

FORESTS OF THE CZECH REPUBLIC IN THE FACE OF CLIMATE CHANGE:

IMPACTS AND OPTIONS FOR ADAPTATION



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Some starting points

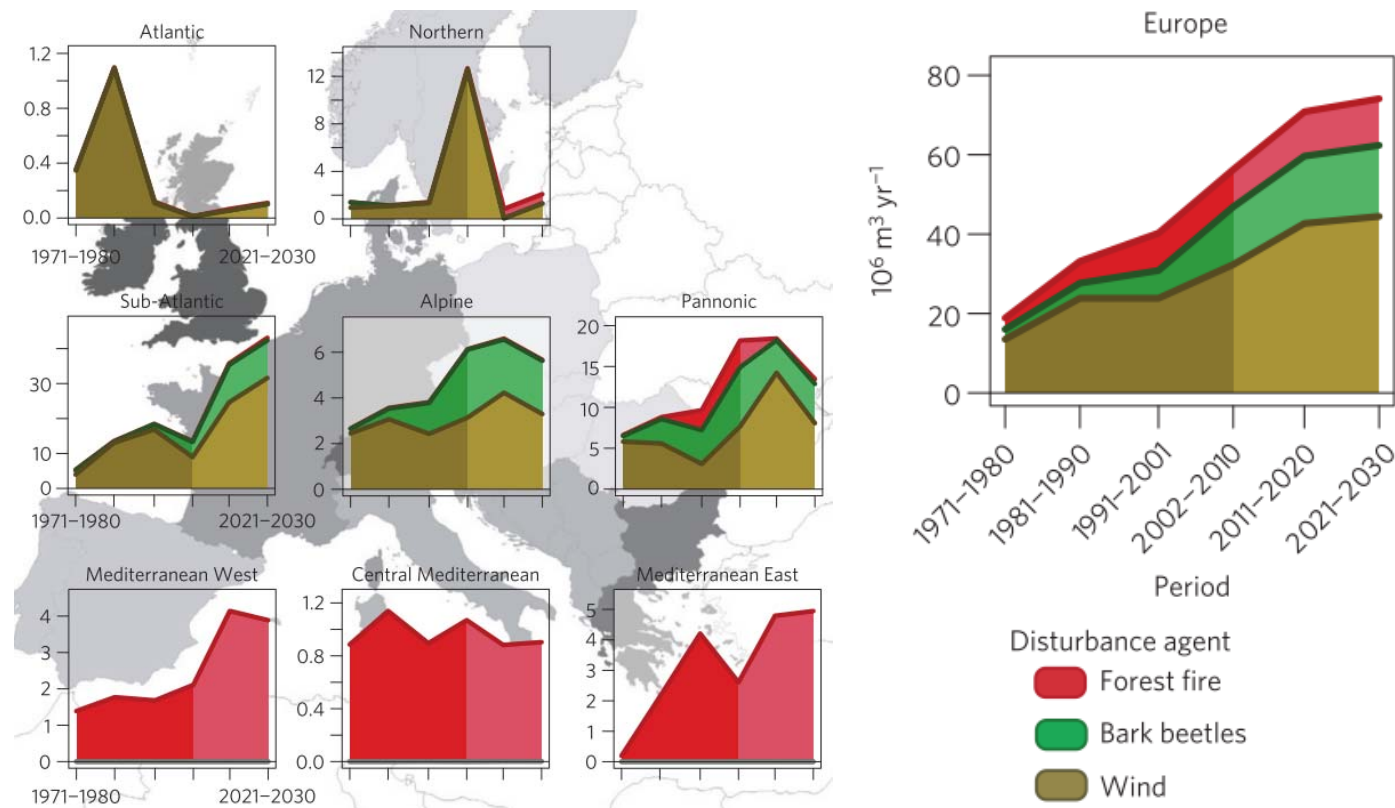
- unfavourable tree species composition and age structure, which is prone to damage
- worsening growing conditions for most of currently dominating tree species
- significantly elevated forest damage rate (across Europe), which is likely to increase
- influx of new pests and altered population dynamics of native pests

Objective

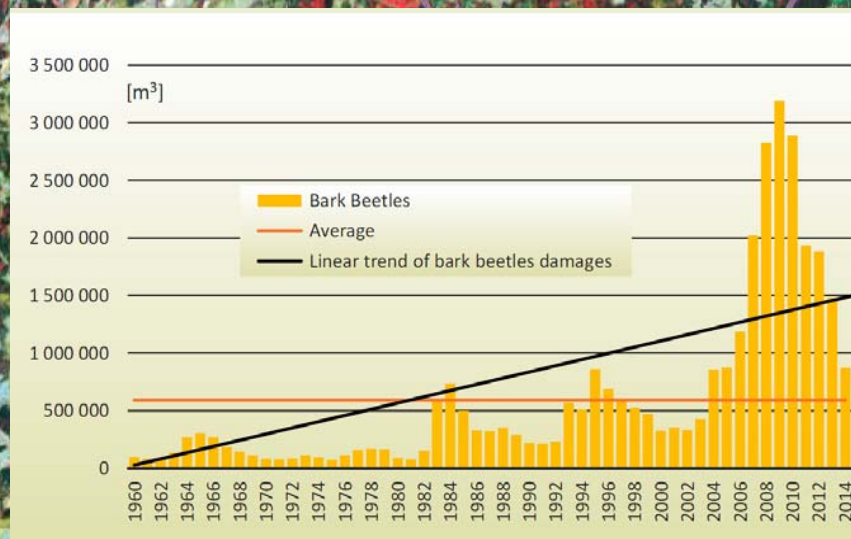
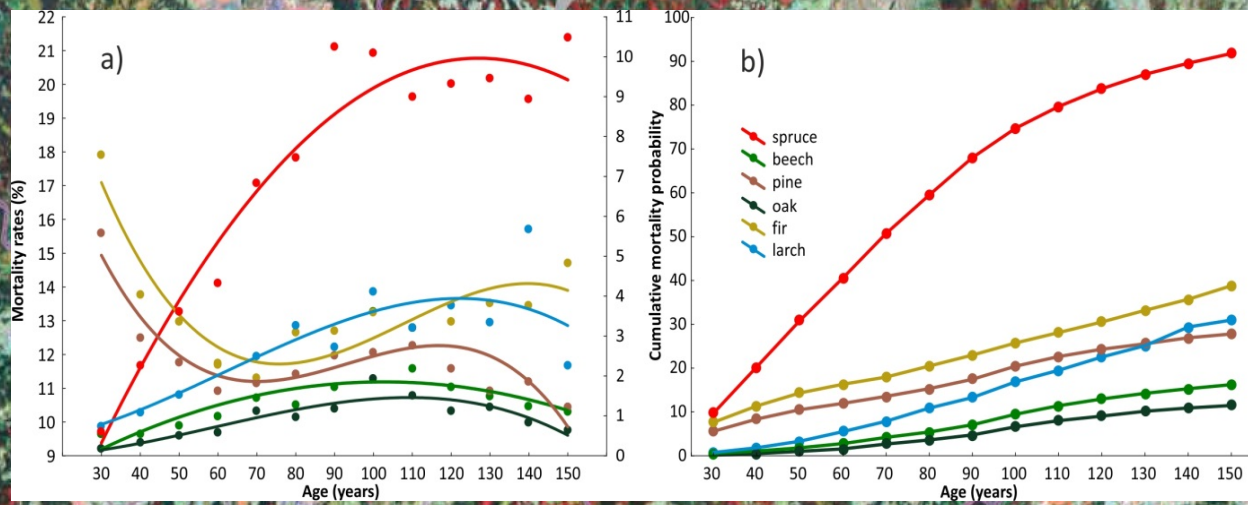
- strongly promoted timber-oriented management, while forest multifunctionality and CC adaptation are addressed only marginally
- general consensus on the need of adaptation is lacking, climate-scepticism is strong in the society
- insufficient transfer of knowledge from research to forestry practice though funding of forestry research is „good“

Subjective

Increasing forest damage



Seidl, R., Schelhaas, M.-J., Rammer, W., & Verkerk, P. J. (2014). Increasing forest disturbances in Europe and their impact on carbon storage. *Nature Climate Change*, 4(September), 806–810.

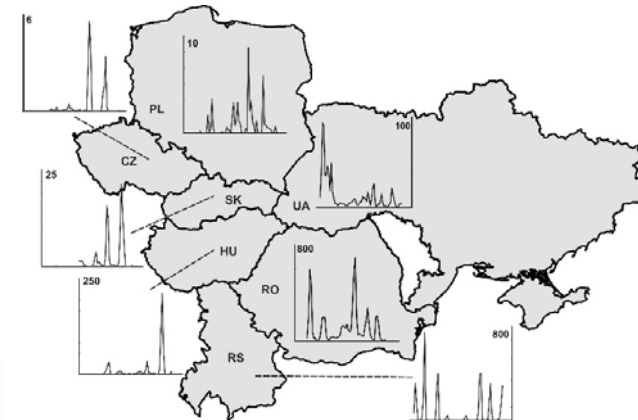
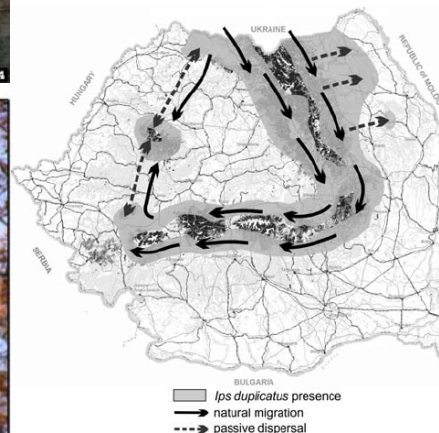


Oak and beech in Slovakia
(polyfagous),
Ambrosia bark beetle
Xylosandrus germanus

Beech in Hungary,
Beech bark beetle
Taphrorychus bicolor

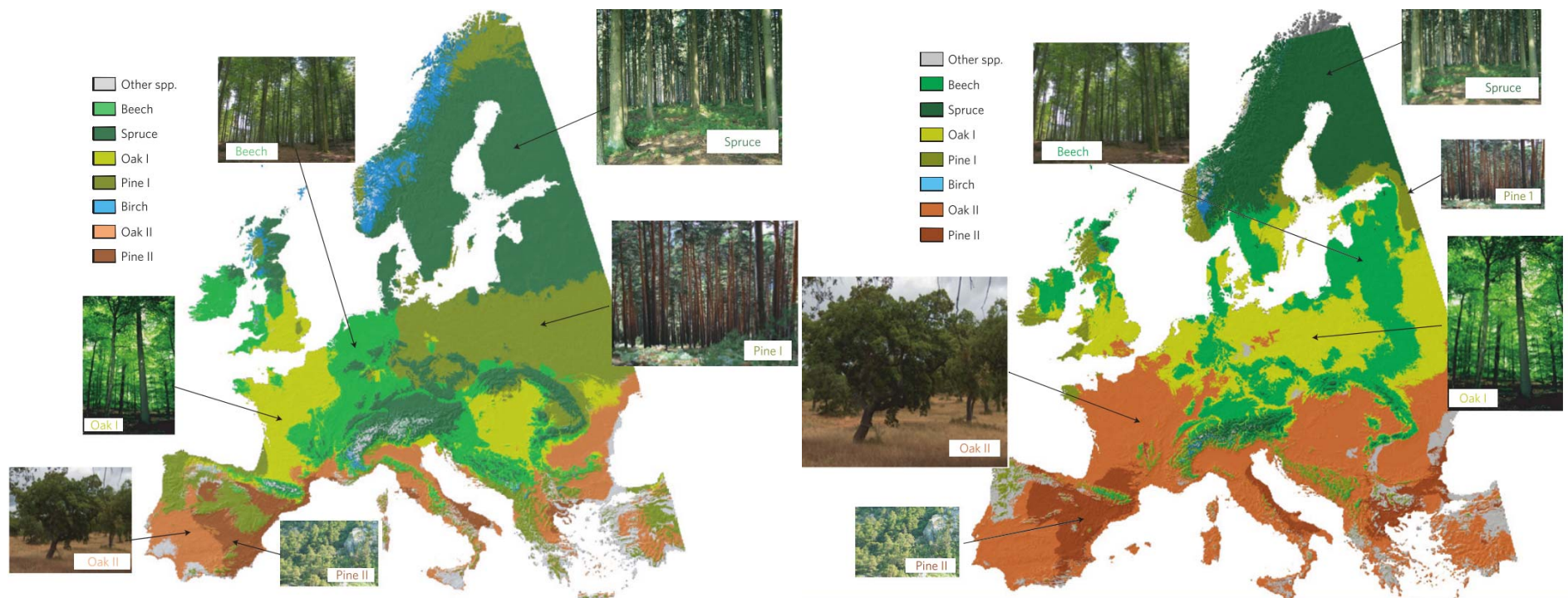
Spruce in UA, Ro, CZ, SK,
PL; Northern bark beetle
Ips duplicatus

Broadleaved forests;
Gypsy moth, *Lymantria*
dispar



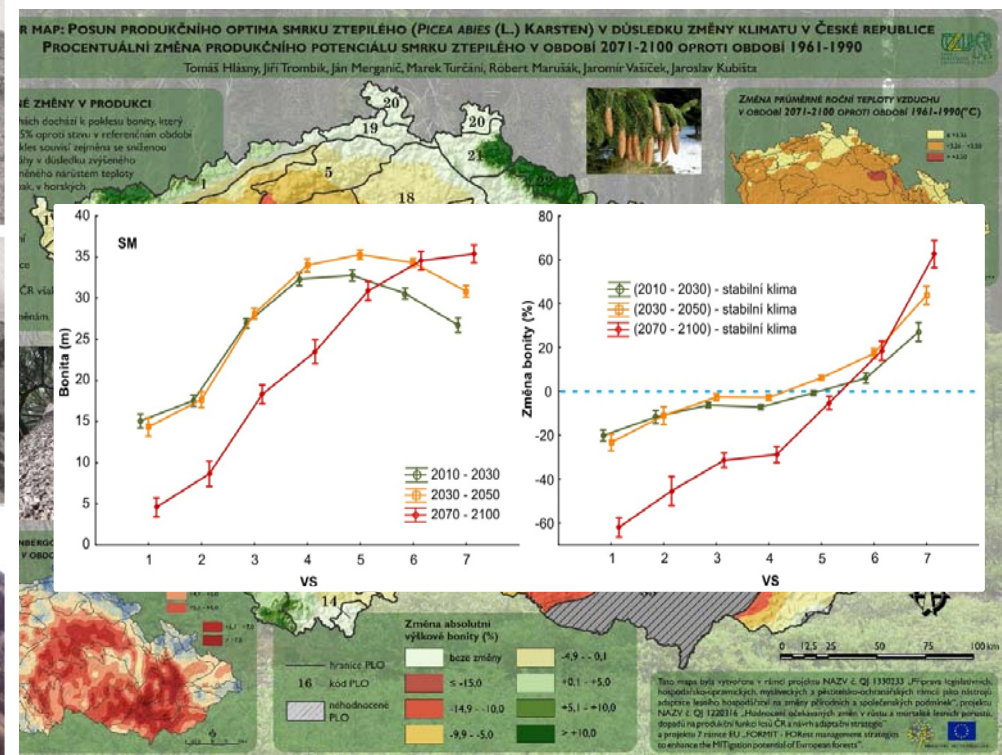
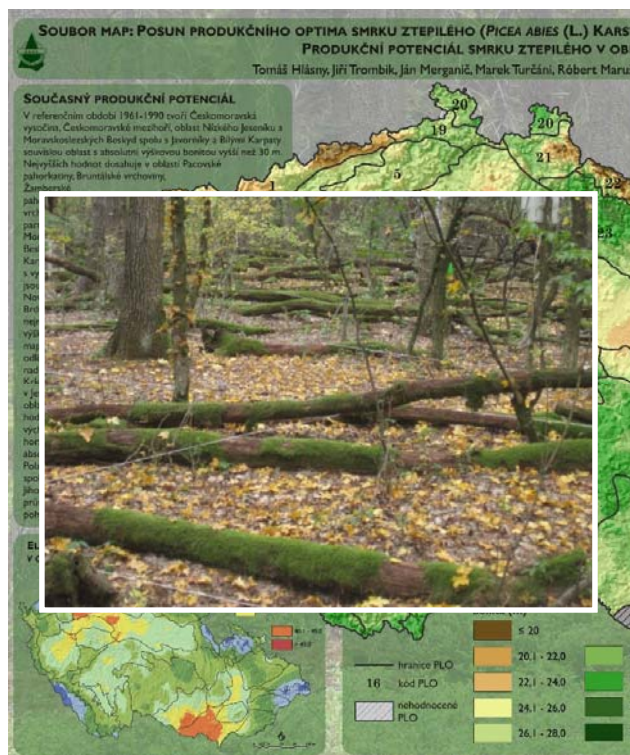
| Statistická charakteristika | 1 generace | | | 2 generace | | | 3 generace | | | 4 generace | | |
|-----------------------------|------------|-------|-------|------------|-----|-------|------------|-----|------|------------|-----|------|
| | 5 % | Med | 95 % | 5 % | Med | 95 % | 5 % | Med | 95 % | 5 % | Med | 95 % |
| 1981-1990 | 779 | 1 020 | 1 275 | 310 | 490 | 775 | 176 | 252 | 410 | – | – | – |
| 2021-2050 | 665 | 1 100 | 1 350 | 309 | 550 | 851 | 169 | 310 | 485 | – | – | – |
| 2071-2100 | – | – | – | 850 | 879 | 1 183 | 247 | 458 | 700 | 168 | 230 | 304 |

Change in climatic conditions for tree species



Hanewinkel, M., Cullmann, D. A., Schelhaas, M.-J., Nabuurs, G.-J., & Zimmermann, N. E. (2012). Climate change may cause severe loss in the economic value of European forest land. *Nature Climate Change*, doi:10.1038/nclimate1687

Example of projected changes – spruce productivity



(Foto: Mátyás, Cs., Peñuelas et al. 2007)

.... on the other hand

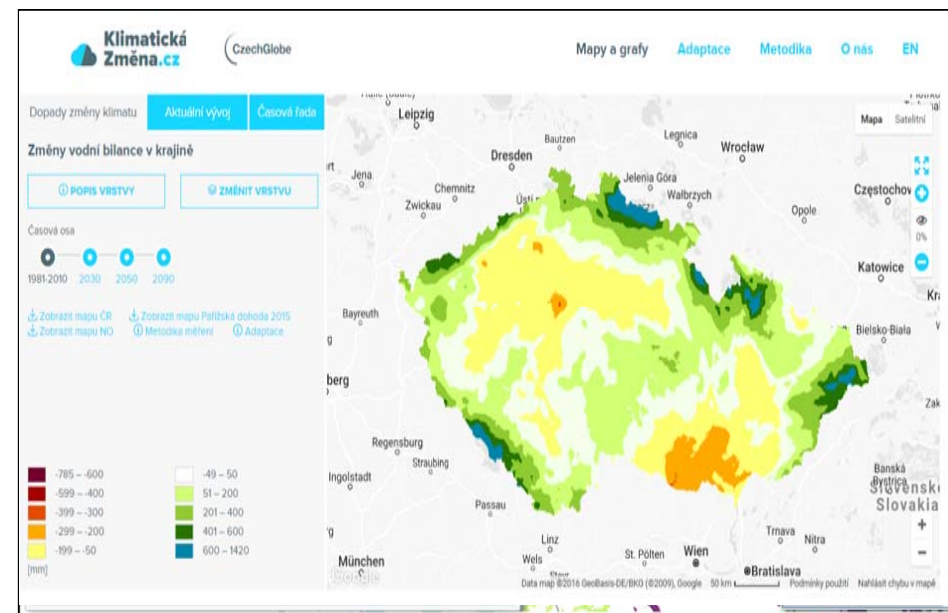
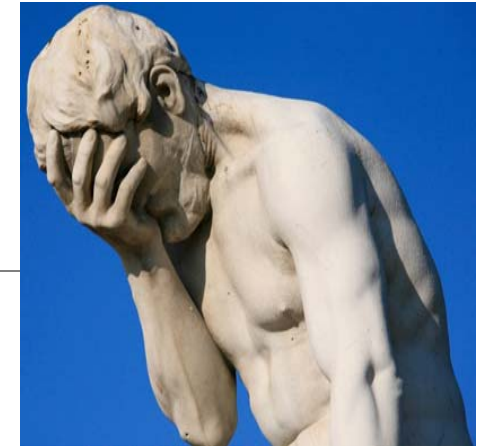
... BUT ...

- National forest adaptation strategy exist (ME, 2015)
- Need of the conversion of vulnerable spruce forests generally accepted
- Good institutional infrastructure (res. institutes, universities, professional bodies)
- Good scientific understanding of CC-related risks and options for adaptation.
- Well functional monitoring systems and high-quality forestry databases (ICP, NFI, FMP ...)
- Good funding of projectes on climate change impacts and adaptation



Communication and transfer – main ways of moving forward

- Series of „official“ planning tools used for the transfer of research outputs to practice
 - Forest management plans, regional forest development plans, certified methodologies, maps, etc.
- Tailored web services (e.g. www.klimatickazmena.cz)
- Meetings like this, seminars for forest owners, managers, state administration, future decision-makers (*pupils, students ...*)
- *Strong initial resistance melts down ca after one hour, but long-term effects are questionable*



Options for adaptation

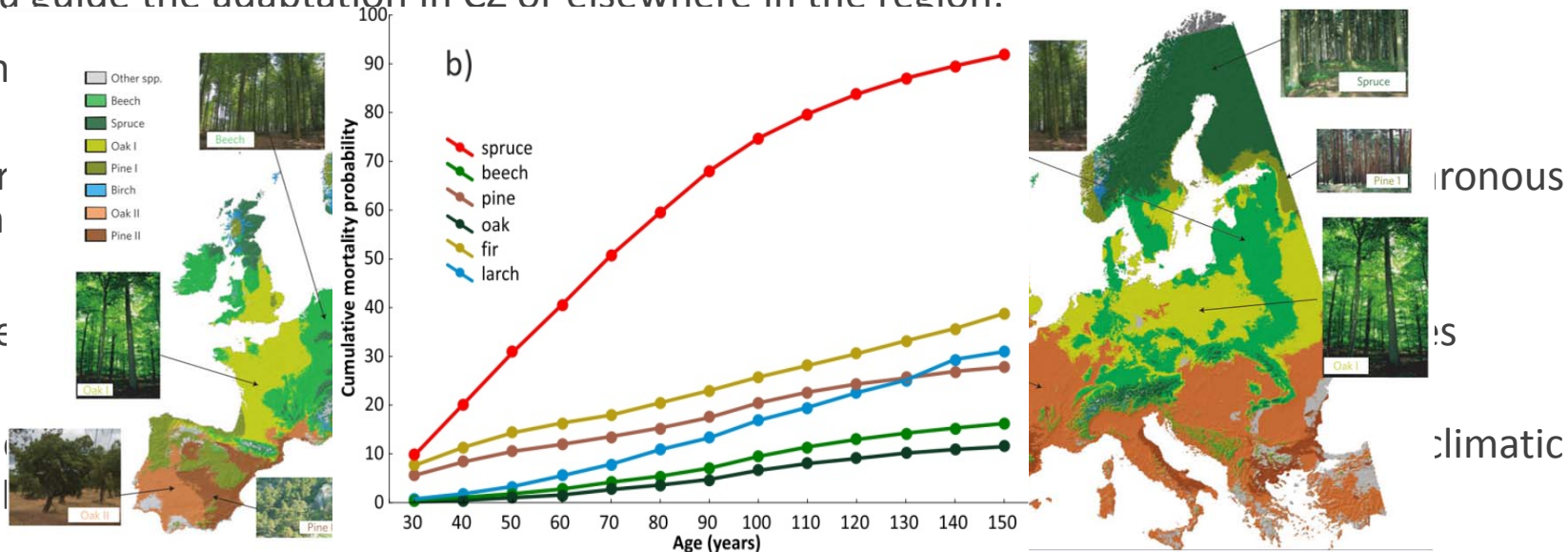
There is a body of studies on forest adaptation, including studies specific to central Europe, which can be used to guide the adaptation in CZ or elsewhere in the region:

Shift from

- Support dynam

- Change

- Consider envelope

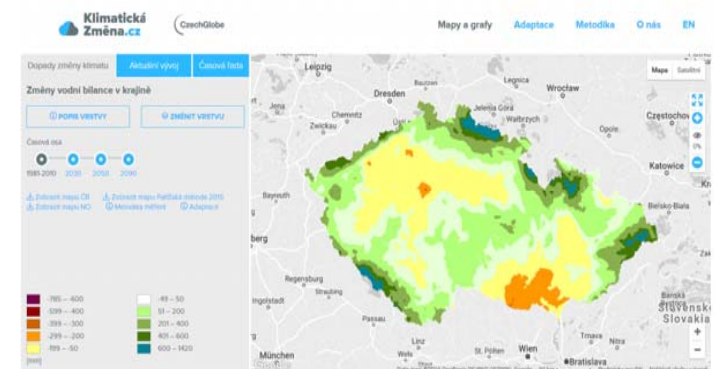


- Shortened rotation period to reduce the extent of vulnerable overmatured trees and support the flexibility of management (be careful please!)

Options for adaptation

Institutional adaptation

- capacities to respond adequately to the newly emerging pests and pathogens need to be strengthened
- communication tools needs to be definitively improved
- mechanisms supporting the participation of forestry enterprises, associations, owners and managers in research need to be strenghtend – it is not working now!



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