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Editorial

Modeling Forest Stand Dynamics, Growth and Yield

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The world's forests are diverse and serve myriad purposes; however, regardless of the management objective, reliable models of forest stand dynamics, growth and yield are required. Steady progress has resulted from the application of increasingly sophisticated quantitative analysis techniques and cutting-edge technologies to measuring, monitoring, and modeling forest trees and stands. However, challenges and opportunities remain as forest modeling continues to evolve and advance.

We encouraged contributions to this Special Issue on all aspects of forest growth and yield modeling, including data collection and analysis, modeling approaches, and model validation and implementation. The call for contributions resulted in an eclectic group of papers. As might be expected, around half of the contributions address some aspect of modeling tree or stand growth in even-aged monocultures. Modeling response to silvicultural inputs—thinning and fertilization in particular—are addressed herein. Quantifying the yield of genetic provenances is also covered, and a paper on modeling spatial structure following thinning treatments is incorporated. Regression analysis is central to many of the papers, and a contribution on the mitigation of re-transformation bias in regression equations is presented. The ever-increasing role of technology in forest modeling is recognized via a paper on the applications of machine learning models and a contribution on the use of terrestrial Lidar scanning.

This Special Issue is comprised of eight papers with authors from 11 countries in Asia, Australasia, Europe, North America, and South America. The compilation begins with a paper on modeling tree growth using forest inventory data [1], which is followed by a presentation on modeling spatial structure changes in white spruce plantations after thinning [2]. A non-destructive method for tree pith location based on terrestrial laser scanning is described in the next paper [3]. The focus returns to forest growth modeling with a contribution on the response to mid-rotation treatments in loblolly pine plantations [4]. A study aiming to reduce the uncertainty of site productivity maps using machine learning models is also presented [5]. The response to the mid-rotation fertilization of loblolly pine plantations via relative volume increment is also provided [6]. A meta-analytic approach to quantify the yields of spruce provenances in the boreal forests of Canada is included [7]. The final paper presents two examples of dealing with the bias introduced by transformation of the dependent variable when fitting equations to data [8].

The aim of this Special Issue is to present state-of-the-art papers on topics and techniques related to Modeling Forest Stand Dynamics, Growth and Yield and to provide a window to future research on their challenges and opportunities.

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