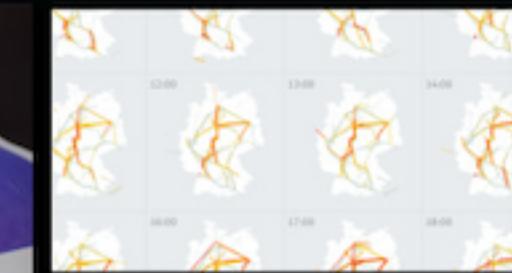
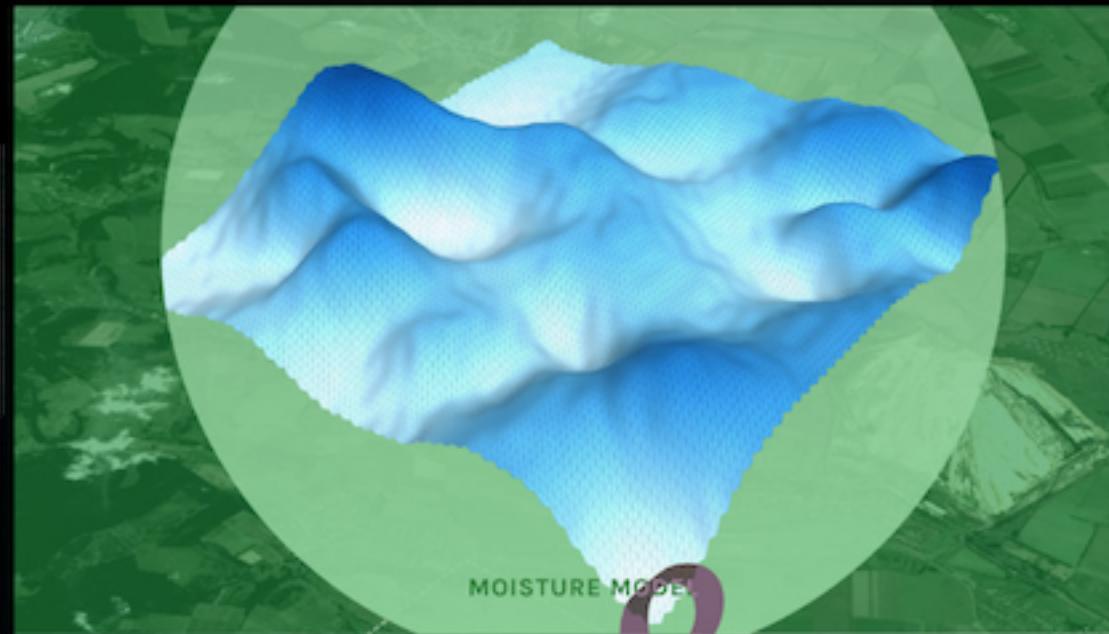
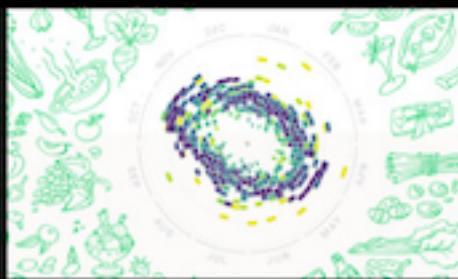


\*

# The art and science of data visualization



# DATA STORIES



Podcast: <http://datastories.es>

# Peak Spotting

## Vorausschau



Spz<sup>(x)</sup>tti

- Vorschlagene Suchen
- Zug 50 - 70 mit Prognose > 77,5% in der 2. Klasse übermorgen
- Linie 10 + 20 + 30 mit Buchungen >= 54%
- Zug 220, 221 und 222 vom 18.7.2020 bis zum 22.7.2020
- Stuttgart Hbf Mittwochs nach 22 Uhr in nächsten 2 Wochen

Tag 05.10.17

FILTER (1)

LISTE

KORRIDORE

ZEIT-WEG

STUNDLICH

KARTE

12:58



Peak Checker

21.12.2021

Schnelle Bearbeitung Analyse Benachrichtigungen 3 0

Filter

Bahnhof  
Alle

Linie  
Alle

Korridor  
Alle

Züge  
Alle

Komfort Kl.  
1. 2.

Prognosemodell

Kritikalität  
Buchungen 0-49% 50-69% 70%+

Ergebnisse 53

Sortierung  
Sortiert nach max. Kritikalität

Measure	Zug	Datum	Start – Ziel Bahnhof
72%	174	01.10.21	Bad Schandau – Dresden Hbf
71%	37	01.10.21	Dortmund Hbf – Wien Hbf
70%	54	01.10.21	Berlin Hbf – München Hbf
58%	1018	01.10.21	Nürnberg Hbf – Hamburg A.
56%	12	01.10.21	Köln Hbf – Berlin Ges.
56%	14	01.10.21	München Hbf – Karlsruhe

Details Zug 174

1. Klasse

2. Klasse

Info

BS	Ablauf	Fahrtabschnitt	LF	BS	MJ	ME
<input type="checkbox"/>	12:18	Bad Schandau – Dresden Hbf	12%	0%	4%	12%
<input type="checkbox"/>	12:55	Dresden Hbf – Dresden-Neustadt	24%	12%	24%	23%
<input type="checkbox"/>	13:02	Dresden-Neustadt – Berlin Südkreuz	48%	54%	31%	52%
<input type="checkbox"/>	14:37	Berlin Südkreuz – Berlin Hbf (tief)	72%	89%	62%	67%
<input checked="" type="checkbox"/>	15:06	Berlin Hbf (tief) – Berlin-Spandau	66%	100%	63%	66%
<input checked="" type="checkbox"/>	15:17	Berlin-Spandau – Wittenberge	32%	89%	52%	52%
<input type="checkbox"/>	16:02	Wittenberge – Ludwigslust	48%	23%	48%	34%
<input checked="" type="checkbox"/>	16:20	Ludwigslust – Büchen	13%	0%	13%	13%



The screenshot displays two views of the WHO Data Design Language (DDL) website. The left view shows the homepage with a dark blue header featuring the DDL logo and navigation links for Overview, Principles, Design system, Charts, Demos, and About. Below the header is a large white section with the text "Version 0.9.0" and the title "Data Design Language". A small paragraph explains the site's purpose: "This site presents the underlying principles, design system and chart components of the Data Design Language for data.who.int". To the right of the text is a grid of colored dots and a circular navigation icon. The right view shows a detailed look at the "Design system" section, specifically the "Colors" tab. It includes a color palette with hex codes for various categories like "brand/base", "foreground/base", "background/base", and "category/base". Below the palette are several charts demonstrating the use of these colors in data visualization, such as a treemap and scatter plots.

Version 0.9.0

# Data Design Language

This site presents the underlying principles, design system and chart components of the Data Design Language for data.who.int.

The WHO Data Design Language (DDL) provides building blocks and techniques for creating rich information experiences for everyone.

Our objective is to ensure that a user's experience of our data presentation is as informative, equitable, accessible and delightful as possible.

Deliberately not designed as a rule set, but rather a toolbox, the DDL includes a chart library, design guidelines, colour and typographic style specifications with usability guidance for internationalization (i18n) and accessibility (a11y), all reflecting our data design principles — ready to use and apply in a variety of settings and environments.

**Featured Core Values**

**Clear**  
Data presentations are tailored to information needs, understandable and approachable.

**Transparent**  
They reveal uncertainty, precision, provenance, and coverage of the data.

Colors

brand/base

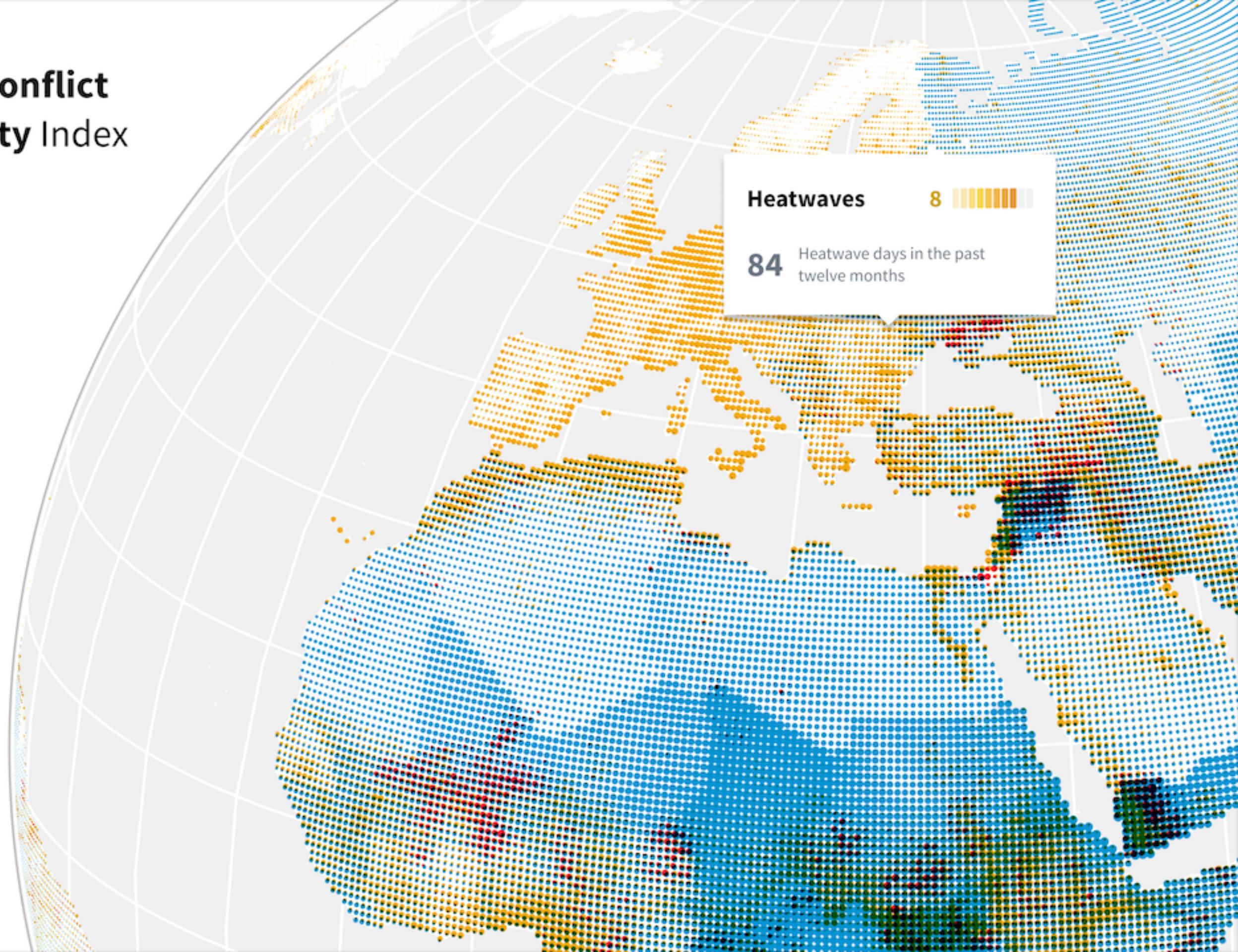
foreground/base

background/base

category/base



# Climate—Conflict Vulnerability Index



# Data visualization

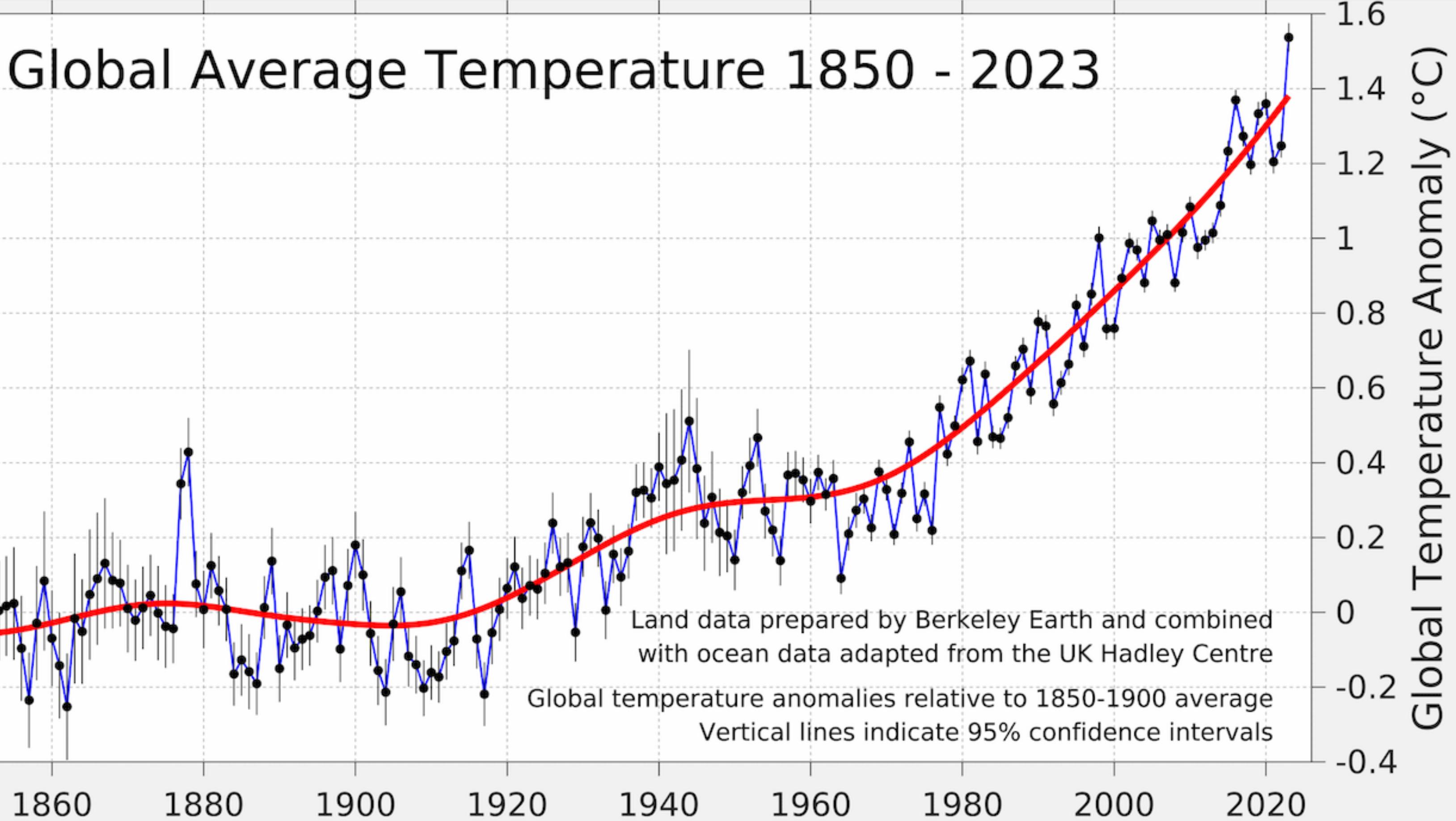
= how to make better  
charts?

Data  
visualization  
is a  
medium

---

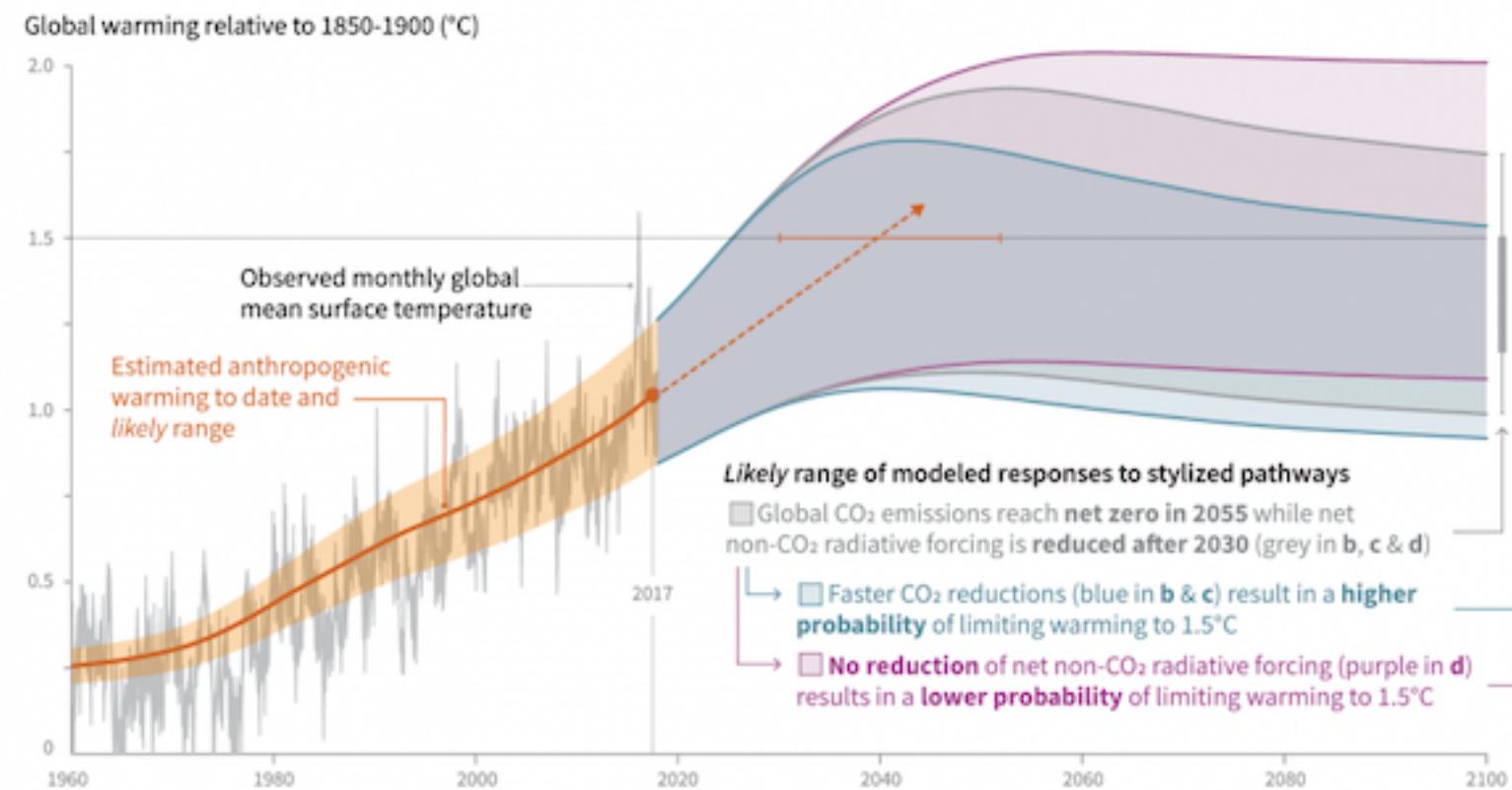
Eric Rodenbeck, ca. 2008.

# Global Average Temperature 1850 - 2023



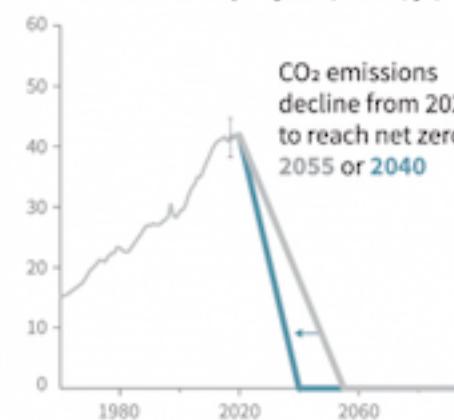
## Cumulative emissions of CO<sub>2</sub> and future non-CO<sub>2</sub> radiative forcing determine the probability of limiting warming to 1.5°C

a) Observed global temperature change and modeled responses to stylized anthropogenic emission and forcing pathways



b) Stylized net global CO<sub>2</sub> emission pathways

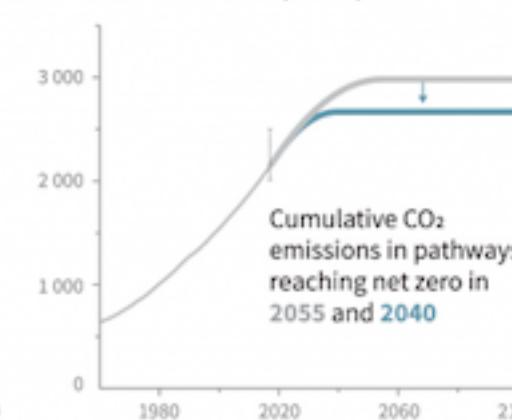
Billion tonnes CO<sub>2</sub> per year (GtCO<sub>2</sub>/yr)



Faster immediate CO<sub>2</sub> emission reductions limit cumulative CO<sub>2</sub> emissions shown in panel (c).

c) Cumulative net CO<sub>2</sub> emissions

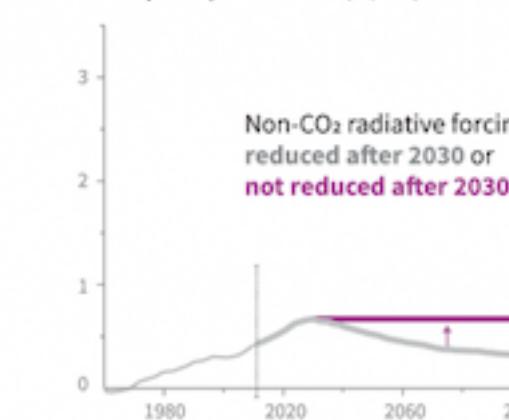
Billion tonnes CO<sub>2</sub> (GtCO<sub>2</sub>)

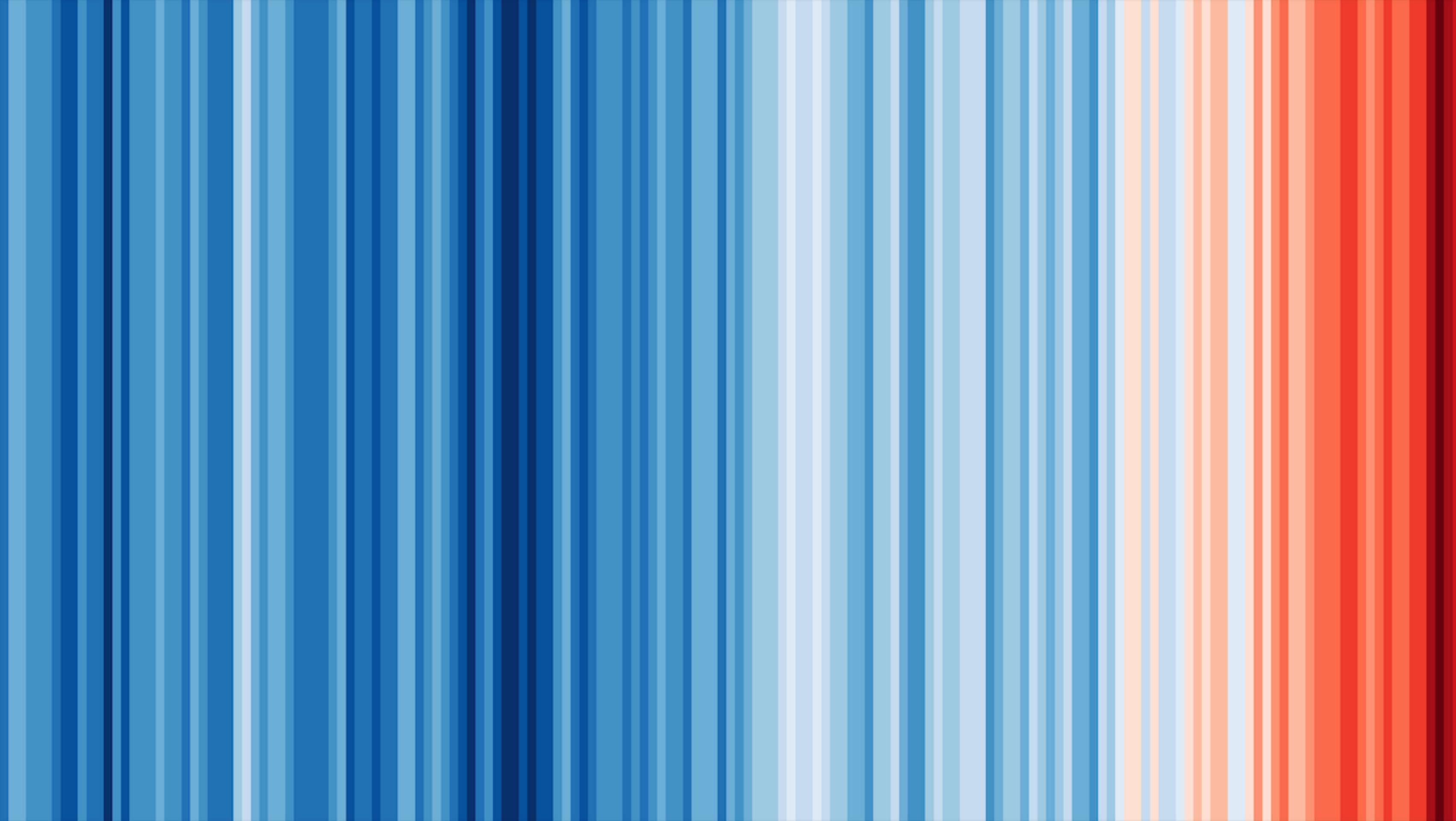


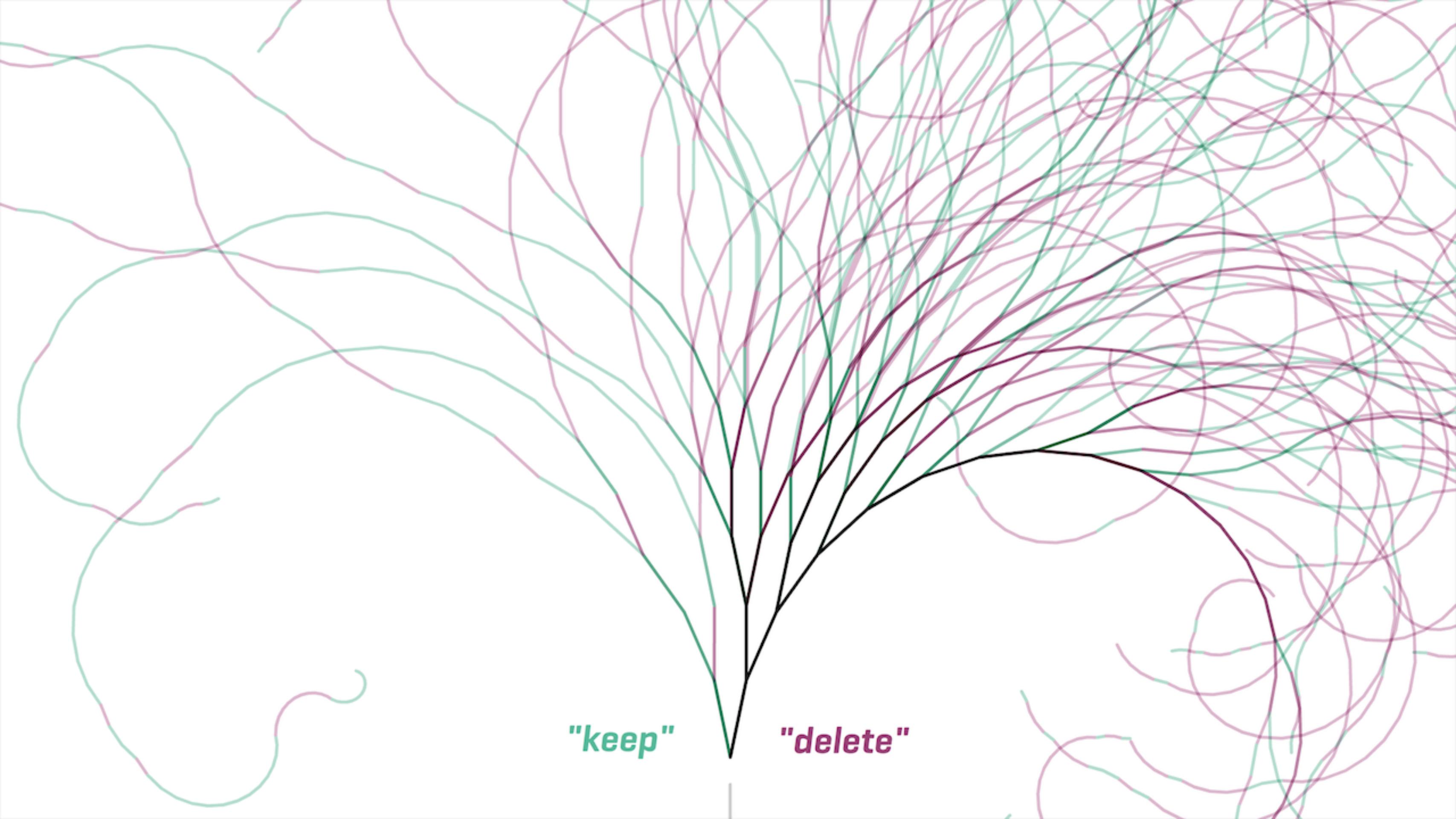
Maximum temperature rise is determined by cumulative net CO<sub>2</sub> emissions and net non-CO<sub>2</sub> radiative forcing due to methane, nitrous oxide, aerosols and other anthropogenic forcing agents.

d) Non-CO<sub>2</sub> radiative forcing pathways

Watts per square metre (W/m<sup>2</sup>)







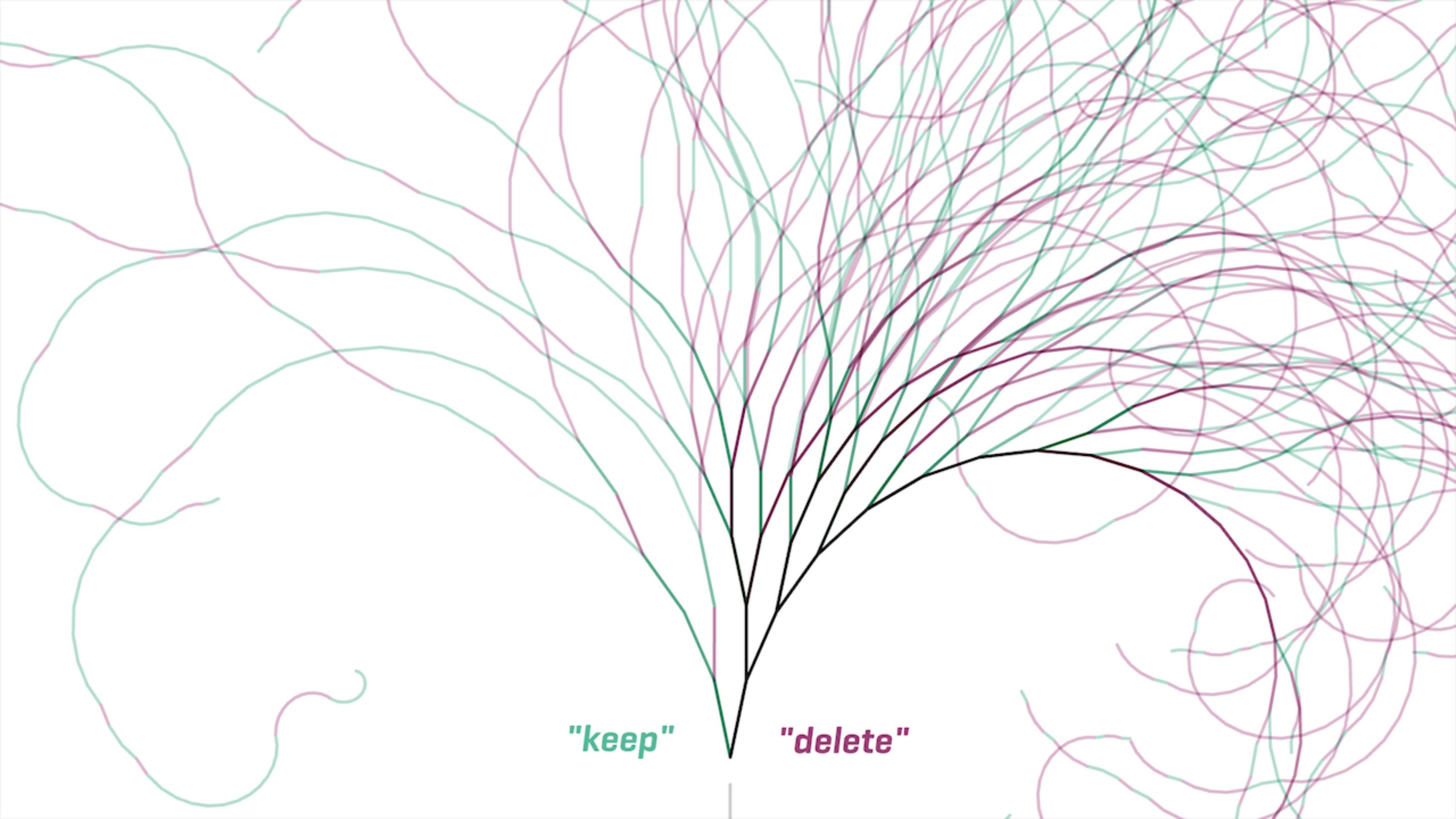
**"keep"**

**"delete"**

# Notabilia

"keep"

"delete"



**"keep"**

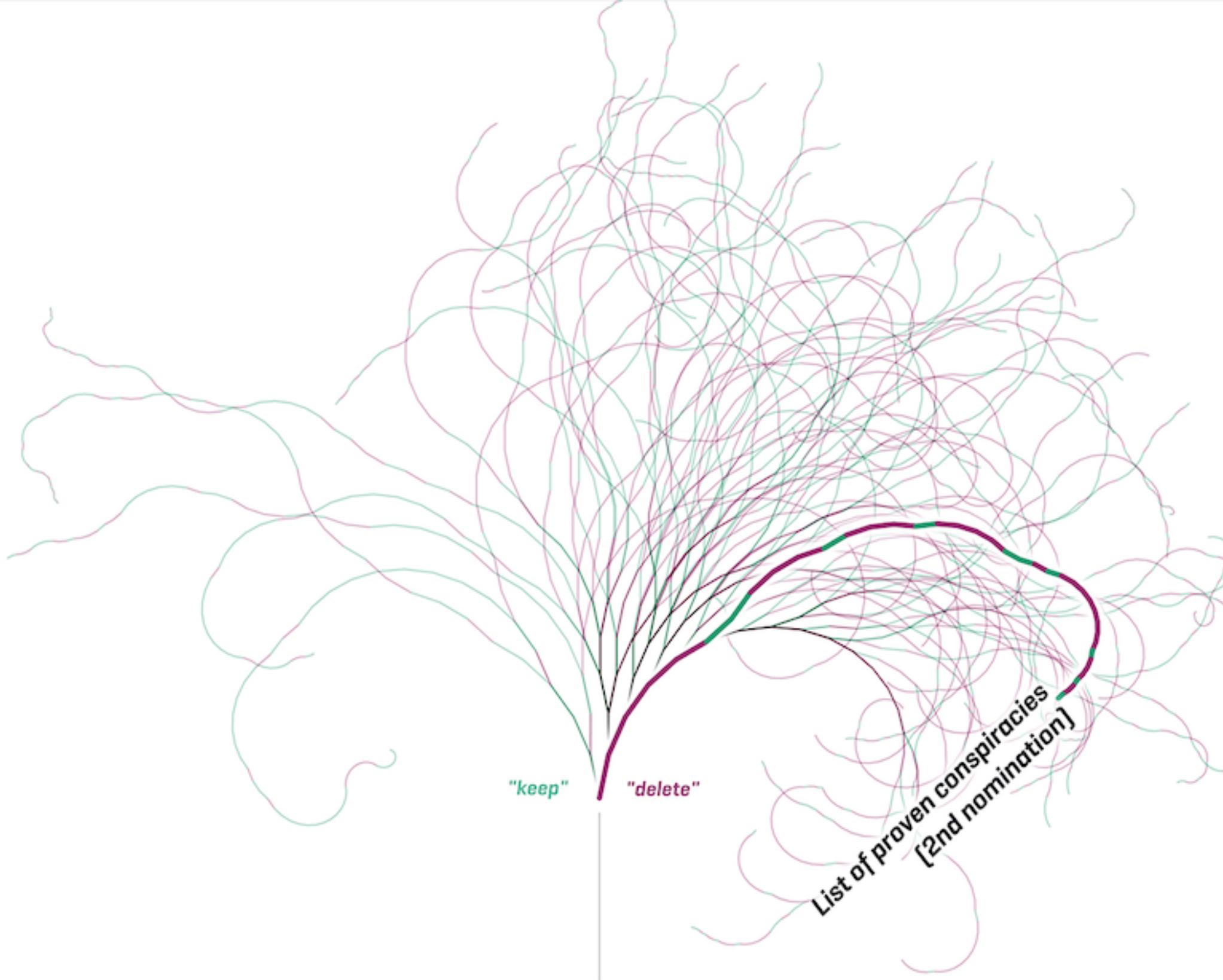
**"delete"**

“*delete*”

**“delete”**  
**“delete”**

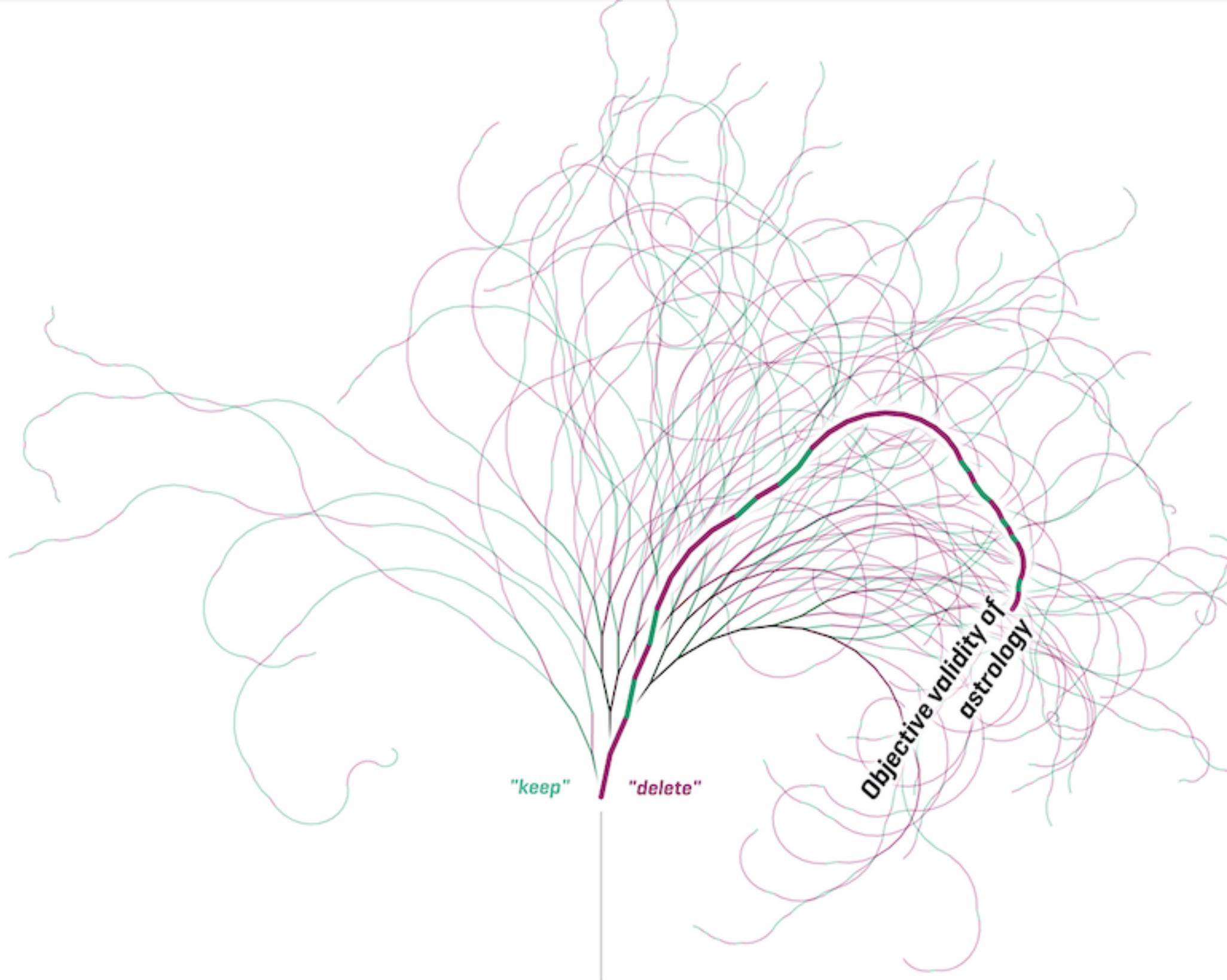
A stylized graphic featuring a thick green curved line on the left containing the word "keep" in green. To its right are several thinner red curved lines, each containing the word "delete" in red.

"keep"



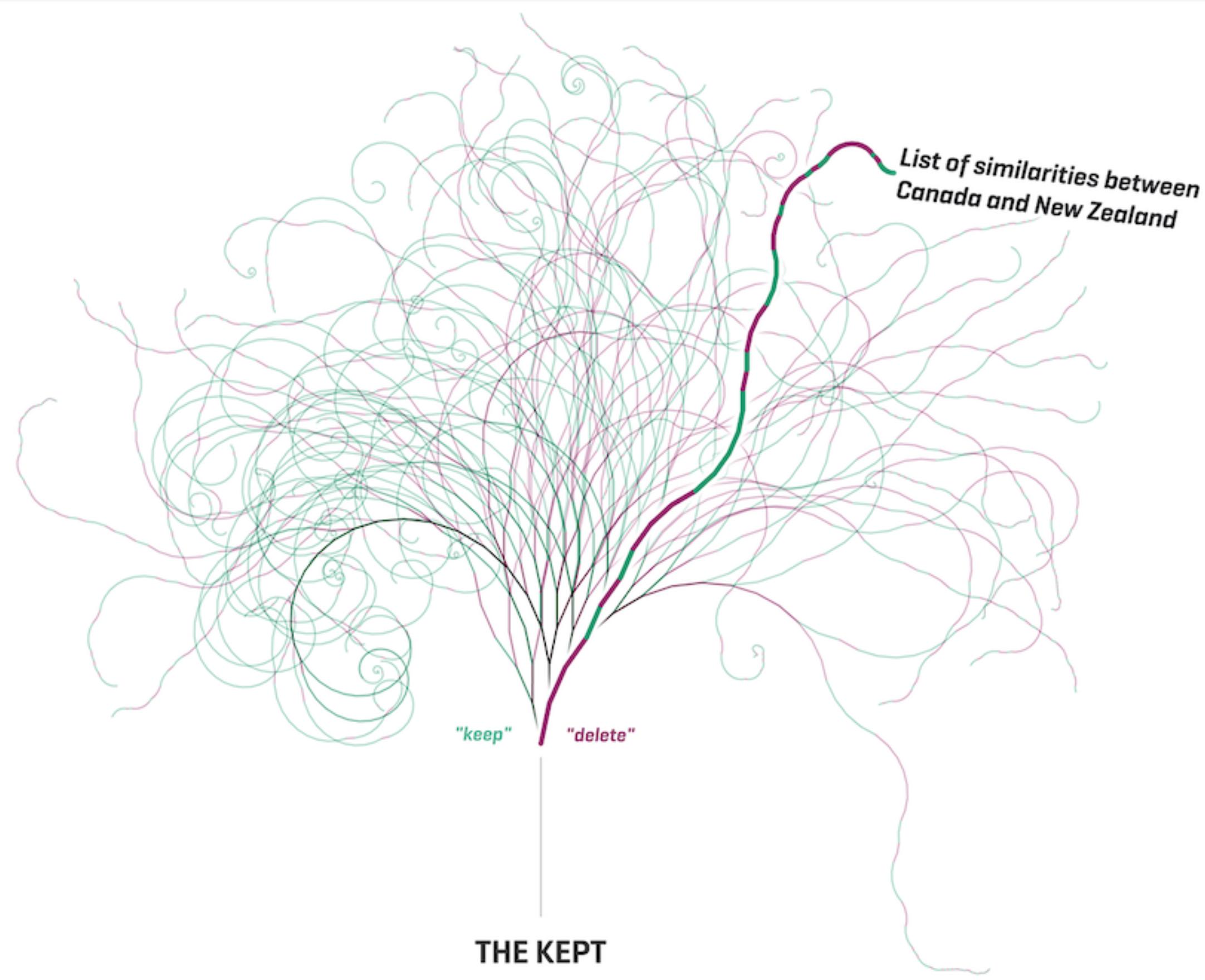
## THE DELETED

The 100 longest Article for Deletion (AfD) discussions on Wikipedia,  
which resulted in **deletion** of the article.



## THE DELETED

The 100 longest Article for Deletion [AfD] discussions on Wikipedia,  
which resulted in **deletion** of the article.



The 100 longest Article for Deletion (AfD) discussions on Wikipedia,  
which did **not** result in deletion of the article (i.e. it was kept, merged or redirected).

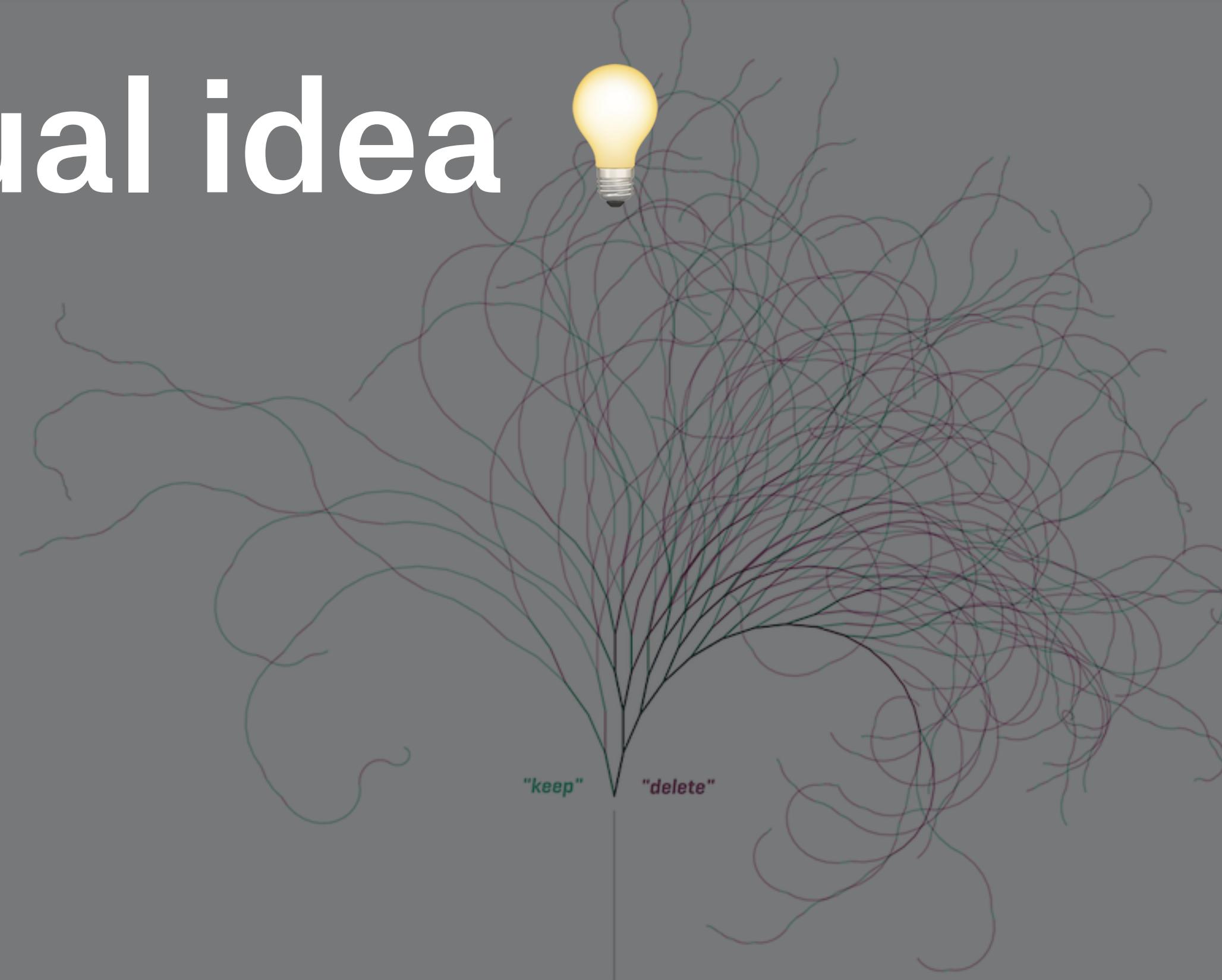
# Form 🤝 Content



## THE DELETED

The 100 longest Article for Deletion [AfD] discussions on Wikipedia,  
which resulted in deletion of the article.

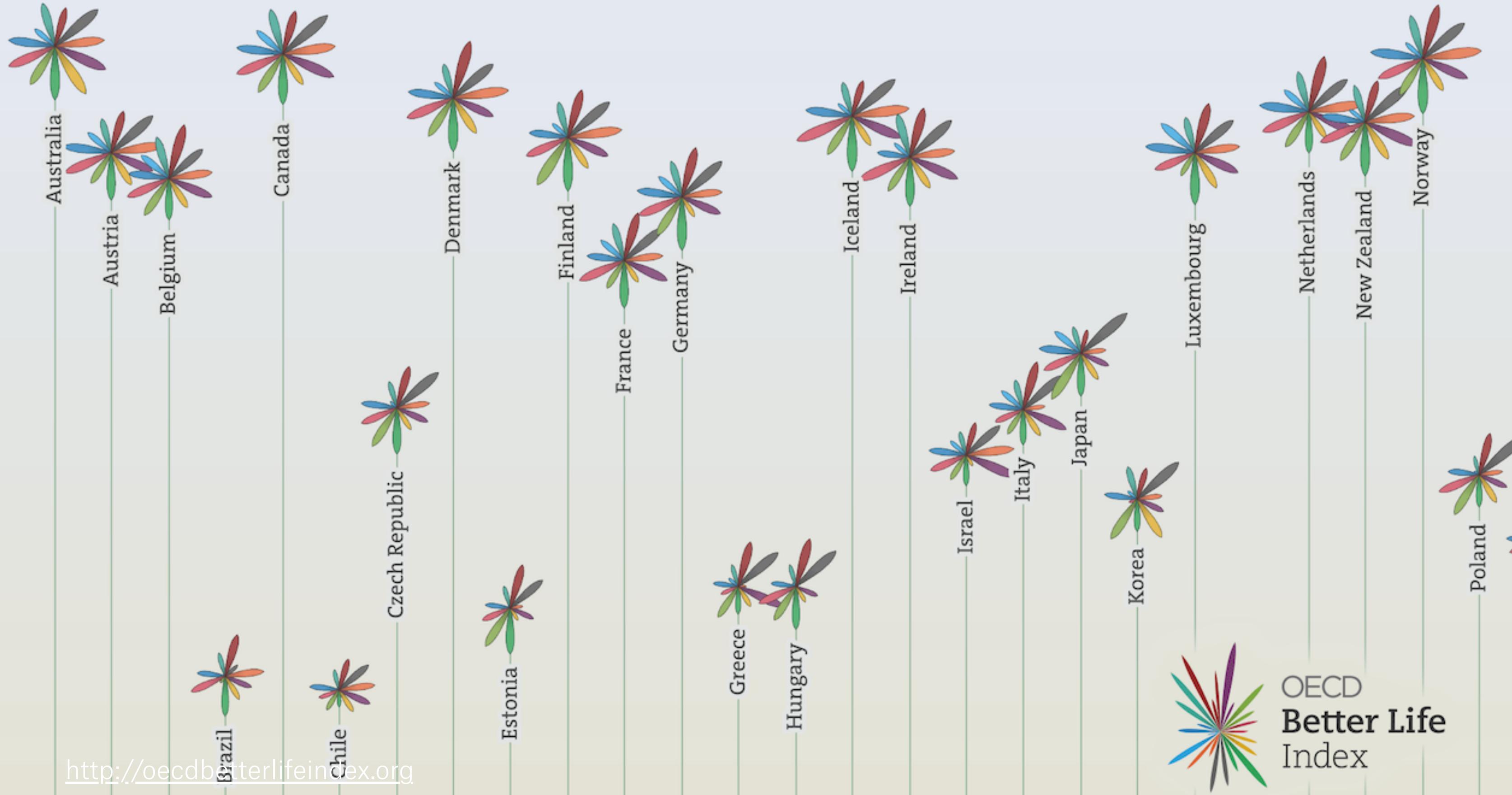
# Visual idea

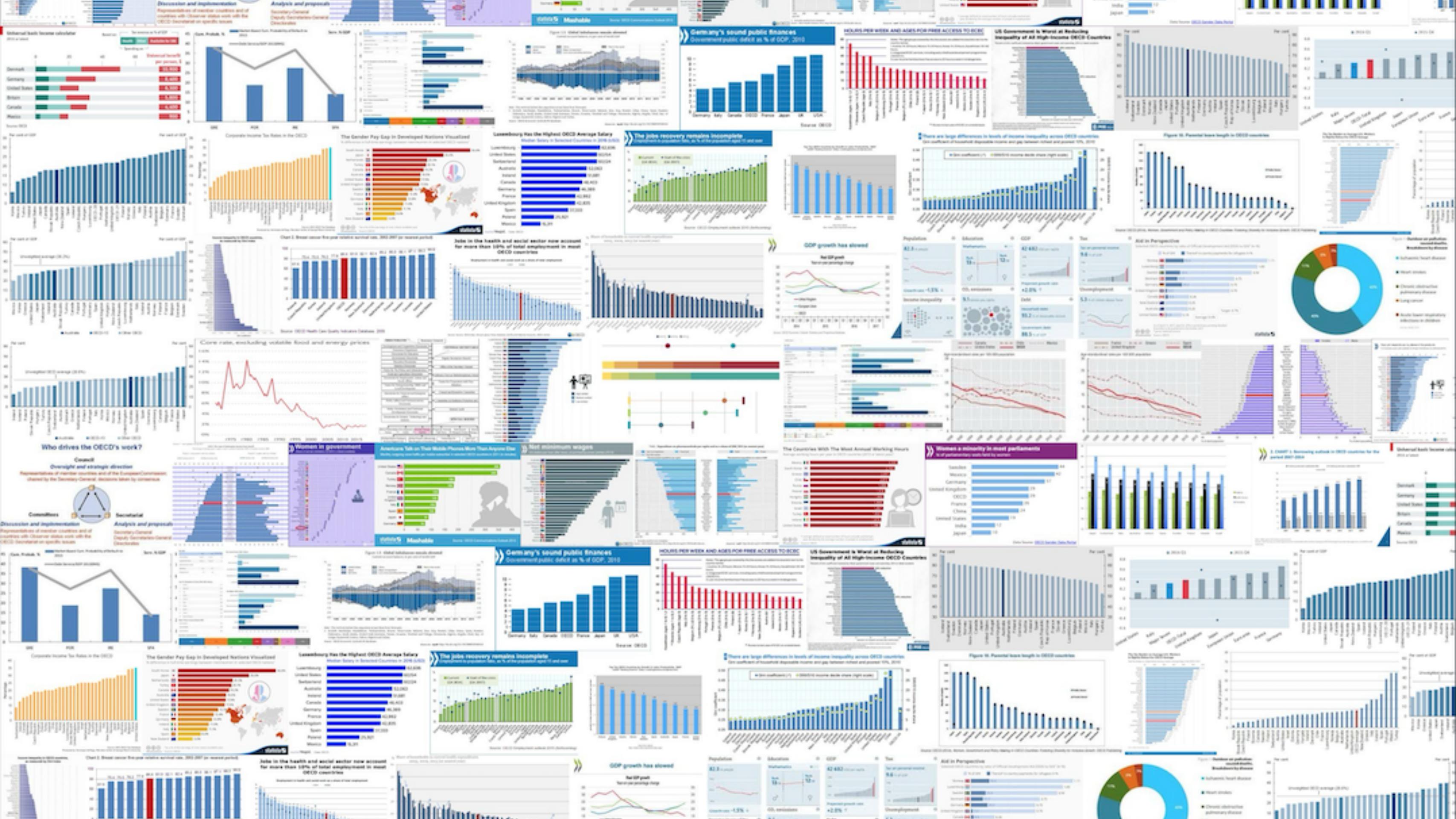


## THE DELETED

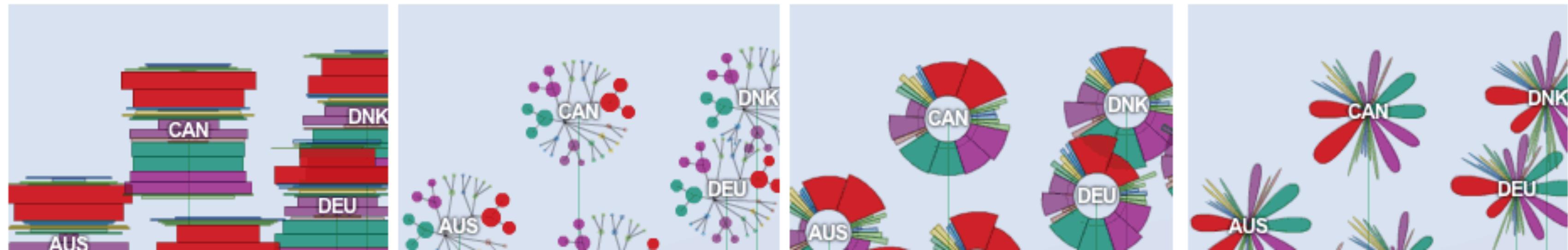
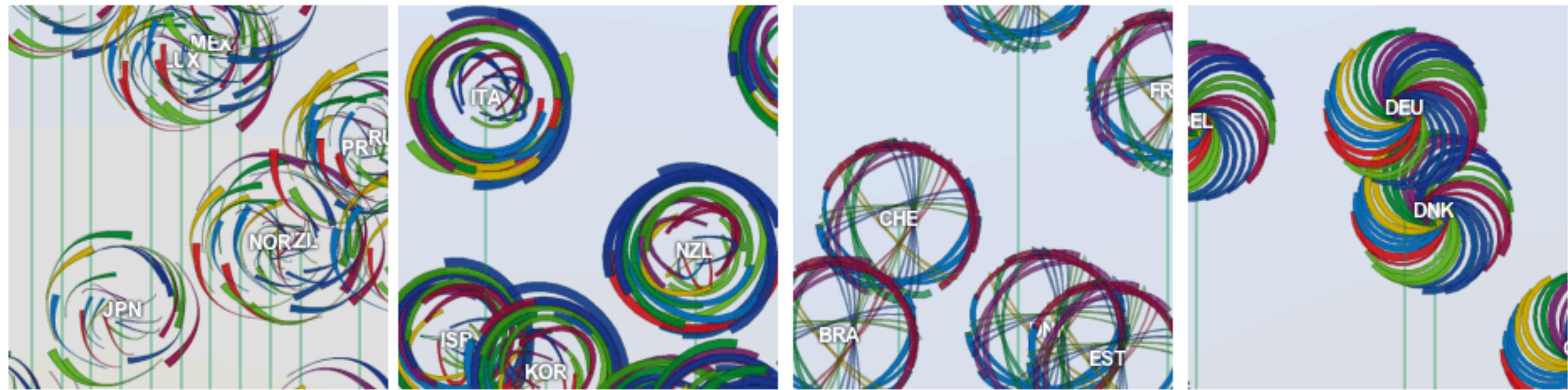
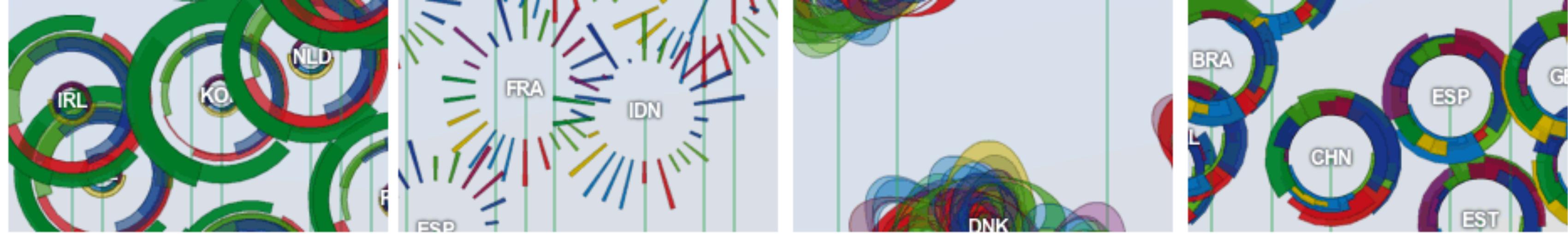
The 100 longest Article for Deletion [AfD] discussions on Wikipedia,  
which resulted in deletion of the article.

**OECD  
Better Life  
Index**











Index

Countries

Topics

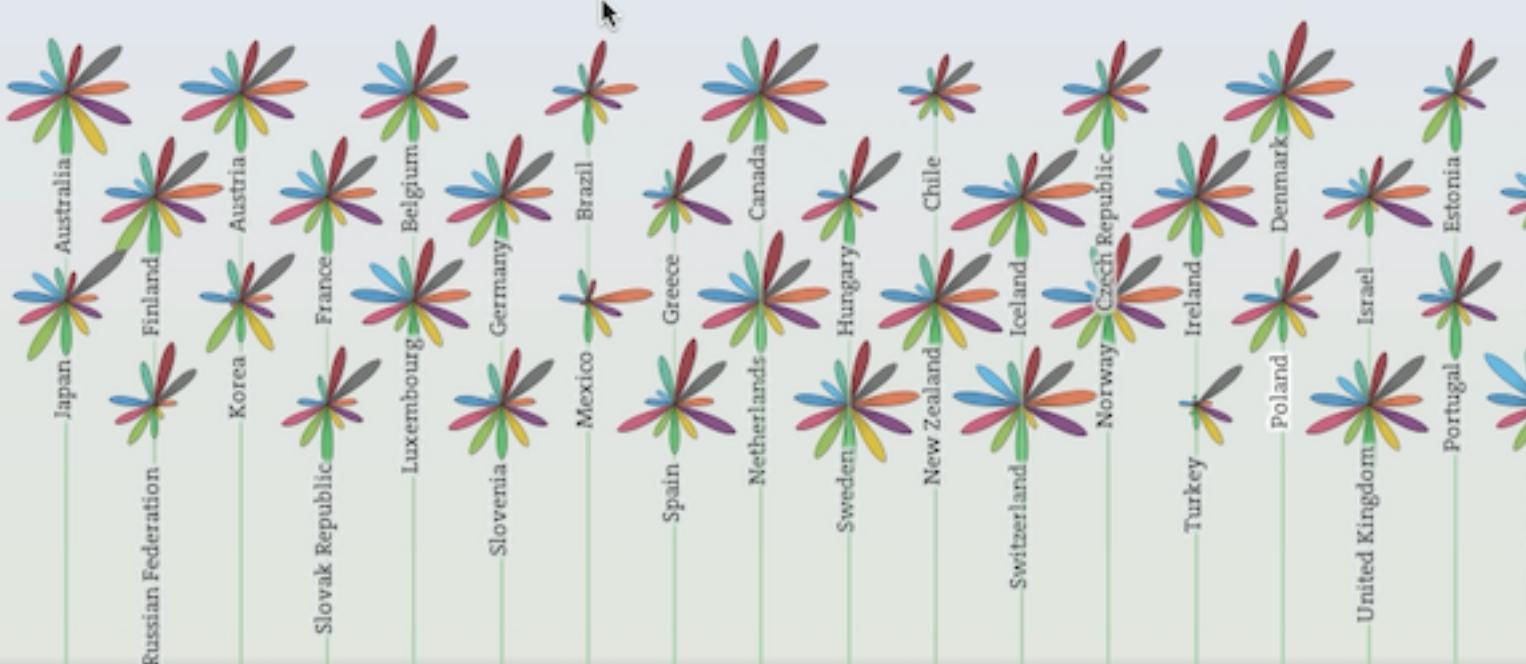
FAQ

## Create Your Better Life Index

What is your recipe for a better life — a good education, clean air, nice home, money?  
See how your country measures up on the topics important to you. [? Help](#)

Start with all topics rated equally

or set your own preferences here.



**Create Your Better Life Index**

Rate the topics according to their importance to you:

Topic	Importance Rating (0 to 10)
Housing	8
Income	9
Jobs	7
Community	6
Education	8
Environment	9
Civic engagement	7
Health	6
Life Satisfaction	5
Safety	7
Work-Life Balance	6

[Reset](#) [Help](#)

[Gender differences](#)

[Compare your index](#)

[Share your index](#)

## How's life?

There is more to life than the cold numbers of GDP and economic statistics – This Index allows you to compare well-being across countries, based on 11 topics the OECD has

Better Life Blog

» Archive

### Wellbeing and children

By Sue Kendall-Billicki, OECD When we think about improving wellbeing, the tendency is to focus on adults rather than children. This seems logical given that

Find Out More

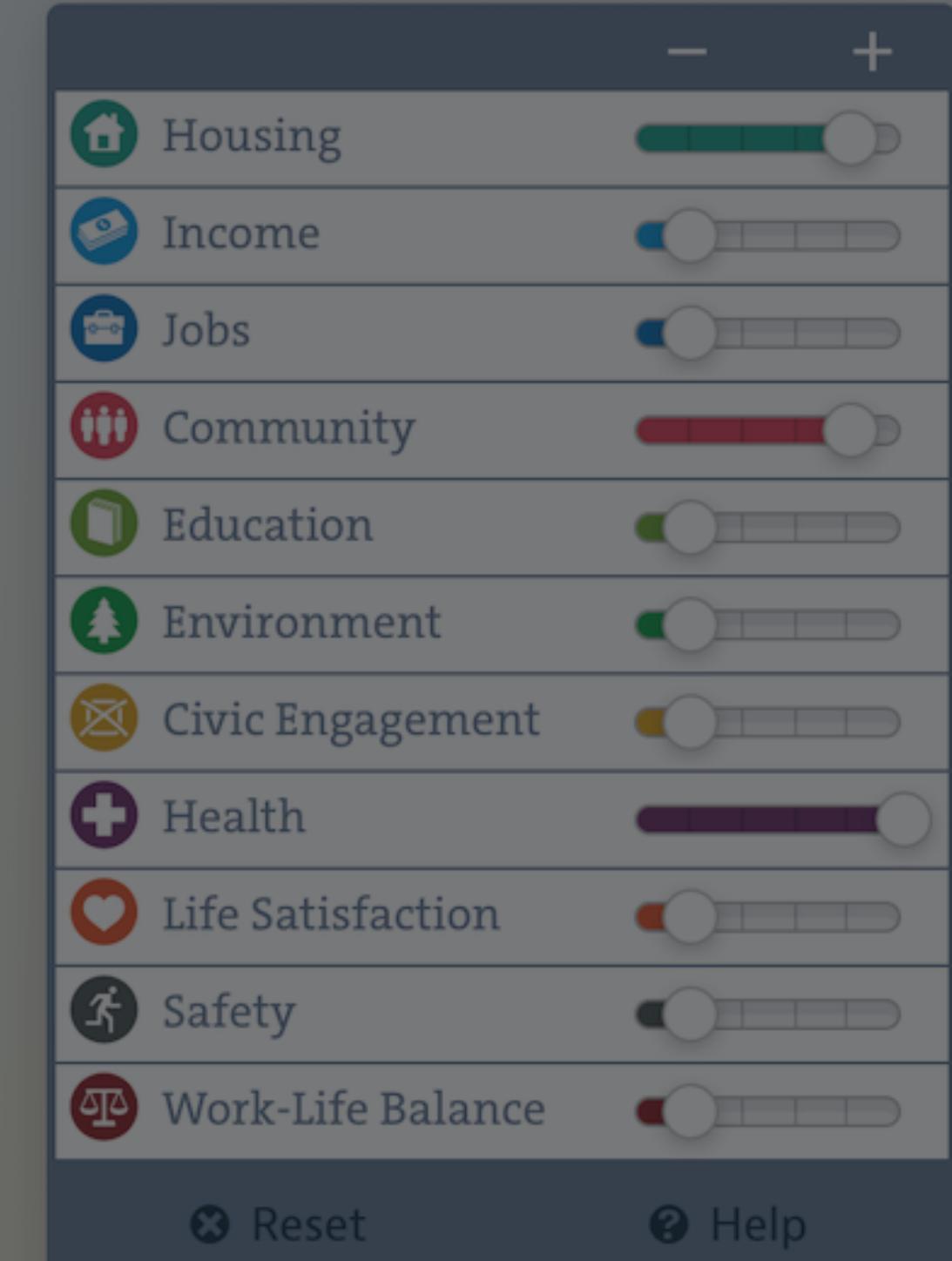
» Archive

May 22, 2013  
**Humanosphere: Why it's so difficult to measure progress and well-being in Africa**

# Multi-dimensional Iconic Playful Personal

## Create Your Better Life Index

Rate the topics according to their importance to you:



Display countries alphabetically | by rank



**makena** @makenalizabeth · Jan 3, 2016

...

apparently I should **move to** scandinavia or australia. also, the **oecd better life index** is way cool: [oecdbetterlifeindex.org](http://oecdbetterlifeindex.org)



**Allison Stadd** 🙌 ✅ @AllisonStadd · Sep 8, 2015

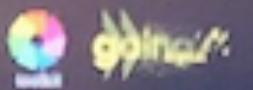
...

Apparently I should **move to** Switzerland. Use the **@OECD Better Life Index** to see which country you'd be happiest in: [bit.ly/1XDHFjz](http://bit.ly/1XDHFjz)



# Create your Better Life Index

What is your recipe for a better life? See how countries measure up on the topics important to you.



## Going Digital Toolkit

The Going Digital Toolkit helps countries assess their state of digital development and formulate policy strategies and approaches in response. Data exploration and visualization are key features of the toolkit.

Home Policy Dimensions Countries Themes About

1 2 3

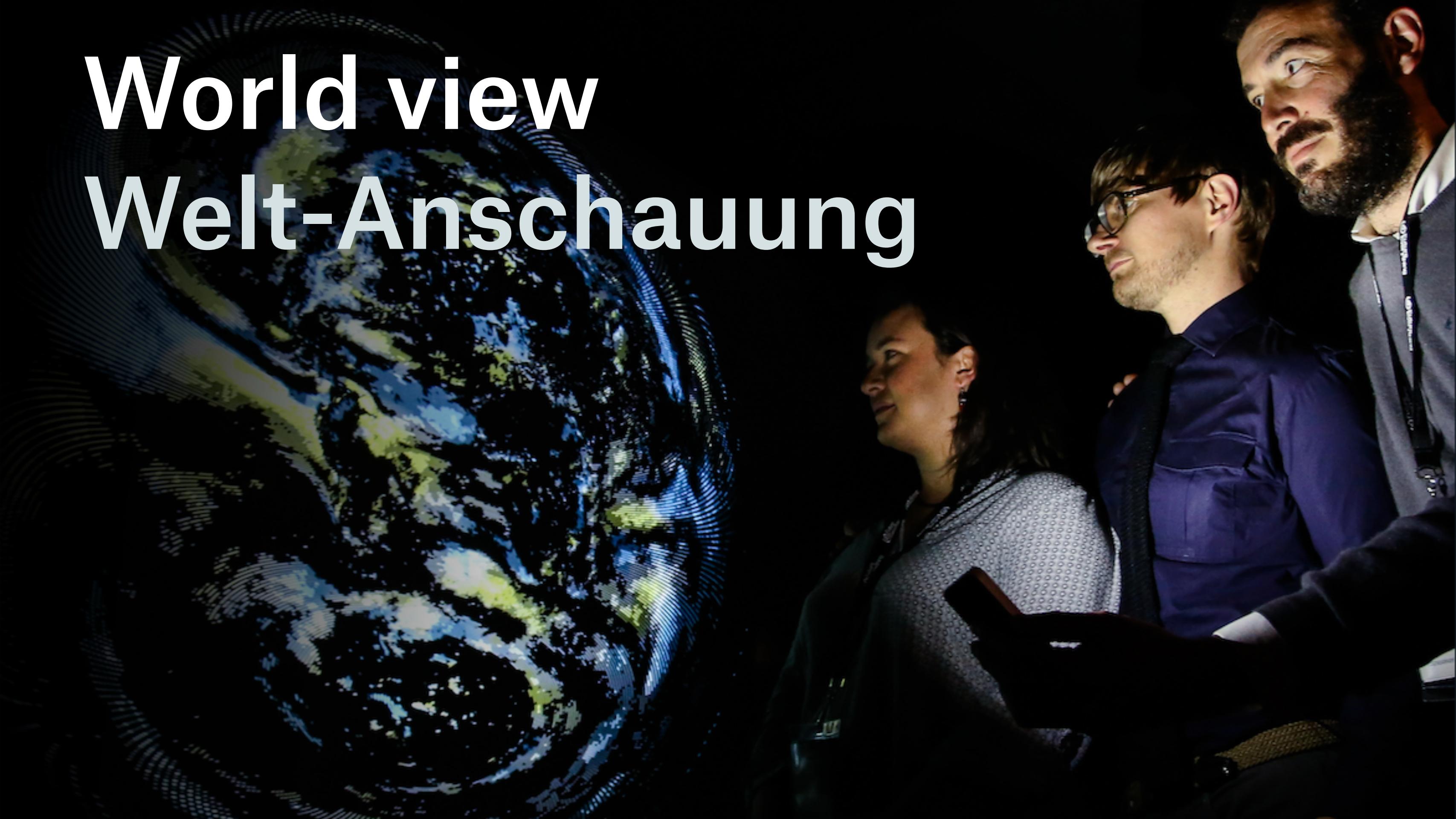
Start to explore



SAMSUNG



# World view Welt-Anschaung



## SOUTHERN OCEAN

## The Hobo-Dyer Equal Area Projection

This new map belongs to the family of Cylindrical Equal Area projections in which the latitude and longitude lines form a rectangular grid. Other projections in this family include the Lambert, Gall, Behrmann, Edwards, and Peters projections. In the present case the "cylinder" is assumed to wrap round the globe and cut through it at  $37\frac{1}{2}^{\circ}$  north and south. In order to preserve the equal area property the shapes of the landmasses become progressively flattened towards the poles, but shapes between  $45^{\circ}$  north and south are well preserved.



# African Union urges adoption of world map showing continent's true size

By Catarina Demony and Ayendeng Bior

August 15, 2025 10:06 AM GMT+2 · Updated August 16, 2025



## Summary

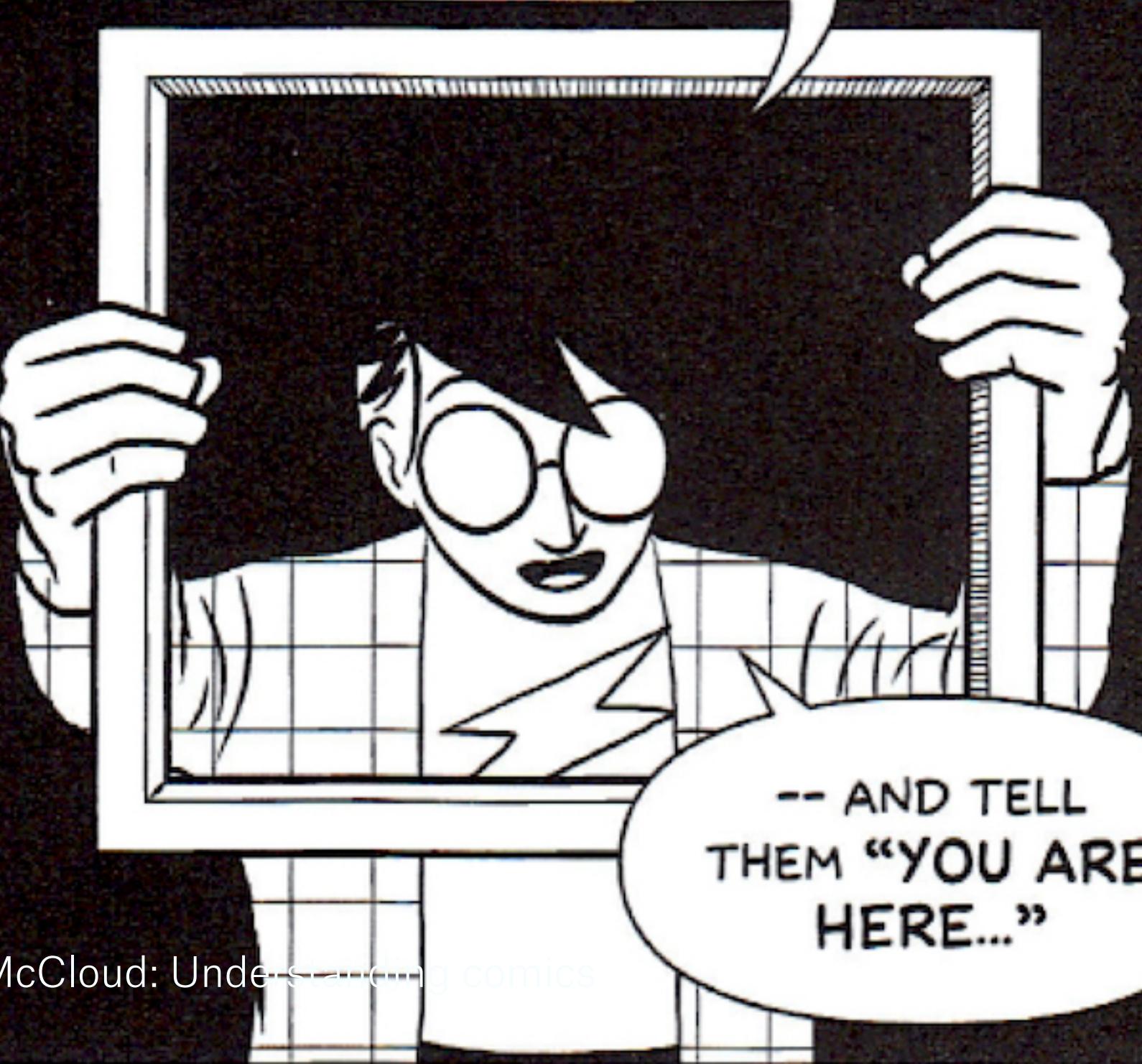
- AU aims to reclaim Africa's global position, supports map change
- Mercator map distorts Africa's size, says AU Commission's Haddadi
- 'Correct The Map' campaign promotes Equal Earth projection

<https://www.size-2025-08>

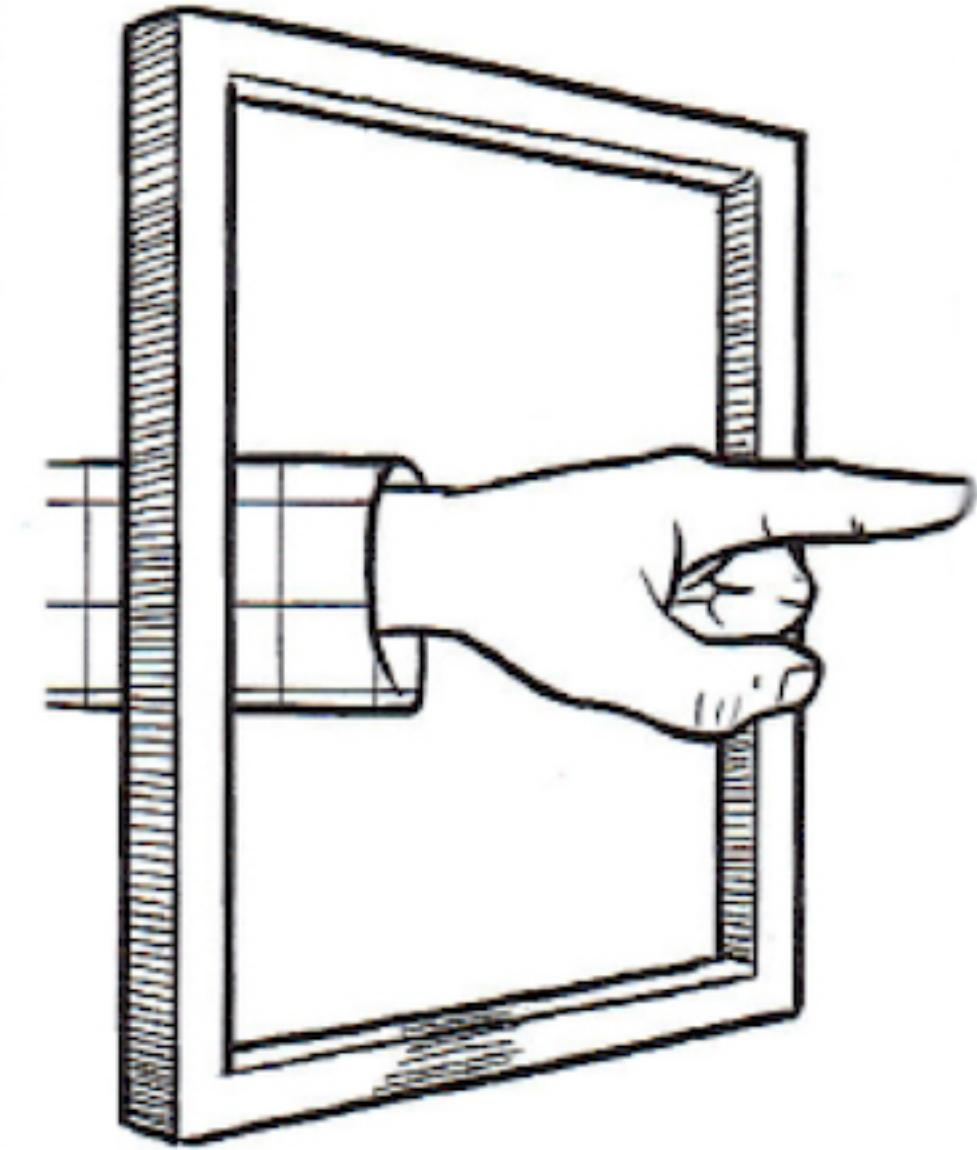
LONDON/DAKAR, Aug 14 (Reuters) - (This Aug. 14 story has been refiled to clarify the number of AU member states in paragraph 3)

s-true-

THIS IS THE DEVICE BY WHICH YOU CAN  
GRAB THE READER BY THE SHOULDER,  
GUIDE THEM TO THE RIGHT SPOT --



"NOW  
LOOK."



A close-up photograph of a sandwich with yellow mustard seeds scattered around it. The sandwich is cut in half, showing a filling of meat and cheese. The mustard seeds are bright yellow and appear to be spilling out from the sandwich onto a dark, textured surface.

Can food  
be a medium?

# DATA CUISINE

## WORKSHOP



Susanne Jaschko  
Moritz Stefaner

+ local

organizers  
chef  
data  
participants











# Atomic shots

201'723

People living  
in 30km radius



Chooz

782'898



Thiange

904'424



Mol

1,546,730



Doel

# Energy mix



In Switzerland, only  
15%  
of energy consumed  
comes from  
renewable sources

# Death by chocolate





# Small data, but deep experience



# Data situations



# Catalyst for conversation



# Tangible, digestible information



# Impfdashboard

Wie ist der Fortschritt der COVID-19-Impfung?

## Aktueller Impfstatus

Am 28. Februar 2021 wurden in Deutschland  
107.019 Impfdosen verabreicht. Damit sind nun  
2.095.255 Personen (2,5% der Gesamtbevölkerung)  
vollständig geimpft. Insgesamt haben 4.079.107  
Personen mindestens eine Impfdosis erhalten.

**Zusammen gegen Corona**

MO DI MI DO FR SA SO

+107.019  
Sonntag 7. März 2021

**Impf-Uhr**

Bei aktuell 152.179 Impfungen pro Tag\* wird im Schnitt alle 0,6 Sekunden eine Impfung durchgeführt.

In den 6 Sekunden, die Sie bisher auf dieser Webseite verbracht haben, wurden in Deutschland also – rein statistisch – 11 Personen mit einer Impfdosis versehen.

Impfdashboard.de Stand: 01. März 2021, 09:35 Uhr

https://www.impfdashboard.de

**73.1 %**

Fully vaccinated

**160.4 M**

Vaccine doses administered



Daily vaccine doses administered

**+610 K**

Wednesday 19.01.22

How is COVID-19 vaccination proceeding?

## Current vaccination status

On 19. January 2022, 610 K vaccine doses were administered in Germany. That means, no less than 60.8 M people (73.1% of the overall population) are now fully vaccinated. At least 40.7 M of these (48.9%) <sup>(?)</sup> have also received a booster.

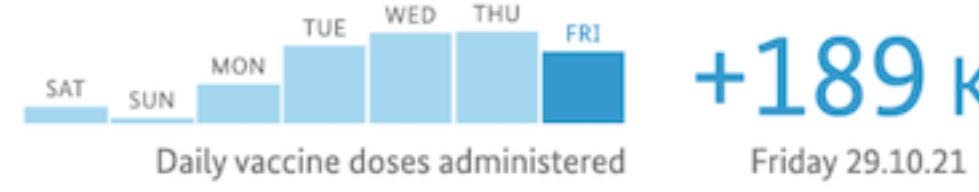
### Vaccination clock

The current rate of **552 K** vaccinations per day\* means that on average, **more than 6 people** are being

# Doses over time

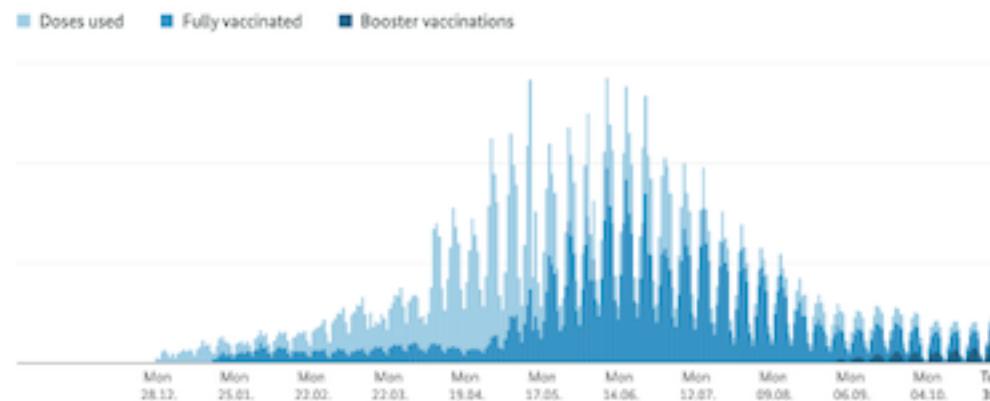


Single number  
(current speed)



+189 K  
Friday 29.10.21

Last seven days  
(weekday effects)



All-time, with type  
(big picture)



# Vaccination clock

The current rate of **147 K** vaccinations per day\* means that on average, almost 2 people are being vaccinated every second.

So, during the **1,179** seconds you have just spent on this website, statistically speaking, 2,004 people in Germany were given a vaccine dose.

\* Daily average over the last seven days, distributed evenly over 24 hours.

As of: 30.10.2021 (Vaccinations)

Source: impfdashboard.de, Robert Koch Institute, Federal Ministry of Health.

Stop animation



**klax**

@klax74

...

Vielleicht werde ich ja langsam wunderlich, aber gucke  
mir gern mal ein paar Minuten die Impfuhr an. Good  
News für zwischendurch ... #corona #covid19

Translated from German by Google

Maybe I'm starting to get strange, but like to watch the  
vaccination clock for a few minutes. Good news for in  
between ...#corona#covid19



Jules    
@hallo\_kurt

...

**Samstag, ein guter Tag um auf die Impfuhr zu starren.**

Translated from German by Google

**Saturday, a good day to stare at the vaccination clock.**

11:41 AM · Feb 20, 2021 · Twitter Web App



bobopopo

@bobopopo16

...

Die [#impfhuhr](#) auf [impfdashboard.de](#) regt mich tierisch auf: Das ist Propaganda pur, wo Zahlen beschönigend dargestellt werden und Erfolg suggeriert wird. Man sollte lieber ehrlich sein, dass man im [#Impfchaos](#) nichts auffe Kette kriegt und Energien lieber ins Impfen stecken.

Translated from German by Google

the [#impfhuhr](#) on [impfdashboard.de](#) I am furious: This is pure propaganda, where numbers are euphemistically presented and success is suggested. Better be honest that you're in [#Impfchaos](#) gets nothing on the chain and prefers to put energies into the vaccination.

# Data for everybody – a11y & i18n

The image displays three versions of the Impfdashboard.de website's vaccination statistics page for Germany, illustrating multilingual support (German, English, and Russian). Each screenshot shows key metrics: 68.9% vaccination rate, 110.2 million doses administered, and 167,788 daily vaccinations.

**Aktueller Impfstatus (German Version):**

- 68,9 % Mindestens eine Impfdosis
- 110,2 Mio. Verabreichte Impfdosen
- +167.788 Täglich verabreichte Impfdosen (Dienstag 19.10.21)

**Current vaccination status (English Version):**

- 68.9 % At least one vaccine dose
- 110.2 m Vaccine doses administered
- +167,788 Daily vaccine doses (Tuesday 19.10.21)

**Güncel aşılama stat (Turkish Version):**

- 68,9 % En azından bir doz aşısı
- 110,2 Milyon Yapılan aşır dozları
- +167.788 Günlük olarak verilen aşır dozları (Salı 19.10.21)

**Горячие линии вакцинации (Russian Version):**

- 68,9 % Как минимум одна доза вакцины
- 110,2 млн Введенные дозы вакцины
- +167 788 Ежедневно вводимые дозы вакцины (вторник 19.10.21)

**Current vaccination status (Detailed English Version):**

On 19. October 2021, 167,788 vaccine doses were administered in Germany. That means, 54,808,484 people (65.9% of the overall population) have now received at least one vaccination. A total of 57,326,792 people (68.9%) have received at least one vaccination.

**Vaccination clock (English Version):**

The current rate of 125,415 vaccinations per day\* means that on average, more than 1 person are being vaccinated every second.

**Часы вакцинации (Russian Version):**

При текущем количестве прививок в день\* 125 415 в среднем в секунду прививается

Data happens everywhere

Social media  
previews show  
real data

BMG  @BMG\_Bund · Jan 21

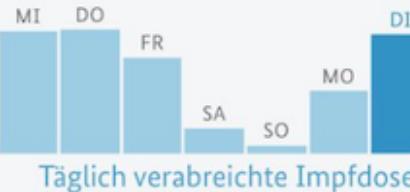
Tagesaktuelle Informationen zum Stand der #Corona-Schutzimpfungen in Deutschland finden Sie auf unserem Impf-Dashboard unter:

Impfdashboard.de Stand: 27. Oktober 2021, 09:22

Zusammen gegen Corona

69,2 %  
Mindestens eine Impfdosis

Täglich verabreichte Impfdosen



+192 Tsd.  
Dienstag 26.10.21

## Aktueller Impfstatus

Wie ist der Fortschritt der COVID-19-Impfung?

impfdashboard.de  
Das offizielle Dashboard zur Impfkampagne der Bundesrepublik Deuts...  
Wie die Impfkampagne in Deutschland vorankommt.

52

38

95

↑

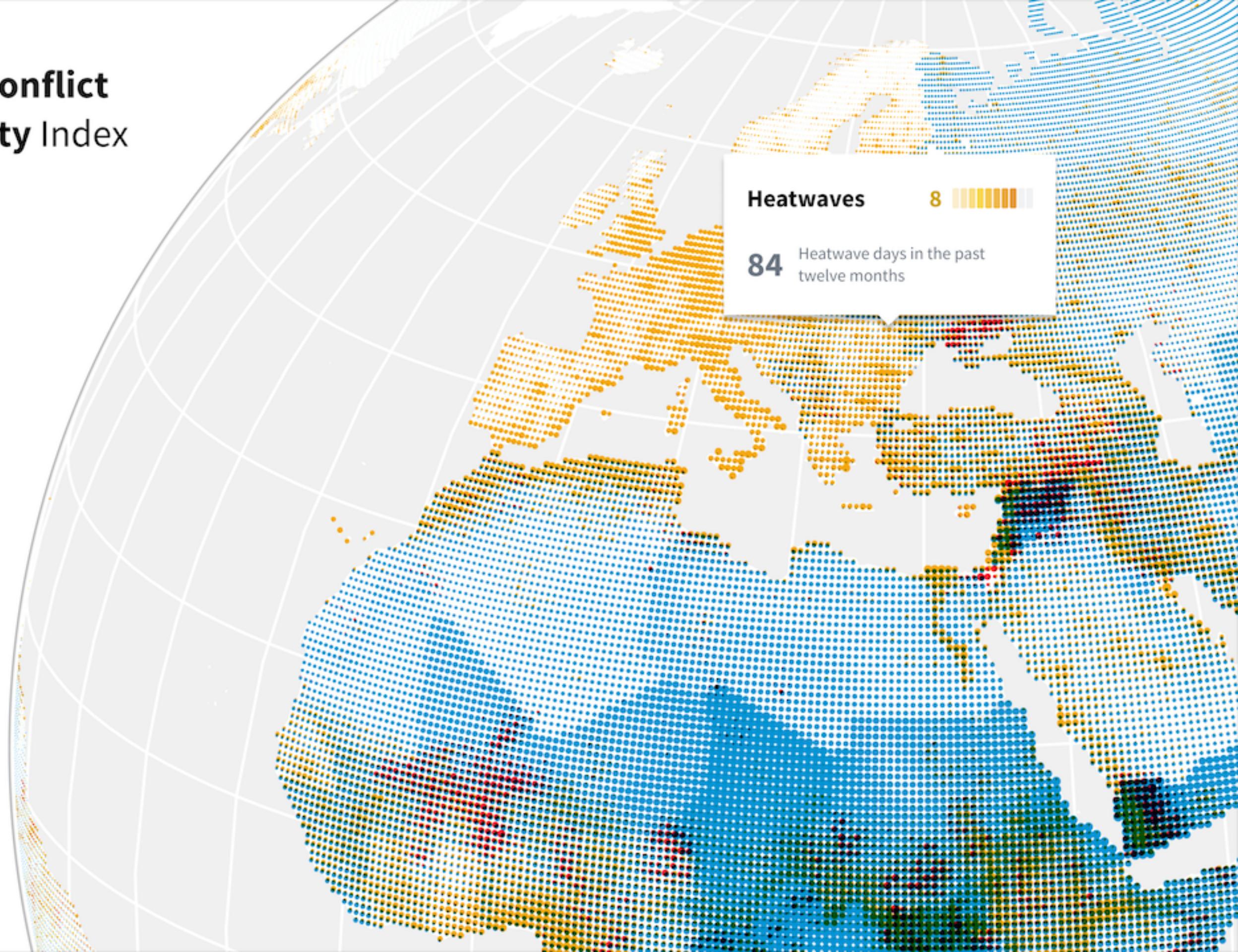
# Data visualization



Data-rich  
mixed media  
information products



# Climate—Conflict Vulnerability Index



## Hazard Exposure and Vulnerability i

This map presents a combined view on climate hazard exposure, conflict hazard exposure and vulnerability.

### Legend

- Climate
- Conflict
- Vulnerability

What do the scores mean? i

### METRICS

#### Hazard Exposure and Vulnerability

#### Climate and Conflict Risks

#### CCVI

#### Climate risk

##### Climate Hazard Exposure

Current extreme events ▼

Accumulated extreme events ▼

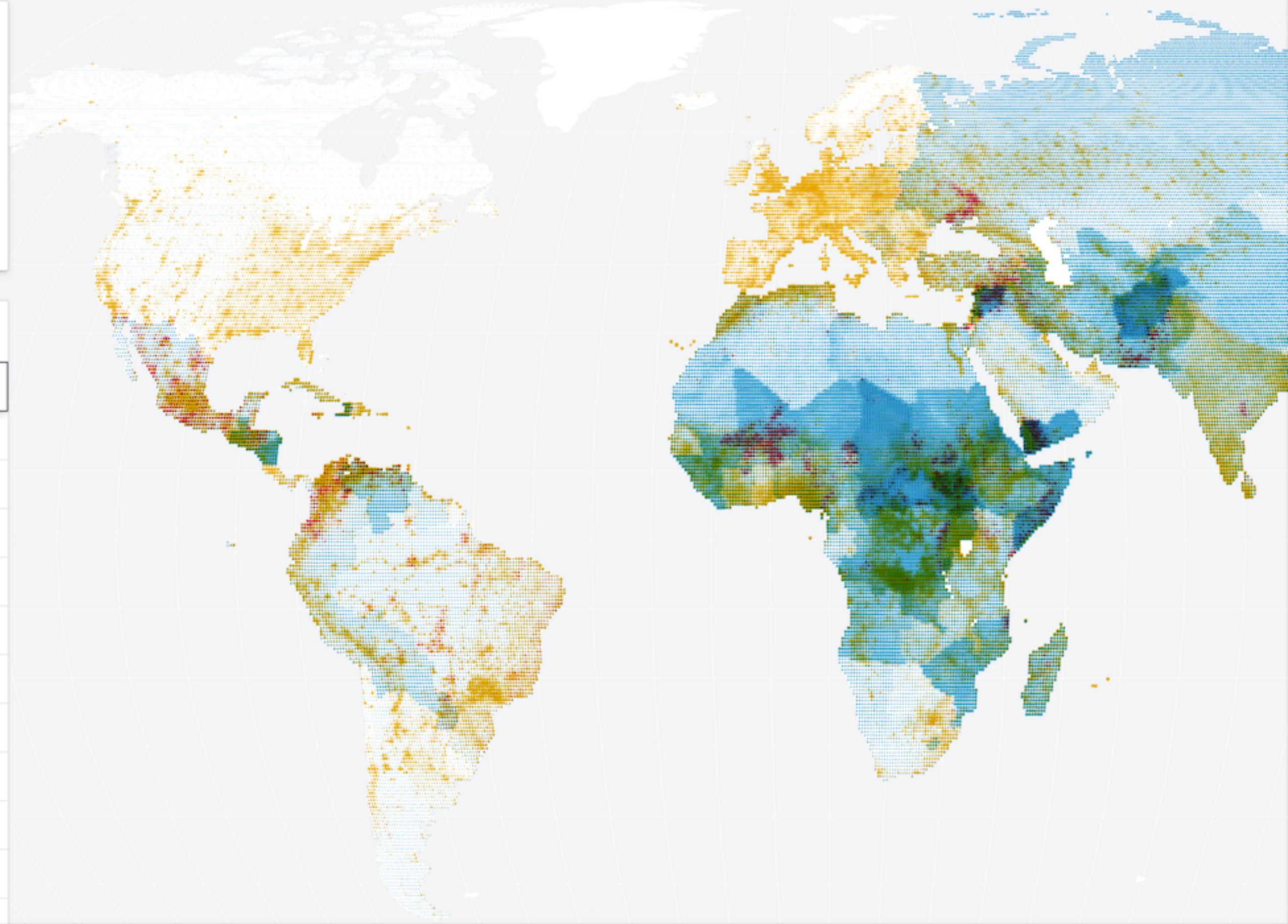
Shifts in long-term conditions ▼

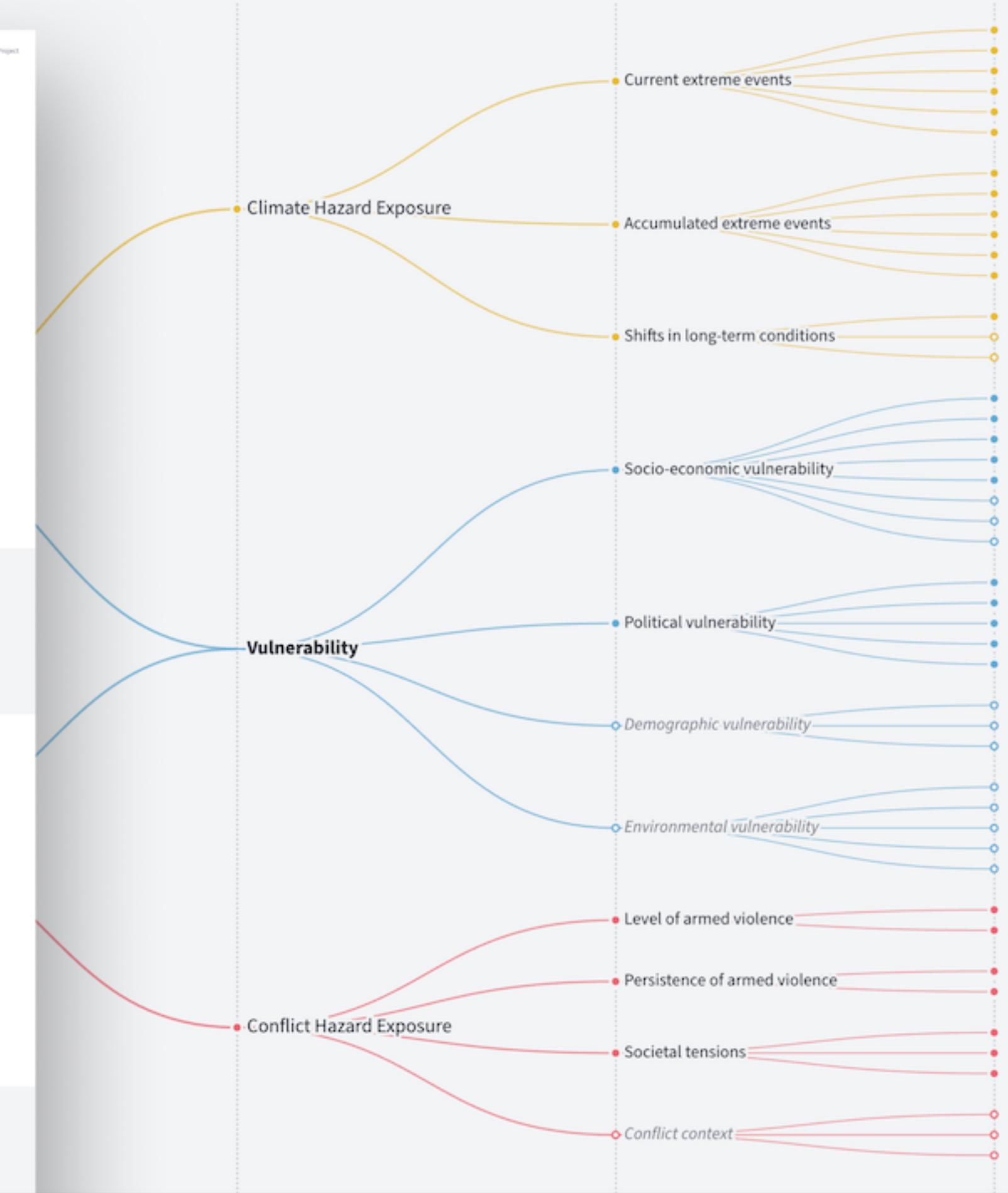
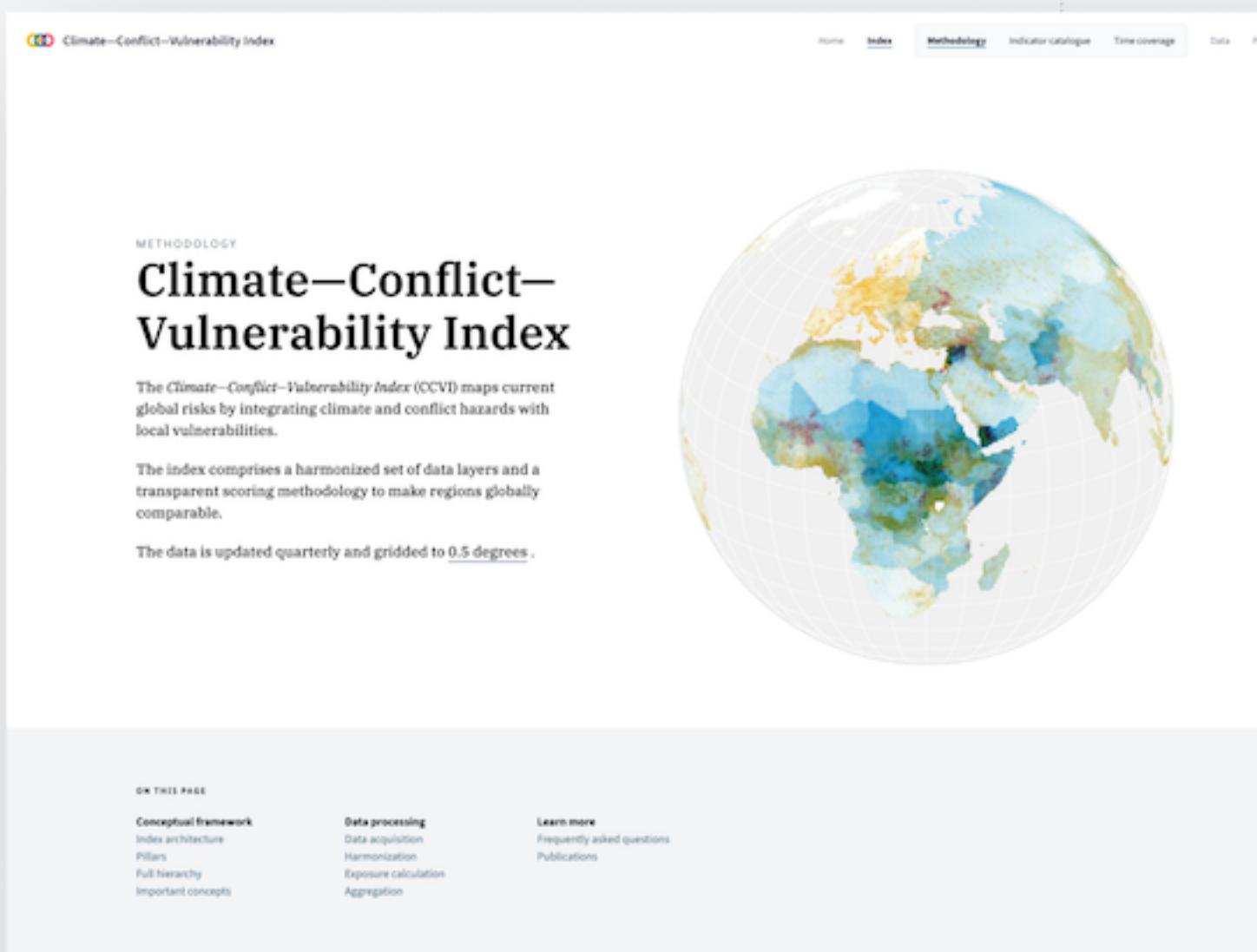
#### Conflict risk

##### Conflict Hazard Exposure

Level of armed violence ▼

Persistence of armed violence ▼

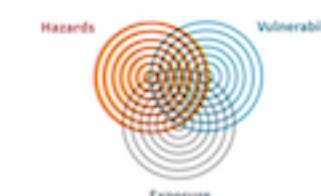




## Index architecture



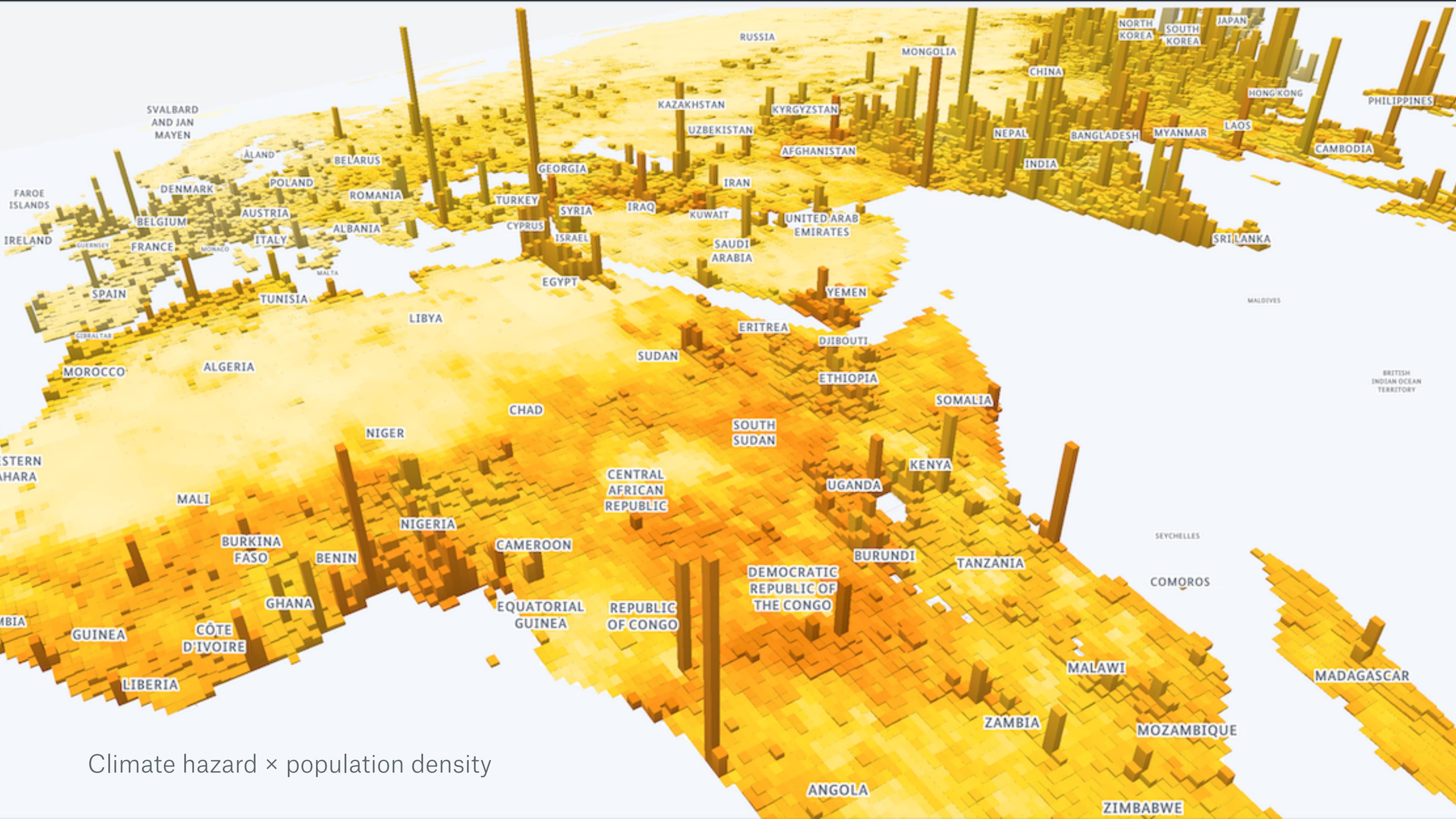
The CCVI investigates the overlap between climate and conflict risks.



Following the [IPCC definition](#), the climate and conflict risk metrics take hazards, exposure and vulnerability into account.

Hazards create risks only in combination with exposure and vulnerability.

For example, whether a drought (hazard) results in crop losses

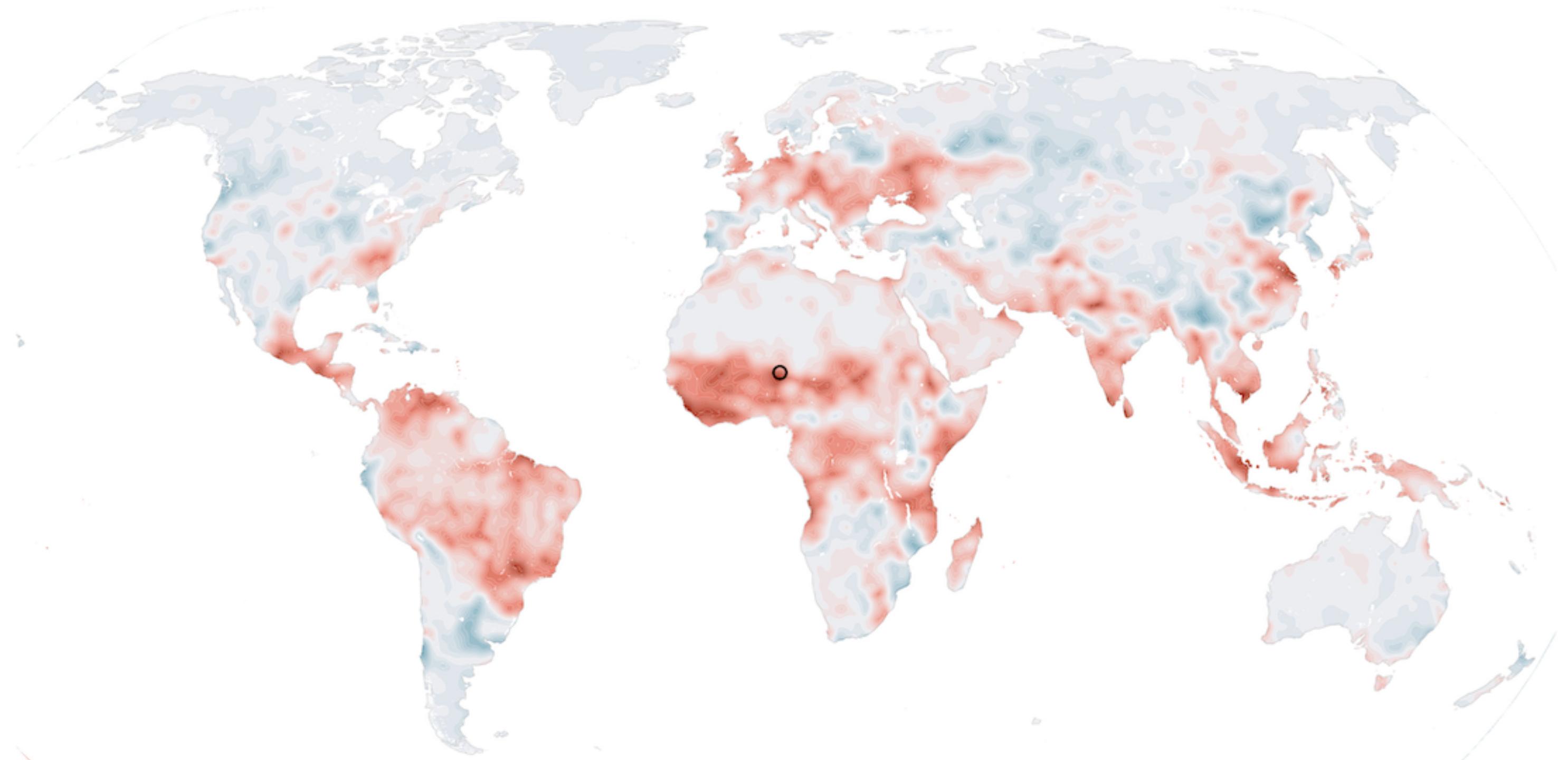
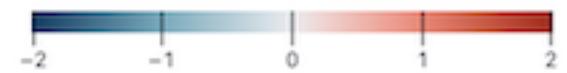


## Climate hazard × population density

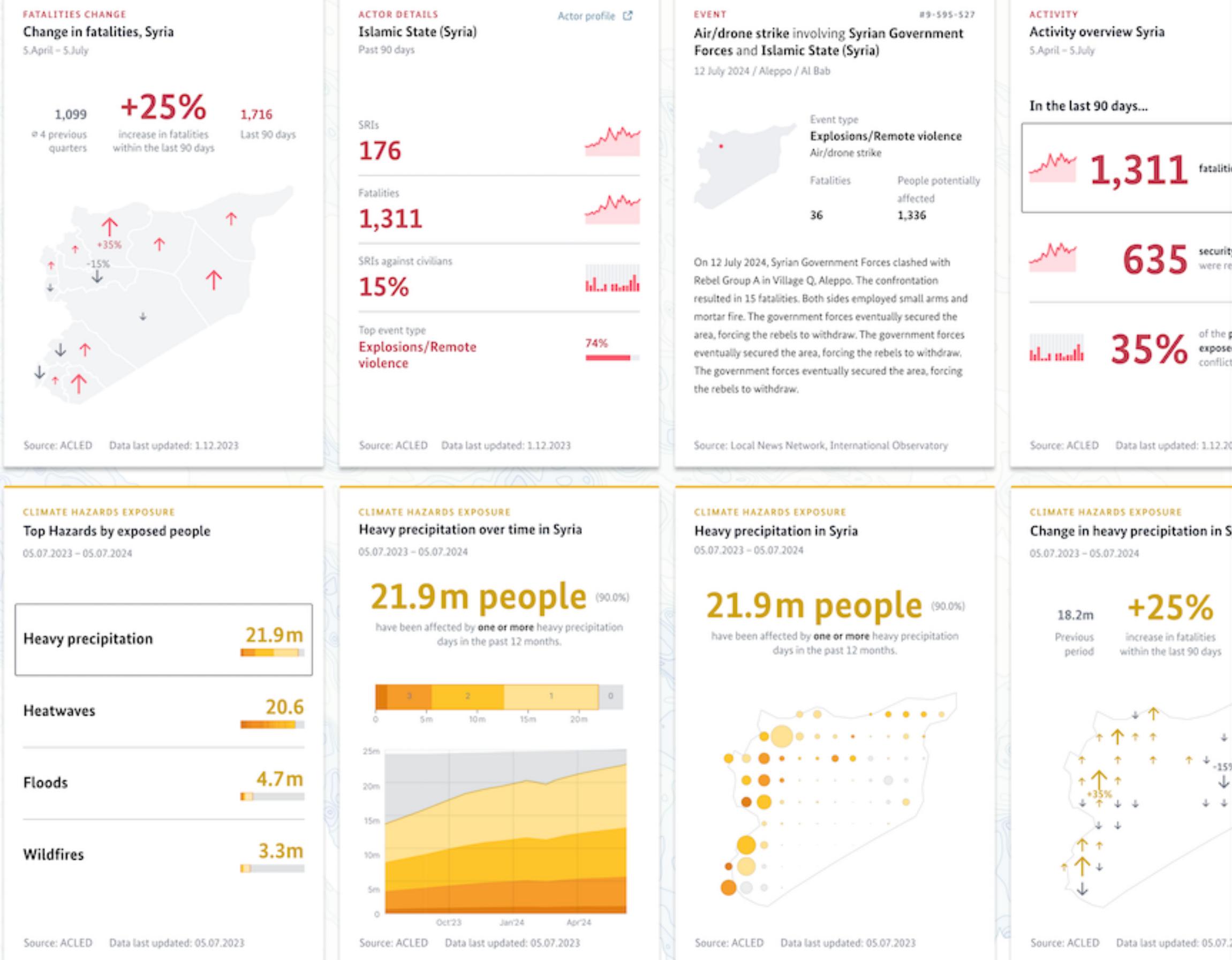
Climate Hazard Exposure

### Climate Hazard Exposure: Change to previous year

2024–Q3



# Domain-specific widgets



# Data Design System

**PREVIEW Data Design Language v2.2.2**

## Elements

### Colors

Based on the design guidelines of the German Federal Republic, our color palettes are optimized for data presentation, legibility and accessibility. For each color tone, we provide various shades, to meet differing requirements when used for area, line, dot, or text elements.

#### Table of Contents

- ↳ Theme and functional colors
- ↳ Color scales

Show colors as: Hex HS CSS Transparency  100

Color Model: RGBA RGB Theme Light Dark

#### Theme and functional colors

A set of brand, complementary, background and foreground colors is available in three shades each.

##### Theme

#1F78B4FF	#1F78B4FF
theme/weaker	theme/base
Weak version of theme color.	Main theme color, usually the brand color.

#1F374DFF	#E64A19FF
theme/stronger	complementary/weaker
Stronger version of theme color.	Weak version of complementary color.

#E64A19FF	#1F374DFF
complementary/base	complementary/stronger
Main complementary color.	Stronger version of complementary color.

##### Structure

#1F1F20FF	#667380FF
foreground/base	foreground/weaker
Used for elements in the foreground that have a strong contrast to the background.	Used for elements in the foreground that have a weaker contrast to the background (e.g. axes).

#A9A9A9FF	#D9D9D9FF
foreground/weakest	foreground/paint
Used for elements in the foreground that have the weakest contrast to the background (e.g. ticks, help-lines).	Used for elements in the foreground that have the weakest contrast to the background (e.g. ticks, help-lines).

**PREVIEW Data Design Language v2.2.2**

## Elements

### Typography

Typography is a key element of our design language. It is used to create a clear hierarchy of information and to guide the reader through the content. The font families and sizes are optimized for legibility and accessibility.

#### Table of Contents

- ↳ Font families
- ↳ Font sizes
- ↳ Font styles

#### Font families

'BundesSans Web', sans-serif base	'BundesSans Web', sans-serif heading
--------------------------------------	-----------------------------------------

'Fira Mono', monospace mono	'IBM Plex Serif', serif display
--------------------------------	------------------------------------

#### Font sizes

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua.

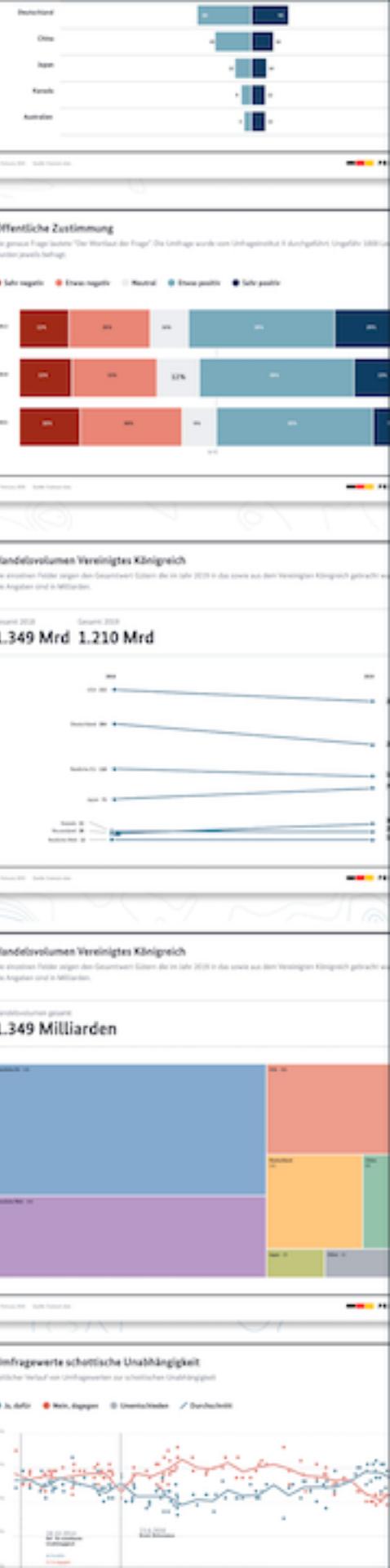
Size: Small Large

14px text-sm	14px text-sm
-----------------	-----------------

16px text-md	16px text-base
-----------------	-------------------

18px text-lg	20px text-xl
-----------------	-----------------

24px text-2xl	28px text-3xl
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## Project communication

Source: CCVI | 2024

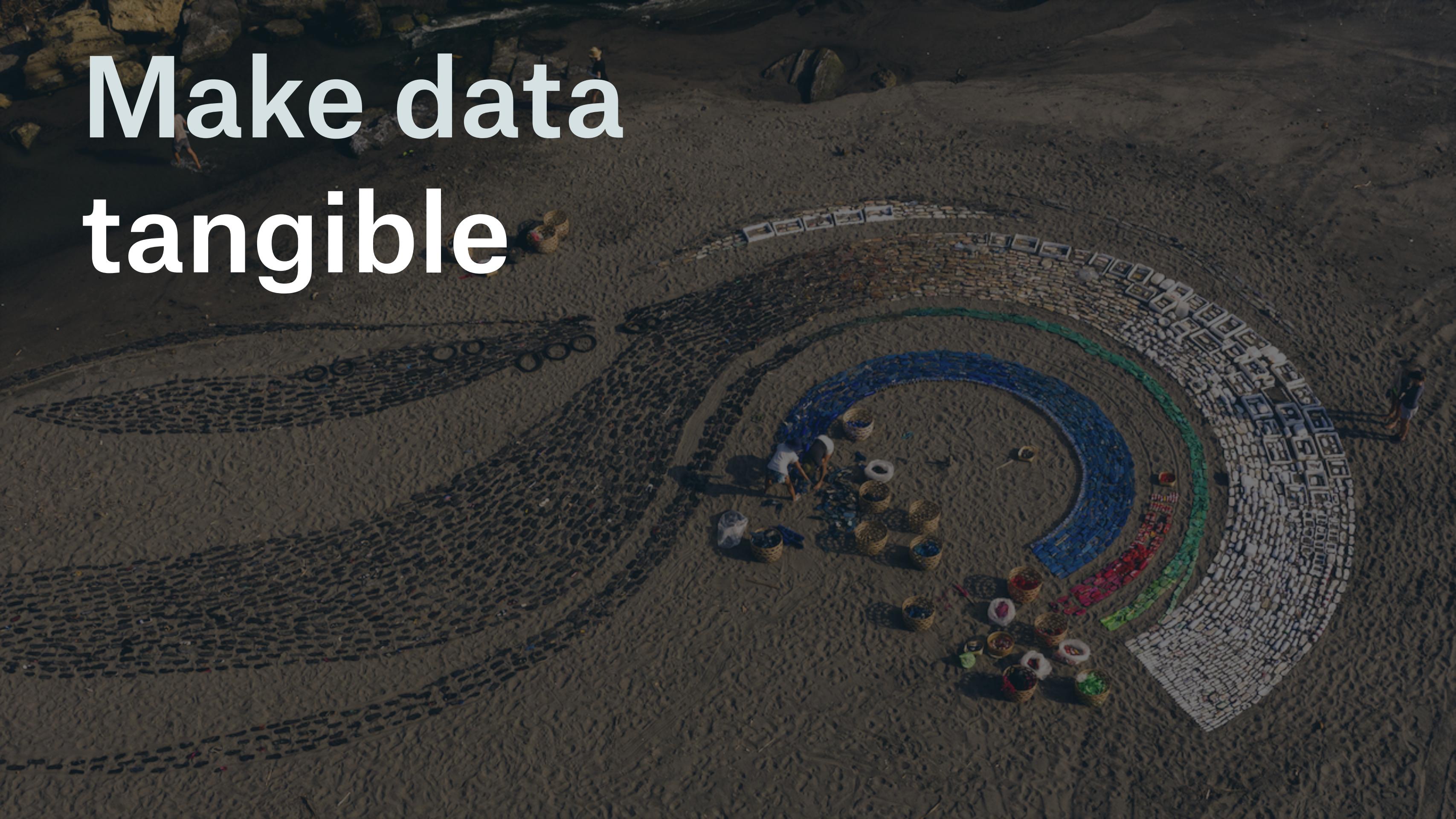


Data design  
beyond  
"nicer charts"

# Make data legible and actionable



# Make data tangible





Make data  
graspable  
and digestible



Make data  
personal and  
human-scale

# Make data iconic and memorable

Community



Income



Educational attainment



Civic engagement



Health



Life Satisfaction



Safety



Environment

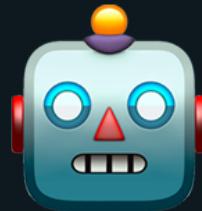
# Make data emotional

Suzanne Firstenberg: In America

# Make data meaningful, and truthful



Making data legible  
with standard charts  
will increasingly be  
automated.



There will always be great

value in ✨ crafting rich,  
personal, opinionated  
information experiences.

truth-and-  
beauty.net



## The Science of Visual Data Communication: What Works

Steven L. Franconeri<sup>1</sup>, Lace M. Padilla<sup>2</sup>, Priti Shah<sup>3</sup>, Jeffrey M. Zacks<sup>4</sup>, and Jessica Hullman<sup>5</sup>

### Abstract

Effectively designed data visualizations allow viewers to use their powerful visual systems to understand patterns in data across science, education, health, and public policy. But ineffectively designed visualizations can cause confusion, misunderstanding, or even distrust—especially among viewers with low graphical literacy. We review research-backed guidelines for creating effective and intuitive visualizations oriented toward communicating data to students, coworkers, and the general public. We describe how the visual system can quickly extract broad statistics from a display, whereas poorly designed displays can lead to misperceptions and illusions. Extracting global statistics is fast, but comparing between subsets of values is slow. Effective graphics avoid taxing working memory, guide attention, and respect familiar conventions. Data visualizations can play a critical role in teaching and communication, provided that designers tailor those visualizations to their audience.

### Keywords

visual communication, graph comprehension, reasoning, statistical cognition, uncertainty communication, data visualization

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<sup>1</sup>Department of Psychology, Northwestern University

<sup>2</sup>Department of Cognitive and Information Sciences, University of California, Merced

<sup>3</sup>Department of Psychology, University of Michigan

<sup>4</sup>Department of Psychological & Brain Sciences, Washington University in St. Louis

<sup>5</sup>Department of Computer Science, Northwestern University

**Corresponding author(s):**

Steven L. Franconeri, Department of Psychology, Northwestern University Email: [franconeri@northwestern.edu](mailto:franconeri@northwestern.edu)

# Starting points

- <https://datastori.es/>
- <https://www.rawgraphs.io/>
- <https://flourish.studio/>
- <https://observablehq.com/>
  - [CCVI example](#)
- <https://flowingdata.com/>