

Evolution of the bark beetle crisis in Norway spruce forests: A spatial and temporal remote sensing analysis in Belgium and North-eastern France

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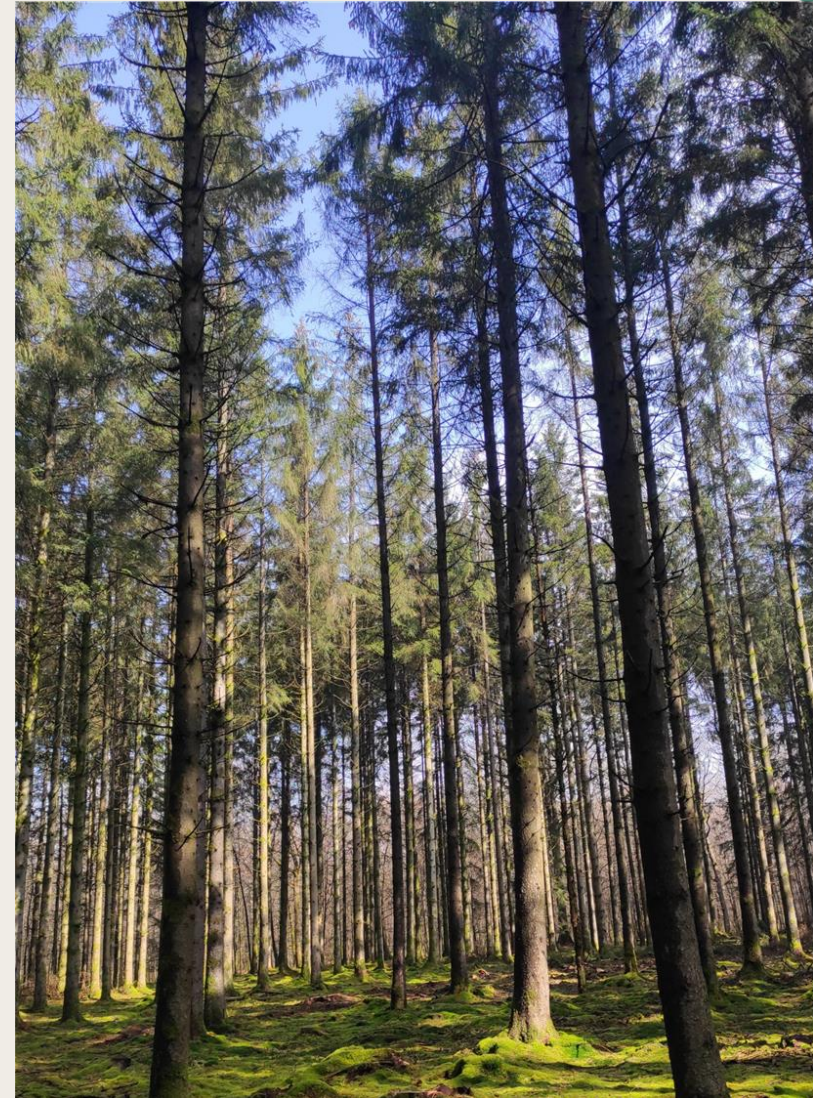
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Norway spruce in Belgium and North-eastern France

- Exotic species introduced in 19th
- First production species in south of Belgium (1/4 of the forest area in 2021 ~ 126 000 ha)*
- Norway spruce area in North-eastern France: 122 000 ha**

*Lejeune et al. (2022)

**IGN-Inventaire forestier national français. (2024)

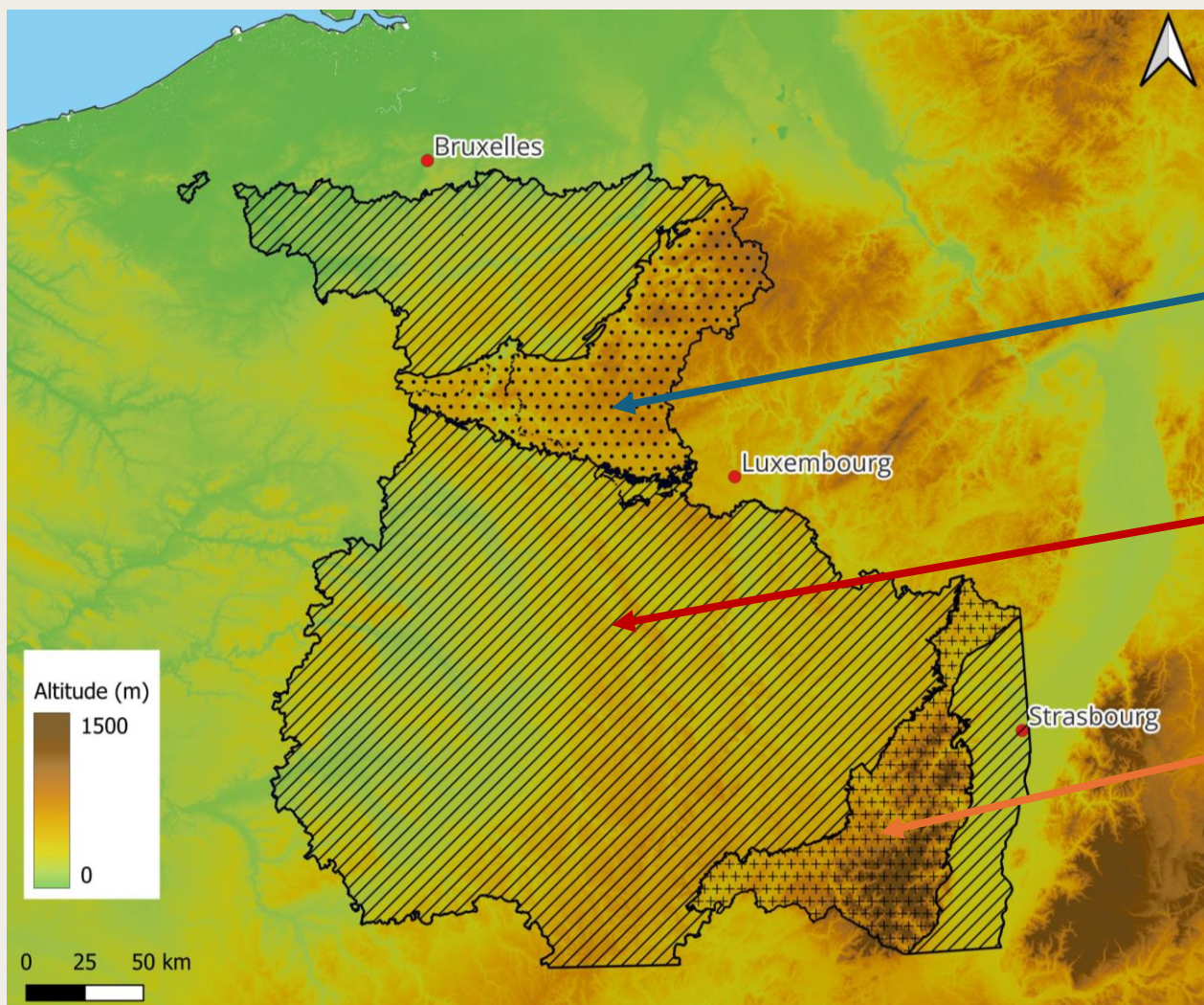


Outbreak bark beetle in 2018-2022



Dieback area during the outbreak and dynamic of damage ?

Study area

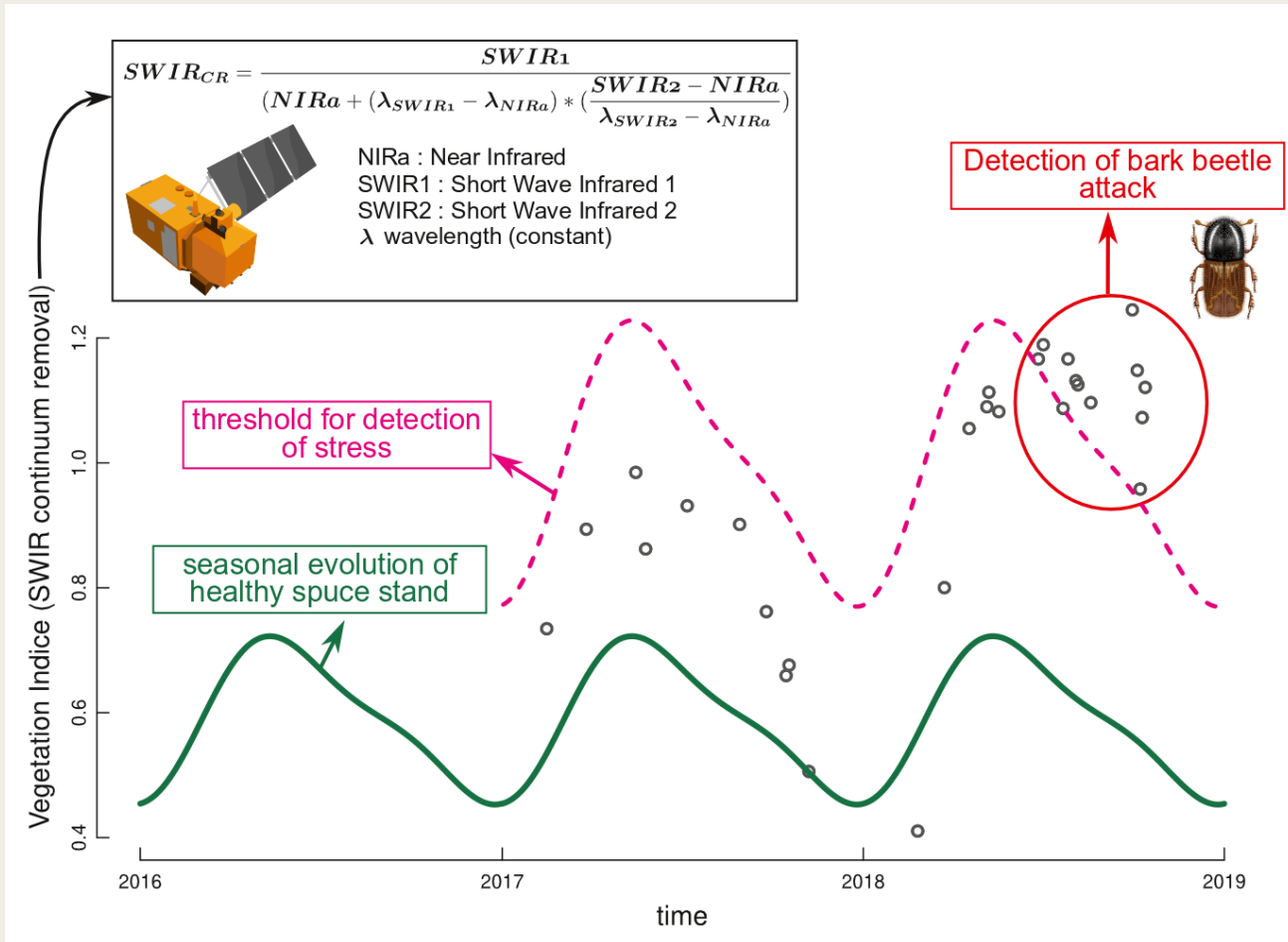


Ardenne (200m-700m)

Plains (100m-500 m)

Vosges (300m-1500m)

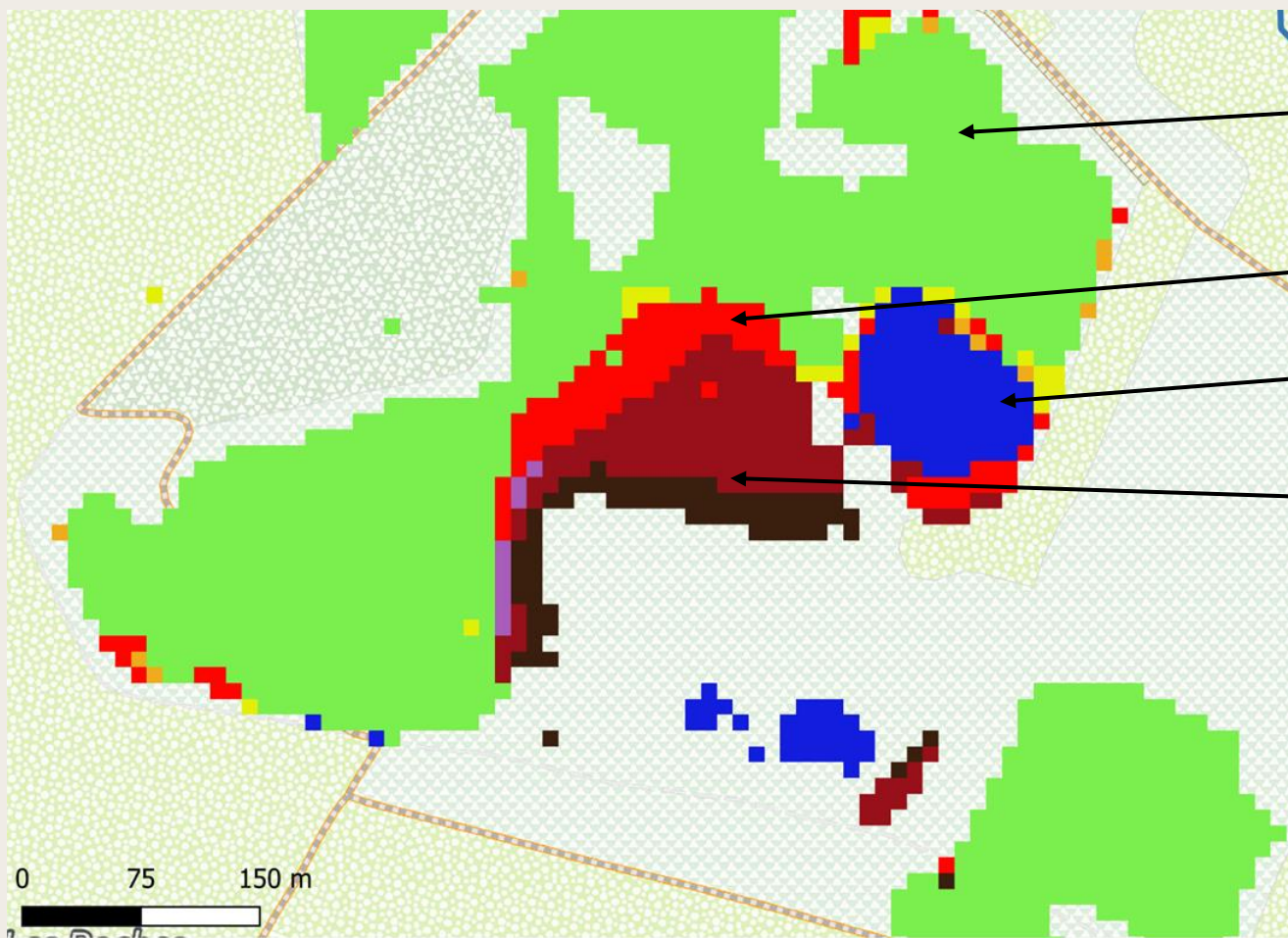
Spectral indice



CR_{swir} sensitive to vegetation moisture content

↓
symptom observations

Norway spruce health map



Healthy stand

Attacked stand

Normal harvest cut

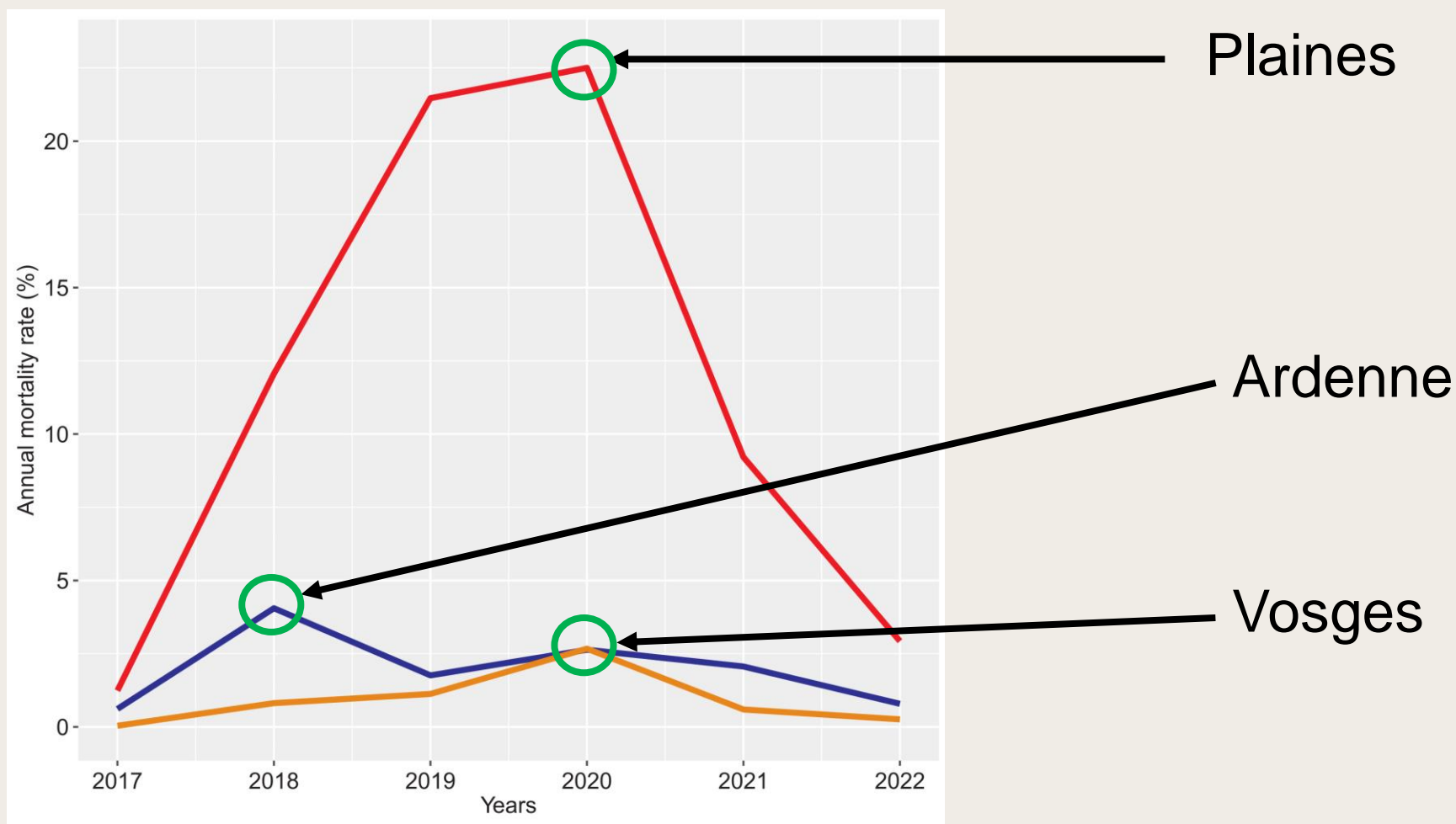
Sanitary cut

- Resolution :10mX10m
- 15 dates/years
- Online on forestimator.be

Result: quantification of damages

Regions	Spruce area impacted by bark beetles during the outbreak (ha)	Spruce area before the outbreak (ha)	Ratio of the spruce area impacted by bark beetles(%)
Plains	7 634	15 028	50,1 <i>More impacted</i>
Ardenne	11 822	104 723	11,3
Vosges	4 218	75 068	5,6 <i>Less impacted</i>
Total	23 674	194 819	12,2

Result: evolution of the outbreak damage




Gilles et al., 2024

Take home message

- Ardenne and Vosges: the less impacted but plantation is debatable
- Plains area: No longer plant Norway spruce as the principal tree species in stand





Thank you for your attention!

More informations

- Gilles, A. *et al.* Spatial and temporal remote sensing monitoring shows the end of the bark beetle outbreak on Belgian and north-eastern France Norway spruce (*Picea abies*) stands. *Environ Monit Assess* **196**, 226 (2024).
<https://doi.org/10.1007/s10661-024-12372-0>