CLIMATE DETECTIVES 2020 – 2021

FOREST IN CHANGE

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RESEARCH QUESTION

How big is the spatial distribution of forest damage in the spruce and pine stand by the bark beetle in the Waldviertel region (Waidhofen an der Thaya and Zwettl district, Lower Austria) for the period

SUMMARY OF PROJECT

Climate change is also making a strong impact on bark beetles in the Waldviertel region (NW of Lower Austria). The heat and dryness are optimal for the bark beetle expansion. Secondly there are spruce monocultures in this area, which are not in accordance with the location, where bark beetle can increase rapidly.

In case study areas (Buendlberg, Military Training Area near Alltensteig and the forest NE of Waidhofen an der Thaya) the dissemination of bark beetle in time and space can be investigated by ESA-Sentiel 2 ifrared satellite images. Affected forstest areas show red-brown anomalies.

The Austria Federal Agency for Forest is developing a suitable method in remote sensing to quantify the affected areas by overlaying Ortho Photos and ESA-Sentiel 2 Images. Because of new methods in remote sensing it is possible to quanifiy the damage and forest owners will get financial aid e.g. also to develop the forest monocultures to nature-orientated sustainable forest which can survive in climate change.

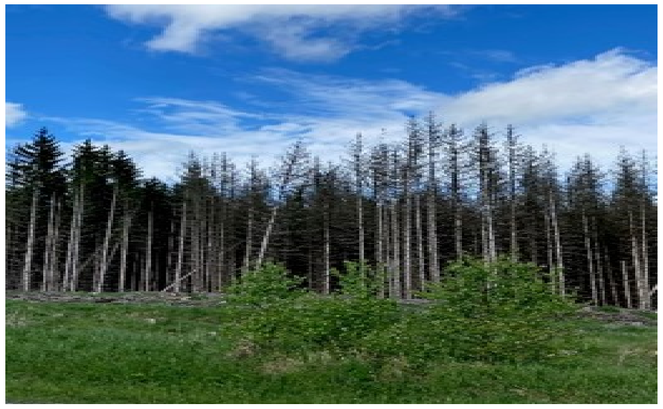


Figure 1: Dry trees that were attacked by barke beetle in the Waldviertel Region (Lower Austria), Photo: Loidolt S.,

MAIN RESULTS

Since 2015, the bark beetle phenomenon has been multiplying rapidly. Another reason for that is, for example, that spruce trees are planted in large areas and the bark beetle has so much attack surface. Particularly, the Waldviertel and the Muehlviertel region (Austria) are strongly affected by the bark beetle plague.

Archaeology offers chronic examinations. In the early Middle Ages there were mainly a mixed natural wood with mostly beeches and fir dominant in the Waldviertel region (Lower Austria).

In the last few years the forests were heavily infested by the bark beetle in the region Waldviertel (Austria). The special 'bark beetle years' were 2018 and 2019, a little weakened in 2020. The tree species mostly infested is the spruce. Also pine trees are often infested. Spruces aren't going to be planted anymore in the Waldviertel region in the future. Instead, larch, marple, oak, European beech and many other species will be used, because deciduous trees are not attacked. It is set to mixed forests.
The damage caused by the insects has fallen since then, but still above average.

The Austrian bark beetle monitoring was initiated in 2005 by the state forestry authorities and the forestry board of the Chamber of Agriculture. The aim of this service is to inform farmers and foresters, who suffer from a bark beetle plague, about the current flight situations of the most stubborn bark beetle species. These can then set up bark beetle traps to prevent the greatest possible damage.

The forest has already mostly been destroyed In the district Waidhofen an der Thaya an Zwettl (NW of Lower Austria). An impressive example is the area of Raabs an der Thaya. Also the forest is destroyed in the military training area near Allentsteig. The spruces and pine trees which are still left are highly threatened.

BRUENDLBERG:

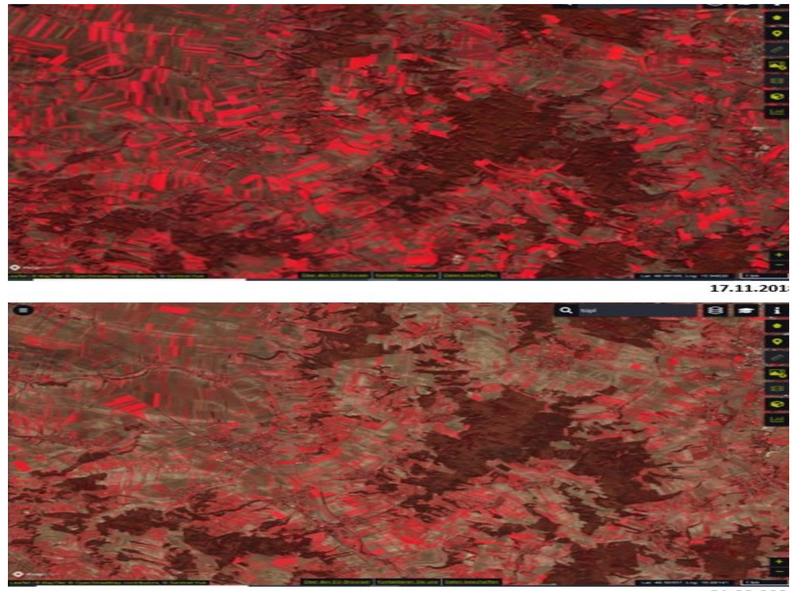


Figure 2: Case Study Bruendlberg: Forest with Bark Beetle Infestation, Eastern of Waidhofen an der Thaya (Austria), ESA-Sentiel 2 Images, IR timelapse animation: 17.11.2018 till 31.03.2021

ACTIONS TO HELP LESSEN TO THE PROBLEM

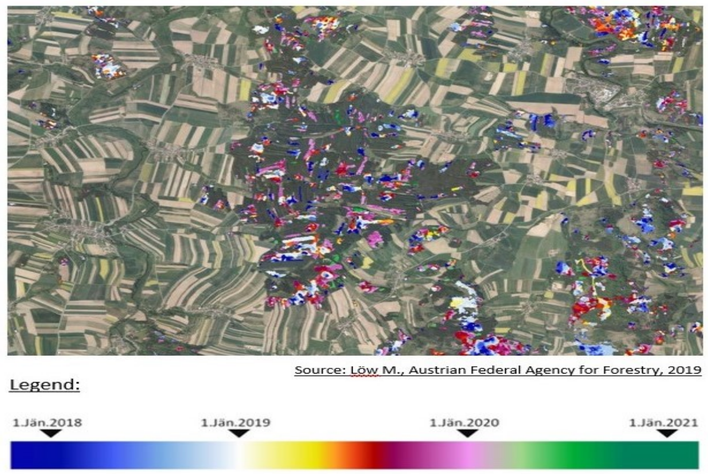


Figure 3: Forest with bark beetle damage NE Waidhofen an der Thaya (Lower Austria), ESA-Sentiel 2 Satellite Image with Ortho Photo Layer, Summer 2019

The Austrian Federal Agency for Forestry is developing a special remote sensing method in combining ESA-Sentiel 2 satellite images and ortho photos for quanitfiying the forest damage because of the barke beetle. Since 2021 there will be paid financial subsidies to forest owners to redevelop the forest to nature-orientated sustainable forest which can survive in climate change.
There is an overview of any actions the team 'Earth Protectors' has taken or plan on taking to help address the climate problem they investigated:

- save water
- make a shopping list before going to shop, don't waste food
- buy organic products
- buy regional products
- rely on a vegetarian diet and no industrial treatment
- buy Fair Trade products
- plant your own vegetable garden
- flowering meadows in the garden instead of a lawn
- later mowing of flowering meadows in the garden
- go by foot more
- more cycling
- use the public transport instead of taking the car
- don't drive unnecessary routes with the car
- use reusable shopping bags