



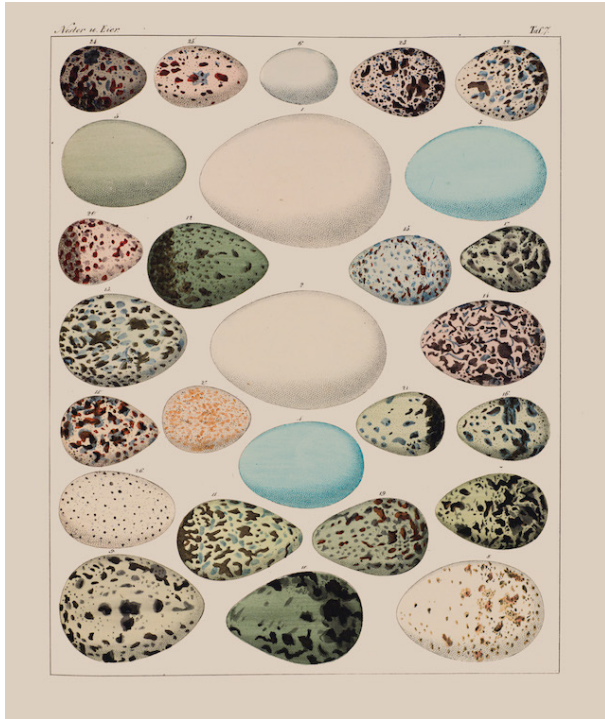
Intent, Initialization & Inference: Improving Representation of Microbial Dynamics in Earth System Models



Will Wieder, Gordon Bonan, Mark Bradford, Jessica Gilman Ernakovich, Stuart Grandy, Melannie Hartman, Caitlin Hicks Pries, Hannah Holland Moritz, Fiona Jevon, Samar Khatiwala, Sam Levis, Fernando Montaña López, Derek Pierson, Alexander Polussa, Katie Rocci, Sean Schaefer, Else Schlerman and Andrew Wilson

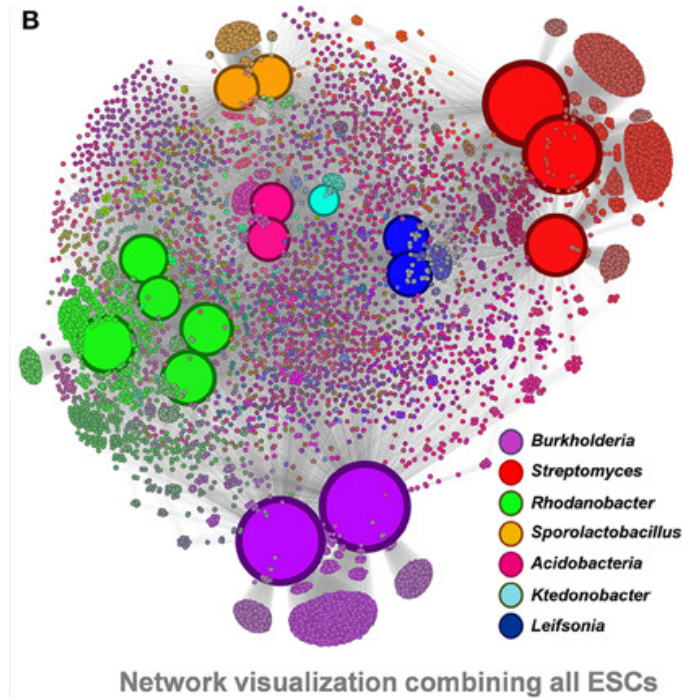
This material is based upon work supported by the National Center for Atmospheric Research, which is a major facility sponsored by the National Science Foundation under Cooperative Agreement No. 1852977.

beyond Cataloguing

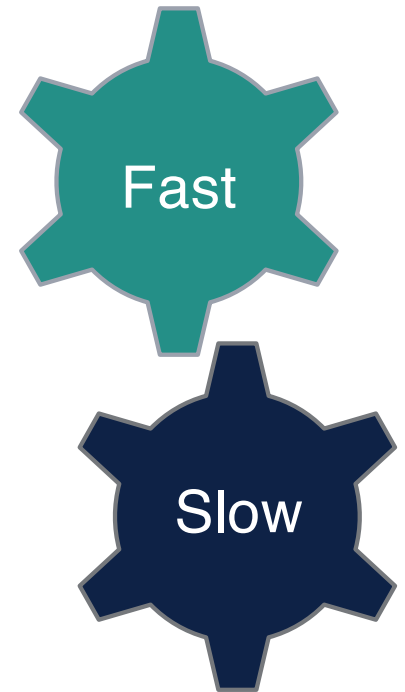


Lorenz Oken (1779-1851)

towards Function



Delmont et al. Front. Microbiol. 2015



Intent:

Substrate
Quality

+

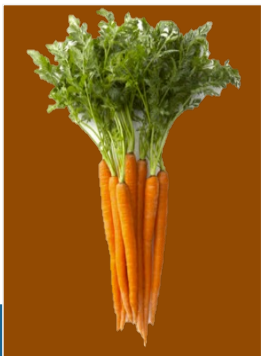
Microbial
Explicit

+

Mineral
protection

→

Globally



Wieder et al. 2014,
Wieder et al. 2015

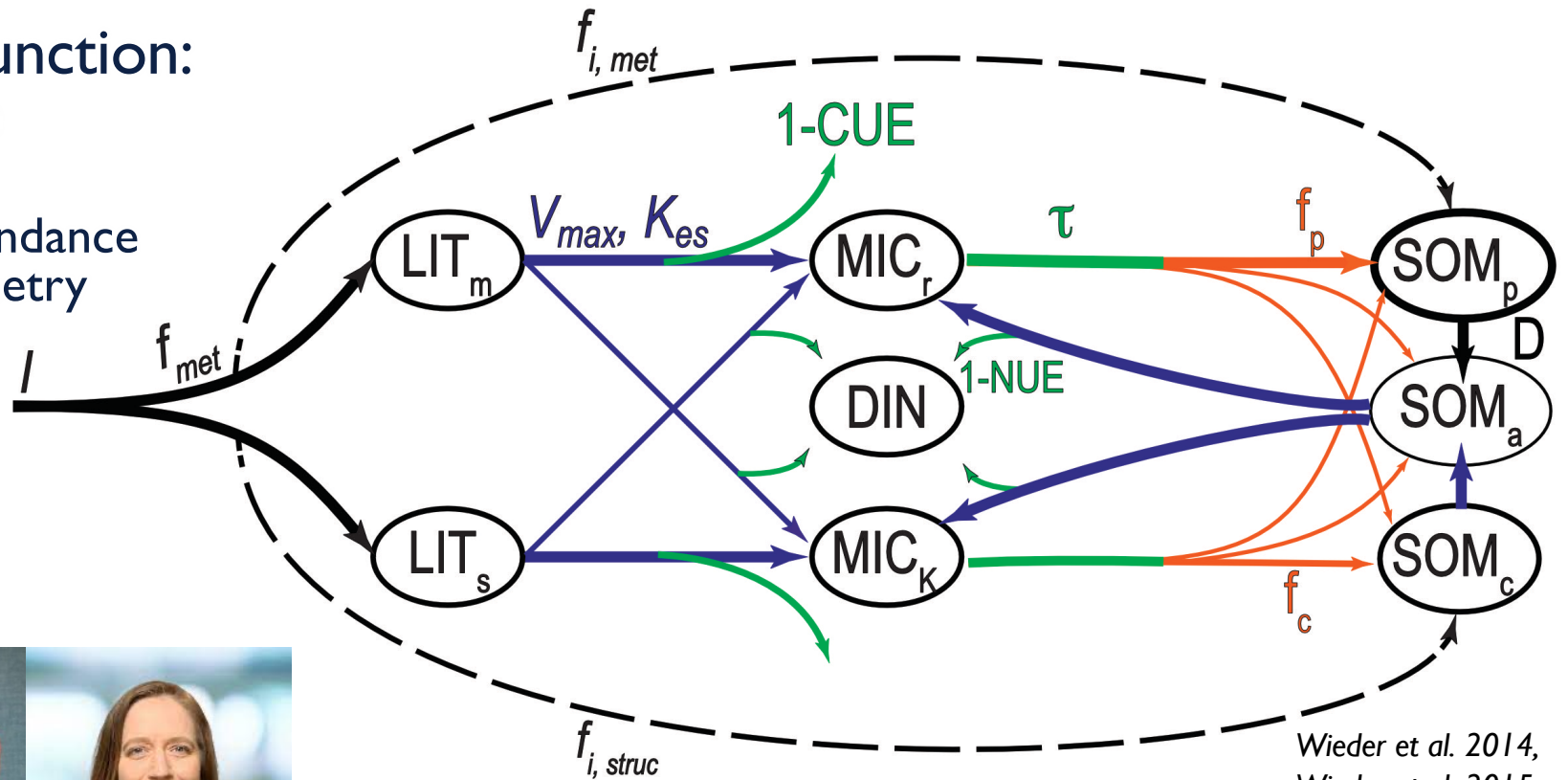
Intent: MIMICS

Microbial Function:

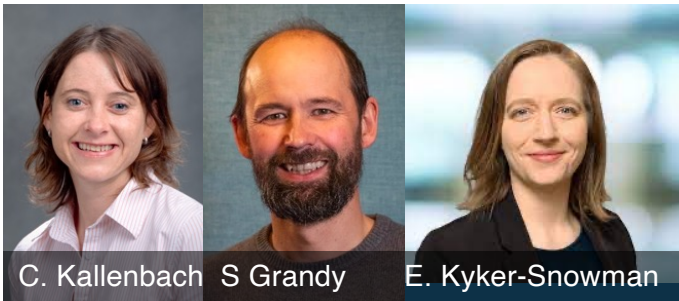
Rate

Fate

Relative abundance
Stoichiometry



Wieder et al. 2014,
Wieder et al. 2015
Kyker-Snowman 2020
Wieder et al. 2024



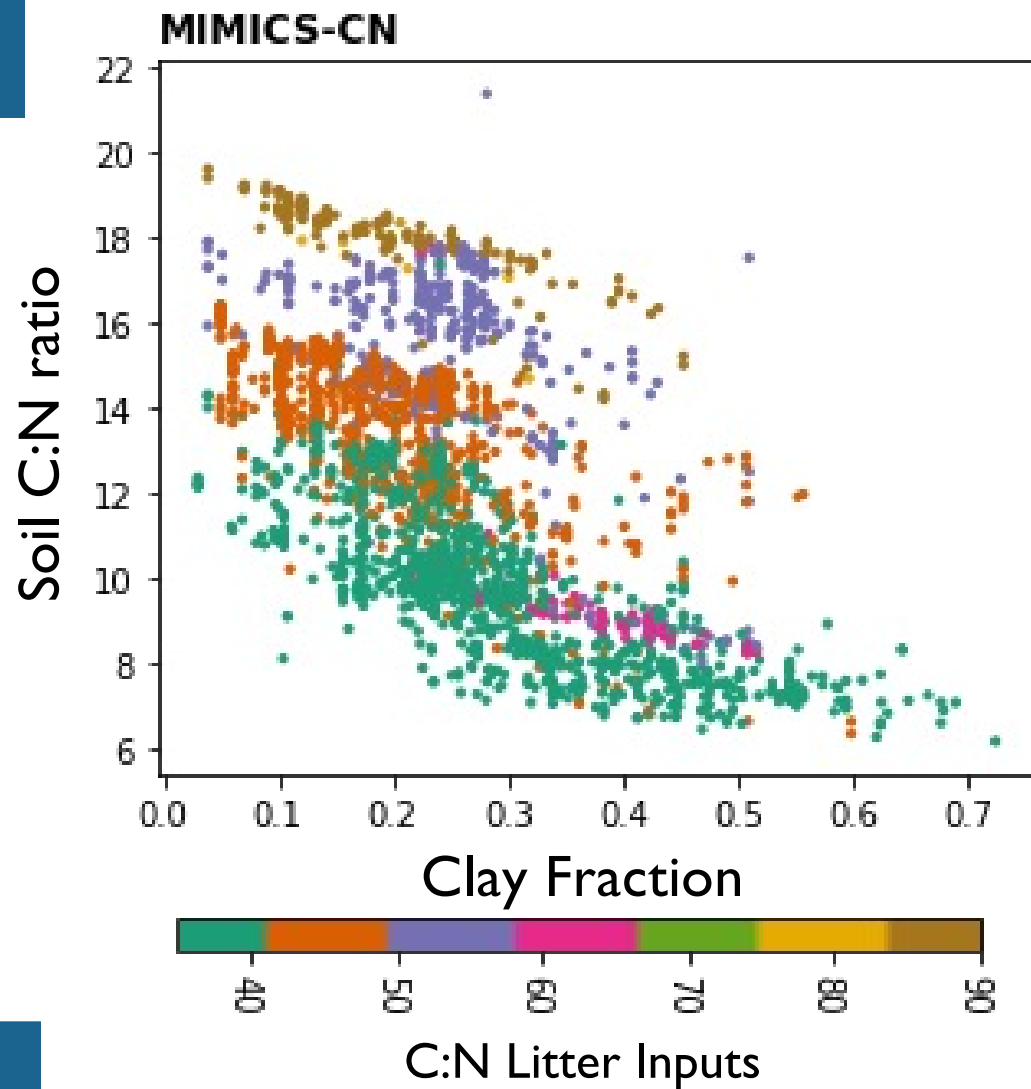
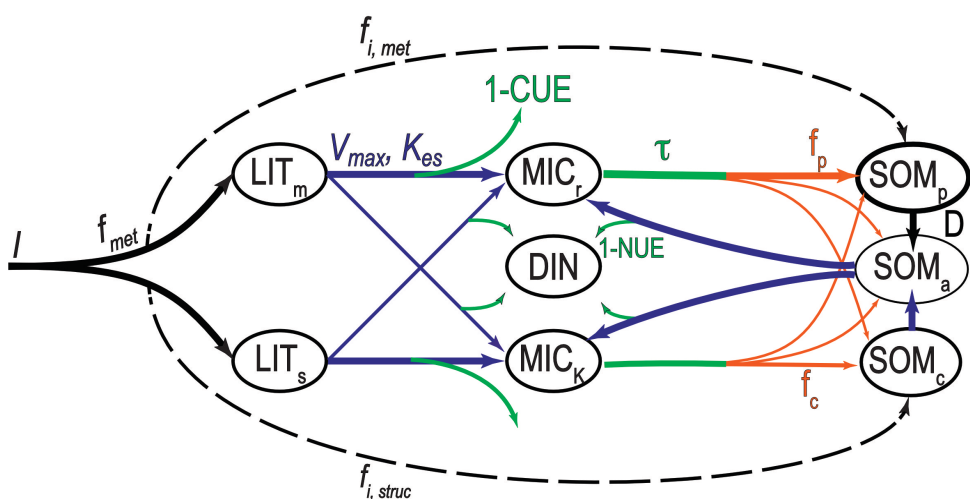
C. Kallenbach

S. Grandy

E. Kyker-Snowman

MIMICS-CN

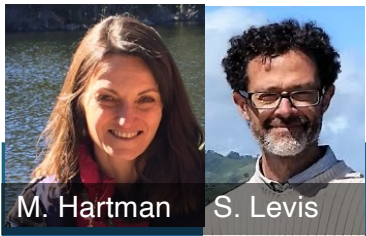
Stoichiometry



Initialization: the challenge of Spin-up

Bringing MIMICS into the
Community Land Model (CLM)

Vertical Resolution
Plant-Soil Feedbacks
C-cycle projections (CESM)



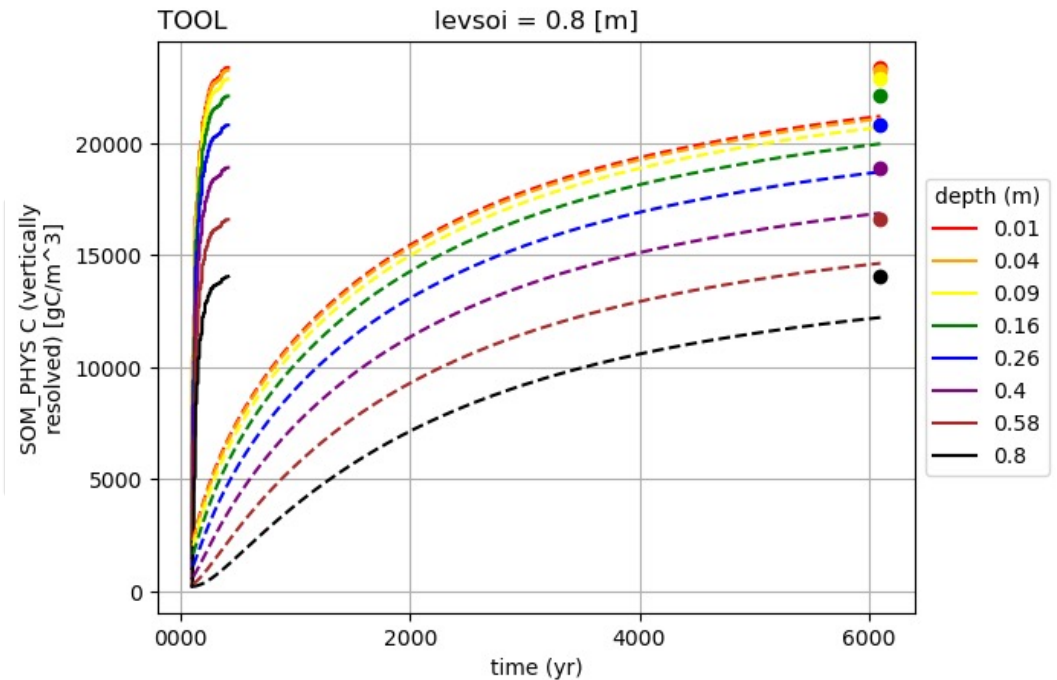
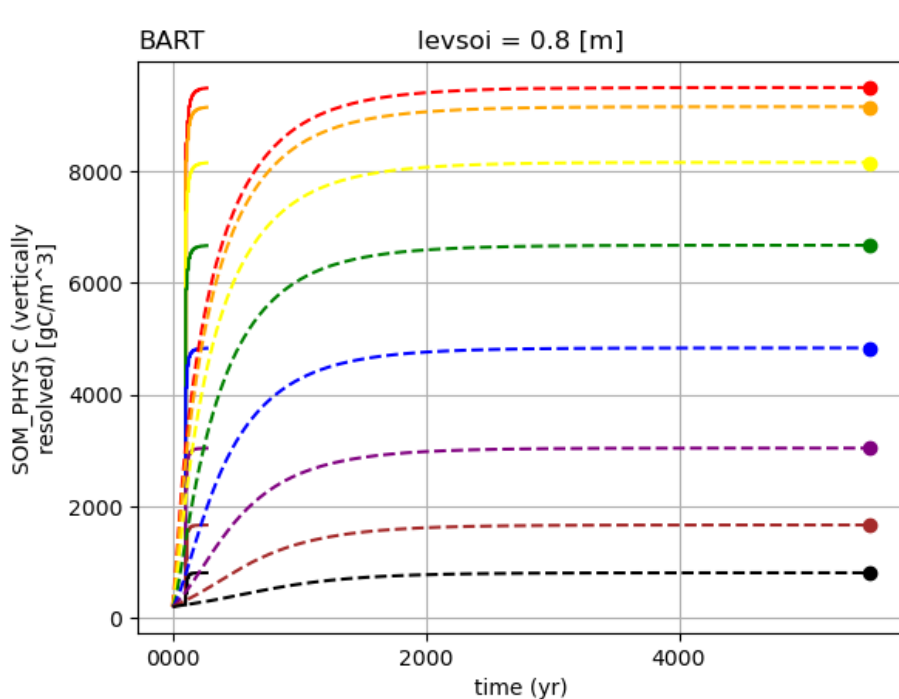
M. Hartman

S. Levis



Images: NEON

Initialization: the challenge of Spin-up

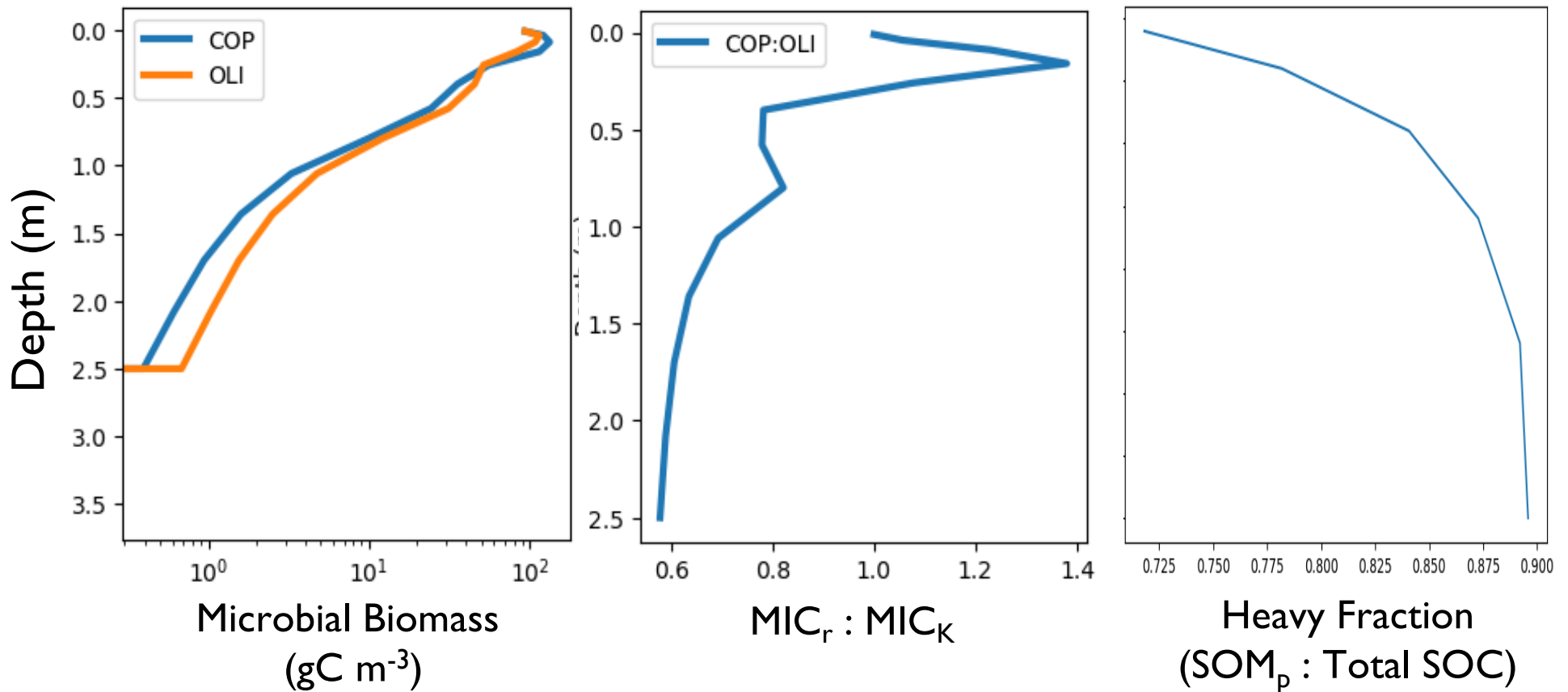


Inference: Interesting emergent properties

- Vertical resolution
- Turnover time



Inference: Changes w/ depth



Inference: Microbes & Turnover time

