visualization & gaming

Towards an increased awareness of climate change and guides for actions?

Tomasz Opach

NTNU
Kunnskap for en bedre verden

LINKÖPING UNIVERSITY

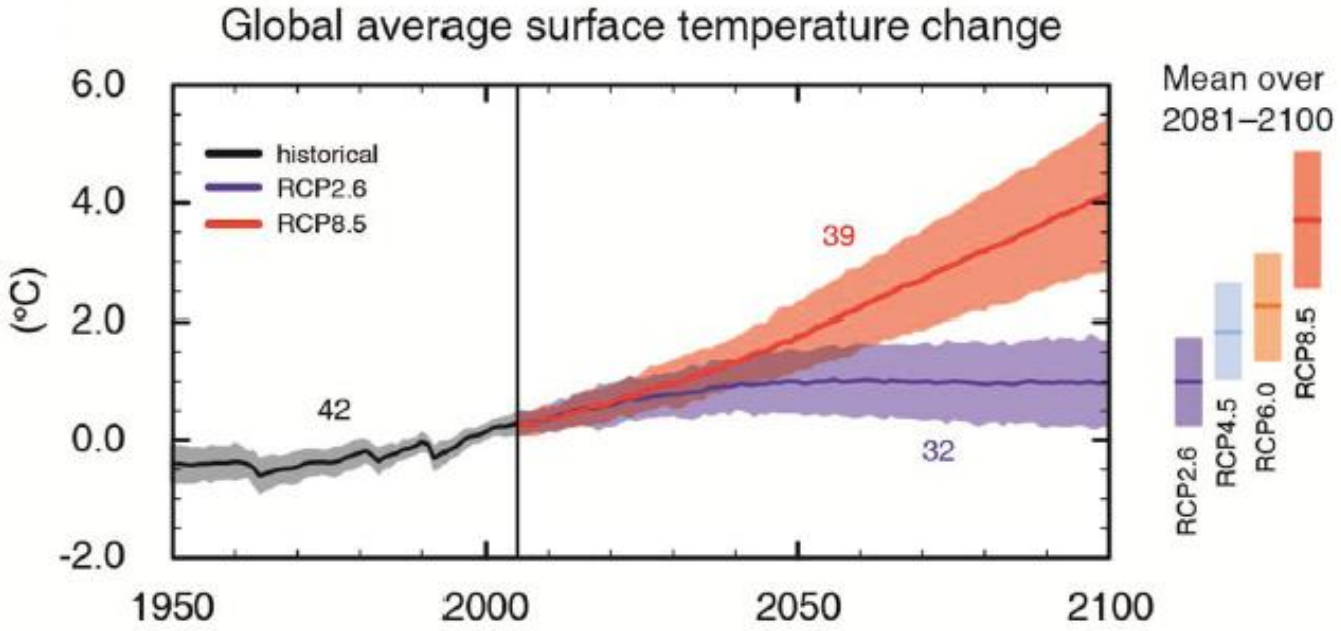
Jan Ketil Rød

NTNU
Kunnskap for en bedre verden

Climate change

may be described as vague, **abstract**, and hidden,

something that affects others, **far away**

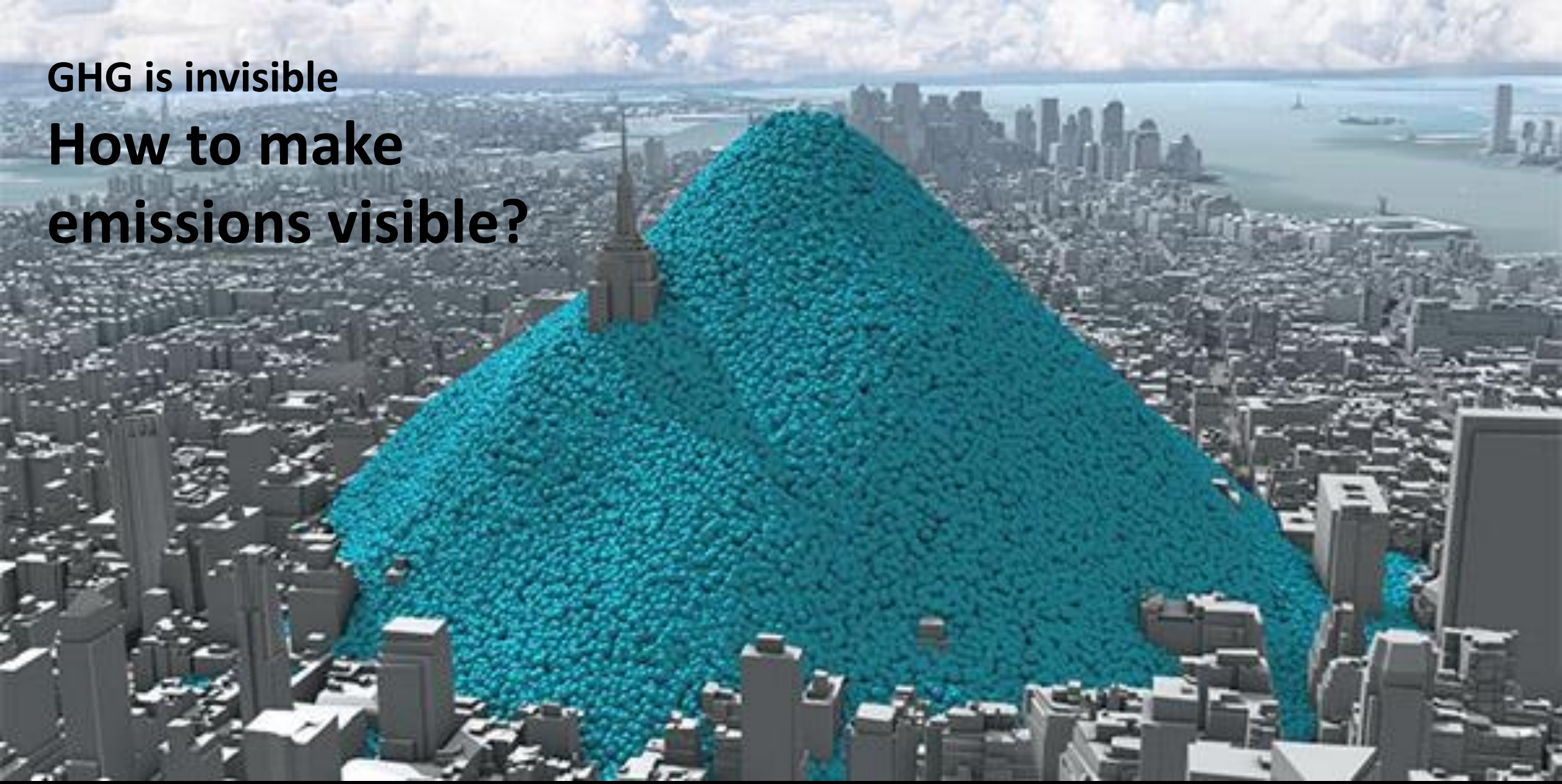


Visualization is a common method to convey scientific basis of climate change such as Representative Concentration Pathways (RCPs)

Does it increase awareness? Is such message affordable for many?

GHG is invisible

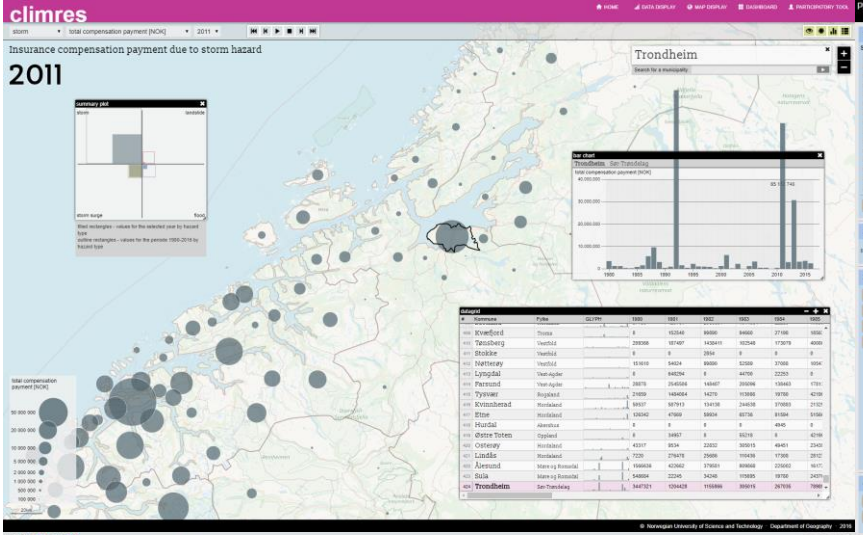
How to make emissions visible?

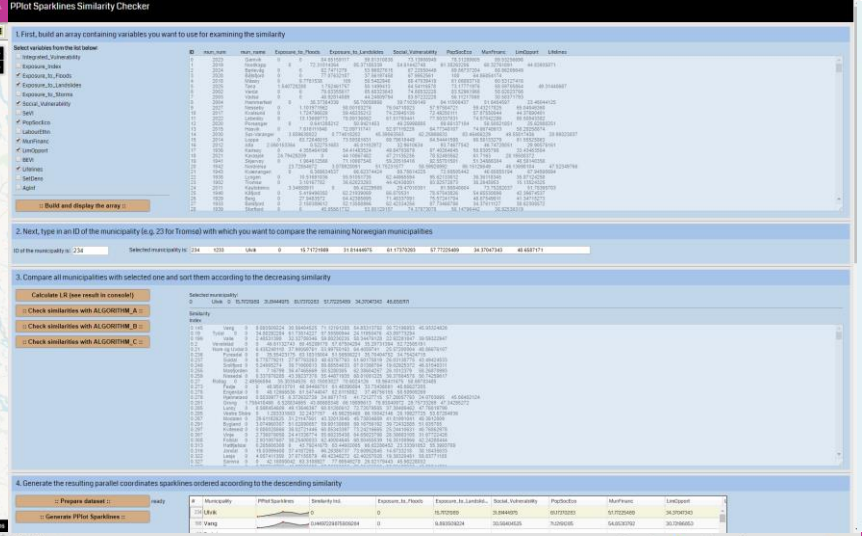


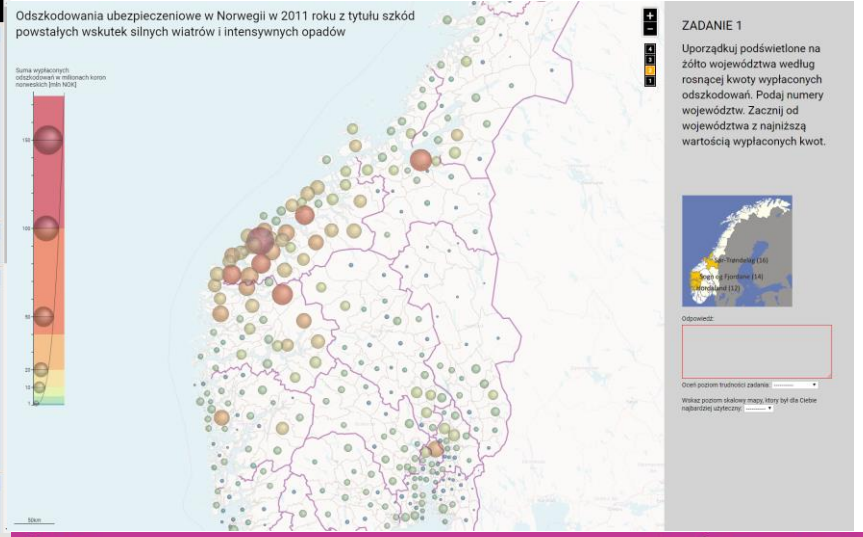
New York City's daily carbon dioxide emissions as one-tonne spheres

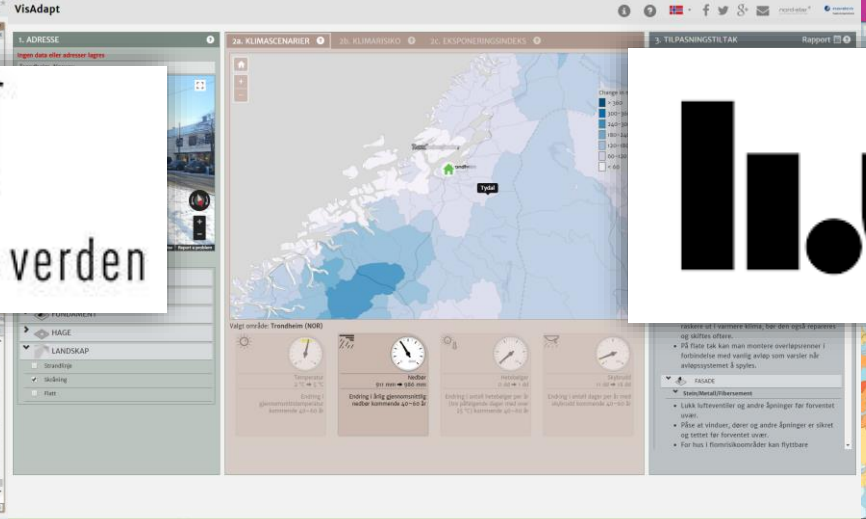
CarbonVisuals

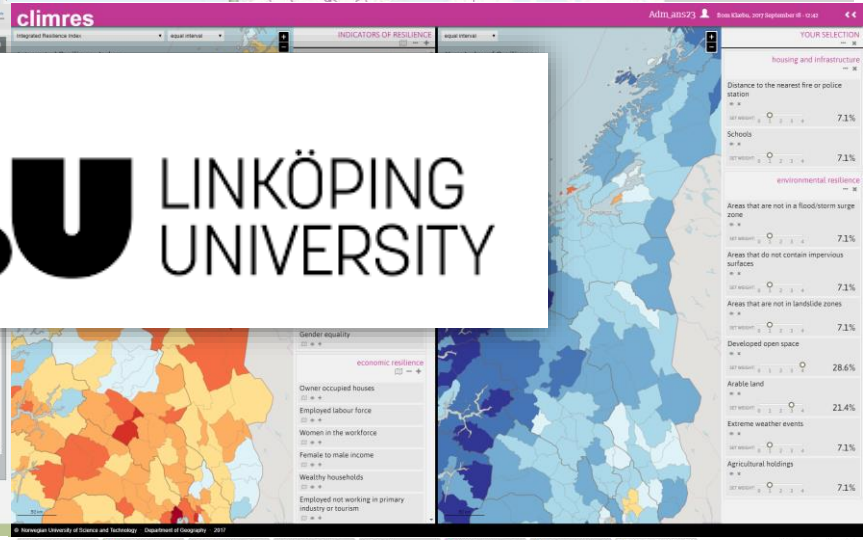
More local, more explicit, more touchable message











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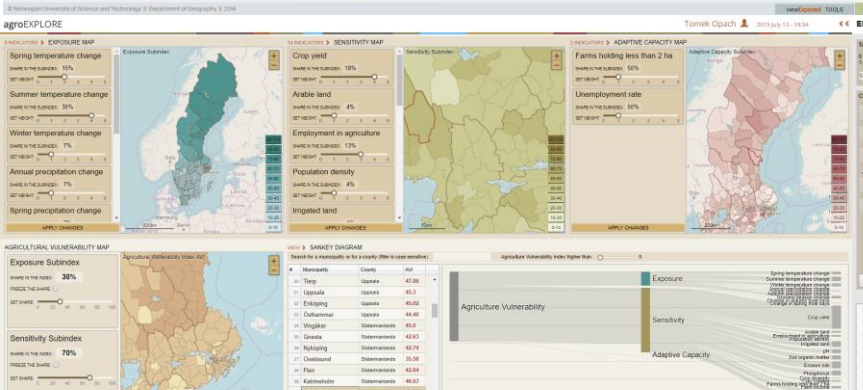
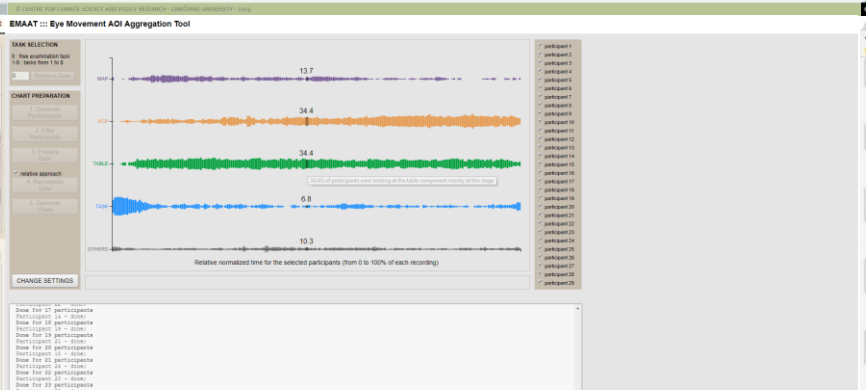
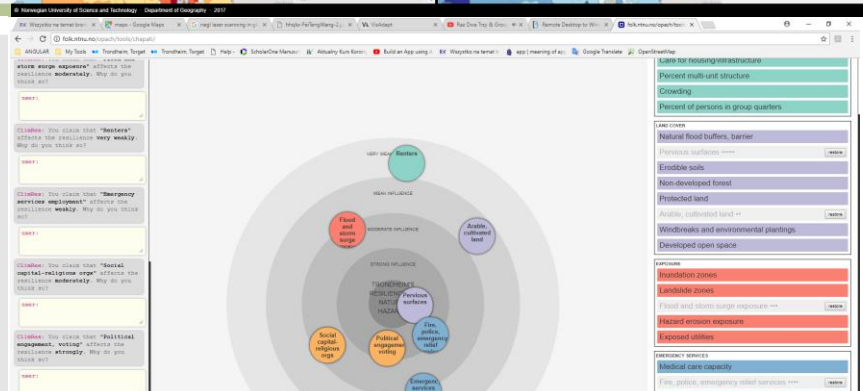




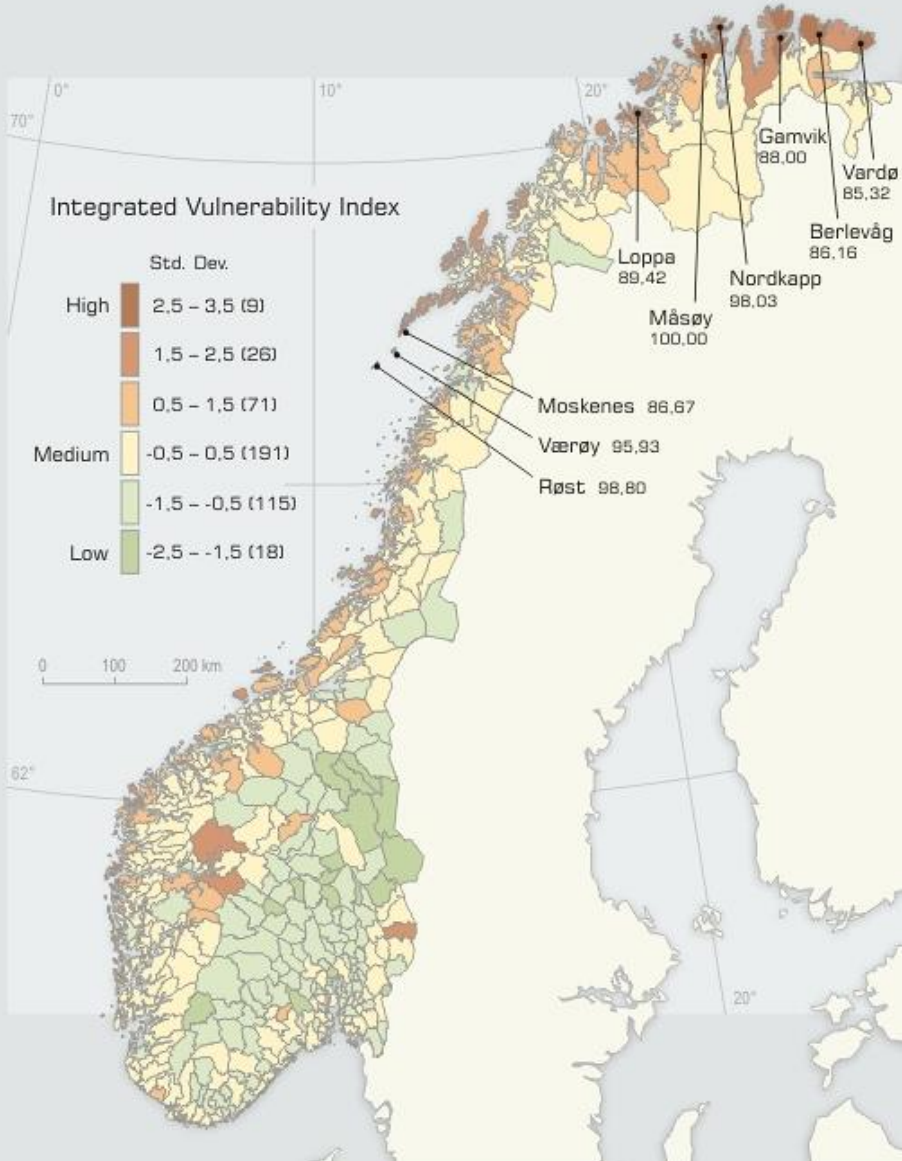


nord-star*
NORDIC STRATEGIC ADAPTATION RESEARCH

Of importance is to **know exposed places**,

of importance is to **know vulnerable places**

…and **why** these are exposed and vulnerable



version 1.0

viewExposed

Exposure and Vulnerability to Natural Hazards in Norway

Our mission

The viewExposed web application helps users to better understand an exposure and vulnerability to natural hazards. Application's content and functionality facilitate walking through the factors that influence the overall vulnerability. Owing to the approach with linked multiple views and sparklines employed for enhancing the information provided in the parallel coordinates, users are able to analyse data either in a geographic context or in an attribute context but always having simultaneous responses from all components (widgets) after selecting specific area (or areas).

System and hardware requirements

Until now, viewExposed has been optimized for the Google Chrome (version higher than 20) web browser. Moreover, the application works properly in Mozilla Firefox (version 16) and Opera (version 12). There is no any extra plugin or browser extension needed to run the application.
It is strongly recommended to use monitors that support 1920×1080 resolution.

Authors

The viewExposed web application is designed and developed at the Department of Geography of the Norwegian University of Science and Technology in Trondheim as a part of the Nord-Star project. For more details please contact Jan Ketil Rød (application content) or Tomasz Opach (application design and implementation).

Learn how the vulnerability was calculated | Learn how to use viewExposed

Run viewExposed

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Map View

Integrated Vulnerability | Layer transparency: 0%

SET MAP LAYERS

50 km
20 mi

Selbu

Integrated Vulnerability Index: 53.99
Social Vulnerability Index: 33.84
Exposure Index: 68.88
Exposure to Floods: 45.28
Exposure to Landslides: 9.01
Exposure to Storms: 56.72

> 85 IntVI
68-85
50-68
32-50
14-32
<14

Sverige

Vulnerability Data by the Department of Geography NTNU

Scale =1 : 3M

11.18388, 63.34751

Parallel Coordinate Plot

CUSTOM SETTINGS | EXPOSURES | VULNERABILITIES

Integrated Vulnerability | Exposure Index | Exposure to Floods | Exposure to Landslides | Exposure to Storms | Social Vulnerability

max : 100 … min : 0

Mean

min : 0 μ:40.84 || σ:17.72
min : 0 μ:48.55 || σ:17.49
min : 0 μ:2.51 || σ:10.39
min : 0 μ:4.09 || σ:9.82
min : 0 μ:53.86 || σ:18.76
min : 0 μ:40.87 || σ:12.7

Finnmark
Troms
Nordland
Nord-Trøndelag
Sør-Trøndelag
Møre og Romsdal
Sogn og Fjordane
Hordaland
Rogaland
Vest-Agder
Aust-Agder
Telemark
Vestfold
Buskerud
Oppland
Hedmark
Oslo
Akershus
Østfold

Municipality: Selbu | County: 16 | Integrated Vulnerability Index: 53.99

Datagrid

Search for a municipality or for a county (filter is case sensitive): Sør-Trøndelag

Integrated Vulnerability Index higher than : 0

#	Municipality	County	IntVI - Bars	PPlot Sparklines	Integrated Vul.	Exposure Index	Exp. to Floods	Exp. to Landslide...	Exp. to Storms	Social Vul.	SeVI	Po
120	Klæbu	Sør-Trøndelag			37.61	50.4	0	1.1	57.36	32.34	58	
121	Selbu	Sør-Trøndelag			53.99	68.88	45.28	9.01	56.72	33.84	56.9	
126	Meldal	Sør-Trøndelag			37.35	40.01	0.74	0.85	45.73	47.45	70.72	
129	Tydal	Sør-Trøndelag			17.01	24.26	0	0	28.96	34.8	47.51	
132	Midtre Gauldal	Sør-Trøndelag			32.87	39.84	10.78	0.61	41.17	39.72	60.15	
134	Holtålen	Sør-Trøndelag			25.47	32.64	0	0.86	38	37.33	55.26	
135	Rennebu	Sør-Trøndelag			30.15	32.2	0	0	37.63	46.33	64.09	
142	Oppdal	Sør-Trøndelag			31.54	37.14	0	6.23	42.24	41.39	61.19	
147	Røros	Sør-Trøndelag			15.7	25.04	0	0.1	29.8	31.3	47.13	
408	Snillfjord	Sør-Trøndelag			48.34	58.91	0	5.24	66.12	38.72	58.97	
409	Agdenes	Sør-Trøndelag			52.78	63.84	0	0	72.15	39.23	56.28	
426	Trondheim	Sør-Trøndelag			23.08	30.94	2.86	3.6	34.55	35.61	40.3	

Showing all 25 rows

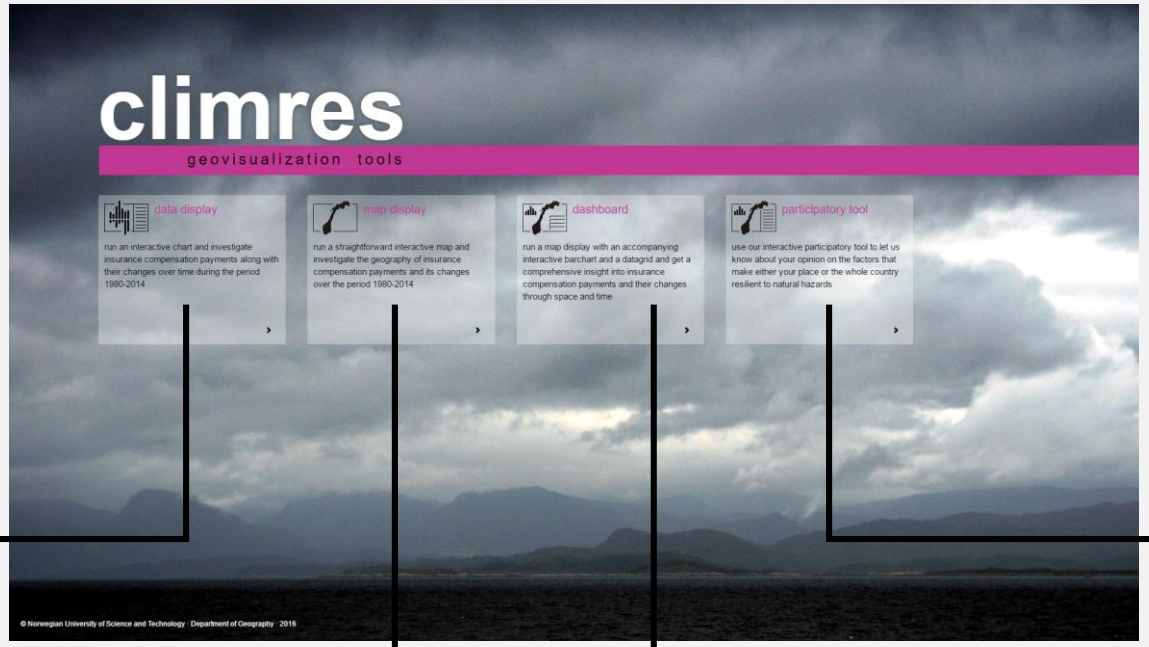
VULNERABILITY

predisposition to be adversely affected; the characteristics that influences people's capacity to anticipate, cope with, resist, and recover from the adverse effects of physical events (IPCC 2012, 32)

RESILIENCE

ability of a community to recover by means of its own resources (Mileti 1999)

a set of capacities that can be fostered through interventions and policies, which in turn help build and enhance a community's ability to respond and recover from disasters (Cutter et al. 2010)


climres
geovisualization tools
data display
run an interactive chart and investigate insurance compensation payments along with their changes over time during the period 1980-2014
map display
run a straightforward interactive map and investigate the geography of insurance compensation payments and its changes over the period 1980-2014
dashboard
run a map display with an accompanying interactive barchart and a datagrid and get a comprehensive insight into insurance compensation payments and their changes through space and time
participatory tool
use our interactive participatory tool to let us know about your opinion on the factors that make either your place or the whole country resilient to natural hazards
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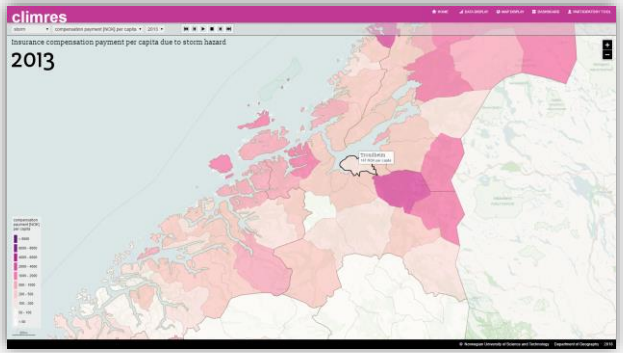
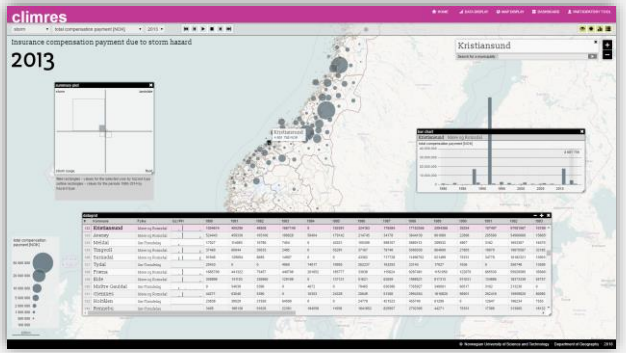
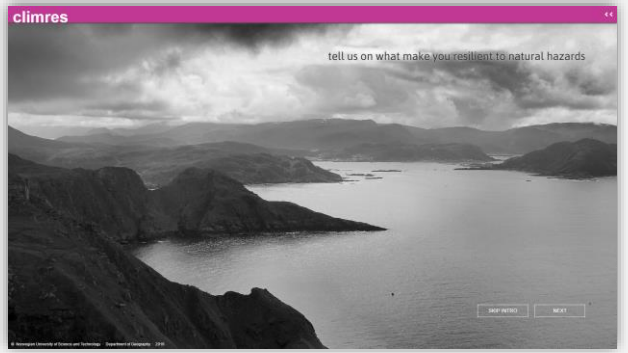
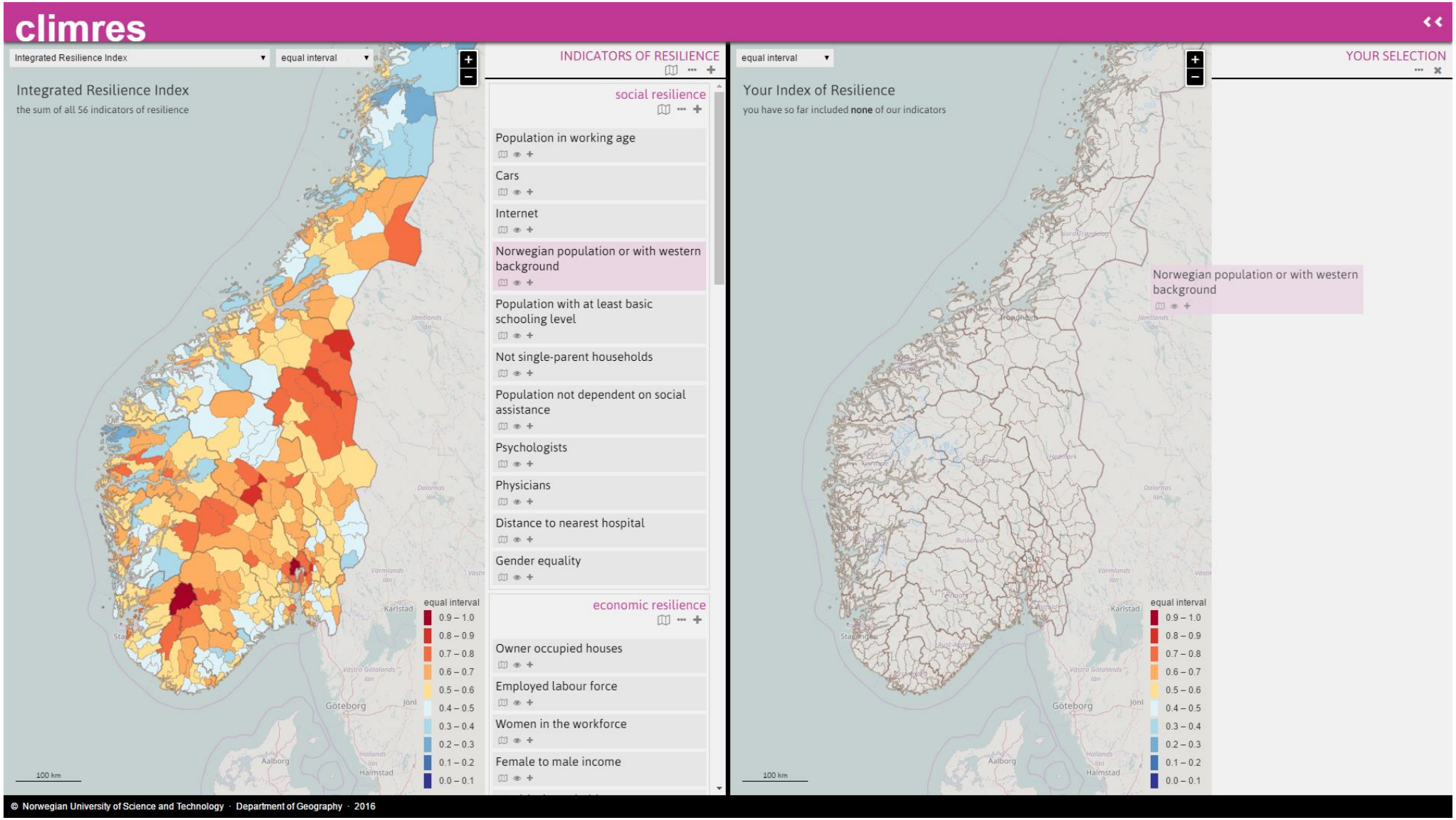
climres
geovisualization tools
Insurance compensation due to natural hazards paid from the Norwegian Natural Perils Pool and Finance Norway


climres
Insurance compensation payment per capita due to storm hazard
2013


climres
Insurance compensation payment due to storm hazard
2013
Kristiansund


climres
tell us on what make you resilient to natural hazards


climres
Integrated Resilience Index
equal interval
INDICATORS OF RESILIENCE
Integrated Resilience Index
the sum of all 56 indicators of resilience
social resilience
Population in working age
Cars
Internet
Norwegian population or with western background
Population with at least basic schooling level
Not single-parent households
Population not dependent on social assistance
Psychologists
Physicians
Distance to nearest hospital
Gender equality
economic resilience
Owner occupied houses
Employed labour force
Women in the workforce
Female to male income
equal interval
0.9 – 1.0
0.8 – 0.9
0.7 – 0.8
0.6 – 0.7
0.5 – 0.6
0.4 – 0.5
0.3 – 0.4
0.2 – 0.3
0.1 – 0.2
0.0 – 0.1
100 km
equal interval
YOUR SELECTION
Your Index of Resilience
you have so far included none of our indicators
Norwegian population or with western background
equal interval
0.9 – 1.0
0.8 – 0.9
0.7 – 0.8
0.6 – 0.7
0.5 – 0.6
0.4 – 0.5
0.3 – 0.4
0.2 – 0.3
0.1 – 0.2
0.0 – 0.1
100 km
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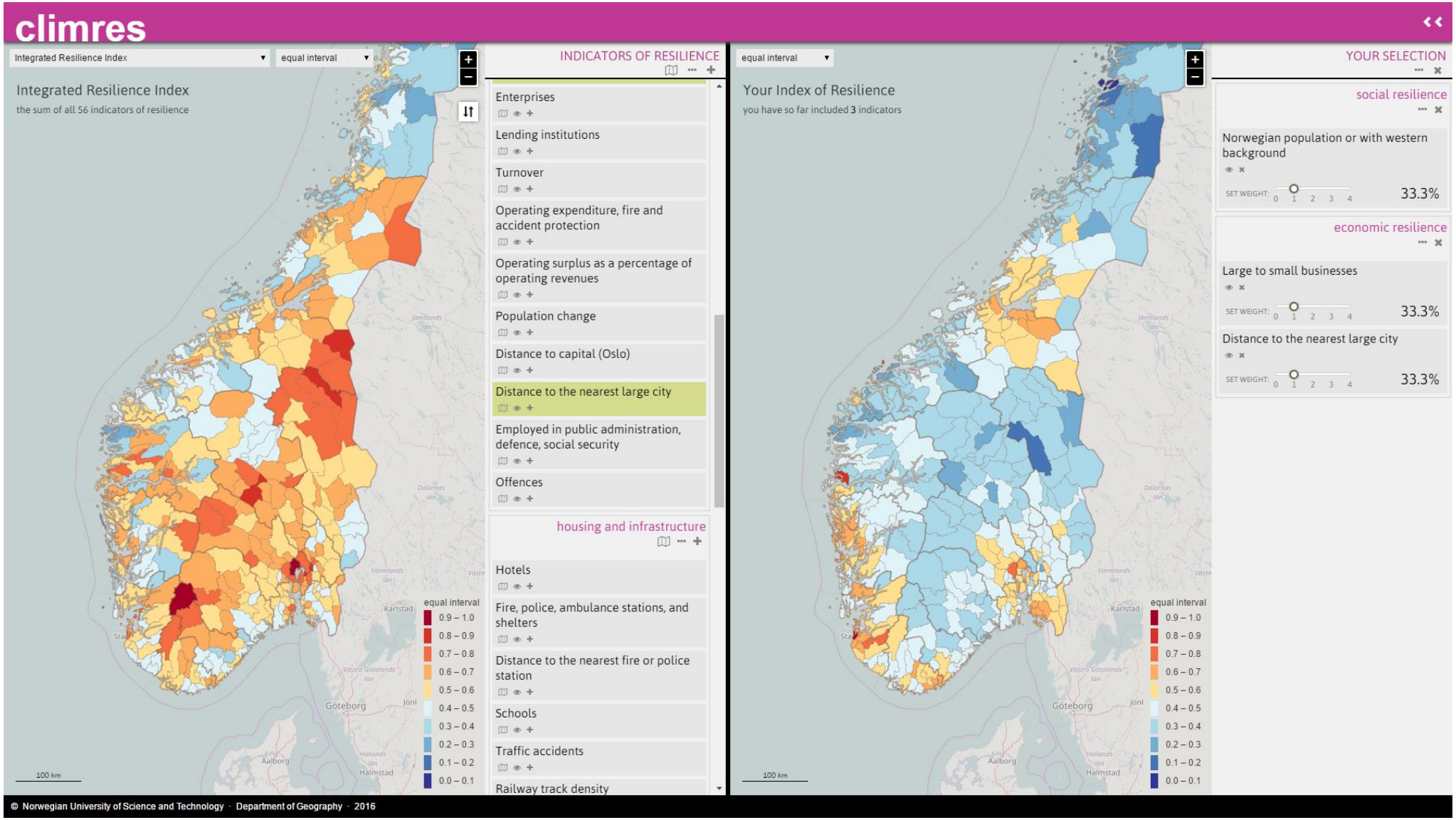
climres
Integrated Resilience Index
equal interval
Integrated Resilience Index
the sum of all 56 indicators of resilience
INDICATORS OF RESILIENCE
Enterprises
Lending institutions
Turnover
Operating expenditure, fire and accident protection
Operating surplus as a percentage of operating revenues
Population change
Distance to capital (Oslo)
Distance to the nearest large city
Employed in public administration, defence, social security
Offences
housing and infrastructure
Hotels
Fire, police, ambulance stations, and shelters
Distance to the nearest fire or police station
Schools
Traffic accidents
Railway track density
equal interval
0.9 – 1.0
0.8 – 0.9
0.7 – 0.8
0.6 – 0.7
0.5 – 0.6
0.4 – 0.5
0.3 – 0.4
0.2 – 0.3
0.1 – 0.2
0.0 – 0.1
100 km
Göteborg
Karlstad
Aalborg
Halmstad
equal interval
Your Index of Resilience
you have so far included 3 indicators
YOUR SELECTION
social resilience
Norwegian population or with western background
SET WEIGHT: 0 1 2 3 4
33.3%
economic resilience
Large to small businesses
SET WEIGHT: 0 1 2 3 4
33.3%
Distance to the nearest large city
SET WEIGHT: 0 1 2 3 4
33.3%
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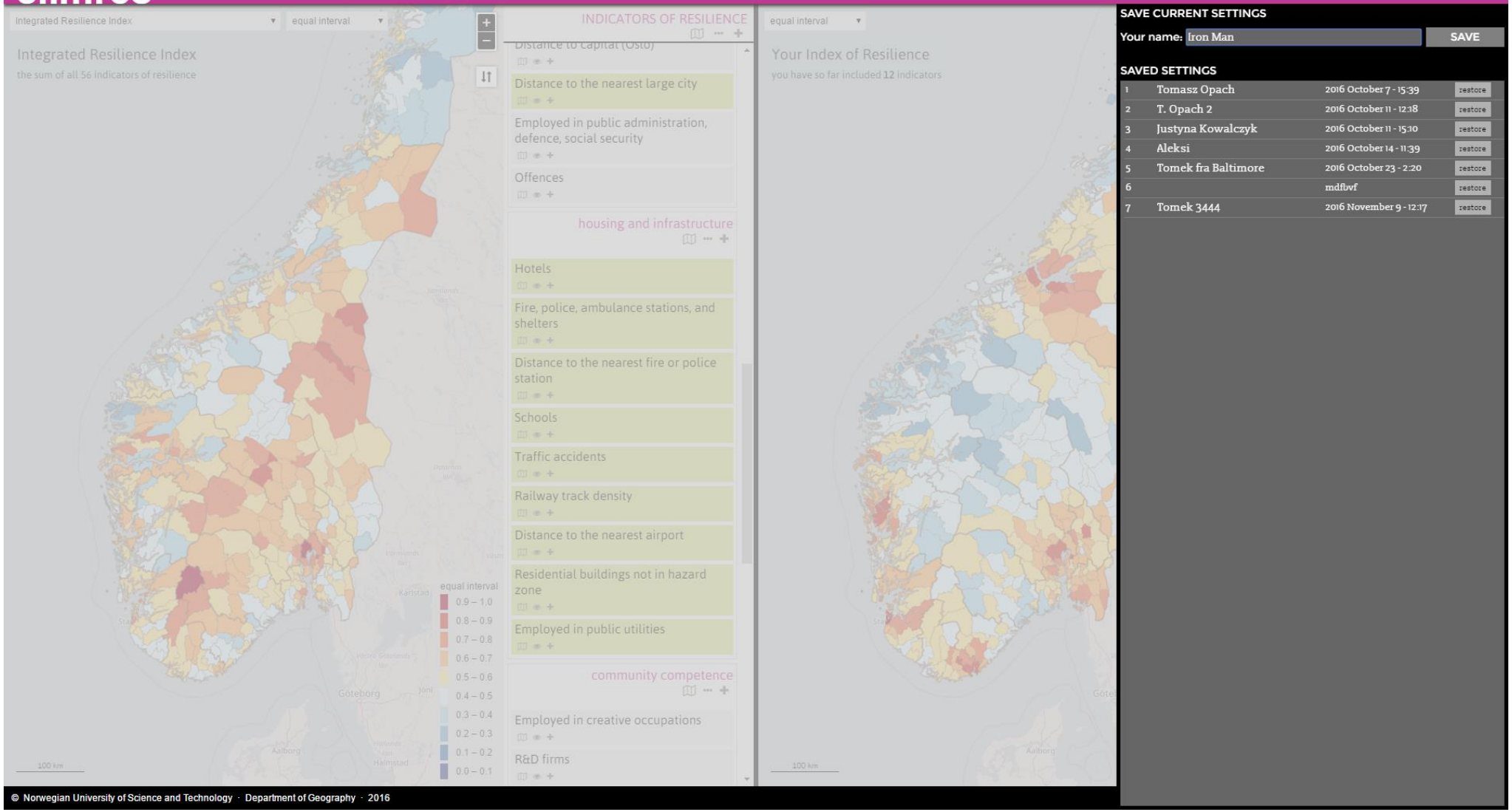
climres



SAVE CURRENT SETTINGS

Your name: Iron Man SAVE

SAVED SETTINGS

1	Tomasz Opach	2016 October 7 - 15:39	restore
2	T. Opach 2	2016 October 11 - 12:18	restore
3	Justyna Kowalczyk	2016 October 11 - 15:10	restore
4	Aleksi	2016 October 14 - 11:39	restore
5	Tomek fra Baltimore	2016 October 23 - 2:20	restore
6		mdflvvf	restore
7	Tomek 3444	2016 November 9 - 12:17	restore

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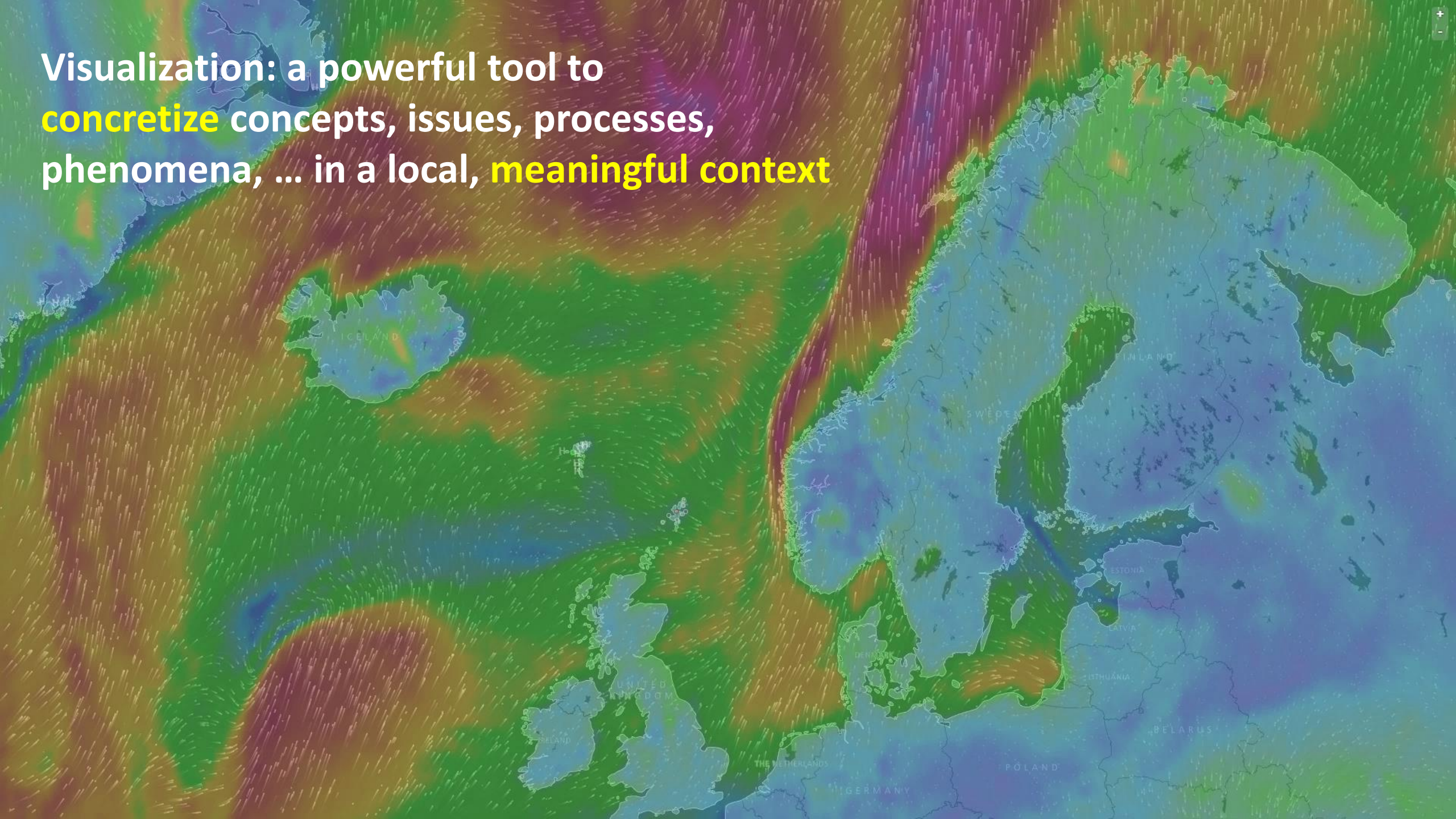

Visualization: a powerful tool to
concretize concepts, issues, processes,
phenomena, … in a local, meaningful context
ICELAND
SWEDEN
FINLAND
ESTONIA
LATVIA
LITHUANIA
BELARUS
POLAND
GERMANY
THE NETHERLANDS
IRELAND

Visualizing effects

Higher temperature → **More intense, more often heavy rain** → **Increased flood hazard in flood prone areas**

Useful information

understand the implications

for the place and its surroundings

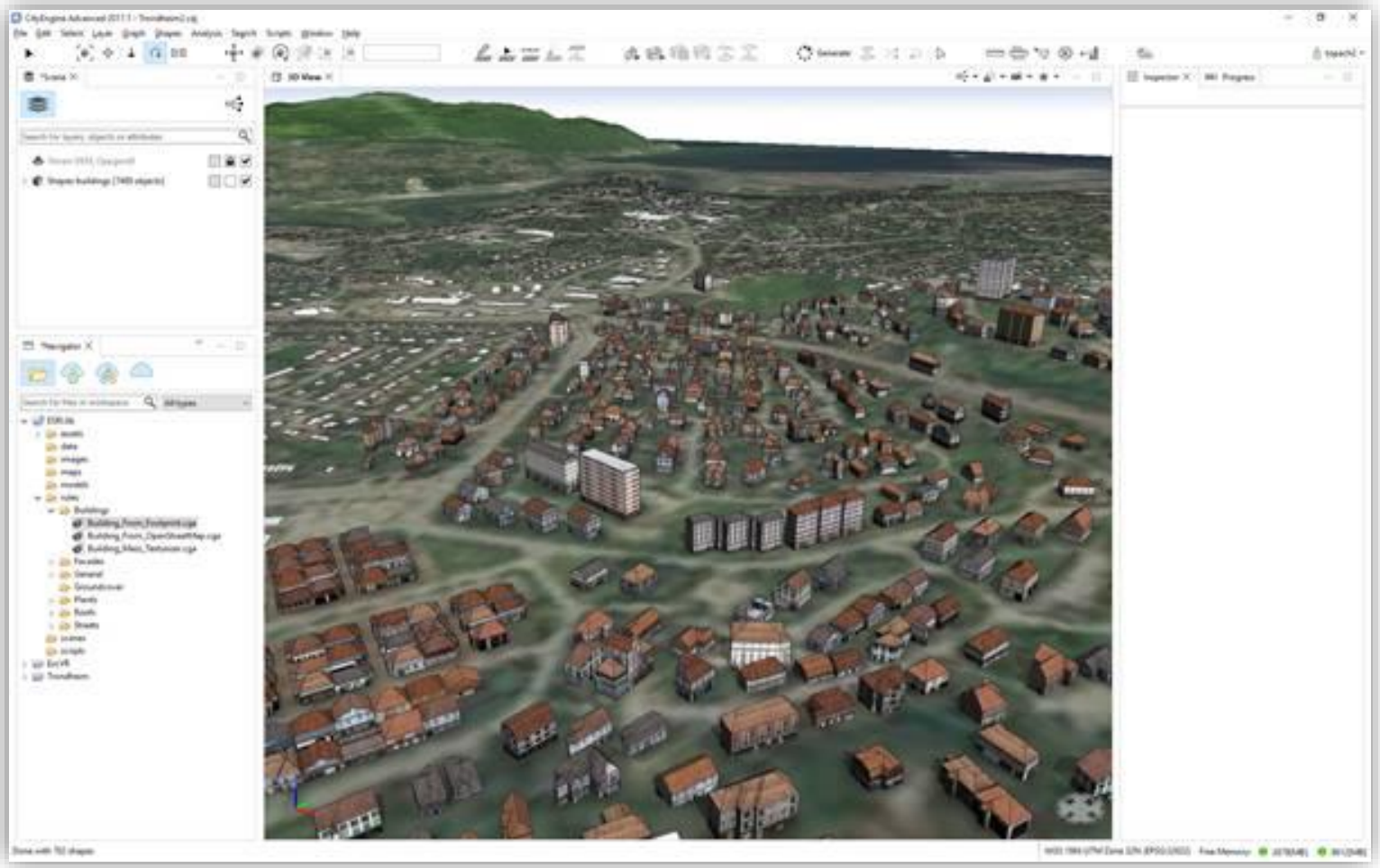
able to act/take decisions upon it

Visualizing climate change effects

Let’s play with visualizing storm surge and …

Visualizing climate change effects

Mitigation (reduce causes) & adaptation (reduce negative effects)



VR content for Trondheim in geography courses

visualization and gaming

increasing awareness and triggering actions