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: Maaike Bader
Moderator: Georg Gratzer
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, Maaike
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, Florian; Hasibeder, Roland; Wagner, Julia; Hartmann, Henrik; Losso, Adriano; Mayr, Stefan; Oberhuber, Walter; Wieser, Gerhard; Bahn, Michael
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; Rixen, Christian; Bebi, Peter; Brown, Carissa D
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
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 Ecologia, 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 Aysen¹,²; 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, Maaike²; 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, Stefan³; Tappeiner, Ulrike¹,³
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; Stöggl, 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, Christine1,2,3; 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; Klingsbigr, Daniela3; Kohl, Bernhard1; Markart, Gerhard1; Meišl, Gertraud3; Nagl, Fabian1; Perzl, Frank1; Pircher, Georg4; Rössler, Theresa5; 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, Lászlo 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, Michæla1,2; 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 micorefugia - 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

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<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
<th>Institutions</th>
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<tr>
<td>5:45pm - 5:47pm</td>
<td>Aspiration of inter-tracheid pit and cavitated tracheids after frost drought cause inhibition of water transport in young stems of Abies veitchi</td>
<td>Taneda, Haruhiko¹; Ooeda, Hiroki¹; Ohtsuka, Akihiro¹; Ogasa, Mayumi²; Yazaki, Kenichi²; Maruta, Emiko³</td>
<td>¹The University of Tokyo, Japan; ²Forestry and Forest Products Research Institute; ³Kanagawa University</td>
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<td>5:47pm - 5:49pm</td>
<td>Changes in xylem anatomy and hydraulic properties of European beech (Fagus sylvatica L.) along an elevational transect in the Tirolean Alps</td>
<td>Mazzocco, Antonio G. F.</td>
<td>Georg-August-Universität Göttingen, Germany</td>
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<td>5:49pm - 5:51pm</td>
<td>Spatial Patterns of Global Treeline Ecotones</td>
<td>Bader, Maaike Y.¹; Case, Bradley S.²; Prakash, Nishtha¹</td>
<td>¹Ecological Plant Geography Research Group, Faculty of Geography, Philippus-Universität Marburg, Germany; ²Auckland University of Technology, School of Science, Auckland, New Zealand</td>
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<td>5:51pm - 5:53pm</td>
<td>The Impact of Climate on Treelines in Scandinavia</td>
<td>Byrne, Jasmine Anastasia</td>
<td>University of Southeast Norway, Norway</td>
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<td>5:53pm - 5:55pm</td>
<td>What forest structure and soil properties account for the protection against shallow landslides</td>
<td>Graf, Frank¹; Rickli, Christian²; Bast, Alexander¹</td>
<td>¹WSL Institute for Snow and Avalanche Research SLF, Switzerland; ²Swiss Federal Institute for Forest, Snow and Landscape Research WSL, Switzerland</td>
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<td>5:55pm - 5:57pm</td>
<td>Mapping ecosystem services of mountain forests in Europe</td>
<td>Orsi, Francesco¹; Geneletti, Davide²; Ciolli, Marco²</td>
<td>¹Landscape Architecture and Spatial Planning Group, Wageningen University &amp; Research; ²University of Trento, Italy</td>
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<td>Elevational shifts in the topographic control of Andean treeline forest distribution</td>
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<td>Limitations to the recruitment of Araucaria angustifolia beyond forest fragment edges and its implications for forest expansion</td>
<td>Salles, Mali C.; Nagy, László K.</td>
<td>Departamento de Biologia Vegetal, Universidade de Campinas, Brazil</td>
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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 Ecologia, 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

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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’Études de la Neige, Saint Martin d’Hères, France; 4WSL Institute for Snow and Avalanche Research SLF, Davos Dorf, Switzerland

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BFW, Austria

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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
Ganthaler, Andrea1; Trujillo-Moya, Carlos2; Schüler, Silvio2; George, Jan-Peter2; Stögl, Wolfgang1; Kranner, Ilse1; Mayr, Stefan1
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, Maaike
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 Aysen1,2; 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

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