

Wo sind Brennpunkt des Klimawandelrisikos in Österreich, und wie sind diese charakterisiert?

Eine räumlich-integrative Perspektive am Beispiel des Hochwasserrisikos

Stefan KIENBERGER & Jutta-Lucia LEIS

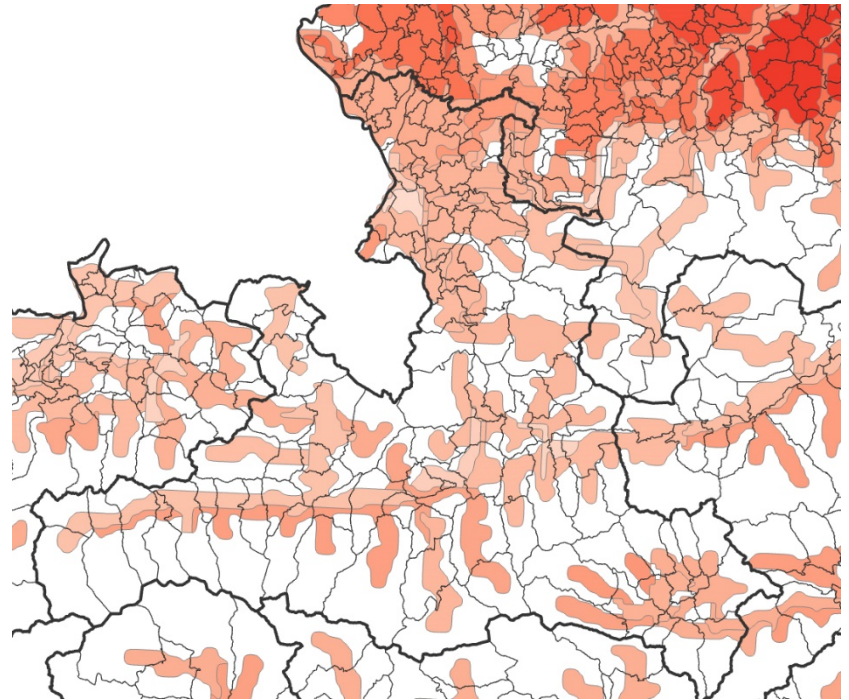
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Innovationen

‘Neuer’ Risikoansatz des IPCC

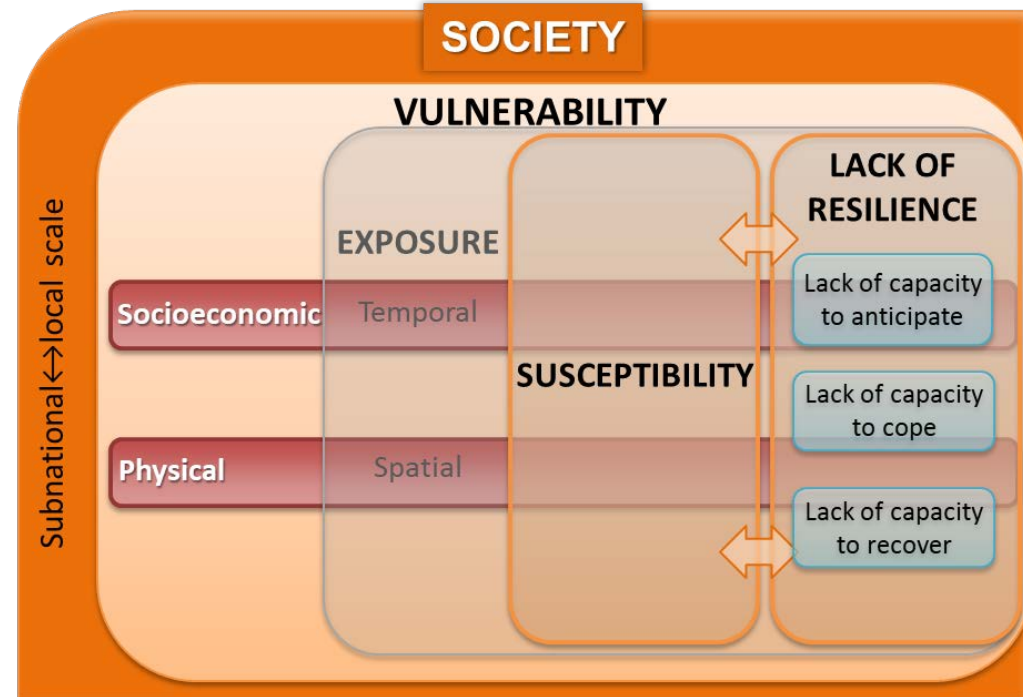


Homogene Raumeinheiten Regionen der Verwundbarkeit / des Risikos



Innovationen

‘Neuer’ Risikoansatz des IPCC



MOVE FRAMEWORK
(nach Birkmann et al 2013)

Innovationen

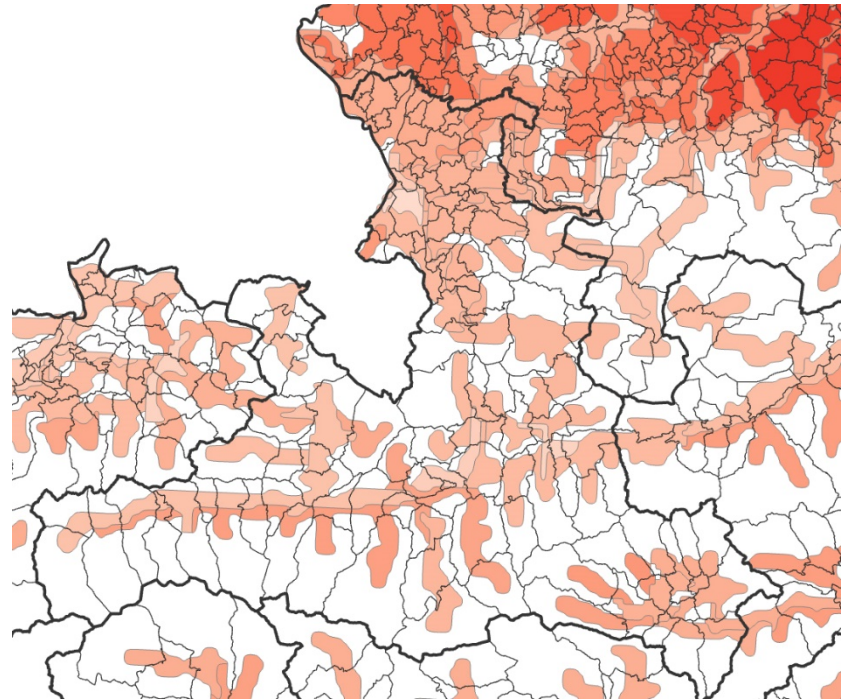
Homogene Raumeinheiten
Regionen der Verwundbarkeit / des Risikos

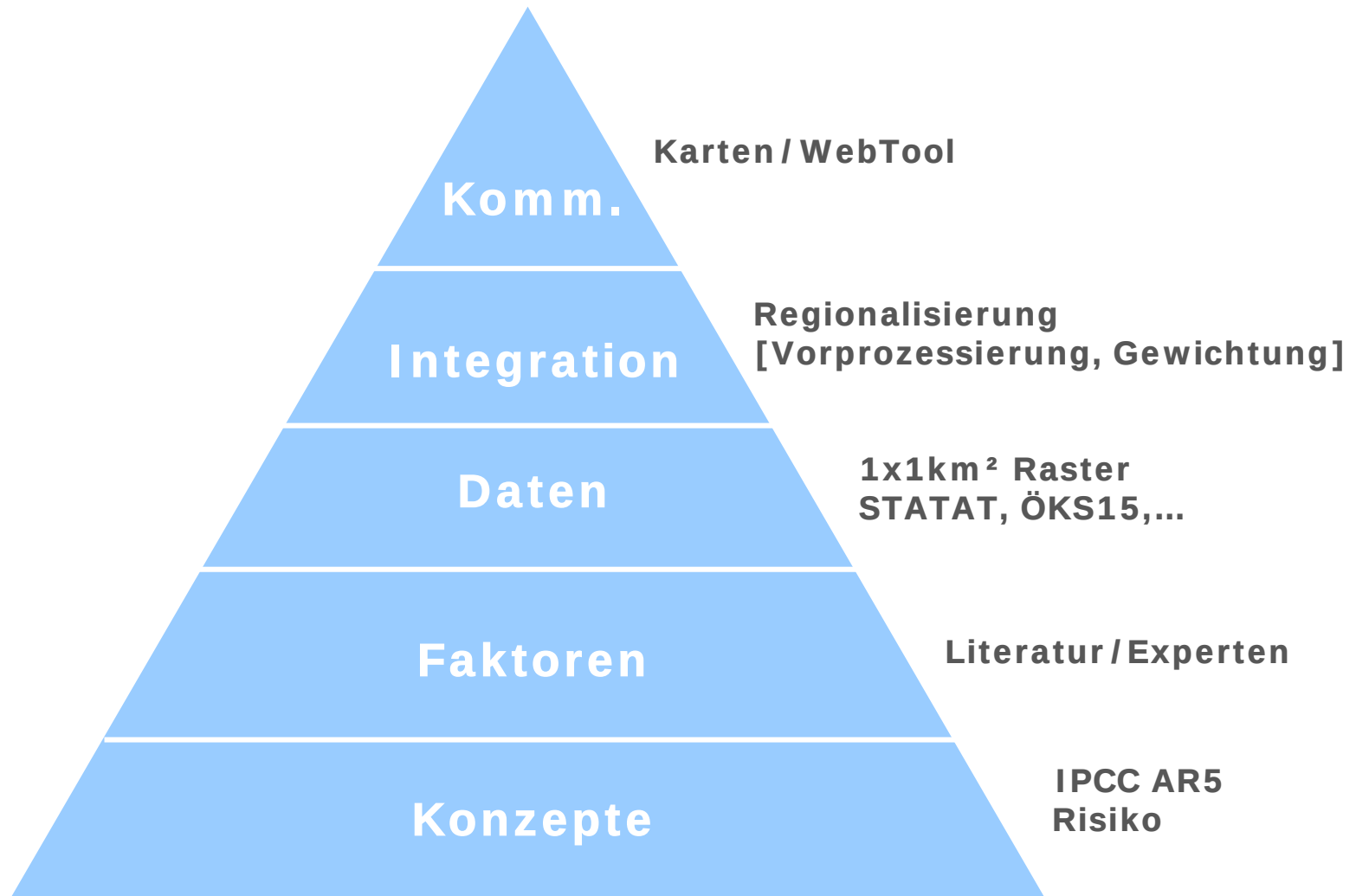
‘Geon’

Räumlich-explicit

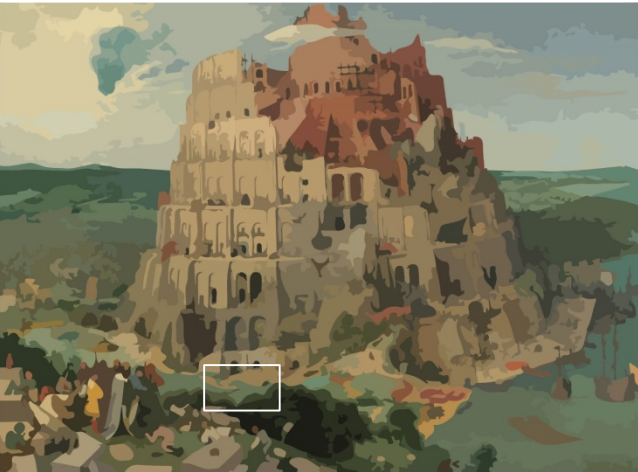
Quantitativ & qualitativ

Integration von Rastereinheiten







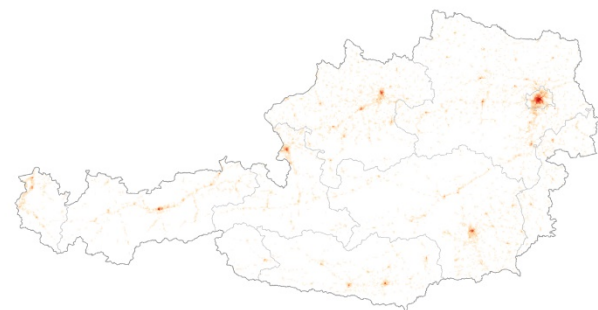
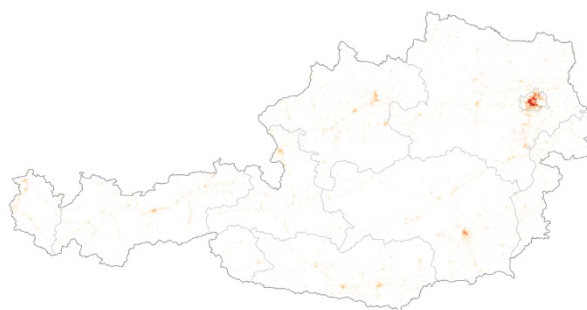
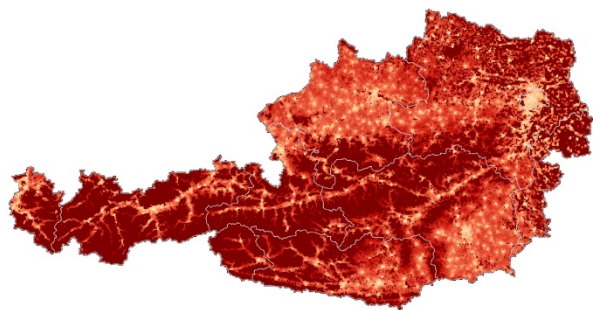
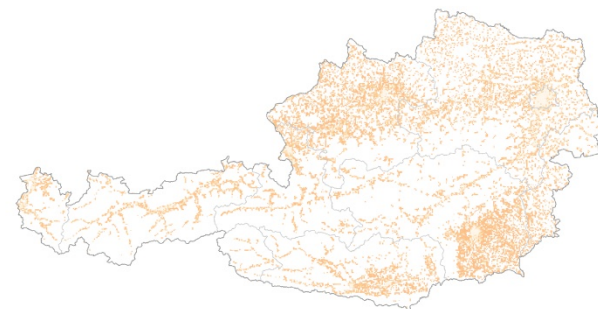
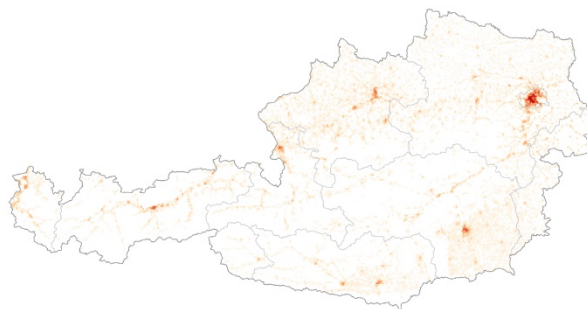
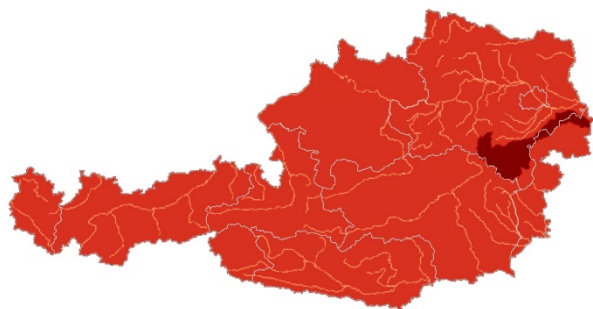
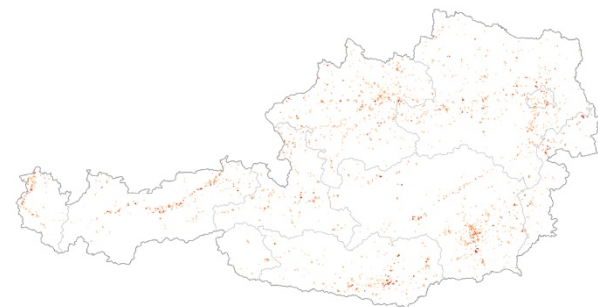
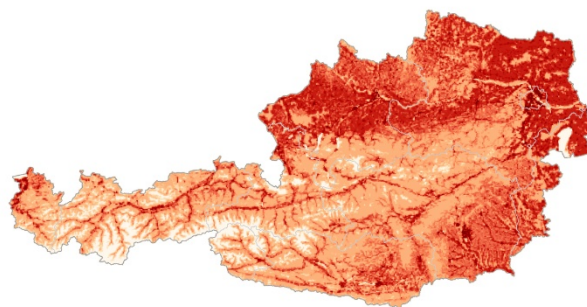
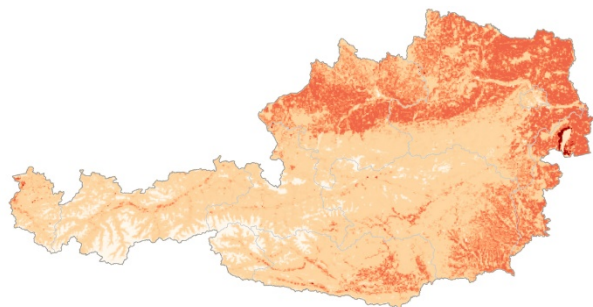
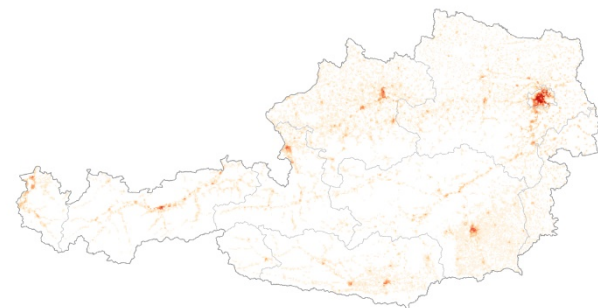
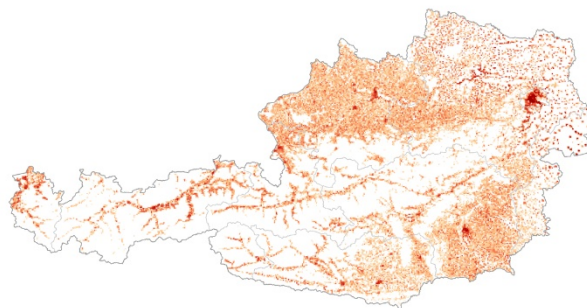
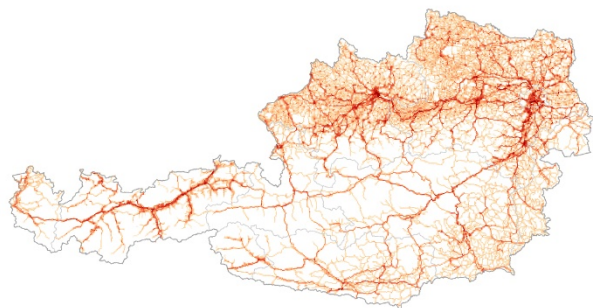


Ergebnisse

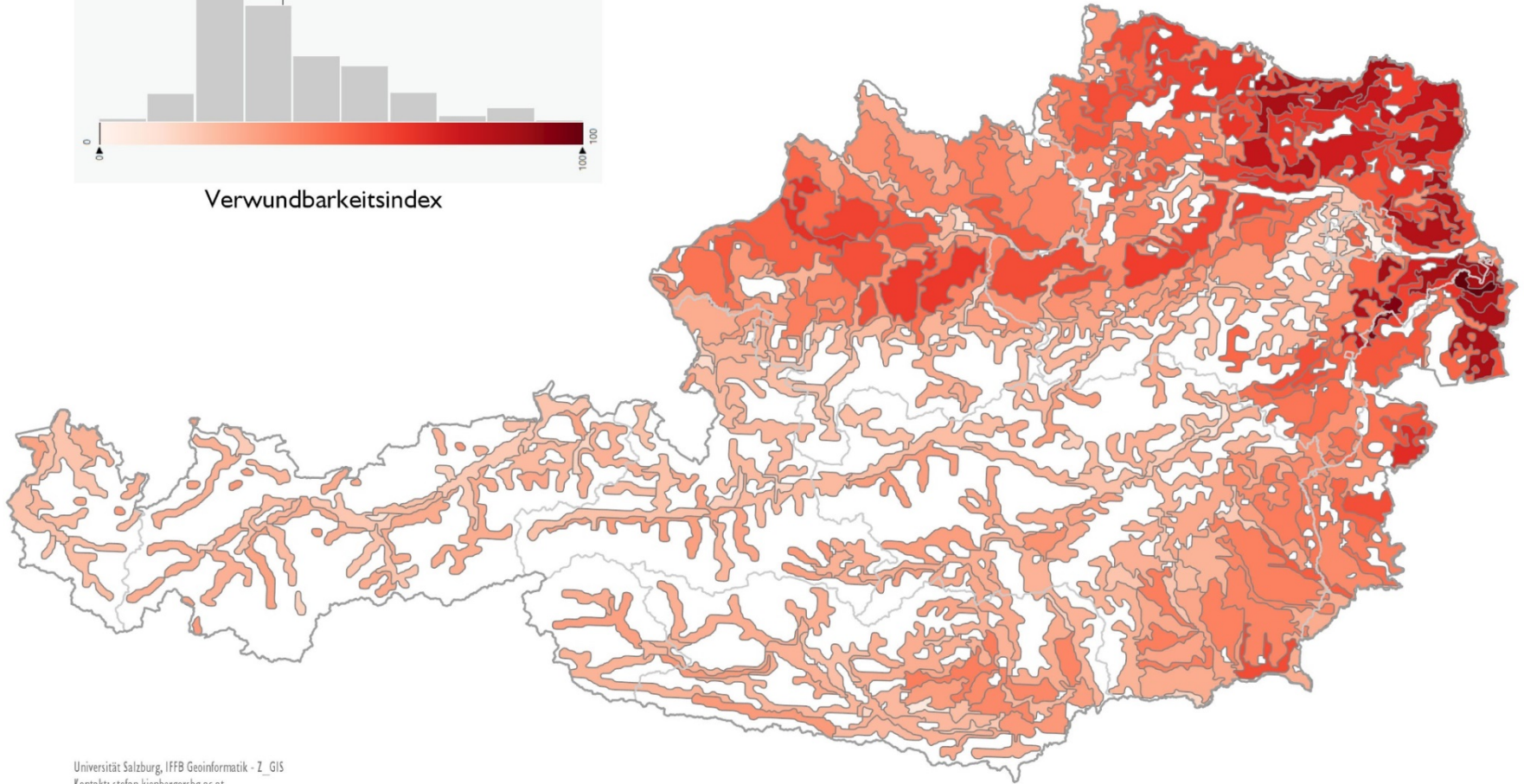
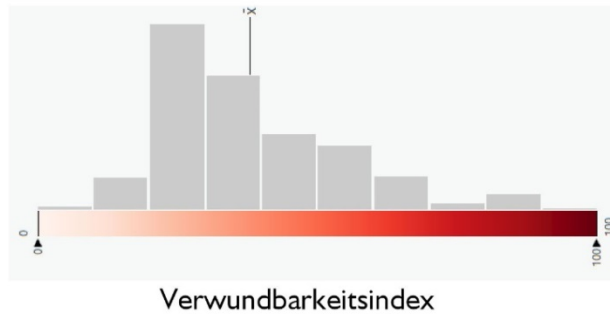
Risiko & Verwundbarkeit – ‘Floods’

Indikatoren Sozio-ökonomische Verwundbarkeit

Risk Component	Domain	Composite indicators	Single Indicators	Sign	Weighting	Data Source	Date
Hazard		Consecutive Wet Days [Flood probability]			n/a	ÖKS15/HORA	
Exposure		Permanent settlement area					
Socio-economic Vulnerability	Susceptibility	Transport infrastructure	Highways	+	0,25	GIP	2017
			Primary roads	+	0,25	GIP	2017
			Secondary roads	+	0,25	GIP	2017
			Railway	+	0,25	GIP	2017
		Employment by sectors	Employment in primary sector	+	0,50	STATAT	2015
			Employment in secondary sector	+	0,35	STATAT	2015
			Employment in tertiary sector	+	0,15	STATAT	2015
		Age distribution	Population under 20 years	+	0,40	STATAT	2016
			Population between 20 and 64 years	+	0,20	STATAT	2016
			Population over 64 years	+	0,40	STATAT	2016
		Ecosystem services	Food production	+	0,30	CLC	2012
			Disturbance regulation	-	0,25	CLC	2012
			Recreation	+	0,20	CLC	2012
			Raw materials	+	0,25	CLC	2012
		Landuse	Cropland	+	0,20	CLC	2012
			Pasture	+	0,20	CLC	2012
			Woodland/forest	+	0,10	CLC	2012
			Industrial/commercial	+	0,25	CLC	2012
			Urban	+	0,25	CLC	2012
		Urbanization		+	n/a	CadasterENV (HR Change Alert Map)	2006-2012
	Lack of Resilience	Early warning system	Forecasting model presence for river	-	0,75	BMNT - Hochwasserprognose	2018
			Forecasting model presence for catchment	+	0,25	BMNT - Hochwasserprognose	2018
		Origin	Origin Austria	+	0,28	STATAT	2016
			Origin Europe/Northern America/Australia	+	0,33	STATAT	2016
			Origin MEDCs/LEDsS/unknown	+	0,40	STATAT	2016
		Education level	Academic degree	-	0,23	STATAT	2015
			Matura or other higher school certificate	-	0,23	STATAT	2015
			Apprenticeship	-	0,23	STATAT	2015
			Compulsory school certificate	-	0,30	STATAT	2015
		Accessibility	Access to health services	-	0,50	STATAT (Accessibility-Study)	2014
			Access to security services	-	0,25	STATAT (Accessibility-Study)	2014
			Access to retail services	-	0,25	STATAT (Accessibility-Study)	2014
	Lack of Coping Capacities	Unemployment		+	n/a	STATAT	2015
		Size of companies	Micro-enterprises	+	0,40	STATAT	2011
			Small enterprises	+	0,30	STATAT	2011
			Medium-sized enterprises	+	0,20	STATAT	2011
			Large enterprises	+	0,10	STATAT	2011

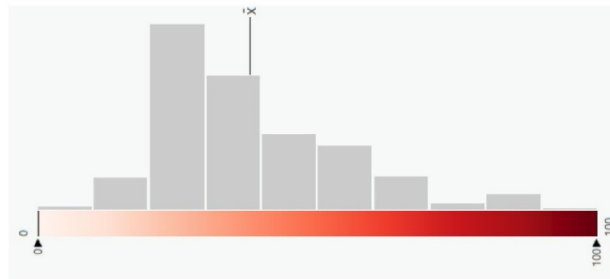


Sozio-ökonomische Verwundbarkeit 'Überschwemmungen'/[Floods]

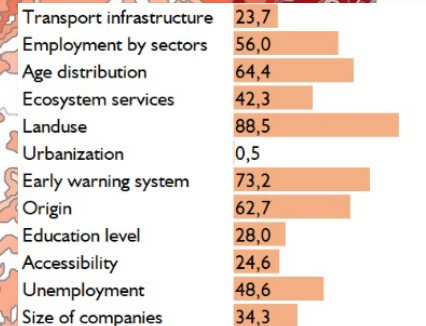
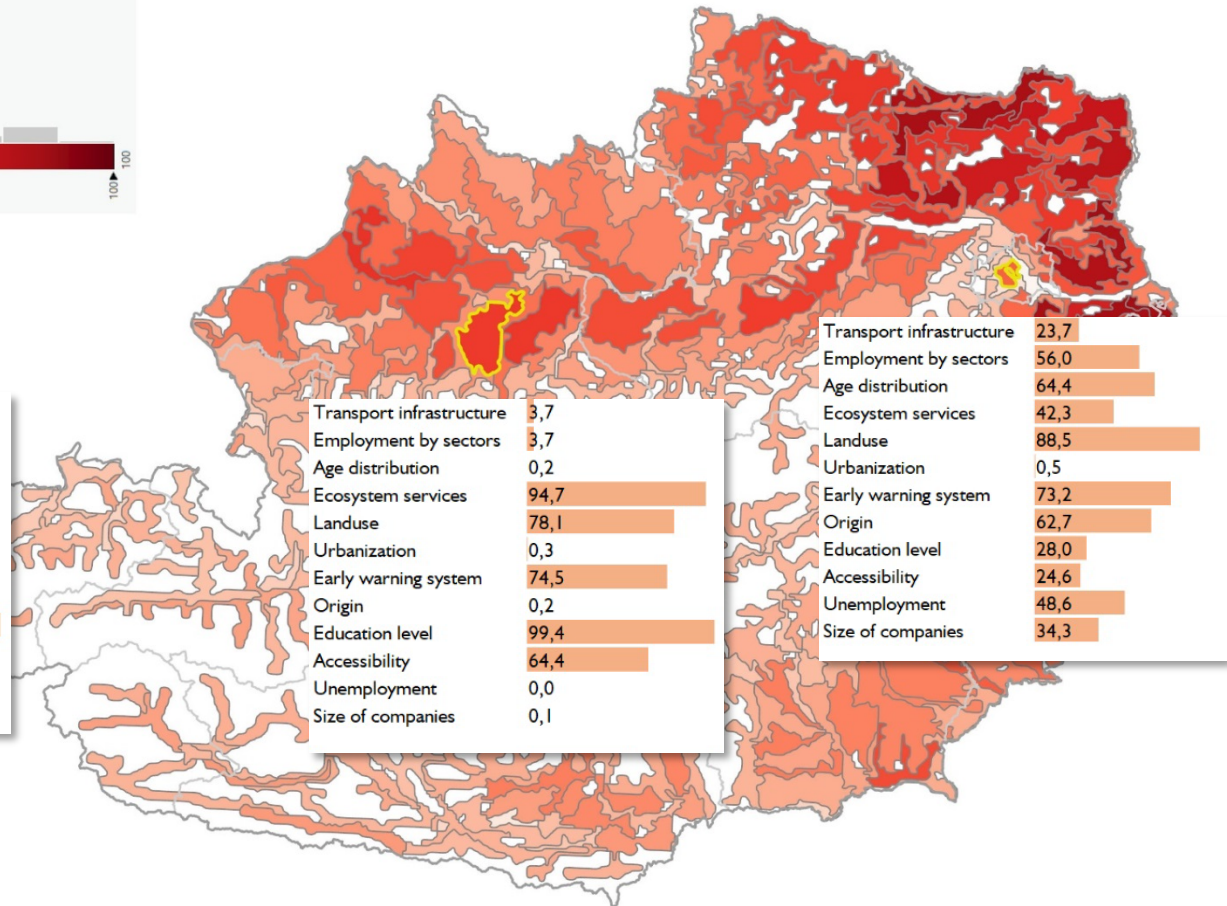
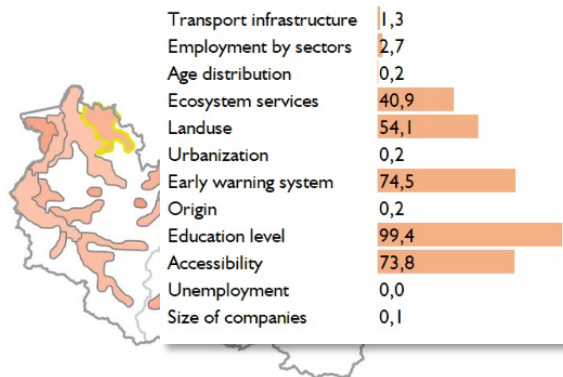


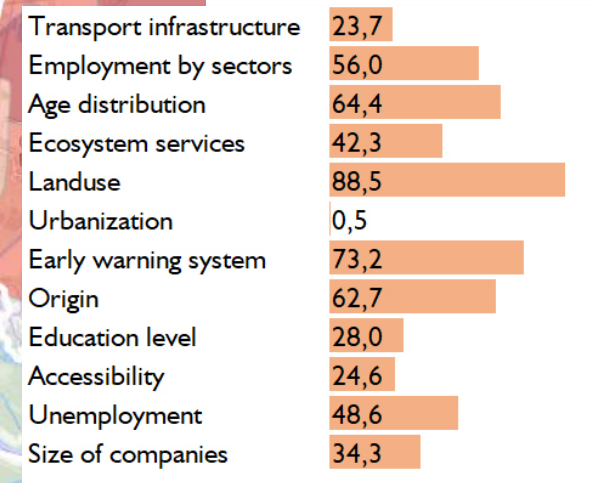
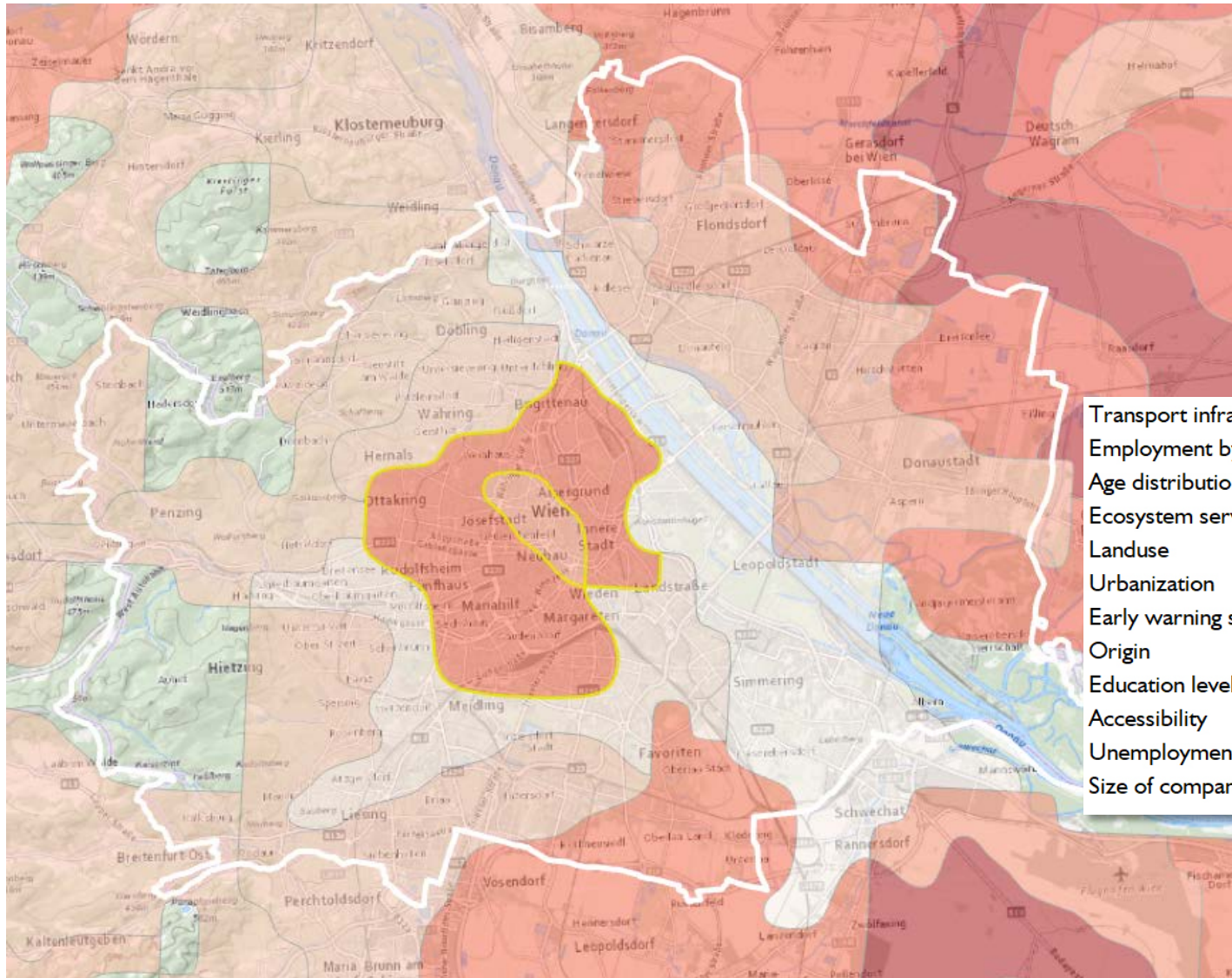
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Kontakt: stefan.kienbergersbg.ac.at
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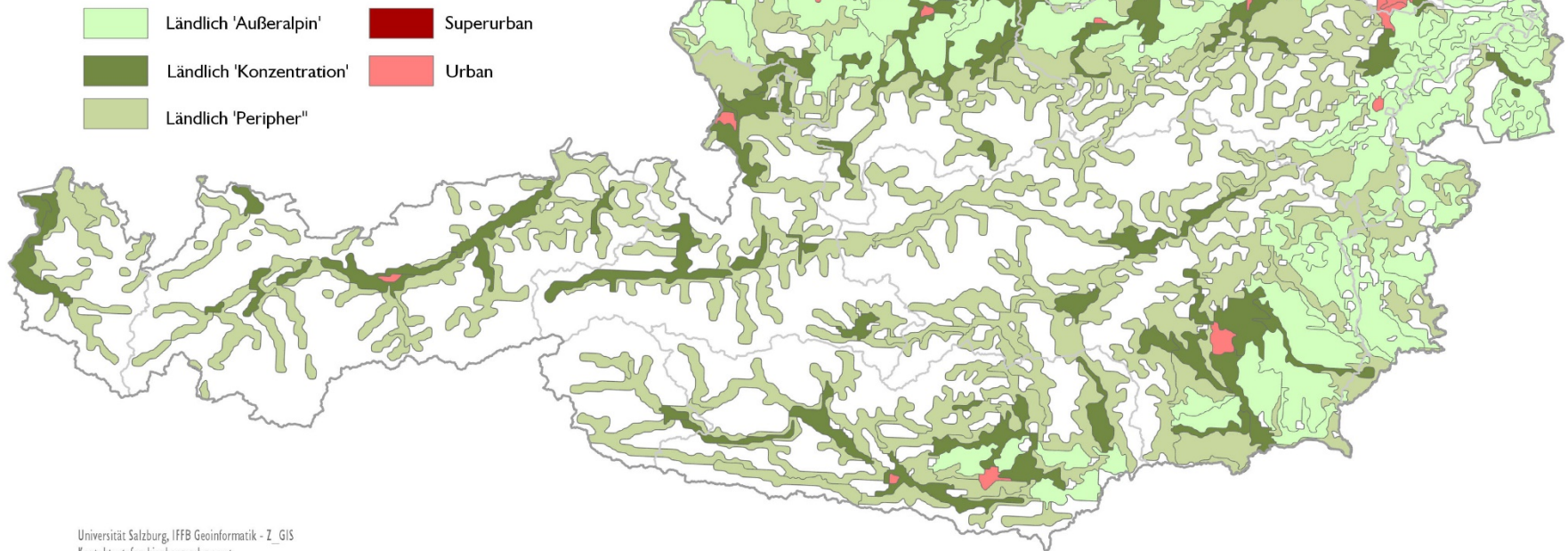
Sozio-ökonomische Verwundbarkeit 'Überschwemmungen'/[Floods]



Verwundbarkeitsindex

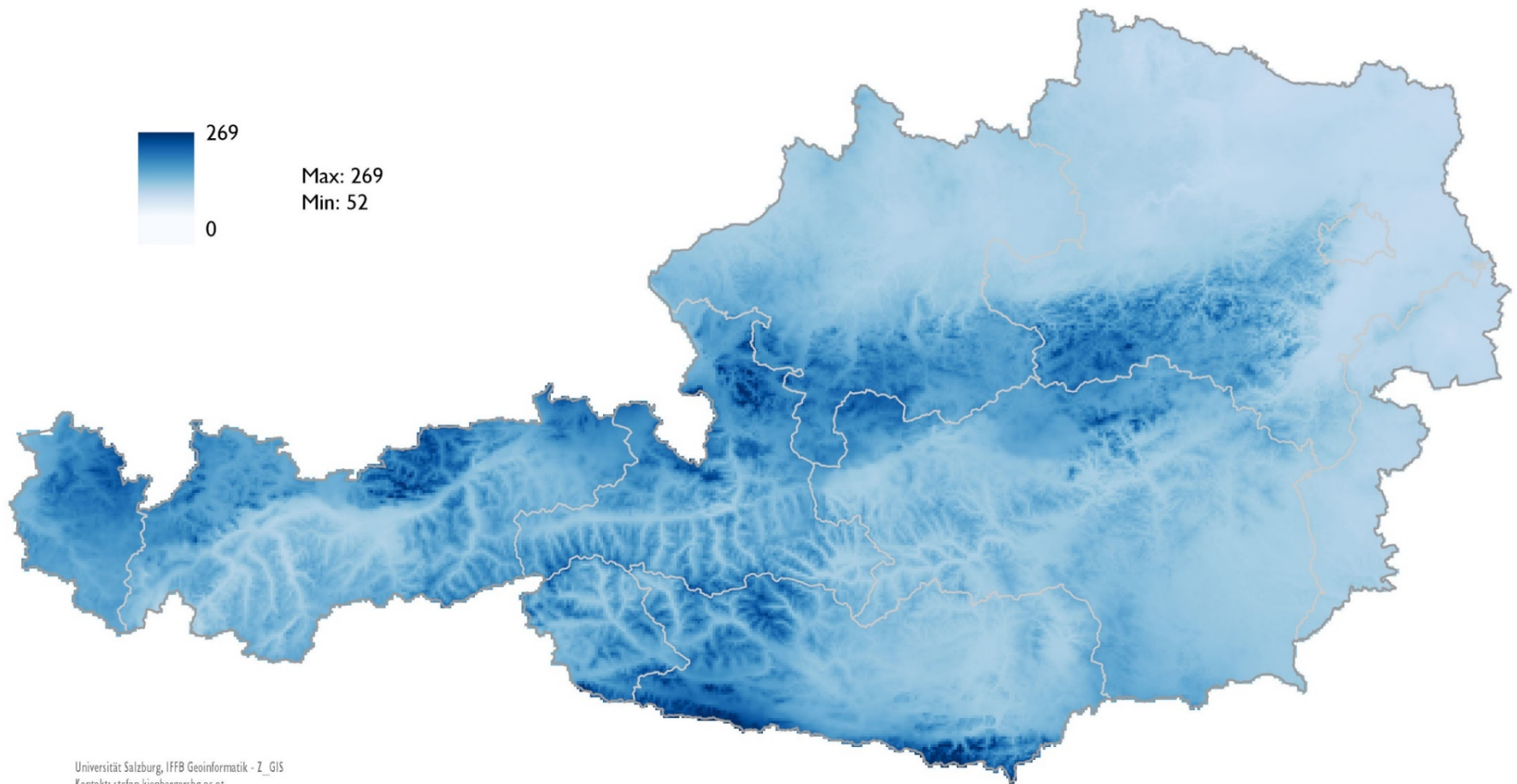






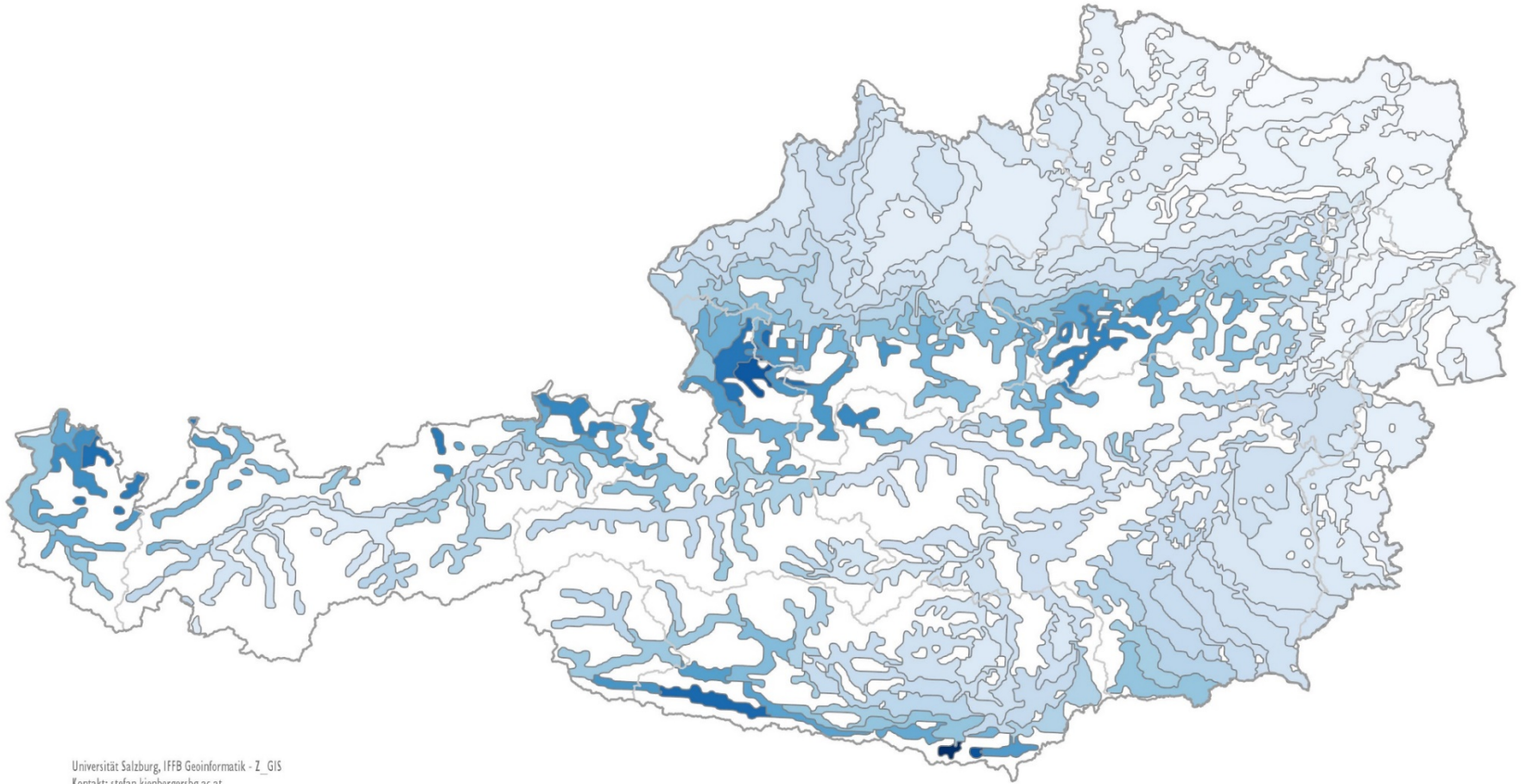
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rx5 | Maximale 5-tägige Nieerschlagsmenge [ÖKS15] Gegenwart

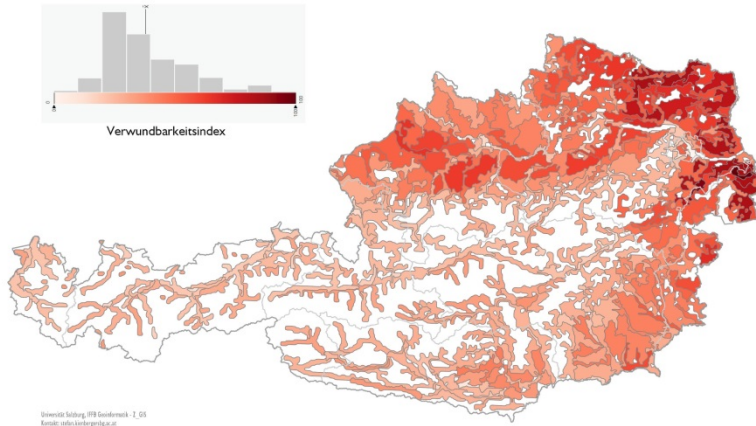


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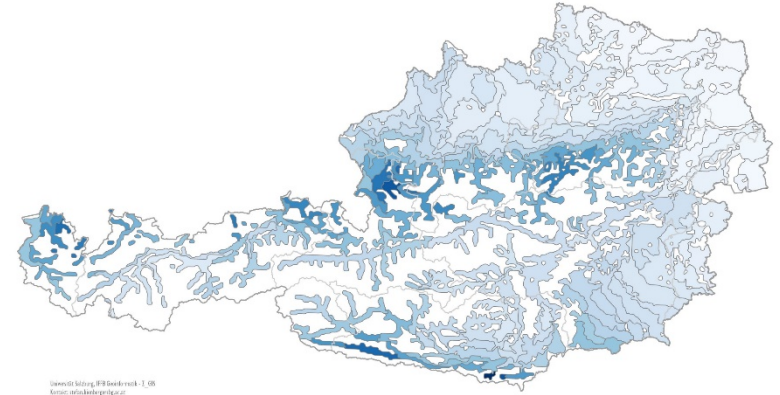
rx5 | Maximale 5-tägige Nieerschlagsmenge [ÖKS15] Gegenwart



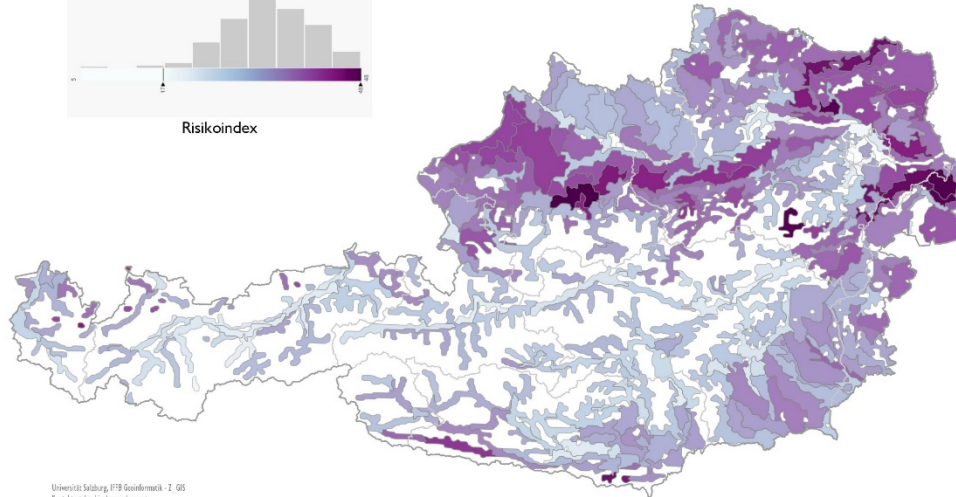
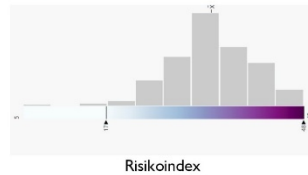
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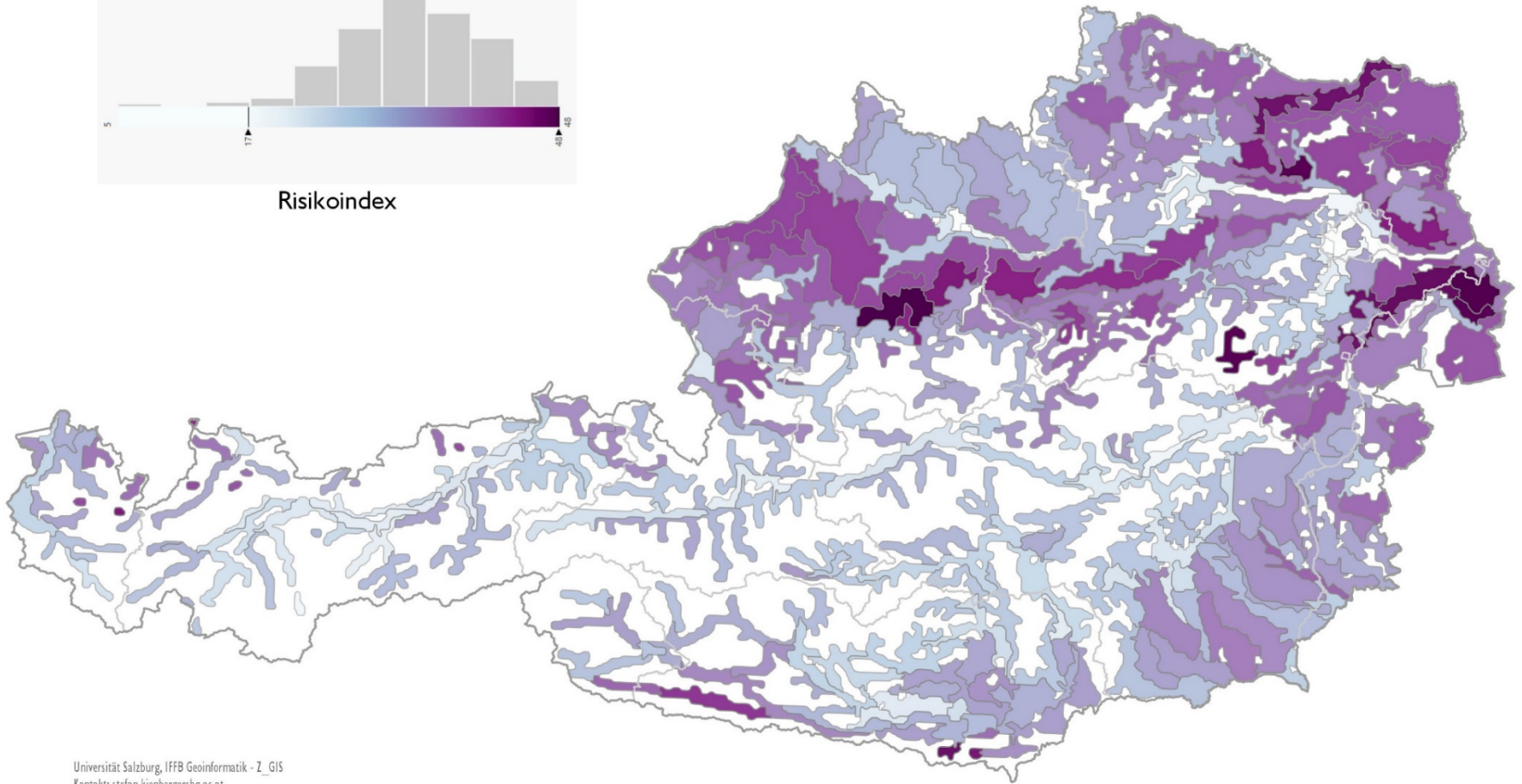
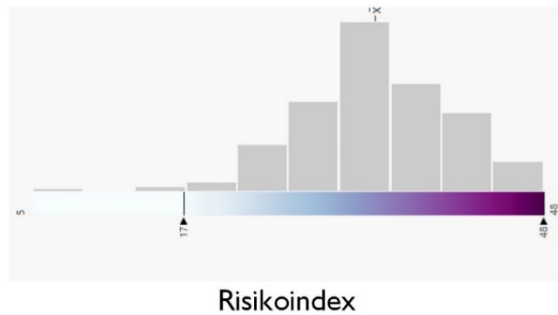
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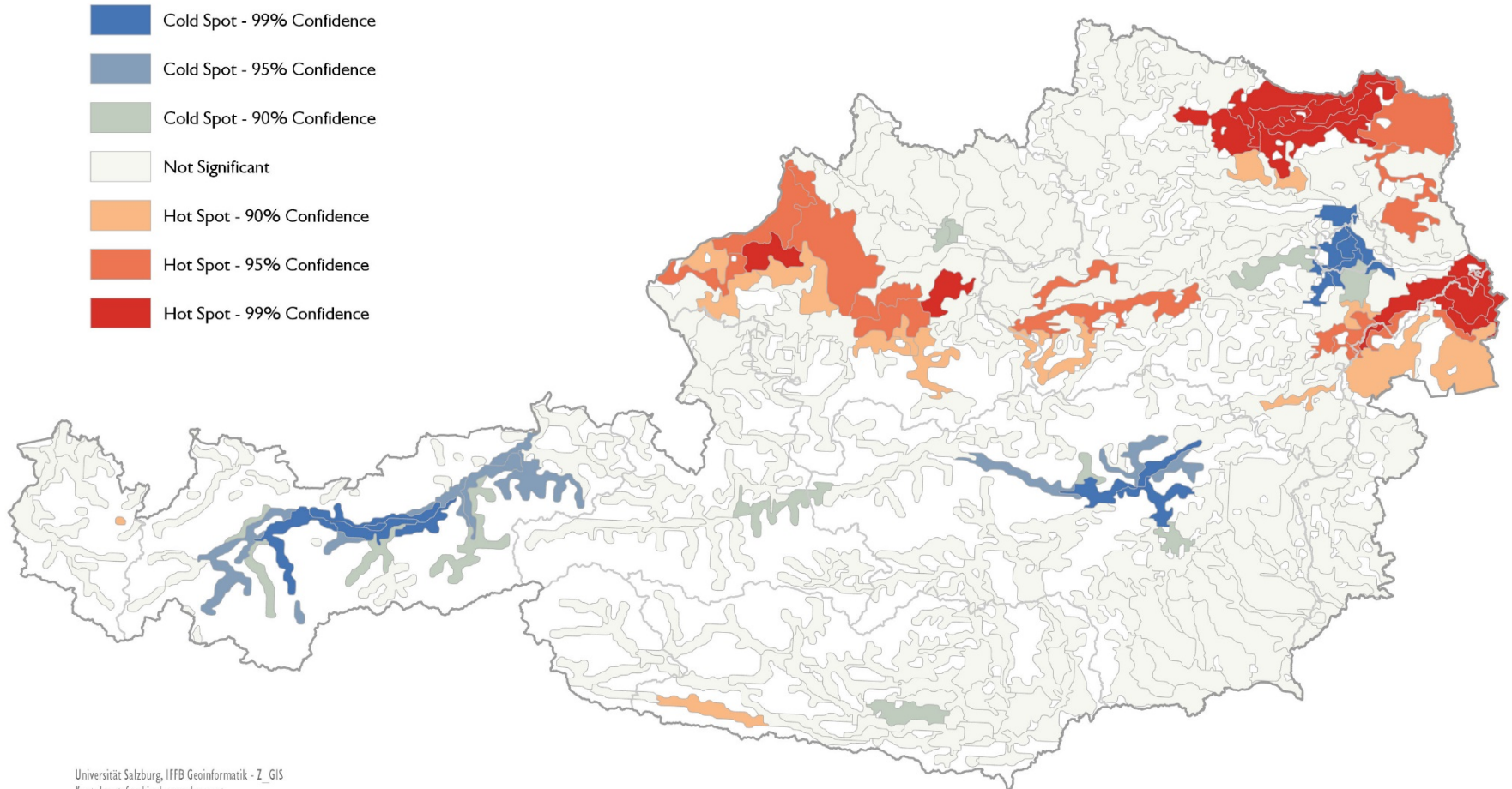
Sozio-ökonomisches Risiko
'Überschwemmungen'/[Floods]



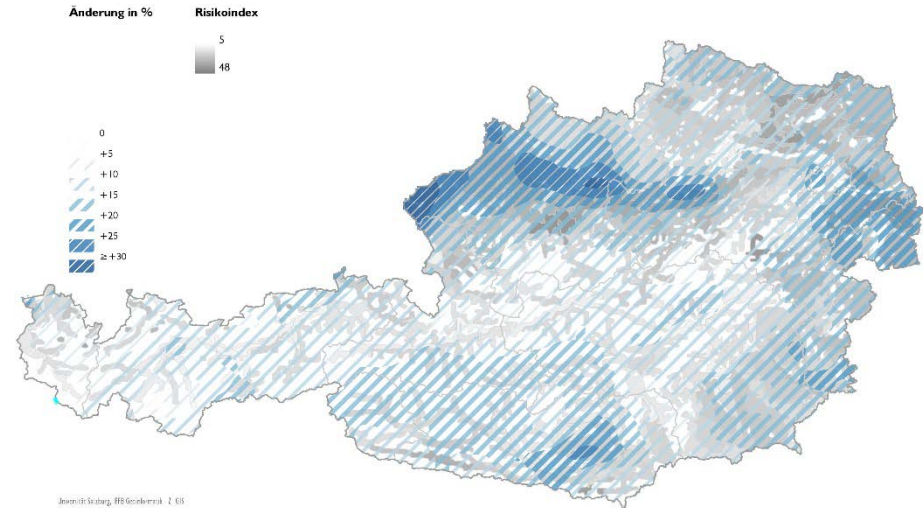
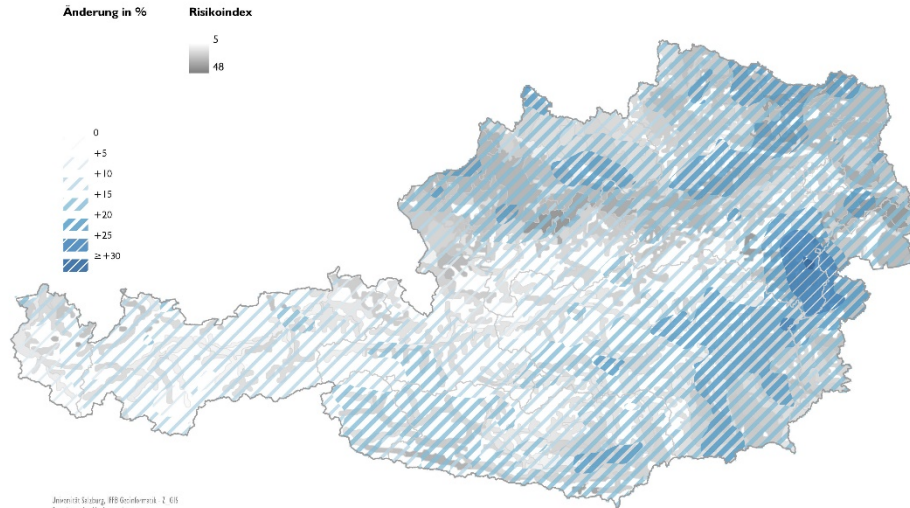
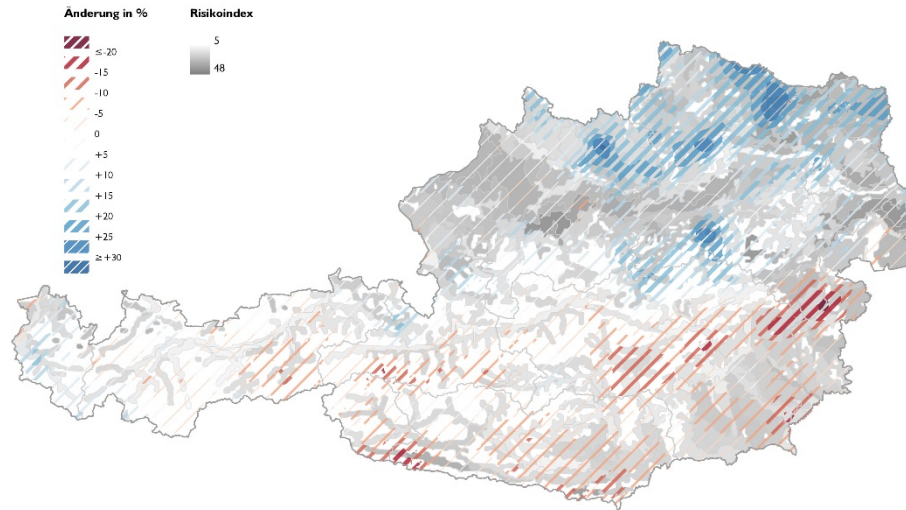
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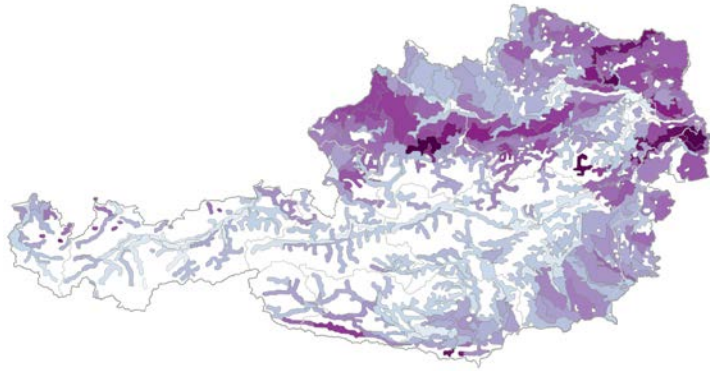


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Marc's Fragen

■ Frage 1:

- Gemeinsamer Prozess mit Nutzern (Faktoren, Gewichtungen, Validierung) - Schärfung
- Kritische Schwellwerte von Indikatoren
- Kombination Gefährdungen & Verwundbarkeit
- 'Klimagefährdungen' Brennpunkte; Impactmodelle basierend auf ÖKS15/Climamap Daten limitiert
- Kommunikation & Aufbereitung der Ergebnisse

■ Frage 2:

- Hier: Fokus auf 'Gefährdungen' (Überschwemmungen, landwirt. Dürre)
- Möglich: Bündelung über Handlungsfelder
- Grundsätzlich: Naturgefahren über Handlungsfelder hinweg (DRR & CCA)

■ Frage 3:

- 'Kern' zur Identifikation von Anpassungsmaßnahmen
- Monitoring & Evaluierung/Fortschrittsberichte
- ...Aufzeigen von Transformationspotenzialen

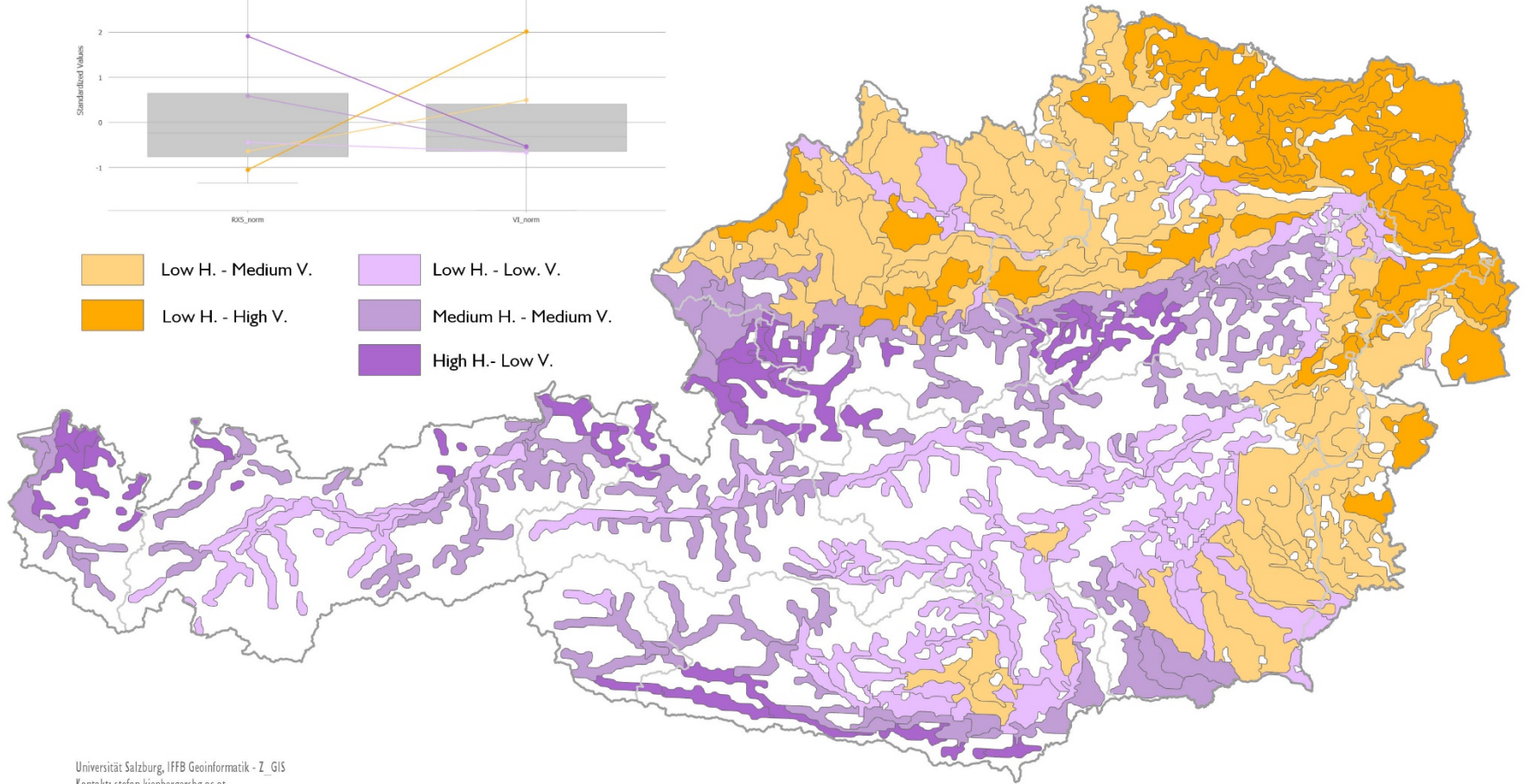
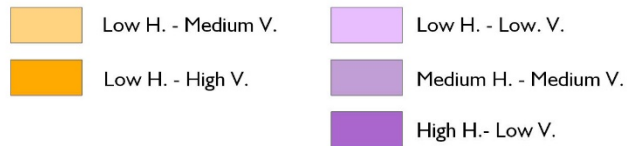
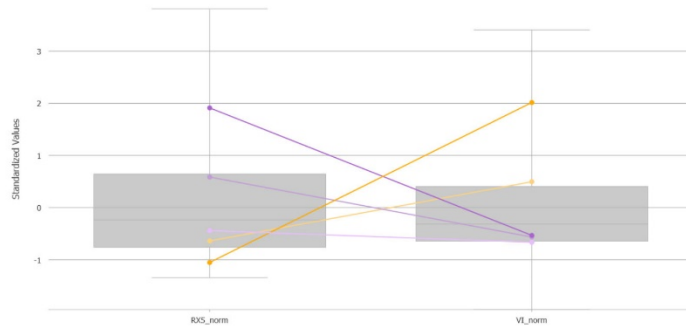


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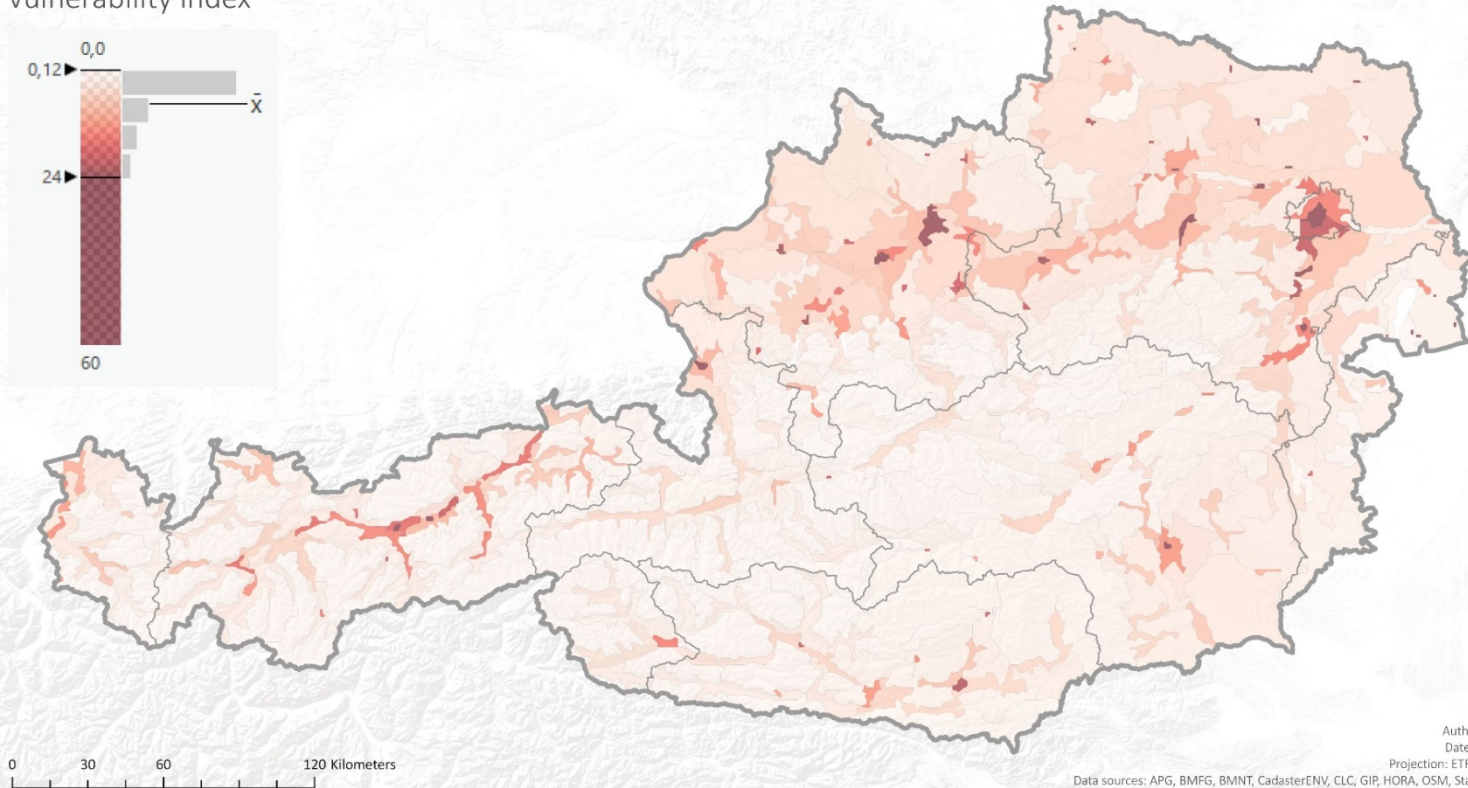
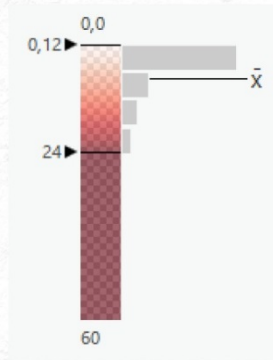


Physical Risk | Floods

Risk Component	Domain	Composite indicators	Single Indicators	Sign	Weighting	Data Source	Date
Hazard		Flood probability			n/a	HORA	
Exposure		Land not covered under water bodies		+	n/a	CLC	2012
Physical Vulnerability	Susceptibility	Transport infrastructure	Highways	+	0,25	GIP	2017
			Primary roads	+	0,25	GIP	2017
			Secondary roads	+	0,25	GIP	2017
			Railway	+	0,25	GIP	2017
		Critical infrastructure	Public security	+	0,17	OSM	2018
			Public information and communication infrastructure	+	0,17	OSM	2018
			Public health services	+	0,17	BMFG	2017
			Public water supply	+	0,17	OSM	2018
			Public energy supply lines	+	0,08	APG	2018
			Public energy supply plants	+	0,08	APG	2018
			Public transport stations	+	0,06	OSM	2018
			Public transport halts	+	0,03	OSM	2018
			Public transport railway lines	+	0,06	GIP	2017
			Public transport inner city lines	+	0,03	OSM	2018
		Buildings	1-2 households per building	+	0,13	STATAT	2016
			≥ 3 households per building	+	0,21	STATAT	2016
			Tourism relevant buildings	+	0,17	STATAT	2016
			Office buildings	+	0,13	STATAT	2016
			Commercial buildings	+	0,17	STATAT	2016
			Industrial buildings	+	0,21	STATAT	2016
		Workplace by sectors	Workplace in primary sector	+	0,50	STATAT	2011
			Workplace in secondary sector	+	0,35	STATAT	2011
			Workplace in tertiary sector	+	0,15	STATAT	2011
	Lack of Resilience	Early warning system	Forecasting model presence for river	-	0,75	BMNT - Hochwasserprognose	2018
			Forecasting model presence for catchment	+	0,25	BMNT - Hochwasserprognose	2018
		Accessibility	Access to health services	-	0,50	STATAT (Accessibility-Study)	2014
			Access to security services	-	0,25	STATAT (Accessibility-Study)	2014
			Access to retail services	-	0,25	STATAT (Accessibility-Study)	2014

Physical vulnerability to floods in Austria

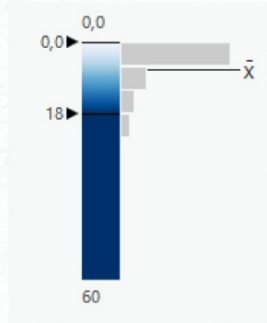
Physical
vulnerability index



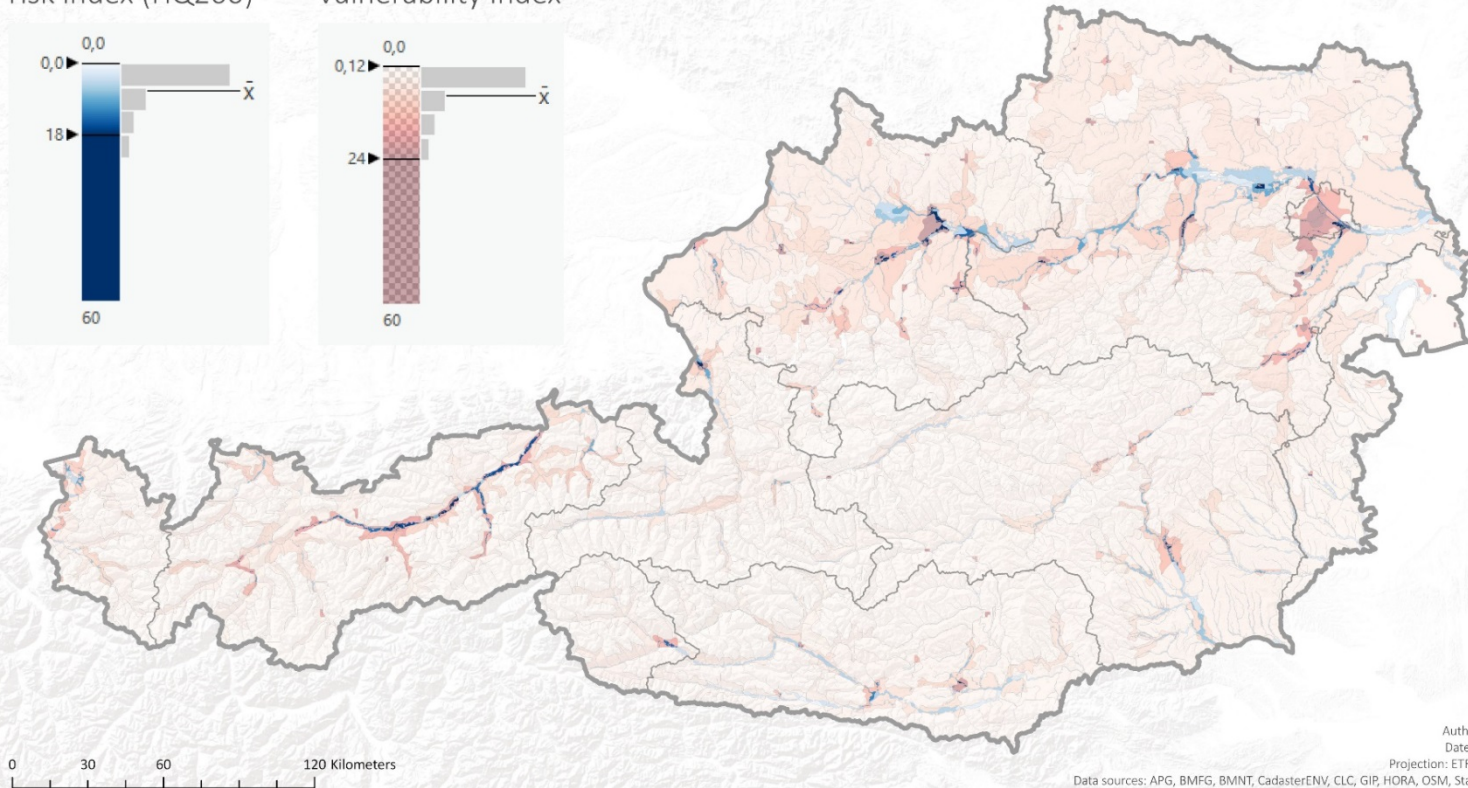
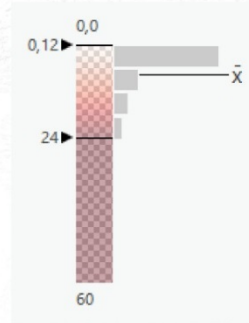
Author: Lucia Leis
Date: 26.06.2018
Projection: ETRS 1989 LAEA
Data sources: APG, BMFG, BMNT, CadasterENV, CLC, GIP, HORA, OSM, Statistik Austria
Sources: Esri, USGS, NOAA

Physical risk to floods in Austria (HQ200)

Physical
risk index (HQ200)



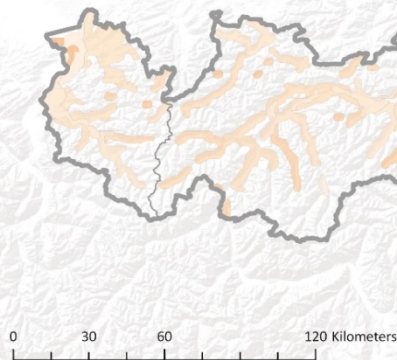
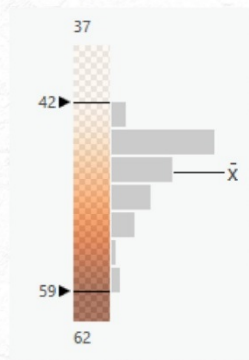
Physical
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Socio-economic vulnerability to floods in Austria

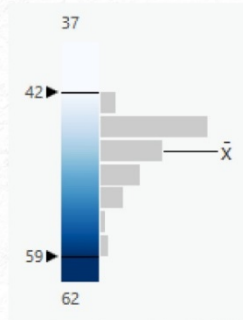
Socio-economic
vulnerability index



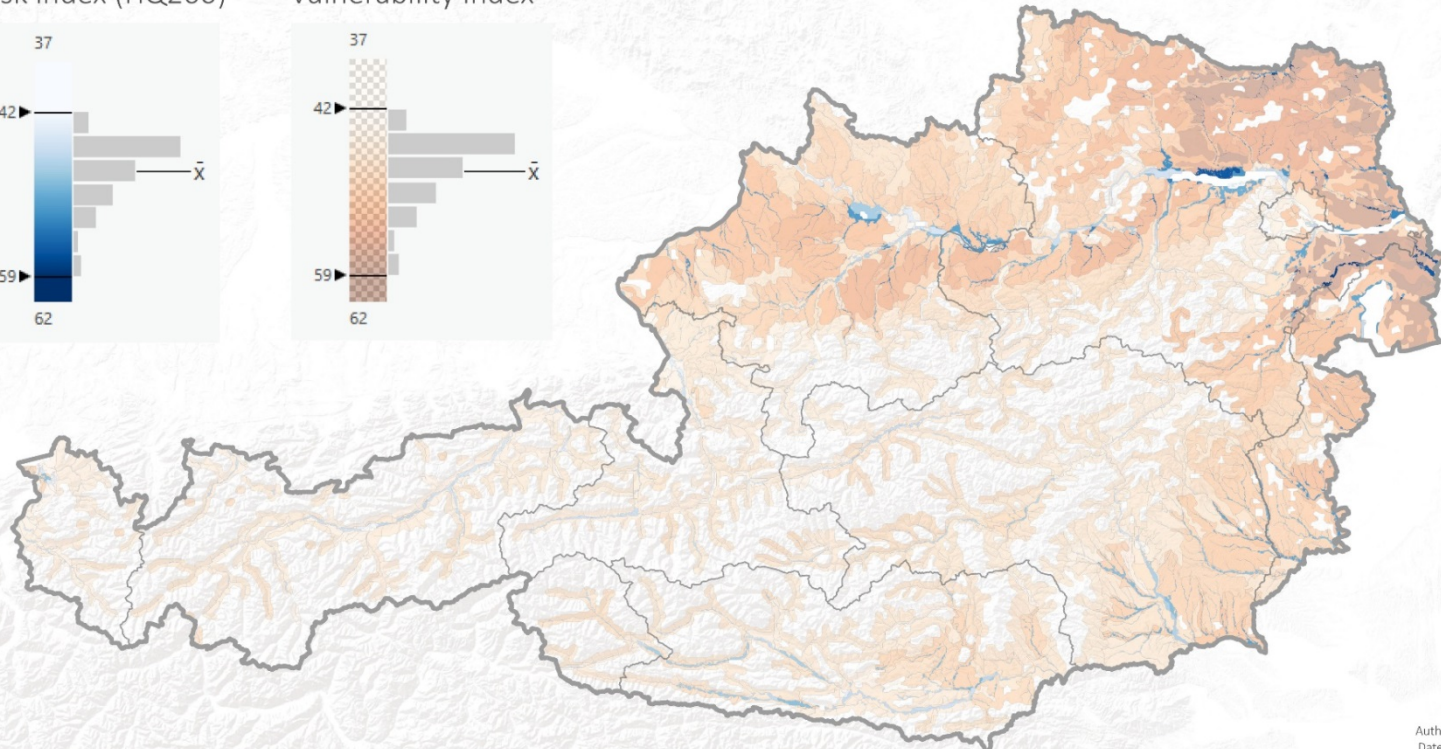
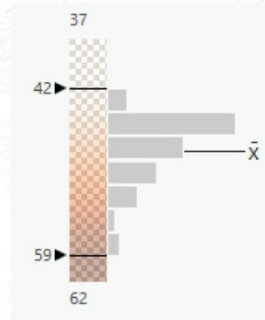
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Socio-economic risk to floods in Austria (HQ200)

Socio-economic
risk index (HQ200)



Socio-economic
vulnerability index



0 30 60 120 Kilometers

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Date: 26.06.2018
Projection: ETRS 1989 LAEA
Data sources: APG, BMFG, BMNT, CadasterENV, CLC, GIP, HORA, OSM, Statistik Austria
Sources: Esri, USGS, NOAA

Indikatoren

Sozio-ökonomische Verwundbarkeit

Landwirtschaftliche Dürre

Risk Component	Domain	Composite indicators	Single Indicators	Sign	Weighting	Data Source	Date
Hazard		Drought probability		+	n/a		
Exposure		Permanent settlement area		+	n/a	STATAT	2011
Socio-economic Vulnerability	Susceptibility	Population density		+	n/a	STATAT	2016
		Ecosystem services (food production)		+	n/a	CLC	2012
		Land use	Cropland	+	0,3	CLC	2012
			Woodland/forest	+	0,2	CLC	2012
			Wetland	+	0,2	CLC	2012
			Water	+	0,15	CLC	2012
			Urban	+	0,15	CLC	2012
		Diversity of plants in agriculture		-	n/a	INVEKOS (Schläge)	2016
		Permanent crops		+	n/a	INVEKOS (Schläge)	2016
	Lack of Resilience Lack of Coping	Transport infrastructure	Highways	-	0,25	GIP	2017
			Primary Roads	-	0,25	GIP	2017
			Secondary Roads	-	0,25	GIP	2017
			Railway	-	0,25	GIP	2017

Socio-economic vulnerability to droughts in Austria

Socio-economic
vulnerability index

