

ClimVis Europe survey results

*for Germany, Sweden, Estonia,
Russia, Ukraine and Poland*

The survey was conducted by the following institutions:

Germany: SEI (Tallinn Centre)

Sweden: SEI (Headquarters)

Estonia: SEI (Tallinn Centre)

Poland: University of Krakow / Polish Hydrometeorological Service

Russia: Institute of Monitoring of Climatic and Ecological Systems

Ukraine: National Ecological Centre of the Ukraine

Structure

- 1) Survey organisation and statistics
- 2) User experience with existing climate tools
- 3) User requirements for useful climate tools

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Survey organisation

- Survey to identify user backgrounds, needs, desires and perceived gaps in current climate information in six European countries
- Main target groups:
  - decision makers of various sectors
  - people engaged in education (teachers, lecturers, trainers)
- Run from December 2020 to February 2021 (Sweden until May)
- Country-specific recruitment strategies, mainly by emails distributed using institutional contact lists and via contacting umbrella organisations of potential climate data users
- Difficulties to motivate users to participate during “Corona winter” (not among currently pressing topics)

Extract of the questionnaire



ClimVis Europe: Questionnaire on climate data visualisation

1) In which context do you use climate information? *

	0 (No use)	1	2	3	4	5 (Strong use)
Work process and decision making	☐	☐	☐	☐	☐	☐
Research and/or analysis	☐	☐	☐	☐	☐	☐
Communication (via reports, bulletins etc.)	☐	☐	☐	☐	☐	☐
Communication (via newsletters, social media etc.)	☐	☐	☐	☐	☐	☐
Private investigations	☐	☐	☐	☐	☐	☐

2) I am interested in: *

Multiple answers possible

- ☐ Past climate (previous decades to centuries)
- ☐ Present climate
- ☐ Future climate (up to end of the 21th century)

Photo credit: Getty / yimwow

Survey organisation

- Explored user experiences and requirements of a useful web-tool providing climate information
- 10 open and 12 closed questions
- 390 responses; distributed by countries:
  - Germany: 50 responses
  - Sweden: 30 responses
  - Estonia: 56 responses
  - Russia: 47 responses
  - Ukraine: 30 responses
  - Poland: 177 responses
- To reduce evaluation biases, averages over the six country means are used (instead of averages over all 390 responses)
- This presentation: evaluation of answers provided for open and closed questions

Extract of the questionnaire

ClimVis Europe: Questionnaire on climate data visualisation

17) Are you interested in use-cases (case studies) available in our tool? If yes, which?

Use-case provide examples of how users may employ climate information for their own purposes. (e.g., Where do I need to look to find tailored information of how heat events have changed in my region? How do I compare this winters snow depth data with long-term developments? Which visualisations improve my knowledge of past and future changes in the hydrological cycle of my city or region?

Your answer

18) Do you prefer certain file types to export underlying data?

☐ xlsx

☐ csv/txt

☐ shp

☐ tif

☐ geotiff

☐ netcdf

☐ grib

☐ Other: _____

19) Which of the following language(s) would you prefer to assess web-based climate information? *

☐ My own national language

☐ English

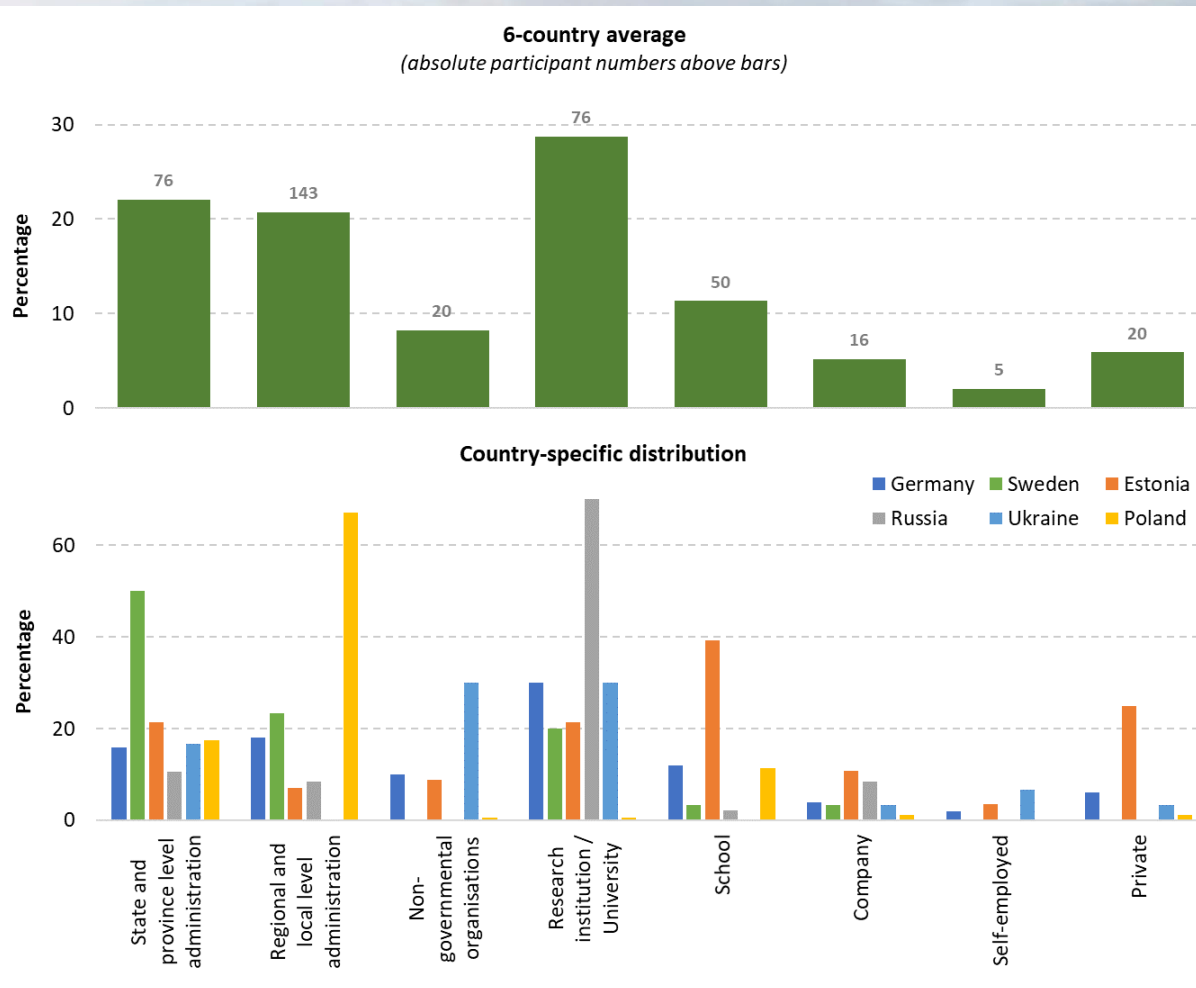
☐ Other: _____

20) Briefly describe the areas you could imagine applying climate information at work - additional to current use (question 4):

Survey participants - institution

“Which type of institution do you work for?”

One answer possible

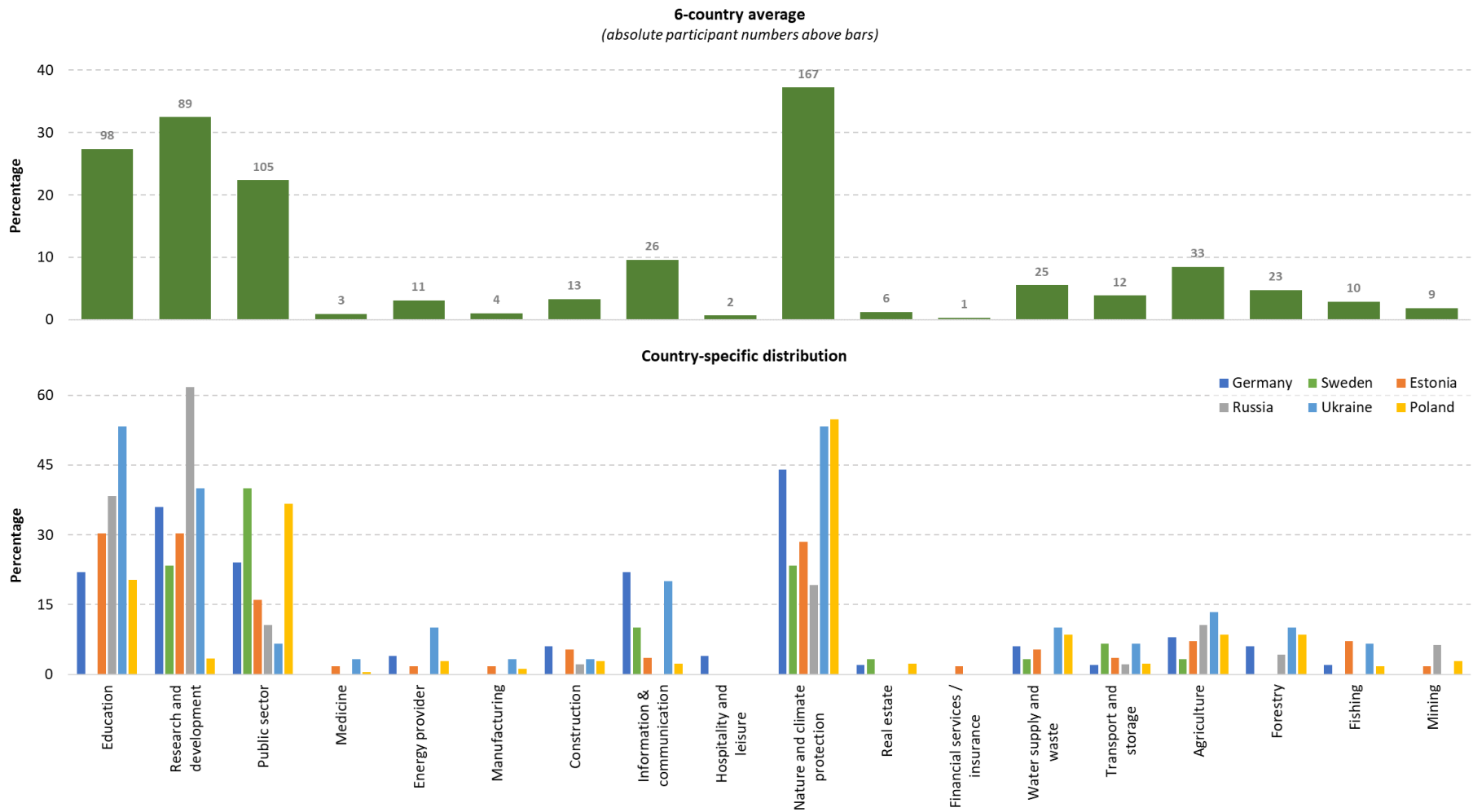


- Comparatively large difference in respondents' institutional affiliations between the countries
- Certain institutions dominate in Poland, Russia and Sweden, while more equal distribution prevails in other three countries
- (the unequal distribution in participant affiliations is another reason to use 6-country averages)

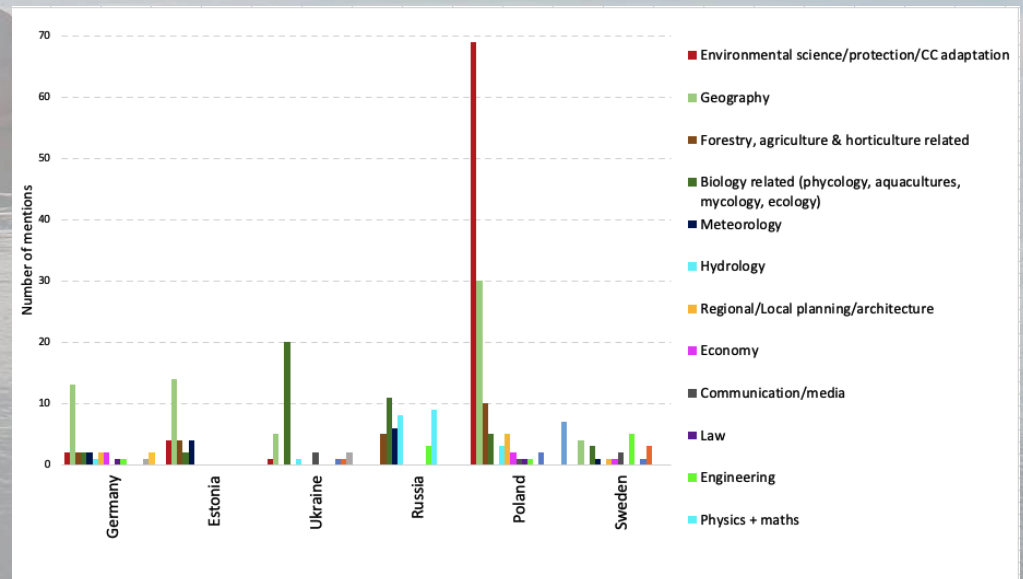
Survey participants - sector

"Which sector does your workplace belong to?"

Multiple answers possible



- Poland: dominated by environmental sciences/ adaptation-related specialisations
- Germany/Estonia: often geography-related
- Russia: often physics/ mathematics related (due to natural science/university background)
- Ukraine: often biology-related
- Sweden: relatively equal distribution
- Answers are biased by previously shown varying institutional and sector affiliations per country



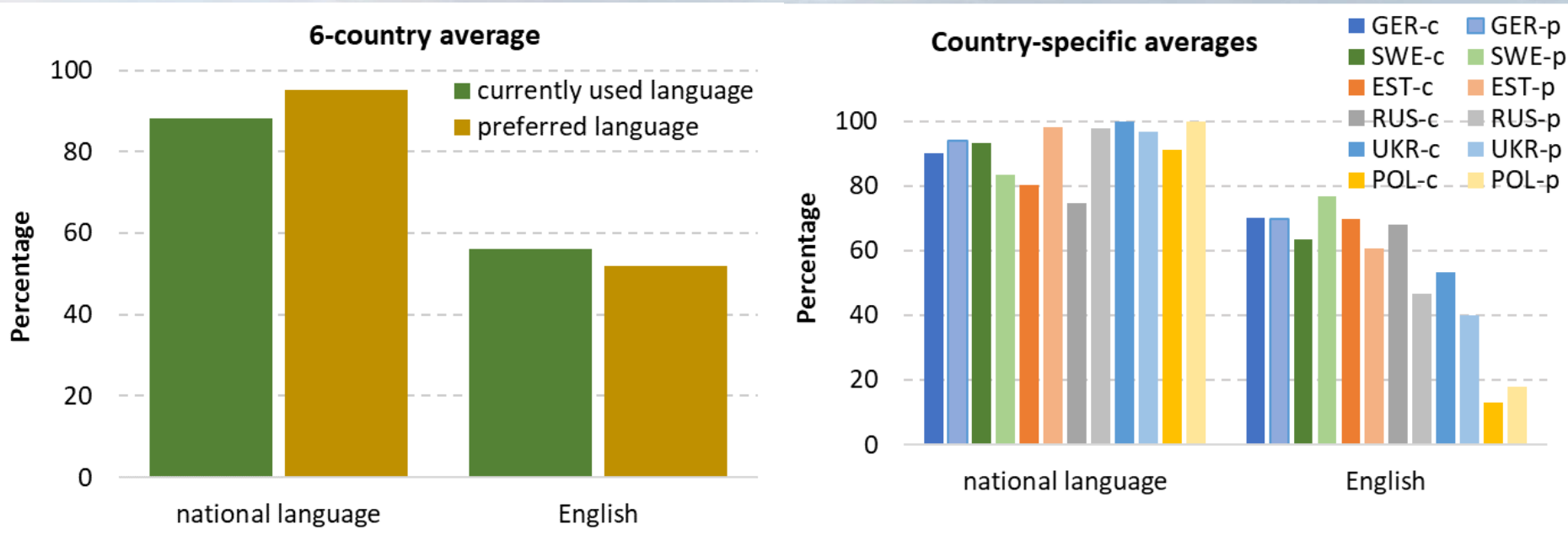
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Used and preferred language

“Which language do you use or prefer?”

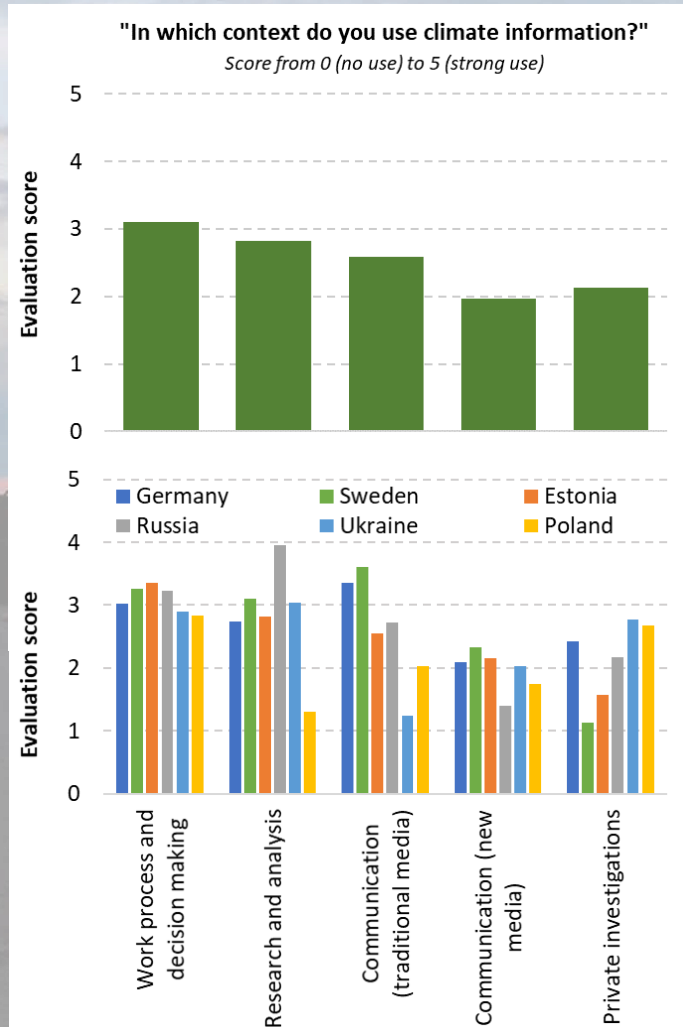
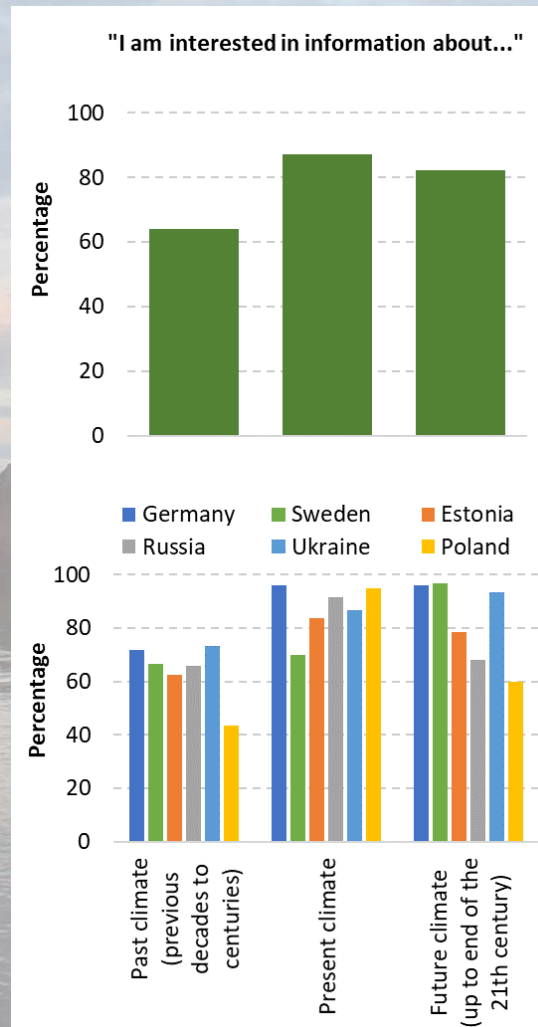
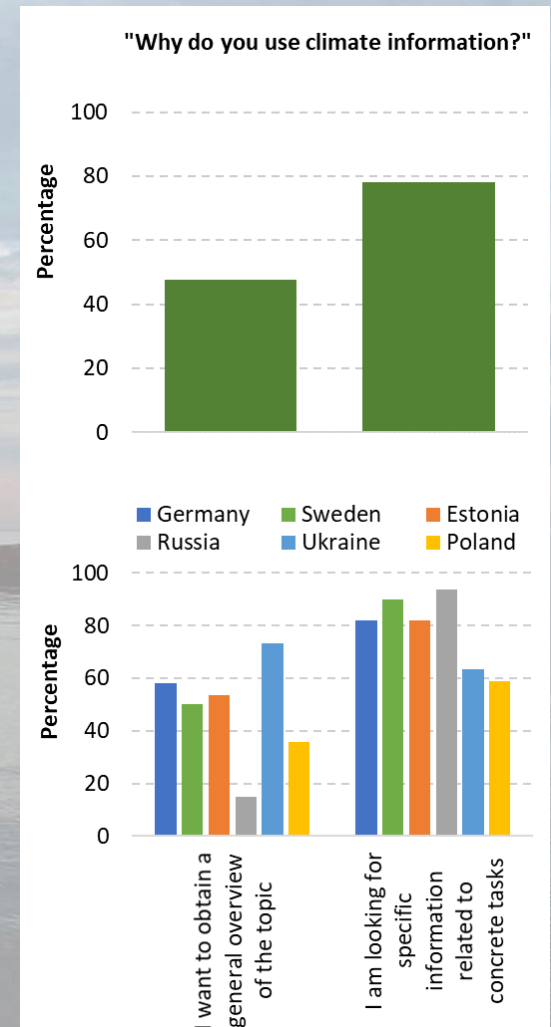
c = current, p = preferred



- Almost all users prefer to access climate information in their own language
- Access in English is fine by about half of the participants, with large country- and sector-specific differences
- Results show the need (and not only the preference) of the accessibility of climate information in national languages

Reasons to use climate information

(3 questions – see diagram headlines)



Applied tasks for climate information

“Concretely, for which tasks do you apply climate information?”

- Commonly used in all countries for:
  - Developing, coordinating and justifying Climate Change adaptation (and mitigation) measures (incl. communicating and discussing related activities / strategies with stakeholders)
  - Assessing climate effects and risks in various contexts (e.g., urban planning, food security, agriculture, forestry, ecosystem services and biodiversity)
  - Education and communication: in research, teaching and outreach activities
  - Research purposes: scientific papers/articles
- Most mentioned key words: adaptation measures, research purposes and hydrological cycle

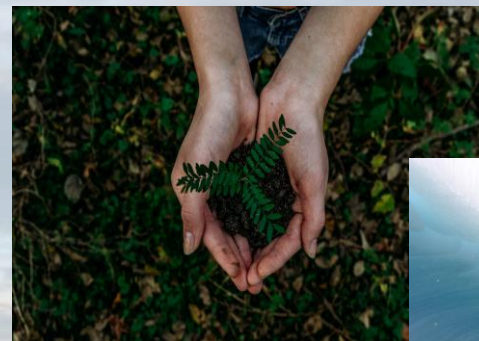


Figure 1. Hands holding a plant.
Downloaded from “The Earth and I”
by Noah Buscher, 2018,
unsplash.com.



Figure 2. Ice shelf.
Downloaded from
“The Edge of an
iceberg, melting in
the Austral summer”
by NOAA, 2020,
unsplash.com.



Figure 3. Smoke over the forests.
Downloaded from “Smoke rising
towards the sky from the chimneys of a
paper mill in Sweden” by Daniel Moqvist,
2020, unsplash.com.

Popular climate information sources

“Which source(s) of web-based climate information do you currently use?”

- In each of the 6 countries national weather service websites were mentioned most often (unclear if users differentiate between weather and climate here):
  - Germany –DWD <https://www.dwd.de/>
  - Estonia –EMHI <http://www.ilmateenistus.ee>
  - Ukraine - <https://meteo.gov.ua/ua/#>
  - Poland - NWS <https://www.imgw.pl>
  - Sweden - SMHI <https://www.smhi.se/>
  - Russia – <https://meteoinfo.ru>
- International websites often mentioned:
  - IPCC, Copernicus, WMO, NASA, NOAA
- National weather service webpages were more often mentioned compared to international sources



Figure 4. Screenshot from IPCC Sixth Assessment Report website (IPCC, 2021).



Figure 5. Screenshot from Copernicus website (Copernicus, 2021).

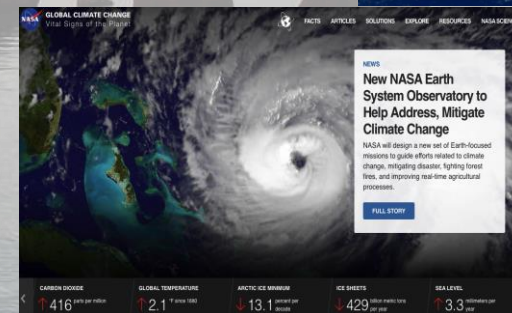


Figure 6. Screenshot from NASA website (NASA, 2021).

Useful aspects in existing tools

“Which aspects (content, design etc.) do you find useful in the mentioned web applications?”

- Important aspects: fitting content, user-friendly interface, intuitive handling and comprehensible visualisation styles (maps/diagrams/ interactivity/ figures)
- Data accessibility related: comprehensive, updated archives along with download possibility, comparable data sources providing various service features and climate model ensemble members



Criticized aspects in existing tools

“Which aspects (content, design etc.) do you dislike in the mentioned web applications?”

- Important aspects: Too complicated, missing context, too long reports/explanations & bad design
- Disturbance by advertisements mentioned in most countries (may relate to way of access, browser and technical device)
- Difficulties with data accessibility: data extraction, missing accuracy and sources, and data not being up to date
- Uncertainties not mentioned with model runs and data was also mentioned by some respondents



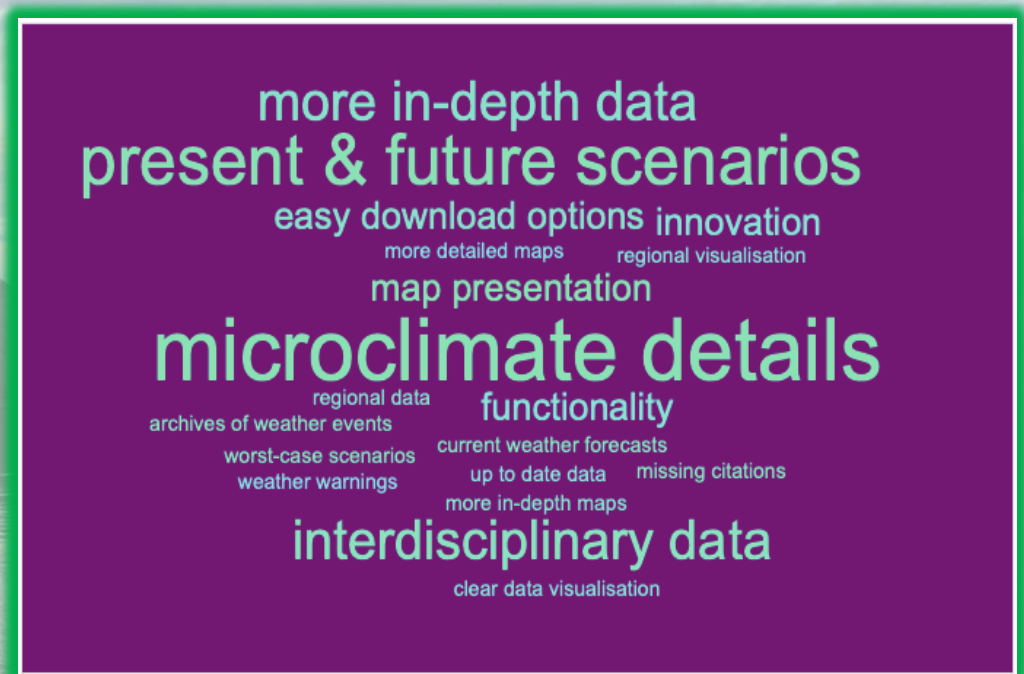
Missing aspects in existing tools

“Which aspects (content, design etc.) do you miss in the mentioned web applications?”

Often requested were more easily accessible and up-to-date data, incl. regional, urban and microclimate information

Mentioned in most of the countries:

- Innovative, functional and high-quality graphical map and data presentations/solutions
- Present and future weather and climate forecasts, but especially projections/scenarios including interdisciplinary aspects and effects (risks, weather events)



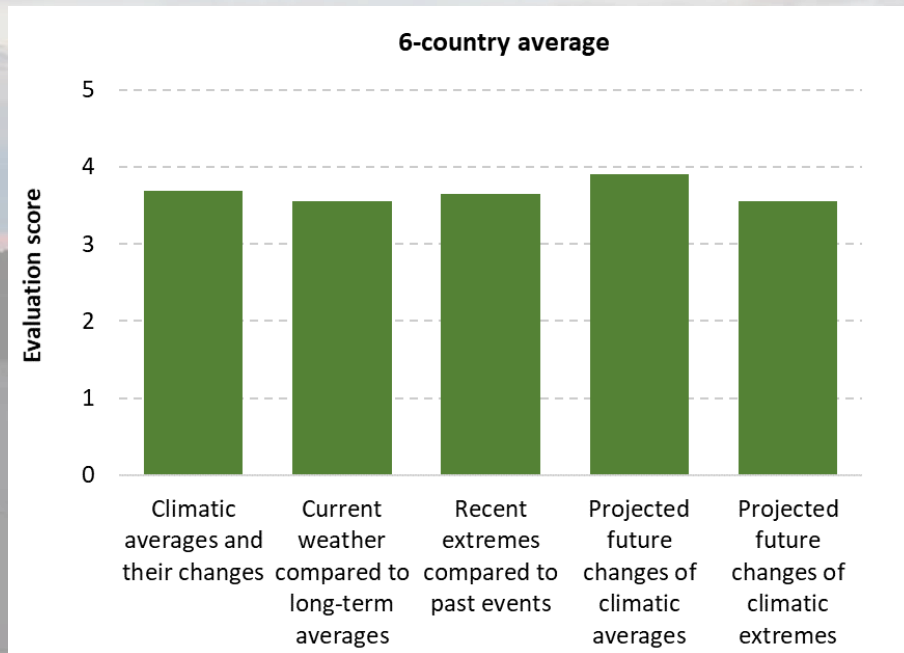
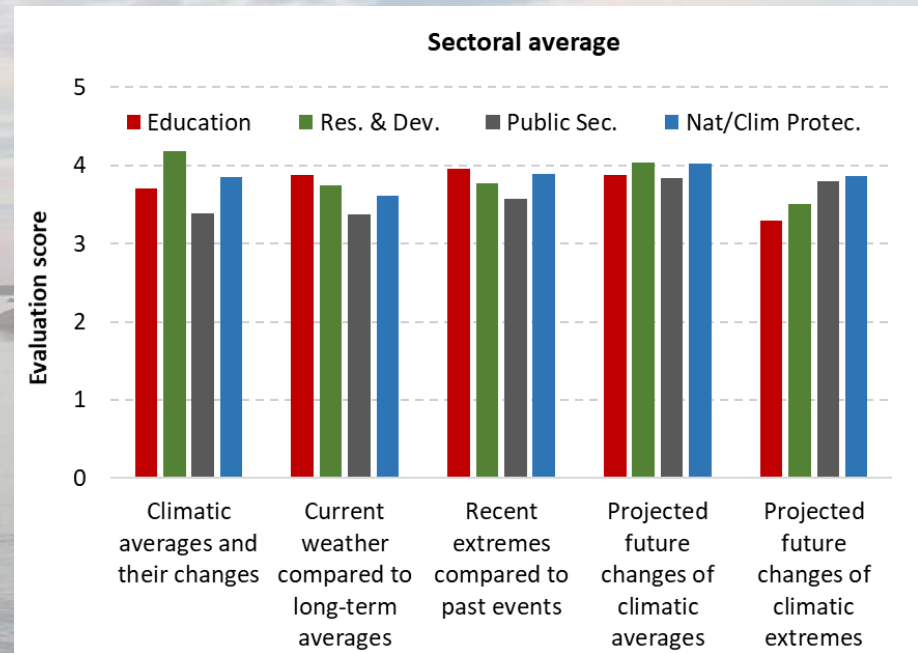
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Requested climate information

“Which climate information are you interested in?”

Score from 0 (no interest) to 5 (strong interest)



Interest in specific climate information

"I am interested in the following climate information:"

- Large variation between the countries and answers – may result from different respondent structure, target areas, relevant local topics or country-specific beliefs and policies.
- See country flags for a (non-representative) selection of given answers

- Urban climate data
- Climate projections up until 2100
- Wind climatology
- Links to relevant research
- Weather type climatology

- Forecast modelling & comparison
- Weather extremes (frosts & heat waves)
- 'What if...' scenarios in the context of polar ice sheets
- Projections & probability for weather extremes related to weather patterns
- CC adaptation & mitigation costs

- CC impact to natural & anthropogenic (economy) systems
- Data on the flooding and drought risk areas
- State of biogeochemical systems
- Melting and state of permafrost in the northern hemisphere

- Climate change at different spatial & temporal scales
- Periodical values of meteorological parameters
- Weather extremes & phenomena
- Precipitation type & amount

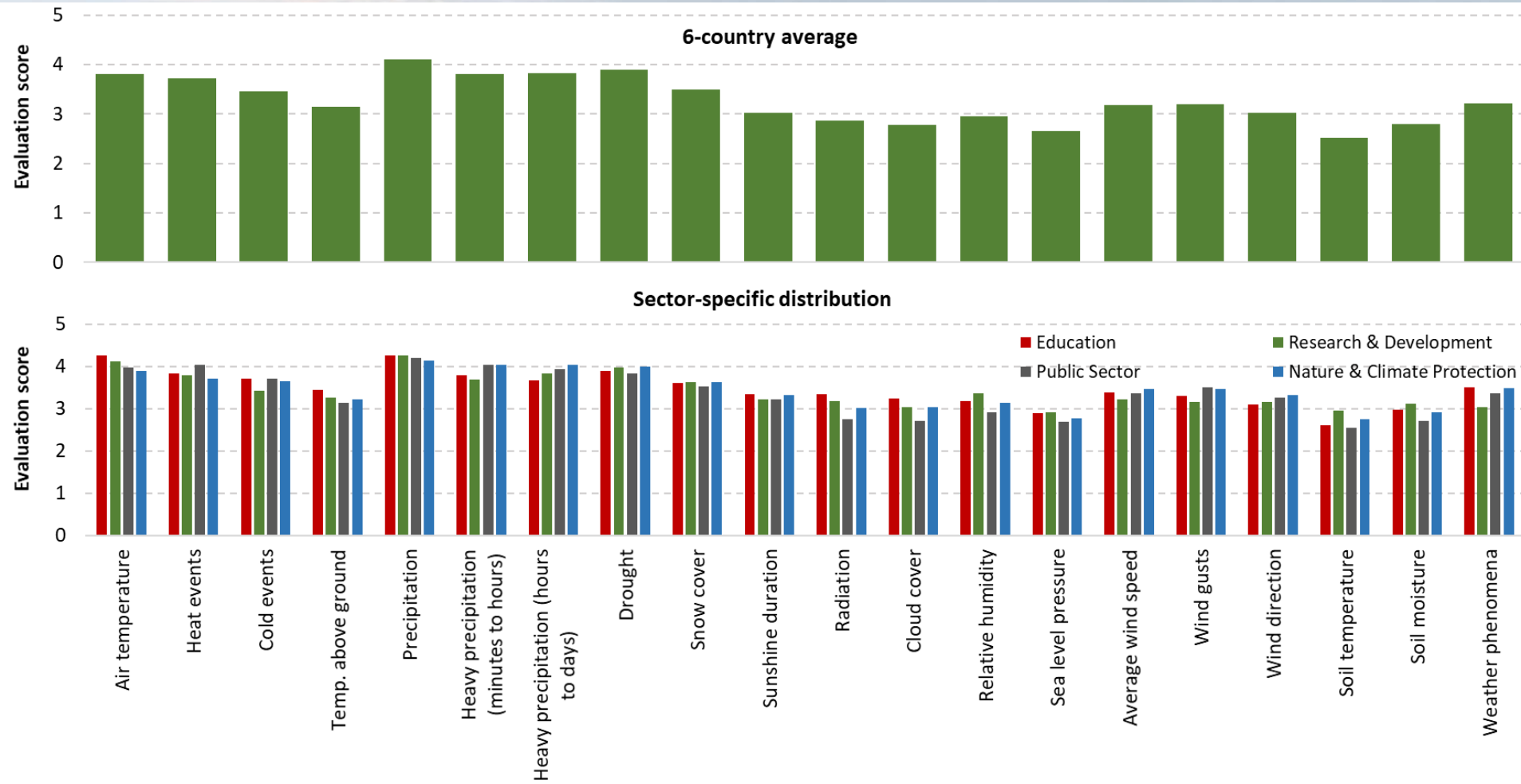
- Long-term forecast
- Historical climatic data
- Impacts on mountain ecosystems
- Water cycle impacts & biodiversity research + plants and soils related issues
- CC adaptation & mitigation in relation to health, economy, local areas

- Climate Change impacts to human society, specifically in Estonia
- CO₂ calculation methods/analysis and its changes over time
- Historical information before in-situ observations/data collection started

Relevance of climate parameters

“How relevant are the following climate parameters for you?”

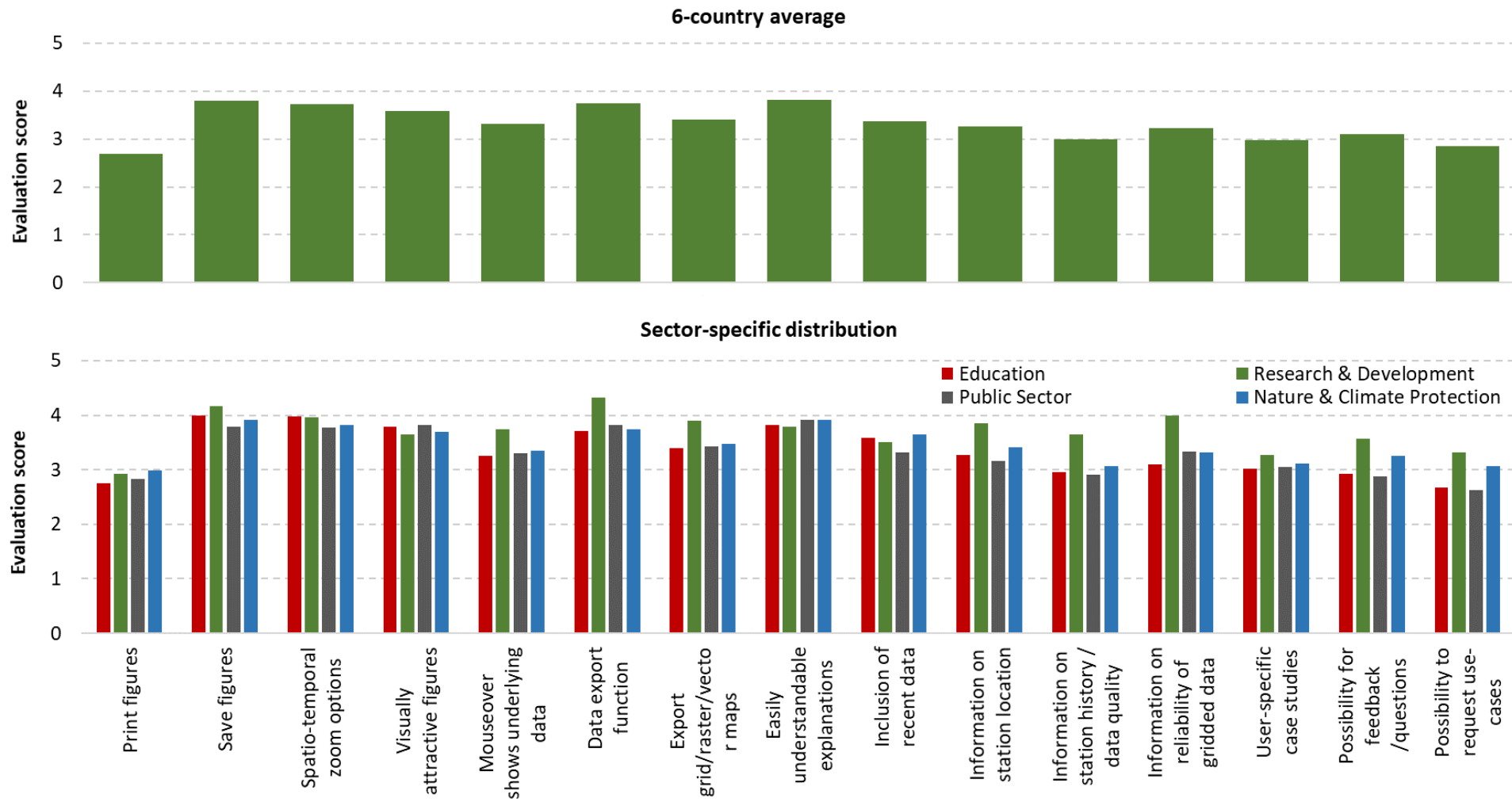
Score from 0 (irrelevant) to 5 (very relevant)



Relevance of website services

"How important are the following services for you?"

Score from 0 (not important) to 5 (very important)

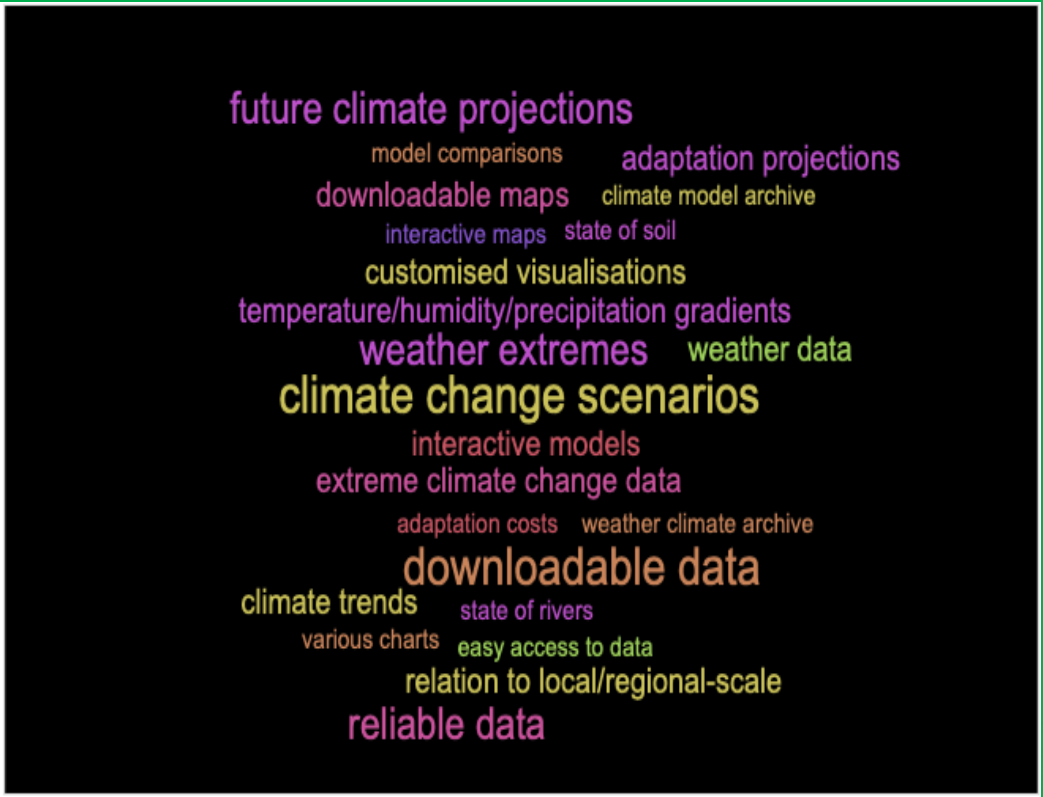


Requested (additional) services

“Which additional services would you like to have provided in a new climate tool?”

Often mentioned: including and easily accessible data sources & metadata, including figure and data download options; Climate Change visualisations & relation to country specifics

- Overall: large variability in answers in each of the countries and very difficult to pick out more common denominators (see word cloud)
- Sometimes mentioned that a question is difficult to evaluate without reference to an existing prototype

A word cloud on a black background with a green border, listing requested services. The words are in various colors (purple, yellow, orange, green) and sizes. The most prominent words are 'future climate projections', 'climate change scenarios', 'downloadable data', and 'weather extremes'. Other words include 'model comparisons', 'adaptation projections', 'downloadable maps', 'climate model archive', 'interactive maps', 'state of soil', 'customised visualisations', 'temperature/humidity/precipitation gradients', 'weather data', 'interactive models', 'extreme climate change data', 'adaptation costs', 'weather climate archive', 'climate trends', 'state of rivers', 'various charts', 'easy access to data', 'relation to local/regional-scale', and 'reliable data'.

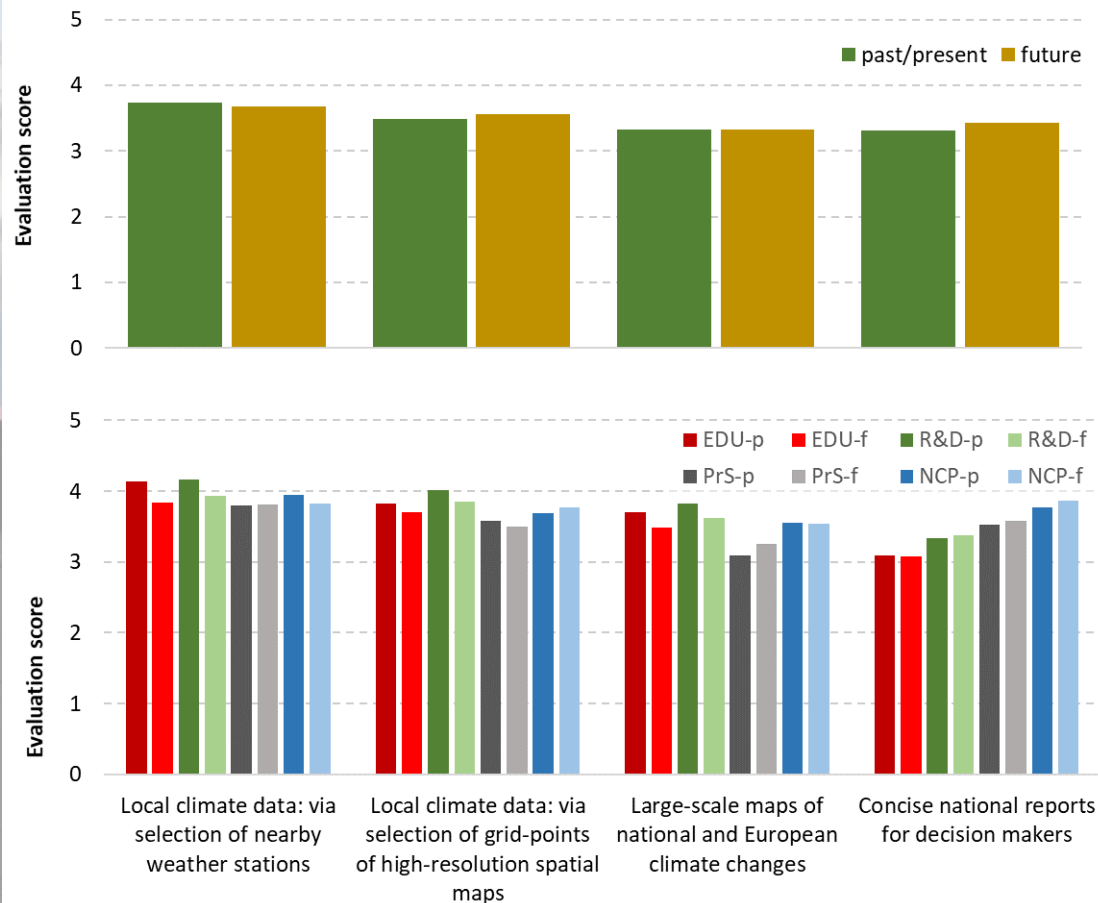
future climate projections
model comparisons adaptation projections
downloadable maps climate model archive
interactive maps state of soil
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temperature/humidity/precipitation gradients
weather extremes weather data
climate change scenarios
interactive models
extreme climate change data
adaptation costs weather climate archive
downloadable data
climate trends state of rivers
various charts easy access to data
relation to local/regional-scale
reliable data

Climate information types / data export

(2 questions – see diagram headlines)

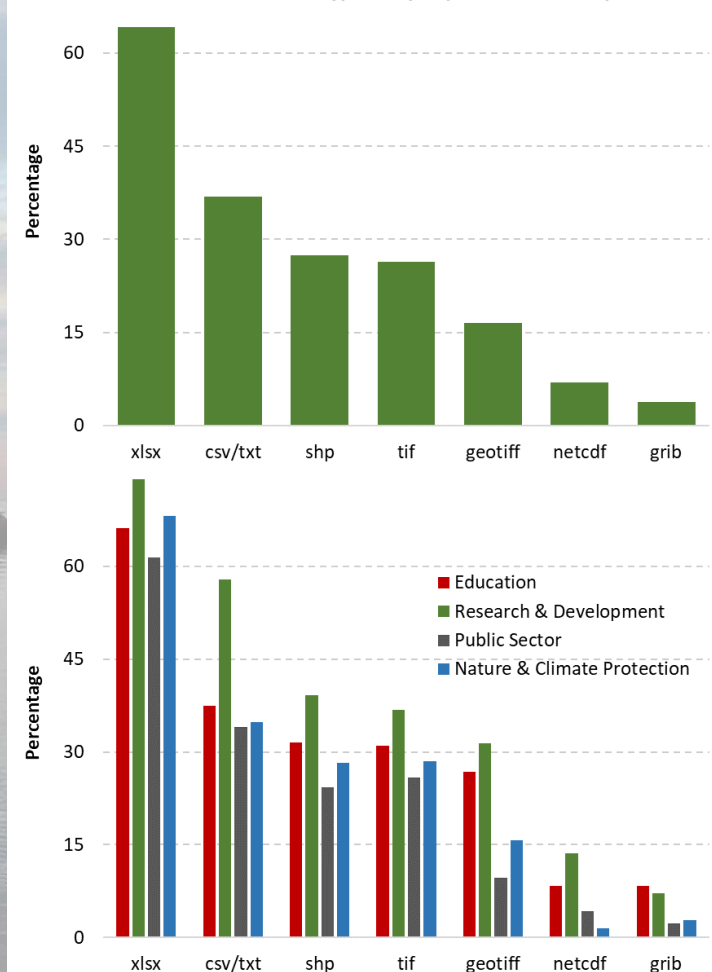
"How important are the following climate information for you?"

Score from 0 (not important) to 5 (very important)



p = past/present, f = future

"Which file types do you prefer for data export?"

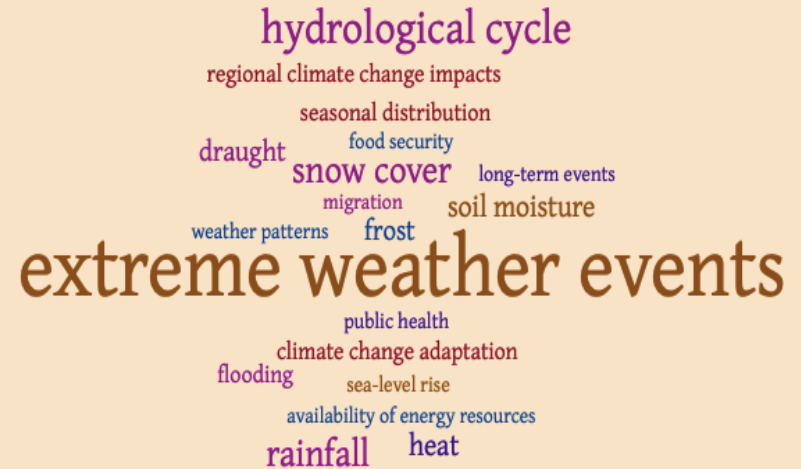


Interest in specific use-cases

“Are you interested in use-cases (case studies) available in our tool? If yes, which?”

Interest in case study topics:

- Most countries: Precipitation events (snow cover, heavy rainfall etc.), weather extremes, hydrology related patterns and change in atmospheric dynamics over time
- Relevance for countries' specific climate conditions; some prefer relating them to risk assessment or adaptation questions



A word cloud on a light orange background with a green border. The words are arranged in a circular pattern. The most prominent words are 'extreme weather events' in large brown font at the bottom. Other words include 'hydrological cycle' in purple at the top, 'snow cover' in purple in the center, 'draught' in purple on the left, 'regional climate change impacts' in brown at the top left, 'seasonal distribution' in brown at the top right, 'food security' in brown at the top right, 'long-term events' in brown at the top right, 'soil moisture' in brown at the top right, 'migration' in purple at the top right, 'frost' in blue at the top right, 'weather patterns' in blue at the top right, 'public health' in blue at the bottom right, 'climate change adaptation' in brown at the bottom right, 'sea-level rise' in brown at the bottom right, 'availability of energy resources' in brown at the bottom right, 'rainfall' in purple at the bottom left, 'heat' in purple at the bottom left, and 'flooding' in purple at the bottom left.

hydrological cycle
regional climate change impacts
seasonal distribution
food security
draught
snow cover
long-term events
migration
soil moisture
weather patterns
frost
extreme weather events
public health
climate change adaptation
flooding
sea-level rise
availability of energy resources
rainfall
heat

Additional application of climate info

“Briefly describe areas you may apply climate information additional to current use”

- Science fields answers relate to:
  - Estonia/Germany – teaching/education
  - Russia – in scientific research (maths/physics)
  - Germany - More related to political aspects and usage in decision making areas
  - Poland/Sweden – Climate Change adaptation research and public awareness
- Respondents’ own profession/specialisation most often provided in each of the six countries.



Suggestions for tool promotion

“Which possibilities do you see to promote the upcoming tool to allow a wide-spread use?”

Commonly offered possibilities in the countries:





ClimVis Europe Pilot Project

...towards a European climate data visualisation tool for decision makers, education and the public
...increasing local transparency of past, present, forecasted and future Climate Change.



Appendix: ClimVis questionnaire

Part 1: User experience with web-tools providing climate information

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- 1) In which context do you use climate information? *
- 2) I am interested in: *
- 3) Generally, why do you use climate information? *
- 4) Concretely, for which tasks do you apply climate information?
- 5) Which source(s) of web-based climate information do you currently use?
- 6) ... in which language? *
- 7) Which aspects (content, design etc.) do you find useful in the mentioned web applications?
- 8) Which aspects (content, design etc.) do you dislike in the mentioned applications?
- 9) Which aspects (content, design etc.) do you miss in the mentioned web applications?

Closed questions with pre-given answer possibilities *

Appendix: ClimVis questionnaire

Part 2 (1): Requirements of a useful web-tool providing climate information

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- 10) Name the kind of climate information you are interested in? *
- 11) I am interested in the following additional climate information:
- 12) How relevant are the following climate parameters for you? *
- 13) Observed climate data (past and present): How important is accessibility to the following information for you? *
- 14) Projected climate data (future): How important is accessibility to the following information for you? *
- 15) How important are the following services for you? *
- 16) Which additional services would you like to have provided in a newly designed visualisation tool of climate data?
- 17) Are you interested in use-cases (case studies) available in our tool? If yes, which?

Closed questions with pre-given answer possibilities *

Appendix: ClimVis questionnaire

Part 2 (2): Requirements of a useful web-tool providing climate information

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- 18) Do you prefer certain file types to export of underlying data? *
- 19) Which of the following language(s) would you prefer to assess web-based climate information? *
- 20) Briefly describe the areas you could imagine applying climate information at work – additional to current use (question 4):
- 21) Which possibilities do you see to promote the upcoming visualisation platform to allow a wide-spread use (e.g., links on which websites)?
- 22) Finally, would you be interested to support the upcoming development of the platform by providing feedback during the implementation process? If yes, please specify: *
- 23) If you agree to support us, please provide us with your name...
- 24) ...and the email-address we can use in this context.

Closed questions with pre-given answer possibilities *

Appendix: ClimVis questionnaire

Part 3: Statistical information

- a) Gender *
- b) Age *
- c) Type of institution *
- d) Sector *
- e) Specialisation

Closed questions with pre-given answer possibilities *

Photo references

Buscher, N. (2018) “The Earth and I”. Available at: <https://unsplash.com/photos/x8ZStukS2PM> (Accessed 10 June 2021).

Copernicus (2021) European Union's Earth observation programme, Copernicus. Available at: <https://www.copernicus.eu/en/about-copernicus> (Accessed 10 June 2021).

IPCC (2021) ‘Sixth Assessment Report’, Intergovernmental Panel of Climate Change, IPCC. Available at: <https://www.ipcc.ch/assessment-report/ar6/> (Accessed 10 June 2021).

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