F118-P004 **Room: Poster Session Hall** **Time: May 21**

Optimization of ecosystem model parameters: Fitting the observed seasonal cycles of atmospheric CO_2 of Siberia

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The technique of inverse modeling was used to evaluate the model parameters of the Carnegie-Ames-Stanford-Approach (CASA) terrestrial biosphere model in order to provide a best fit between the observed and modeled seasonal cycles of atmospheric CO_2 (e.g. Randerson et al. 2002). Specifically, the maximum light use efficiency, E_{max}, of a net primary production, and a factor of a temperature sensitivity of heterotrophic respiration, Q10, were optimized for each vegetation type used in the CASA to simultaneously fit the observed seasonal cycles of CO_2 from several CO_2 observation sites in Siberia along with 12 other sites in the northern hemisphere. The misfits between the observed and modeled CO_2 were found to be reduced for some, but not all, of the sites. For the set of data used for this study, it was found that uncertainties in Q10 were reduced most predominantly for biome types of evergreen needle leaf forest and deciduous needle leaf forest, both of which are prevalent over Siberia. The optimized Q10 for these biome types were found to be 1.53 for evergreen needle leaf forest and 1.66 for deciduous needle leaf forest. Similarly, the uncertainties in E_{max} were reduced for evergreen and deciduous needle leaf forests. Interestingly, the uncertainty in E_{max} of a biome type of broadleaf trees and shrubs, which are found predominantly in tropical regions in Southeast Asia, Africa, and South America, was also reduced notably. This can be attributed to the data from places other than Siberia. The newly found biome-dependent E_{max} and Q10 were used for the CASA model. The total global NPP was found to decrease by 13 Gt/year compared to when the biome-type indepent parameters of Q10=1.50 and E_{max}=0.55 gC/ MJ are used.

Our method for calculating the sensitivities of the CASA to the changes in E_{max} and Q10 will also be closely investigated and presented in this poster.