



## Assessing the **DIS**tributional effects of **CL**imate **CH**ange impacts and adaptation in **AusTR**ia, for just, targeted and efficient adaptation

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April 4, 2024

Vienna



# Brief description of the project

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## Objective

- To **inform** decision makers in Austria about group-specific social vulnerabilities to key climate risks as well as the within-country distributional effects of climate change impacts and adaptation on a national scale.
- This will **enable** the implementation of just and cost-effective adaptation measures, including the strengthening of adaptive capacities where most needed.



## Means

- To reach this objective DISCC-AT follows an **inter- and transdisciplinary** approach, combining **qualitative and quantitative methods**, embedded in a broad stakeholder process.



## Focus

- **Flood** and **heat**-related risks

# Key research questions

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1. What are the **vulnerabilities** and therein particularly the adaptation capacities for **different societal groups** with respect to flood and heat related health risk?
2. How can the **public sector** increase adaptation capacities where most needed?
3. Who bears the **welfare costs** of climate change-induced flood and health impacts in Austria and **who benefits from public adaptation**?
4. What are ways forward for **mainstreaming just adaptation** in the existing institutions and in new policies?

# Selected first results and dissemination

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**Website:** [www.discc.at](http://www.discc.at)

## Working papers

- Wallner, P. and Moshhammer, H. (2023). Social Vulnerability and Heat: Systematic Literature Search and Narrative Synthesis. (*available on website*)
- Moshhammer, H. (2023). District characteristics predicting vulnerability to heat. (*available on website*)
- Tesselaar, M. and Botzen W.J.W. (2024). Social flood risk in Austria: assessing flood risk using detailed projections of socioeconomic vulnerability. (*available on website*)
- Preinfalk, E., Beier, J., Hanger, S., Knittel, N., Bachner, G. (2024). Characterizing differential climate vulnerability: A mixed-methods approach for heat related risk in Austria. (*in progress*)

## Dataset

- Marbler, A. (2024). Pop-AUT: Subnational SSP Population Projections for Austria (Version 1.0) → online tool

# Subnational SSP Population Projections

## Pop-AUT: Subnational SSP Population Projections for Austria



Subnational SSP Population Counts   Subnational SSP Population Distribution   Compare SSP Versions   About

Map   Time Series

Bundesland/Province   Bezirk/District   Gemeinde/Municipality   Gridded (~1x1 km)

Select initial scenario and year

SSP5

2015

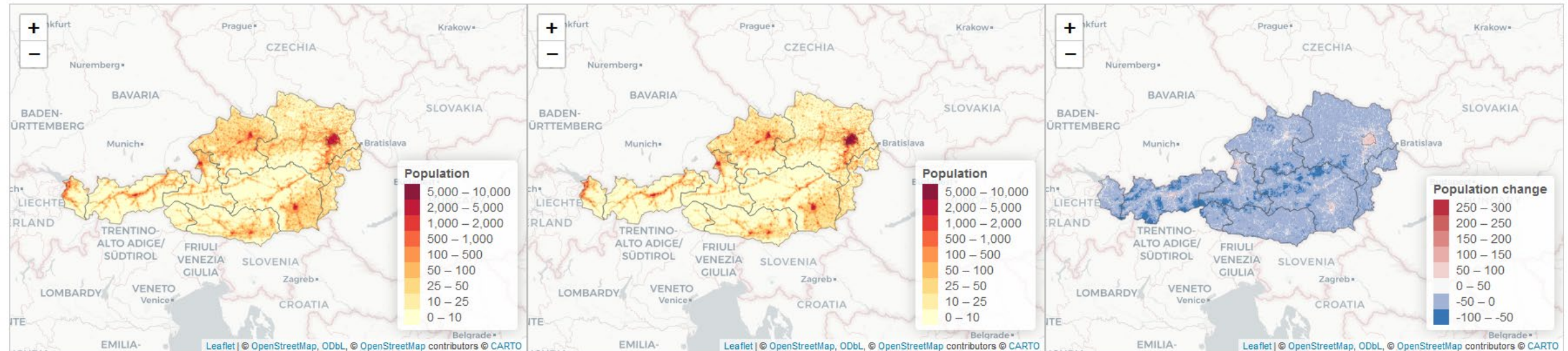
Select alternative scenario/year

SSP5

2080

Select change type

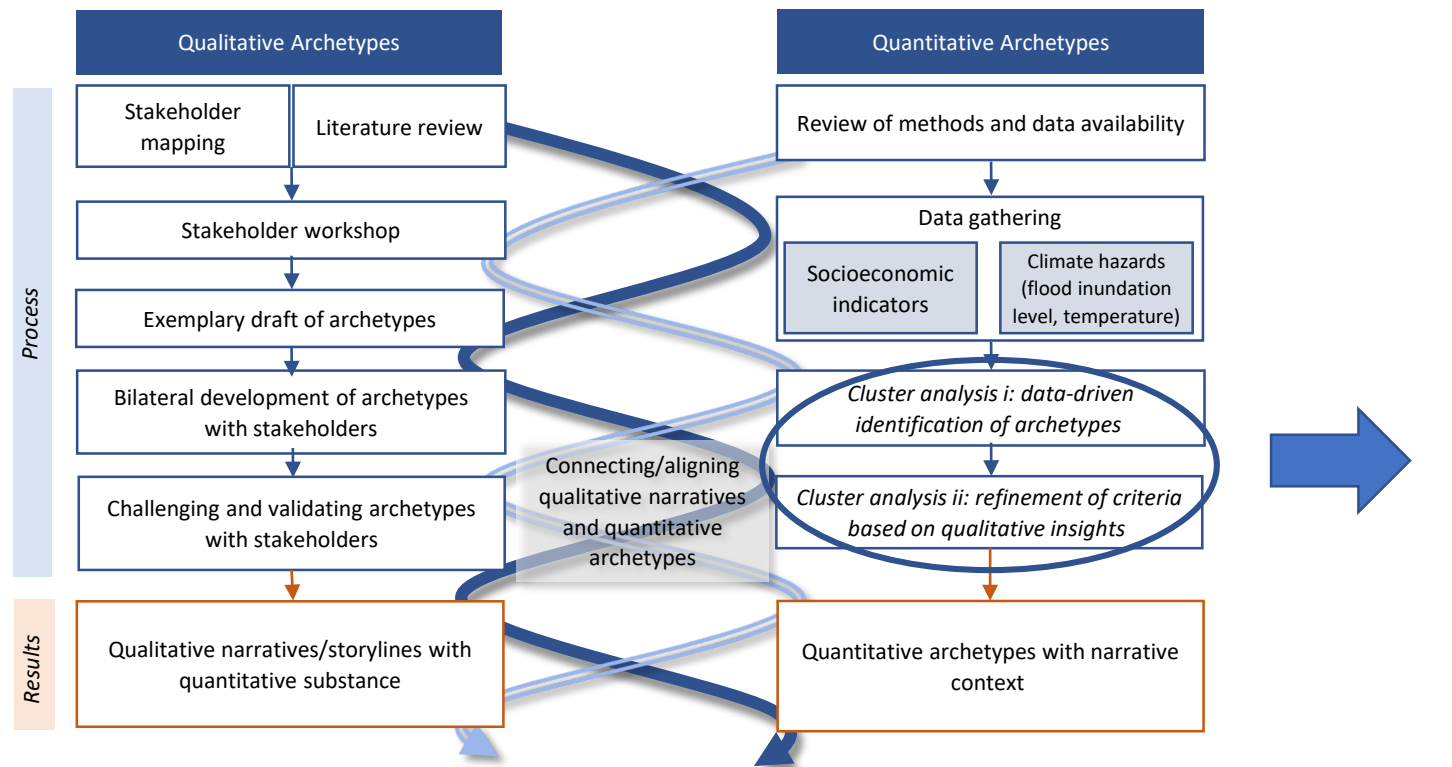
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Download Data

# Mixed-methods approach

## Co-development of profiles of vulnerable households



**Example: Heat**  
→ 90 clusters depicting different risk profiles  
→ Filter those with highest risk (H x E x V) based on the combination of risk drivers  
→ 23 clusters

→ What do they have in common? Differences?  
→ What patterns do we detect?

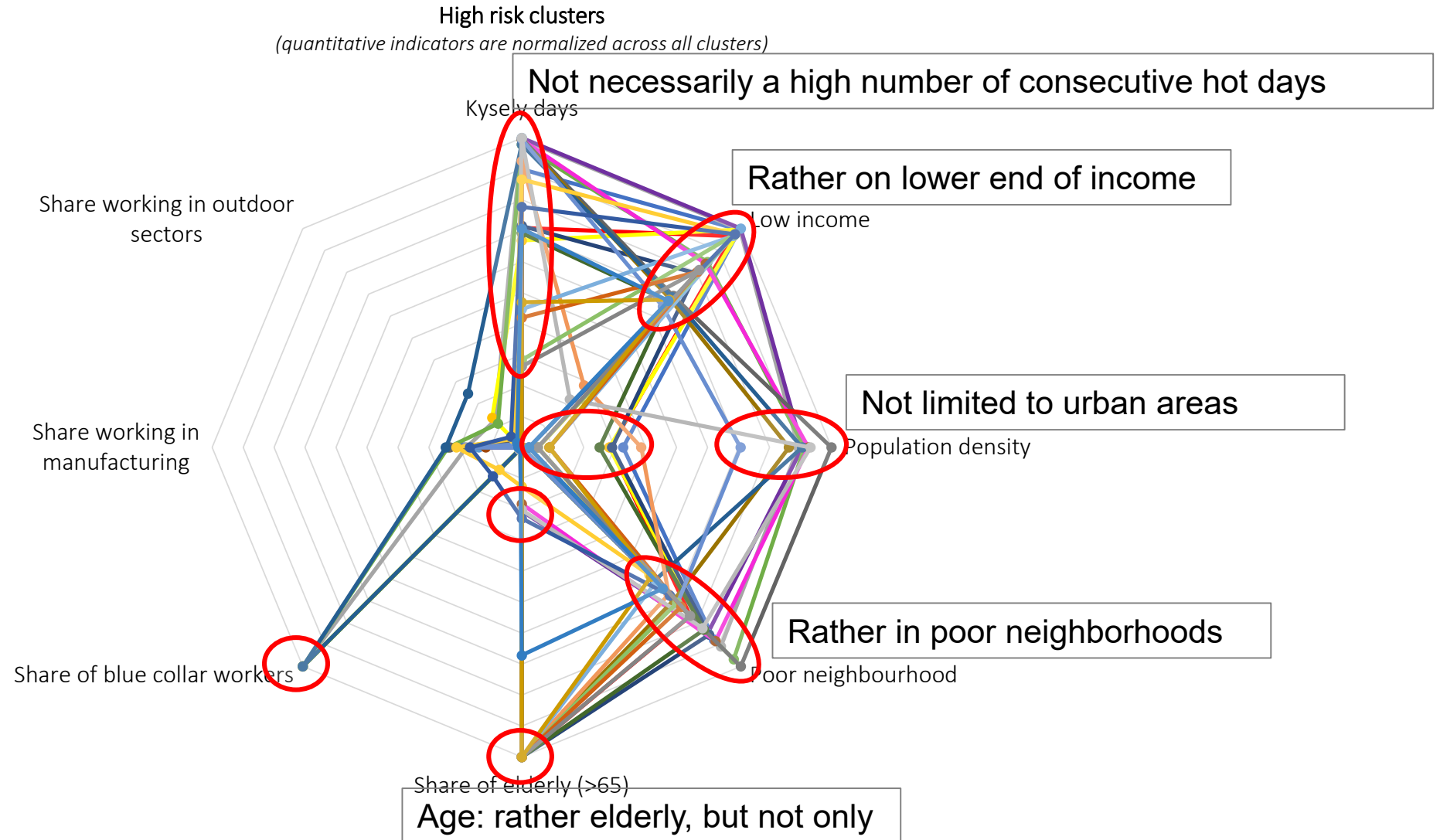


# Mixed-methods approach for heat related risk

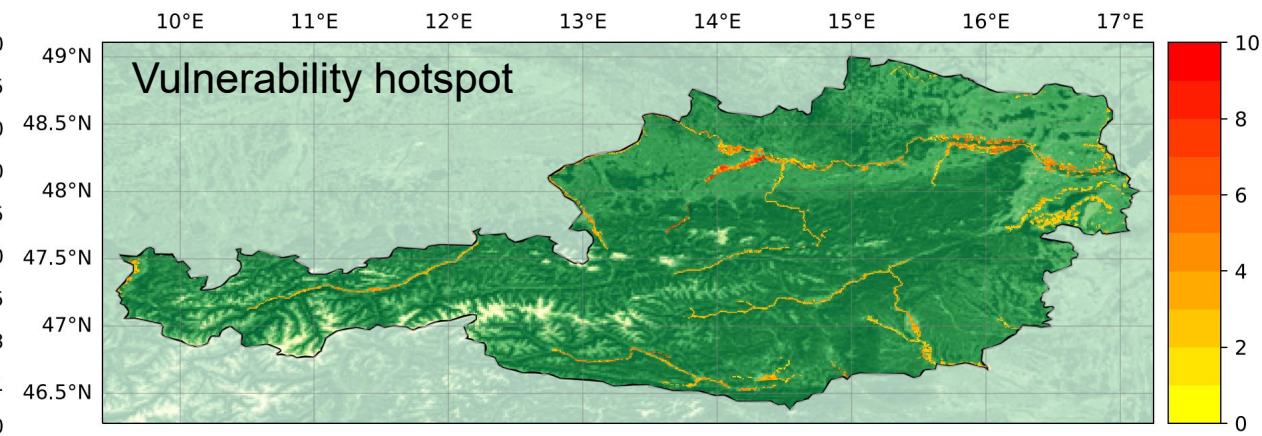
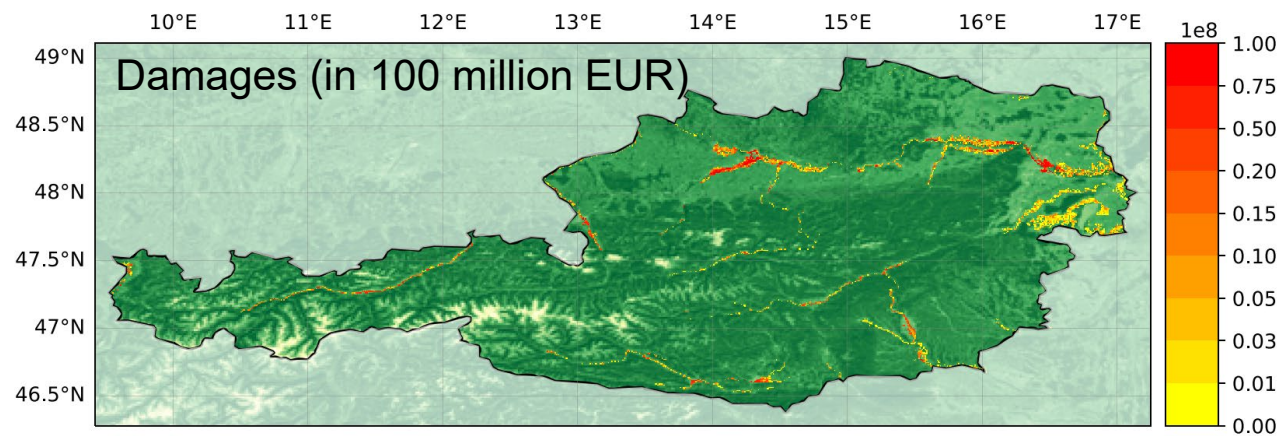
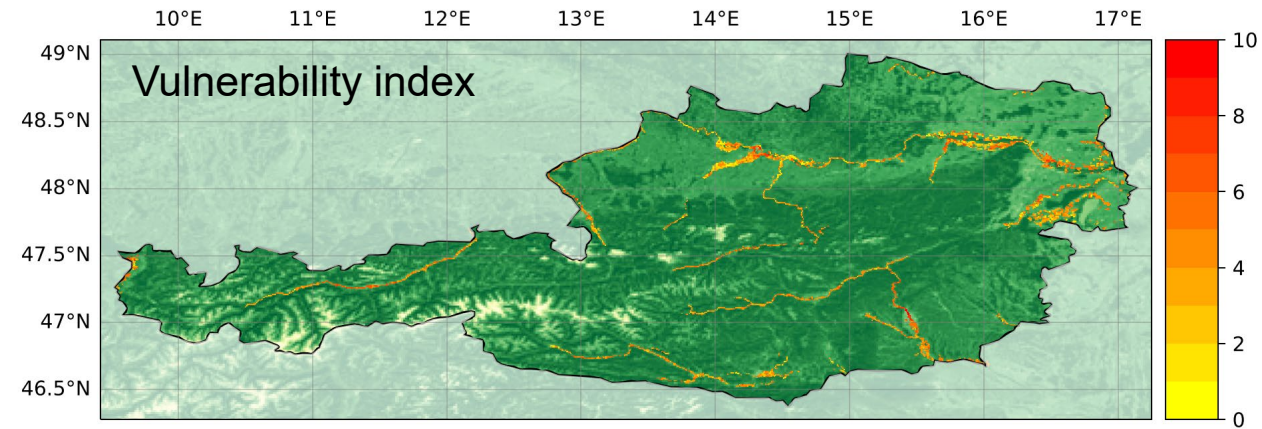
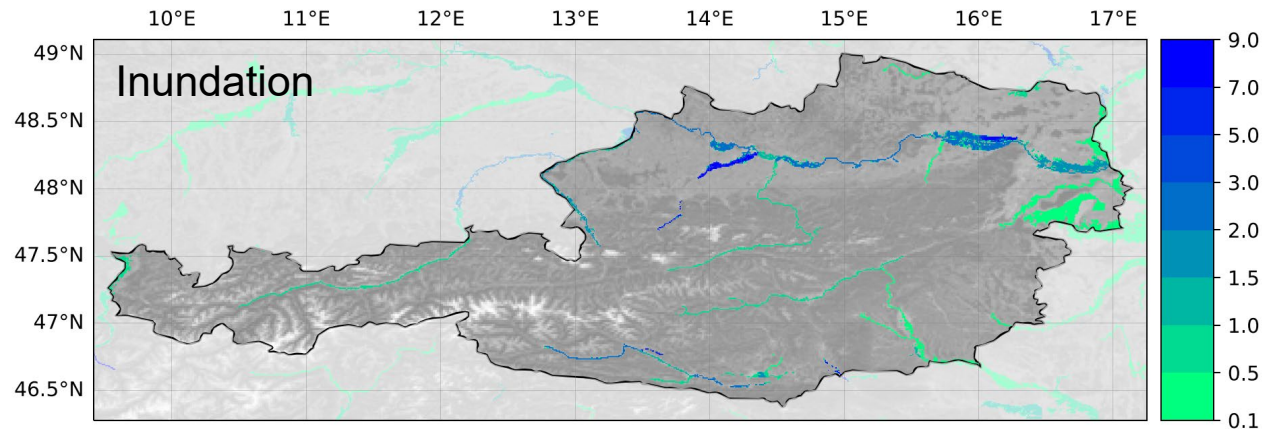
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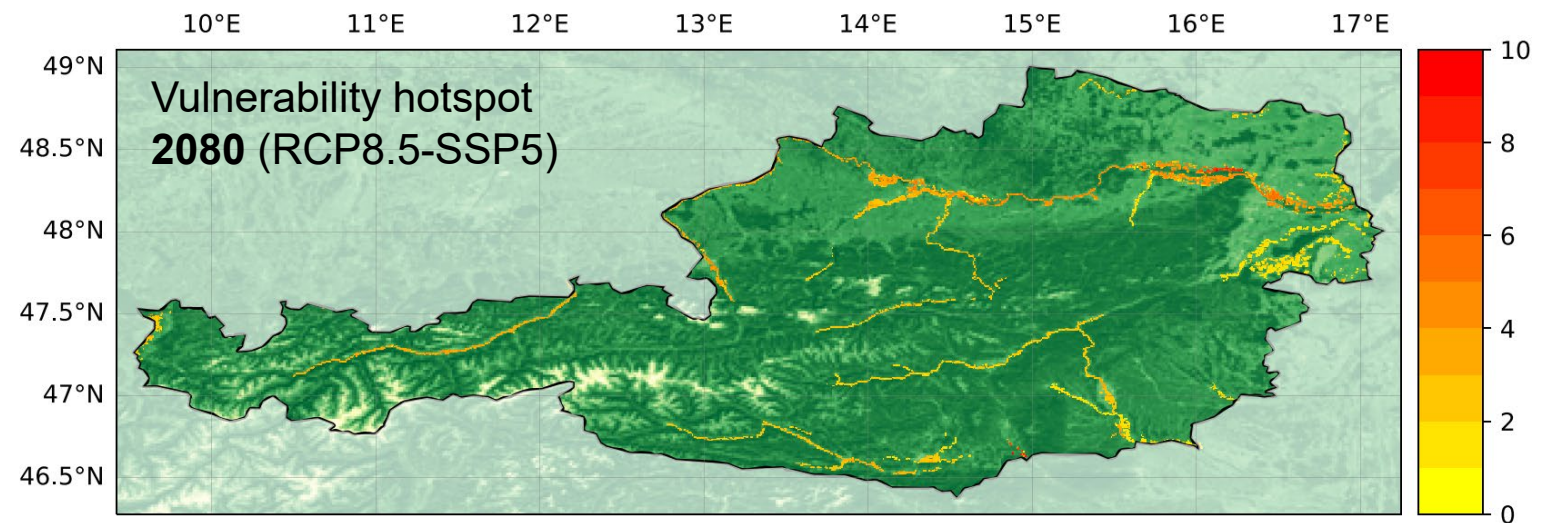
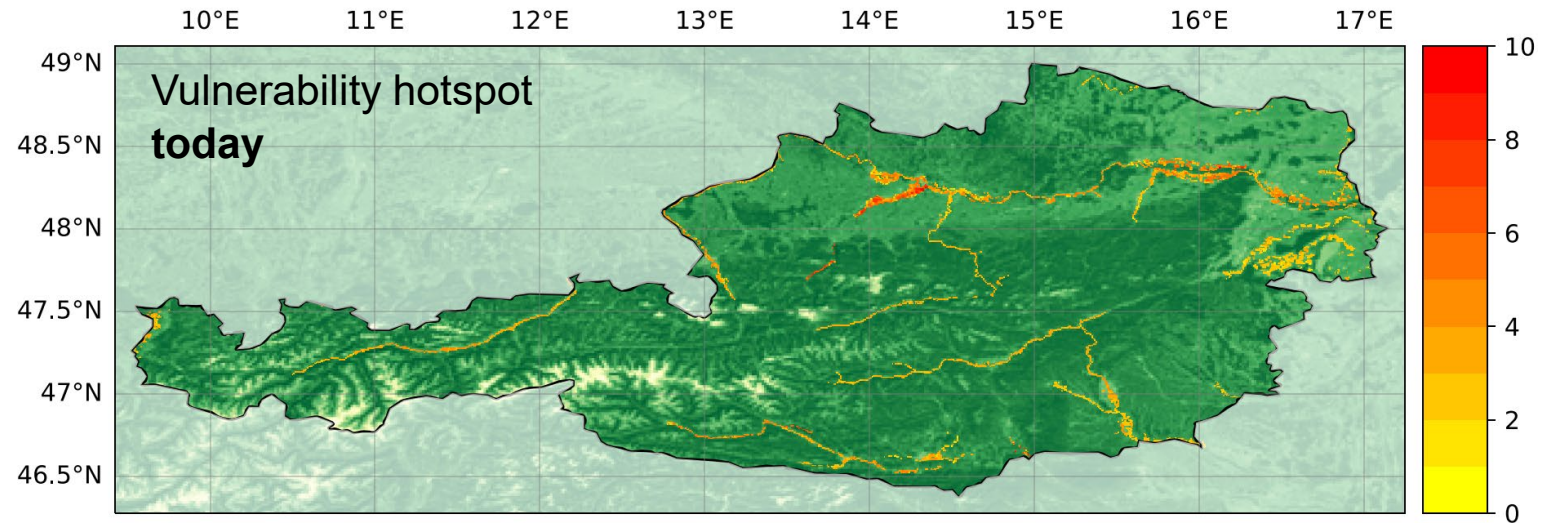
→ What do they have in common? Differences?  
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# Social flood risk - 250-year flood



# Social flood risk - 250-year flood



## Dissemination

- First stakeholder workshop in March 2023
- 3rd International Conference on Natural Hazards and Risks in a Changing World, Amsterdam, June 12-13
  - Paper accepted for oral presentation
- EGU General Assembly 2024, Vienna, April 14-19
  - Paper accepted for oral presentation
- Klimatag 2024, Vienna, April 2-4
  - “Building quantitative and qualitative archetypes of households to assess vulnerability to flood and heat-related risks in Austria” (Nr. V16), Julia Beier
  - “ÖKS15-Luftfeuchtigkeit” (Nr. VP17), Martin Jury

## Other

- Stakeholder map (website)
- An overview of attributes of social vulnerability (website)

# Progress, challenges and outlook

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# Project progress

			Okt.23	Nov.23	Dez.23	Jän.24	Feb.24	Mär.24	Apr.24	Mai.24	Jun.24	Jul.24	Aug.24	Sep.24	Okt.24	Nov.24	Dez.24	Jän.25	Feb.25	Mär.25	Apr.25	Mai.25	Jun.25	Jul.25	Aug.25	Sep.25
			Project months																							
	lead	support	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
<b>WP1: Participatory assessment of intersectional vulnerabilities</b>	<b>IIASA</b>																									
Task 1.1 scoping interviews and stakeholder maps	EAA	IIASA			M1.1																					
Task 1.2 review of existing vulnerability assessments	IIASA	EAA, all			M1.2																					
Task 1.3 specification of vuln. indctrs. and adapt. cap.	IIASA	EAA										M1.3				M1.4										
Task 1.4 synthesis of gained insights	IIASA	EAA, EconClim-TIM																					M1.5			
<b>WP2: Climate and socio-economic scenarios and data</b>	<b>RegClim</b>																									
Task 2.1 socio-economic data	EconClim	VU, MedUniWien														M2.1										
Task 2.2 downscaled climate data	RegClim	VU, MedUniWien															M2.2	M2.3&2.4								
<b>WP3: Flood risk modelling</b>	<b>VU</b>																									
Task 3.1 simulation of flood risk	VU	EconClim, IIASA															M3.1									
Task 3.2 sim. of insurance and risk-reduction measures	VU	EconClim, IIASA																								
<b>WP4: Health impact modelling</b>	<b>MedUniWien</b>																									
Task 4.1 systematic review	MedUniWien	IIASA				M4.1																				
Task 4.2 cluster analysis	MedUniWien	RegClim						M4.2																		
Task 4.3 time-series analysis	MedUniWien												M4.3													
Task 4.4 estimation and calculation of health impacts	MedUniWien																							M4.4		
Task 4.5 estimate labour productivity losses	EconClim	RegClim																						M4.5		
<b>WP5: Economy-wide modelling of distributional effects</b>	<b>EconClim</b>																									
Task 5.1 disaggregating the CGE models' database	EconClim	IIASA														M5.1										
Task 5.2 calibration to SSP-RCP combinations	EconClim	RegClim																							M5.2	
Task 5.3 model linkage to the flood risk model	EconClim	VU																							M5.3	
Task 5.4 links to health impact assessment	EconClim	MedUniWien																							M5.4	
Task 5.5 simulation of scenarios	EconClim																									M5.5
<b>WP6: Stakeholder integration and co-production of knowledge</b>	<b>EconClim-TIM</b>																									
Task 6.1 stakeholder management	EAA	IIASA, EconClim-TIM																								
Task 6.2 science-stakeholder workshop 1	EconClim-TIM	EAA			M6.1																					
Task 6.3 science-stakeholder workshop 2	EconClim-TIM	EAA																							M6.2	
<b>WP7: Project management</b>	<b>EconClim</b>	<b>all</b>	M7.1	M7.2								M7.3														M7.4

# Challenges

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- Low availability of stakeholders in December and January 2023 → scoping interviews had been delayed
- Acquisition of socio-economic data on 1x1 km scale, due to data protection issues
- Acquisition of data on humidity/dewpoint temperatures and coming to a consistent dataset on climate indicators that fulfils requirement for all modelling tasks
- Low resolution of future flood risk data (flood zones and inundation levels); only major rivers covered; no pluvial flood risk

- 2nd stakeholder workshop in May 2024
- Heat-related labour productivity losses
- Economy-wide modelling of distributional effects, based on archetypes
  - Climate change impacts
  - Adaptation
- Factsheets and policy briefs
- Journal publications



# Links and synergies with other ACRP projects

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# Links and synergies within ACRP

## Finished:

- **COIN and PACINAS**  
Economy-wide welfare effects of impacts/adaptation  
→ more nuanced w.r.t. households and justice in DISCC-AT
- **MacroMode**  
CGE modelling: distributional welfare effects of floods
- **ÖKS15**  
Extending dataset by dewpoint temperature (humidity), and the heat indices: indoor wet bulb globe temperature (WBGT-ID), HUMIDEX and NOAA heat index (HI)

## Running:

- **Future Capacity**  
Heat-ozone interaction on health
- **2<sup>nd</sup> Austrian Assessment Report**  
Supplying downscaled SSP-data to AAR2
- **INTEGRATE**  
Ongoing CGE model development  
@ University of Graz
- **Klimaszenarien.at (ÖKS26)**  
Gathering experience for including dewpoint temperature (humidity)
- **UrbanHeatEquality**  
Just adaptation to heat in cities → planned to reach out
- **GreenAdaptation**  
Adaptative capacities → planned to reach out



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