www.elsevier.com/locate/yjtbi

Modeling forest ecosystem responses to elevated carbon dioxide and ozone using artificial neural networks

Peter E. Larsen, Leland J. Cseke, R. Michael Miller, Frank R. Collart

PII: S0022-5193(14)00336-1
DOI: http://dx.doi.org/10.1016/j.jtbi.2014.05.047
Reference: YJTBI7766

To appear in: *Journal of Theoretical Biology*

Received date: 10 July 2013
Revised date: 23 May 2014
Accepted date: 31 May 2014

Cite this article as: Peter E. Larsen, Leland J. Cseke, R. Michael Miller, Frank R. Collart, Modeling forest ecosystem responses to elevated carbon dioxide and ozone using artificial neural networks, *Journal of Theoretical Biology,* http://dx.doi.org/10.1016/j.jtbi.2014.05.047

Modeling forest ecosystem responses to elevated carbon dioxide and ozone using artificial neural networks

Peter E. Larsen[1*], Leland J. Cseke[2], R. Michael Miller[1], Frank R. Collart[1]

[1]Argonne National Laboratory, Biosciences Division, 9700 South Cass Avenue, Argonne, IL 60439, U.S.A.
[2]Department of Biological Sciences, University of Alabama in Huntsville, Huntsville, AL 35899, U.S.A.

*****Corresponding author. Tel.:1 (630) 252-3984

Email address: plarsen@anl.gov

Coauthors Email address: csekel@uah.edu (L. Cseke), rmmiller@anl.gov (R. Miller), fcollart@anl.gov (F. Collart)

HIGHLIGHTS

- Different aspen clones have characteristic responses to elevated atmospheric concentrations of carbon dioxide and ozone
- Observed aspen community phenotypes for an aspen forest ecosystem can be accurately modeled using an Artificial Neural Network approach
- Clone-specific regulatory networks associated with sensitivity to elevated atmospheric concentrations of carbon dioxide and ozone are predicted
- The specific molecular mechanisms that distinguish clone-specific responses to environmental conditions are proposed by this computational model will form the basis for future experimental validation