

# Oceanic and atmospheric drivers of interannual variability in shelf sea nitrate supply

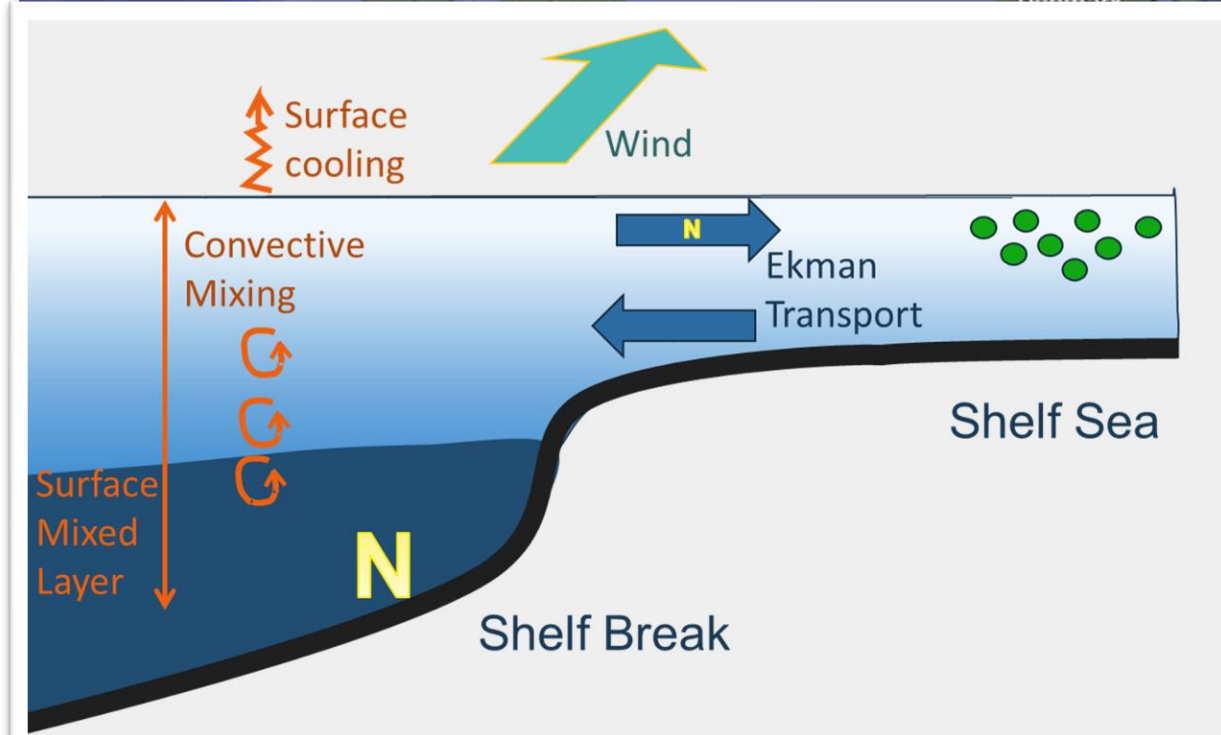
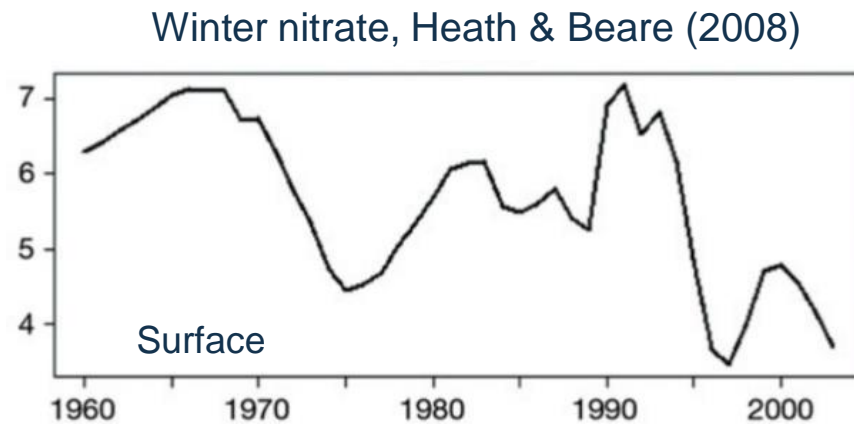
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## NW European Shelf

- Large economic & ecological value
- Large pre-bloom nitrate variability → primary production → fish production, CO<sub>2</sub> uptake
- Most nitrate of oceanic origin
- Total downwelling circulation (Holt et al., 2009)

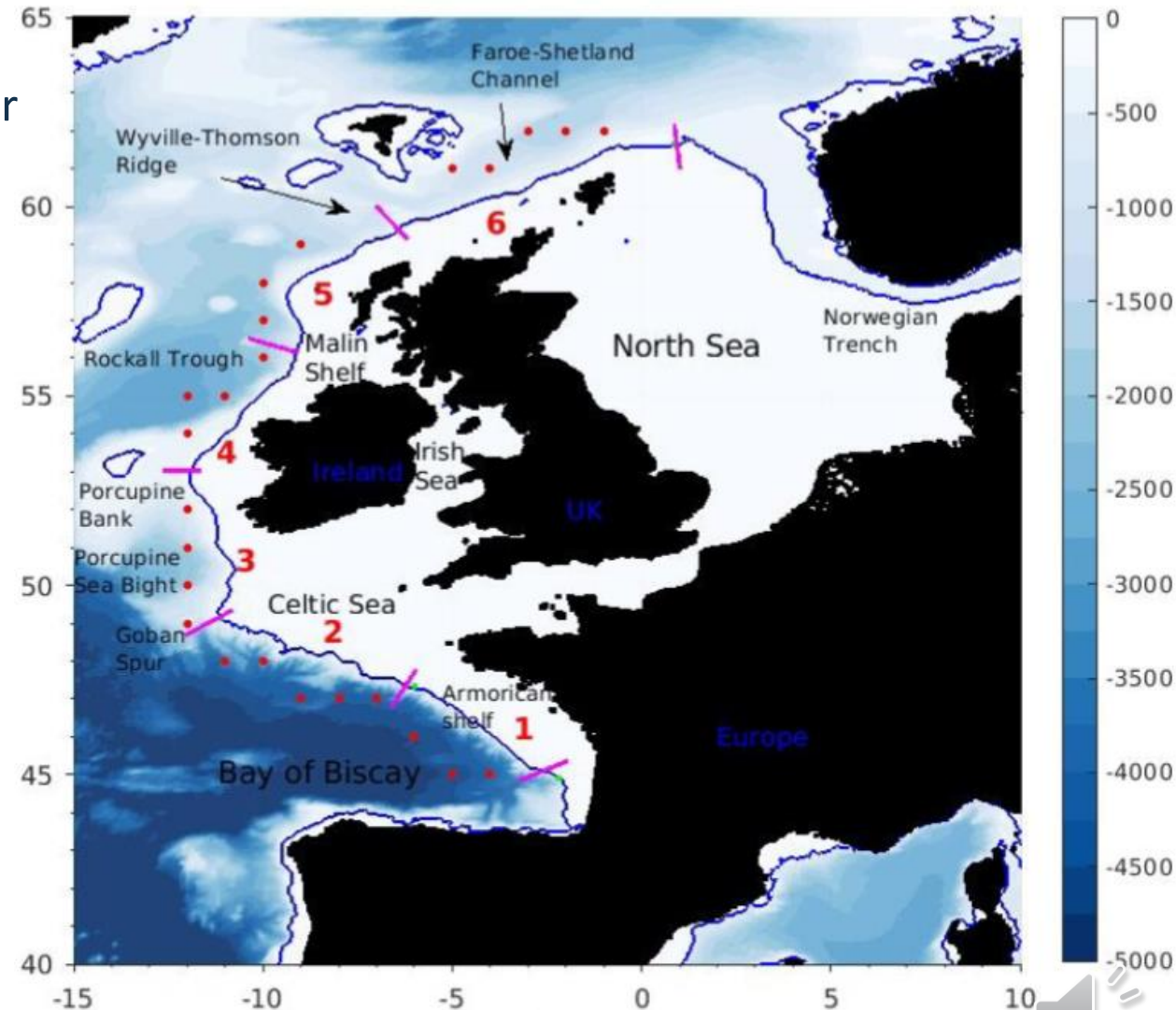


**Question: how does winter surface Ekman transport at shelf edge affect adjacent shelf nitrate interannual variability?**



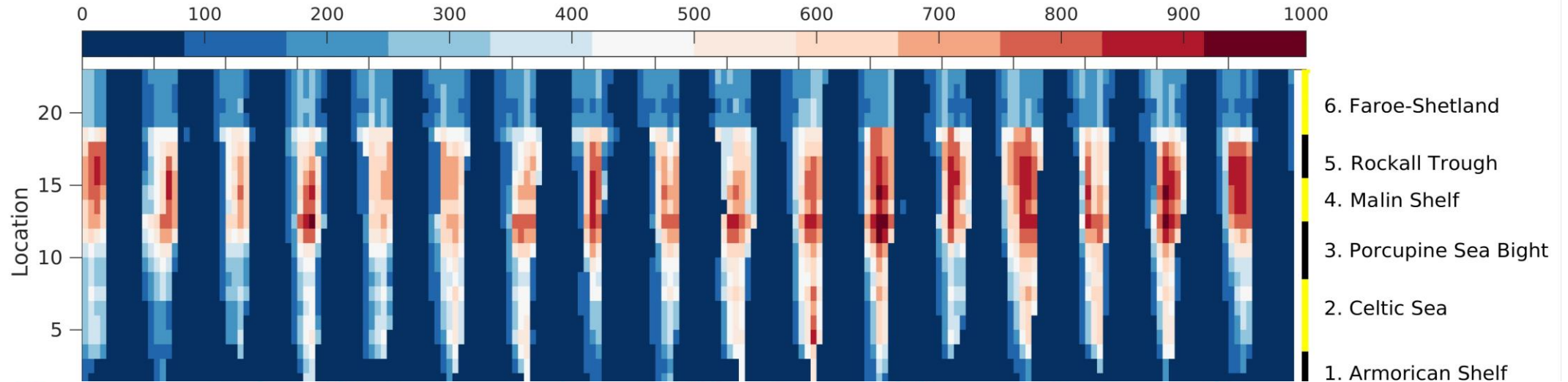
# Research method

- Sectors divided by different hydrography, shelf break orientation, geographic separation, water masses.
- Historic data analysis
  - water temperature-- EN4,
  - nitrate profile climatology-- World Ocean Atlas
  - Wind-- ERA5 reanalysis
  - Chla-- MODIS ocean color  
approx. indicator of shelf nitrate availability

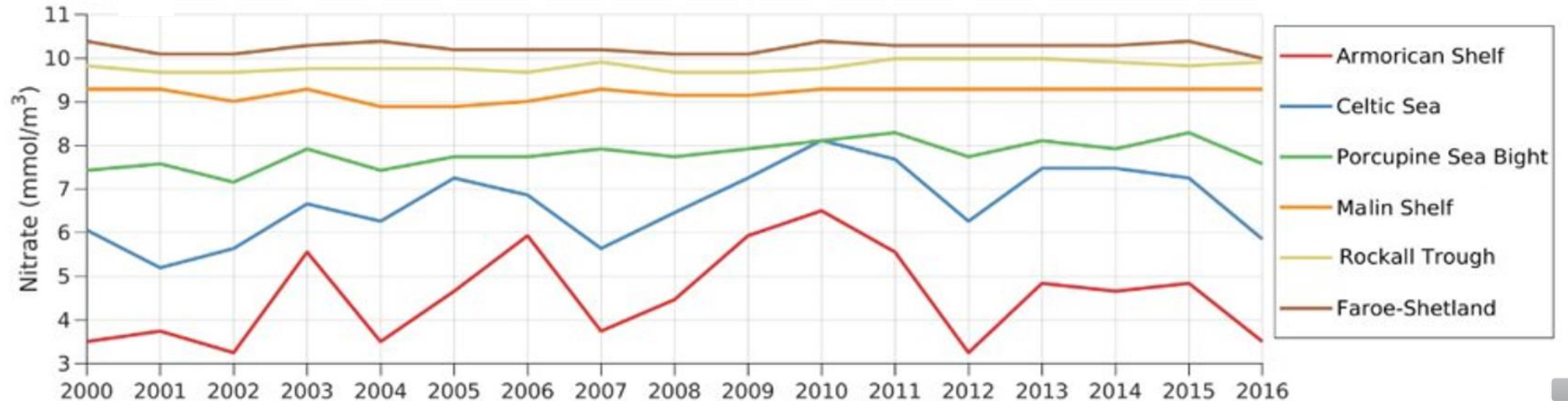




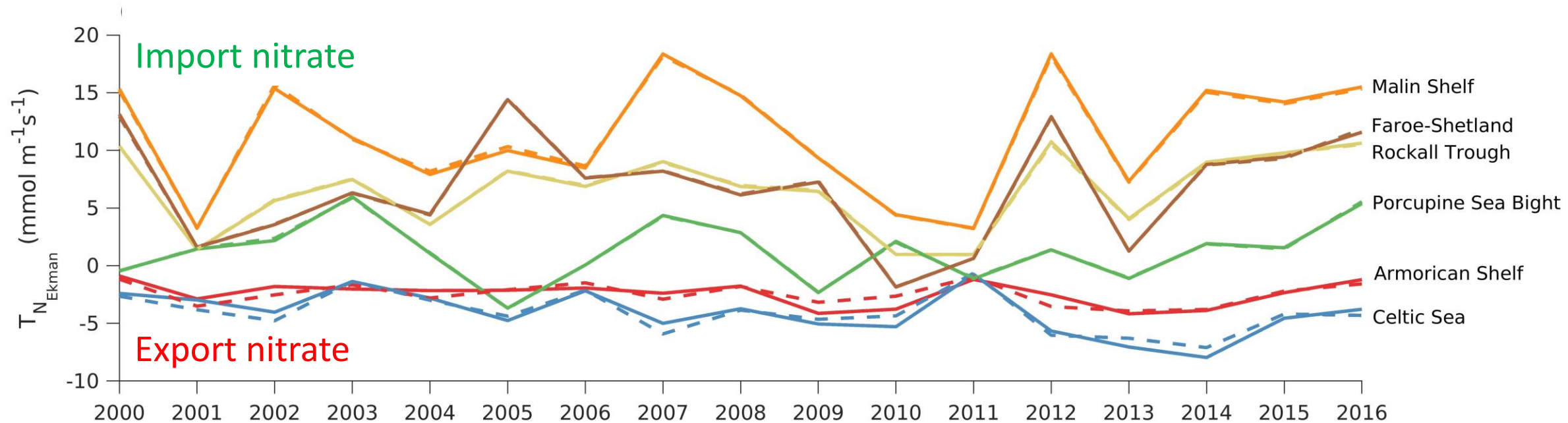
# Shelf-edge surface mixed layer & nitrate recharge



**Strong spatial and interannual variability in pre-bloom nitrate recharge**



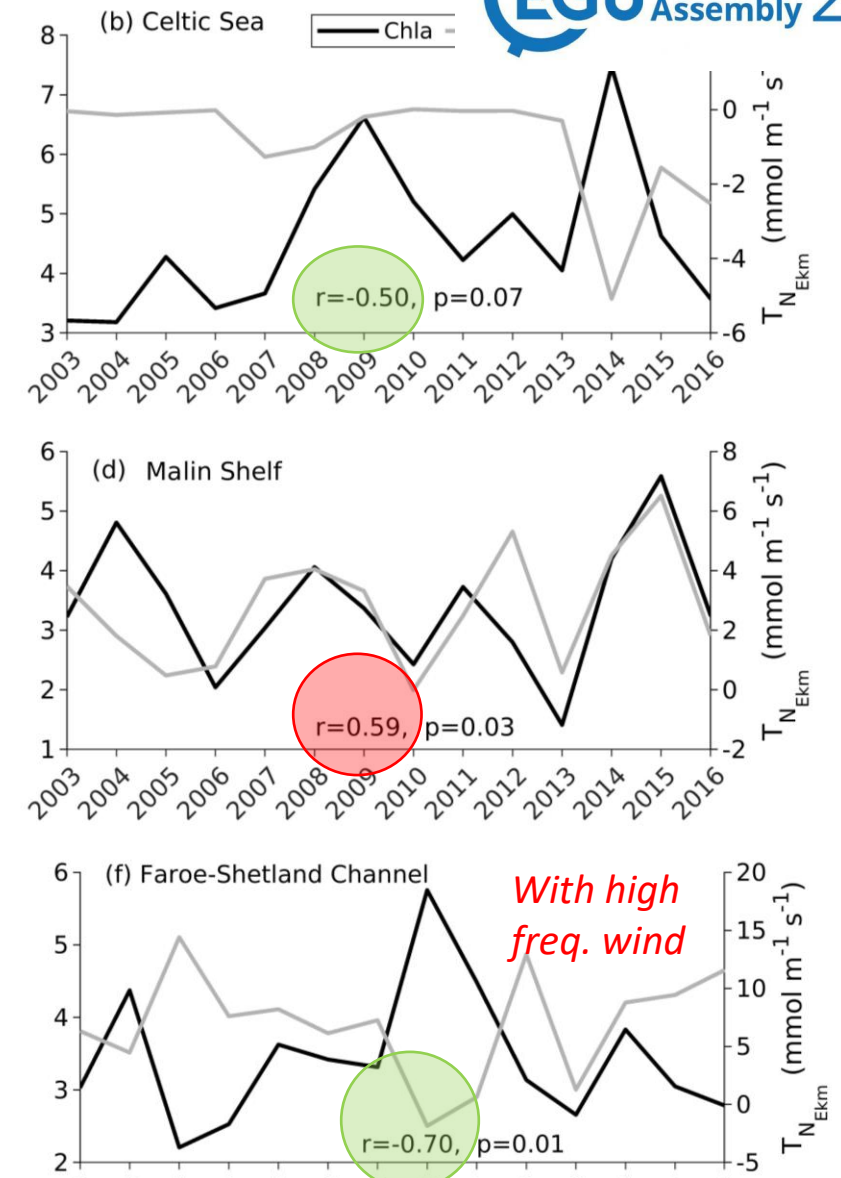
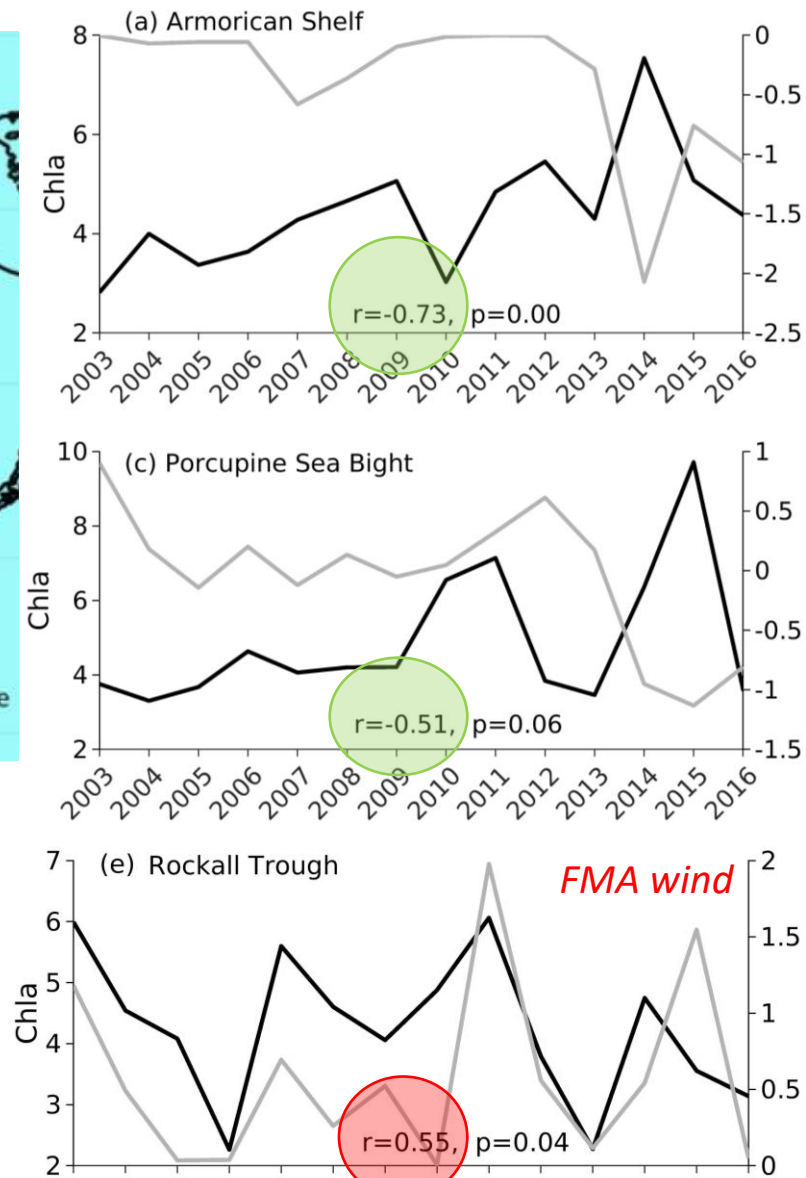
# Surface Ekman transport at shelf edge



**Interannual variations of Ekman nitrate transport mostly due to wind variability**



# Spring Chla VS winter surface Ekman transport

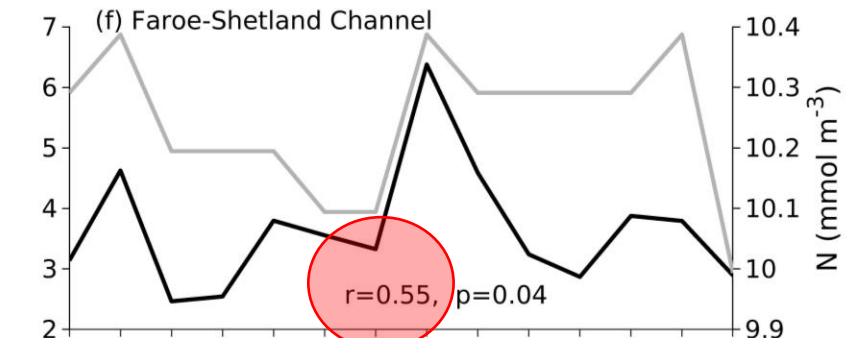
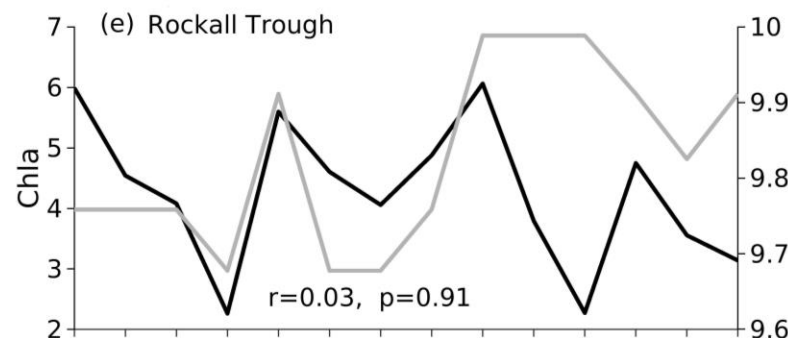
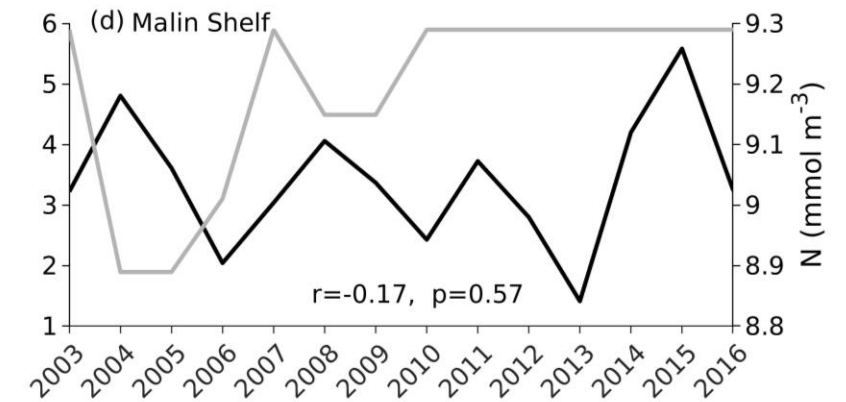
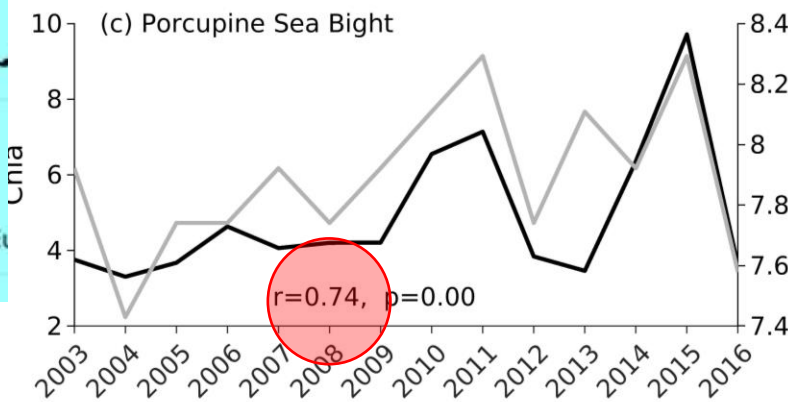
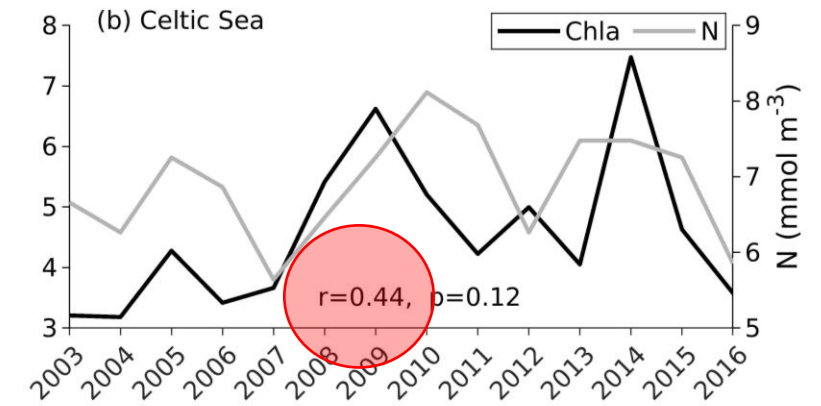
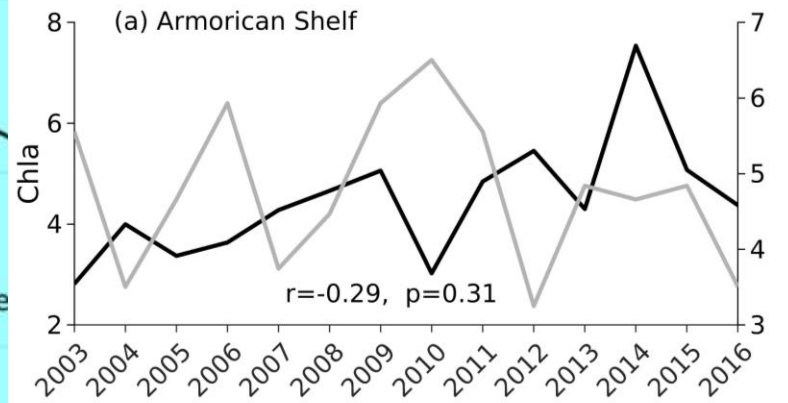


*Surface Ekman transport and shelf sea nitrate supply can be positively or negatively correlated!*





# Spring Chla VS winter nitrate recharge

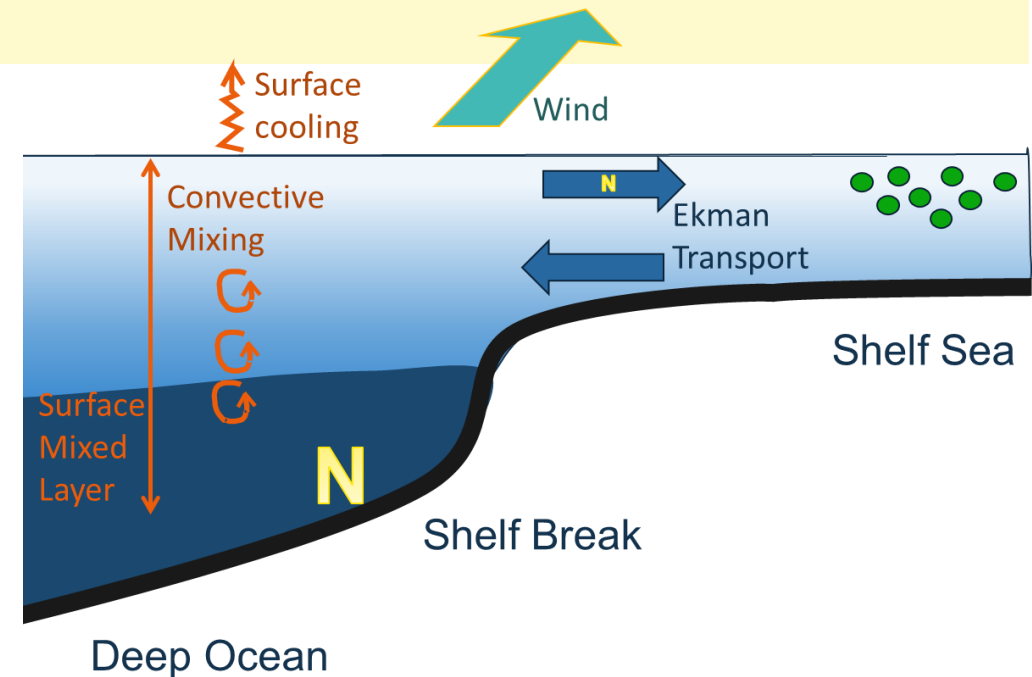
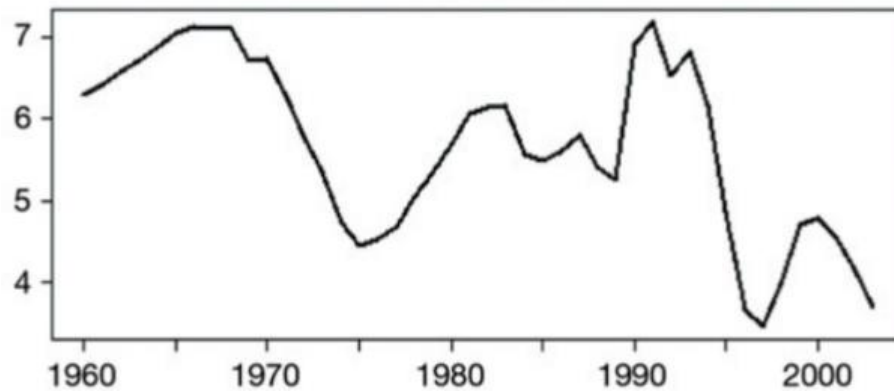


*Winter nitrate recharge is strongly correlated with shelf sea nitrate supply in 3 sectors.*



# Summary

***How does winter Ekman transport at shelf edge affect adjacent shelf nitrate interannual variability?***



- Winter surface Ekman transport contribute positively or negatively to shelf-sea nitrate variability.
- Importance of other processes (tide, internal tides, eddies, slope currents, etc). Any suggestion?

(Wei et al., in prep)

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# Thank you!