

Figure 1. A comparison of observed and simulated basal area (m<sup>2</sup>/ha) at four elevations (740m, 890m, 1190m and 1680m) along the North Slope of Changbai Mountain (42.2°N, 128.0°E), Northeastern China.

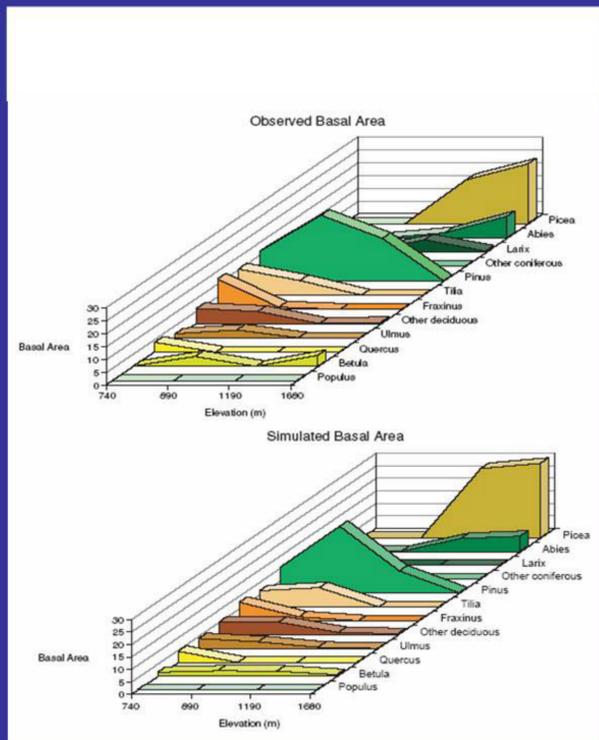
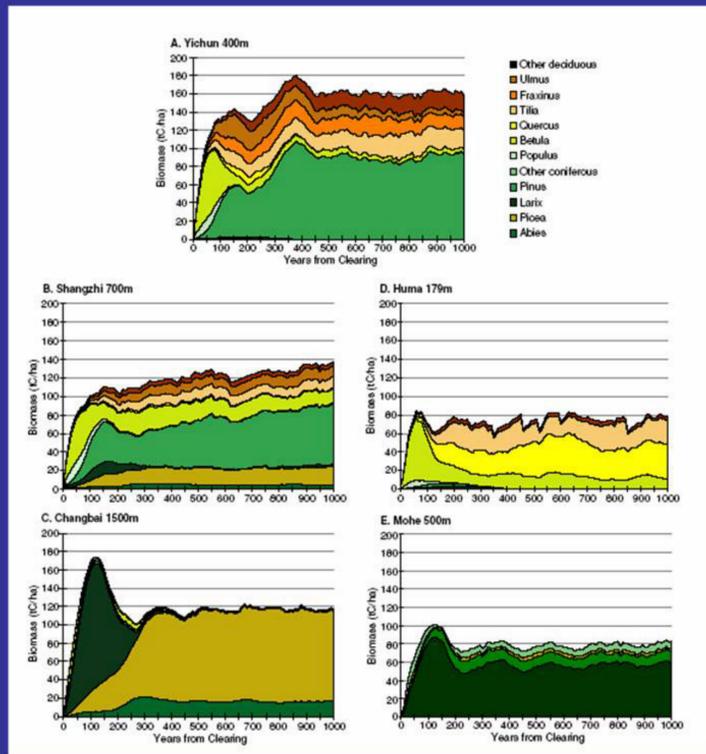


Figure 2. The simulated forest species composition dynamics by biomass (tC/ha) originated from clear-cutting bare floor for: a. Yichun site (Xiaoxing'an Mountain), 400m in elevation; b. Shangzhi site (Zhangguangcai Mountain), 700m in elevation; c. Changbai Mountain, 1500m in elevation; d. Huma site, 179 m in elevation (same altitude as the meteorological station); e. Mohe (Daxing'an Mountain) site, 500m in elevation.



# Projecting Large-Scale Ecosystem Change: A Forest Gap Model to Simulate Dynamics and Patterns of Eastern Eurasian Forests

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\* Support from NASA Grant NAG5-11084

## ABSTRACT

Change in the vegetative cover of the vast Eurasian super-continent has the potential to interact with the atmosphere and create meso- and global-scale climatic consequences. An example of one such change is the potential positive feedback attending a warming-induced greening of the northern boreal zone of Eurasia. The predictions of the surface changes associated with such an interaction necessitate the development of a continental-scale capability to predict such changes in vegetative cover. This poster illustrates an approach to this problem with an individual-based simulation model (the forest gap model, FAREAST) that simulates the distribution, composition and dynamics of forests in Eastern Eurasia. Tests of the model include:

1. Species composition comparisons between simulated and observed mature forests.
2. Comparison of simulated and observed forest stands in different stages of succession.
3. Simulations of carbon biomass, which are correlated with observations across an extensive region.
4. Species composition and biomass response to climate change scenarios.

Model comparisons with independent data indicate the FAREAST model is capable of representing many of the broad features of the forests of Northeastern China. After model validation in the Northeast China region, model applications were developed for the forests of the Russian Far East. In simulations at 31 different sites distributed across the entire Russian Far East and including a wide variety of natural forests, the model demonstrates an ability to reproduce observed vegetation patterns. Continental-scale forest cover can be simulated to a relatively realistic degree using a forest gap model with standard representations of individual-plant processes. It appears that such a model, validated relatively locally in this case in Northeastern China, can then be applied over a much larger region. A potential application of this model is to predict large-scale dynamics of carbon biomass and species composition during climate change.

Figure 3. Simulated net primary production (kgCm<sup>-2</sup>yr<sup>-1</sup>) for 593 Chinese forest survey stations versus observed data from Luo Tianxiang, 1996.

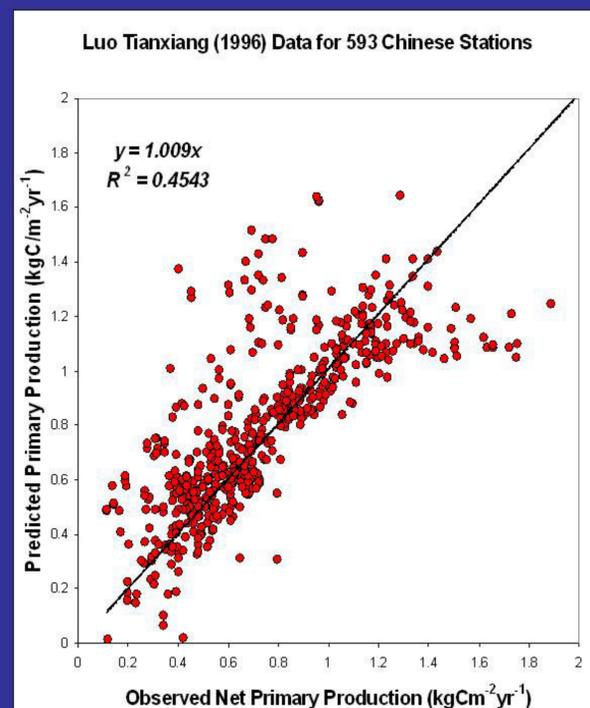


Figure 4. (Left) : Siberian pine regeneration under a *Larix* canopy (Bottom) : Predicted changes in *Larix* biomass under IPCC projections.

