



Climate Change

A C3S based climate hazard dataset for climate related financial disclosures

General presentation

Harilaos Loukos

CEO - the climate data factory

UEF21 webinar – June 5th 2021





Commercial climate services provider
focusing on climate data management and processing

What we do

Ready to use **climate projections**

(on-line **Data shop**)

Ready to use **climate forecast**

On-demand **data management & processing**

“Climate data for your project, service or application”

Who we help

Adaptation **professionals**, **Scientists** and
Service **providers**

“

“The data was very useful to help us in analysing the climate conditions in Sub Saharan Africa. I particularly appreciated the quality of data and the usability of the data shop.”



Alessandro Pezzoli, Senior Lecturer
Risk Assessment and Weather Risk Management
Politecnico di Torino & University of Turin (Italy)

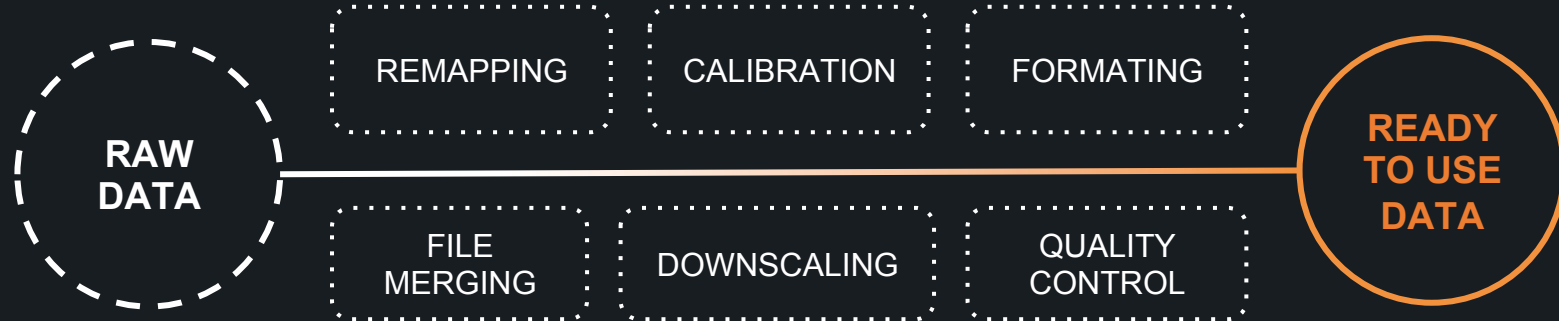
“

“We used downscaled and debiased decadal temperature hindcasts from the climate data factory to explore skill for viticulture applications. It was a fruitful collaboration.”



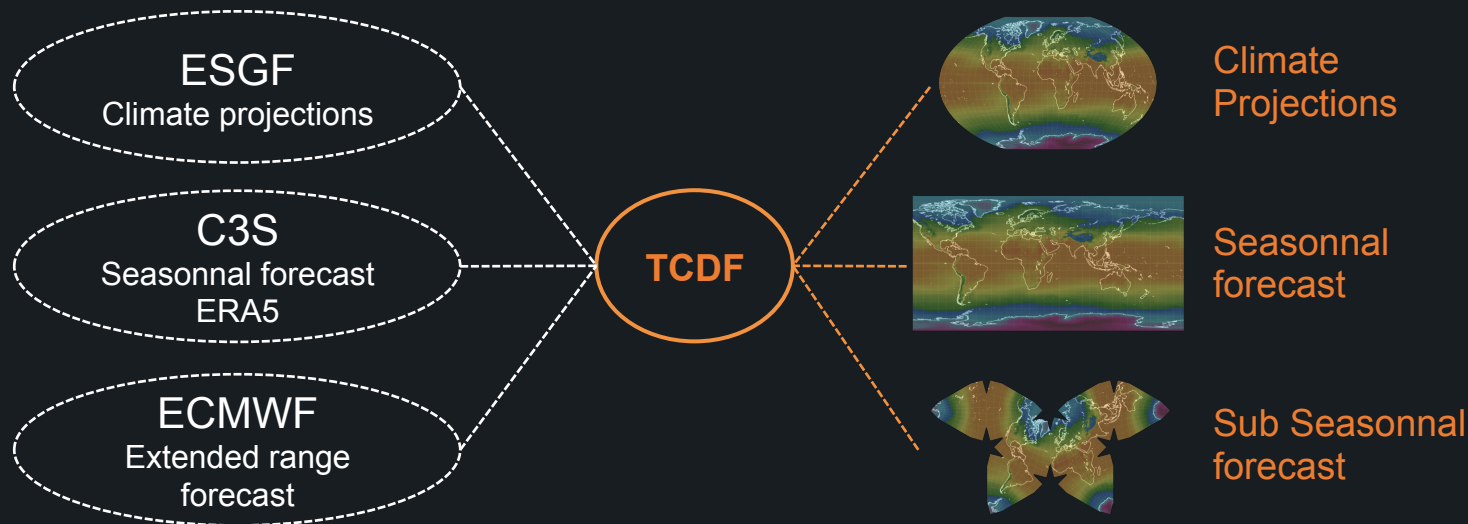
Didier Swingedouw, Senior Scientist
Department of Agriculture
University of Bordeaux (France)

Ready-to-use ?



Automated, ESGF/CMIP6 compliant, HPC & cloud services

Data we process



All using ERA5 (/ERA5-Land) for
downscaling and/or calibration

H2020 CLINT - Climate Intelligence

AI/ML enhanced climate science and services

Detection, causation and attribution
of extreme events

15 Partners (ECMWF) - 6 M€ - 4 Years (2021/25)



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The Demo project

Implemented by ECMWF as part of The Copernicus Programme

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Climate hazards data to prepare financial institutions for the future

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Partners



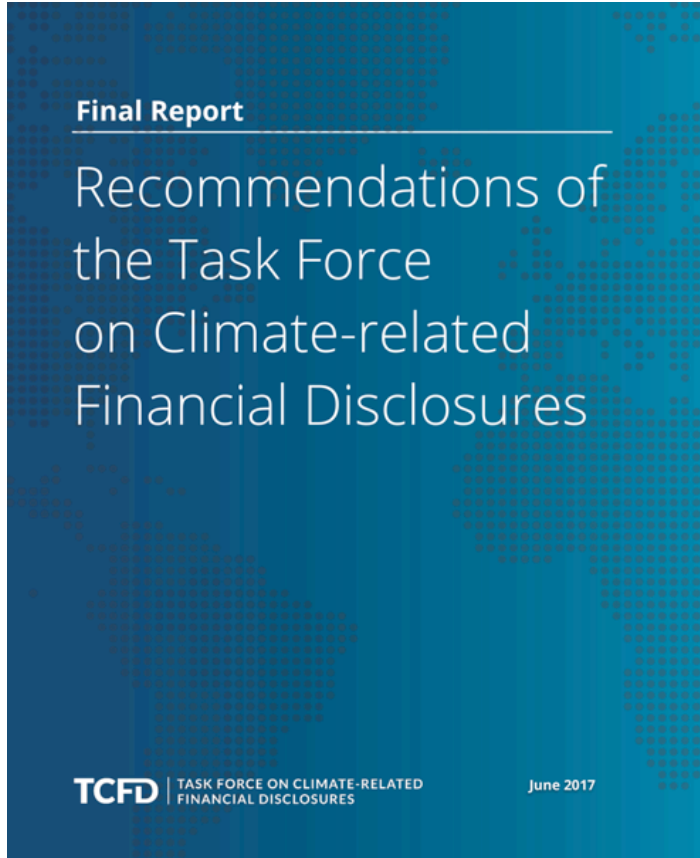
Sponsor





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Background: TCFD



2015 Launch of TCFD initiative
Disclose information on how corporate activities relate to climate issues

2017 TCFD recommendations

- **Financial risk and opportunities**
- **Contribution to international climate goals**
 - **Governance**
 - **Strategy**
 - **Risk management**
 - **Metrics and targets**

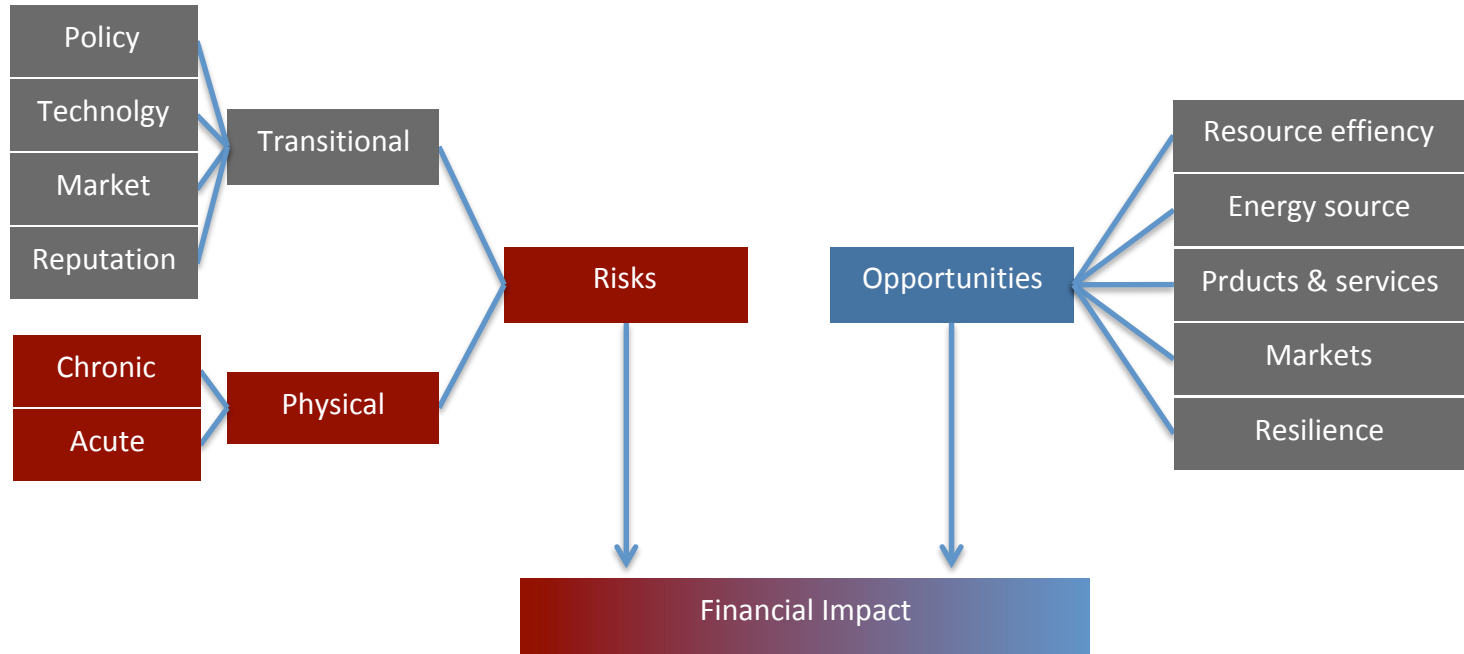
Starting to become mandatory

- **New Zealand (2020) and UK (2021 by 2025)**
- **EU ? 2021 might be a key year**



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Background: TCFD Risks, opportunities and impact





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T C F D m e n t i o n n e d h a z a r d s

TCFD mentioned Hazards	Acute Hazards	Chronic Hazards
Temperature	Extreme temperature Heat wave Cold Wave	Temperature increase Average Temperature Heat Stress Urban heat Island
Precipitation	Extreme precipitation Extreme snowfall	Rainfall Patterns Rainy season Average Annual precipitation Precipitation increase/decrease
Drought Water supply and demand	Drought Water stress	Water stress (long term) Water availability/supply Water scarcity Water demand/use Water stress (use/supply ratio)
Storm surges	Coastal flood	
Floods	River flood Pluvial flood Groundwater flood	
Wildfires	Wildfires	
Hurricanes cyclones and typhoons	Tropical storms Extratropical storms	
Landslides	Landslides	
Sea level rise		Sea level



- **Problem: lack of specifications and easy access to climate data**

The TCFD encourages the use of authoritative datasets (e.g., CMIP5).

but guidance is not practical enough on data specifications.

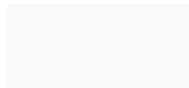
It is a challenge for financial institutions to identify, gather and process climate hazards data.

No benchmarking possible between disclosures. Market voices are asking for transparency on data and methods if not standardization.

- **Solution: A specific dataset for the financial sector**

Design and assemble a climate hazards data set of reference for physical risk assessment that is aligned with TCFD recommendations.

A first version of specifications and first dataset is developed to test feasibility and market interest.





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Timeline

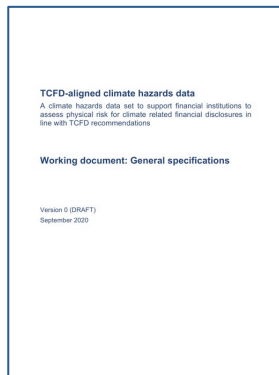
Design Phase

February 2020

Stocktaking (reports)
Engaging consultants (5)

May 2020

General Specifications & tentative roadmap



Implementation phase

February 2021

User feedback on specs. (35)
Preparing the dataset

Demo dataset release UNEP-FI Webinar



June 2021

User feedback
on dataset (>30)



Climate Change

UNEP - FI Sponsored Webinar

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ADAPTATION WEBINAR SERIES: CLIMATE DATA FOR PHYSICAL RISK ASSESSMENTS

18 February 2021

A TCFD ALIGNED CLIMATE HAZARD DATASET FOR PHYSICAL RISK ASSESSMENTS

▶

18 FEBRUARY 2021, 14:00-15:00 CET

A TCFD aligned climate hazard dataset for physical risk assessments

Paul Smith (Moderator), Harilaos Loukos (CDF), Stijn Vermoote (European Centre for Medium-range Weather Forecasts))

Play

Feb 18 2021 | 61 mins

The use of authoritative datasets and data sources is a challenge for many financial institutions. A collaboration between the Climate Data Factory and the EU's Copernicus Climate Change Service is aiming to provide a climate hazards data set of reference for physical risk assessment that aligns with the recommendations of the TCFD, and that will also align with the



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Market interest and feedback

NGOs



Industry



Engineering firm



Risk Platforms



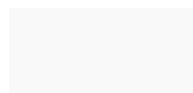
Adaptation consulting



Sustainability / consulting firms



Banks



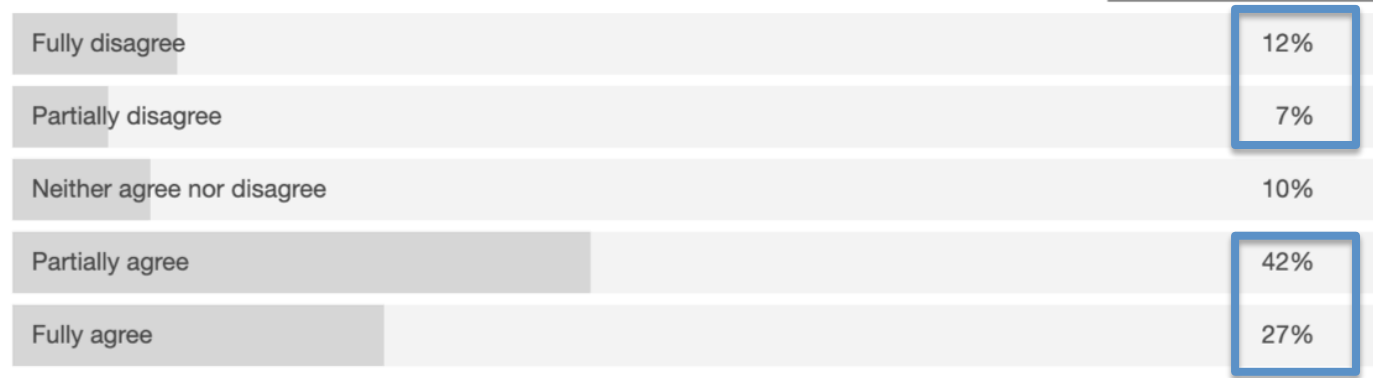


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Webinar Poll

Q Is access to relevant climate data a barrier to the elaboration of Climate related financial disclosures ?

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NO
19%

YES
69%

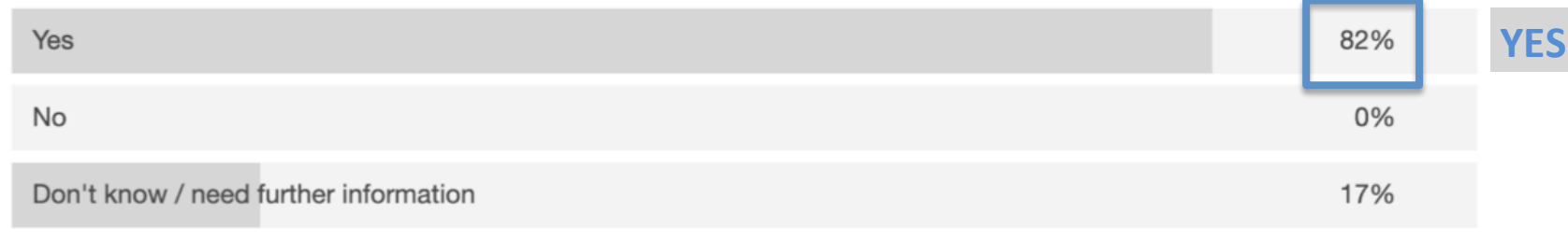


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Webinar Poll

Q Do you find this initiative useful for the finance community?

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YES

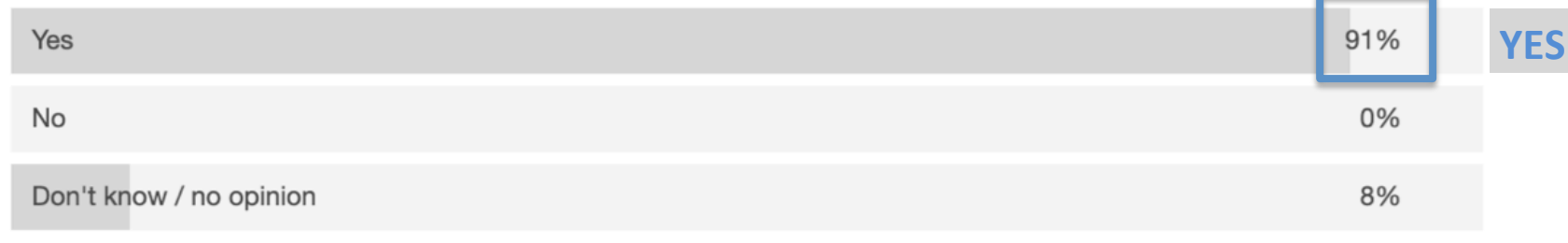


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Webinar Poll

Q Would you like to attend a technical training on the potential use of C3S driven solutions in the scope of TCFD?

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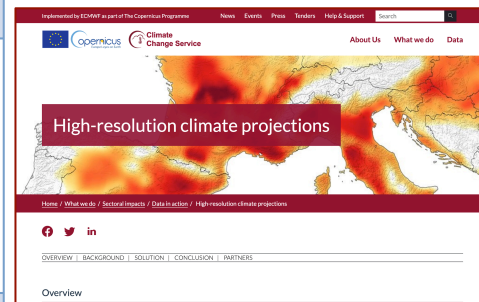




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Demo dataset + roadmap

	CMIP5 (demo dataset)	CMIP6 (Update)
Scenarios	RCP8.5	SSP- 8.5 & SSP-2.6 + Eventually SSP-1.9 / 7.0
Time frames (30y averages)	1991-2020 2021-2050 / 2051-2080 /2071-2100	Same
Historical data	ERA5 0.25°x0.25°	ERA5 / ERA5-LAND 0.25°x0.25° / 0.10°x 0.10°
Models (GCMs)	IPSL-CM5A-LR GFDL- ESM2M HadGEM2-ES MIROC5 Downscaled 0.25°x0.25°	IPSL-CM6A-LR GFDL-ESM4 UKESM1-0-LL MPI-ESM1-2-HR MRI-ESM2-0 Downscaled 0.25°x0.25° / 0.1°x0.10°
Surface Variables	Daily mean temperature Daily Precipitation	Same + Daily min/max temperature Daily Wind speed (Or/and other variables)
Hazard Indices	About 20 ETCCDI indices	ETCCDI + other indices + Specific (e.g. Fire Index) + Other hazards





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Indices for Chronic and Acute Hazards

Chronic hazard	Candidate Indicator
Temperature increase	Average temperature increase by month
Average Temperature	Average temperature by month
Heat Stress (long term)	To be determined See heat wave indicators
Urban heat Island	To be determined
Rainfall Patterns	Precipitation days Index Heavy precipitation days Index Mean precipitation amount at wet days
Rainy season	Average Total precipitation by month
Average Annual precipitation	Average Annual Total precipitation
Precipitation increase	Wet Days Index Consecutive wet days Index Number of consecutive wet days periods
Precipitation decrease	Dry days Index Consecutive Dry days Index Number of consecutive dry days periods
Water - Availability/supply - Demand/Use - Stress (use/supply)	To be determined Alternative: Aqueduct water stress projections
Sea level	To be determined
Sea Ice	To be determined
Snow load	To be determined
Permafrost	To be determined

Acute Hazard	Candidate Indices
Extreme temperature	tm: Cold days, Warm days, HDD, CDD tmax: Very cold days, Very warm days, Summer days, Ice days tmin: Cold nights, Warm nights, tropical nights, Frost days.
Heat wave	tm: Warm-spell days Index, Heat wave magnitude index daily ³ , Wet Bulb Globe Temperature (needs also relative humidity and surface pressure) ³ tmax: Consecutive summer days, Heat wave duration Index tmin: Very warm days
Cold Wave	tm: Cold-spell days Index tmax: Very cold days tmin: Cold wave duration Index, Consecutive frost days Index
Extreme precipitation	Very heavy precipitation days Index (>20mm) Extremely wet days (> 99th percentile) Precipitation fraction due to extremely wet days Highest 5 days precipitation amount Highest one day precipitation amount
Extreme snowfall	To be determined
Drought/Water stress	Dry days index Consecutive Dry days Index Number of consecutive dry days periods
Wildfire	To be determined
Flood type - River - Pluvial - Groundwater - Coastal	To be determined Alternative: Aqueduct Flood projections Extremely wet days, consecutive extremely wet days
Landslides	To be determined
Storms - Tropical storms - Extra tropical storms	To be determined Extremely windy days (> 99th percentile) Consecutive extremely windy days Hurricane Days index (> 32,5 m/s) Consecutive Hurricane days Index

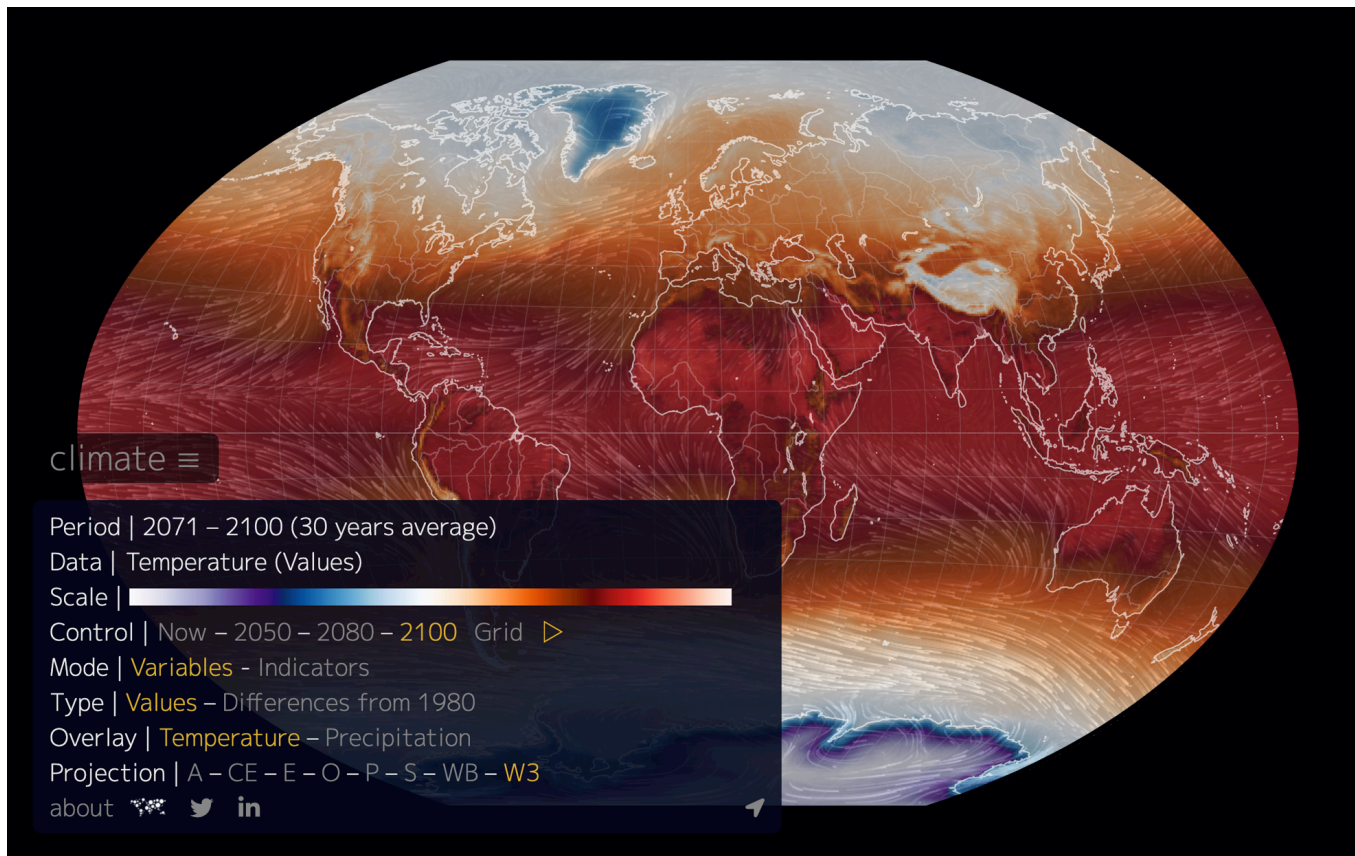
Indices as proxy of hazards ..

Fire index (ERA-Land/CMIP6) in prep



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Interactive animated map



Online at climate.theclimatedatafactory.com



Respond to a growing information demand ?

Added value of C3S

- Authoritative source of climate data
- Focus on forward-looking hazard scenarios
- Focus on hazards at global scale
- Build on a widely used historical data set: ERA5
- Use robust community tools for custom calculations (toolbox)
- Co-construct with users
- Provide technical training in scope with the TCFD



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Thank you

Harilaos Loukos

harilaos@theclimatedatafactory.com

financial-disclosures.climate.copernicus.eu

