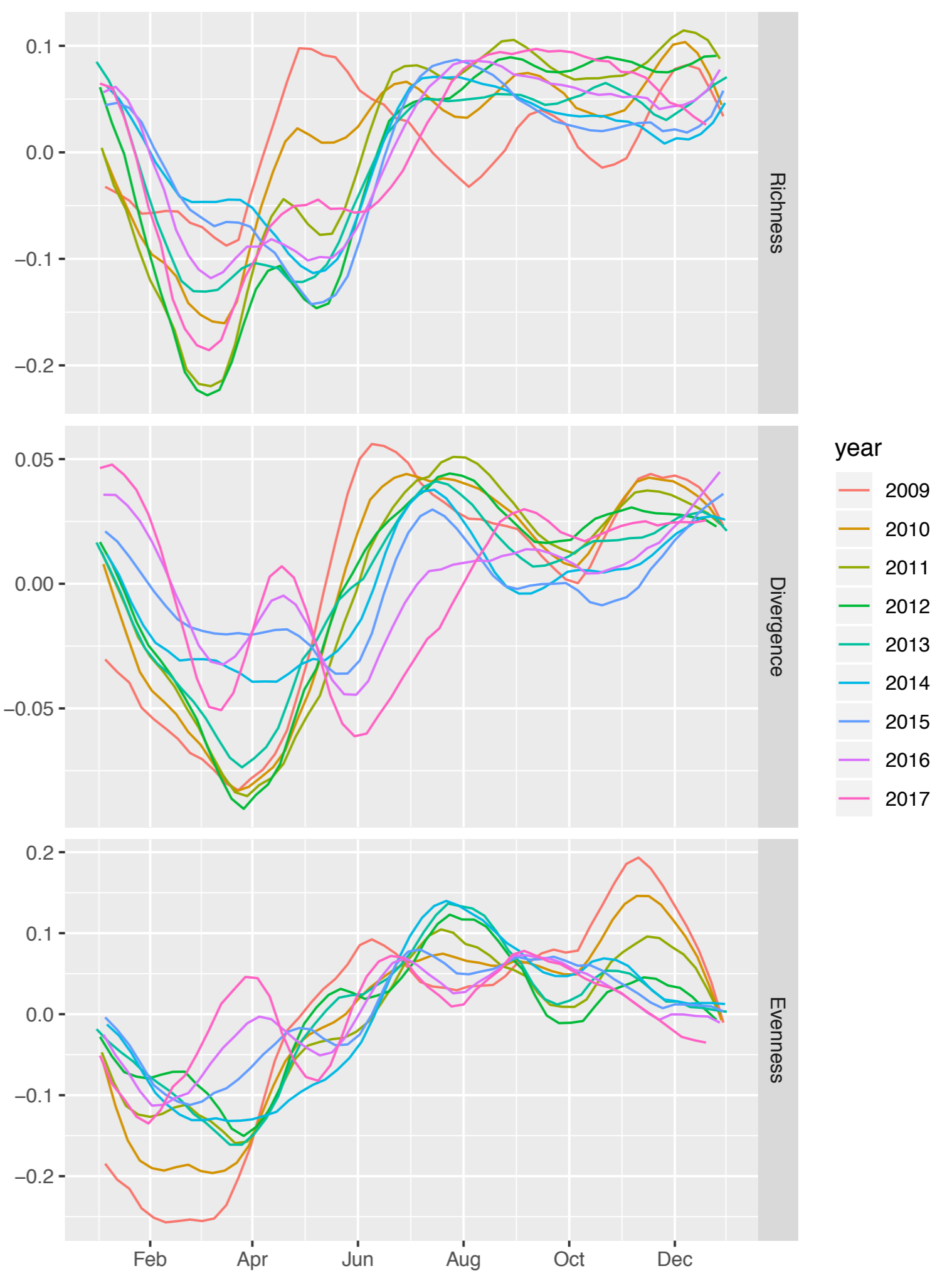
+ Season Trend

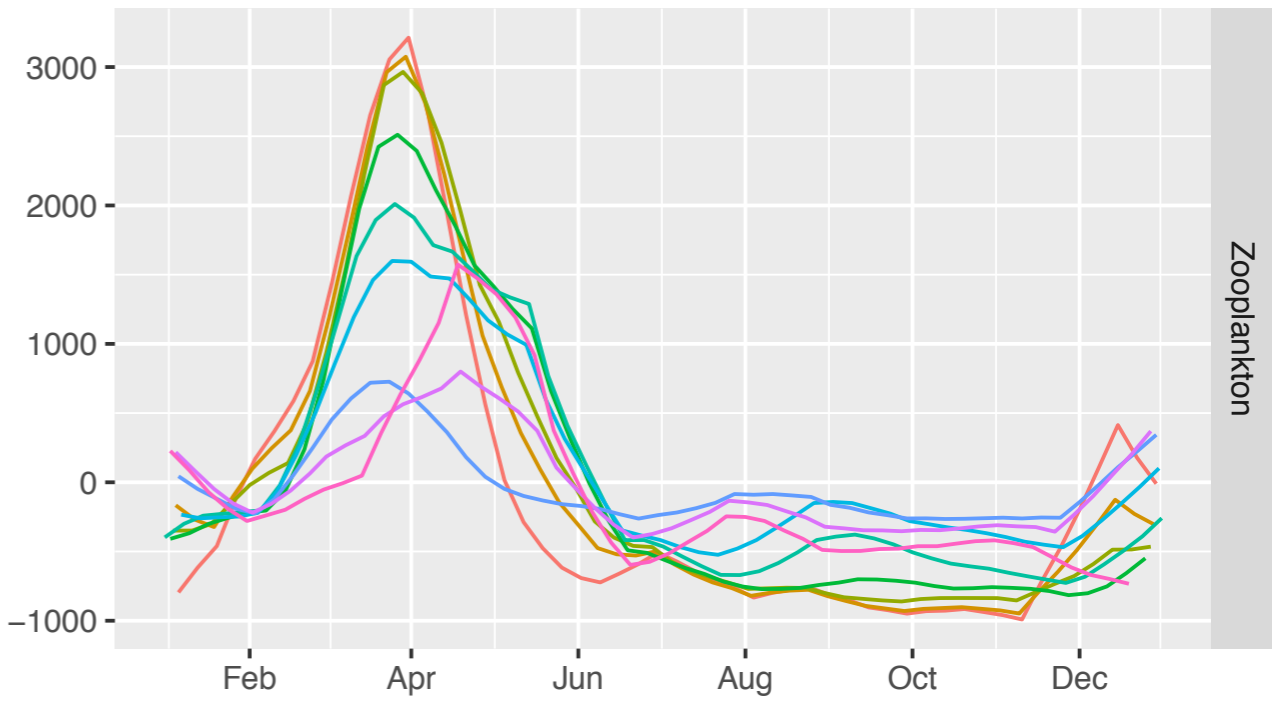
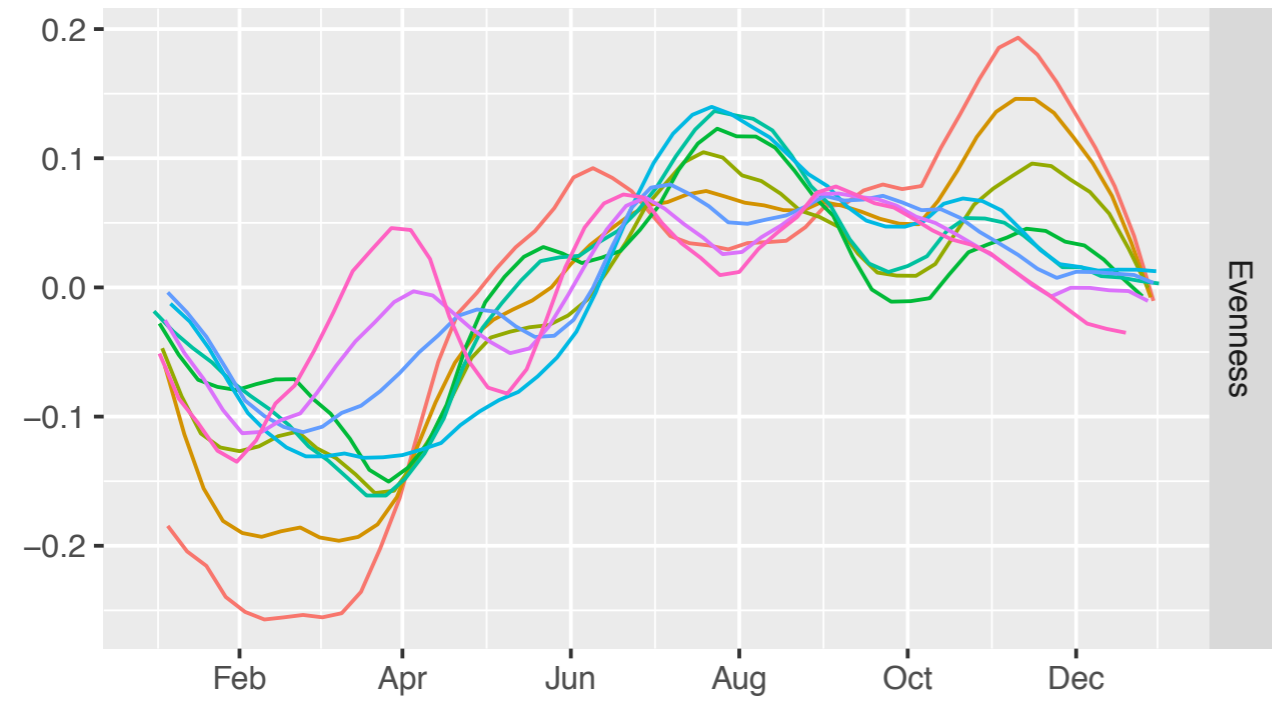
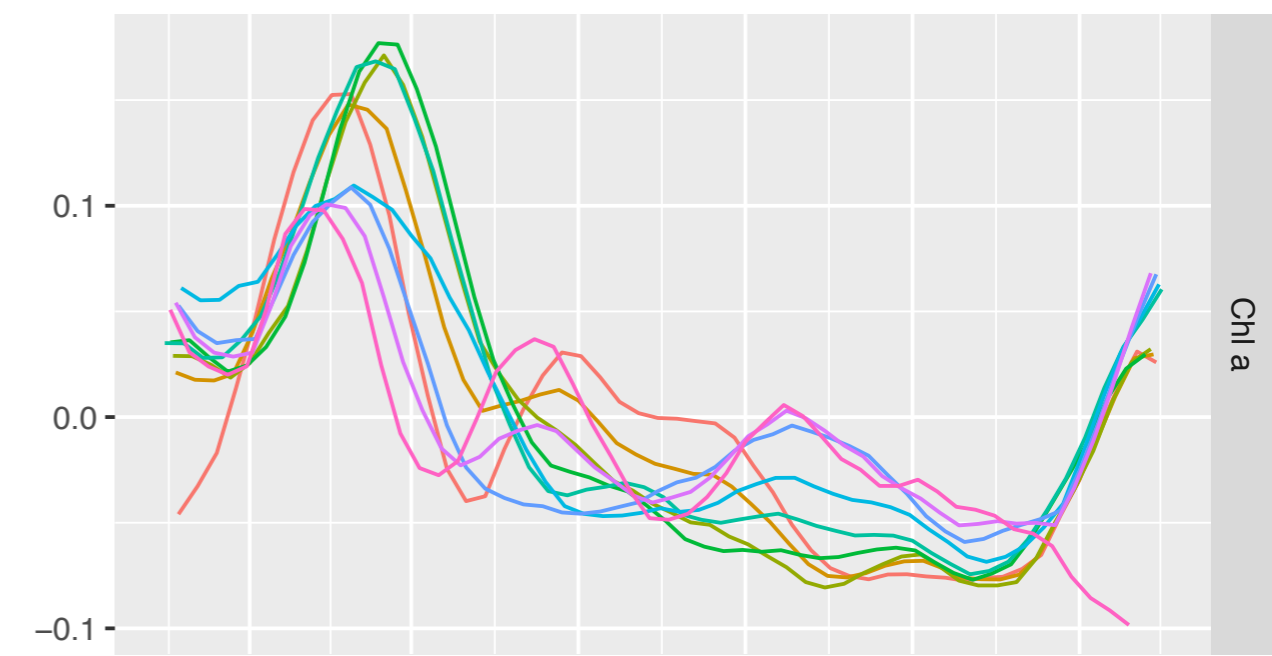
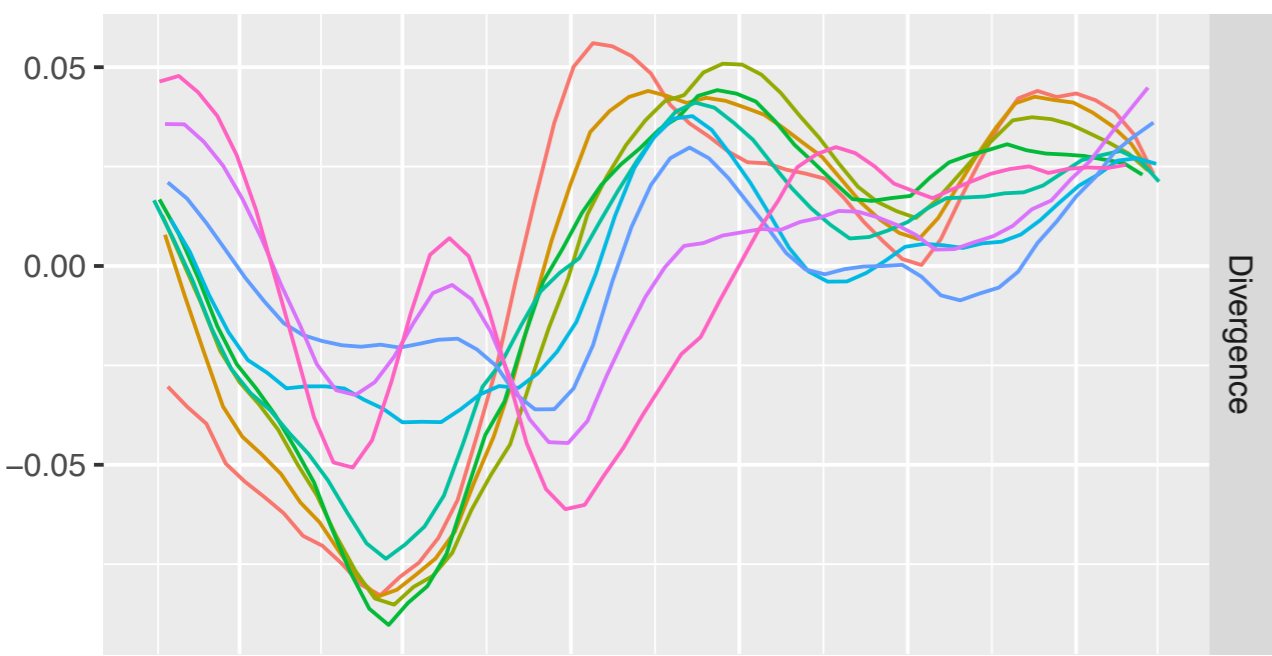
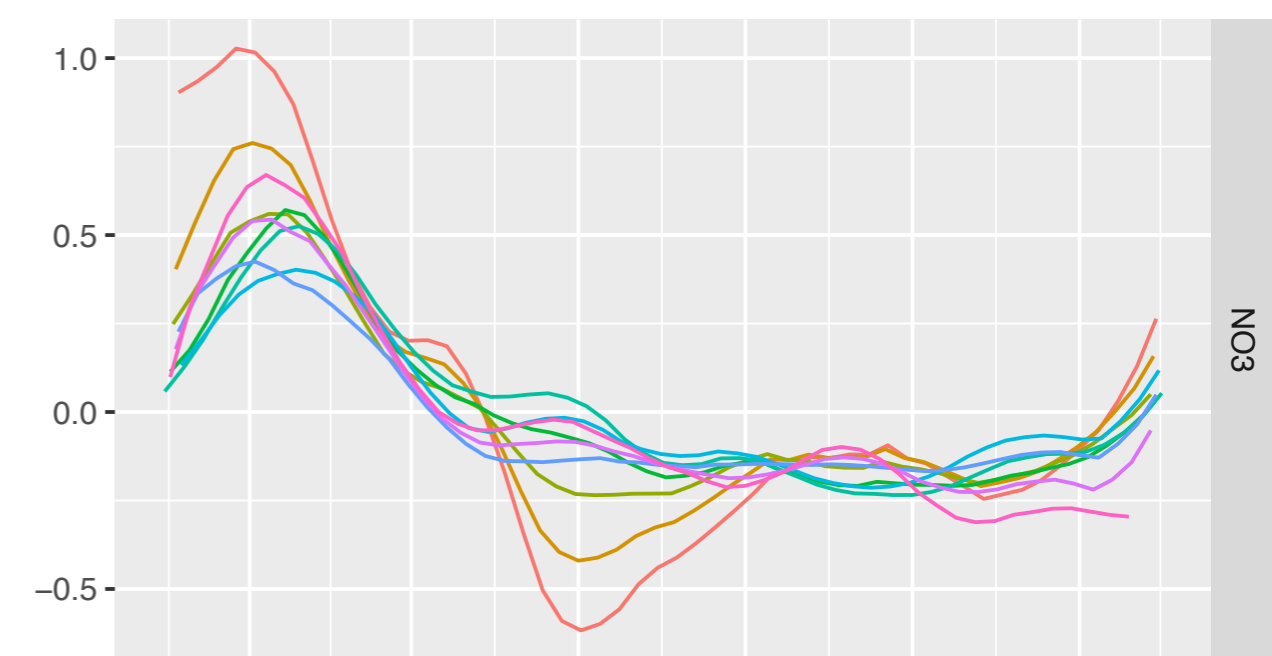
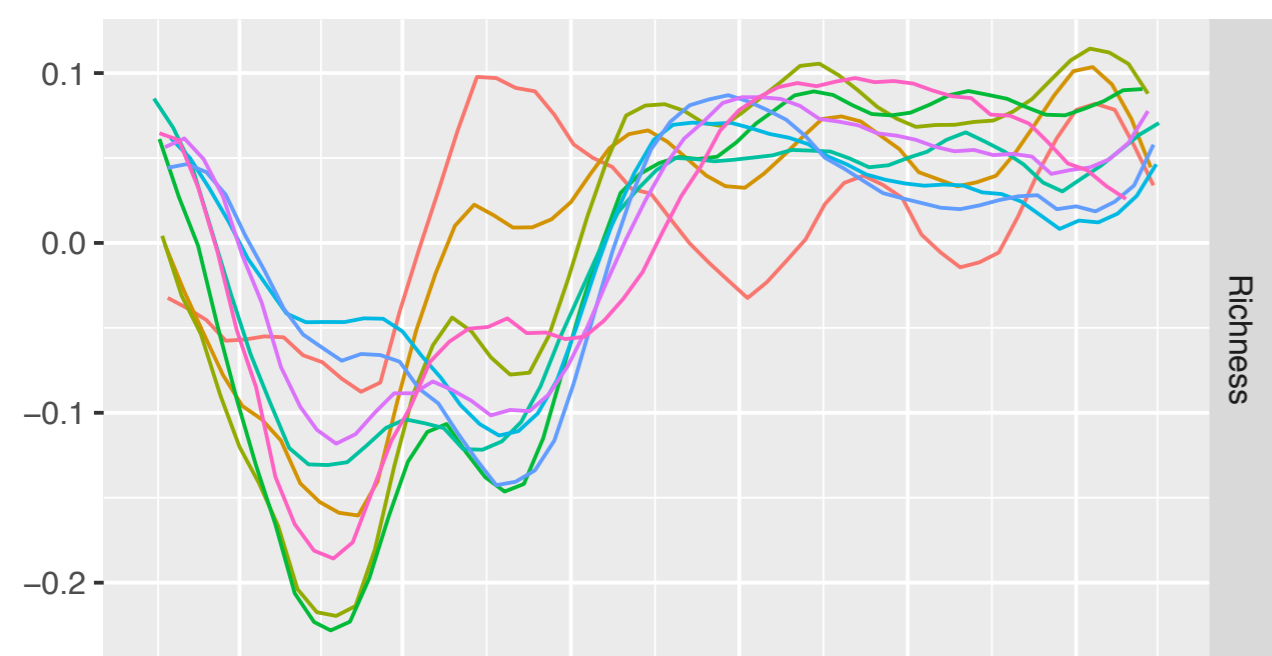


Season

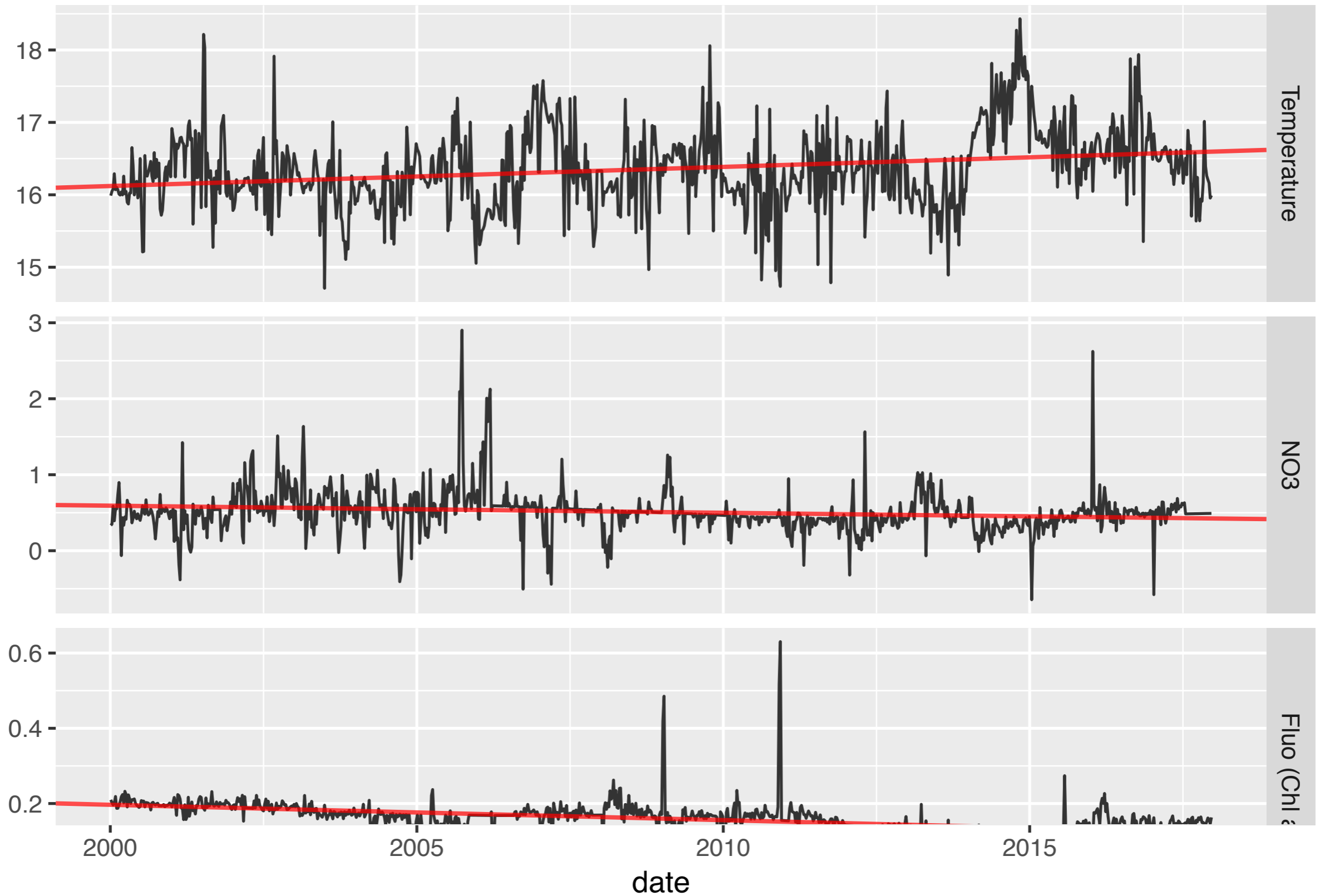
Decrease of morphological diversity in the spring

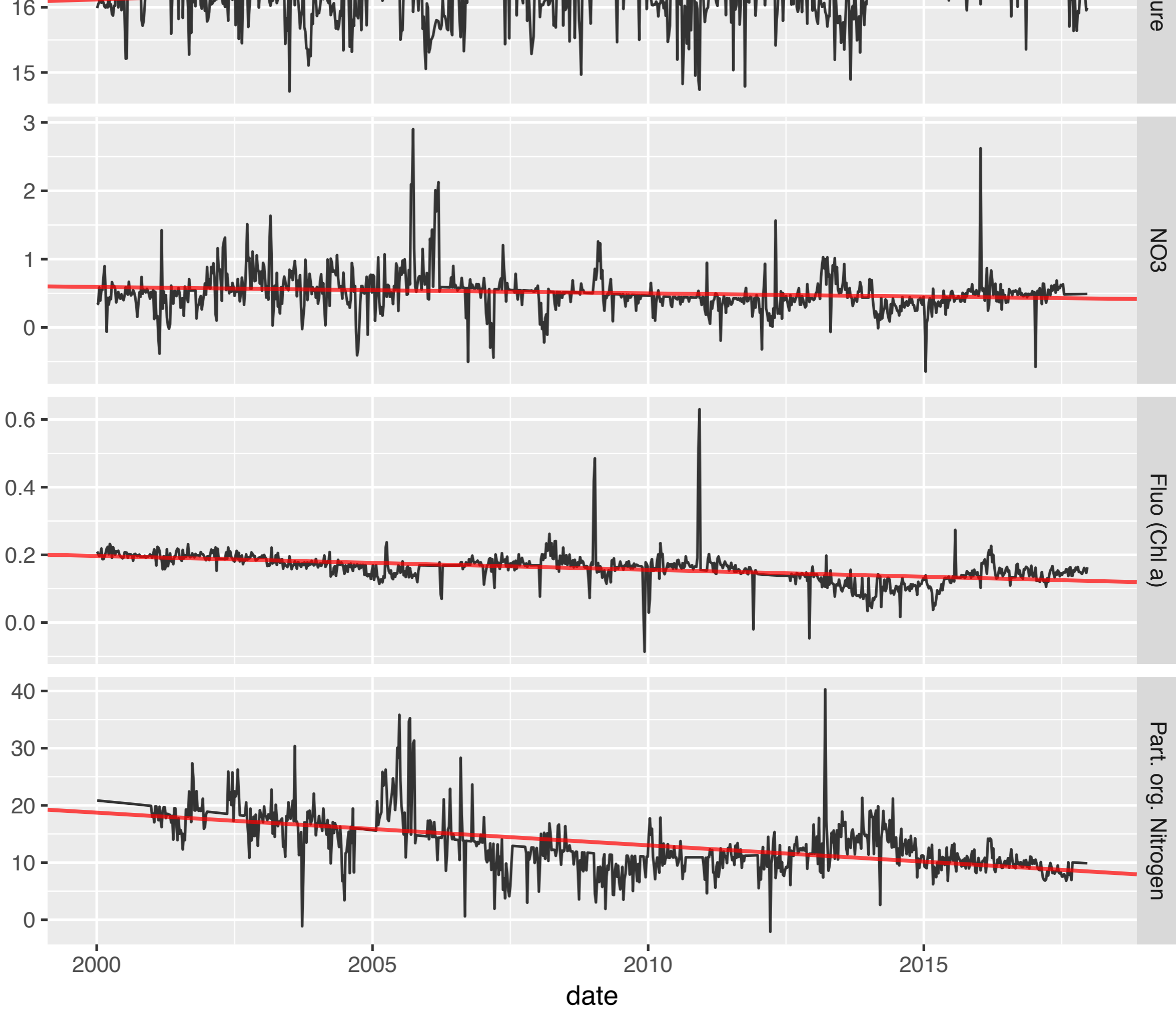
All indices and ~ all years are affected

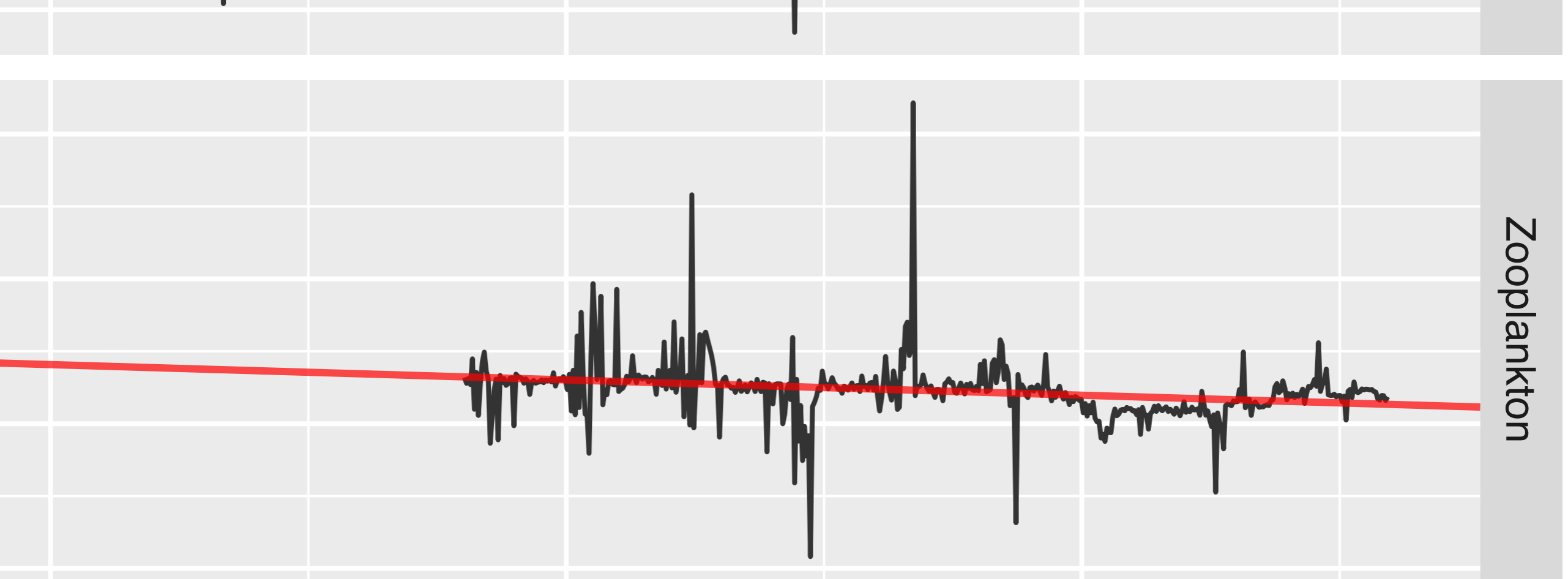




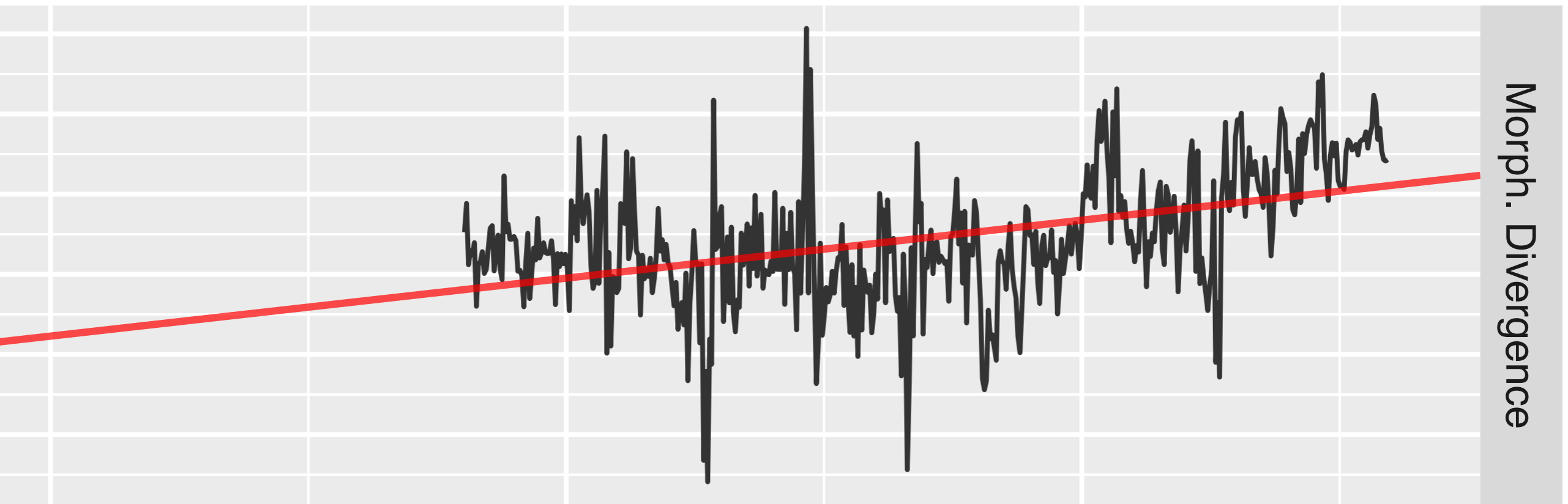
Trends







Zooplankton



Morph. Divergence

2005 2010 2015

date

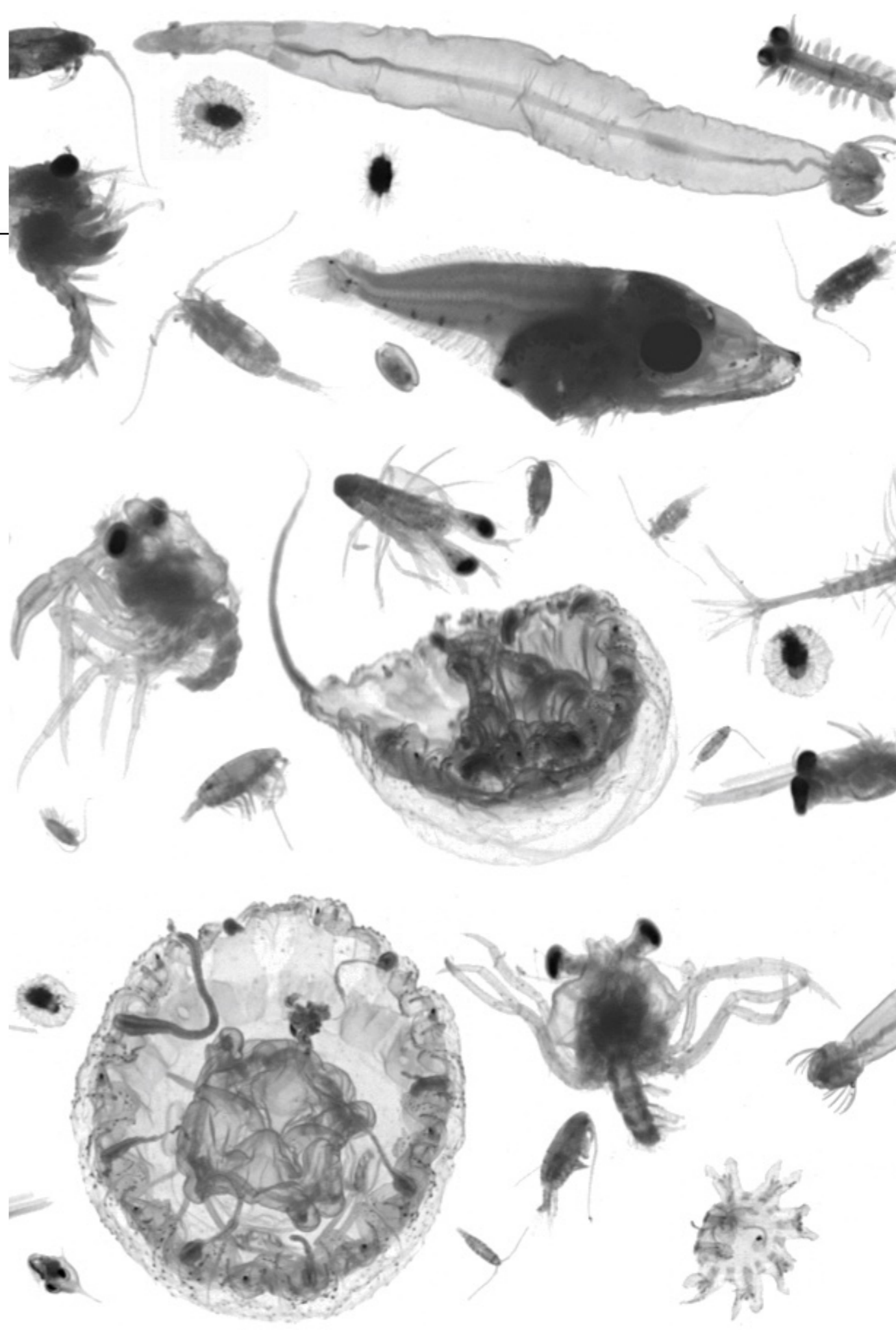
In summary

Consistent morphologies of zooplankton can be defined from generic descriptors

Morphs are **not** just taxa

Morphological diversity **increases with oligotrophy**, seasonally and over the long term

Our interpretation: **dominance** of generic forms (copepods) in the spring + niche **specialisation** over the long term



What's next?



Write a **paper** for  Peer Community In Ecology !!!



Use different morphological **features**

Work on a **larger *in situ*** images dataset

Opportunities for funded access to facilities :

Merçi

