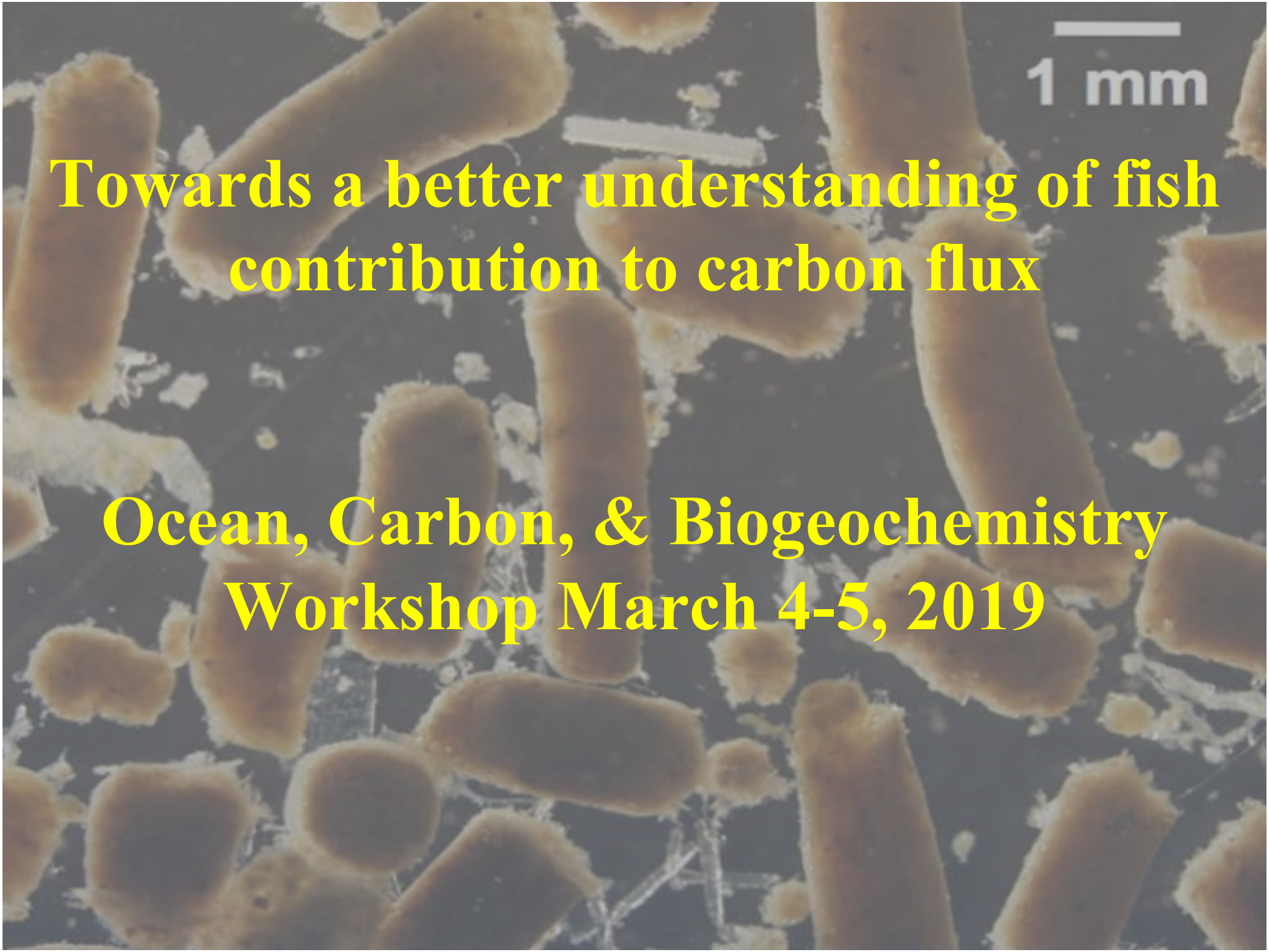
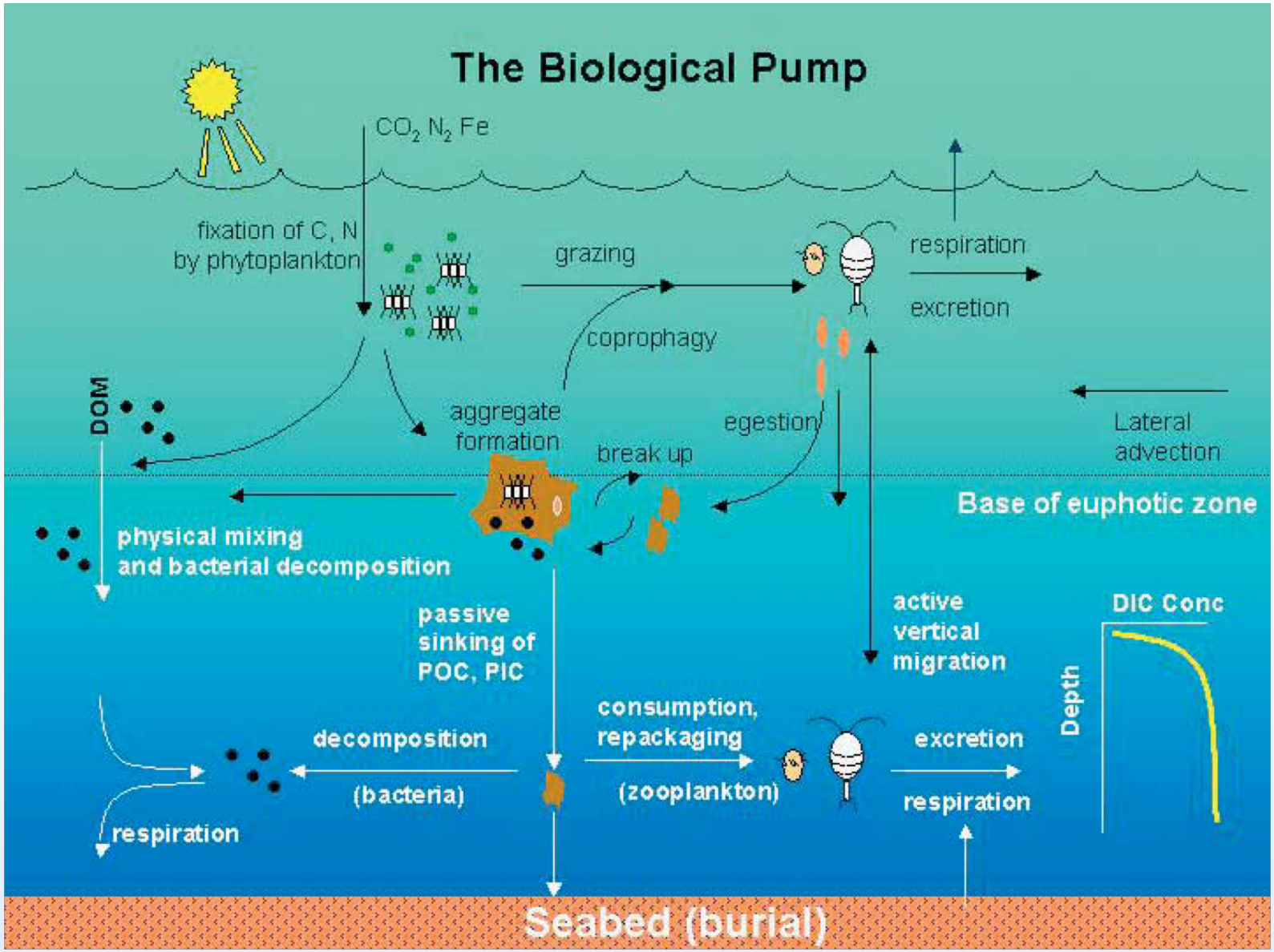


Towards a better understanding of fish contribution to carbon flux

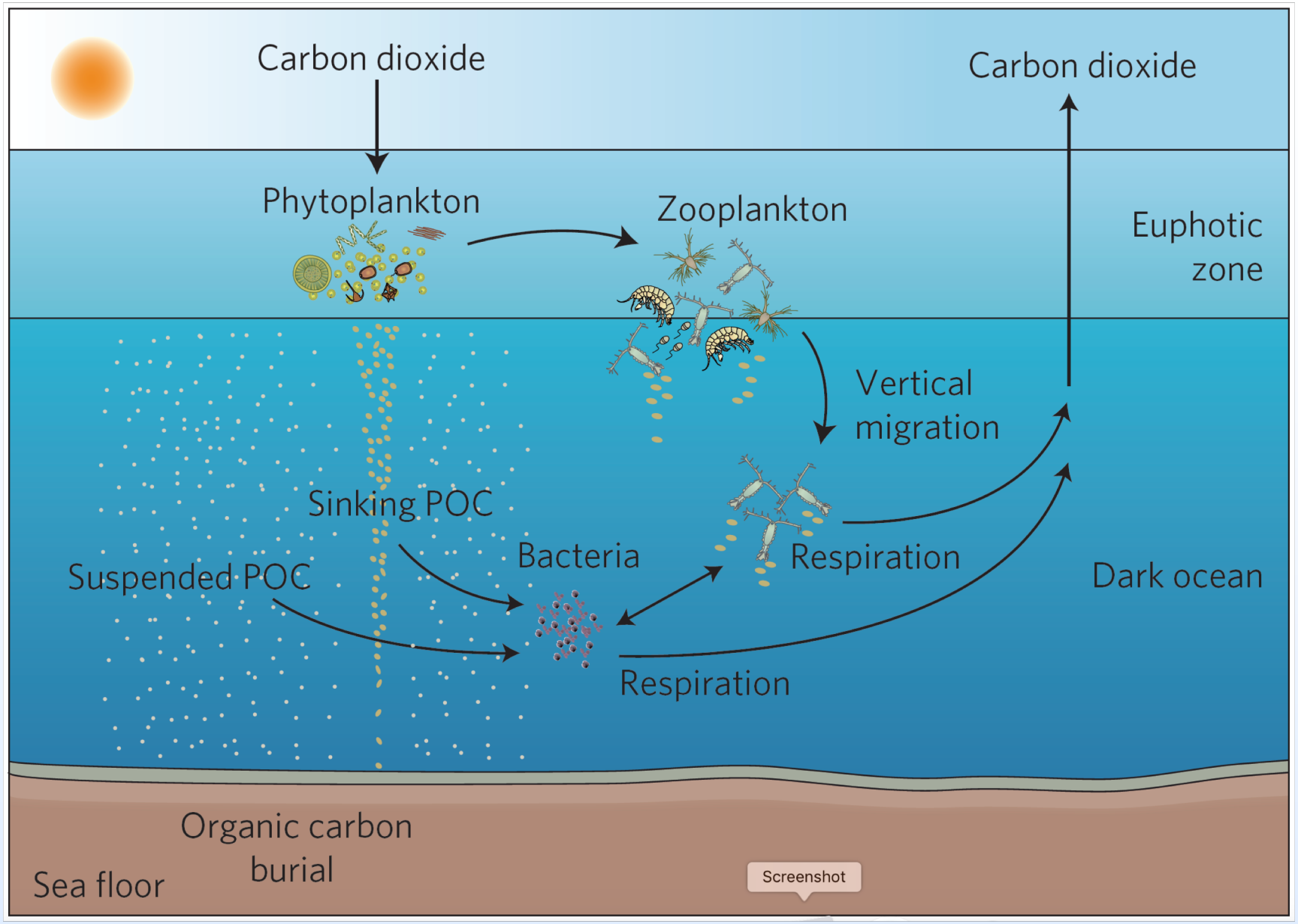
Ocean, Carbon, & Biogeochemistry Workshop March 4-5, 2019

Motivation



Ducklow, Steinberg, Buesseler 2001

Motivation

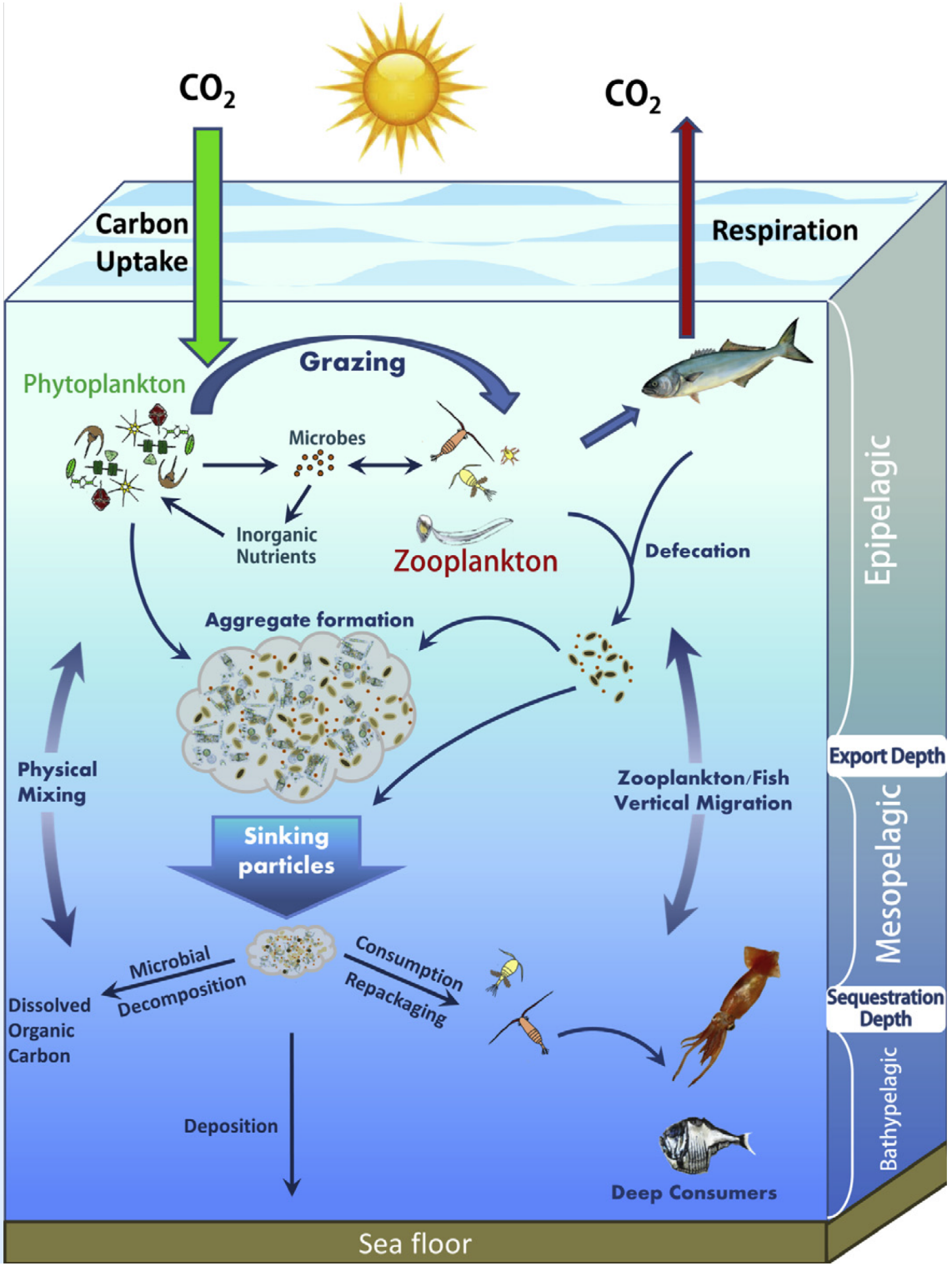


Herndl & Reinthaler 2013

Motivation

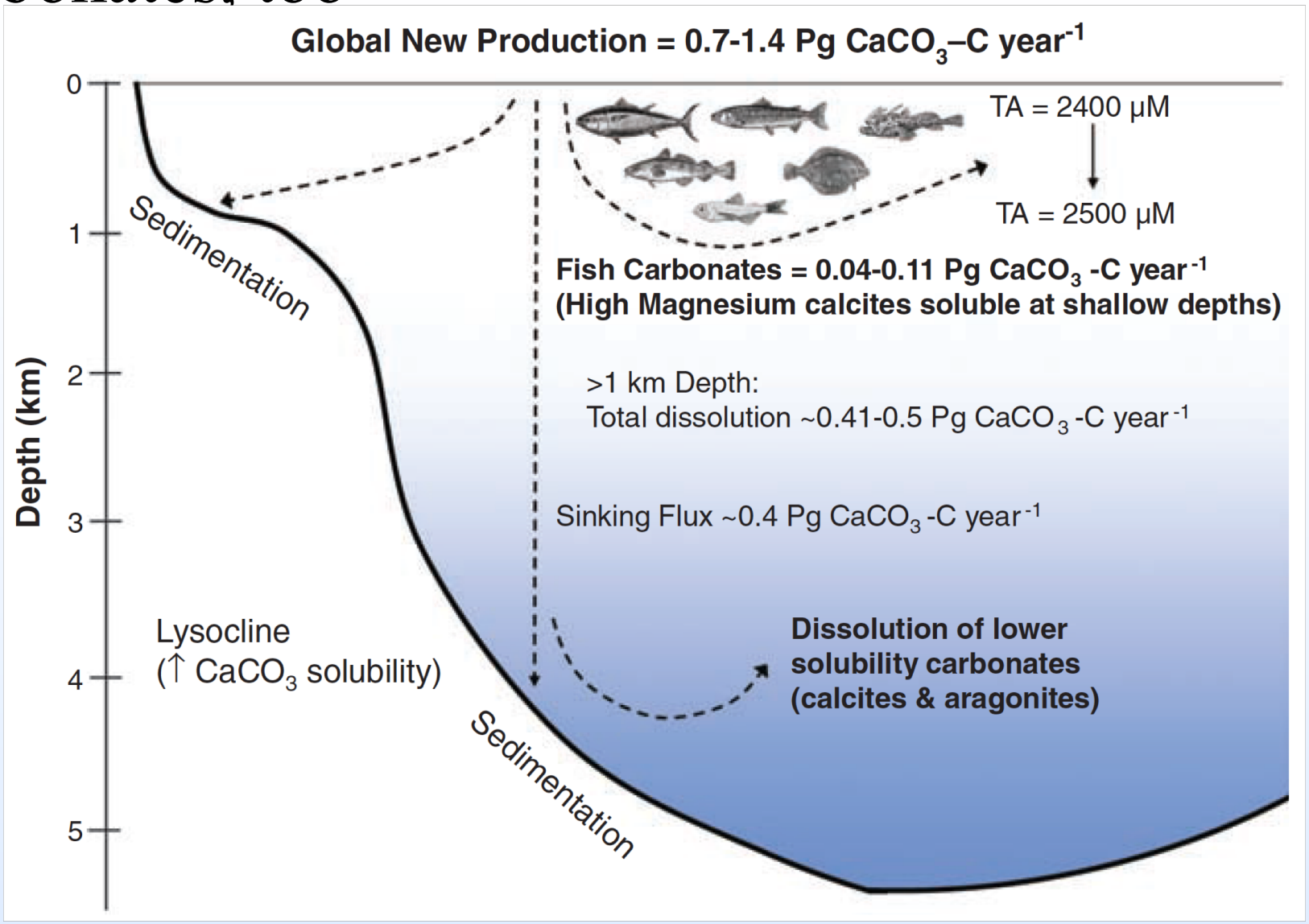
FISH!

Turner 2015



Motivation

Carbonates, too



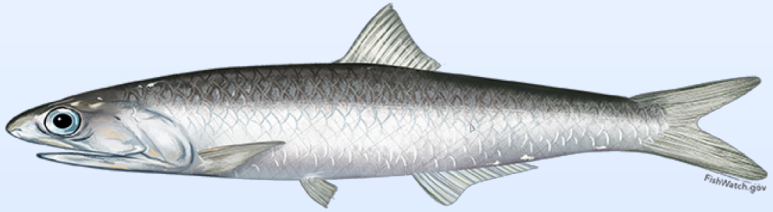
Wilson et al. 2009

Motivation

Greatly limited number of studies on fish carbon flux

< 10 studies have estimated active transport in DVM fish

< 5 studies have focused on direct measurements of fish passive flux



Why Fish Carbon Needs to be Resolved

- Essential to determine its potential for a food source for benthic organisms
- Improve parameterization of key processes affecting the biological pump
- Develop more accurate regional and global carbon models
- Understand interannual and seasonal/spatial variability and long-term changes of fish fecal flux
- Evaluate the potential role of environmental factors and climate change on fish carbon flux

Project Goals

- Synthesize the existing research on fish carbon flux
  - Active and Passive flux

Project Goals

- Synthesize the existing research on fish carbon flux
  - Active and Passive flux
  - Identify species, major taxon groups, and habitats most frequently studied

Project Goals

- Synthesize the existing research on fish carbon flux
  - Active and Passive flux
  - Identify species, major taxon groups, and habitats most frequently studied
  - Attempt to estimate fish fluxes on larger scales (different ecosystems, regions, etc.) using two potential approaches:
    - Combining fisheries stock assessment data with existing fish flux data
    - Incorporating a fish component into biogeochemical models
  - Compare fish flux measurements to those reported for zooplankton

Project Goals

- Synthesize the existing research on fish carbon flux
  - Active and Passive flux
  - Identify species, major taxon groups, and habitats most frequently studied
  - Attempt to estimate fish fluxes on larger scales (different ecosystems, regions, etc.) using two potential approaches:
    - Combining fisheries stock assessment data with existing fish flux data
    - Incorporating a fish component into biogeochemical models
  - Compare fish flux measurements to those reported for zooplankton = Paper #2

Project Goals

- Synthesize the existing research on fish carbon flux

- Recognize challenges in measuring fish carbon flux and discuss approaches to resolve them
  - Sampling approaches
  - Required fish information (species, abundance, biomass, spatial/vertical distributions, etc.)

Project Goals

- Synthesize the existing research on fish carbon flux
- Recognize challenges in measuring fish carbon flux and discuss approaches to resolve them
- Develop research priorities to fill the large gaps in understanding fish carbon flux
  - Define key laboratory and/or field studies
  - Upscaling measurements to regional & global estimates through modeling

Project Goals

- Synthesize the existing research on fish carbon flux
- Recognize challenges in measuring fish carbon flux and discuss approaches to resolve them
- Develop research priorities to fill the large gaps in understanding fish carbon flux
- Identify opportunities to obtain resources needed to move this research forward

Workshop Goals

- Finalize Paper 1: Synthesis, Challenges, Gaps, Research Priorities, Assign specific tasks with deadlines for completion

- Make as much progress as possible on Paper 2:
  - Finalize Approaches for Fish Biomass Estimates, Passive and Active Fish Carbon Fluxes, Comparisons to Total Carbon Flux and Zooplankton Flux
  - Assign specific tasks with deadlines to complete Paper 2

- Discuss Potential Proposals for Filling Gaps