A minimal Barents Sea ecosystem model from first principles.

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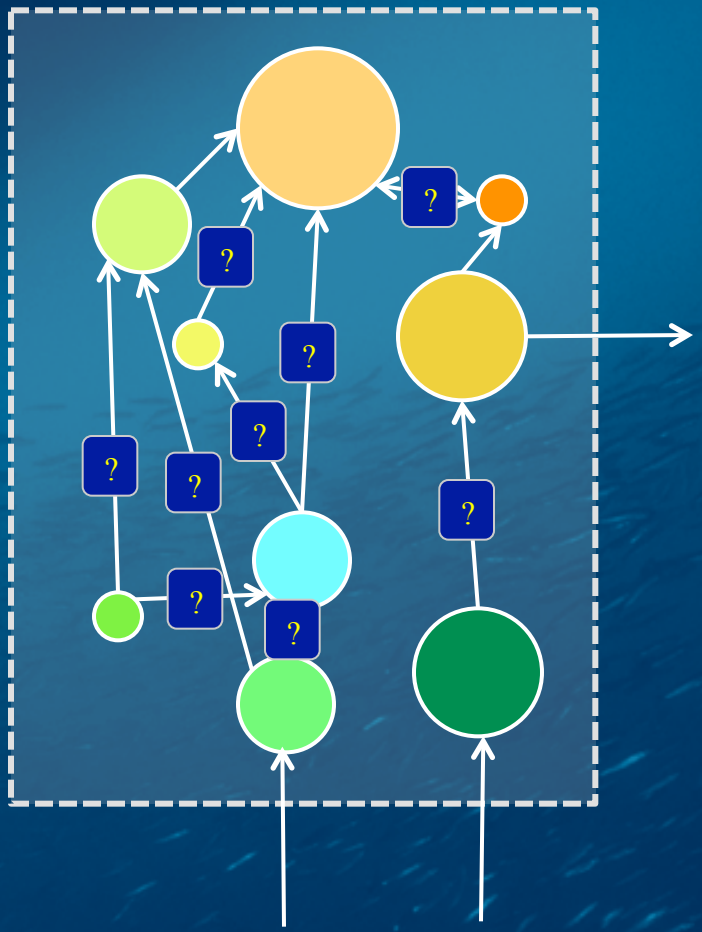
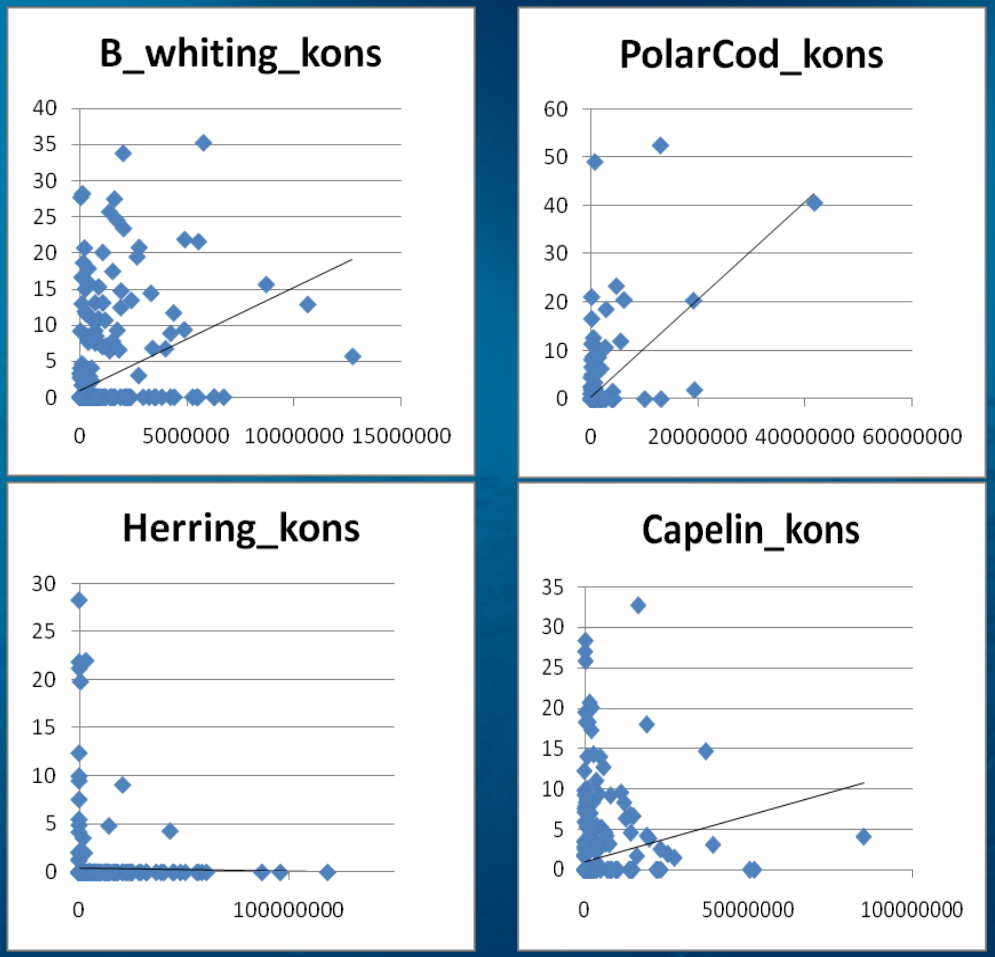
The Barents Sea
Arild Sæther 2006

A dynamic stochastic food web model

- Food Web
- Stochastic



Stochasticity in prey-predator functional relationships?



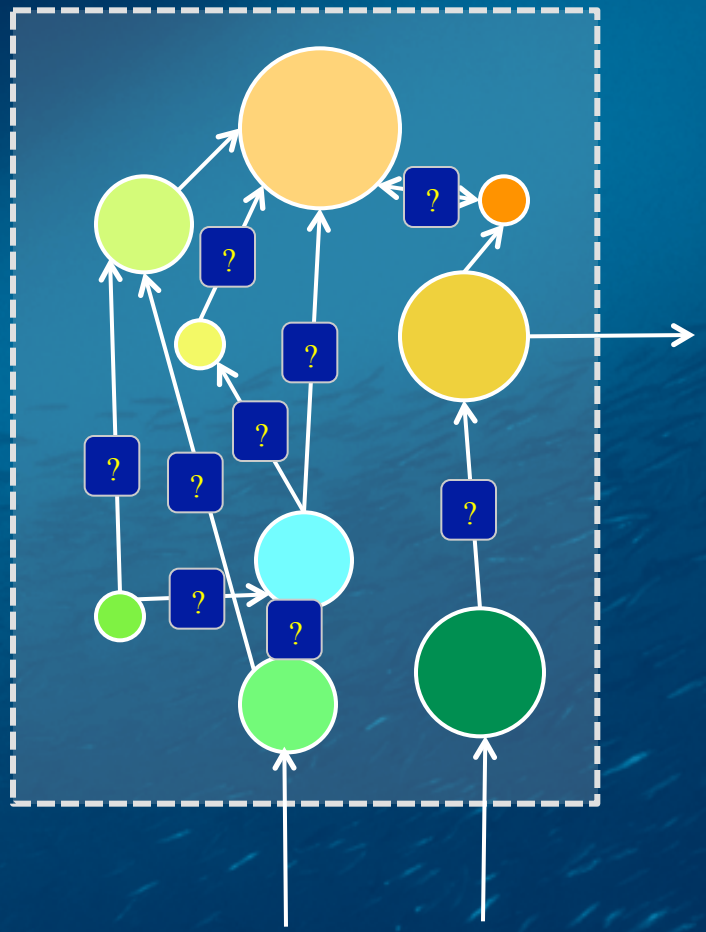
Prey consumption (g/day)

Prey biomass (g/nm2)

Edda Johannesen. Pers. com.

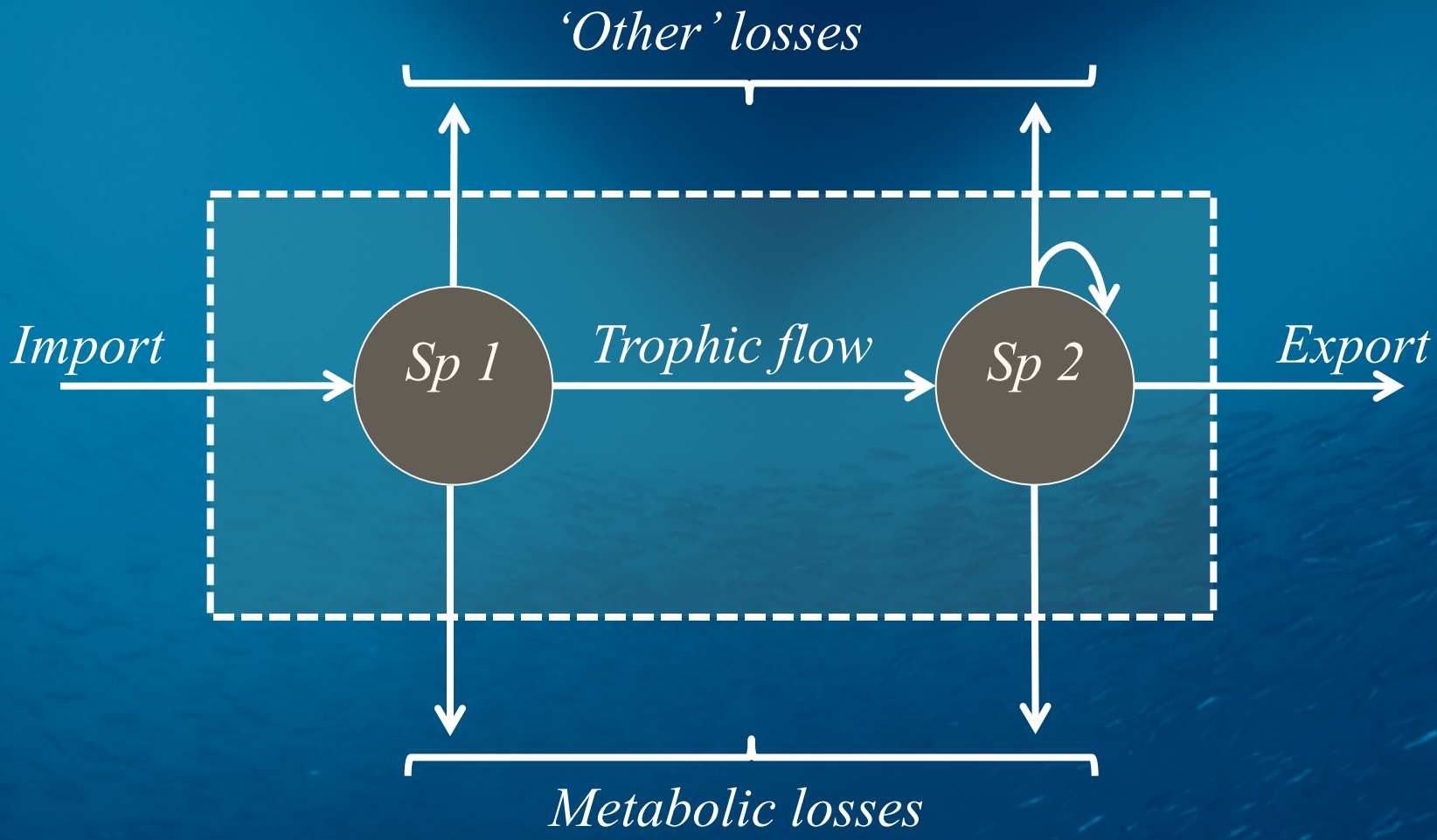
A dynamic stochastic food web model

- Food Web
- Stochastic
- Constrained
  - Mass Balanced
  - Satiety and inertia

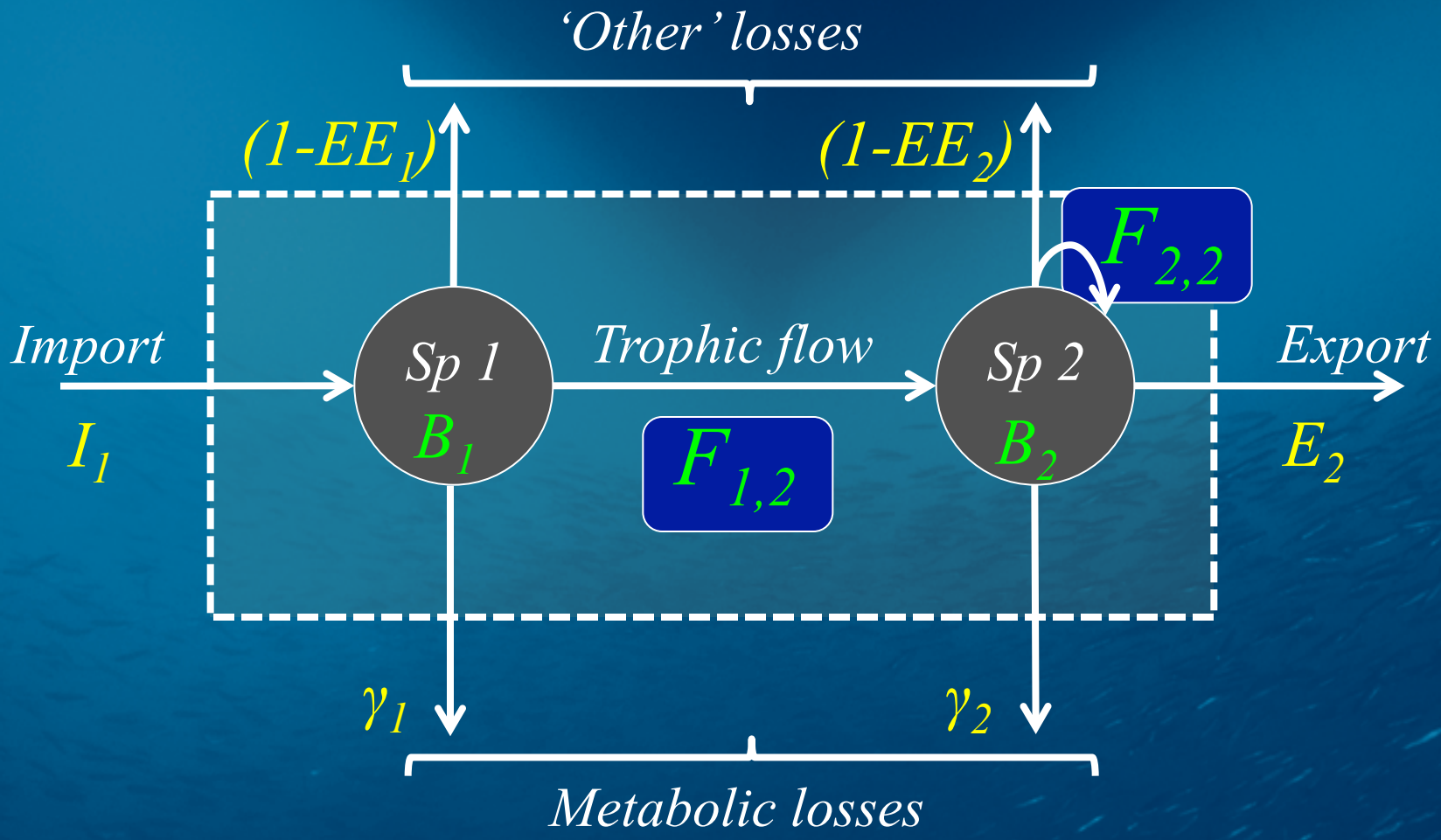


***Mullon et al**. 2009. A minimal model of the variability of marine ecosystems. Fish and Fisheries, 10: 115-131.*

Model Principles: Mass-balance



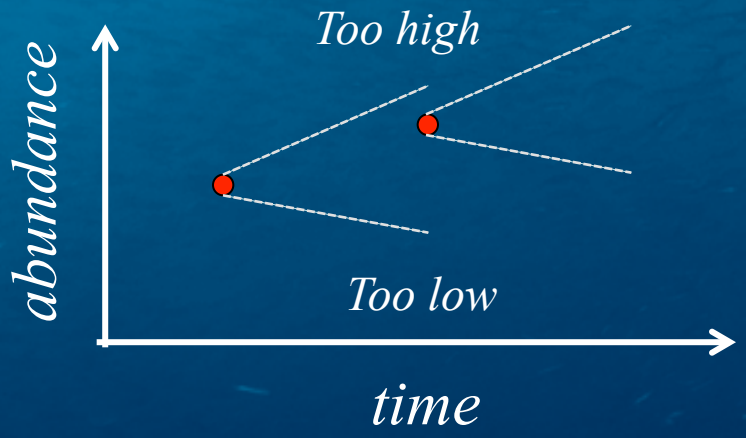
Model Principles 2. Mass-balance



Model Principles: Additional Constraints

- Satiety

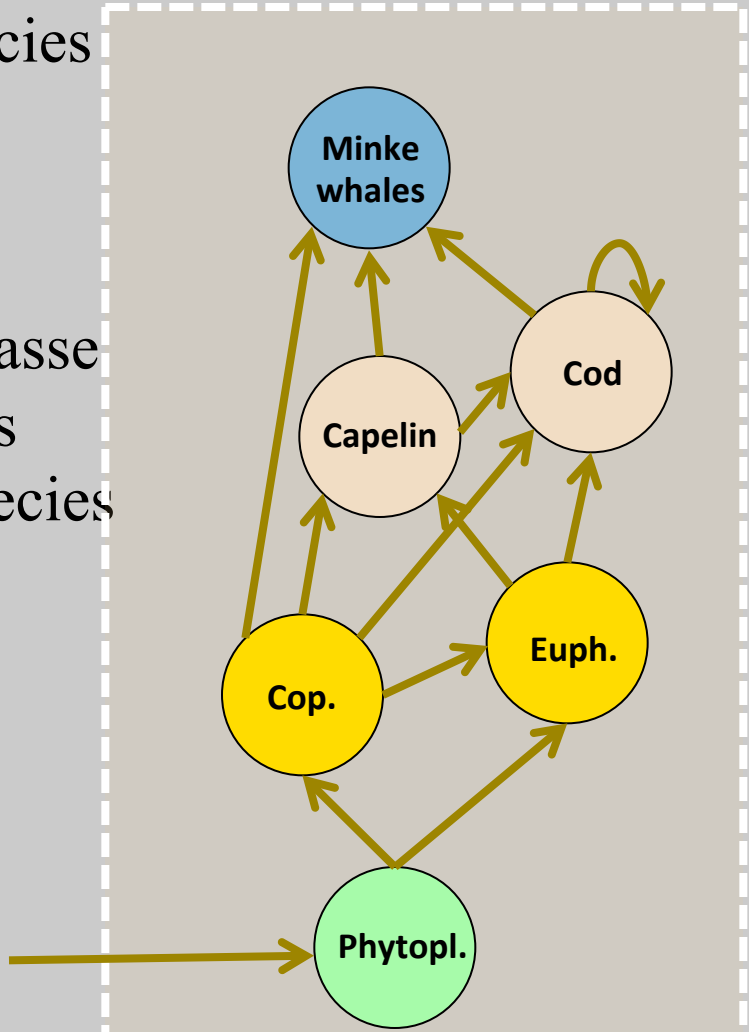
- Inertia



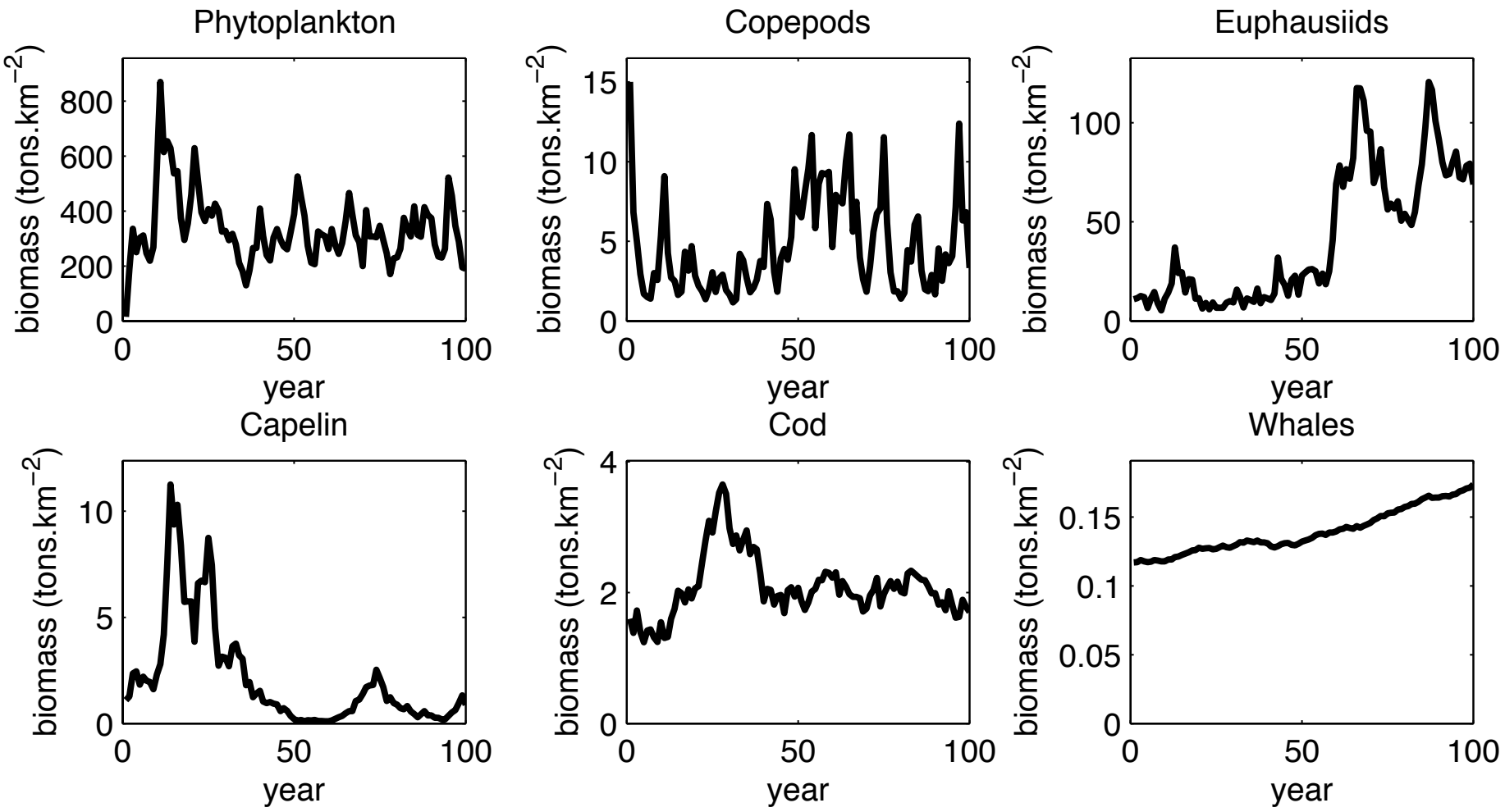
The minimal Barents Sea model

6 trophospecies
12 fluxes
1 import

Initial biomasse
4 coeficients
For each species



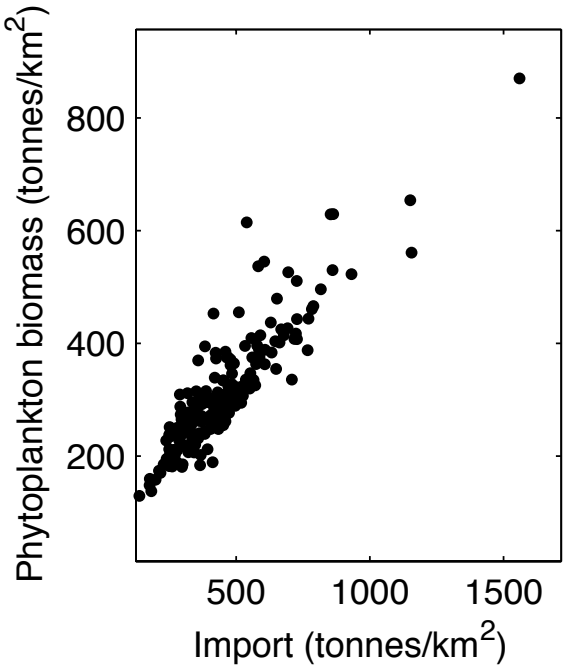
Results 1. Time series

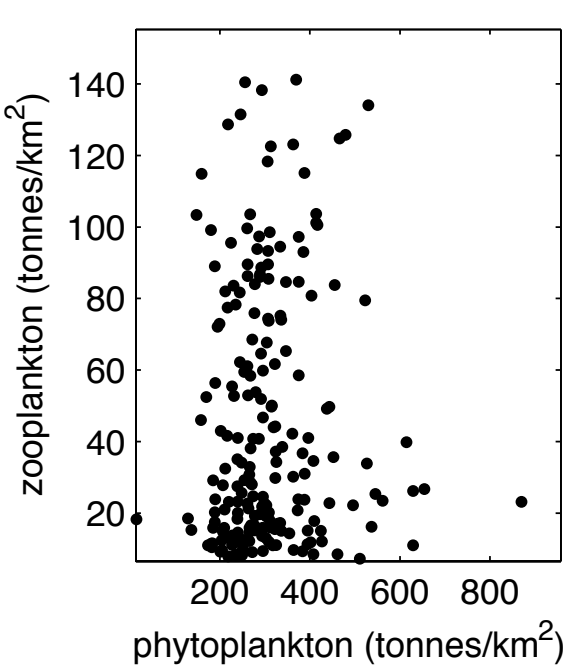


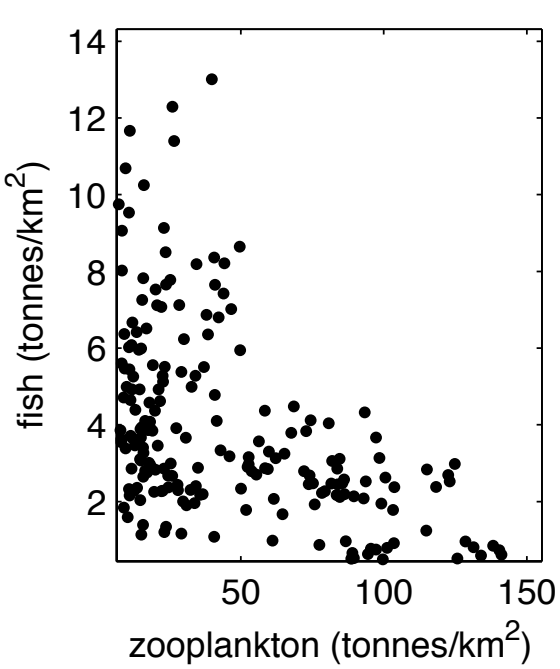
WORK IN PREP.
NOT AVAILABLE

Johannesen et al.
In prep.

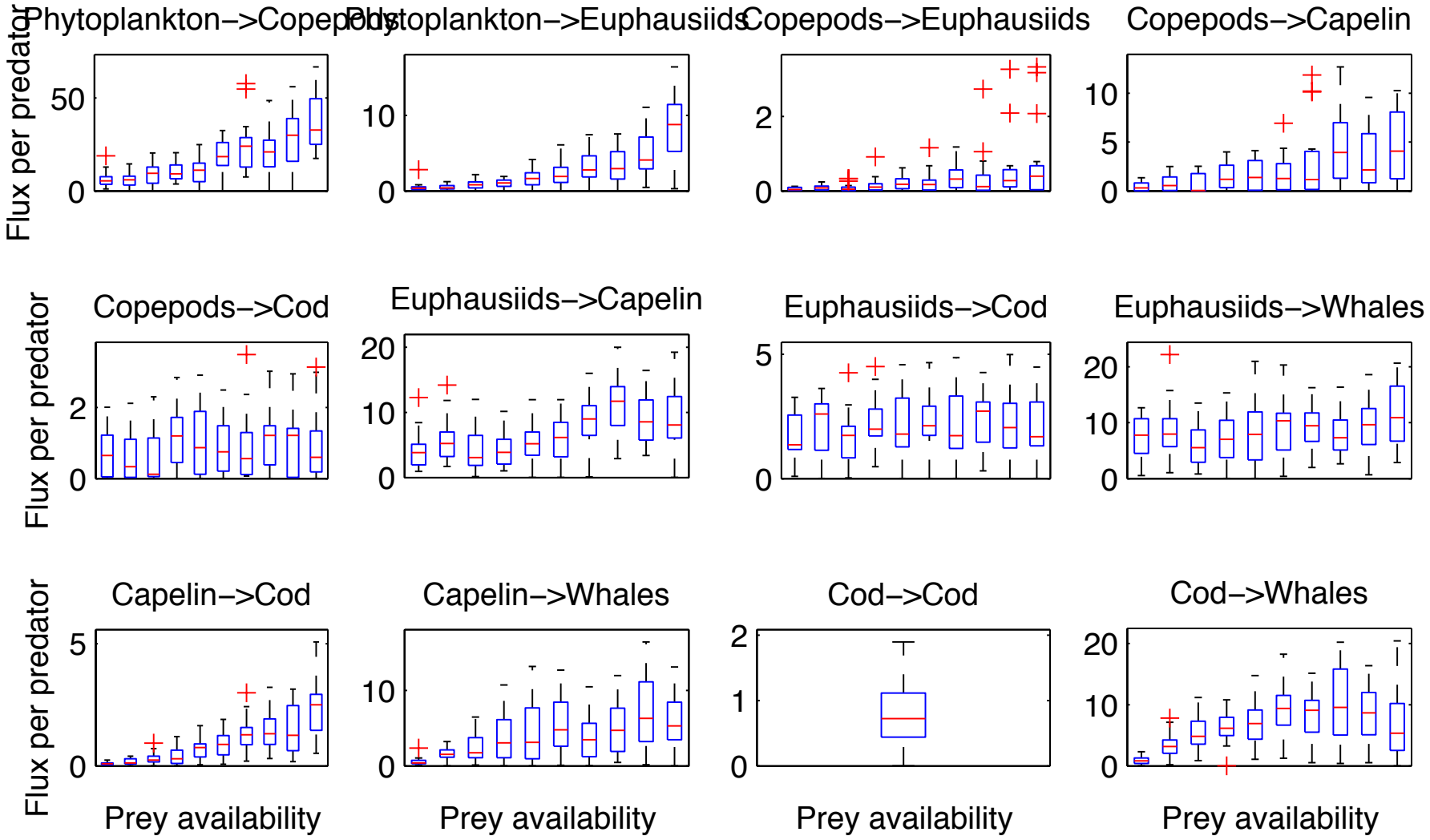
Results
2. bottom up & top –down controls ?



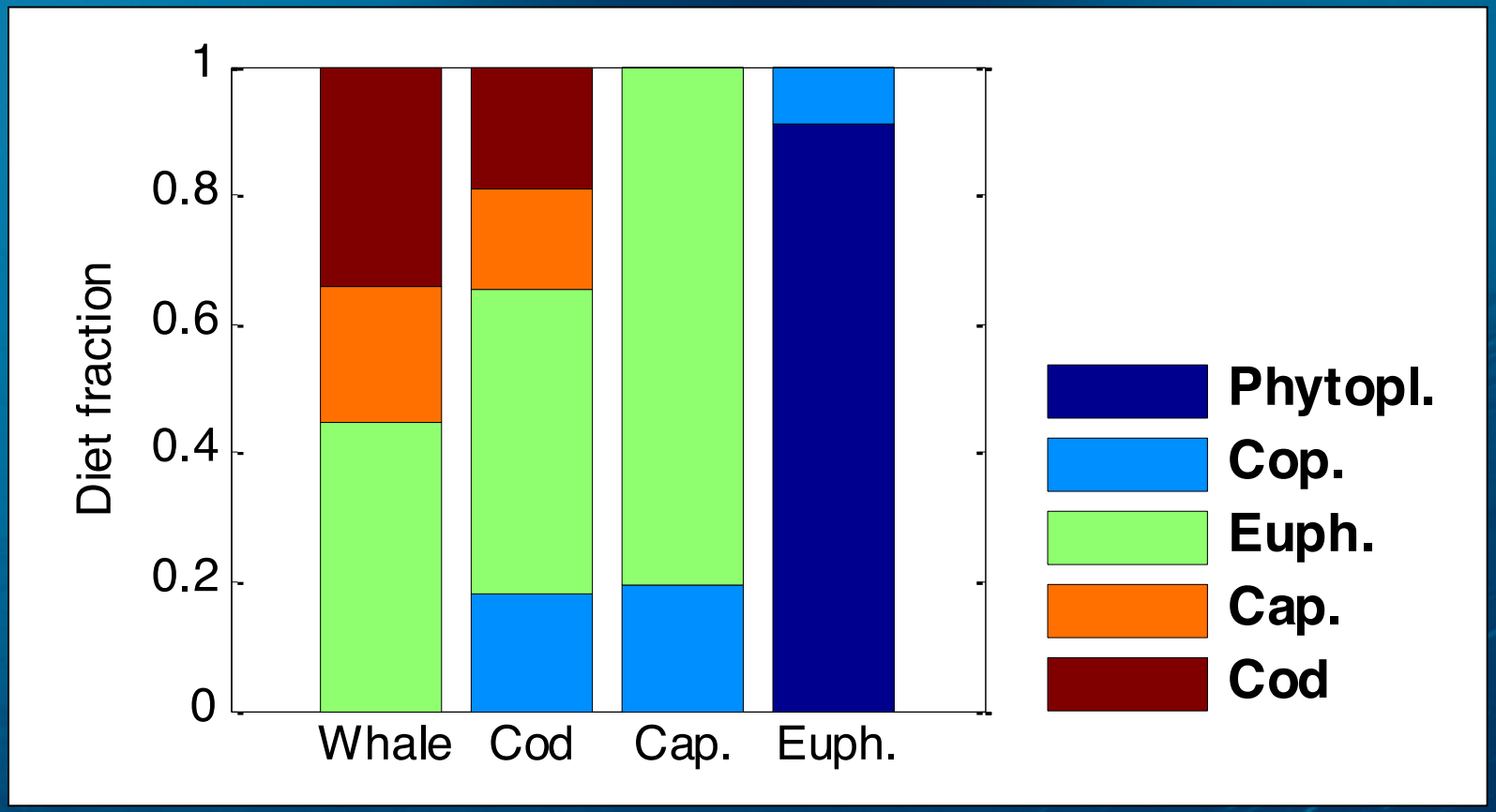




Results 3. trophic functional relationships



Results 4. Diet fractions



Conclusions

- Stochastic model with a few constraints…
  - Mass-balance, satiation, inertia
- …and few parameters
  - EE, Metabolic efficiency, Lifespan, Satiation, import, Export
- Simple, Fast and Transparent
- Simulates realistic ecosystem features
- Set a reference for expected ecosystem properties under a minimal set of assumptions

Epilogue:
decadal fluctuations in top-down/bottom-up control

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NOT AVAILABLE

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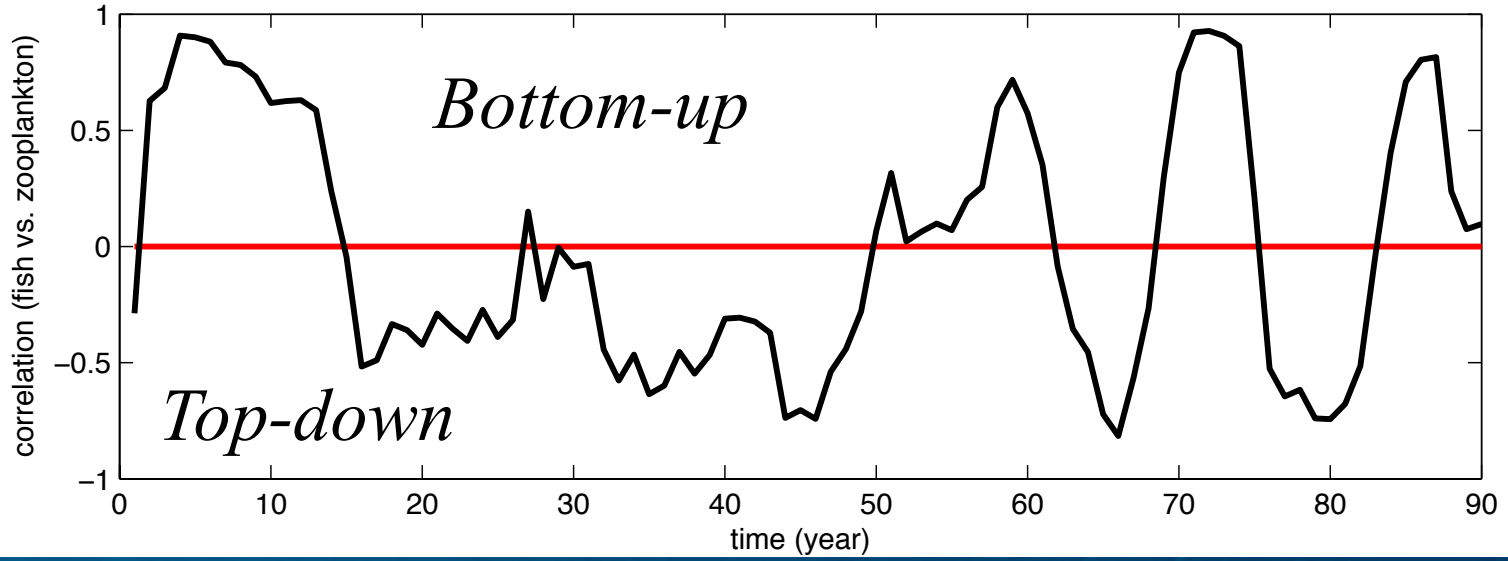
In prep.

Epilogue:
decadal fluctuations in top-down/bottom-up control




Thank you
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Poster: S6-P2