

## SS02030018 - Centrum pro krajinu a biodiverzitu



Scénáře klimatické změny: modely, mapové výstupy  
a jejich interpretace z hlediska zranitelnosti krajiny ČR

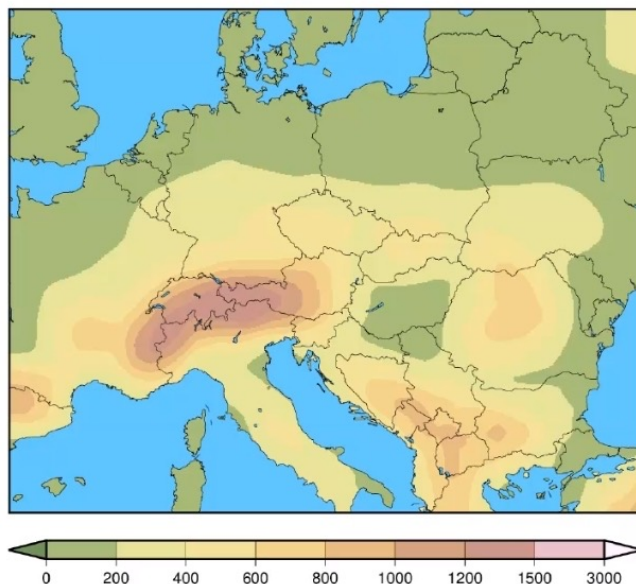
Martin Možný (ČHMÚ)

# Klimatické scénáře Aladin-Climate:

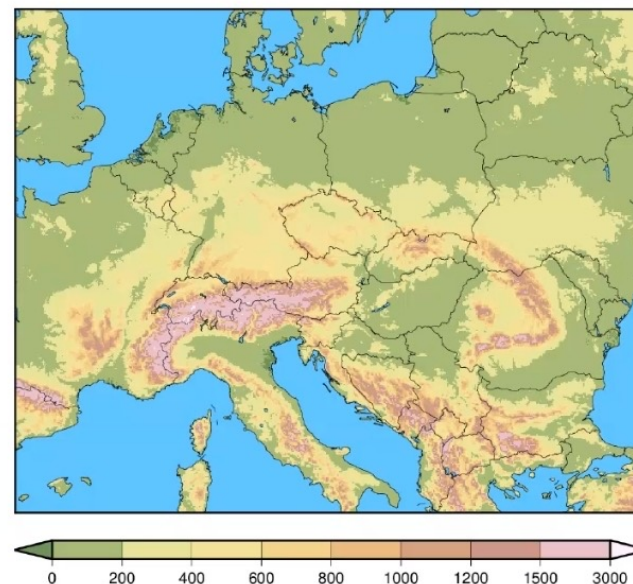
- Scénáře nejsou „předpovědi“, ale projekce (modelové simulace budoucího klimatu).
- Výstupy scénářů: [www.perun-klima.cz/scenare](http://www.perun-klima.cz/scenare) - vypočtená a rastrová data s rozlišením 2,3 km
- Emisní scénáře: RCP8.5 (nejhorší scénář, růst emisí), RCP4.5 (realistický scénář, mírný růst a pak stagnace).



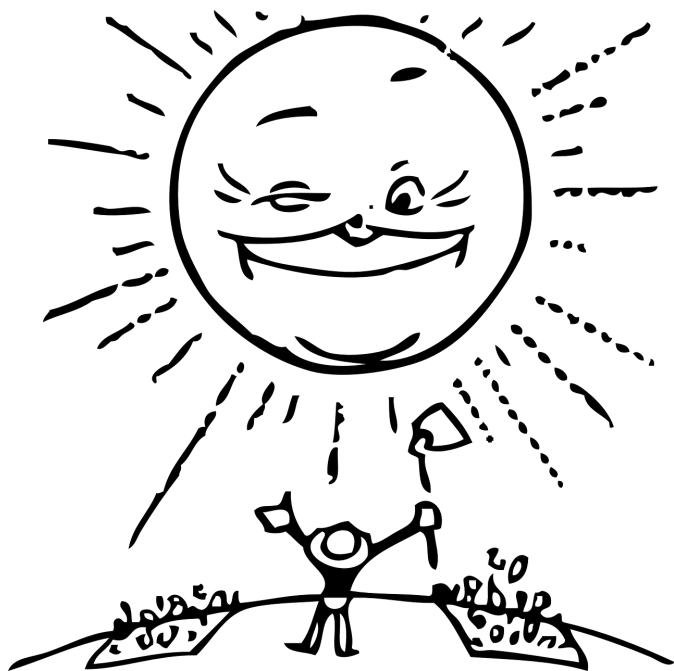
CNRM-ESM2-1,  $\Delta x = 156\text{km}$



ALADIN/ČHMÚ,  $\Delta x = 2,3\text{km}$



# Projekce teploty vzduchu



- Růst teplot +1,2 až +1,9 °C (RCP4.5) oproti 1991-2020
- Nárůst tropických dnů (+48%), pokles ledových dnů (-28%)

## Průměrné roční teploty vzduchu v ČR (°C) – změna oproti 1991-2020

| Scénář               | RCP4.5       | RCP8.5       |
|----------------------|--------------|--------------|
| V blízké budoucnosti | +0,7 až +1,3 | +0,9 až +1,5 |
| V polovině století   | +1,2 až +1,9 | +1,5 až +2,3 |
| Na konci století     | +2,0 až +2,8 | +3.0 až +5.7 |

# Projekce srážek

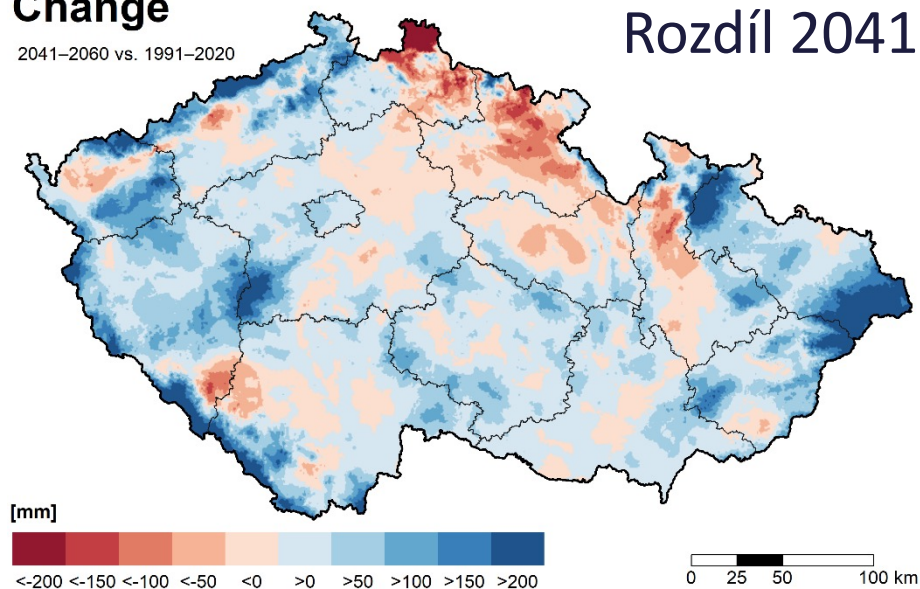


- Na většině území spadne  $\pm$  stejně srážek oproti 1991-2020 (RCP4.5), regionální rozdíly + nejistoty projekce
- Pokles počtu dnů se sněhovými srážkami

## Change

2041–2060 vs. 1991–2020

Rozdíl 2041-2060 vs 1991-2020





# Projekce dopady na vegetaci a sucho



- Prodloužení vegetační sezóny oproti 1991-2020 (+7 dnů), urychlení fenologického vývoje
- Změna rajónizace (optimálních podmínek pro jednotlivé plodiny) rámci ČR
- Růst počtu dnů se suchem v orniční vrstvě (+49%)



# Průměrná roční teplota vzduchu

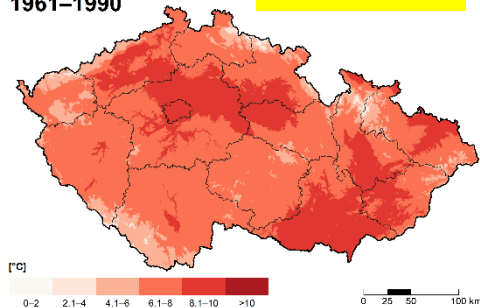
Mapové výstupy  
– nárůst teplot, vyšší u RCP8.5

[°C]

0–2    2.1–4    4.1–6    6.1–8    8.1–10    >10

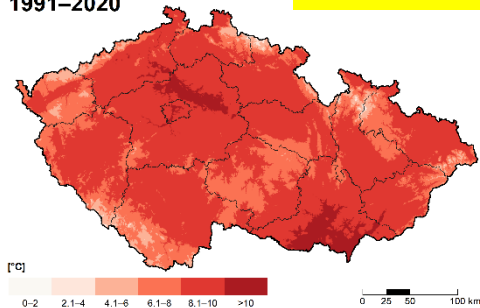
1961–1990

1961–1990



1991–2020

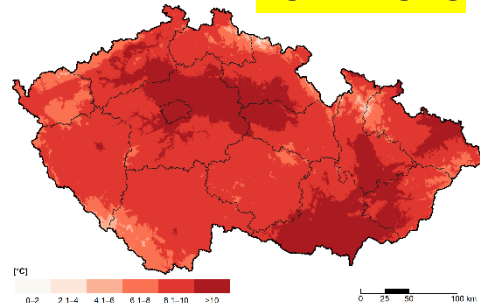
1991–2020



2021–2040 (SSP2-4.5)

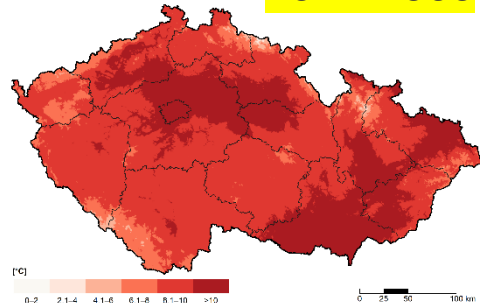
2021–2040

RCP4.5



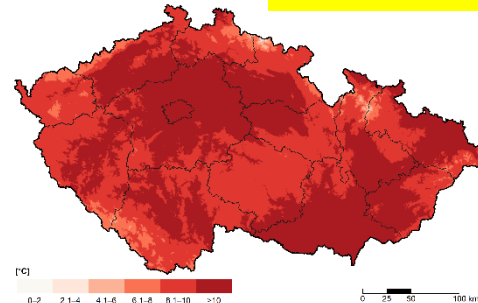
2041–2060 (SSP2-4.5)

2041–2060



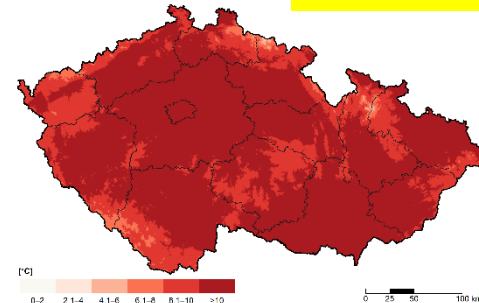
2061–2080 (SSP2-4.5)

2061–2080



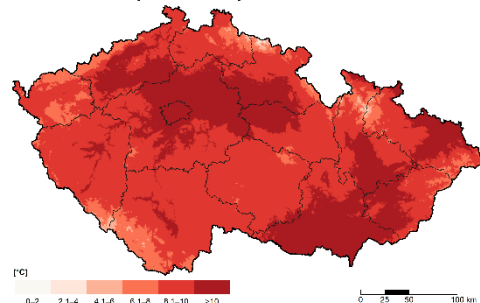
2081–2100 (SSP2-4.5)

2081–2100

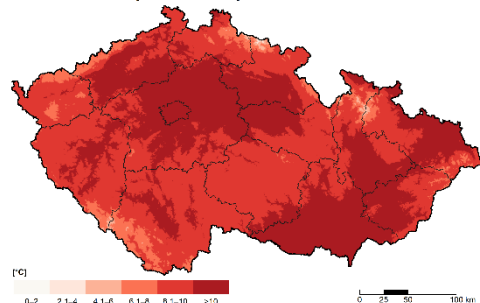


2021–2040 (SSP5-8.5)

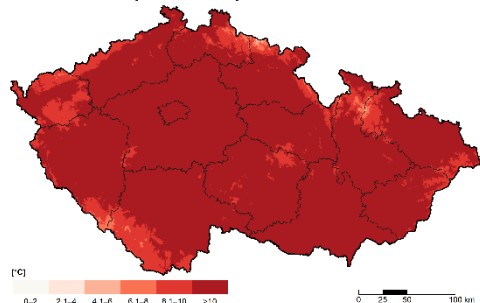
RCP8.5



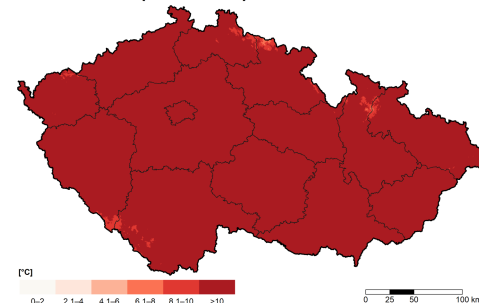
2041–2060 (SSP5-8.5)



2061–2080 (SSP5-8.5)

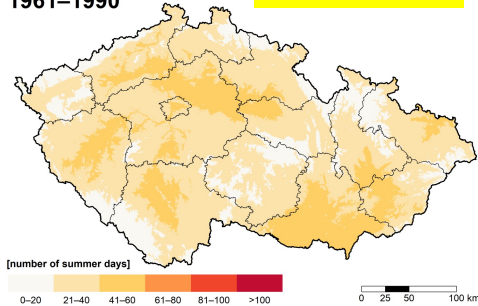


2081–2100 (SSP5-8.5)

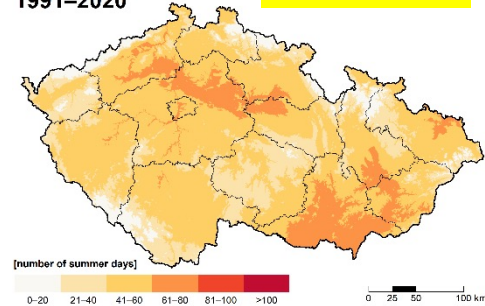


# Průměrný počet letních dnů

1961–1990



1991–2020



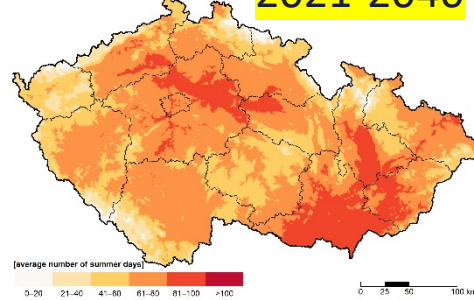
Mapové výstupy –  
nárůst dnů, vyšší u RCP 8.5

[average number of summer days]

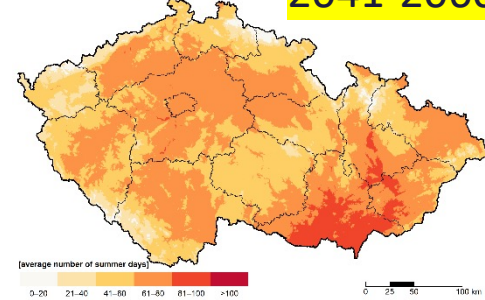


RCP4.5

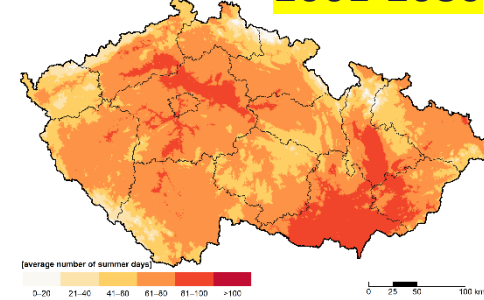
2021–2040 (SSP2-4.5)



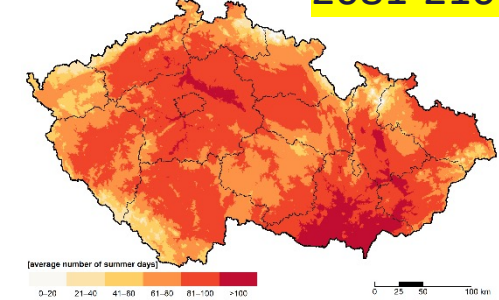
2041–2060 (SSP2-4.5)



2061–2080 (SSP2-4.5)

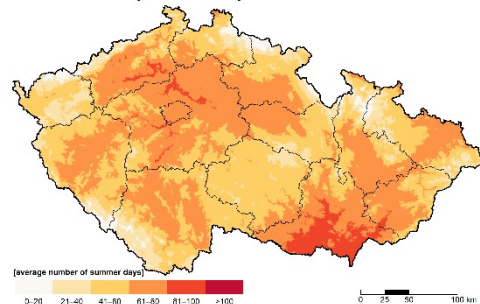


2081–2100 (SSP2-4.5)

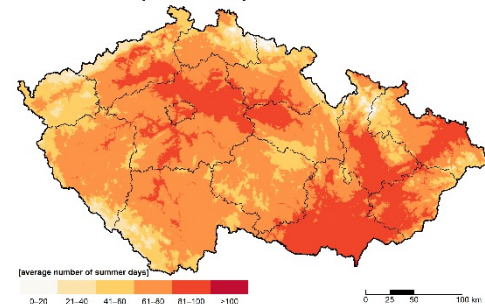


RCP8.5

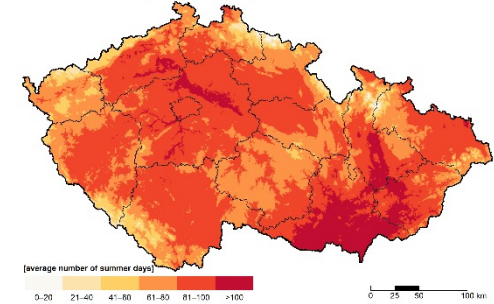
2021–2040 (SSP5-8.5)



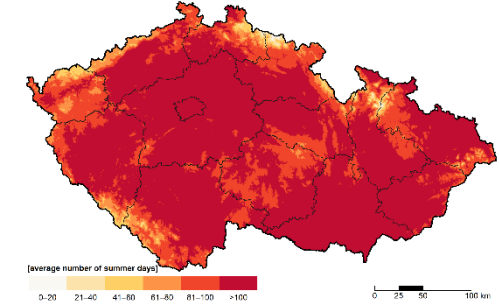
2041–2060 (SSP5-8.5)



2061–2080 (SSP5-8.5)



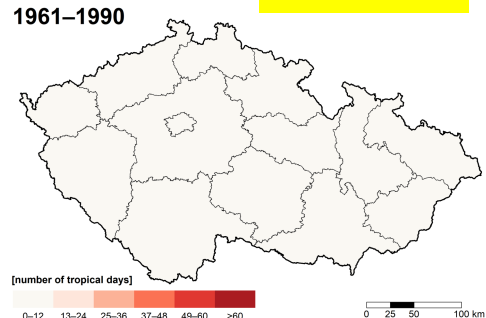
2081–2100 (SSP5-8.5)



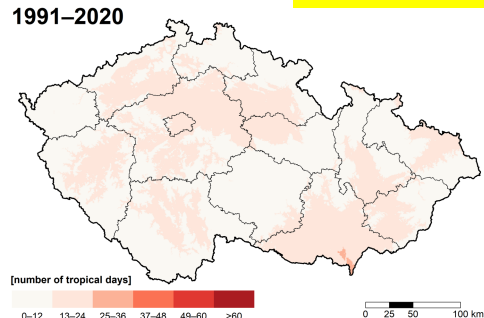


# Průměrný počet tropických dnů

1961-1990

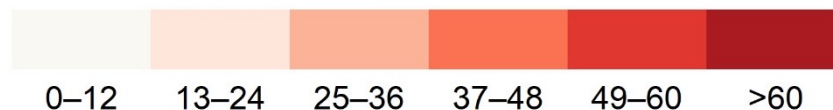


1991-2020



Mapové výstupy –  
nárůst dnů, vyšší u RCP 8.5

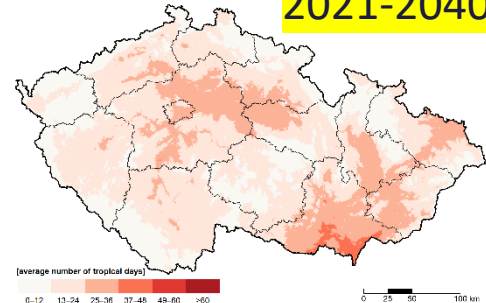
[number of tropical days]



2021-2040 (SSP2-4.5)

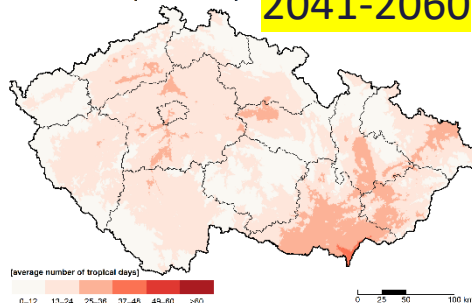
2021-2040

RCP4.5



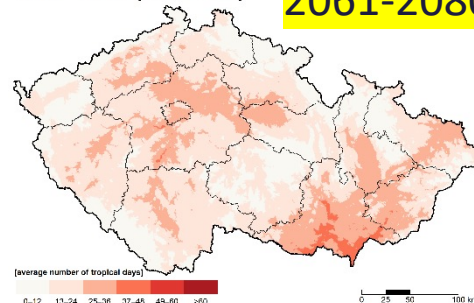
2041-2060 (SSP2-4.5)

2041-2060



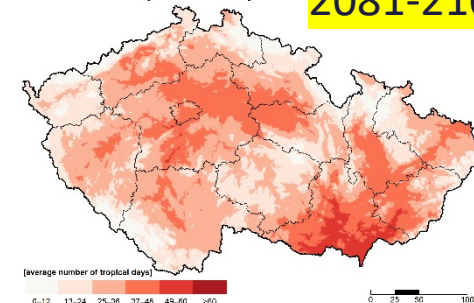
2061-2080 (SSP2-4.5)

2061-2080



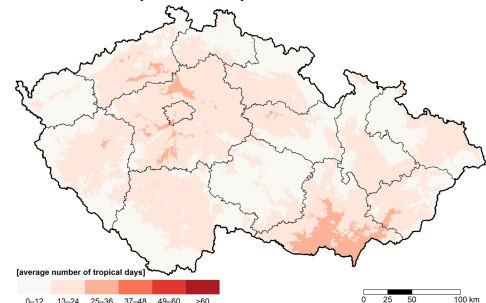
2081-2100 (SSP2-4.5)

2081-2100

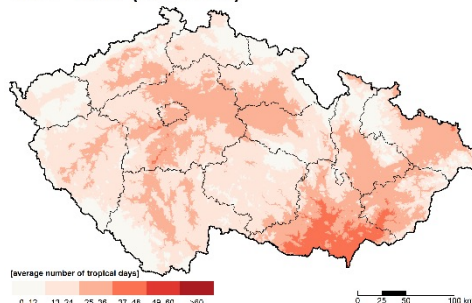


2021-2040 (SSP5-8.5)

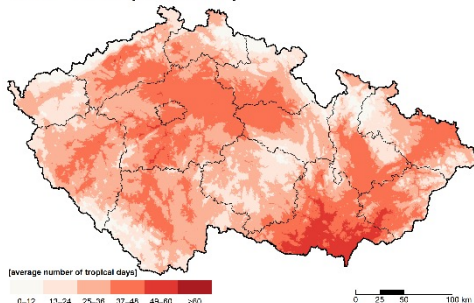
RCP8.5



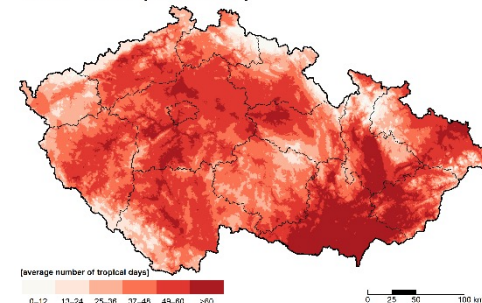
2041-2060 (SSP5-8.5)



2061-2080 (SSP5-8.5)



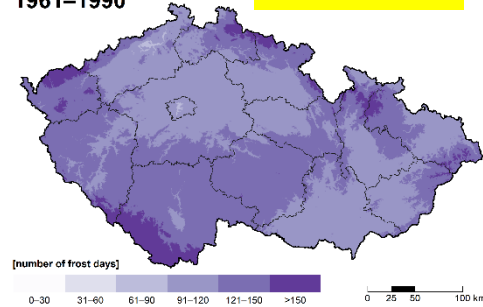
2081-2100 (SSP5-8.5)



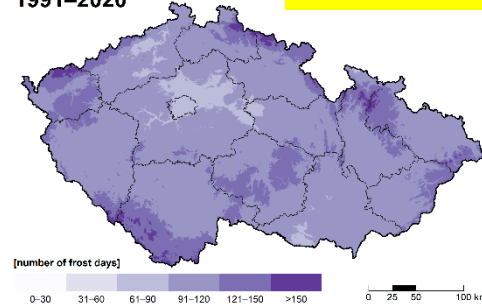


# Průměrný počet mrazových dnů

1961–1990 1961–1990



1991–2020 1991–2020

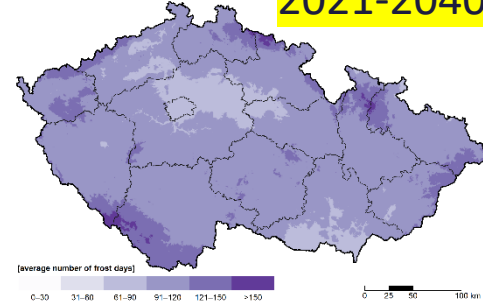


Mapové výstupy –  
výrazný pokles, pod 60 dnů v nížinách

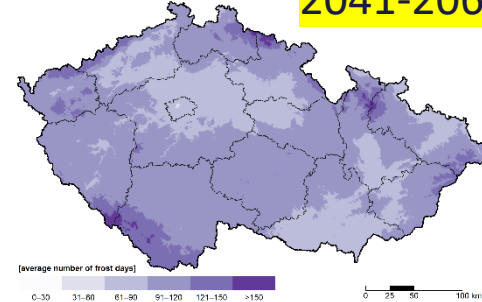
[average number of frost days]

0–30 31–60 61–90 91–120 121–150 >150

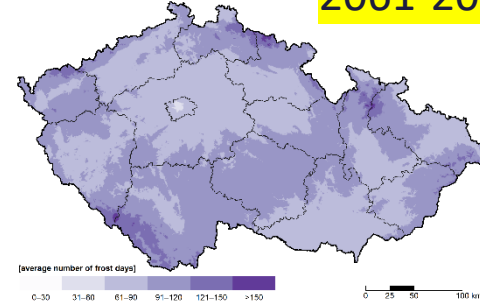
2021–2040 (SSP2-4.5) 2021–2040



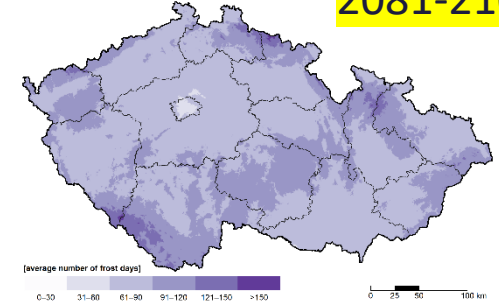
2041–2060 (SSP2-4.5) 2041–2060



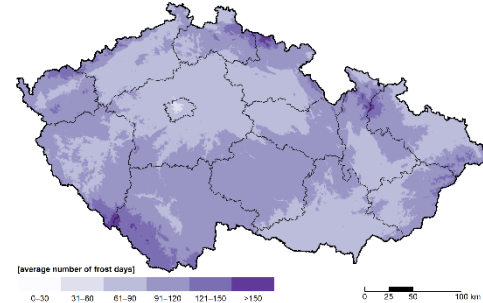
2061–2080 (SSP2-4.5) 2061–2080



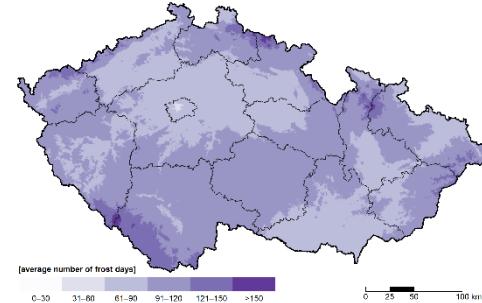
2081–2100 (SSP2-4.5) 2081–2100



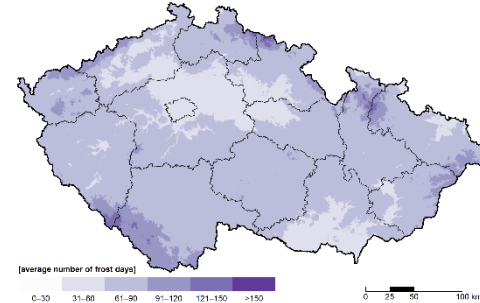
2021–2040 (SSP5-8.5)



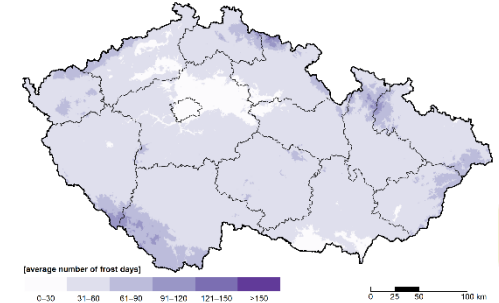
2041–2060 (SSP5-8.5)



2061–2080 (SSP5-8.5)



2081–2100 (SSP5-8.5)



RCP4.5

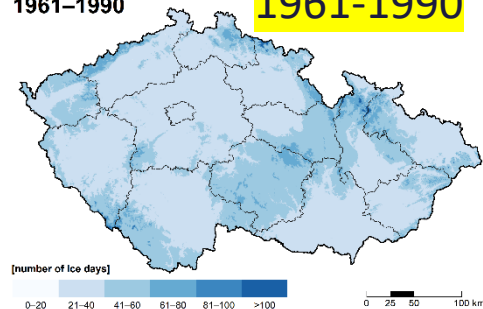
RCP8.5

# Průměrný počet ledových dnů

Mapové výstupy –  
výrazný pokles, pod 20 dnů v nížinách

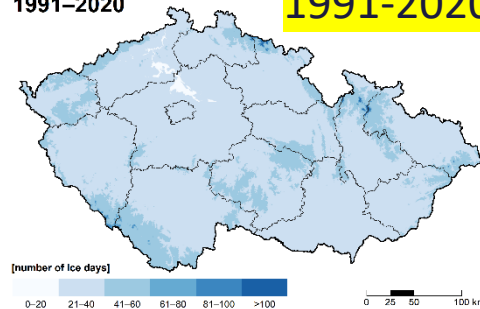
1961–1990

1961–1990



1991–2020

1991–2020

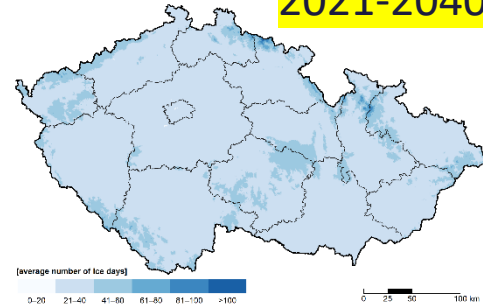


[number of ice days]

0–20 21–40 41–60 61–80 81–100 >100

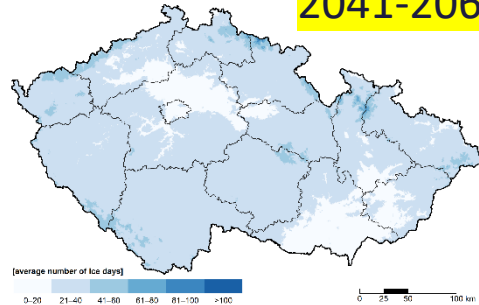
2021–2040 (SSP2-4.5)

2021–2040



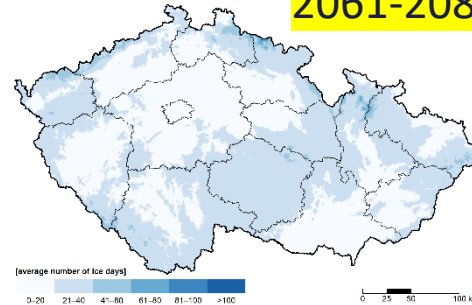
2041–2060 (SSP2-4.5)

2041–2060



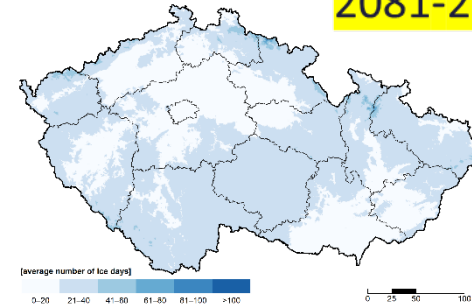
2061–2080 (SSP2-4.5)

2061–2080



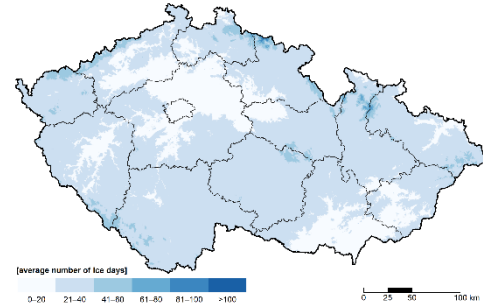
2081–2100 (SSP2-4.5)

2081–2100

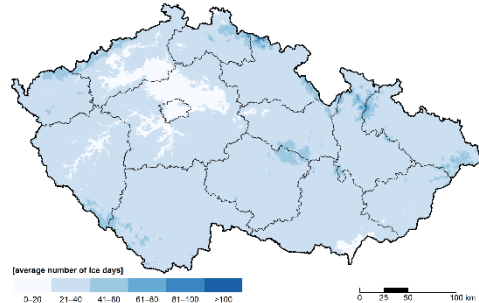


RCP4.5

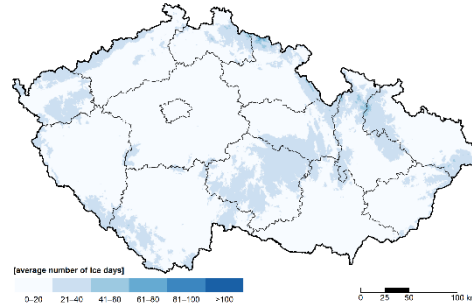
2021–2040 (SSP5-8.5)



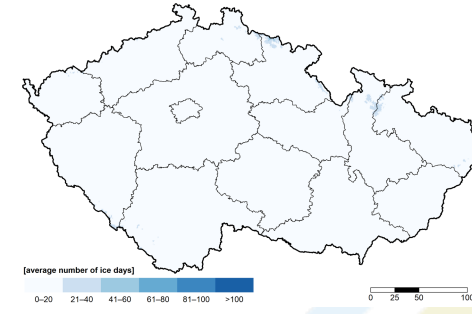
2041–2060 (SSP5-8.5)



2061–2080 (SSP5-8.5)



2081–2100 (SSP5-8.5)

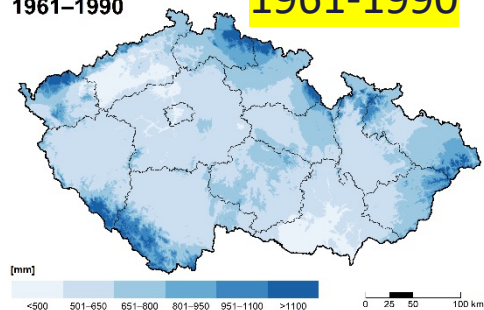


RCP8.5

# Průměrné roční srážky

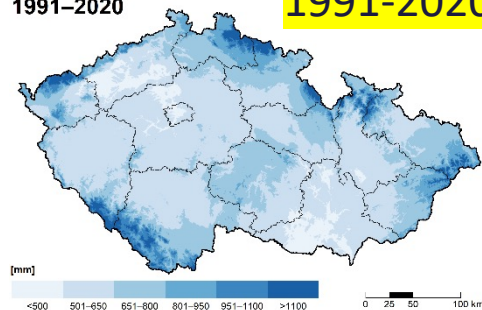
1961–1990

1961-1990



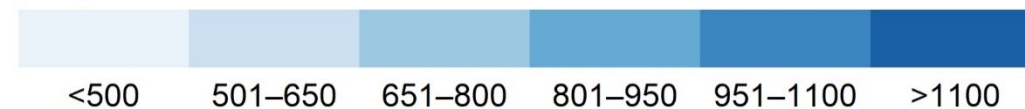
1991–2020

1991-2020



Mapové výstupy –  
± stejně, opatrně při interpretaci (nejistota)

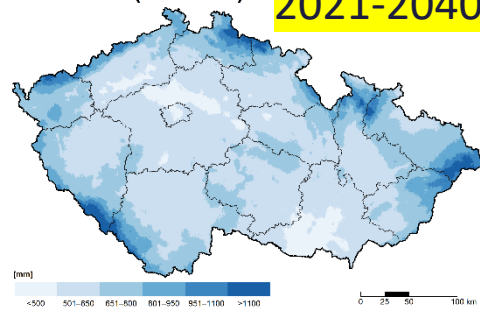
[mm]



2021–2040 (SSP2-4.5)

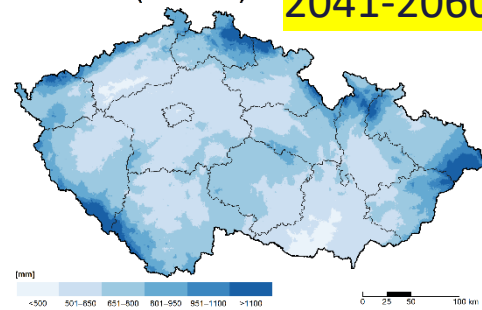
2021-2040

RCP4.5



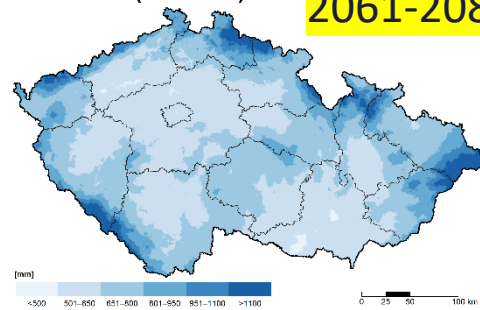
2041–2060 (SSP2-4.5)

2041-2060



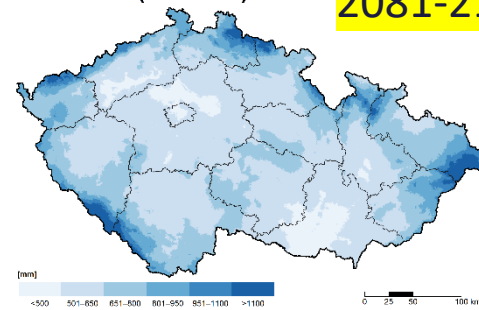
2061–2080 (SSP2-4.5)

2061-2080



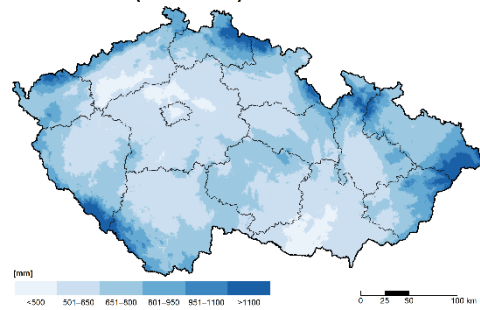
2081–2100 (SSP2-4.5)

2081-2100

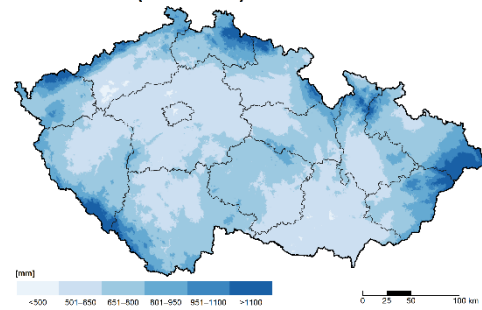


2021–2040 (SSP5-8.5)

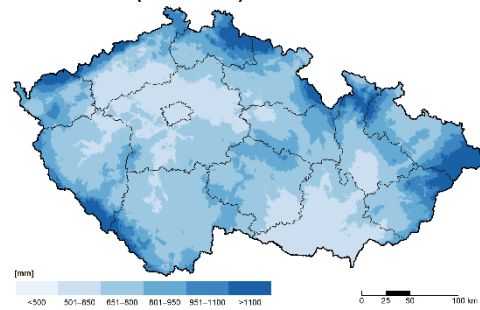
RCP8.5



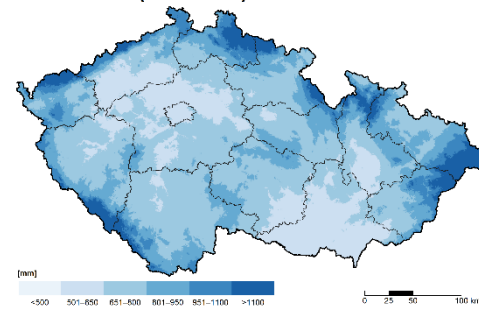
2041–2060 (SSP5-8.5)



2061–2080 (SSP5-8.5)



2081–2100 (SSP5-8.5)

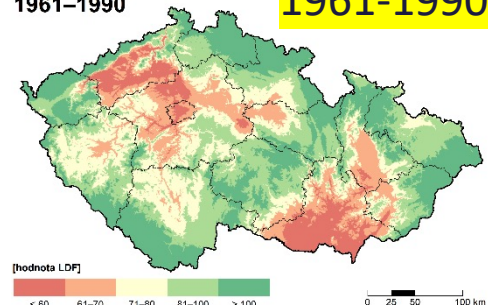




# Sucho – Langův dešťový faktor

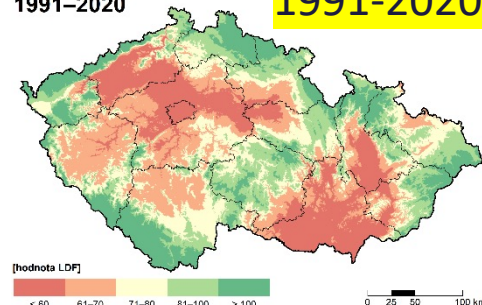
1961–1990

1961–1990



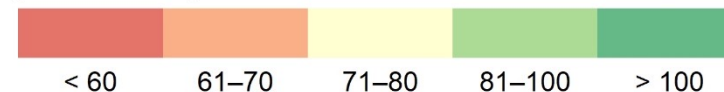
1991–2020

1991–2020



Mapové výstupy –  
výrazný vzestup suchých oblastí

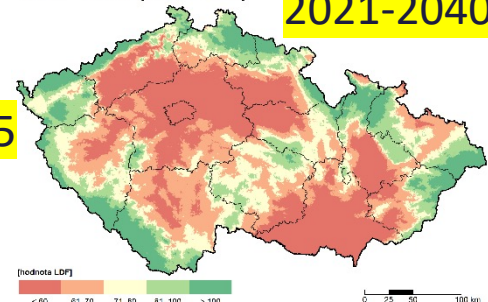
[hodnota LDF]



2021–2040 (SSP2-4.5)

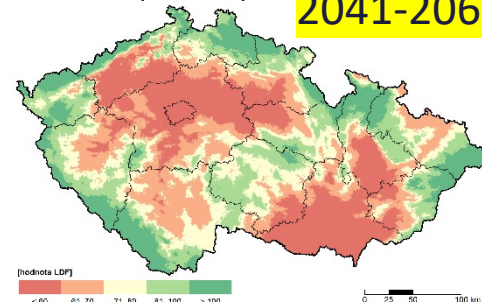
2021–2040

RCP4.5



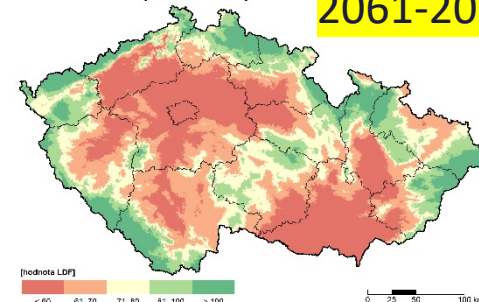
2041–2060 (SSP2-4.5)

2041–2060



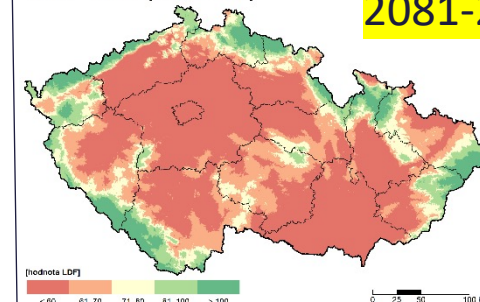
2061–2080 (SSP2-4.5)

2061–2080



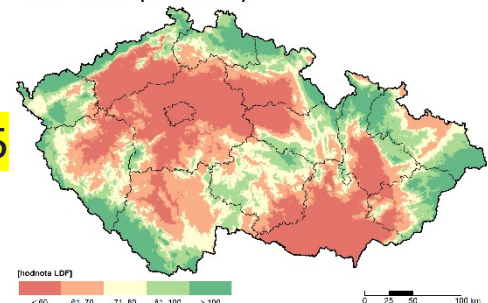
2081–2100 (SSP2-4.5)

2081–2100

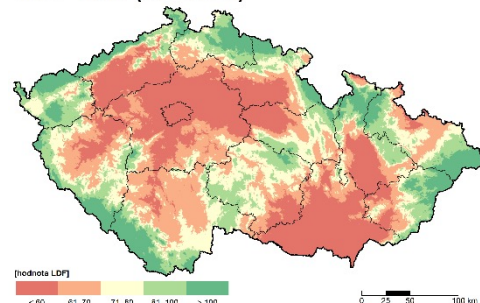


2021–2040 (SSP5-8.5)

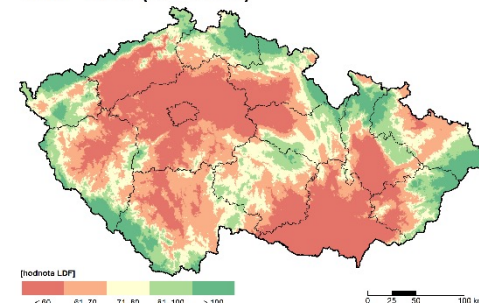
RCP8.5



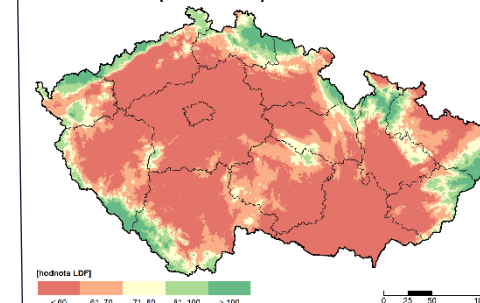
2041–2060 (SSP5-8.5)



2061–2080 (SSP5-8.5)



2081–2100 (SSP5-8.5)





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[Martin Možný](#)✉, [Miroslav Trnka](#), [Vojtech Vlach](#), [Zdenek Zalud](#), [Tomas Cejka](#), [Lenka Hajkova](#), [Vera Potopova](#), [Mikhail A. Semenov](#), [Daniela Semeradova](#) & [Ulf Büntgen](#)

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International Journal of Biometeorology (2023) 67:465–473  
<https://doi.org/10.1007/s00484-023-02426-2>

ORIGINAL PAPER

### Common snowdrop as a climate change bioindicator in Czechia

Lenka Hájková<sup>1</sup>✉ · Martin Možný<sup>1</sup> · Veronika Oušková<sup>1</sup> · Adéla Musilová<sup>1</sup> · Vojtěch Vlach<sup>1,2</sup> · Petra Dížková<sup>3,4</sup> · Lenka Bartošová<sup>3,4</sup> · Zdeněk Žalud<sup>3,4</sup>

Received: 21 September 2022 / Revised: 3 January 2023 / Accepted: 4 January 2023 / Published online: 18 January 2023  
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Články – aromatický chmel v Evropě + rajónizace území + fenologické změny

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by [Martin Možný](#)<sup>1,2</sup>✉, [Lenka Hajkova](#)<sup>1,\*</sup>✉, [Vojtech Vlach](#)<sup>1,3</sup>✉, [Veronika Ouskova](#)<sup>1</sup> and [Adela Musilova](#)<sup>1</sup>

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*Climate* **2023**, 11(10), 210; <https://doi.org/10.3390/cli11100210>

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2023, VOL. 38, NOS. 7–8, 506–512  
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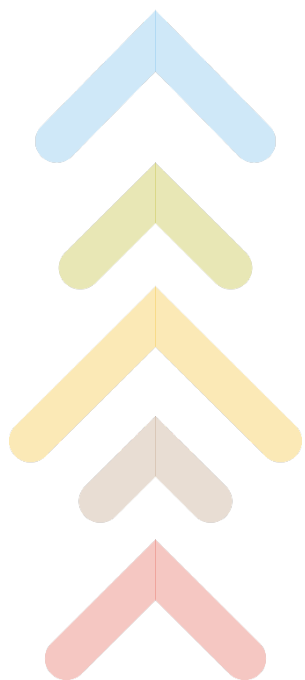
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RESEARCH ARTICLE

### Change in *Carpinus betulus* flowering in the Czech Republic

Lenka Hájková<sup>a</sup>, Martin Možný<sup>a</sup>, Veronika Oušková<sup>a</sup> and Zdeněk Žalud<sup>b,c</sup>

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## Závěr :

- Projekce ukazují na výrazný růst teplot vzduchu a sucha
- Reakcí přijmutí adaptačních opatření v zemědělství a změnit způsob hospodaření na zemědělské půdě.





# Děkuji za pozornost



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