Administrative reminders and updates

All Team PINEMAP meeting
April 17, 2015

Upcoming meetings

- April 23 10-11AM ET: executive committee meeting
- June 3-4 all day: 2015 PINEMAP annual meeting in Athens at UGA conference center
- July 9 10-11AM ET: executive committee meeting
- July 17 12-1:30 ET: next All Team PINEMAP meeting

Continuation proposal, progress reporting

- Year 5 funds are here
  - If trouble interfacing w/ UF, let Grace know
- AIM progress reports for FY 4 are due
- **Advance notice:** we will have earlier deadline for fall progress reporting to allow us to apply for NCE on 8/31

Annual meeting **logistics**

- Year 4 annual report is at designer – goal is to printer and posting on website May 11.
- BIG THANK YOU to everyone for helping put the report together!
- Register to come (30 so far) and register your poster (1 so far) – links on intranet home page
- Hotel block information on intranet home page

Annual meeting **sessions**

- Few plenary science talks
- Invited speaker
- Poster session
- Big papers planning workshop
- Outreach and Extension integration
- Visioning final year and final meeting
- Post-PINEMAP future: reflection, logistics, meta-papers, fostering future collaboration

Annual meeting **pre-work**

- Big/ integrative paper ideas
  - World café workshop session planned for annual meeting to flesh out messaging, authorship, content needs, outreach, adding value
  - Send ideas to Grace with a "responsible party" attached to each big paper idea
- Integration platform timeline updates
  - Tim and Grace will facilitate virtual meeting to do this
  - Focus on handoffs, bottlenecks, changes in direction
  - Will use session in annual meeting to integrate big paper ideas and outreach into timelines and discuss as a group

Evan Brooks, Randolph Wynne, David Arthur Sampson

Preliminary Regional 3-PG Results

Overview

- Review: Flavors
- Review: Datasets
- Site by Site
- Regionwide

Review: Flavors

Flavor	SI-FR Model	Parameter Set	3-PG Model
A	Teskey	Bryars	Bryars
B	Subedi	Bryars	Bryars
C	Subedi	Sampson	Landsberg/Sands
D	Subedi	Sampson	Bryars
E	Teskey	Subedi	Bryars

These were all the flavors that were available at the time of comparison

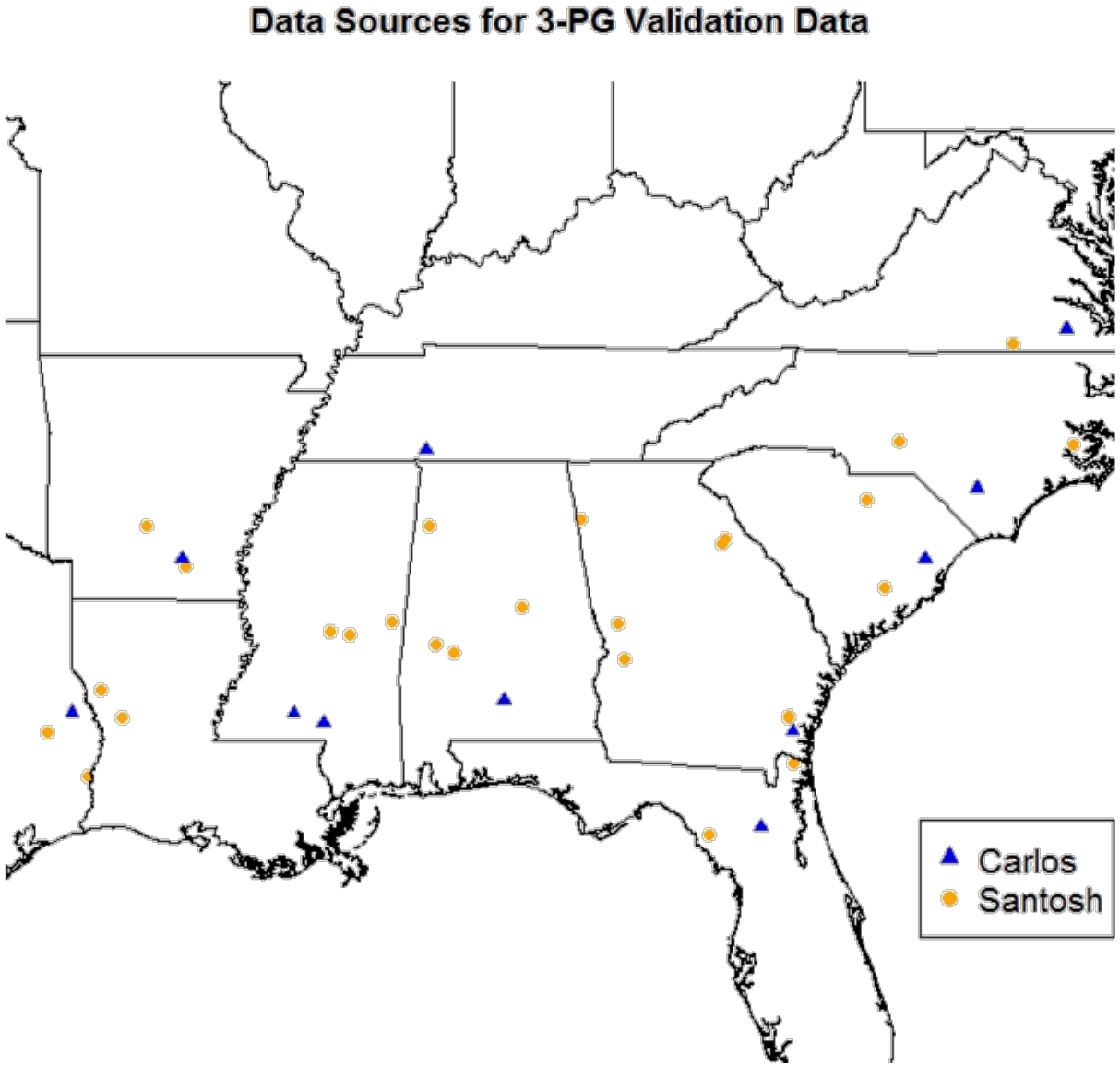
Review: Flavors

- In order to compare the different flavors, we used site/plot level validation data as well as regional data
  - Site level comparison gives the best sense of the accuracy and precision of each flavor
  - Regional comparison gives a broader sense of pattern and scale

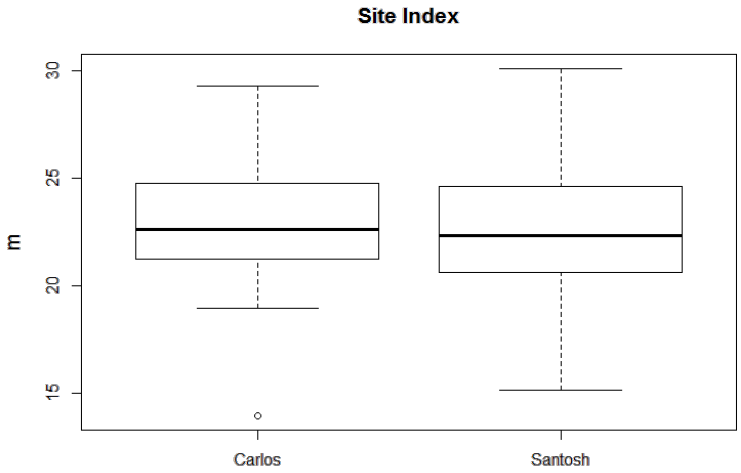
Review: Datasets

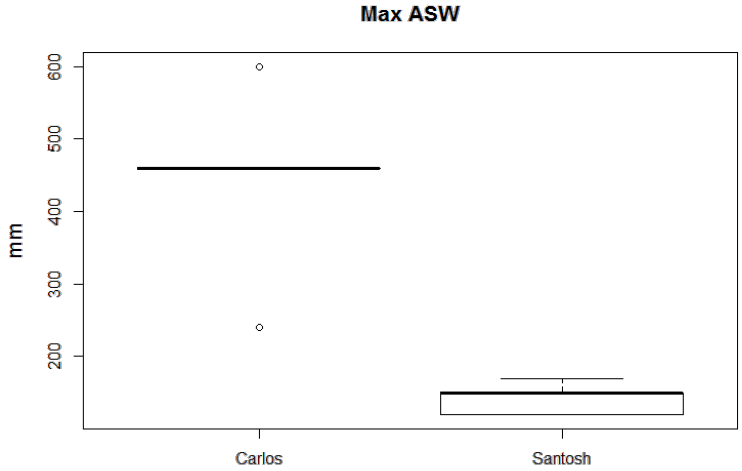
Direct Contributor	Carlos González Benecke	Santosh Subedi
Source	Tier 1 dataset	Regionwide 18 sites
Number of plots (may include multiple plots within studies)	44 (4 per state for 11 states)	47 (Varies per state)
Treatments	None	Unfertilized, but many are thinned (only the data up to thinning were used)
Weather/Climate Data	Observed on site	Observations on site, averaged to a single year and repeated
Index Variables	Year Measured Age SI	
Observed Variables	$Biomass_{FOL}$ $Biomass_{ROOT}$ $Biomass_{STEM}$ AGB BA VOB Survival QMD HT	AGB BA VOB Survival

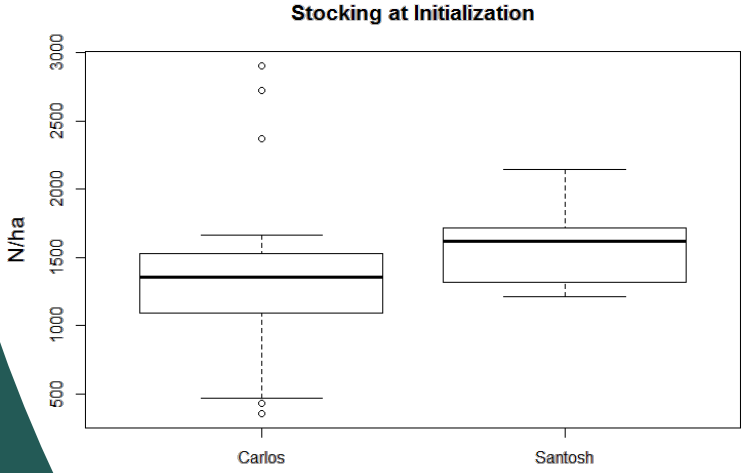
Review: Datasets

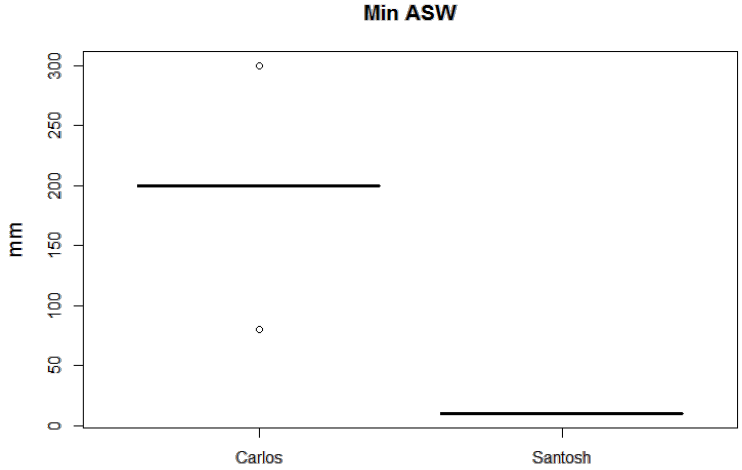


Site Level: Initialization Variables









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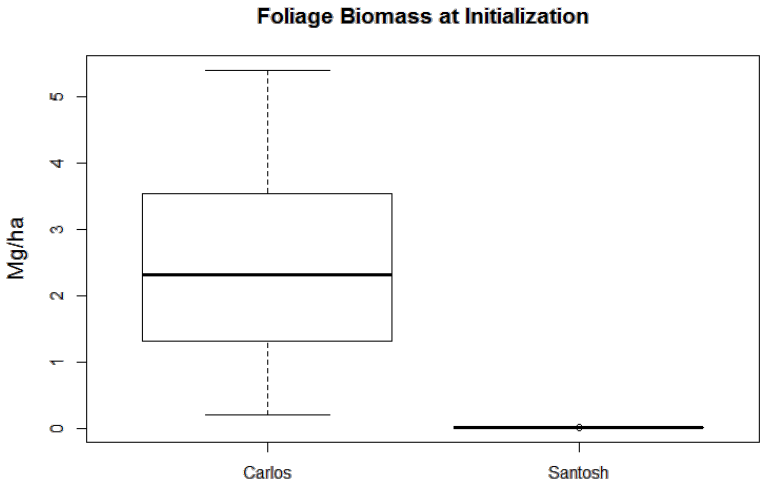
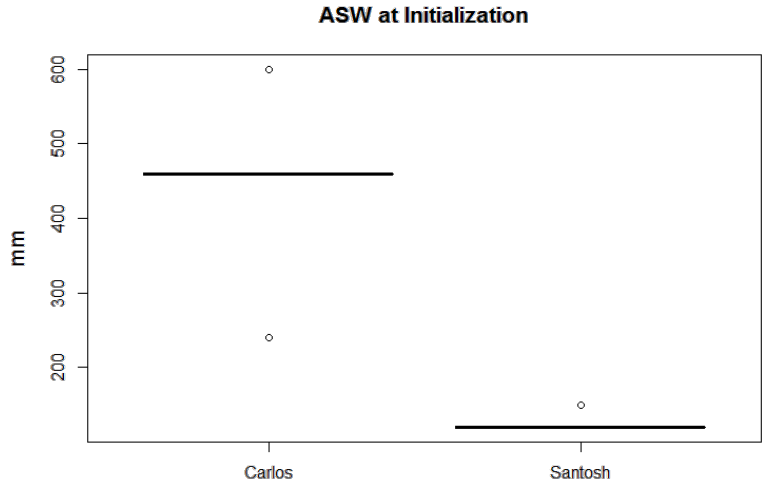
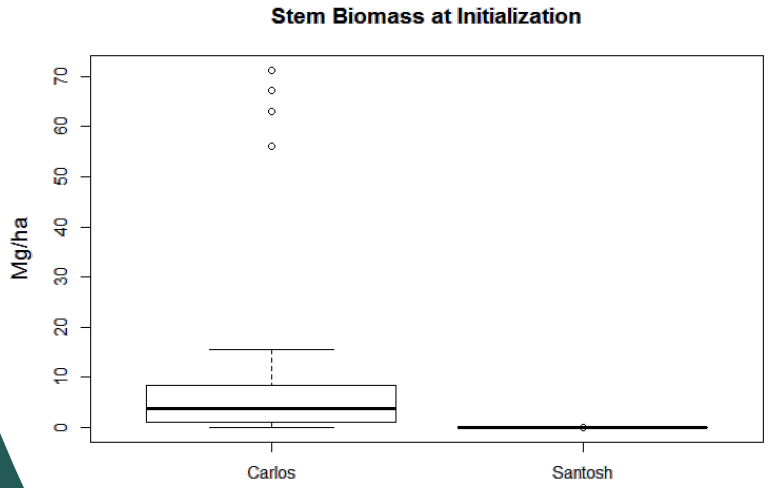
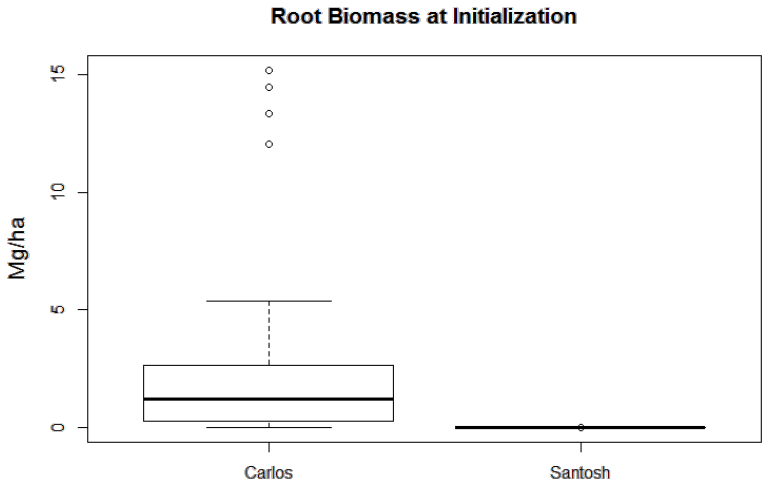








Review: Datasets

Input	Source	Variables
Soils	SSURGO	% Sand % Clay % Silt ASW
Climate	MACA	T_{max} T_{min} Rain Solar Frost Days
Fertility Rating (modeled from Site Index)	SSURGO	SI

Review: Datasets

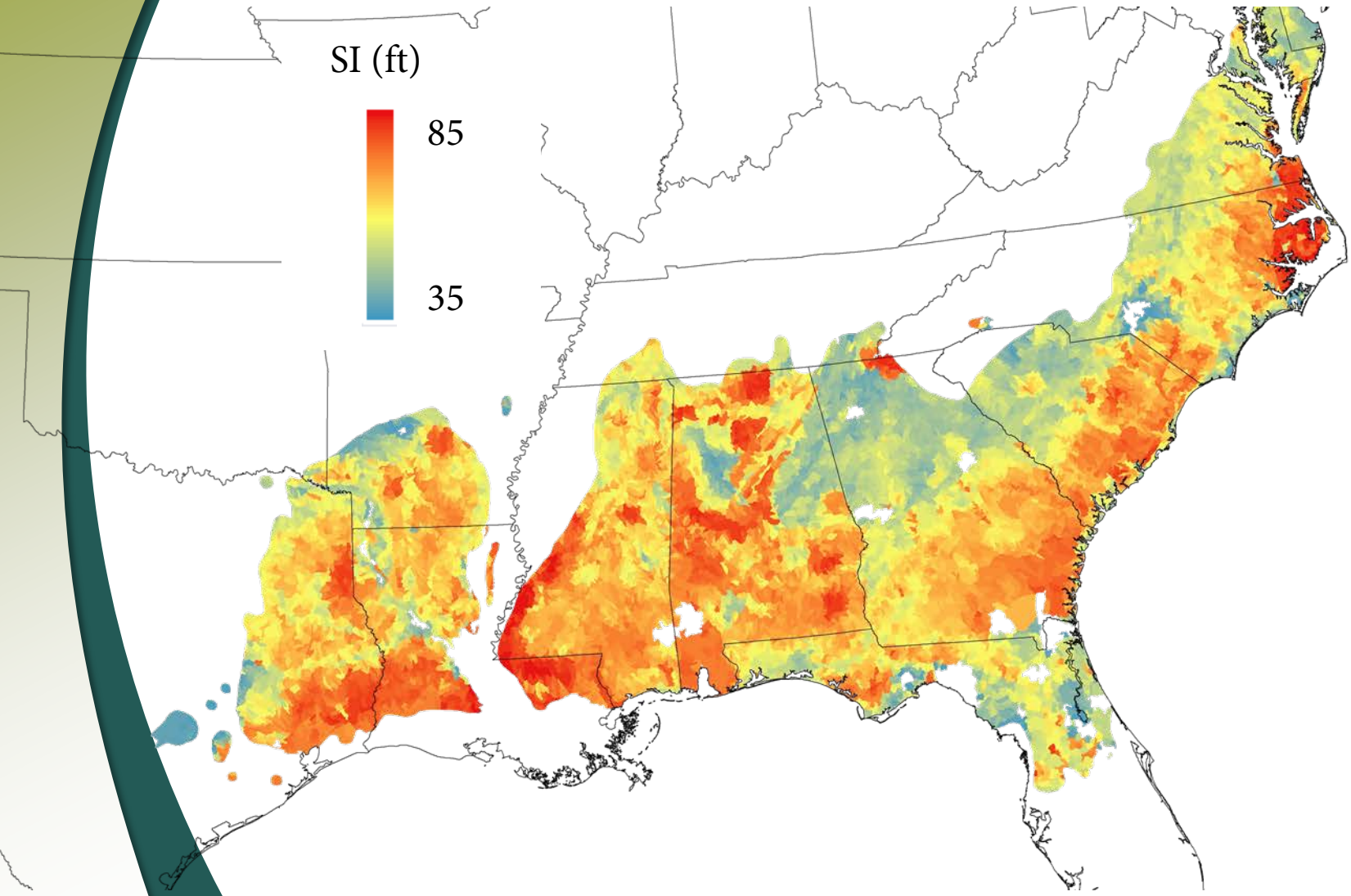
- Soils
  - SSURGO data (component and chorizon tables) aggregated to HUC-12 resolution by area-weighted averaging or summing as appropriate
    - Features with “Very Poor Drainage” were excluded as being unfeasible planting locations
      - Remaining area recorded per HUC for more accurate regional estimates
  - Soil Class input to 3-PG computed by shortest distance (in textures) to the four soil classes of Sandy, Sandy Loam, Clay Loam, and Clay

Review: Datasets

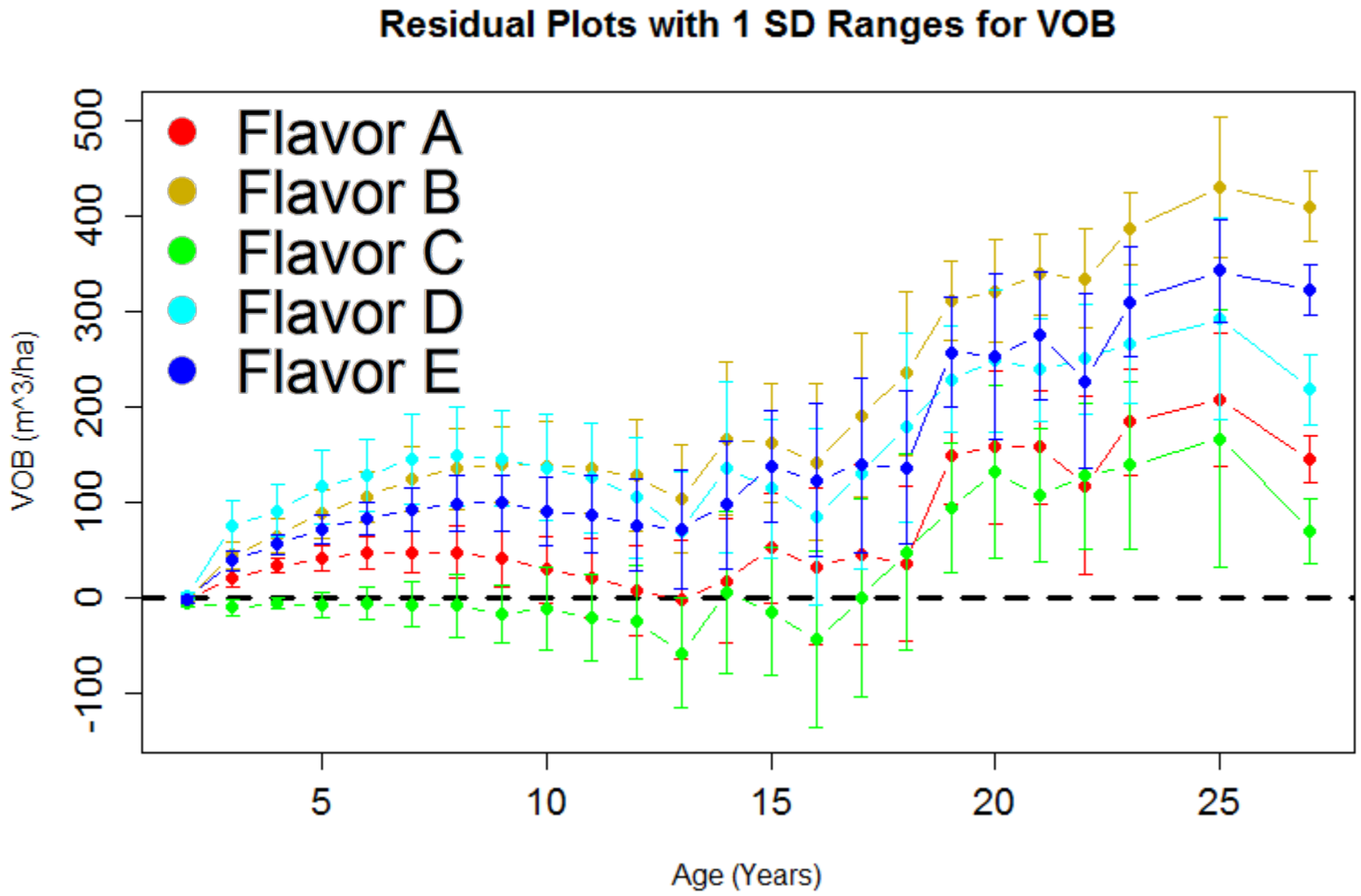
- Climate
  - MACA data aggregated to HUC-12 resolution by Heather Dinon-Aldridge, Ryan Boyles, and Corey Davis
  - Inputs computed from raw data per grid cell, then the results were aggregated via averaging/summing as appropriate
- Site Index (SI)
  - 10-meter gridded SSURGO values for representative SI specific to loblolly pine were averaged per HUC-12 unit
    - HUCs with insufficient cells to make a meaningful aggregate were excluded from the subsequent analysis
  - HUC-resolution values were then converted to base age 25 years via the protocol established for Tier 1 sites
    - These data approximate baseline SI values
      - No silviculture, fertilization, or genetic modification/selection

Diéguez-Aranda, U., H.E. Burkhart and R.L. Amateis. 2006. Dynamic site model for loblolly pine (*Pinus taeda* L.) plantations in the United States. *For. Sci.* 52:262-272.

Site Index, Base Age 25



Site by Site Comparison



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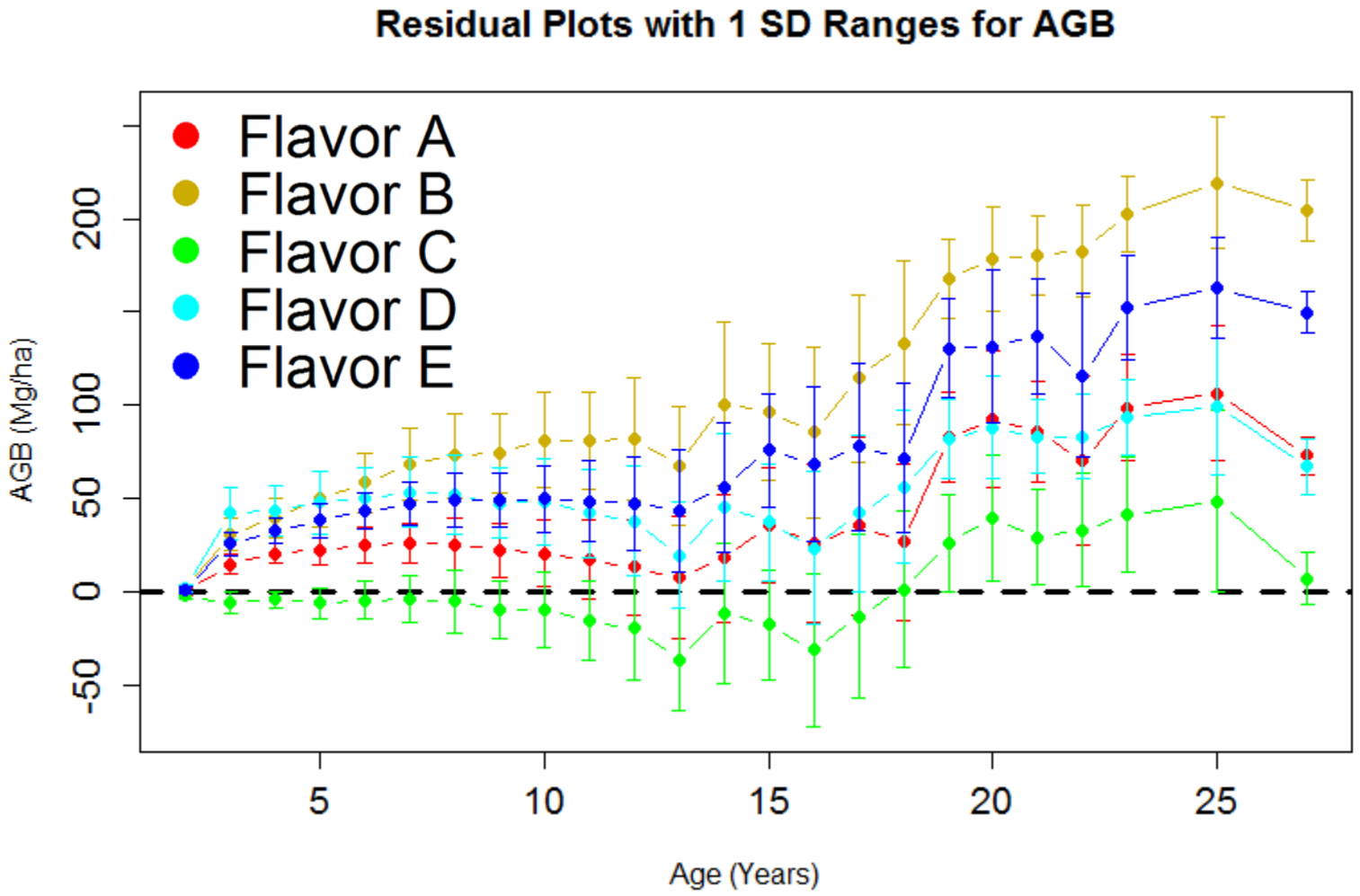

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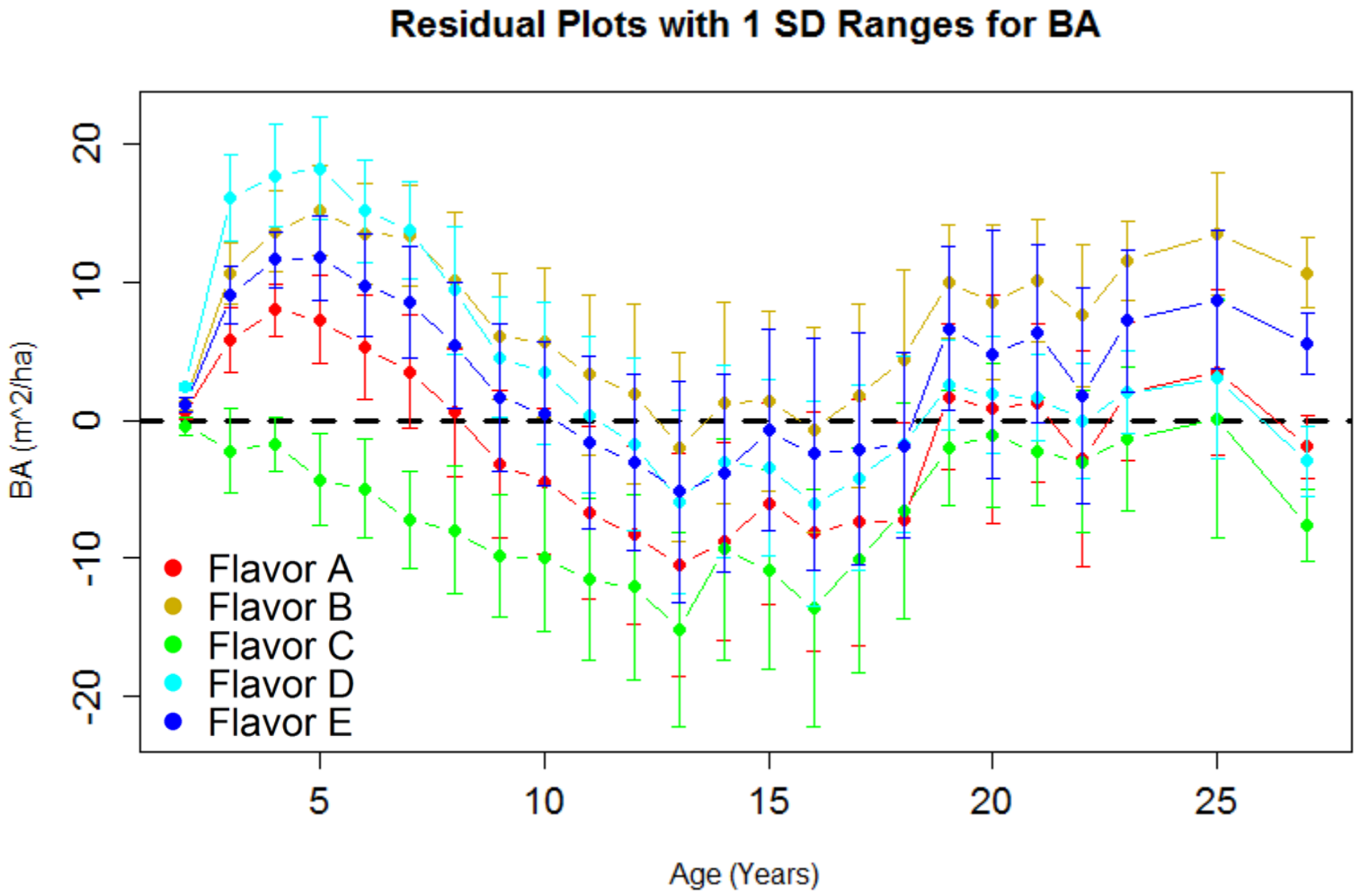


Quantitative Comparison

Symmetric Mean Absolute Percentage Error (sMAPE)

- Tends to over-penalize under-prediction

Flavor	VOB	AGB	BA	Average Across all 3
A	*18.3%*	*18.9%*	*16.2%*	**17.8%**
B	36.7%	38.3%	19.0%	31.3%
C	**16.3%**	**15.3%**	23.8%	*18.5%*
D	35.9%	28.0%	19.7%	27.9%
E	29.6%	29.5%	**15.9%**	25.0%

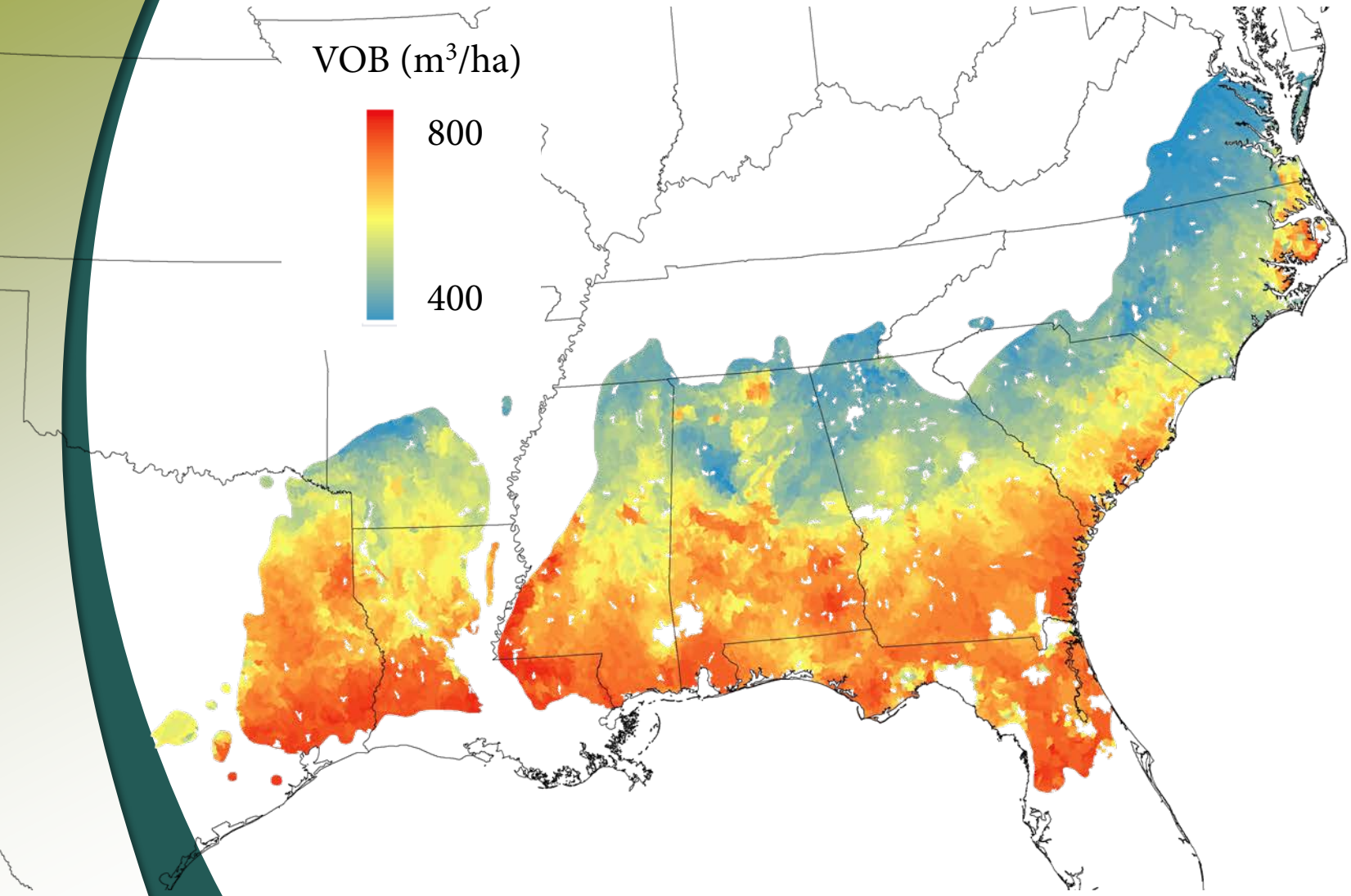
$$\frac{1}{n}\sum_{t=1}^{n}\frac{|Predicted_t - Observed_t|}{Predicted_t + Observed_t}$$

Regional Outputs

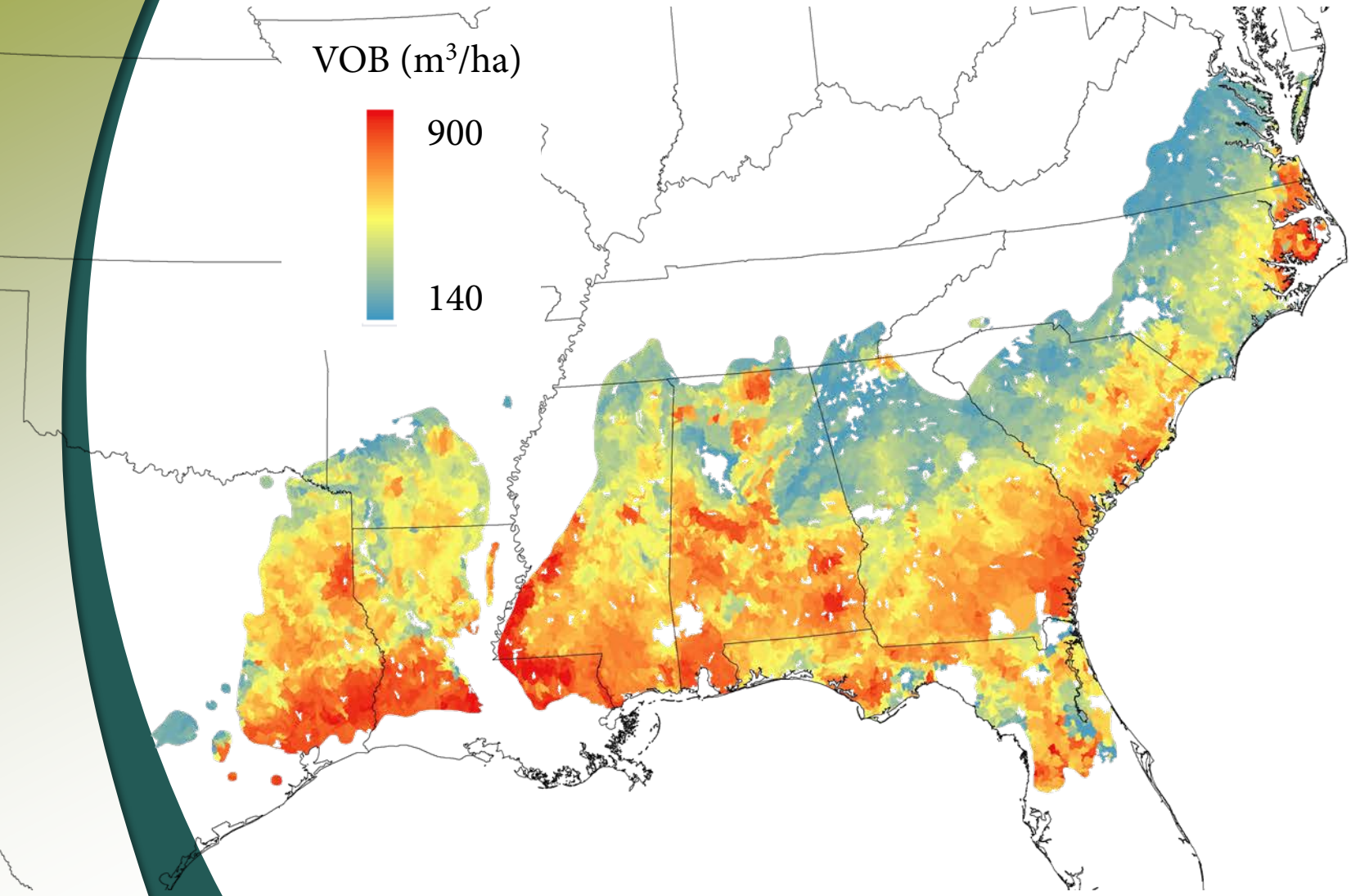
- Global Values

Parameter	Value
Timeframe	2006-2030 (25 year rotation)
Climate Model	CanESM2
Radiative Forcing Scenario	RCP 8.5
Initial Stocking	1,235 trees/ha
Initial Mass (WF_i, WR_i, WS_i)	0.01 Mg/ha each
Age at Initialization	0 (Initialize on planting)

Flavor A



Flavor C



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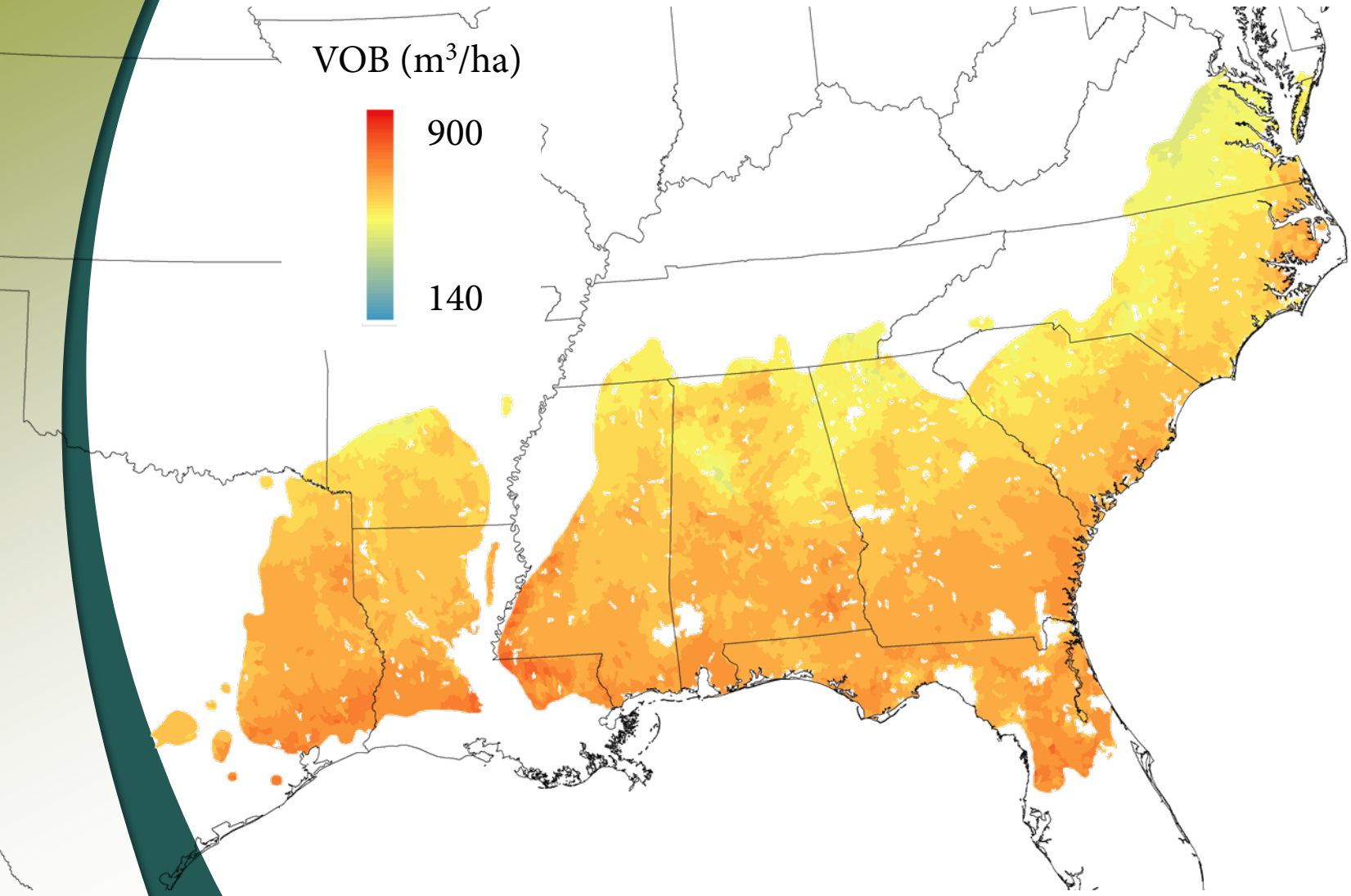

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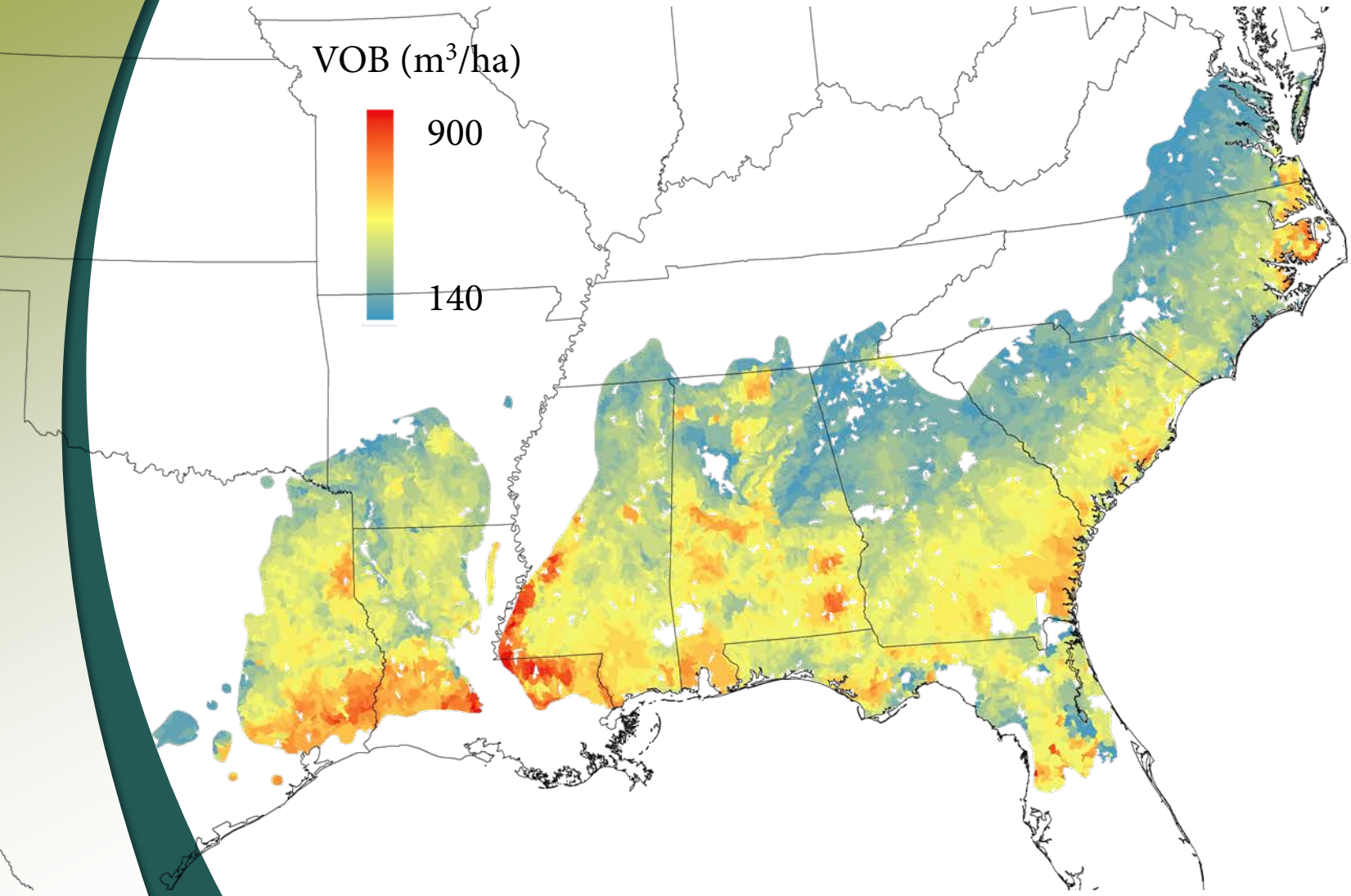

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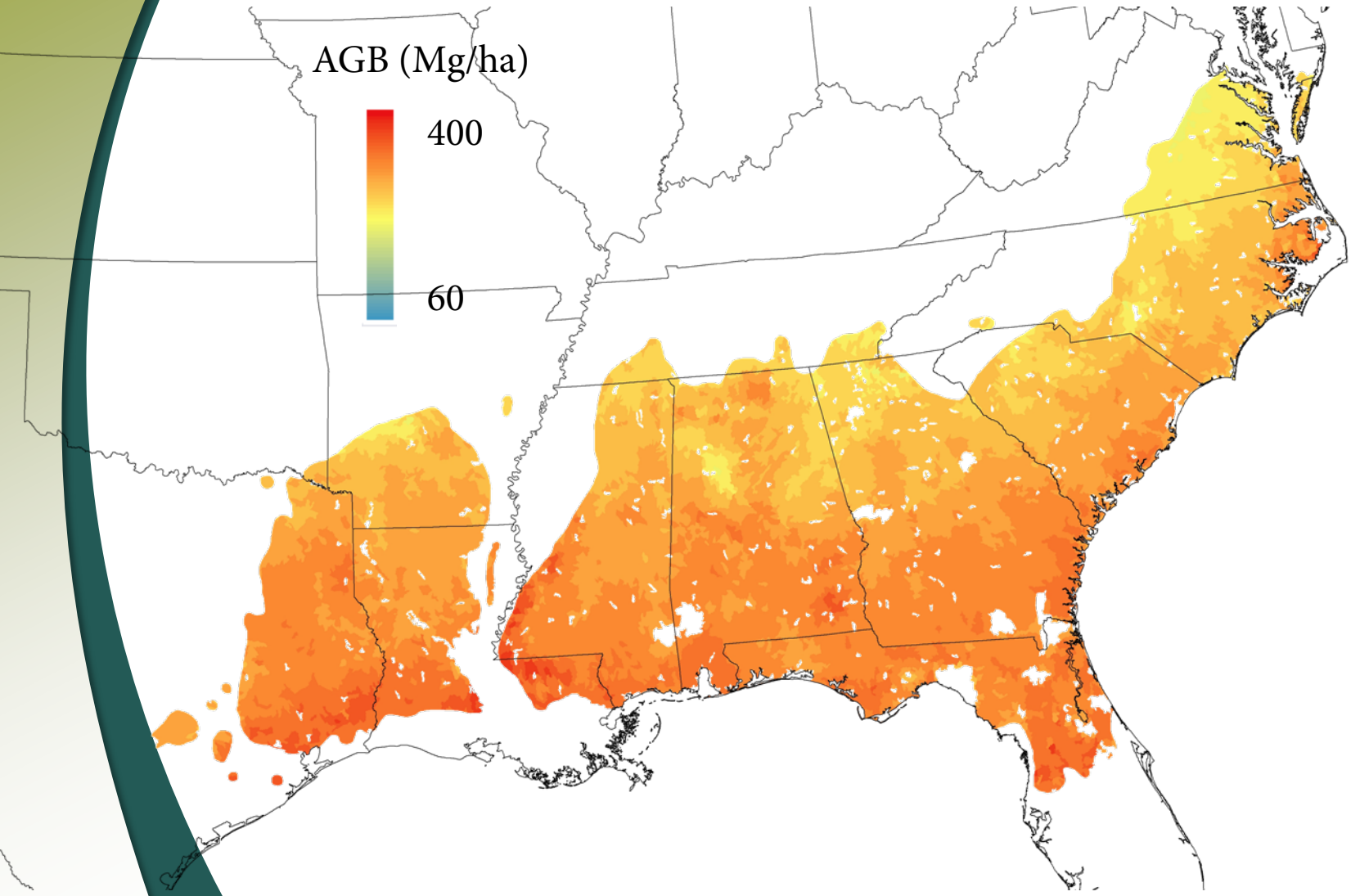

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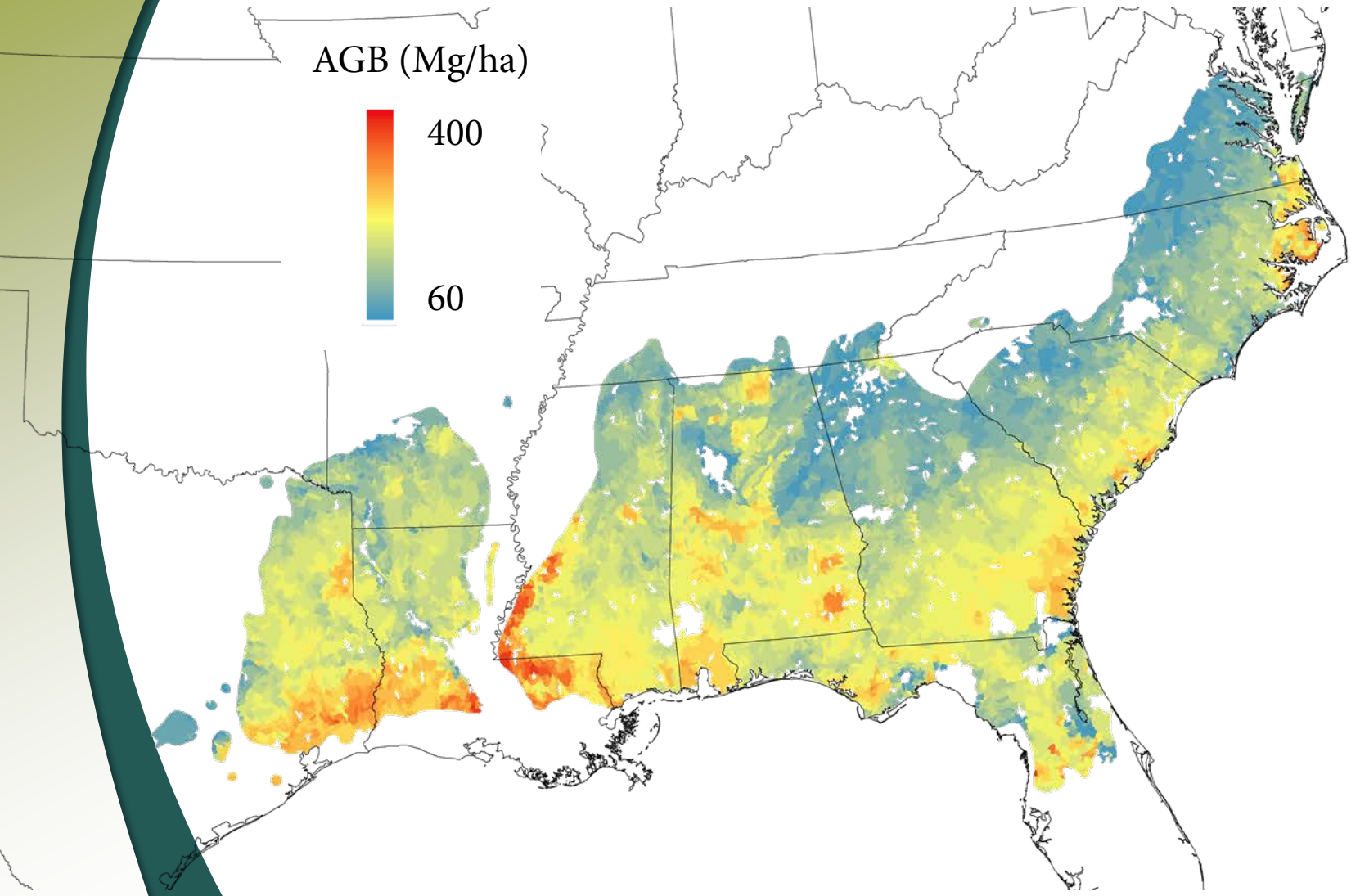

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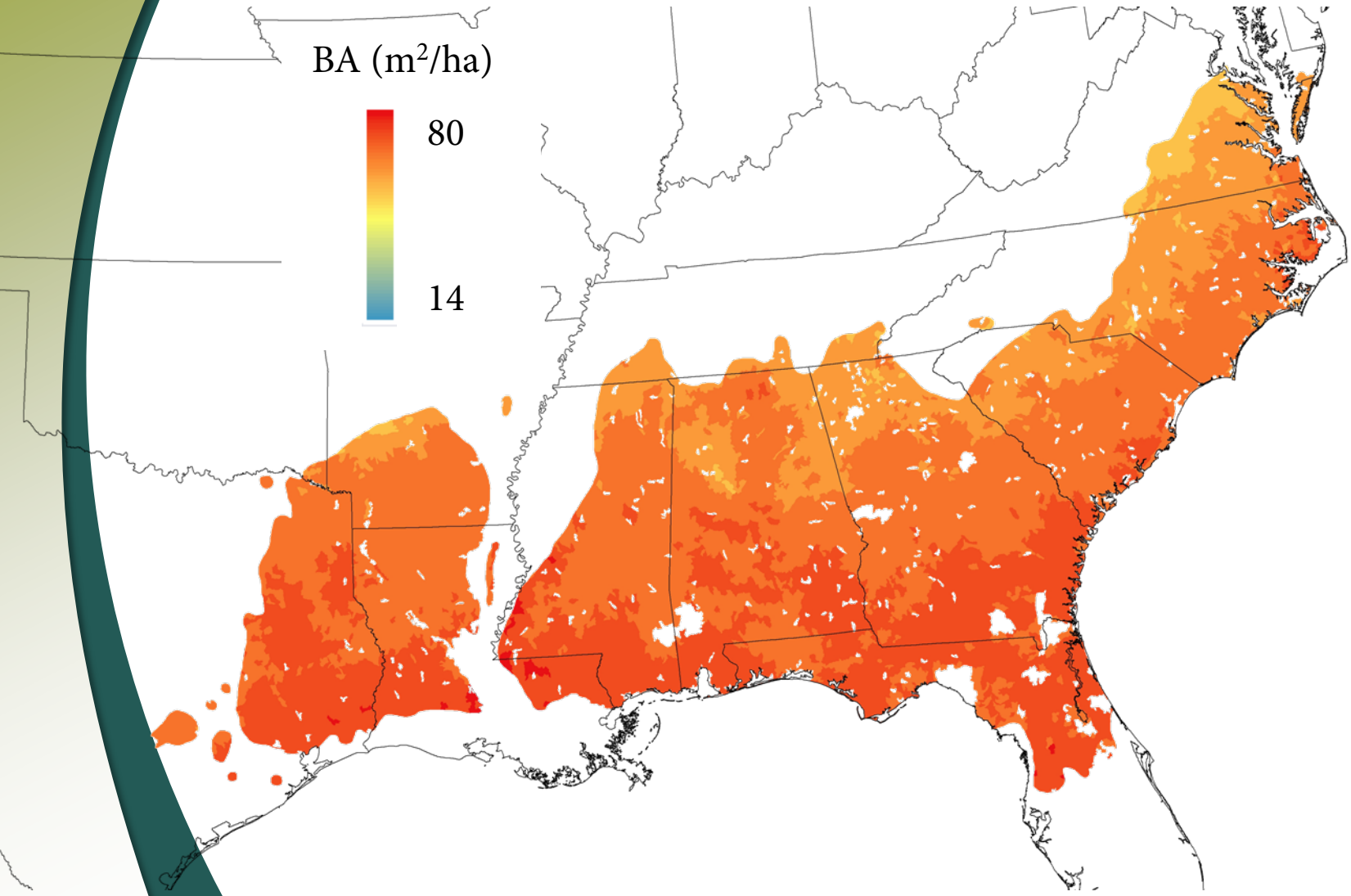

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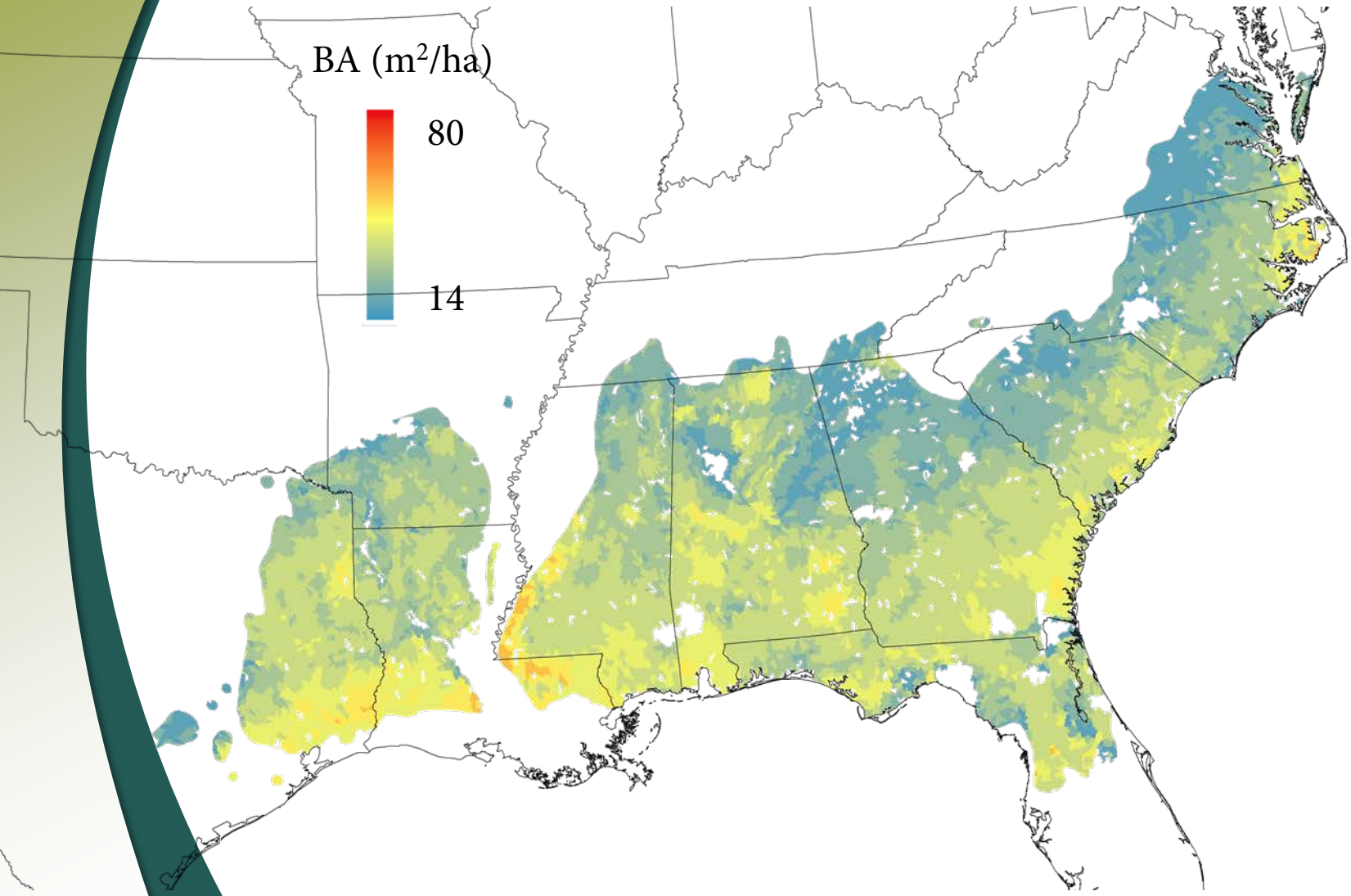

Effects of Adjusting the SI

- Relating the SSURGO SI to the site-based SI suggests that for best comparability, add 6.5 feet to the SSURGO SI
  - Since values are aggregated across all HUCs and include lands not currently planted, this adjustment was not used in the preceding maps
- Re-running the model with this adjusted SI yields the following ranges (with the same general spatial patterns, respective to flavor)

SI	Flavor	VOB (m^3/ha)	AGB (Mg/ha)	BA (m^2/ha)
Base	A	420-800	200-400	50-80
	C	140-900	60-370	14-54
Adjusted	A	400-860	215-420	52-82
	C	230-1045	96-436	18-58

Conclusions

- Baseline regional runs are now possible for any given timeframe and climate scenario
- Of the five flavors compared here, two stand out as being the most accurate and stable in the site-to-site analysis

Flavor	SI-FR Model	Parameter Set	3-PG Model	Average sMAPE across VOB, AGB, and BA
A	Teskey	Bryars	Bryars	17.8%
C	Subedi	Sampson	Landsberg/Sands	18.5%

- From the regional maps, the two flavors offer different spatial patterns and ranges for the output variables considered here
- The next step is to make regional runs with the full suite of climate models and make comparisons with the outputs from the other regional models