Terrific Theory Group – G16 Report-Back

CENTRAL QUESTION: What are the drivers and dominant scales of variability in planktonic communities?

- **Projects 1-3: Stability-Composition** (C. Carey, E. Gaiser, K. Muraoka)
- **Project 4: Spring Blitz** (L. Senerpont Domis, B. Ibelings)
- **Projects 5: Storm Blitz** (J. Stockwell, O. Anneville, E. Nodine)
- **Projects 5: Regional Assessment of Zooplankton** (D. Straile, S. Arnott, J. Stockwell)
- **Projects 6: C_{Max}** (B. Beisner)
- **Projects 7: Fitness Landscapes** (M. Thomas)

TTG Spring Blitz

PARTICIPANTS: O. Anneville, S. Bertilsson, J. Brentrup, J. Brookes, C. Carey, K. Chiu, J. Christensen, L. de Senerpont Domis (Lead), D. de Motta Marques, E. de Eyto, E. Gaiser, N. Gallina, S. Fey, P. Hanson, N. Hayes, A. Hetherington, L. Hislop, B. Ibelings, K. Kangro, L. Knoll, A. Laas, V. McCarthy, B. Mette, A. Mulvhill , K. Muraoka, E. Nodine, M. Perga, A. Rigosi, J. Rusak, E. Ryder, A. Santoso, G. Valerio, V. Veerkamp, C. Wickramaratne, Y. Yang

PROGRESS:

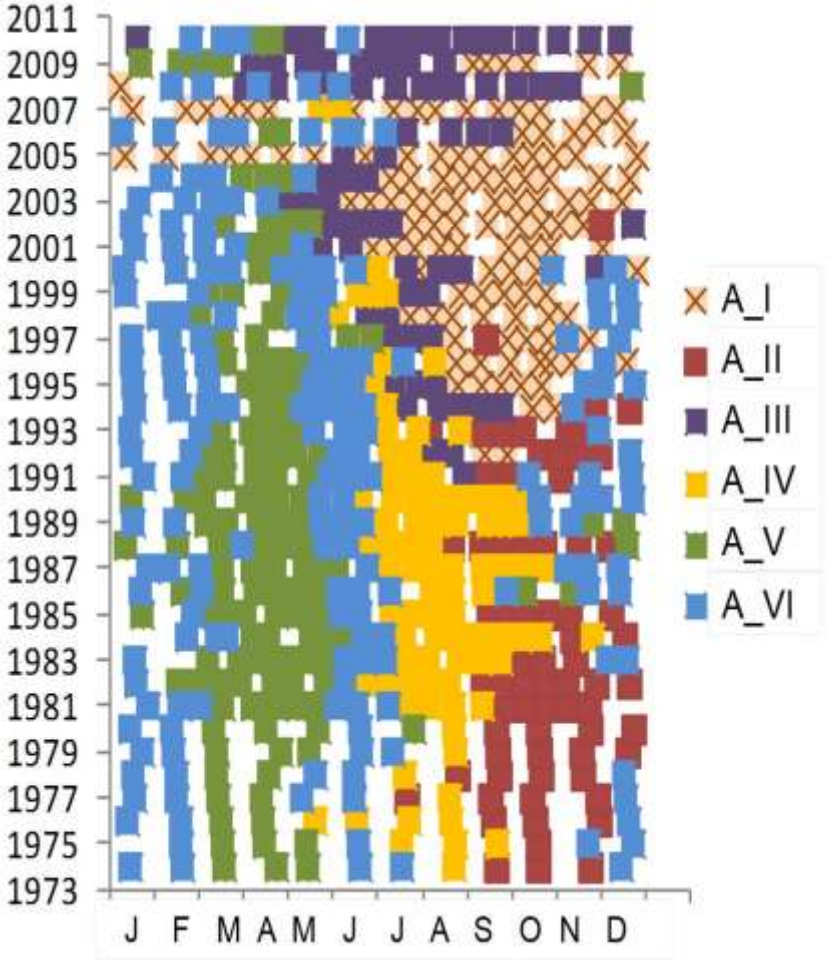
- **Discussed progress on plankton counts**
- **Filled in spreadsheet to track data**
- **Set goals and mechanisms for completing counts in 2015**
- **Many new projects may utilize these data**

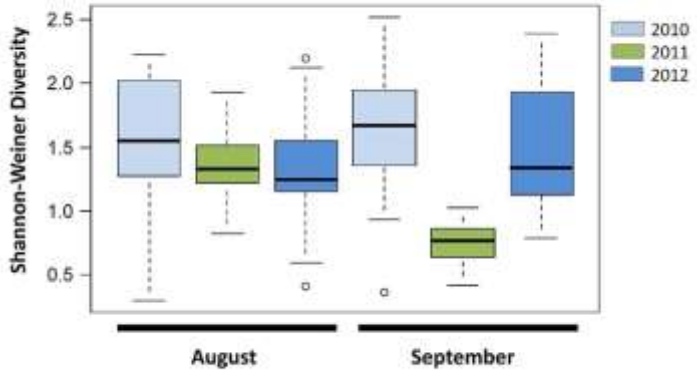
Storm Blitz

PARTICIPANTS: Bas Ibelings , Jason Stockwell , Orlane Anneville, Cayelan Carey, David Motta Marques, Isabelle Domaizon, Evelyn Gaiser, Amy Hetherington, Emily Nodine, Anna Rigosi, Jim Rusak, Sri Ojha, Lars Rudstam, Rita Adrian, Stéphan JACQUET, Tiina Noges, Don Pierson, Dietmar Straile, Guiseppe Morabito, Tamar Zohary, Nico Salmaso, Syuhei Ban, Gael Dur, Sally MacIntyre, Sami Souissi, Francois Schmitt, Patrick Venail, Chi-hao Hsieh, Marc Lajeunesse, Aleksandra Lewandowska

Storm-Blitz

- Green Status
- Post-Doc/PhD student actively working on project
- Full proposal due in December for GEISHA Project (data analysis)
- 19 Lakes – **looking for more lakes** (min. two samples/ month and min. 5 years)
- Phytoplankton composition, thermal profiles, and meteorological data

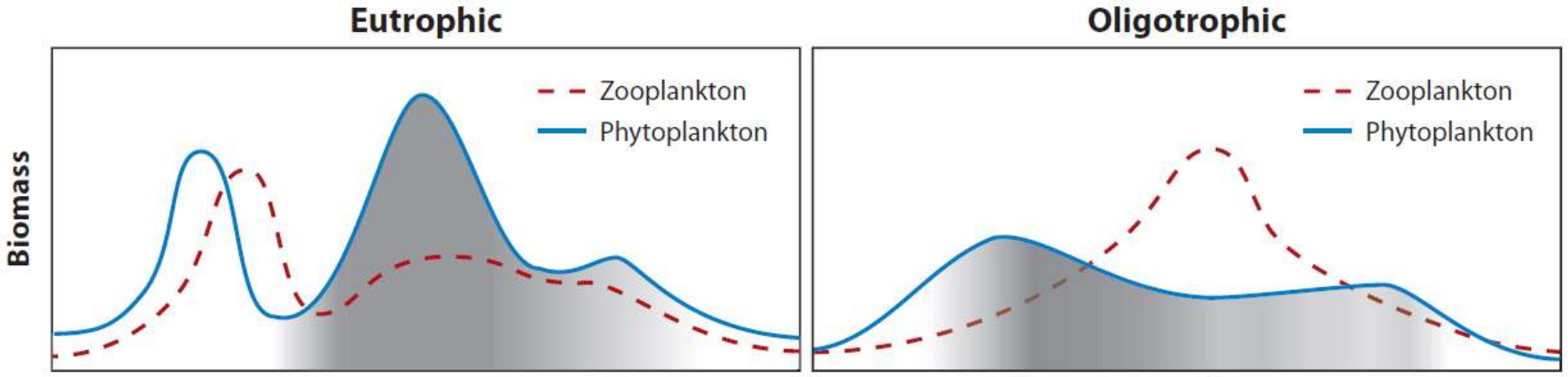


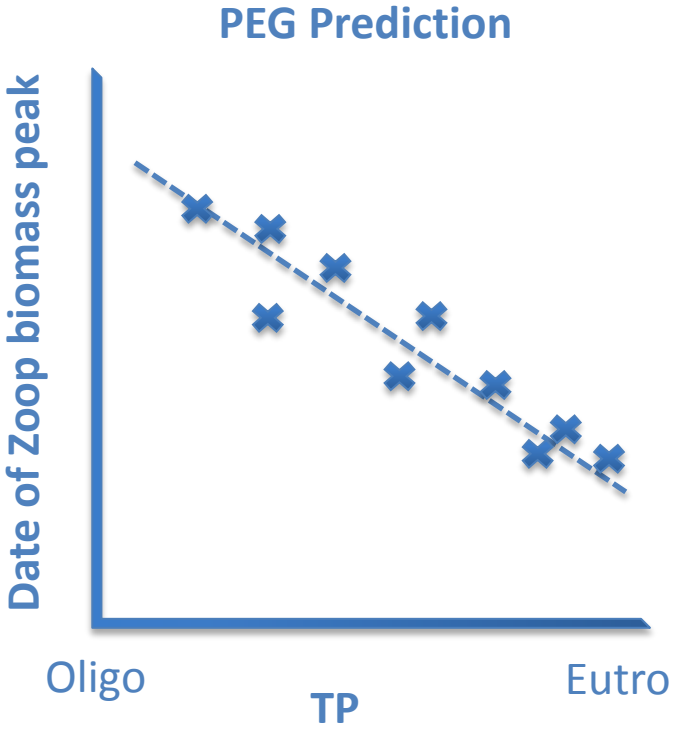


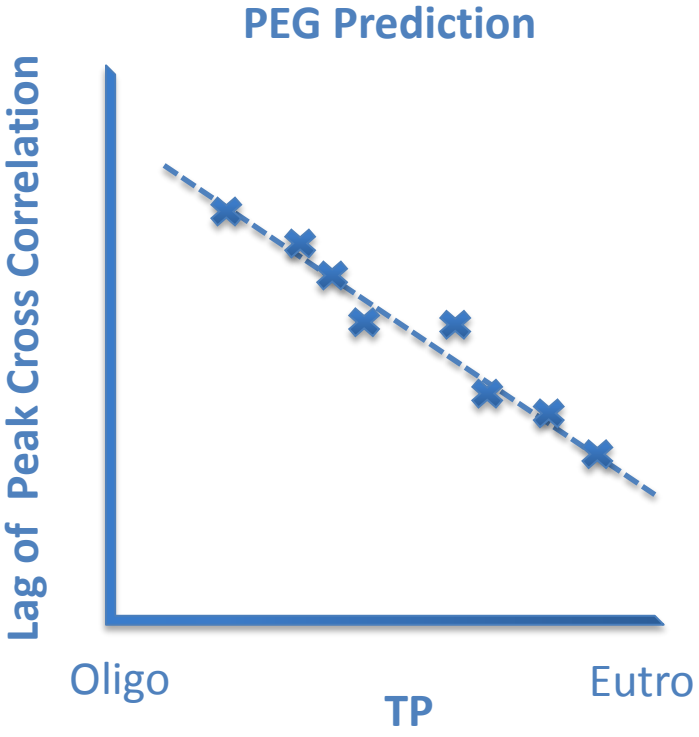
Regional Assessment of Zooplankton

PARTICIPANTS: S. Arnott, E. de Eyto, L. de Senerpont Domis, J. Doubek, S. Fontana, M. Lavender, J. Stockwell, D. Straile (Lead), A. Winegardner, O Anneville

Z-PEG: Empirical support for the Plankton Ecology Group (PEG) Model?







RAZ: Regional Assessment of Zooplankton

- What are important drivers of zooplankton across >1000 lakes in the U.S. from the EPA National Lakes Assessment (NLA)?

- Potential drivers:
  - Temperature
  - Nutrients
  - Phytoplankton
  - Land use
  - Many more…

- Are drivers different in natural lakes vs. reservoirs?
- Copepod/Cladoceran size and dominance relationships across temperature and nutrient gradients?
- Do relative important drivers differ across different regions of the U.S.?

C$_{MAX}$

Questions

- Is the subsurface CM associated with thermocline depth or light?
- Is subsurface CM frequency effected by:
  - Trophic state
  - Transparency
  - Size
  - Depth

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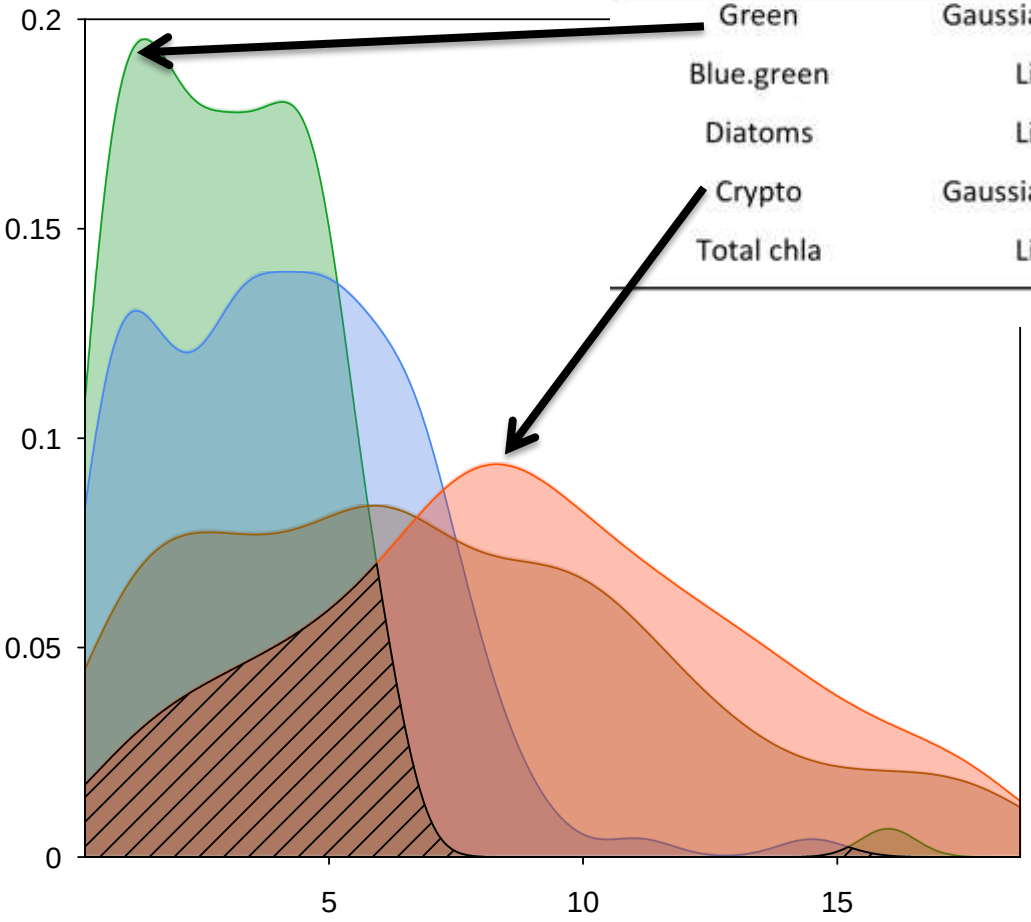
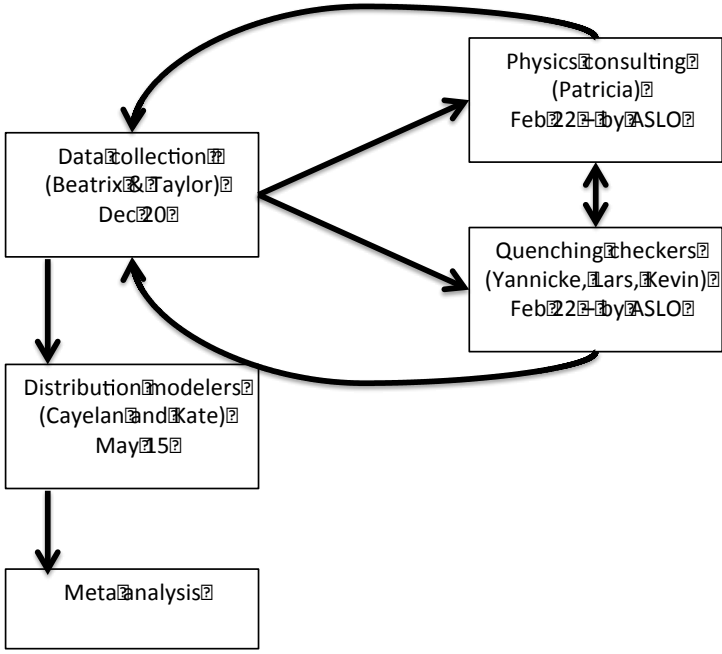
Phytoplankton Group	Best fitting model	R^2	Depth of modeled chl *a* maximum if Gaussian/Normal
Green	Gaussian/Normal	0.81	2.46 m
Blue.green	Linear	0.66	.
Diatoms	Linear	0.48	.
Crypto	Gaussian/Normal	0.56	8.41 m
Total chla	Linear	0.46	.



Workflow



Chl fluorescence, temperature and light (profiles or secchi)

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Fitness Landscapes

PARTICIPANTS: M. Beaulieu, C. Carey, M. Fradette, M. Kadiri, K. Kangas, M. Kehoe, E. Nodine, F. Pomati, T. Tapics, M. Thomas (Lead)

Fitness landscapes across multiple dimensions of environmental variation

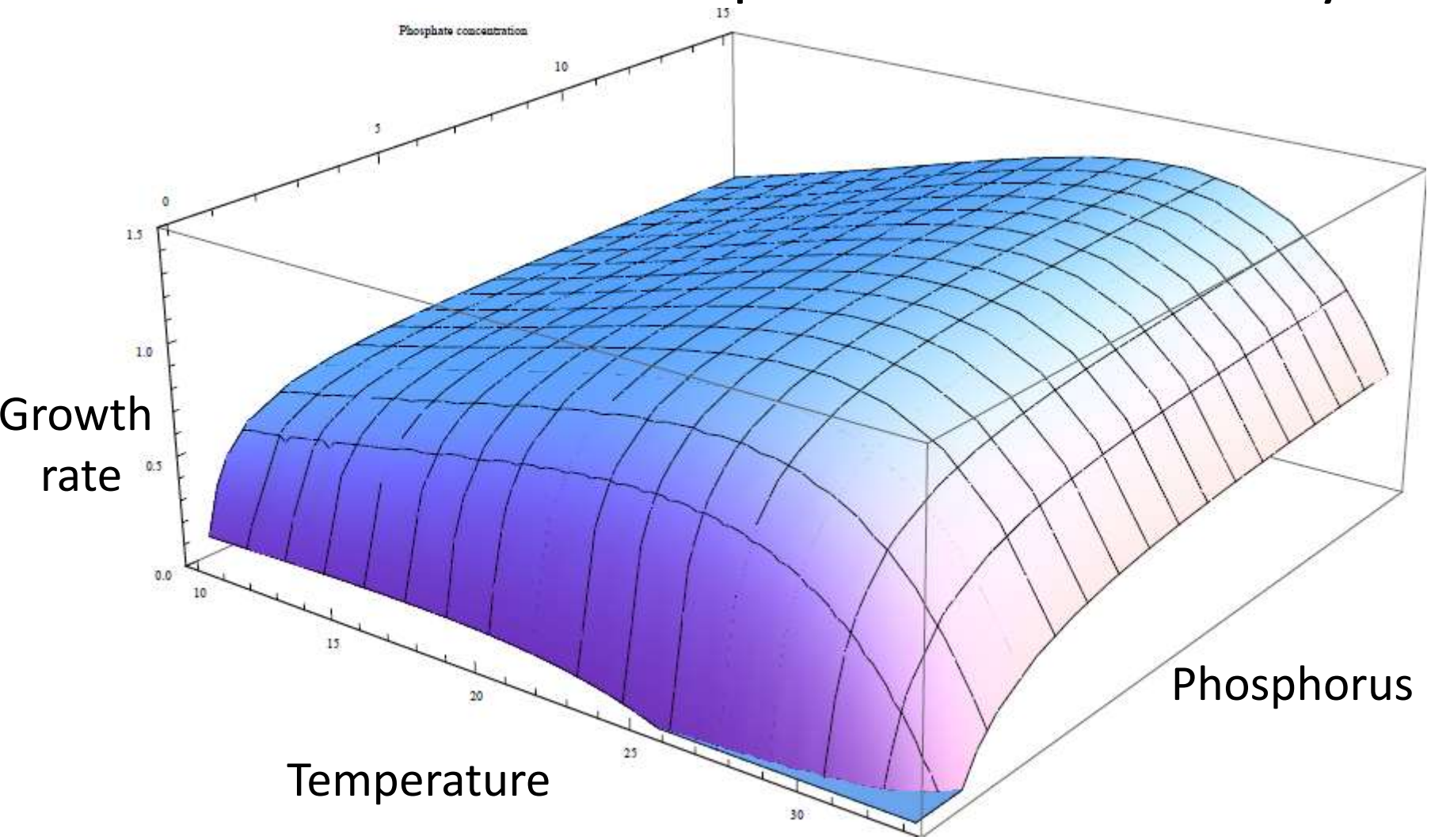
- Ecological theory developed around fitness, but community studies focus on abundance
- Lab data constrains relationships between fitness and environment
- Goal: test ecological theory and improve prediction of community dynamics using growth rates estimated from time series data

Today's population is yesterday's population multiplied by some function of the environment

$$x_t = x_{t-1} \cdot \mu(I, T, N, P, Z)$$

The nature of that function is a hypothesis that can be tested

Extract response to multiple environmental dimensions in all species in a community



Data we are looking for:

1) Phytoplankton species counts
   - at least once per 2 weeks
   - surface /specific depths / mixed layer
2) Temperature
3) Light
   - I_z / I_o / k_d / Secchi depth
4) PO_4
5) NO_3
6) Zooplankton counts
   - Bulk / taxon specific
7) Si
8) NH_4