

RMA

The Resource Modeling Association is an international association of scientists working at the intersection of mathematical modeling, environmental sciences, and natural resource management. We formulate and analyze models to understand and inform the management of renewable and exhaustible resources. We are particularly concerned with the sustainable utilization of renewable resources and their vulnerability to anthropogenic and other disturbances.

RMA Newsletter

Fall 2020



#WCNRM 2021 – fully virtual,

by Felix Meier, Martin Quaas and Hanna Schenk

German Center for Integrative Biodiversity Research (iDiv) Halle-Jena-Leipzig

For the first time in history, the World Conference on Natural Resource Modeling will be fully virtual. It is a pity that the meeting cannot be in person in the beautiful and vibrant city of Leipzig, Germany. Yet this year's experience has shown that also a virtual meeting can be fruitful and stimulating. Abstract submissions will be welcome in January 2021.

As participants are expected from all over the world, the conference will be stretched out over five days,

May 31st to June 4th, with two sessions each day, to ensure that each participant can comfortably attend at least one session. The sessions will be from 14:30-18:00 UTC (coordinated universal time) and from 6:00-9:30 UTC.

For the east coast of Australia, this means that the first session cannot really be attended, but the second session is from 16:00-19:30 AEDT (UTC+10).

For the west coast of the USA, the first session is from 7:30-11:00 PDT (UTC-7), whereas the second ses-

sion is at unusual hours.

For central Europe, the sessions are at 16:30-20:00 and 8:00-11:30 CEST (UTC+2).

Keynote talks and contributed sessions will be recorded (conditional on consent) to make them accessible to all participants. Since social interactions have always been at

Table of contents

President's column.....	p 3
Best Phd Presentations	p 4
Editor's column	p 7



the heart of past conferences, there will also be room for online social events.



photo: Ugo Wagner

The theme of WCNRM 2021 is “Tipping ecological-economic systems towards sustainability”. Many natural resources around the world are being overexploited for short term economic benefits, leaving ecosystems on the brink of collapse. This is especially true for marine systems where overfishing is a continuous and globally increasing ecological and economic issue, also resulting in impacts on society and culture. Marine ecosystems are threatened to cross tipping points, leading to abrupt changes in recruitment, biomass, and consequently in catches. The aim of the conference is to discuss how to change ecological-economic system dynamics towards long-term sustainability.

The program includes two keynote speakers and two special session keynote speakers.



last IPBES report on biodiversity.

Yunne-Jai Shin is a quantitative ecologist and research director at the Research Institute for Development (IRD), France. She is working on marine biodiversity, exploitation and conservation and was one of the lead authors of the



Stephen R. Carpenter is professor at the Department of Integrative Biology at the University of Wisconsin-Madison, USA. His research focuses on the interaction of biogeochemistry and food web processes in lakes.



Marie-Catherine Riekhof is professor of Political Economy and Resource Management at the Faculty of Agricultural and Nutritional Sciences at Kiel University, Germany. She examines the impact of different institutional arrangements in the field of marine and coastal resources.



Camilla Sguotti is an empirical ecologist at the University of Hamburg, Germany. Her research focuses on marine ecosystems and population dynamics under human stressors such as fishing and climate change.

The organizing committee consists of RMA board member : Martin Quaas, professor for Biodiversity Economics at the German Center for Integrative Biodiversity Research (iDiv) Halle-Jena-Leipzig and Leipzig University; Martin Drechsler, researcher at the UFZ and honorary professor for Ecological-Economic Modelling at the Brandenburg University of Technology Cottbus-Senftenberg; Robert Arlinghaus, professor for Integrative Fisheries Management at the Humboldt University of Berlin; Christian Möllmann, professor for Marine Ecosystem and Fishery Science at the University of Hamburg.

Local organizers are Veronika Liebelt, Felix Meier, Martin Quaas, Hanna Schenk and Maria Schnabel.

Please check our website for updates

www.idiv.de/wcnrm2021

for questions please contact : wcnrm2021@idiv.de

We look forward to welcoming you online (!) next year.

PRESIDENT'S COLUMN

by Frank VAN LANGEVELDE



This exceptional year 2020 comes almost to an end. I hope that you and your family are all doing fine. Since the beginning of this year, the world met “nature” and did not really know what to do. Our daily work has been largely affected by the coronavirus SARS-CoV-2. We generally work from home and family visits are limited. Also work-related travelling, such as for meetings or field work, is often not possible. Scientists all over the world worked very hard to produce effective vaccines, and hopefully large-scale vaccination takes place in 2021, that may bring our lives back to what it was before 2020. Many scientists are also discussing how to prevent such pandemic, but there is no clear answer here: Do we need to scan wildlife and livestock for pathogens that have the potential for jumping to humans? Should we regulate wet markets and other places where people meet wildlife? Anyway, we will remember 2020 as a year in which we realized how dependent humanity is on nature.

What can we do as Resource Modelling Association? RMA members could play a role in preventing such pandemic and to mitigate the negative effects. For example, we could model the risk of infection in society and how to reduce this risk, analyse how infection can jump from wildlife to livestock and people, and from livestock to people, model the evolution of several virus families in various hotspots, by predicting potential outbreaks due to resource use, etc. Also we need a better understanding on the relationships between the loss of biodiversity and the spread of zoonotic diseases. Modelling could help to explore several scenarios with a variety of measures to reduce the spread of zoonotic pathogens with a pandemic potential. A nice task for the RMA.

Next year, the annual World Conference on Natural Resource Modeling will be organized in Leipzig, Germany. However, due to the high uncertainties on travelling and organizing big meetings, the organizing team together with the RMA board decided to have an online meeting. This is a pity as the city of Leipzig is worth a

visit. The call for abstract opens soon.

The communication of the RMA through social media such as ResearchGate, LinkedIn and Twitter is open for your input. Do not hesitate to use these media to circulate information in line with the objective of the RMA, such as new academic positions, conferences, workshops, books, papers. It would be great if these media can also be used for topics related to the focus of the RMA to be discussed among the members and others. Let's share ideas about research on Covid-19!.

The objective of the RMA is to foster research and teaching at the interface of ecology, economics, mathematics and computer sciences and devote to the sustainable management of natural resource and ecosystems. As members of the RMA we have the possibility to promote the global interest in sustainability and environmental issues and help to find solutions. I am convinced that the RMA can help society in these unprecedented times. I hope that the upcoming online conference in Leipzig, the journal Natural Resource Modeling and social media will help us with this.

I want to send my very best wishes for 2021 to everyone in the RMA community!

Frank van Langevelde
President RMA,
Professor Wildlife Ecology and Conservation
Wageningen University
The Netherlands

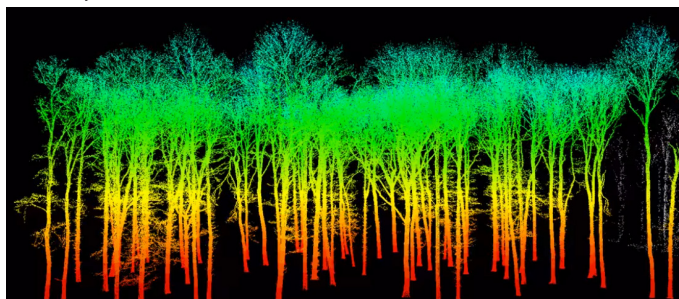
Modelling the effect of environmental factors on the height increment of Norway spruce stands with the use of repeated Airborne Laser Scanning data

by Luiza Tymińska-Czabańska, Jarosław Socha

Institute of Forest Resources Management, Faculty of Forestry, University of Agriculture in Krakow, Al. 29 Listopada 46, 31-425 Krakow, Poland;

The dynamics of forest communities expressed by height increment may be subject to environmental gradients. Tree height increment may be affected by temperature and wetness gradients. It provides a quantitative baseline for understanding patterns of resource use, spatial structure and the physiological mechanism of tree reaction ecosystems to climate stress as the factors predisposing to climate affected disturbances, which are crucial for sustainable forest management (Čermák et al., 2017). Modeling the trends in height increment may be helpful in determining potential changes in natural ranges of distribution of tree species and is crucial for interpreting ecological processes in forest ecosystems.

In forestry practice, mainly permanent sample plots (PSP) observations have been used for forest growth estimation (Raulier et al., 2003). However, field measurements of forest growth are times consuming and expensive, especially in the case of large forested areas. Airborne LiDAR scanning (ALS) has become an efficient and precise tool employed in forest inventories by providing the capability to estimate the forest growth accurately.



Multitemporal ALS observations could be used as a substitute for permanent sample plot data traditionally used to date for the TH growth modeling (Socha et al., 2017; Tompalski et al., 2018). In the presented research, we developed a new approach that allows for the practical application of repeated LIDAR data for the calibration of site index models that are applicable in site productivity estimation. We demonstrated

how wall-to-wall ALS data could also be used for the detailed mapping of the forest site productivity and its changes both in local, regional and country scales. The objectives of this study on Norway spruce representing the whole elevation and aspect gradients in the Jizera Mountains were to:

- detect the site-dependent variability of mean annual height increments,
- explore the main environmental factors limiting height growth.



We hypothesized that the limiting effect of water stress and temperature on height growth is affected by topography. Therefore we revealed that elevation, aspect and topographic indices, which by influence on thermal and moisture conditions affect height increment of Norway spruce may be used as an indicator of the susceptibility of a given site to disturbances. We estimated the height increment based on lidar data from 2007 (Figure 1a) and 2012 year (Figure 1b).

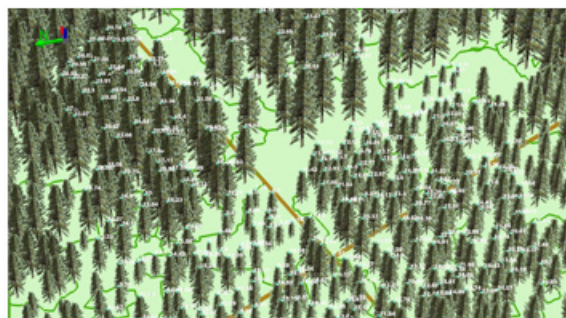


Figure 1a. Height of trees in 2007 obtain from lidar data

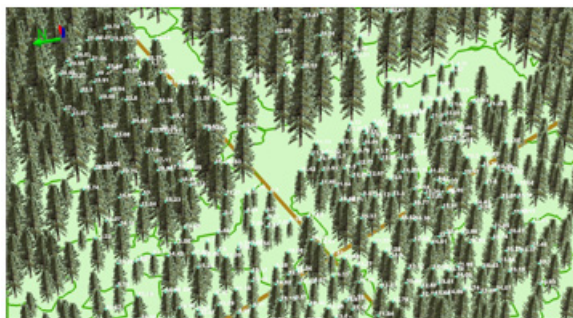


Figure 1b. Height of trees in 2012 obtain from lidar data

Next, we used the Generalized Additive Models (Hastie and Tibshirani, 1990) to analyze the effect of selected site characteristics on height increment, with the following equation:

$$G(E(Y)) = \beta + f_1(X_1) + f_2(X_2) + f_3(X_3) + f_4(X_4) + f_5(X_5) + f_6(X_6) + f_7(X_7) + \varepsilon$$

Where: $G(E(Y))$ - function, which link $E(Y)$ with additive functions explanatory variables, Y - dependent variable (height increment), (X_i) - explanatory variables, (G) link function, f_1, f_2, \dots, f_n spline functions, β - free term, assumed that errors ε have constant variance and mean equal 0.

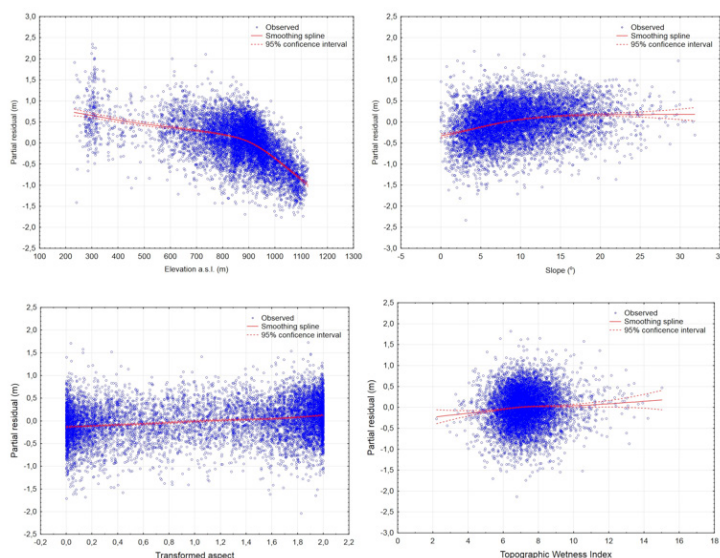


Figure 2. Effect of site characteristics on height increment in model GAM

We found that the height increment of Norway spruce is strongly affected by topography described using: elevation above sea level, aspect, topographic position index, topographic wetness index, and slope (Figure 2). It can be stated that application of wall-to-wall LiDAR

data allowed determine the main factors affecting height increment of Norway spruce stands on the research area and repeated airborne laser scanning data may be recognized as a new, valuable data source for analysis height growth.

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Luiza Tyimińska-Czabańska, warmly rewarded for her presentation.

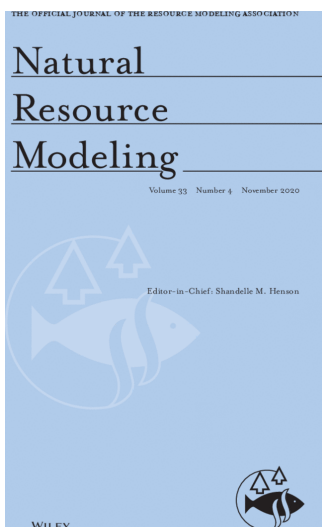


Table of Contents

vol 33, issue 4

Lisa J. Koetke, Adam Duarte, Floyd W. Weckerly : Comparing the Ricker and θ -logistic models for estimating elk population growth.

J.P. Peirce, J.J. Pellett, G.J. Sandland, A mathematical model for the control of swimmer's itch.

Tannaz Alizadeh Ashrafi, Arne Eide, Øystein Hermansen, Spatial and temporal distributions in the Norwegian cod fishery.

Tiantian Chen, Li Peng, Qiang Wang, From multifunctionality to sustainable cultivated land development? A three-dimensional trade-off model tested in Panxi region of southwestern China

Jai Prakash Tripathi, Sarita Bugalia, Vandana Tiwari et al, A predator–prey model with Crowley–Martin functional response: A nonautonomous study.

David C. Elzinga, Erin Boggess, Jordan Collignon et al, An agent-based model determining a successful reintroduction of the extinct passenger pigeon

Sosan Salajegheh, Hamid R. Jafari, Sharareh Pourebra-

him, Modeling the impact of social network measures on institutional adaptive capacity needed for sustainable governance of water resources

Lauren K. Borland, Collin J. Mulcahy, Barbara A. Bennie et al, Using Markov chains to quantitatively assess movement patterns of invasive fishes impacted by a carbon dioxide barrier in outdoor ponds

Fadoua Hamzaoui-Azaza, Mounira Zammouri, Meriem Ameur et al, Hydrogeochemical modeling for groundwater management in arid and semiarid regions using MODFLOW and MT3DMS: A case study of the Jeffara of Medenine coastal aquifer, South-Eastern Tunisia.

Pranesh K. Paul, Babita Kumari, Srishti Gaur, et al, Application of a newly developed large-scale conceptual hydrological model in simulating streamflow for credibility testing in data scarce condition.

Lina Mai, Qiying Ran, Haitao Wu, A LMDI decomposition analysis of carbon dioxide emissions from the electric power sector in Northwest China.

Amitrajeet A. Batabyal, Hamid Beladi, A political economy model of the Ganges pollution cleanup problem.

Amir Aieb, Khalef Lefsih, Marco Scarpa et al, Statistical modeling of monthly rainfall variability in Soummam watershed of Algeria, between 1967 and 2018.

Matti Sihvonen, Jussi Lintunen, Elena Valkama et al, Management of legacy nutrient stores through nitrogen and phosphorus fertilization, catch crops, and gypsum treatment.

REMINDER:

*Special Issue NRM devoted to WCNRM 2020
Valparaíso*

Following the 2020 WCNRM, a special issue of Natural Resource Modeling will be edited by P. Gajardo and H. Ramirez.

The deadline for submitting articles was extended to December 31, 2020, with the goal of publishing the issue in 2021. As guest editors we are committed to speeding up the review process. Contributions should be submitted directly through the journal online system, accessible from its website. When submitting your paper using the online Wiley NRM process, you have to choose the WCNRM2020 option.

Since August 2020, NRM flipped to open access, and therefore new submissions will be affected to the payment of a publication fee. Nevertheless, as the special issue was announced before the journal flipped to open access, authors of this special issue will receive a fee waiver. Thus, in the cover letter, authors should request a waiver and mention that they were invited to this special issue prior to the journal flip.

Pedro Gajardo^a, Hector Ramirez^b

Guest Editors of a Special Issue NRM

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Editor's Column

Gold Open Access for Natural Resource Modeling

by Shandelle M. Henson,
Editor-in-Chief



I have four exciting announcements regarding the Journal. First, I am very pleased to report that, as of 01 January 2021, Natural Resource Modeling will be a full Gold **Open Access** journal.

Papers published in NRM will be immediately freely available to read, download and share. Open Access will increase the visibility of your research, leading to more downloads and citations. The high quality of the peer review and publication process will not be affected. Many funding agencies now require Open Access and we are pleased to make this transition.

Understandably, some authors are concerned about the Article Processing Charge (APC). It is important to understand that authors from countries on the **Waivers and Discounts List** receive automatic APC waivers and discounts when they request the waiver or discount during the submission process. The APC for authors funded by an **agency** or **institution** with a Wiley Open Access Account is paid by that funder or institution. Many authors from **Austrian, Dutch, German, Hungarian, Norwegian, and UK** institutions can access new Publish and Read deals between Wiley and their institutions. Authors whose institutions have paid the Wiley Open Access partner fee also receive discounts.

Second, the Journal is slated to become Free Format submission. Authors will be able to submit manuscripts with any consistent format subject to a few minimum requirements such as statements of ethics and integrity. Free format will attract authors and speed up publishing times.

Third, authors will have the opportunity to highlight their research by including a figure from their paper on the front cover. This is not required, but authors can choose to pay for this. As with the APC, the publisher offers waivers and discounts for authors from developing countries. To see an example of this, check out the

covers for the Wiley journal **Ecosphere**.

Fourth, the Journal now participates in Wiley's **Transfer Desk Assistant**. This tool gives authors the option to transfer their submission to another journal. Papers in the area of natural resource modeling that are rejected by another journal for being out of scope or because of a high rejection rate may then be submitted to NRM. Of course, transferred papers go through the same high-quality peer review process as other submissions to NRM.

Take advantage of these new opportunities. Send your submissions to **Natural Resource Modeling**.

Peace,

Shandelle M. Henson
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The official newsletter of the
Resource Modeling Association



Editors : Anne-Sophie Masure, Julie Vissaguet,
Sébastien Lavaud, Luc Doyen.

