

Understanding phytoplankton shade adaptation to improve nutrient response models



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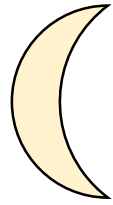
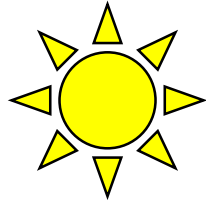
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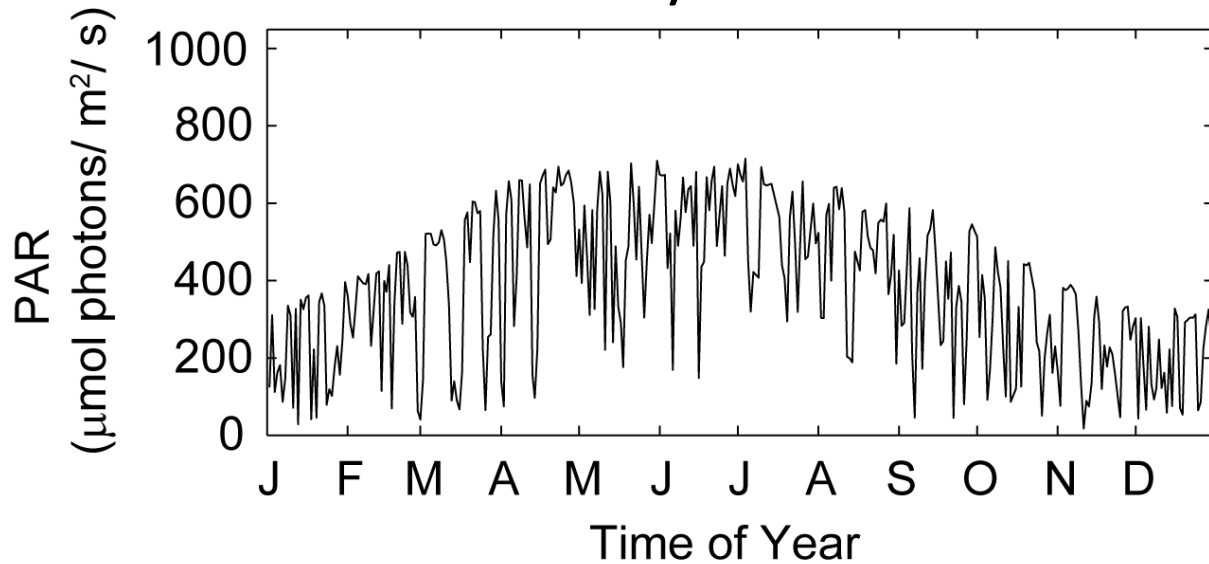
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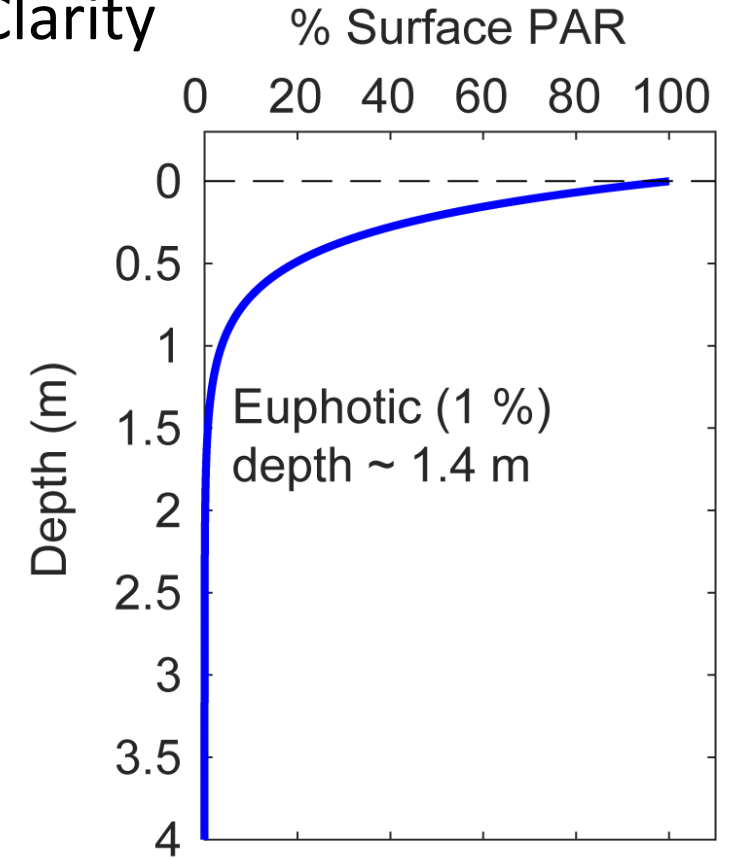
Major Determinants of Photosynthetically Active Radiation (PAR) for Phytoplankton Photosynthesis



Astronomy and Clouds



Water Clarity

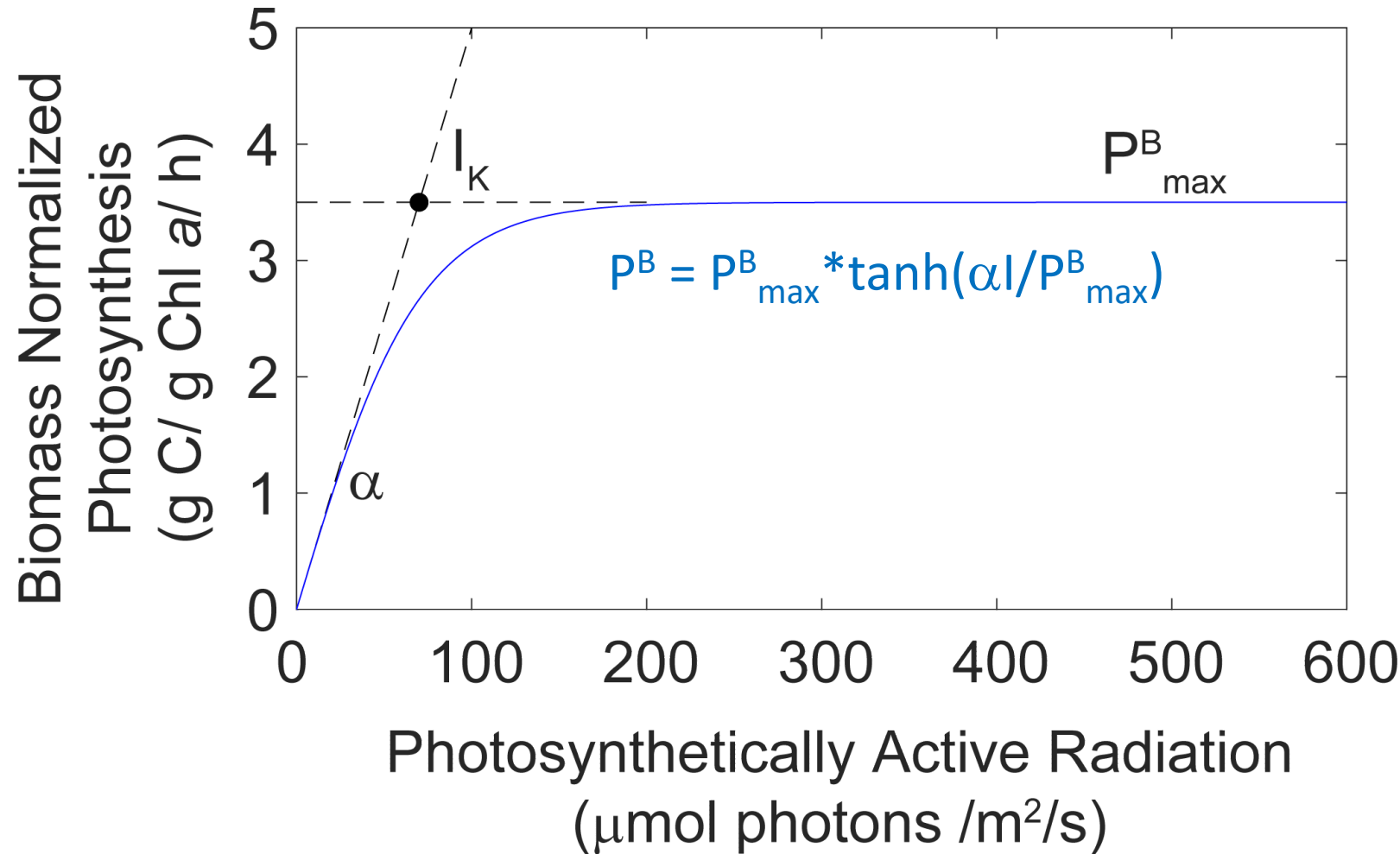


Research Objectives

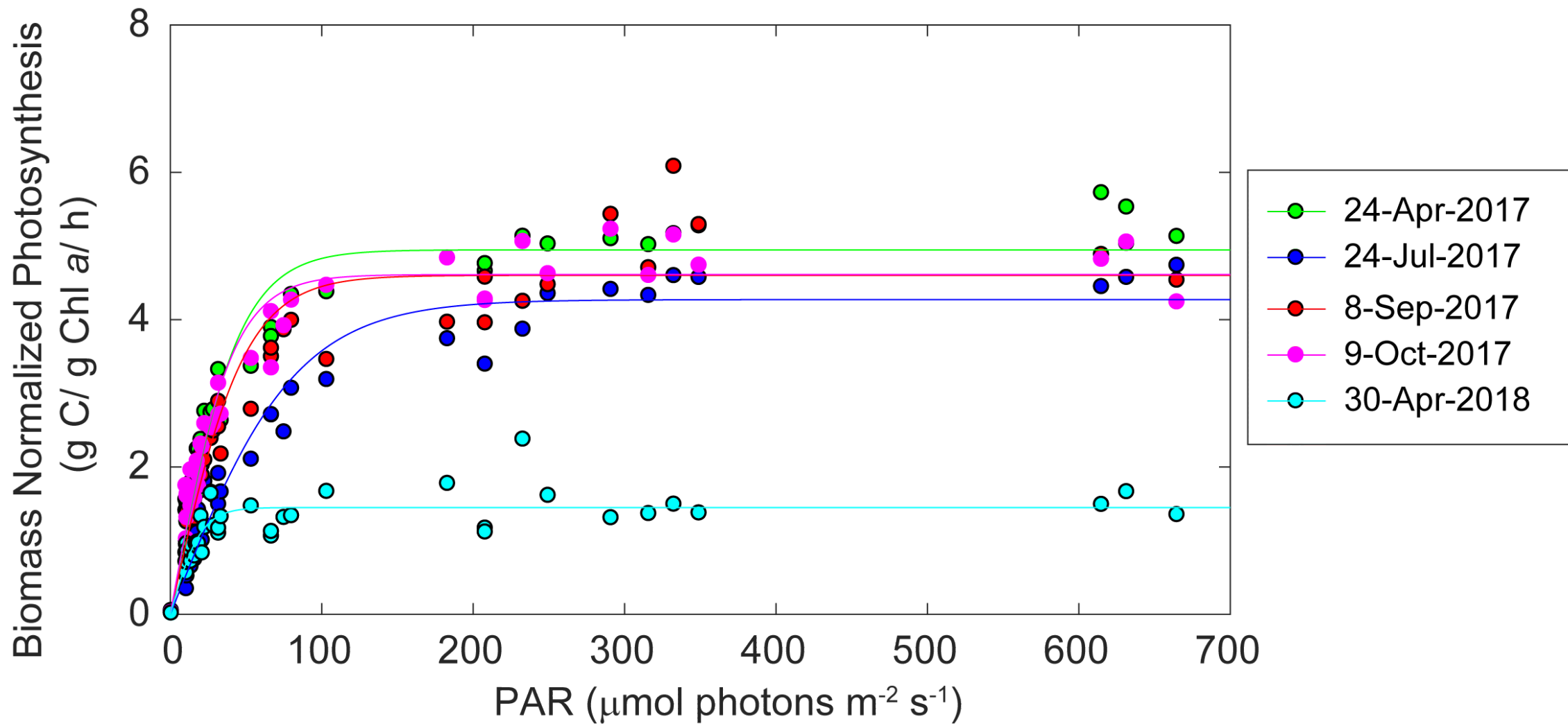
- **Measure the light/ shade adaptation of Jordan Lake phytoplankton to understand production and growth under varying light conditions**
- **Use results to assess and improve parameterization of phytoplankton light adaptation in nutrient response models for Jordan Lake**



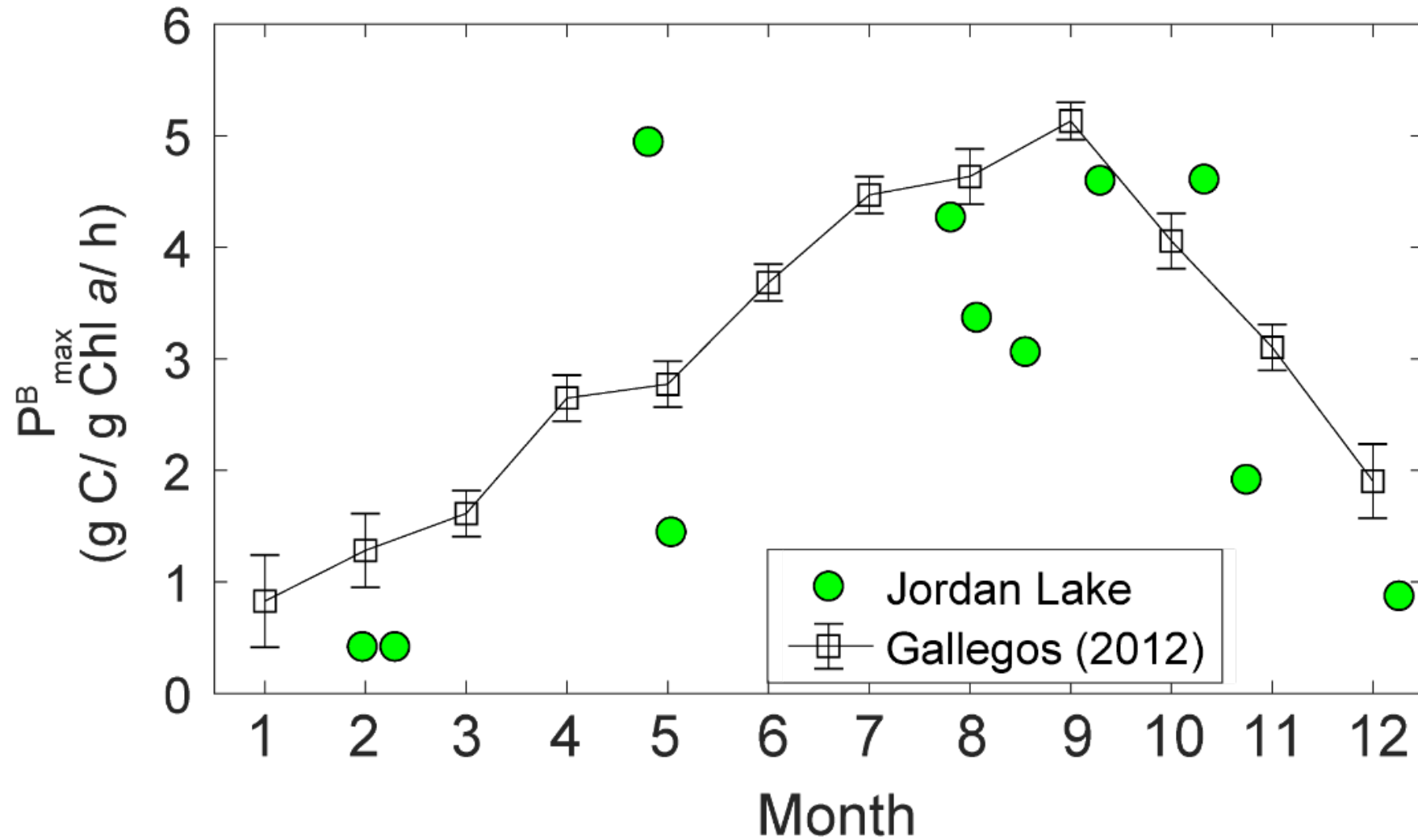
Measuring and Empirically Modeling Photosynthesis vs. Irradiance



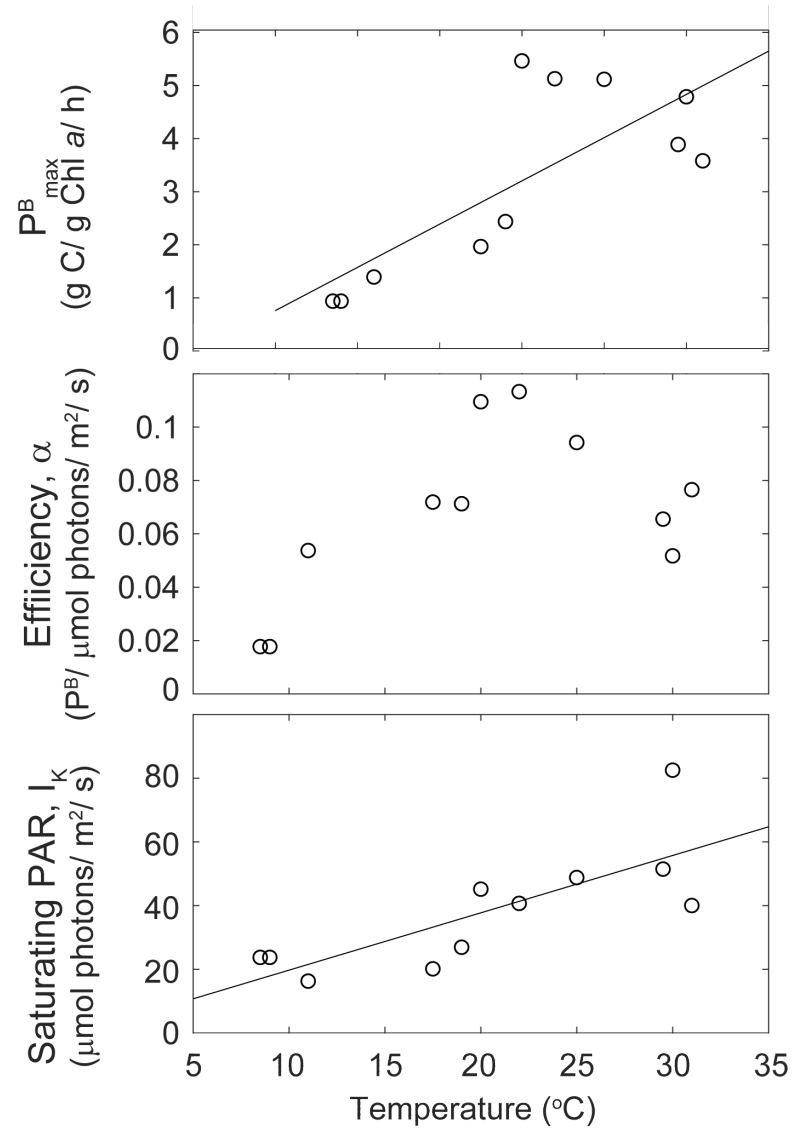
Measured Photosynthesis vs. Irradiance



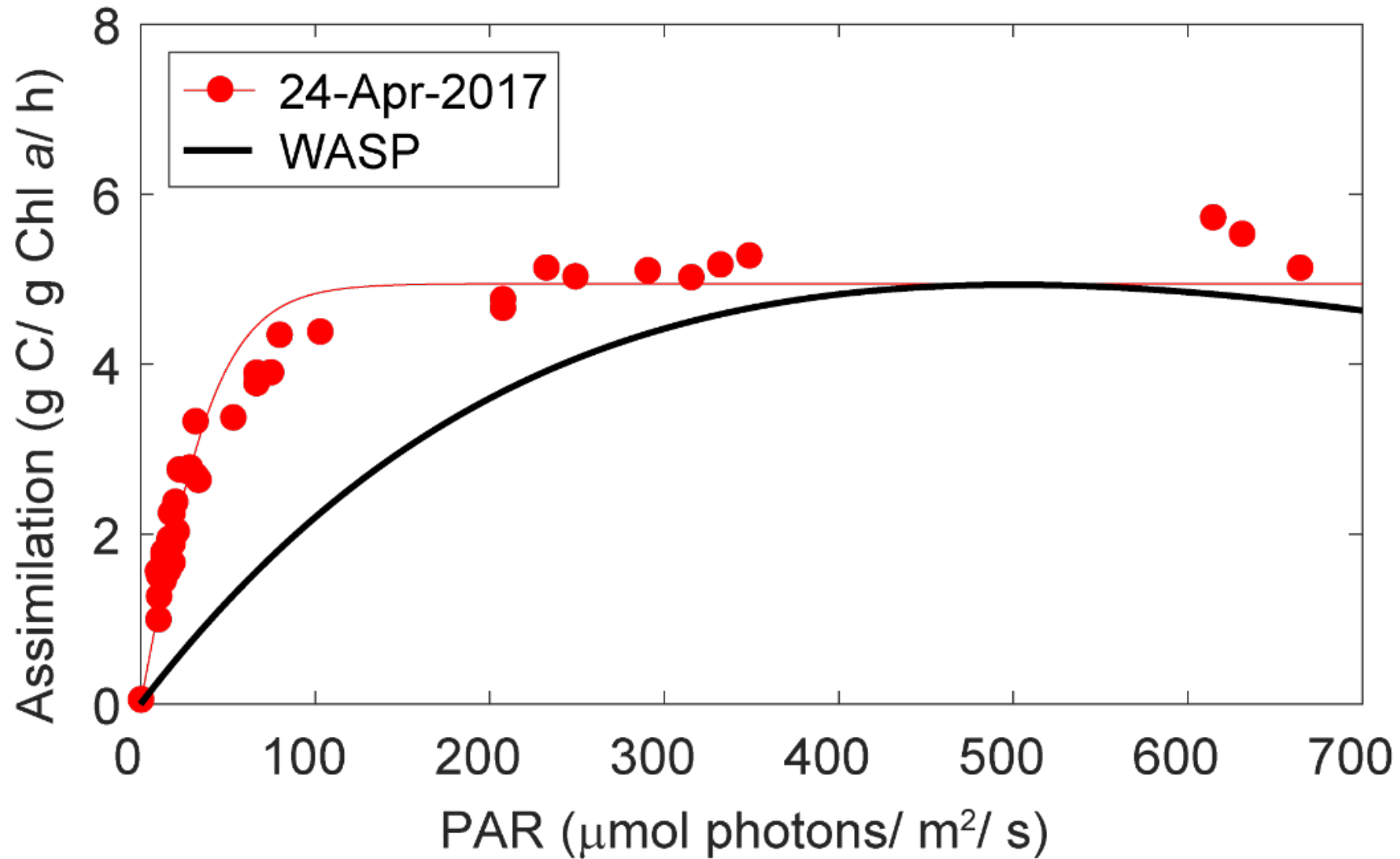
Annual cycle of maximum photosynthetic rate



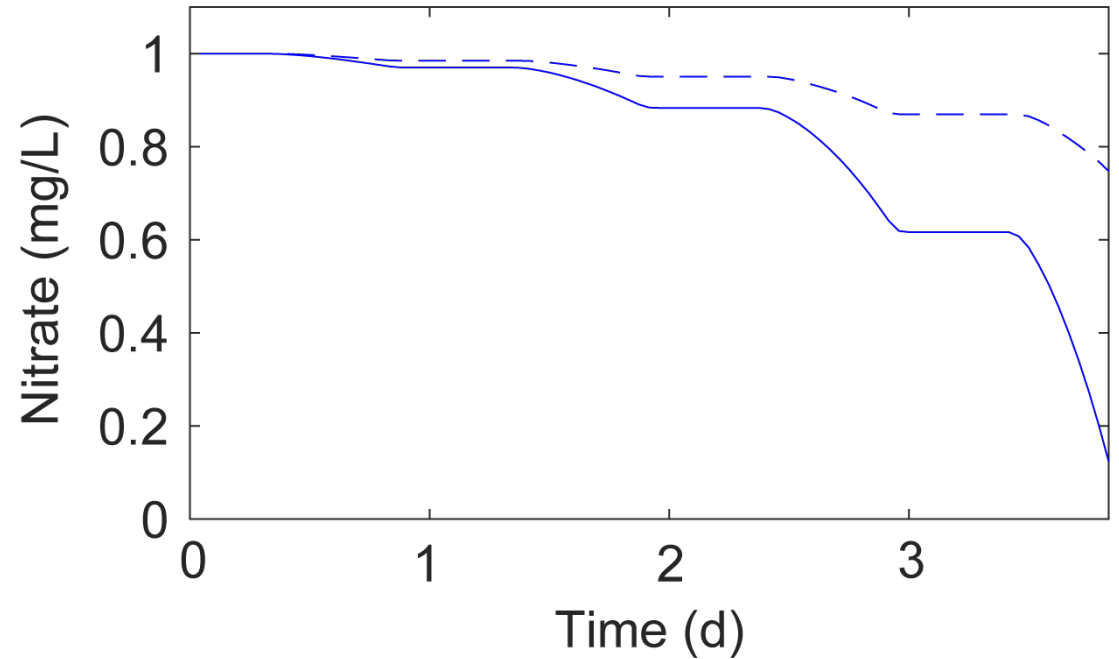
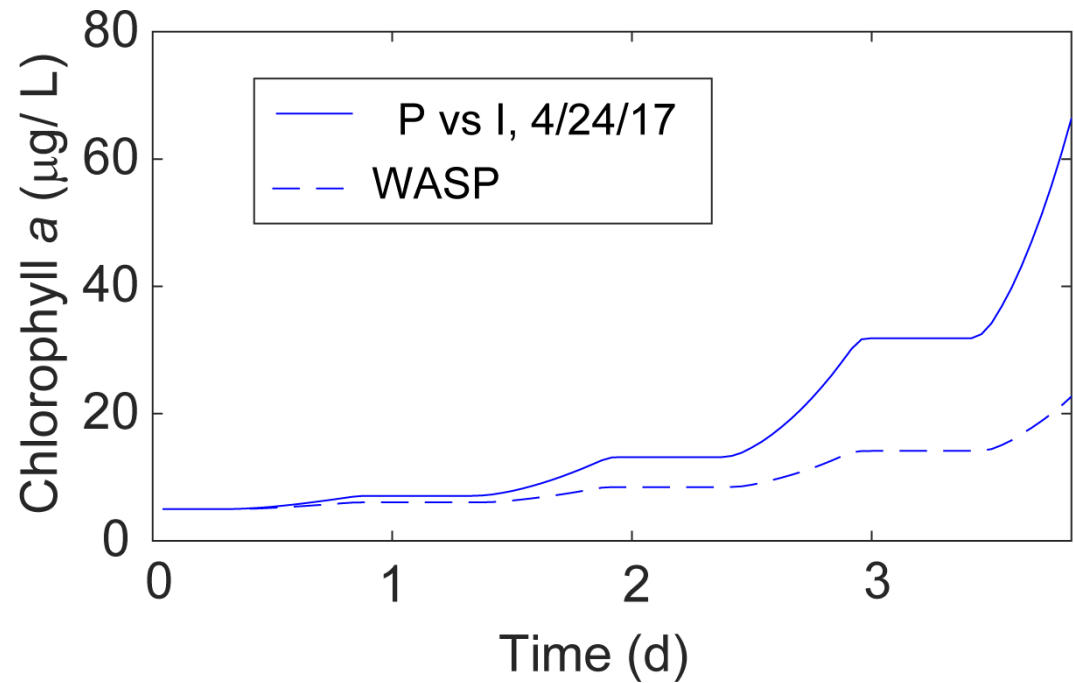
Temperature dependency of photosynthetic parameters will help generalize results for application to nutrient response models



Comparison of Measured Photosynthesis vs Irradiance to Current Parameterization in WASP-EUTRO Nutrient Response Model



Ability to predict bloom dynamics is greatly affected by photosynthesis vs irradiance parameterization



Conclusions

- Phytoplankton are less light limited/ more nutrient sensitive than previously thought
- Current water quality model parameterization overestimates saturating light intensity
- Maximum assimilation photosynthetic rate and saturating light intensity correlated with temperature



Significance

- Will help parameterize more accurate models