

Meeting Synopsis for 11-01-2006

Terrestrial Models Working Group

SAMSI / Duke University

by Jim Crooks

Our meeting on 11-01-2006 focused on how to use GCM output as a driver of the tree stand simulator; specifically we discussed where in the simulator code climate effects can and should be included. We came up with the following list:

Yearlings—The simulator is already set up to take yearly temperature and soil moisture as inputs, that is, the data structures are in place and the effects of these variables on growth have already been modeled. Topographic variation (e.g. soil moisture vs. altitude) can be included too, though I don't think any modeling has been done in this area. GCMs can directly output both of these variables within each grid cell, but it is not clear how best to perform the downscaling.

Seedlings—Potentially we could include some sort of temperature or drought effect for seedling growth, but this hasn't been modeled yet. We could use garden experiments to infer parameters, but doing so is problematic since tree stands and gardens can behave very differently. On the other hand, the younger the tree the greater its response to climate so it might be more realistic to include an effect.

Juveniles/Adults—The effect of climate on increment growth and fecundity is modeled implicitly already by the random year effect, kappa. However, since we want climate to be a driver, not (just) a random effect we would have to estimate the effect of climate on increment growth and fecundity.

We further discussed the question (in the context of Seedlings and Juveniles/Adults) of how to quantify climate. Do we use average yearly temperature? Average summer temperature? Do we average over daily highs or daily means or something else? Do we use precipitation? Should we just collapse all the continuous variables into a categorical “Drought = Yes/No/Kinda” variable? Sean felt that the latter would be best as the others would be overly complex.

Finally, we brainstormed about what data to use to do the final bits of modeling

that are needed. The possibilities are:

Seedlings: (apparently the Clark group didn't focus on these until recently)

- gradient

- GAP plots

- data of Ines

Juveniles/Adults: (Clark group and others from Coweeta and Duke Forest)

- diameter

- diameter increment

- fecundity

- Other regional(?) data include 30-200 years of tree cores and 30 years from FIA

Climate/Weather:

- Coweeta Met station (LTER)

- Duke FACE station

- nearby NOAA weather stations