

Report on the Individual Post-doctoral LTER Cross-site Project Proposal:

"Climate effects on ANPP of saltmarshes of the North American Atlantic coast – a hierarchical model approach"

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We proposed to synthesize data on saltmarsh production from 3 LTER sites and 4 additional sites to generate a comprehensive understanding of the factors driving variation in salt marsh primary production, and how these factors vary geographically. We previously conducted a similar analysis contrasting nine sites within the GCE domain; this allowed us to refine our analytical approach in preparation for the cross-site analysis.

What has been done so far:

1. Data. Most of our colleagues responded positively to our request to share their data for the purpose of the synthesis. We have created a dataset of end of the year *Spartina* biomass from five sites: four from the Atlantic Coast (PIE, VCR, North Inlet, GCE), spanning over 12 degrees of latitude, and one from the Gulf Coast (Barataria Bay, Louisiana). We are still hoping to receive another dataset (Teal and Howes, MA)—Howes agreed to send it but has not done so to date. If we don't receive data from him, we can recreate a partial dataset from a publication. A final site proved unsuitable for further analysis.

We have created a matching dataset of observed daily values of abiotic drivers relevant to each site, drawing from publicly available climate data (USGS, NCDC, GCE LTER data portal). In addition we obtained model-generated precipitation and temperature data for each climate station (Daymet model, <http://daymet.org/>). Daymet data were used to fill in the gaps in the instrument climate dataset.

2. Advisors. We have discussed the methods being used in the analysis with both our advisors (Matt Kirwan and Jim Morris).

3. Analyses. We have conducted a preliminary analysis on the data received up-to-date. Major findings to date:

i) Climate drivers differed in levels of seasonal (within year) and annual (between years) variation along the Atlantic Coast. Sea level was the least variable driver: average within-year CV ranged between 3% (PIE) and 18.6% (VCR, VA). The most variable driver was river discharge, with CV values from 57% (North Inlet, SC) to 86% (GCE, GA).

ii) Climate drivers were mostly uncorrelated with each other, and were mostly uncorrelated across sites.

iii) Higher latitude sites experienced more seasonal and annual variation in temperature, and less variation in precipitation.

iv) *Spartina* biomass varied considerably both spatially and temporally. In the creekbank zone, more productive sites were also more variable. The most productive but also most variable creekbank site at GCE (GA), had 4 times more biomass than the least productive and least variable site at North Inlet (SC).

4. Next steps. Upon receiving the remaining dataset (or extracting it from the manuscript) we will conduct final analyses. These will include testing for the presence of critical climate periods at each site.

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