

Conference Agenda

Session

WS 2.2.A I: The future of Mountain forests

Time: **Wednesday, 11/Sep/2019: 1:30pm - 3:00pm**

Location: **THEOLOGIE - KLS**

Session Chair: **Stefan Mayr**

Moderator: **Maaïke Bader**

Moderator: **Georg Gratzner**

Moderator: **Michael Bahn**

Session Topics: Workshop 2.2.A: The future of Mountain forests

(i) TREELINE: 9 short presentations & Discussion topic (i)

(ii) STRESS: 6 short presentations & Discussion topic (ii)

Session Abstract

Climate change will pose multifold challenges to mountain forests. Changes in precipitation and temperature regimes as well as more frequent and intense climate extremes will influence mountain forests directly (e.g. drought-induced dieback, increasing frequency of forest fires, reduction in frost resistance, rising of the timberline) and indirectly (e.g. bark beetle calamities, pathogens, wind blasts), and intensively managed forests at lower elevation as well as high elevation protective forests. Mountain forests provide numerous important ecosystem-services, with protective functions being most important. Tree stands at higher elevation prevent erosion and avalanches, and thus are the prerequisite for settlements at lower sites. Up to the timberline, not only the protective role of forests increases but also expected climatic changes, which will amplify local and regional effects of resulting changes in mountain forests. As knowledge of tree life and forest ecosystems in mountain regions is still limited, further research on the responses of mountain forests to a future and on their sustainable management is urgently needed.

Question 1: How will changes in climatic parameters and their complex interrelation affect mountain forests, and how will changes in vitality, structure, composition etc. of mountain forests influence their functions?

Question 2: Which direct/indirect and primary/secondary effects will cause relevant damages or dieback with respect to spatial and temporal scales?

Question 3: Which counter strategies can help to overcome negative effects induced by climate change?

Presentations

1:30pm - 1:35pm

Introduction and Explanations

Mayr, Stefan

University of Innsbruck, Austria

1:35pm - 1:39pm

Climate induced changes to tree-line positions

Hansson, Amanda

University of Queensland, Australia

1:39pm - 1:43pm

Effects of climate change on treeline elevation: how to use spatial signals to predict temporal changes?

Bader, Maaïke

University of Marburg, Germany

1:43pm - 1:47pm

Rain exclusion decreases water use of young *Picea abies* but not of *Larix decidua* at treeline in the Central Tyrolean Alps

Wieser, Gerhard

BFW, Austria

1:47pm - 1:51pm

Water use and growth responses of Norway spruce and European larch to experimental drought at the subalpine tree line

Oberleitner, Florian¹; Hasibeder, Roland¹; Wagner, Julia¹; Hartmann, Henrik²; Losso, Adriano³; Mayr, Stefan³; Oberhuber, Walter³; Wieser, Gerhard⁴; Bahn, Michael¹

¹Department of Ecology, University of Innsbruck, Austria; ²Max Planck Institute for Biogeochemistry, Jena, Germany; ³Department of Botany, University of Innsbruck, Austria; ⁴Department of Alpine Timberline Ecophysiology, Federal Research and Training Centre for Forests, Natural Hazards and Landscape (BFW), Austria

1:51pm - 1:55pm

A multi-year field experiment for studying the importance of different abiotic and biotic drivers of tree seedling recruitment in an alpine treeline ecotone

Frei, Esther R.^{1,2}; Rixen, Christian²; Bebi, Peter²; Brown, Carissa D.³

¹Swiss Federal Institute for Forest, Snow and Landscape Research WSL, Birmensdorf, Switzerland; ²WSL Institute for Snow and Avalanche Research SLF, Davos, Switzerland; ³Department of Geography, Memorial University, St John's, Canada

1:55pm - 1:59pm

Forest dynamics in Mediterranean human-disturbed treeline ecotones

Urbinati, Carlo¹; Vitali, Alessandro¹; Malandra, Francesco¹; Tonelli, Enrico¹; Garbarino, Matteo²; Camarero, Julio³

¹Università Politecnica delle Marche, Italy; ²Università degli Studi di Torino, Italy; ³Istituto Pirenaico de Ecología, CSIC, Saragoza, Spain

1:59pm - 2:03pm

VEGETATION STRUCTURE ALONG THE FOREST – PÁRAMO TRANSITION BELT IN THE SIERRA NEVADA DE MÉRIDA: IMPLICATIONS FOR UNDERSTANDING TREELINE DYNAMICS

Ramirez Ramirez, Lirey Aysen^{1,2}; Llambi, Luis Daniel²; Schwarzkopf, Teresa²; Gamez, Luis Enrique³

¹Marburg University, Germany; ²Institute of Environmental and Ecological Science.ULA. Venezuela; ³Faculty of Forest and Environmental Science. ULA. Venezuela

2:03pm - 2:07pm

Elevational shifts in the topographic control of Andean treeline forest distribution

Toivonen, Johanna¹; Gonzales-Inca, Carlos¹; Bader, Maaiké²; Ruokolainen, Kalle¹; Kessler, Michael³

¹University of Turku, Finland; ²University of Marburg, Germany; ³University of Zurich, Switzerland

2:07pm - 2:11pm

Recent growth trends of coniferous species in the Central European Alps indicate decreasing sensitivity to climate warming

Oberhuber, Walter¹; Gamper, Vanessa¹; Geier, Jacob¹; Wieser, Gerhard²

¹Universität Innsbruck; ²Federal Research and Training Centre for Forests, Natural Hazards and Landscape (BFW), Innsbruck

2:11pm - 2:26pm

Discussion Topic (i) TREELINE

Mayr, Stefan

University of Innsbruck, Austria

2:26pm - 2:30pm

Using elevation gradients in inner-alpine dry valleys as a proxy for climate change effects on mountain forests

Obojes, Nikolaus¹; Tasser, Erich¹; Oberhuber, Walter²; Mayr, Stefan²; Tappeiner, Ulrike^{1,3}

¹Institute for Alpine Environment, Eurac Research, Italy; ²Department of Botany, University of Innsbruck, Austria; ³Department of Ecology, University of Innsbruck, Austria

2:30pm - 2:34pm

Pathogen damages in mountain forests: direct and indirect effects of altered climatic conditions

Ganthaler, Andrea¹; Trujillo-Moya, Carlos²; Schüler, Silvio²; George, Jan-Peter²; Stöggli, Wolfgang¹; Kranner, Ilse¹; Mayr, Stefan¹

¹University of Innsbruck, Austria; ²Austrian Research Centre for Forests, Austria

2:34pm - 2:38pm

Forest fires: disturbance of trees in alpine ecosystems

Bär, Andreas; Mayr, Stefan

University Innsbruck, Austria

2:38pm - 2:42pm

Predicting frost risks in plants

Charrier, Guillaume

INRA, France

2:46pm - 2:56pm

Discussion Topic (ii) STRESS

Mayr, Stefan

University of Innsbruck, Austria

WS 2.2.A II: The future of Mountain forests

Session Topics: Workshop 2.2.A: The future of Mountain forests

(iii) MANAGEMENT: 8 short presentations & Discussion topic (iii)

(iv) SYNTHESIS: Group discussion (5 persons) & General discussion

Presentations

4:04pm - 4:08pm

Quantifying the temporal evolution of the protection service of forests in the face of climate change

Moos, Christine^{1,2,3}; Antoine, Guisan²; Luuk, Dorren³; Heike, Lischke⁴; Christophe, Randin²

¹Interdisciplinary Center for Mountain Research, Sion (CH); ²University Lausanne; ³Bern University of Applied Sciences; ⁴Swiss Federal Institute for Forest, Snow and Landscape Research

4:08pm - 4:12pm

Effects of delayed reforestation in protection forests on runoff formation

Lechner, Veronika¹; Hauser, Peter²; Klingsbigl, Daniela³; Kohl, Bernhard¹; Markart, Gerhard¹; Meißl, Gertraud³; Nagl, Fabian¹; Perzl, Frank¹; Pircher, Georg⁴; Rössler, Theresa³; Scheidl, Christian⁵; Schrittwieser, Patricia⁶

¹BFW Austrian Research Centre for Forests, Dep. of Natural Hazards; ²Bezirksforstinspektion, District Administration Landeck; ³University of Innsbruck, Dep. of Geograph; ⁴Forest Inspectorate Schlanders; ⁵University of Natural Resources and Life Sciences, Vienna, Institute of Mountain Risk Engineering; ⁶Office of the Tyrolean Provincial Government, Tyrolean Forest Service, Dep. of Forest Planning

4:12pm - 4:16pm

Sustainable management of the cultural landscapes in the northwest of the Iberian Peninsula: best practices and conservation innovation

Diaz-Maroto, Ignacio J.

University of Santiago de Compostela, Spain

4:16pm - 4:20pm

Uphill battle: limitations to montane mixed Atlantic forest regeneration in a warming climate

Salles, Mali C.; Nagy, László K.

Departamento de Biologia Vegetal, Universidade de Campinas, Brazil

4:20pm - 4:24pm

Effects of bark beetle attacks on forest snowpack and avalanche formation – implications for protection forest management

Teich, Michaela^{1,2}; Giunta, Andrew D.²; Hagenmuller, Pascal³; Bebi, Peter⁴; Schneebeli, Martin⁴; Jenkins, Michael J.¹

¹Department of Natural Hazards, Austrian Research Centre for Forests (BFW), Innsbruck, Austria; ²Department of Wildland Resources, Utah State University, Logan, UT, USA; ³Univ. Grenoble Alpes, Université de Toulouse, Météo-France, CNRS, CNRM, Centre d'Etudes de la Neige, Saint Martin d'Hères, France; ⁴WSL Institute for Snow and Avalanche Research SLF, Davos Dorf, Switzerland

4:24pm - 4:28pm

The effect of windthrow on forest protection capacity

Brožová, Natalie; Bebi, Peter

WSL Institute for Snow and Avalanche Research SLF, Switzerland

4:28pm - 4:32pm

Modelling mountain microrefugia - suitable sites for mountain forests in shifting climate

Toivonen, Johanna

University of Turku, Finland

4:32pm - 4:45pm

Discussion Topic (iii) MANAGEMENT

Mayr, Stefan

University of Innsbruck, Austria

4:45pm - 4:50pm

Reorganisation setting, Explanations

Mayr, Stefan

University of Innsbruck, Austria

4:50pm - 5:30pm

General discussion

Mayr, Stefan

University of Innsbruck, Austria

Conference Agenda

Session

Posters WS 2.2.A

Time: Wednesday, 11/Sep/2019: 5:45pm - 7:00pm

Location: SOWI - Garden

Session Chair: Stefan Mayr

Session Topics: Workshop 2.2.A: The future of Mountain forests

Session Abstract

Note: Explicit time slots are only assigned to researchers that do not present within the preceding workshop.

Presentations

5:45pm - 5:47pm

Aspiration of inter-tracheid pit and cavitated tracheids after frost drought cause inhibition of water transport in young stems of *Abies veitchi*

Taneda, Haruhiko¹; Ooeda, Hiroki¹; Ohtsuka, Akihiro¹; Ogasa, Mayumi²; Yazaki, Kenichi²; Maruta, Emiko³

¹The University of Tokyo, Japan; ²Forestry and Forest Products Research Institute; ³Kanagawa University

5:47pm - 5:49pm

Changes in xylem anatomy and hydraulic properties of European beech (*Fagus sylvatica* L.) along an elevational transect in the Tirolean Alps

Mazzocco, Antonio G. F.

Georg-August-Universität Göttingen, Germany

5:49pm - 5:51pm

Spatial Patterns of Global Treeline Ecotones

Bader, Maaïke Y.¹; Case, Bradley S.²; Prakash, Nishtha¹

¹Ecological Plant Geography Research Group, Faculty of Geography, Philipps-Universität Marburg, Germany; ²Auckland University of Technology, School of Science, Auckland, New Zealand

5:51pm - 5:53pm

The Impact of Climate on Treelines in Scandinavia

Byrne, Jasmine Anastasia

University of Southeast Norway, Norway

5:53pm - 5:55pm

What forest structure and soil properties account for the protection against shallow landslides

Graf, Frank¹; Rickli, Christian²; Bast, Alexander¹

¹WSL Institute for Snow and Avalanche Research SLF, Switzerland; ²Swiss Federal Institute for Forest, Snow and Landscape Research WSL, Switzerland

5:55pm - 5:57pm

Mapping ecosystem services of mountain forests in Europe

Orsi, Francesco¹; Geneletti, Davide²; Ciolli, Marco²

¹Landscape Architecture and Spatial Planning Group, Wageningen University & Research; ²University of Trento, Italy

Elevational shifts in the topographic control of Andean treeline forest distribution

Toivonen, Johanna¹; Gonzales-Inca, Carlos¹; Bader, Maaïke²; Ruokolainen, Kalle¹; Kessler, Michael³

¹University of Turku, Finland; ²University of Marburg, Germany; ³University of Zurich, Switzerland

A multi-year field experiment for studying the importance of different abiotic and biotic drivers of tree seedling recruitment in an alpine treeline ecotone

Frei, Esther R.^{1,2}; Rixen, Christian²; Bebi, Peter²; Brown, Carissa D.³

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Limitations to the recruitment of *Araucaria angustifolia* beyond forest fragment edges and its implications for forest expansion

Salles, Mali C.; Nagy, László K.

Departamento de Biologia Vegetal, Universidade de Campinas, Brazil

Climate induced changes to tree-line positions

Hansson, Amanda

University of Queensland, Australia

Recent growth trends of coniferous species in the Central European Alps indicate decreasing sensitivity to climate warming

Oberhuber, Walter¹; Gamper, Vanessa¹; Geier, Jacob¹; Wieser, Gerhard²

¹Universität Innsbruck; ²Federal Research and Training Centre for Forests, Natural Hazards and Landscape (BFW), Innsbruck

Heat resistance of trees: Bark insulation is crucial in a more fire-prone future

Bär, Andreas; Mayr, Stefan

University Innsbruck, Austria

Management of forest stands of *Quercus robur* L. in mountainous areas of Galicia (NW Spain) according to the environmental factors

Diaz-Maroto, Ignacio J.

University of Santiago de Compostela, Spain

Pine recolonization dynamics in Mediterranean human-disturbed treeline ecotones

Urbinati, Carlo¹; Vitali, Alessandro¹; Malandra, Francesco¹; Tonelli, Enrico¹; Garbarino, Matteo²; Camarero, Julio³

¹Università Politecnica delle Marche, Italy; ²Università degli Studi di Torino, Italy; ³Istituto Pirenaico de Ecología, CSIC, Saragoza, Spain

Is Climate change adaptation in alpine mountain forests constrained by forest seed production and its climatic triggers?

Schüler, Silvio¹; Lapin, Katharina¹; Braun, Martin²; Hesser, Franziska³; Schwarzbauer, Peter²; Koller, Theo³; Dobes, Christoph¹

¹Austrian Research Centre for Forests BFW, Austria; ²University of Natural Resources and Life Sciences Vienna; ³Wood K PLUS

Quantifying the temporal evolution of the protection service of forests in the face of climate change

Moos, Christine^{1,2,3}; Antoine, Guisan²; Luuk, Dorren³; Heike, Lischke⁴; Christophe, Randin²

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Frost survival strategies of vegetative buds in trees from temperate mountains: Deep supercooling and extraorgan freezing versus ice tolerance

Neuner, Gilbert; Monitzer, Kristina; Kaplenig, Dominik; Ingruber, Julia

Department of Botany, University of Innsbruck, Austria

Monitoring of freezing dynamics in trees: an insight into complexity.

Charrier, Guillaume

INRA, France

Pathogen damages in mountain forests: direct and indirect effects of altered climatic conditions

Ganthalter, Andrea¹; **Trujillo-Moya, Carlos**²; **Schüler, Silvio**²; **George, Jan-Peter**²; **Stöggli, Wolfgang**¹; **Kranner, Ilse**¹; **Mayr, Stefan**¹

¹University of Innsbruck, Austria; ²Austrian Research Centre for Forests, Austria

Effects of climate change on treeline elevation: how to use spatial signals to predict temporal changes?

Bader, Maaïke

University of Marburg, Germany

VEGETATION STRUCTURE ALONG THE FOREST – PÁRAMO TRANSITION BELT IN THE SIERRA NEVADA DE MÉRIDA: IMPLICATIONS FOR UNDERSTANDING TREELINE DYNAMICS

Ramirez Ramirez, Lirey Aysen^{1,2}; **Llambi, Luis Daniel**²; **Schwarzkopf, Teresa**²; **Gamez, Luis Enrique**³

¹Marburg University, Germany; ²Institute of Environmental and Ecological Science. ULA. Venezuela; ³Faculty of Forest and Environmental Science. ULA. Venezuela

Water use and growth responses of Norway spruce and European larch to experimental drought at the subalpine tree line

Oberleitner, Florian¹; **Hasibeder, Roland**¹; **Wagner, Julia**¹; **Hartmann, Henrik**²; **Losso, Adriano**³; **Mayr, Stefan**³; **Oberhuber, Walter**³; **Wieser, Gerhard**⁴; **Bahn, Michael**¹

¹Department of Ecology, University of Innsbruck, Austria; ²Max Planck Institute for Biogeochemistry, Jena, Germany; ³Department of Botany, University of Innsbruck, Austria; ⁴Department of Alpine Timberline Ecophysiology, Federal Research and Training Centre for Forests, Natural Hazards and Landscape (BFW), Austria