

CARBON

MODELING

22 MAY 2019, LA JOLLA

SCALING

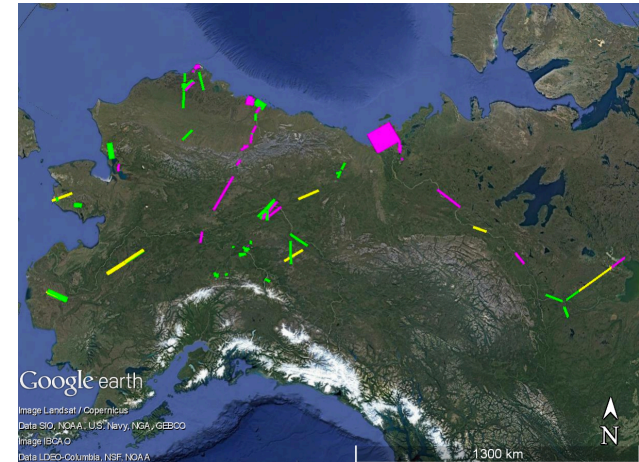


1. Josh Fisher (chair): data-model-improvements
2. Ralph Keeling: atmospheric measurements for constraint
3. Phil Townsend: foliar functional traits for models
4. Erik Larson: mechanistic relationships
5. Min Chen: data-model fusion
6. Yonghong Yi: permafrost, scaling for resolution
7. Lei Hu: atmospheric inverse modeling, scaling, work with ecosystem modelers
8. Nick Parazoo: model inter comparison with common data
9. Jennifer Watts: sub-grid heterogeneity impact on carbon cycle
10. Kevin Schaefer: response functions, sub-grid heterogeneity
11. Mingjie Shi: how to use powerful datasets powerfully in models
12. Haris Riris: have LiDAR and XCO₂ data—how best to serve to models
13. Kevin Dagon: SOC dataset creation, remote sensing models
14. Andy Fox: response functions, scaling, PFTs/traits
15. Bailey Morrison: spatial scaling in ecosystem models
16. Sophie Burke: align field data to models
17. Christina Herrick: CH₄ measurements link to modeled CH₄, lateral scaling, error propagation
18. Brendan Byrne: atmospheric flux inversions—compare atmospheric flux inversions to ecosystem models
19. Aram Kalhori: in situ flux measurements, long term, lateral heterogeneity, temporal scaling
20. Phil Marsh: linking data to models (hydrology, permafrost)
21. Gretchen Keppel-Aleks: model benchmarking, emergent time scales, emergent properties, tie to data
22. Shawn Serbin: data-model fusion, response functions
23. Abhishek Chatterjee: [late]
24. Colm Sweeney: [lurking]



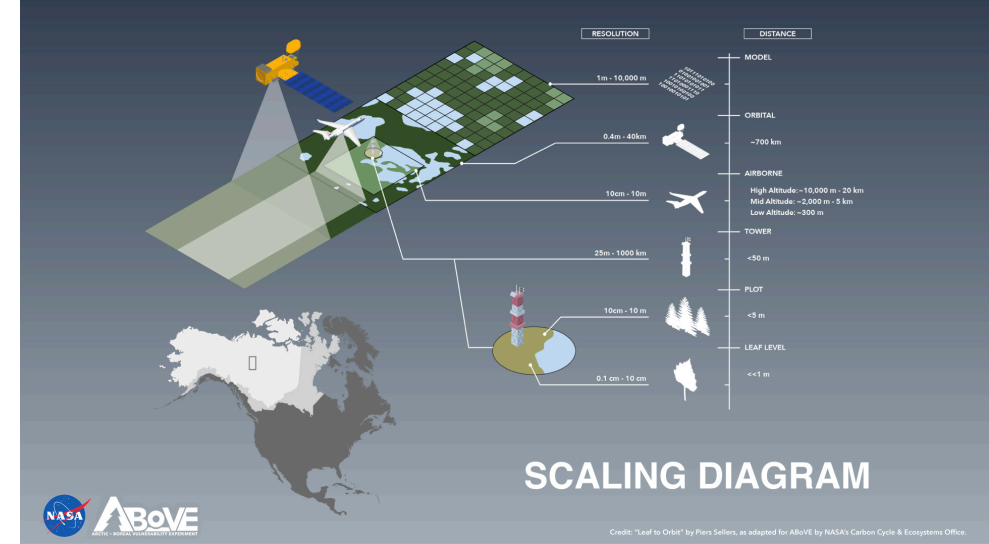
Response Functions

- How do you incorporate multi-(spatial) scale observational datasets into coarse grid models? Response functions!
- Devil in the details...
 - Multi-variate controls
 - Representativeness
 - Still scaling issues: leaf to canopy
- Models should also be confronted against phenomena in addition to benchmarks and response functions
- **SYNTHESIS**: site-level MIP (Nick Parazoo)
- **SYNTHESIS**: response functions (Josh Fisher, Kevin Schaefer, Shawn Serbin, Erik Larson, ...)



Scaling

- Multi-scale measurements
 - Analyses underway to assess error propagation
 - Shawn Serbin on albedo
 - Phil Marsh on nested towers and hydrology
- Sub-grid heterogeneity
 - Thermokarst, lakes, lateral flows, topography, veg type
- Lateral scaling
 - Within ABoVE domain
 - Beyond ABoVE domain
- **SYNTHESIS:** multi-scale assessments (Shawn Serbin, Phil Marsh)



Aligning Data with Models



- Build on Fisher Wordle to go more in depth into data requirements
- Work hand-in-hand with field teams and modelers
 - Modelers provide resource to field teams to provide modeling perspective on field campaign plans
 - Send modelers to the field! (enthusiasm)
- Data that are not directly incorporable into models?
 - E.g., traits vs. PFTs, NDVI vs. LAI, SIF vs. GPP
 - Use expansive datasets to explain model performance/behavior against benchmarks → helps to identify what may be needed in models
- **SYNTHESIS:** ABoVE met reanalysis (Jennifer Watts, Erik Larson, Kevin Schaefer, Shawn Serbin, Abhishek Chatterjee)
- **SYNTHESIS:** model improvements against data

Ecosystem Services & Carbon Modeling?

- C modelers should not attempt interfacing with stakeholders directly, but definitely should through translational groups?
- Need for economic valuation on carbon fluxes and stocks

