



**150 JAHRE
NACHHALTIG
VORAUSSCHAUEN**
1872 - 2022

UNIVERSITÄT FÜR BODENKULTUR WIEN

Research and Education in Forest Sciences

Universität für Bodenkultur Wien (BOKU)

University of Natural Resources and Life Sciences, Vienna

Introduction - Msc European Forestry
19th of January 2023

Harald Vacik
Department of Forest and Soil Sciences
Institute of Silviculture



Mountain Forests

Foto: SPÖRK

World Heritage Region Hallstatt
















Nationalpark Hohe Tauern

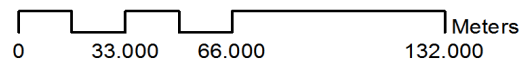
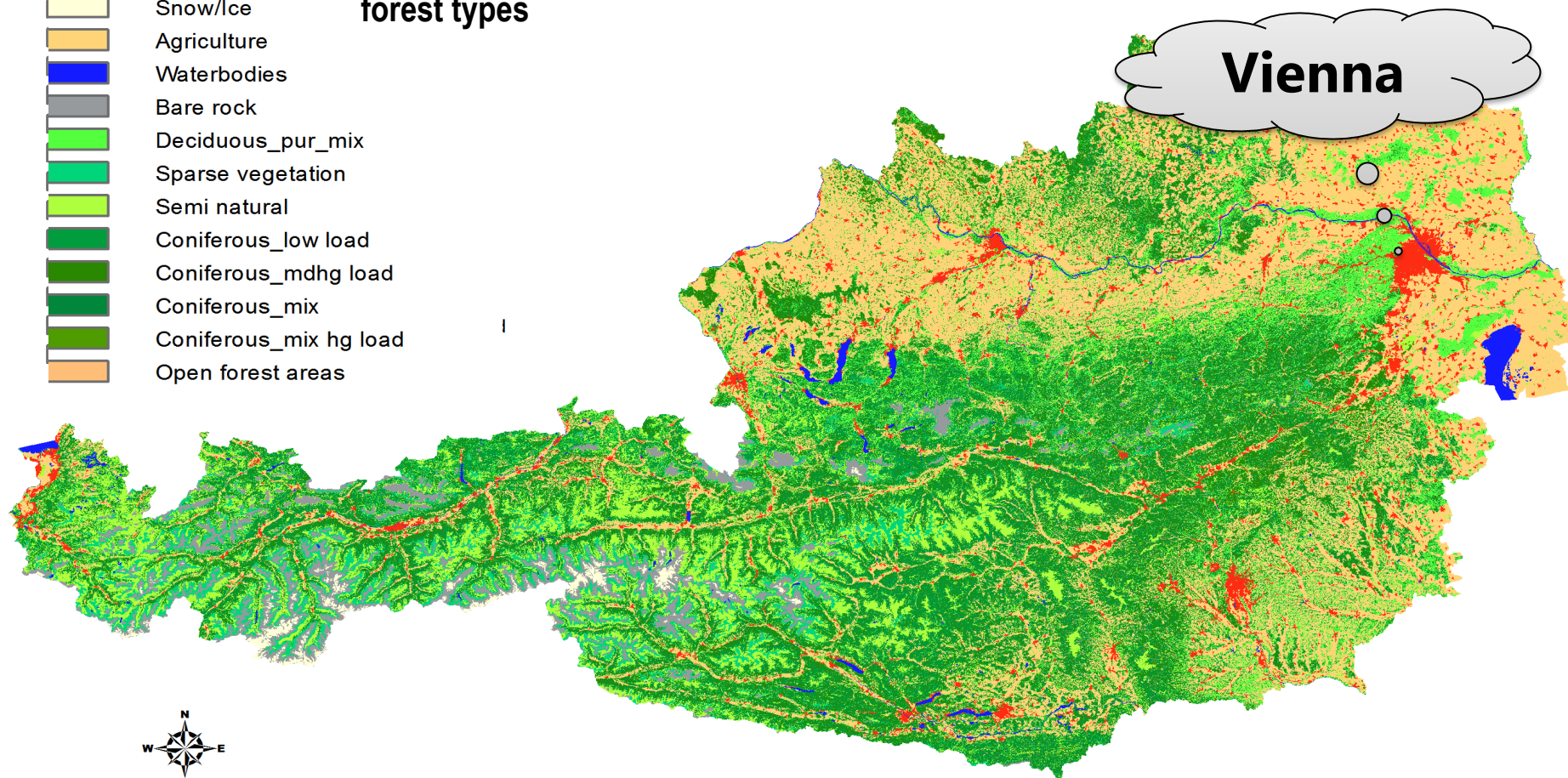


Austria – Vienna

Legend

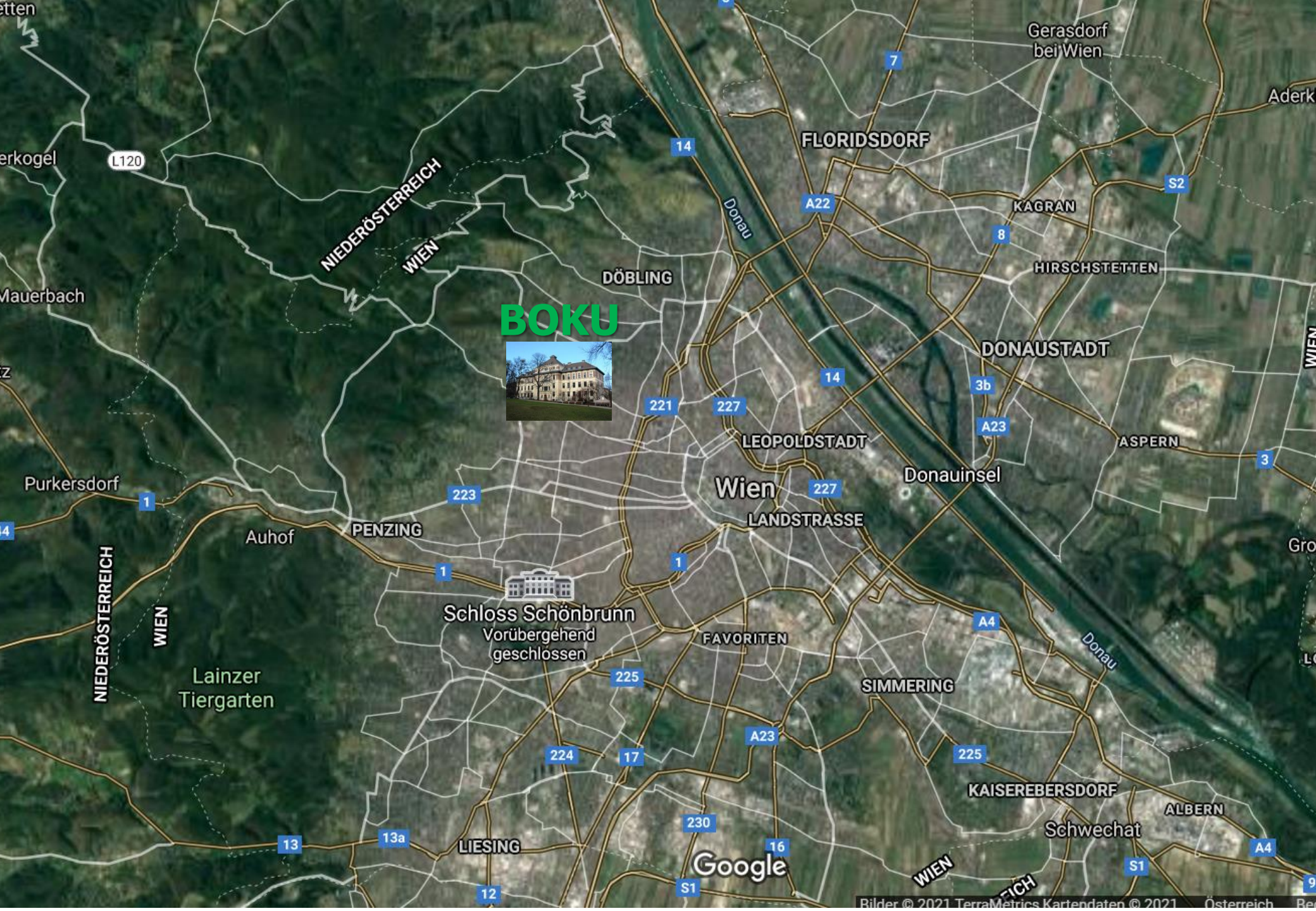
- | | |
|---|------------------------|
|  | Urban areas |
|  | Snow/Ice |
|  | Agriculture |
|  | Waterbodies |
|  | Bare rock |
|  | Deciduous_pur_mix |
|  | Sparse vegetation |
|  | Semi natural |
|  | Coniferous_low load |
|  | Coniferous_mdhg load |
|  | Coniferous_mix |
|  | Coniferous_mix hg load |
|  | Open forest areas |

landcover and forest types



European Beach forest in the Vienna Woods (Wienerwald)





BOKU



Schloss Schönbrunn
Vorübergehend
geschlossen

Google

Universität für **B**oden**K**ultur (BOKU)



BOKU – themes and competences



Soil and terrestrial ecosystems



Water –
Atmosphere –
Environment

Living space and landscape

Development of the living space

Management natural resources



Renewable raw materials, resources oriented technologies



Resources and societal dynamics

Securing nutrition and health

Nano sciences and technology

Food – nutrition – health



Biotechnology

BOKU – University of Natural Resources and Life Sciences Vienna – Facts and figures

- Founded in 1872 – celebrated 150 years in 2022
- ~ **12.000 students** in 8 Bachelor, 26 Master (+ several double degree programmes; 11 Master programs in English) and several PhD programs (~ 800 students); **1550 graduates** per year; students satisfaction: top ranked in Austria; 20% foreign students; Greenmetric University ranking: no. 8 world wide, 2 in education; QS World University Ranking by Subject: Rank 33
- ~ 1600 employees (full time equivalent), **2550 employees** (head count); ~700 scientists employed on a project basis; ~ 74 full professors (1/3 non Austrians), ~ 130 Assoc. Profs
- ~ **700 ongoing projects**, ~ 100 EU projects, ~ 110 FWF projects, participation in several excellence projects (FWF, COMET, Christian Doppler, Laura Bassi, WWTF, Marie Curie,...)
- ~ 100 Mio € GUF, **42 Mio € external resources** (projects; basis 2013)
- ~ **2500 scientific publications** per year (~ 690 SCI), ~ 1400 presentations per year
- Organized in 15 departments

Sites of BOKU

- Türkenschanze / Gregor Mendel Straße
- BOKU Site Muthgasse
- BOKU Site Tulln
- „Fourth Site“ – Research farms and forests
 - Research Farm Groß-Enzersdorf
 - Landscape planning research Essling
 - Horticulture Research Jedlersdorf
 - Forest Nursery and Arboretum Knödelhütte
 - Research Forest Heuberg
 - Water Cluster Lunz

Site Türkenschanze



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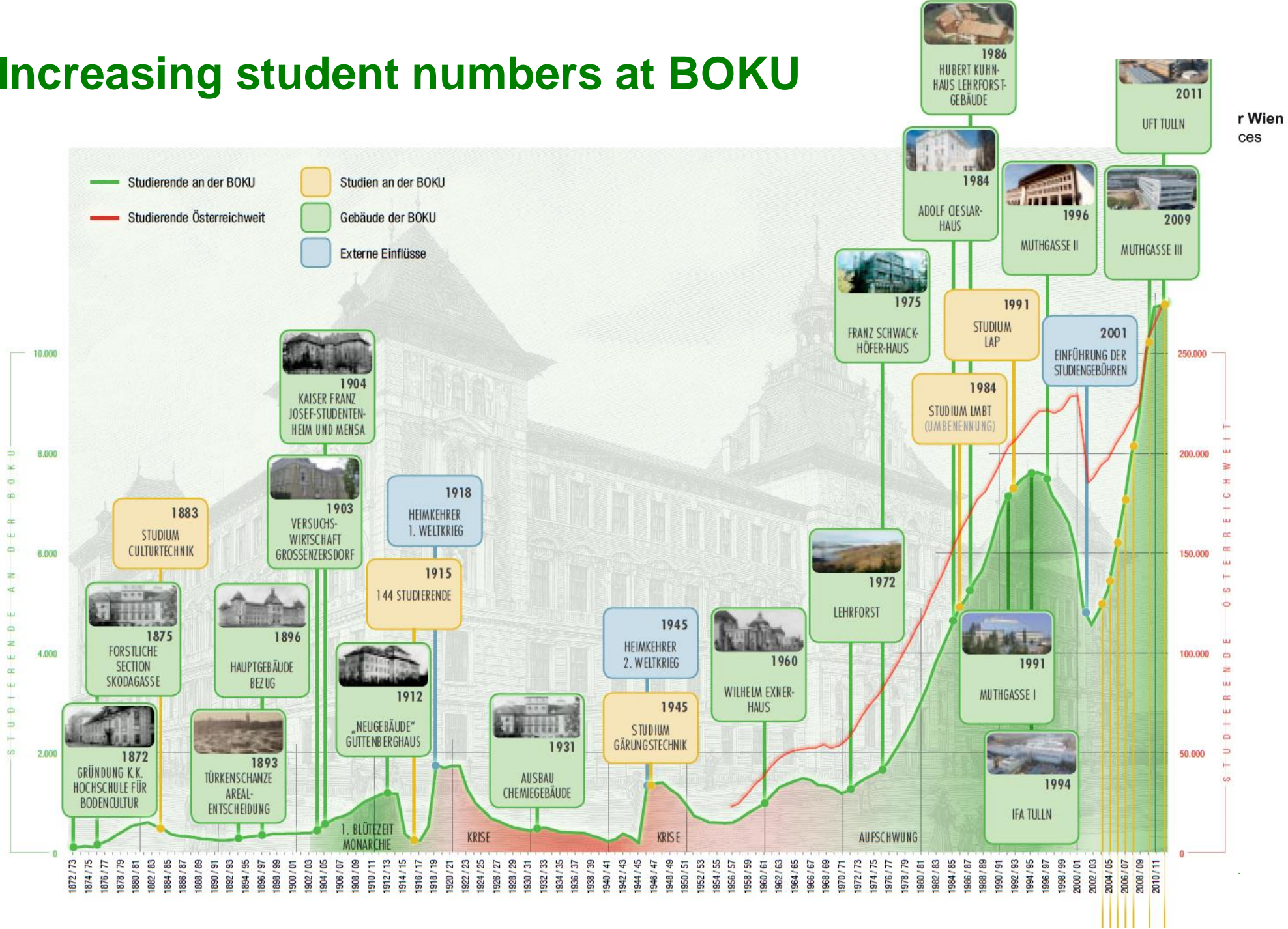
Research farms and forests



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Increasing student numbers at BOKU



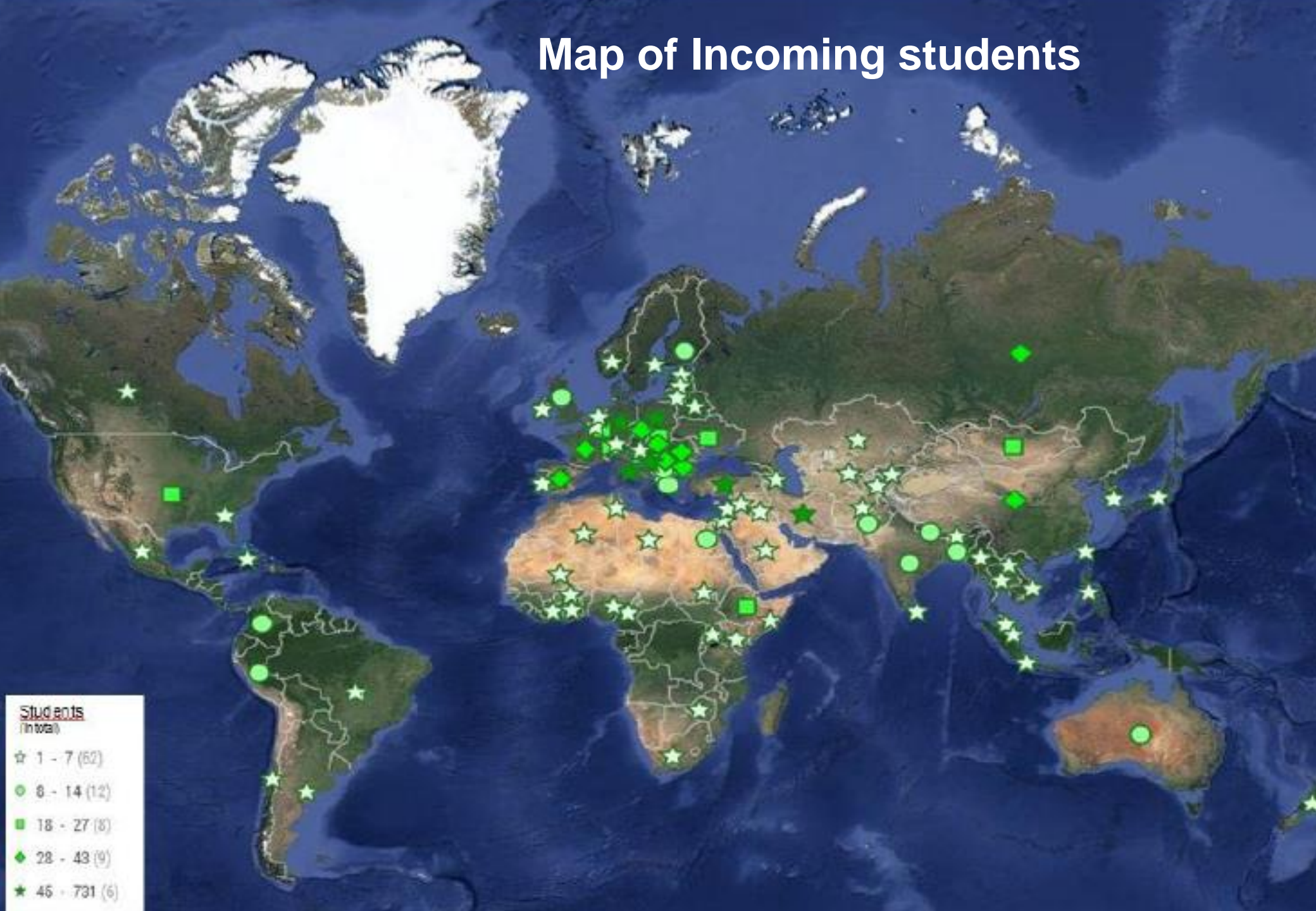
BOKU - international master programs

Further information : www.boku4you.at

- Animal Breeding and Genetics
- Applied Limnology – Wetland Management
- Environmental Sciences – Soil, Water and Biodiversity
- **European Forestry**
- Horticultural Sciences
- Material and thermal utilization of renewable raw materials (German)
- **Mountain Forestry**
- **Natural Resources Management and Ecological Engineering**
- Organic Agricultural Systems and Agroecology
- Safety in the Food Chain
- Sustainability in Agriculture, Food Production, Food Technology in Danube R.
- Viticulture, Oenology and Wine Economy (in German)
- Water Management and Environmental Engineering



Map of Incoming students



Excursion and joint Field Camp I & Field Camp III

28 participants

5 continents: Africa, Asia, Europe, North America, Oceania

16 countries: Bangladesh, Belgium, Bhutan, Canada, China (incl. Hongkong), Ethiopia, France, Germany, India, Nepal, New Zealand, Pakistan, Rumania, Spain, Tanzania, USA



Master programs related to forestry at BOKU

- provide a focused education in managing **mountain forest resources** with a global perspective
- teach students to **recognise and solve problems** in mountain forest management and conservation
- Focus on timber production within **multifunctional management**
- **integration** of engineering, socio-economics and natural sciences
- strengthen **interdisciplinary** approaches in forestry

Learning Outcomes of Mountain Forestry

- able to describe **ecological characteristics** of mountain forest ecosystems and identify site specific limiting ecological factors
- describe natural dynamics and identify the ecological **effects of management strategies** on mountain forest ecosystems based on these specific characteristics
- able to characterize the **role of specific social and economical settings** of sustainable natural resource management of mountain regions
- able to **apply scientific methods including participatory approaches** for analyzing social and economical characteristics of mountain regions
- recognize the **role of multiple stakeholder interests** for management of mountain forests and are able to integrate these into management strategies which they develop and / or implement.
- able to identify, **develop and implement suitable methods for resource inventories** and monitoring, thereby ensuring sustainability of resource use in forests
- able to identify, develop and implement adapted and **appropriate technological methods for sustainable management** of mountain forests.
- able to **integrate ecological, socio-economical characteristics** of mountain regions
- analyse interactions between these factors and **derive management strategies for sustainable provision of multiple ecosystem services**.

Selected courses in MSc EF study tracks

Decision support systems for resource management	Remote sensing and GIS in natural resource management	3	Autumn 2023
	Decision support systems	3	Autumn 2023
	Multiple criteria decision making in natural resource management	3	Autumn 2023
Resource management for ecosystem services	Natural resource management in mountain forests I, III	4+2	Spring 2024
	Agroforestry in mountain regions	2	Spring 2024
	Biodiversity and conservation of mountain forests	2	Spring 2024
	Natural resources management in mountainous areas III - wildlife problems	2	Spring 2024
Spatial and ecological modelling	Modelling of mountain forest ecosystems	2.5	Autumn 2023
	Adapting forest management to climate change	2	Autumn 2023
Resource economics and policy	Forest resource economics	4.5	Autumn 2023
	Innovations for sustainable forest management	4	Autumn 2023
	Mountain forest policy	4.5	Autumn 2023
Silviculture and engineering	Harvesting systems for mountainous regions	2	Autumn 2023
	Cable yarding project	1.5	Autumn 2023
	Road network planning	3	Spring 2024
	Field camp III - integrated forest management applications	3	Autumn 2023

Other selected courses of Msc Mountain Forestry program

Introduction to mountain forestry and scientific skills	Field Camp I - Introduction to mountain forestry and forest sciences (2) Methods of data collection, management and analysis (2)
Ecology of Mountain Forests	Mountain forest dynamics and fire ecology (3) Mountain forest soils and forest nutrition (2,5) Field Camp II -Concepts and methods of site ecology, forest growth and yield (3) Mountain forest climatology and headwater hydrology (2,5) <i>Biodiversity and conservation of mountain forests (2)</i> <i>Air pollution effects on forest ecosystems (3)</i> <i>Chemistry for forestry (1)</i> <i>Specific methods on soil analysis (1)</i> <i>Physical and selected chemical methods of soil analysis (4,5)</i> <i>Forest and water (3)</i>
Economic and social dimensions in mountain forestry	Forest resource economics (4,5) Mountain forest policy (4,5) Participatory methods in development research and practice (3) Project management in development co-operation (2) <i>Economics of multiple use forestry (1,5)</i> <i>Innovations for Sustainable Forest Management (4)</i> <i>Applied development research I (3)</i> <i>Applied development research II (3)</i> <i>Organisational behaviour and gender issues (3)</i> <i>Forest products, marketing and strategy (3)</i>

Other selected courses from modules of Msc Mountain Forestry program

Inventory and Monitoring	<p>Forest inventory (3) Modelling of mountain forest ecosystems (2,5) Remote sensing and GIS in natural resource management UE (3) <i>Remote sensing and GIS in natural resource management VO (3)</i> <i>3P – Sampling (2)</i></p>
Forest Management for goods and environmental services	<p>Natural resource management in mountain forests (4) Agro forestry in mountain regions (2) The role of forests in mountain risk engineering (2) Forest protection (2) <i>Protection and mitigation measures against natural hazards (3)</i> <i>Risk management and vulnerability assessment (3)</i> <i>Mountain hazard processes (6)</i> <i>Decision support systems (3)</i> <i>Multiple criteria decision making in natural resource management (3)</i> <i>Fire management in mountain forest ecosystems (2)</i> <i>Adapting forest management to climate change (2)</i> <i>Natural resources management in mountainous areas III -Wildlife problems (2)</i></p>
Forest Engineering	<p>Harvesting systems for mountainous regions (2) Field Camp III – Integrated forest management applications (3) Road network planning (3) Cable yarding project (1.5) <i>Technology assessment (3)</i> <i>CAD - Computer aided design (1)</i> <i>Timber harvesting (1)</i></p>

Department of Forest- and Soil Sciences

Research and scientific education in (forest-) ecosystems analysis, ecosystem modeling and management, soil use and soil protection organized by:

- Institute of Soil Science
- Institute of Forest Ecology
- Institute of Silviculture
- Institute of Forest Growth and Yield Research
- Institute of Forest Engineering
- Institute of Forest Entomology, Forest Pathology and Forest Protection
- Forest Experimental and Training Centre



Potential fields of research e.g. for conducting a master thesis

- Silvicultural techniques and management of mountain forests
- Evaluating Sustainable Forest Management approaches and Harvesting techniques
- Forest Ecosystem Modeling
- Multi Criteria Decision Making and Decision Support Systems
- Biodiversity and Forest Genetics
- Forest Ecology and natural dynamics of forest ecosystems
- Forest Policy Analysis (EFI – FPNR)
- Forest Genetic and general Soil Lab
- More than 180 experimental sites
- Experimental garden and Tree Nursery “Knödelhütte”



Research in natural reserves to understand forest dynamics and maintain biodiversity



Legende

Wuchsgebiete

Untersuchte
Naturwaldreservate

Größenklassen

- <20 ha
- 20-50 ha
- 50-100 ha
- >100 ha



S. Tschann, 2014
NWR Saminatal

M. Götze, 2013
NWR Hutterwald

M. Kürsten, 2014
NWR Stoissen

M. Kasseroler, 2011
NWR Krimpenbachkessel

M. Rahman, 2007
NWR Lange Leitn

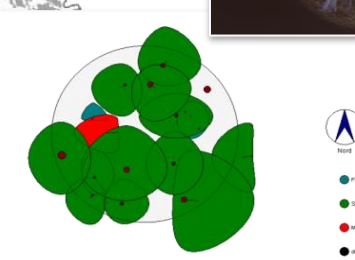
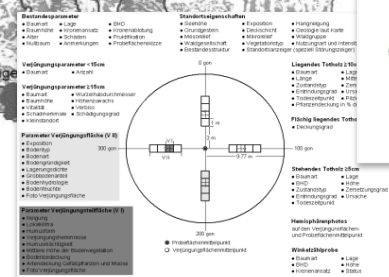
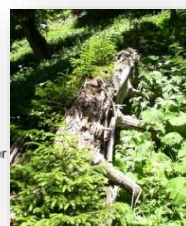
S. Becker, 2014
NWR Dürrwald

H. Ruprecht, 2014
ELENA

M.B. Winter, 2009
NWR Goldeck



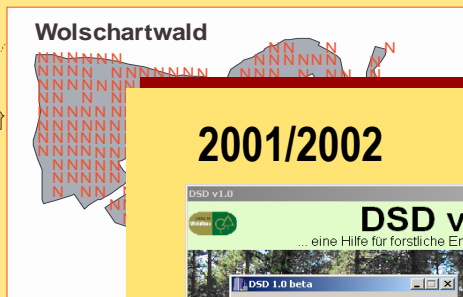
0 100 Kilometer



Stand: Jänner 2007

Forest management planning and decision support systems

1998

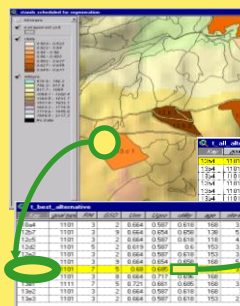


2001/2002



Decision Support Dourova
DSD v1.0 – scots pine forests

1999

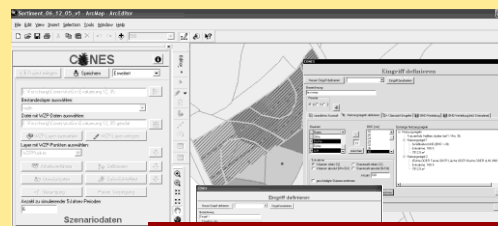


SDSS Wildal

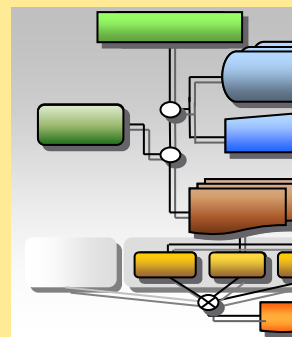
Regeneration planning for a sustained water yield

Deci
Conv

2002/2005



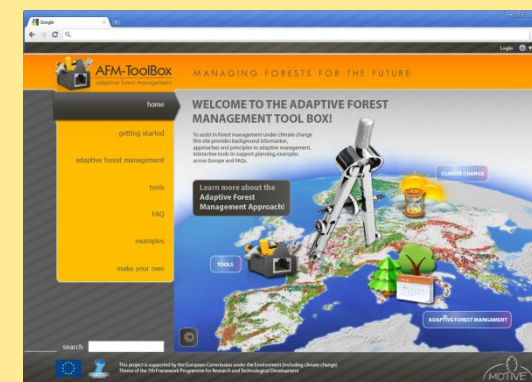
2006/2008



ClimChalp

Adaption of forest management for coniferous forests under climate change

2010/2015



AFM - Toolbox

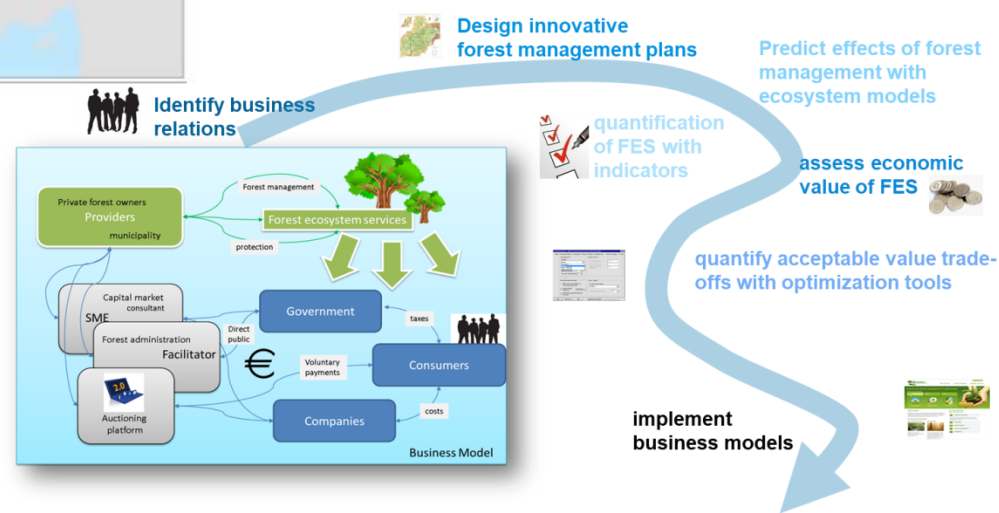
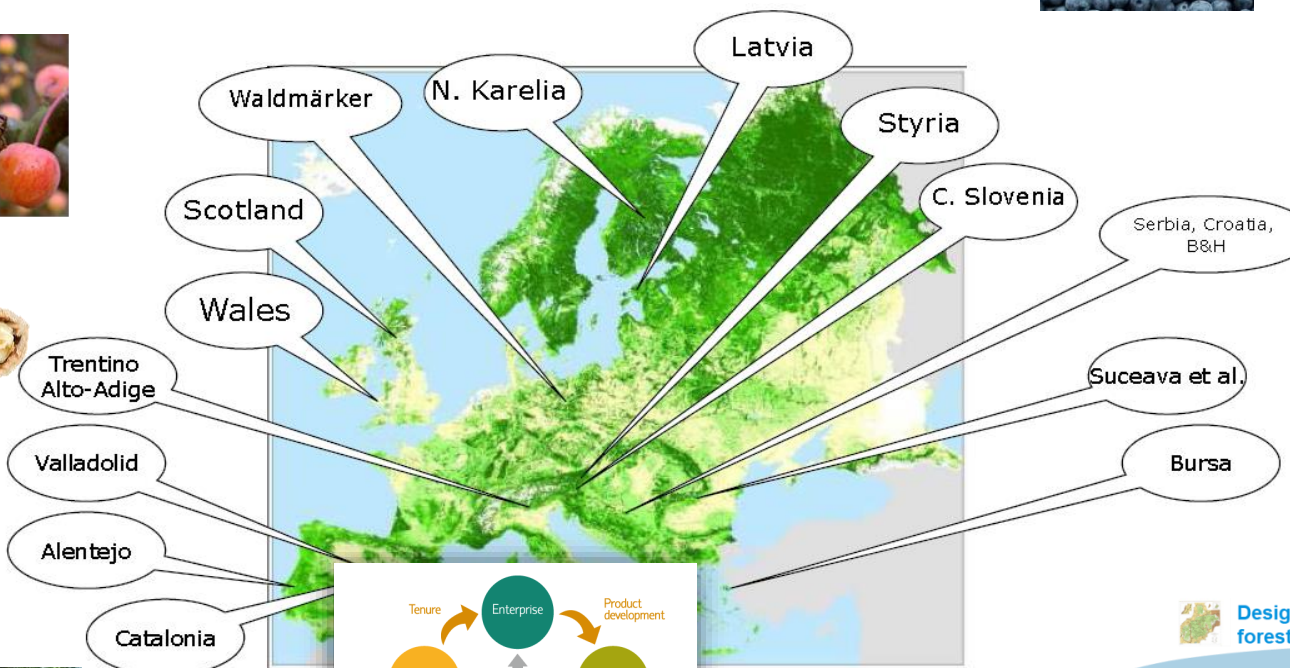
Adaptive forest management under climate change

Sustainable Forest Management

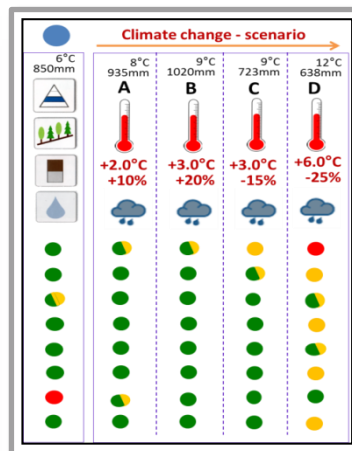
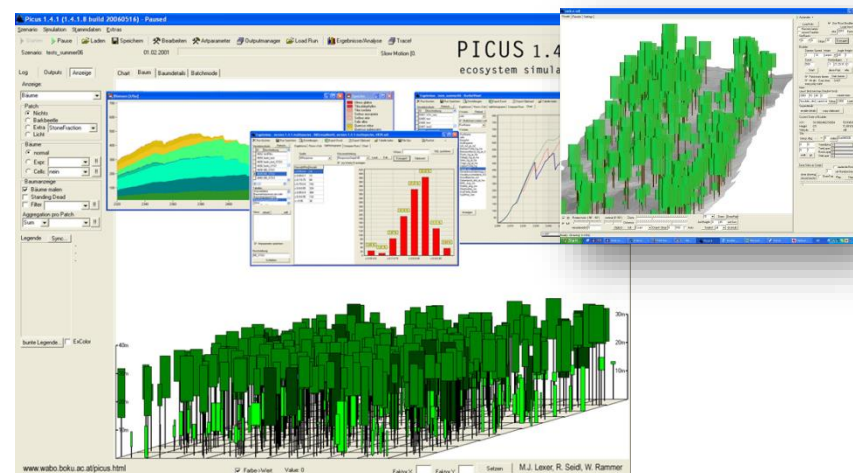
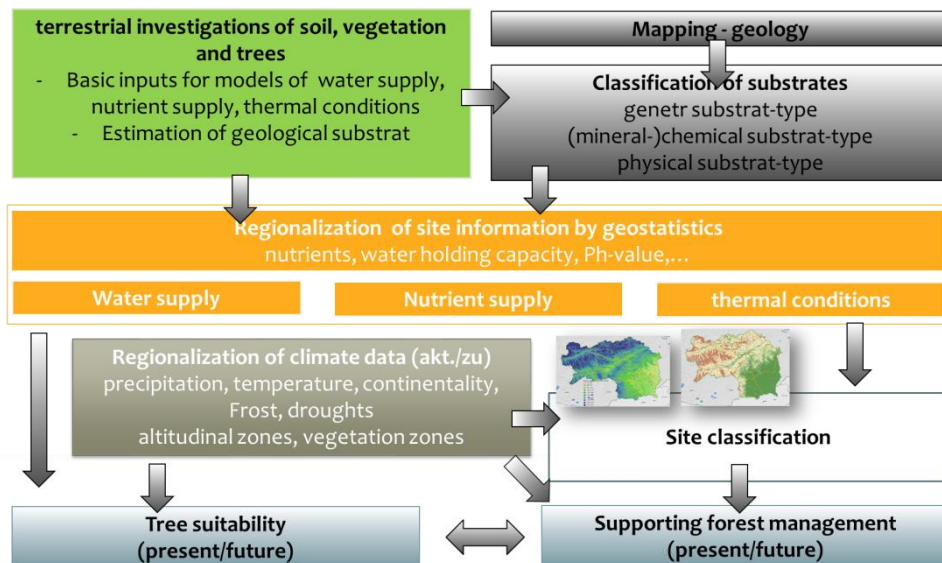
Non Wood Forest Products and Ecosystem Services



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Forest site classification and tree species suitability under climate change



suitability

- weak
- moderate
- good

Input:

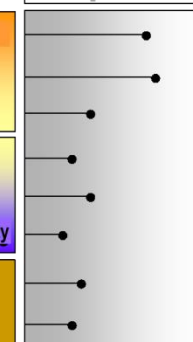
- (-) Site requirements of species
- (-) Site data
- (-) Climate scenarios

[Steiner & Lexer (1998);
Seidl et al. (2011)]

- Growing degree days
- Frost
- Heat stress
- Relative humidity
- Drought periods
- Water holding capacity
- Soil pH
- Nutrient supply
- Vulnerability to pests
- Other risks

Total suitability

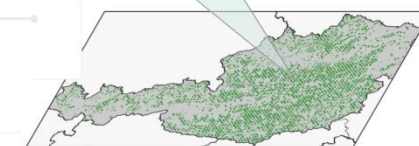
suitability in particular



knowledgebase

- Ecosystem models
- Literature
- Expertknowledge

Spatial unit

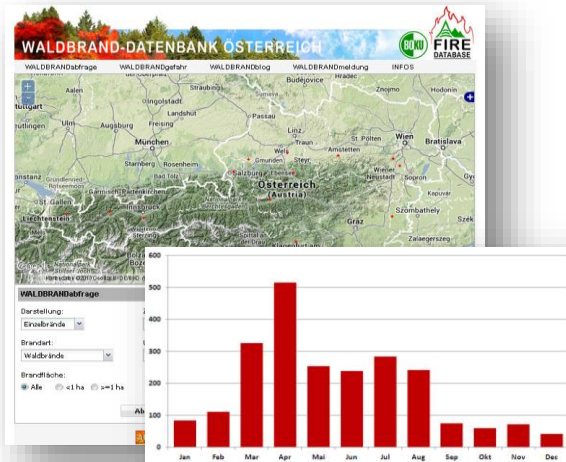


Forest Fire Research in mountain ecosystems

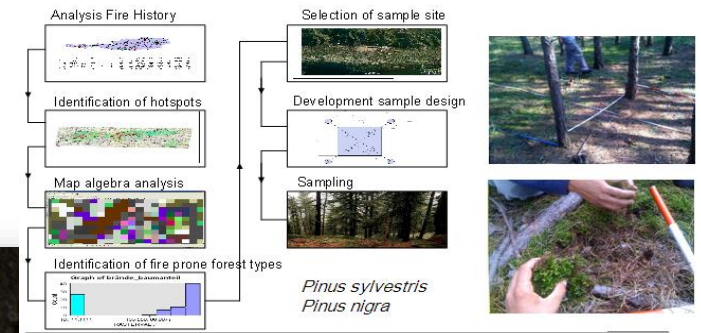


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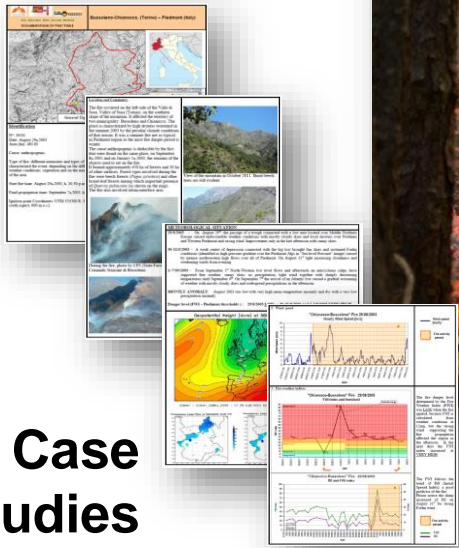
Wildfire database



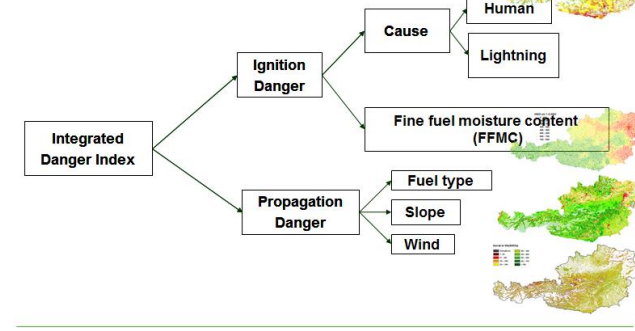
Fuel models



Case studies



Fire danger



Selected master thesis topics of last years

Starcevic A.(2022) Forest dynamics of the **natural forest reserve** Schiffwald

Wangchuk R. (2022) The Factors that Influence the Contribution of **Non-Wood Forest Products** to Rural Livelihoods and the Roles of Policies surrounding NWFPs in Bhutan

Imparato Maximo Y. (2022): Forest **bioeconomy** in Brazil: recent developments and opportunities.

Hoang, T.T. (2021): Analysis of the **stakeholder perceptions** and trends of forest fire occurrence in the Alpine region.

Nazari, M. (2020): Identifying successful mechanisms for the implementation of payment for **ecosystem services**

Yosef, A. B.(2019): **Growth assessment of tree species** growing in the Amhara region in Ethiopia

Delazari Deniz L. (2017): Modelling time and fuel usage in **timber transport** in mountain forestry.

Silva Andrade M. (2017): Evaluation of **drought effects** on radial stem growth of Norway spruce and Scots pine in Tyrol.

Tariyal G. (2017): Building **resilient livelihoods** towards biotic and abiotic disturbance factors in Bhutan – A community based adaptation to global change.

Ohler C. (2017) Cooperation or conflict? An analysis of global **forest governance**.

Vejnovic V. (2016) Analysis of the readiness of Serbia to effectively comply with and implement the **European Timber Regulation** (EUTR).

Yang L. (2015) Influence on nitrogen nutrition form and drought cycles on the **fine root respiration** of two tree species

City of Vienna



Tourist attractions (i)



City Hall



Parliament



Burgtheater



State Opera

Hofburg



Tourist attractions (ii)



St. Charles's Church



Belvedere Palace



St. Stephen's Cathedral



Schönbrunn Palace



Giant Wheel

Traditional food

- Wiener Schnitzel



- Tafelspitz



- Apfelstrudel



- sweet pancakes



- Sachertorte



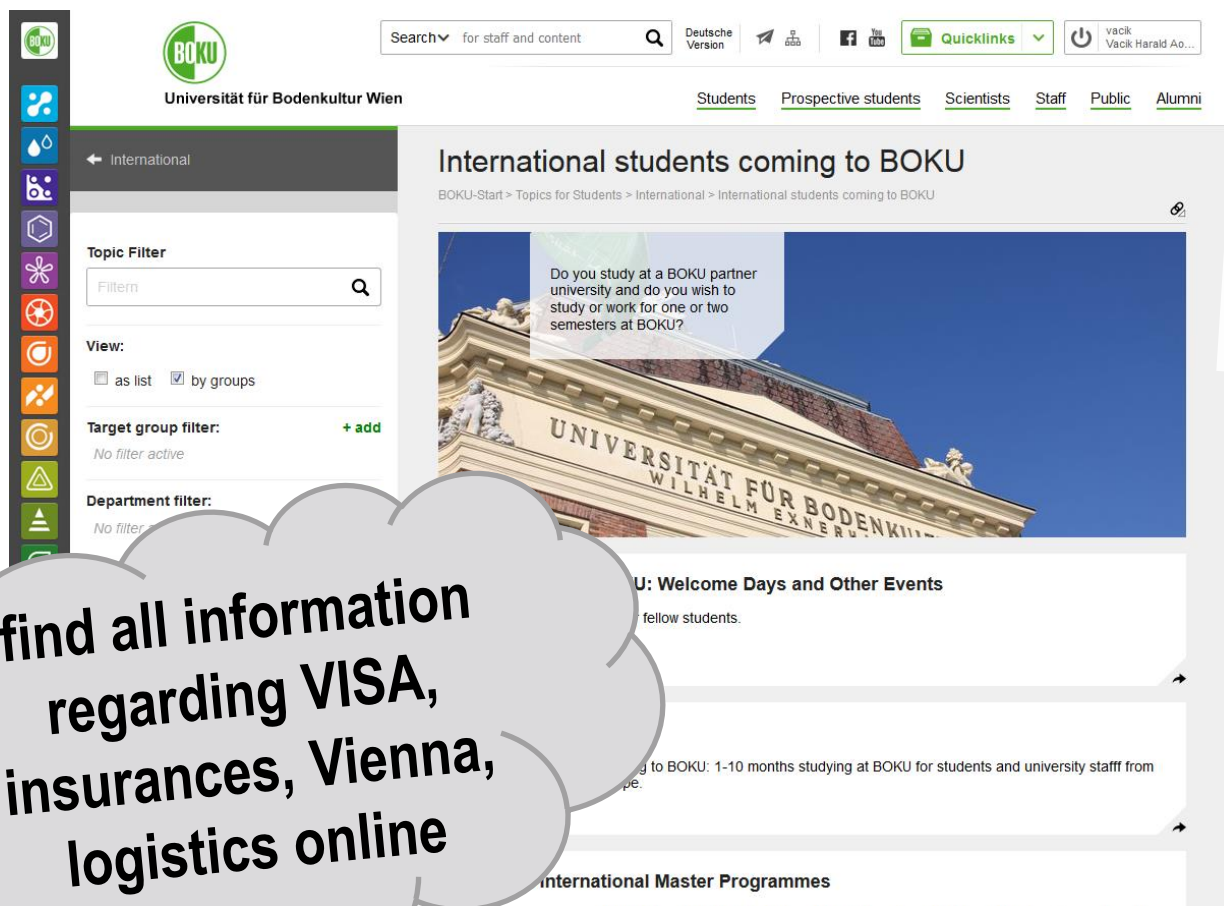
- ...Mozartkugeln and many more ;-)

Any other issues



- Semester starts in October
- Welcome days offered by BOKU
- Introductory Field Camp I (October) to get to know other intern. students
- Offer of german language courses by CIR
- FIS – research database allows to finding a supervisor for master thesis topic – please contact me <https://forschung.boku.ac.at/>
- Networking with IFSA student association <https://www.oehboku.at/oeh-boku-international-network/ifsa.html>
- Support by OEAD housing services for finding a living place, more difficult to find private rooms/flats (monthly rents € 350 – 570.-) <https://www.oeadstudenthousing.at/en/>
- meals offered at mensa BOKU (new wooden building)
- good infrastructure regarding public transport in the city

Center for International Relations (CIR)



find all information regarding VISA, insurances, Vienna, logistics online



Welcome days for international students

contact point for international students from MSc European Forestry programm
Nicole Fohringer
nicole.fohringer@boku.ac.at

<https://boku.ac.at/en/universitaet-fuer-bodenkultur-wien-boku/studieren-an-der-boku/themen-fuer-studierende/internationales/international-students-coming-to-boku/>



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Thanks for your attention!

**Institute of Silviculture
Department of Forest and Soil Sciences
University of Natural Resources and Life Sciences, Vienna**

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