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The ongoing outbreak of *Ips typographus* in Northern Austria

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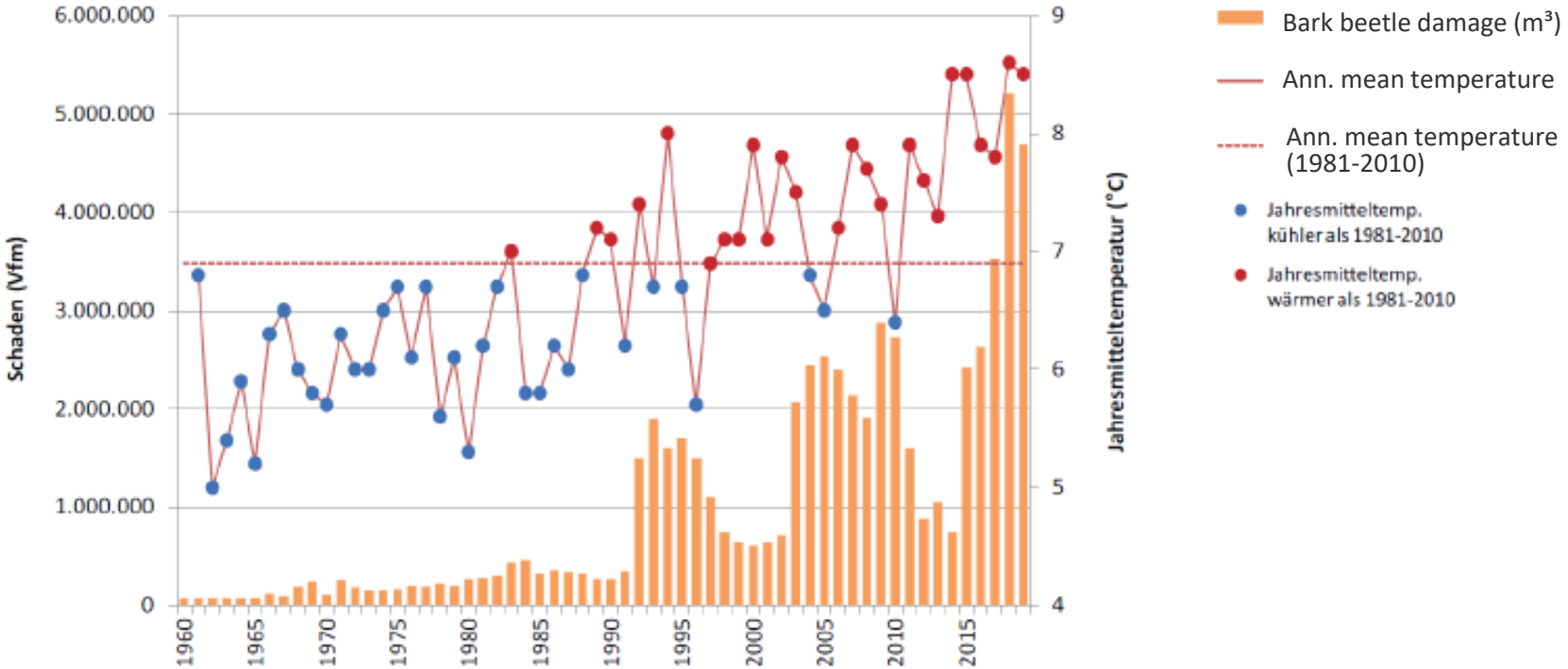
How and when did it all start?

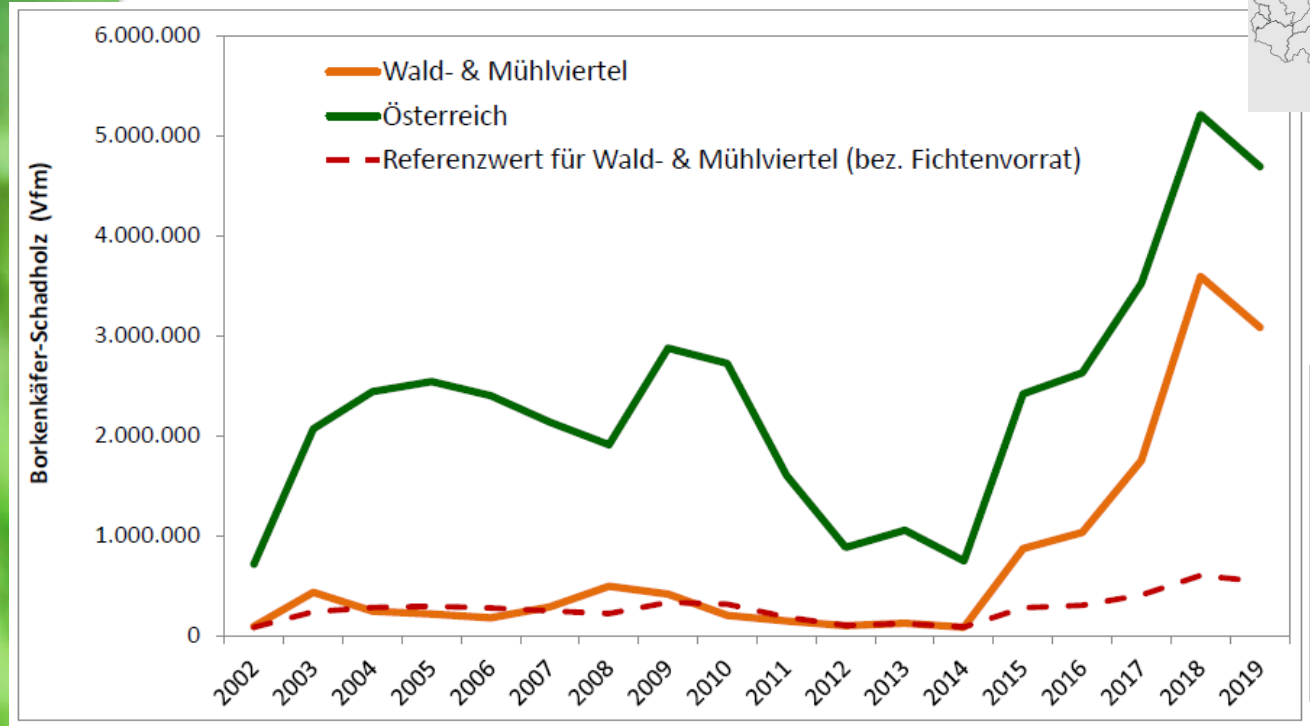


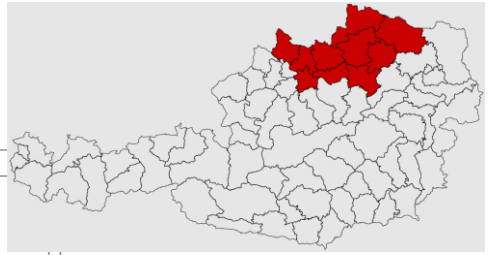
Rising temperatures and increasing damage by bark beetles in Austria (Hoch & Steyrer 2020: CCCA Fact Sheet #31)

How and when did it all start?

Spruce attacked by *Pityogenes chalcographus* in Lower Austria, Sept. 2015

Photo: Krehan, BFW

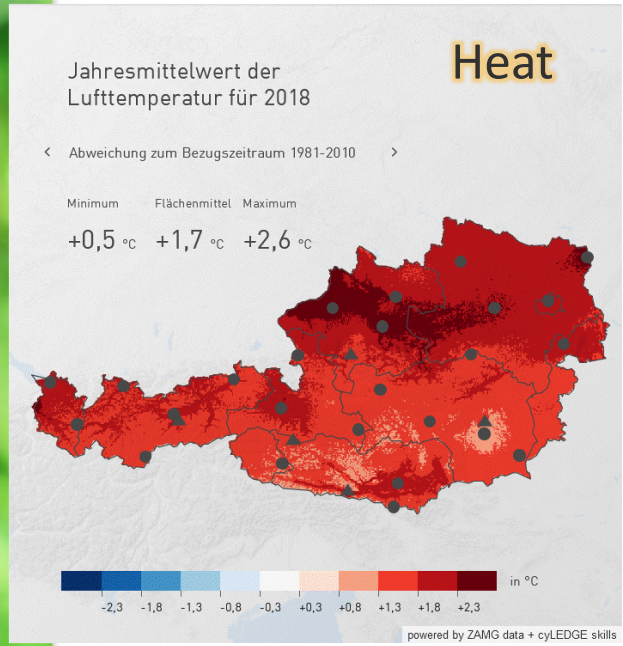




Major storm events (e.g. 2002, 2007/8) preceeded previous outbreaks in AT.
No such major events occurred in the year(s) before 2015 (only regional damage by ice breakage).

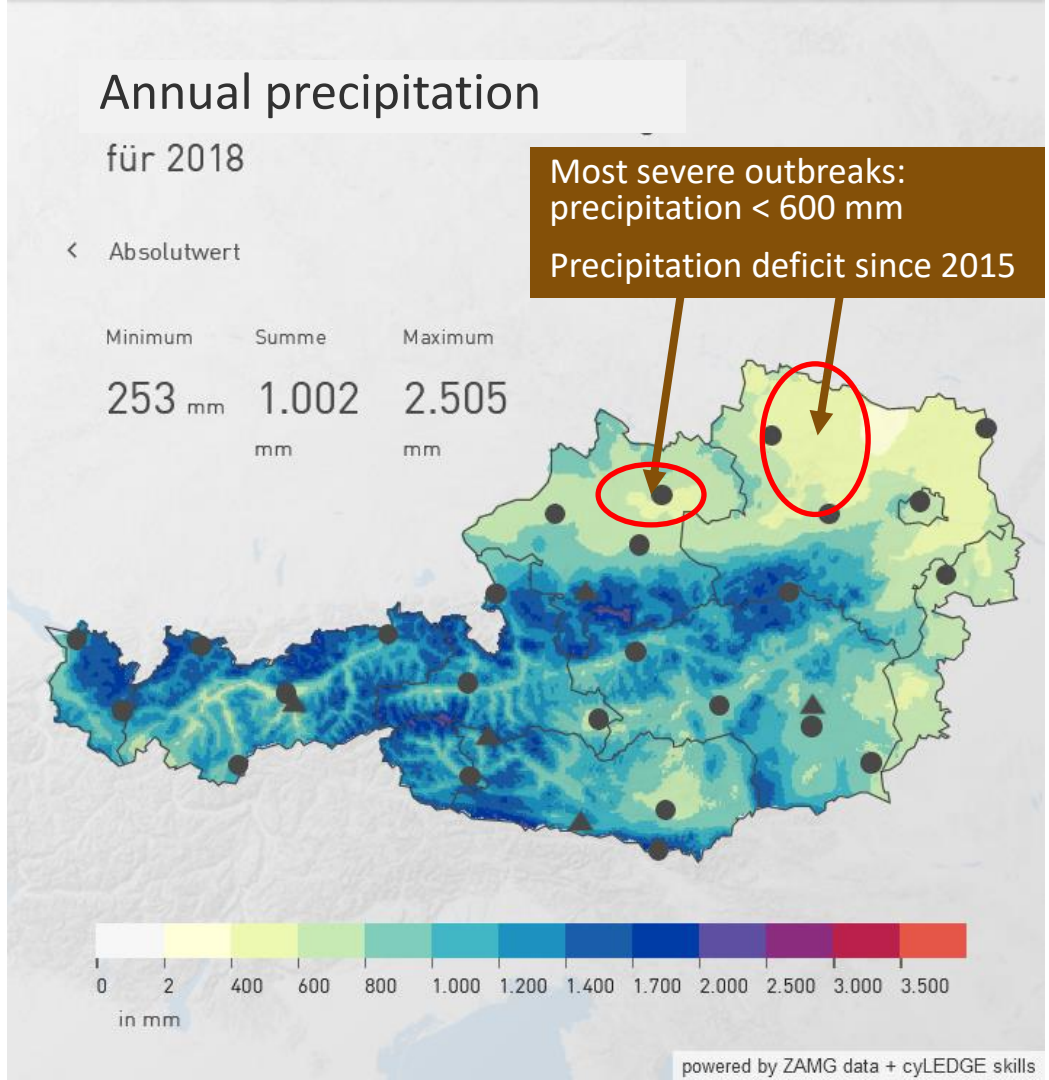
Damage by bark beetles (total) (Documentation of forest damaging factors, **DWF**):
Wald- und Mühlviertel (i.e., northern Austria) in comparison to Austria total (Referenzwert = expected value based on spruce stock).

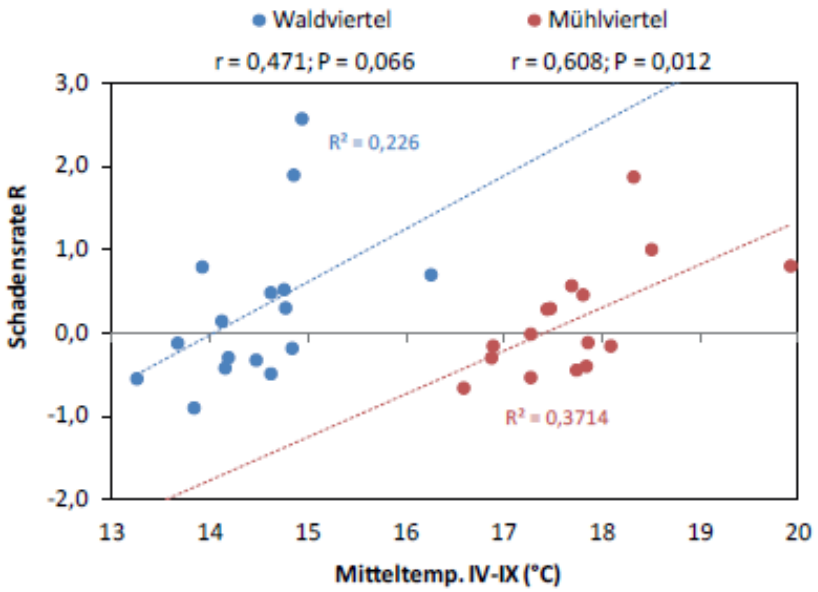
Drought

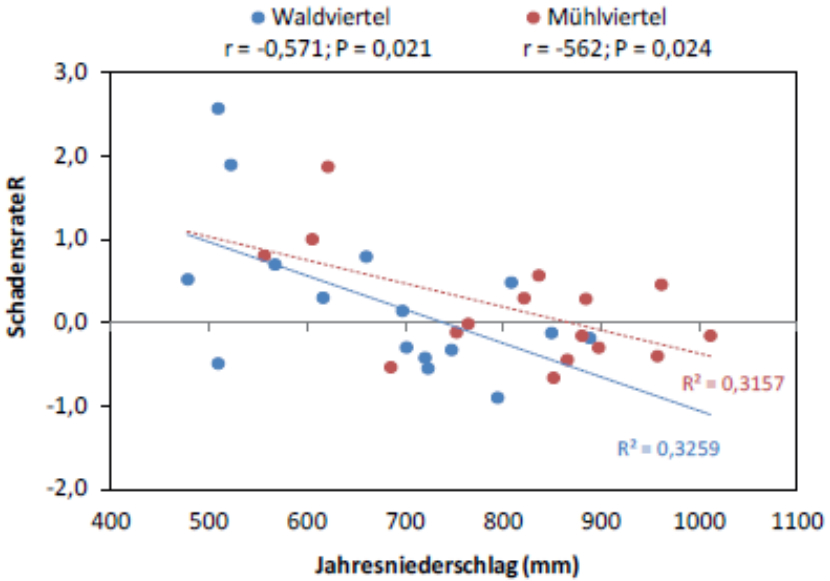


Zentralanstalt für Meteorologie und Geodynamik

www.zamg.ac.at





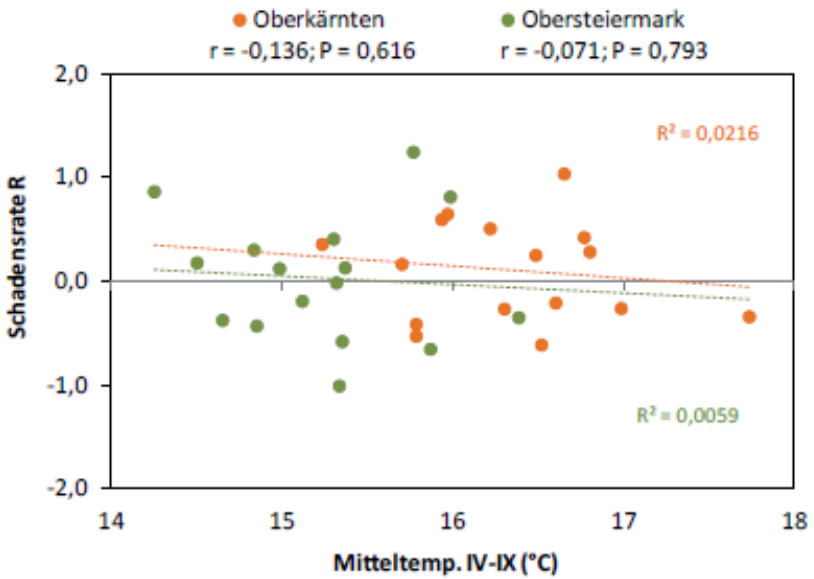


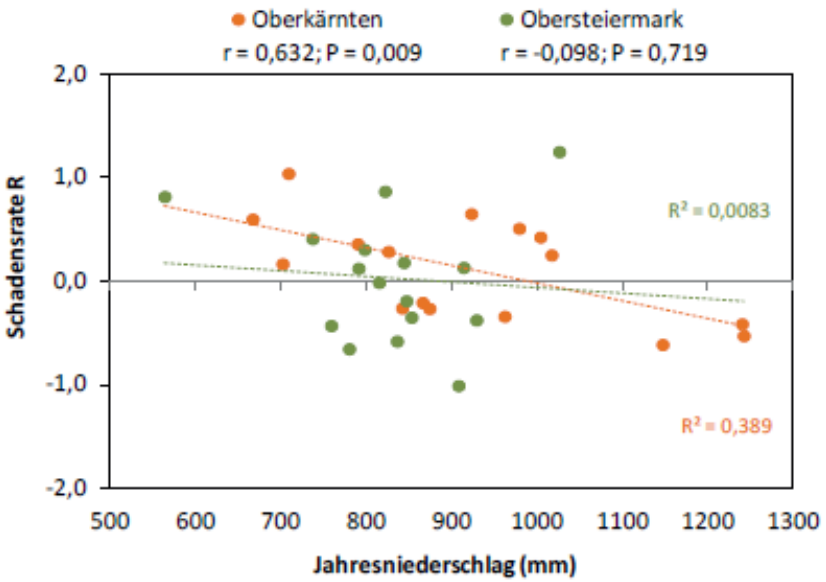
Precipitation and sumer temperature affect rate of bark beetle damage [R = ln(damage$_t$ /damage$_{t-1}$)] in the **Waldviertel** and **Mühlviertel** Regions

Data: DWF and ZAMG (Stationens: Zwettl-Stift, Linz-Stadt)

Bezirk Urfahr-Umgebung, 18.7.2018 (Photo: Hoch, BFW)

Different situation in two Alpine regions of Austria

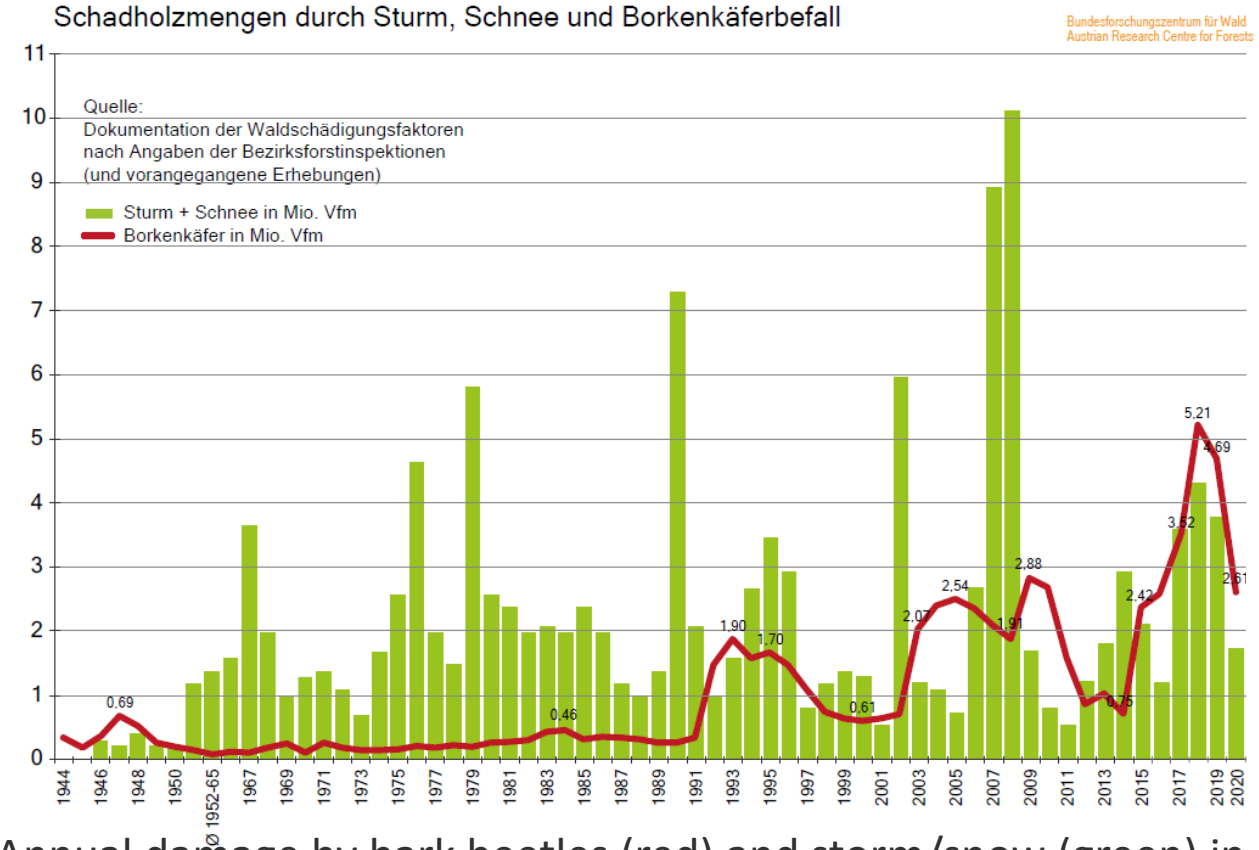




Obersteiermark: significant correlation damage R and damage by wind+snow (t-2); r = 0.715

Precipitation and sumer temperature affect rate of bark beetle damage [R = ln($damage_t$ /$damage_{t-1}$)] in the mountainous regions **Obersteiermark** and **Oberkärnten**. Data: DWF and ZAMG

What is the current situation?



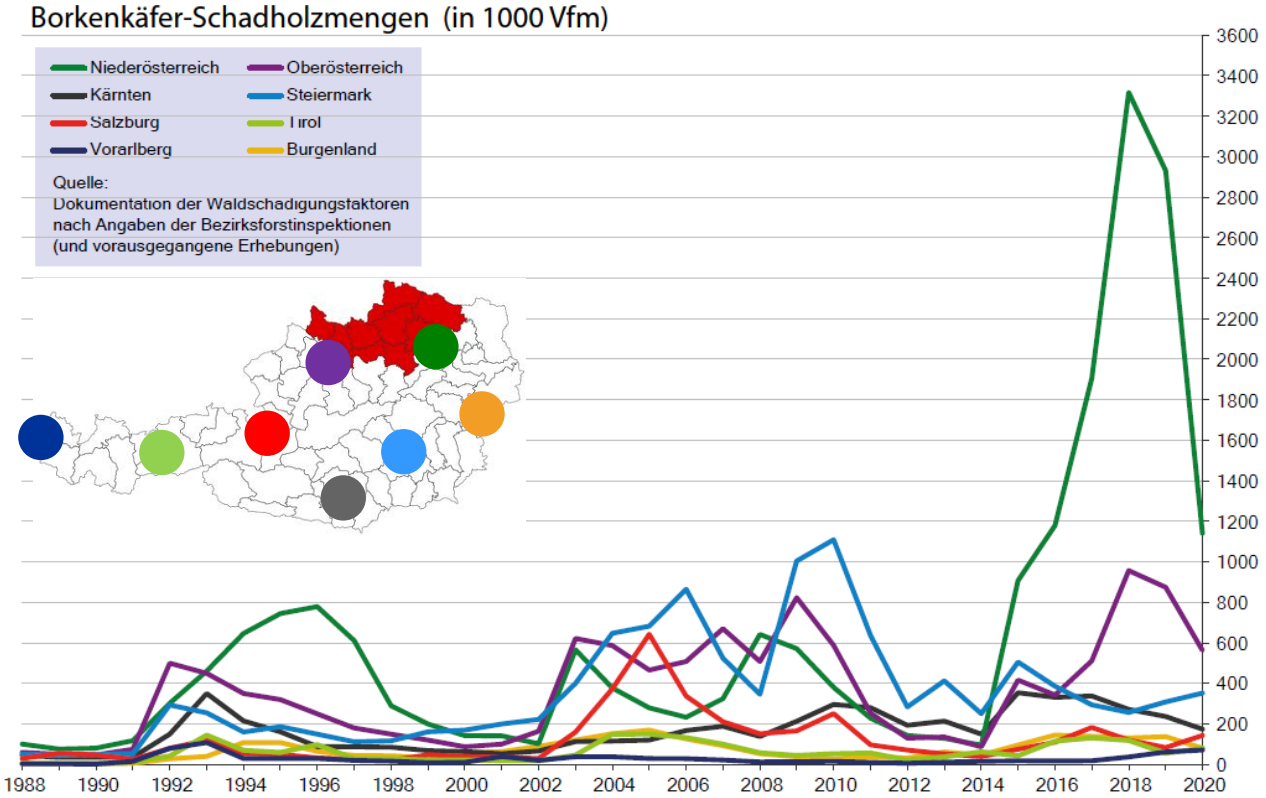
2020:
2.61 mio m³

Annual damage by bark beetles (red) and storm/snow (green) in Austria (Documentation of forest damaging factors, **DWF**)

Damage by bark beetle species in Austria

(Documentation of forest damaging factors, **DWF**)

Damage in 1000 m^3	2018	2019	2020
Ips typographus	**4675**	**4066**	**2207**
Pityogenes chalcographus	321	285	239
Ips amitinus	21	9	13
Tomicus spp.	91	65	46
Other pine bark beetles	80	**234**	73
Ips cembrae	10	11	8
Fir bark beetles	12	**18**	17



Annual damage by bark beetles in Austrian Federal States (Documentation of forest damaging factors, **DWF**)

How do the different forest owners fight this problem?

Forest law is quite strict

Not always easy to execute

High responsibility of forest owner

Diverse **ownership** structure

Integrated bark beetle mana

Removal of suitable breeding mat

Early detection of infested trees

→ ground surve tal models)

Financial support for certain activities

Governement launched major funding programme in 2021

Removal of infested n

→ treatment if ping, burning)

Catching remaining beetles (particul

→ trap trees, traps, Trinet

Documentation

Regional approach *would* be necessary in severely affected areas: increased and targeted actions, higher effort is necessary


Photo: Hoch, BFW

Bark beetle management is also an issue of logistics

Also when attack was detected early: felling, transport and marketing of timber were often difficult

- Machinery and manpower
- Transport capacity
- Saturation of demand by industry

Temporary storage of untreated wood on few, authorized timber yards (distance to susceptible forests, monitoring)

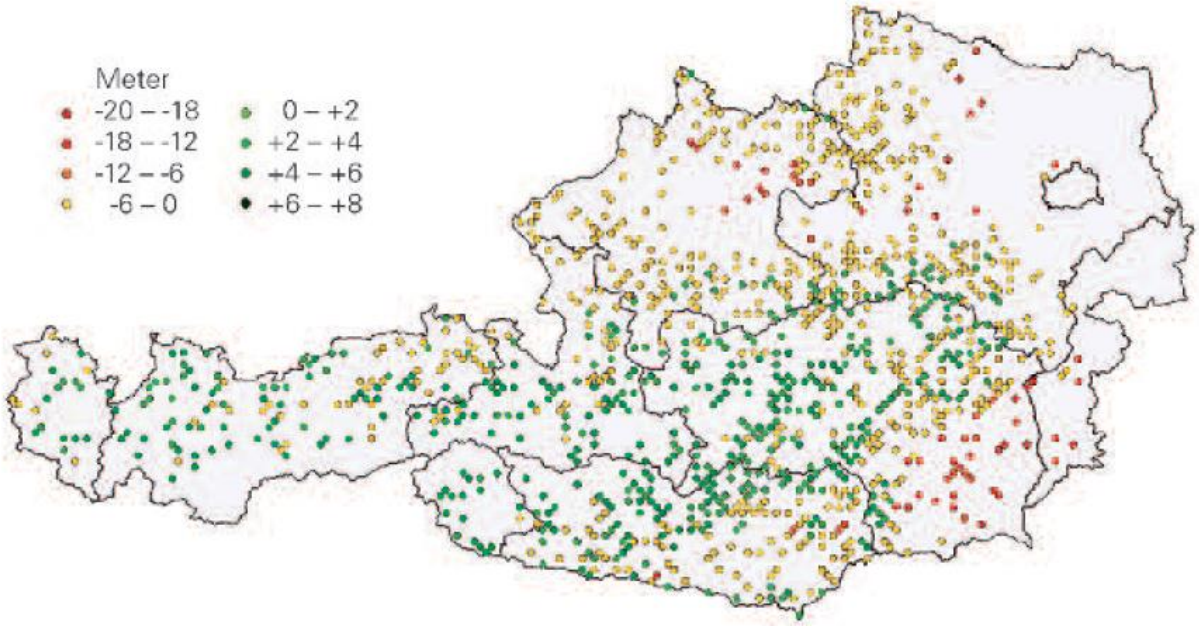
Environmentally sound methods for treatment of stored wood are required (for big and small quantities)

How does it look like for the coming years?

Climate change

Spruce under pressure in lower elevation

I. typographus can develop more generations /yr at higher elevations → higher risk after abiotic disturbances



Model: Change of spruce growth (site index) under **+2,5°C** temperature scenario (Schadauer et al. 2019: BFW-Praxisinformation)

The ongoing barkbeetle outbreak is a symptom of climate change

Regional approaches required – but difficult to implement

Increasing temperatures and more frequent drought will support bark beetles and other secondary pests (not only spruce)

Thank you!

Silvicultural solutions are necessary!

Photo: Hoch, BFW (2018)