



**WEMC**  
World Energy &  
Meteorology Council

# ICEM 2023 workshop: Visualisation of Climate and Sectoral indicators

28th June 2023

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Welcome

Introduction to the WEMC Teal tool

Public Teal tool

Co-designed bespoke public versions

Additional modules

Group challenges

Answers and feedback

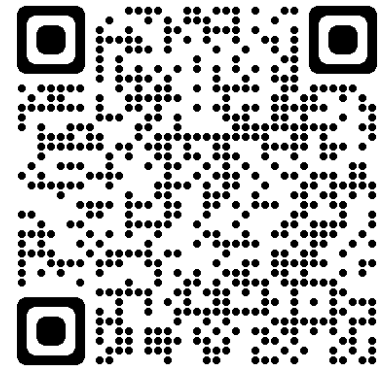


# Introduction to the WEMC Teal tool

- Designed to be easy and visually appealing for a non-expert to use
- Developed by a team including software engineers, data scientists, educators
- Originally designed to raise awareness, and provide data and visualisation, about climate change and related energy issues
- Built upon previous visualisation tools such as the C3S EduDemo

[Public TealTool introduction video](#)

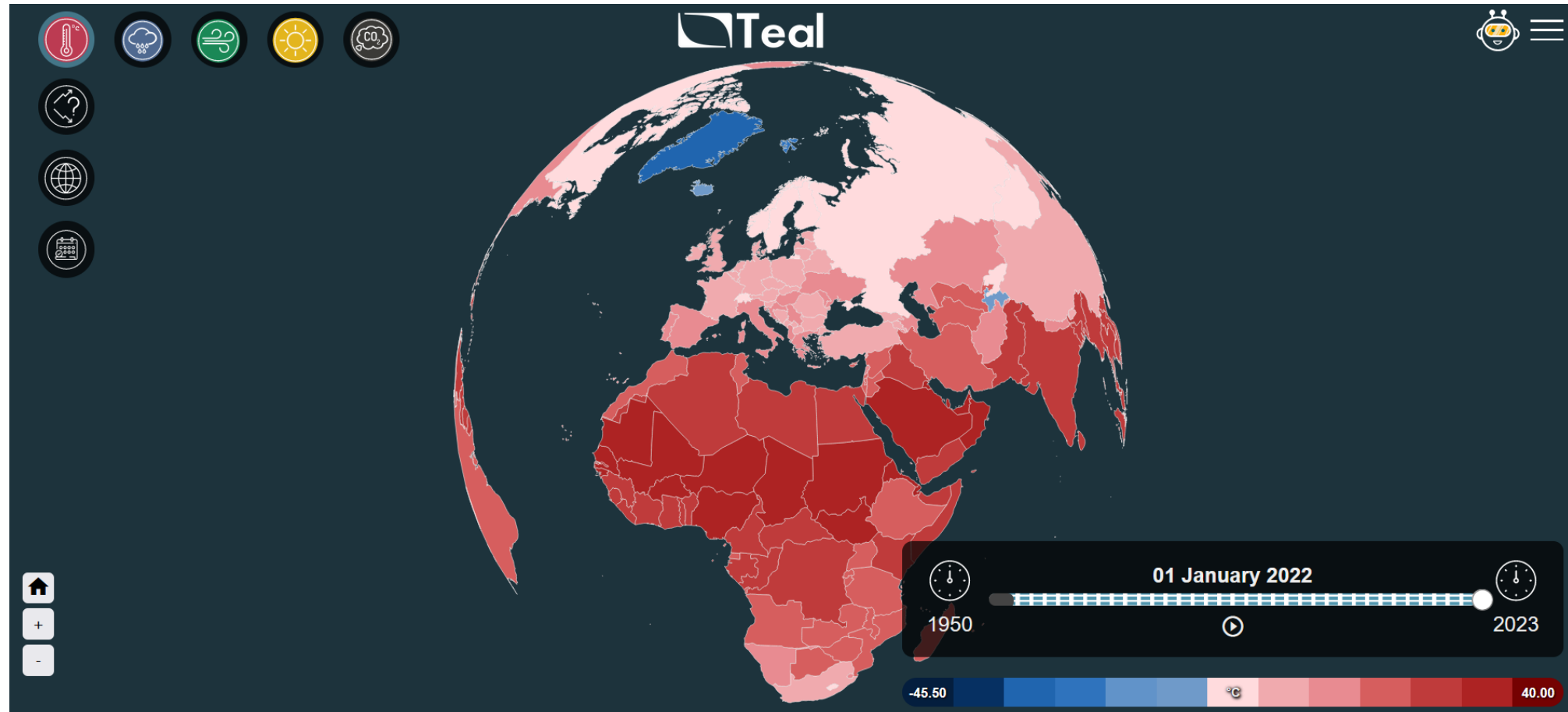
Note this video was made with the first release, so doesn't show all existing features





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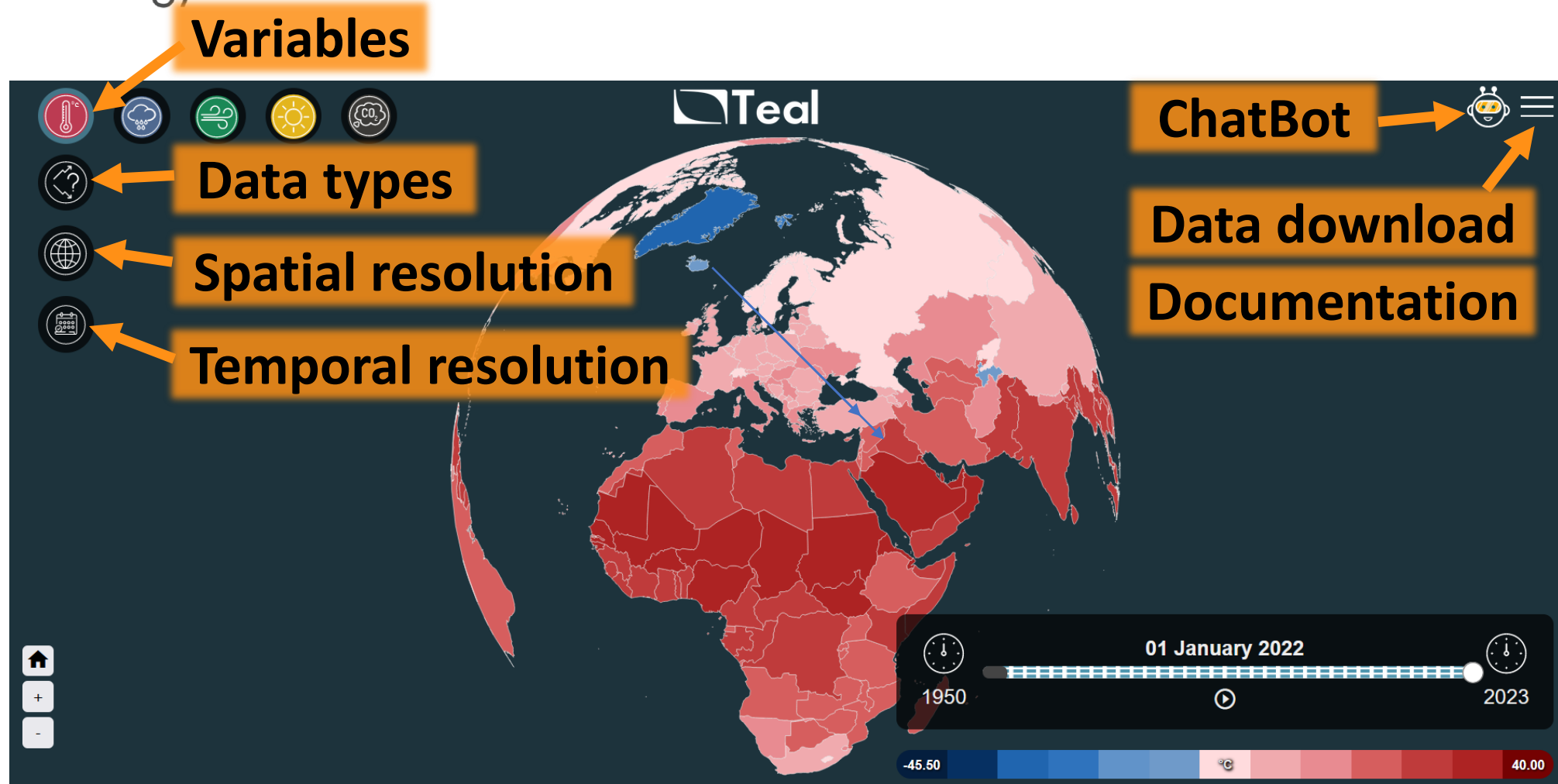
# Public Teal tool

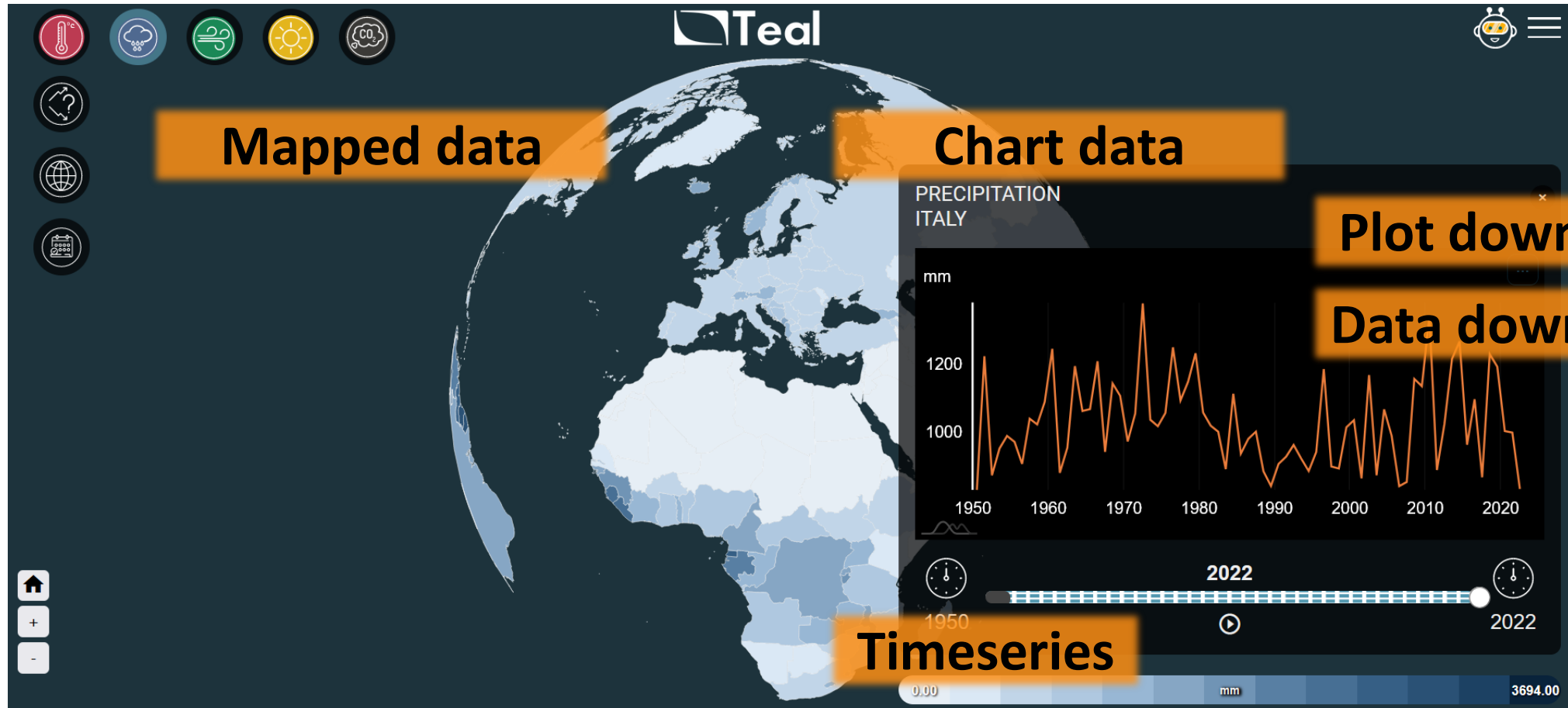




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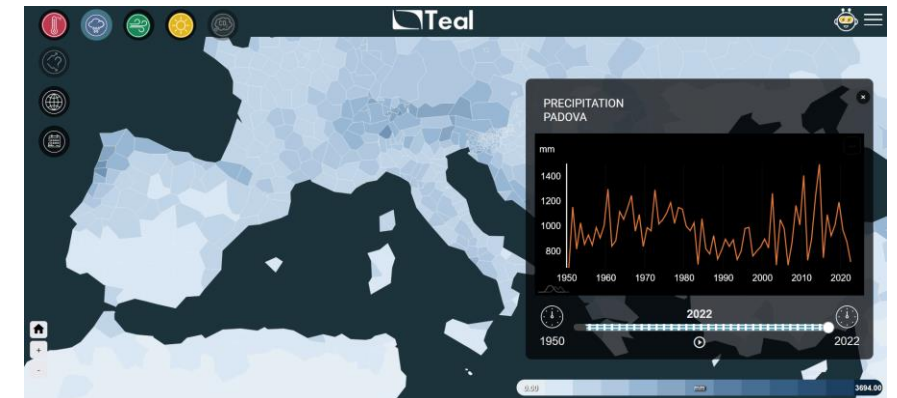
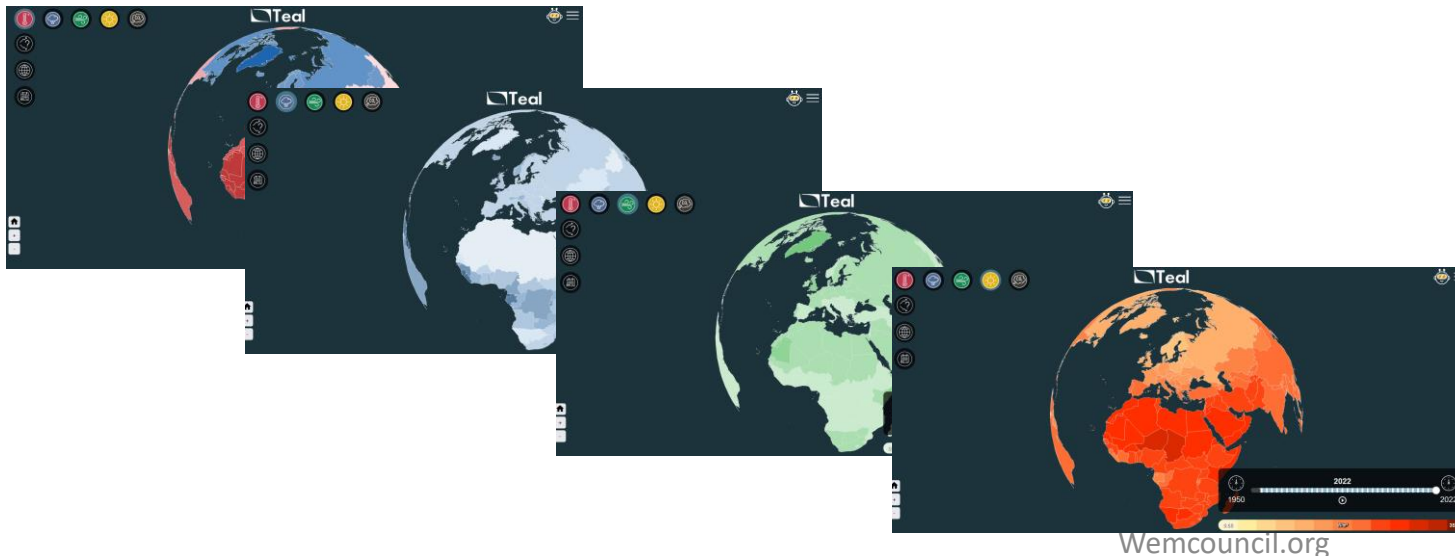
# Public Teal tool







Historical data sourced from ERA5:  
4 variables – temperature, precipitation, wind speed, solar radiation  
annual, seasonal, monthly, daily time sampling  
mapped data shows regions aggregated to country and sub-country  
level, charts show timeseries for region selected

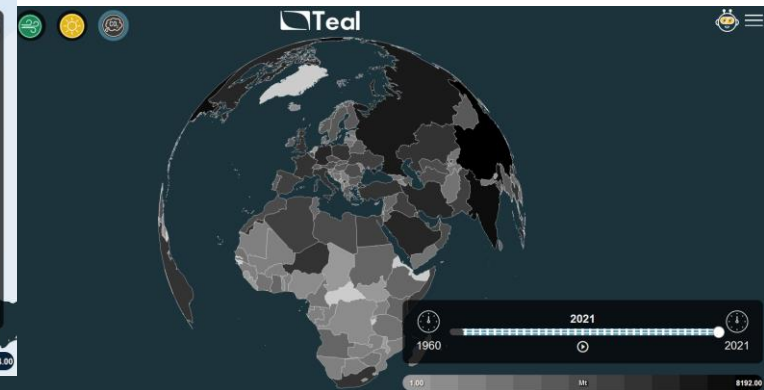
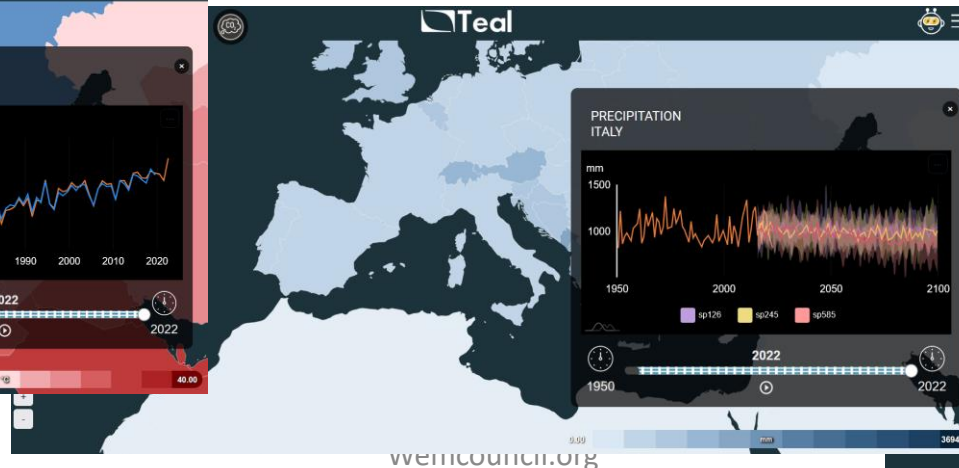
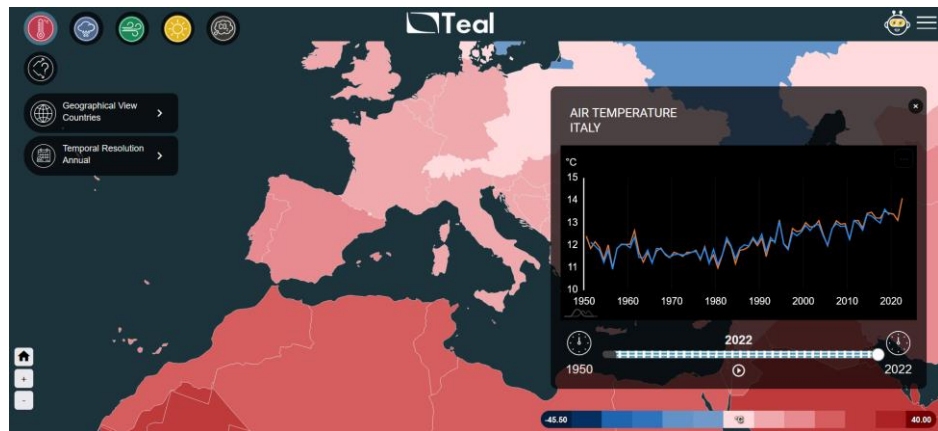






## Other data streams

- Observations - observed temperature data – UEA CRU
- Projection data from CMIP6 can be added to chart – 3 SSP scenarios, toggle on or off
- Energy data - CO2 emissions on this version

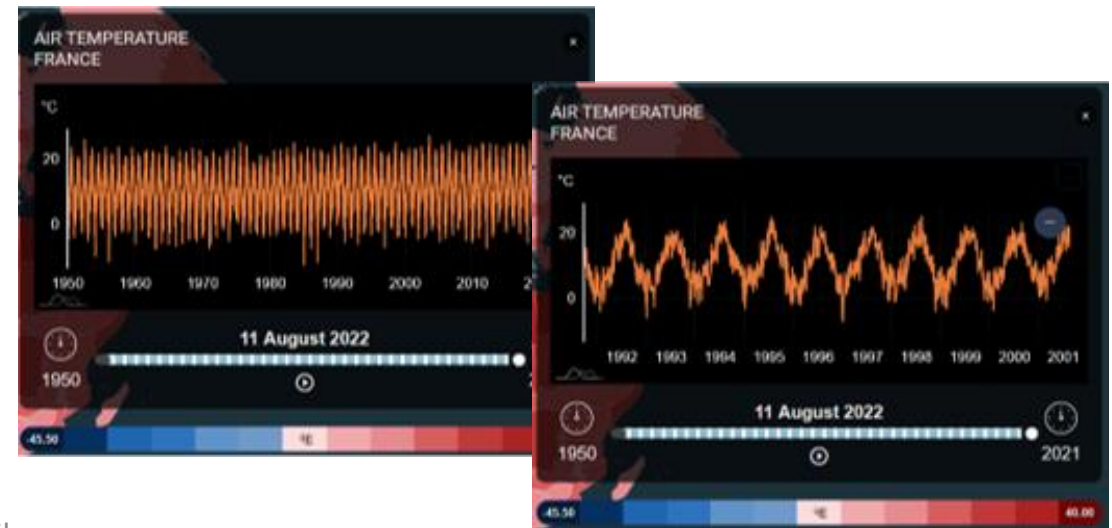
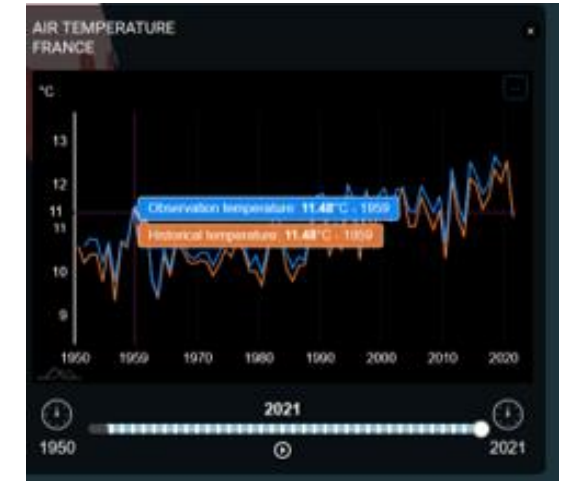






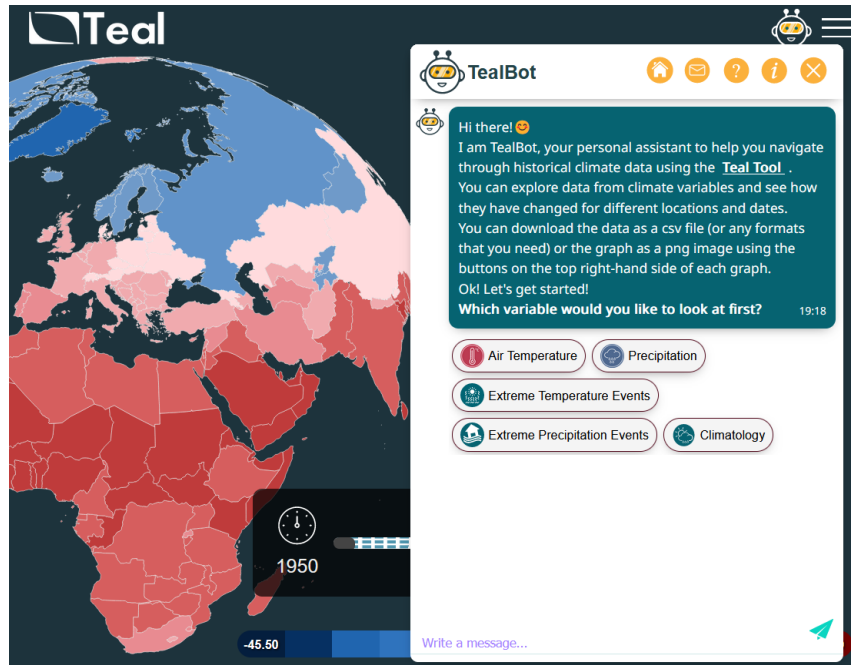
## Features

- mouse hover shows tooltips
- Globe can be zoomed and rotated
- Zoom function on timeseries plots
- downloads for data & images



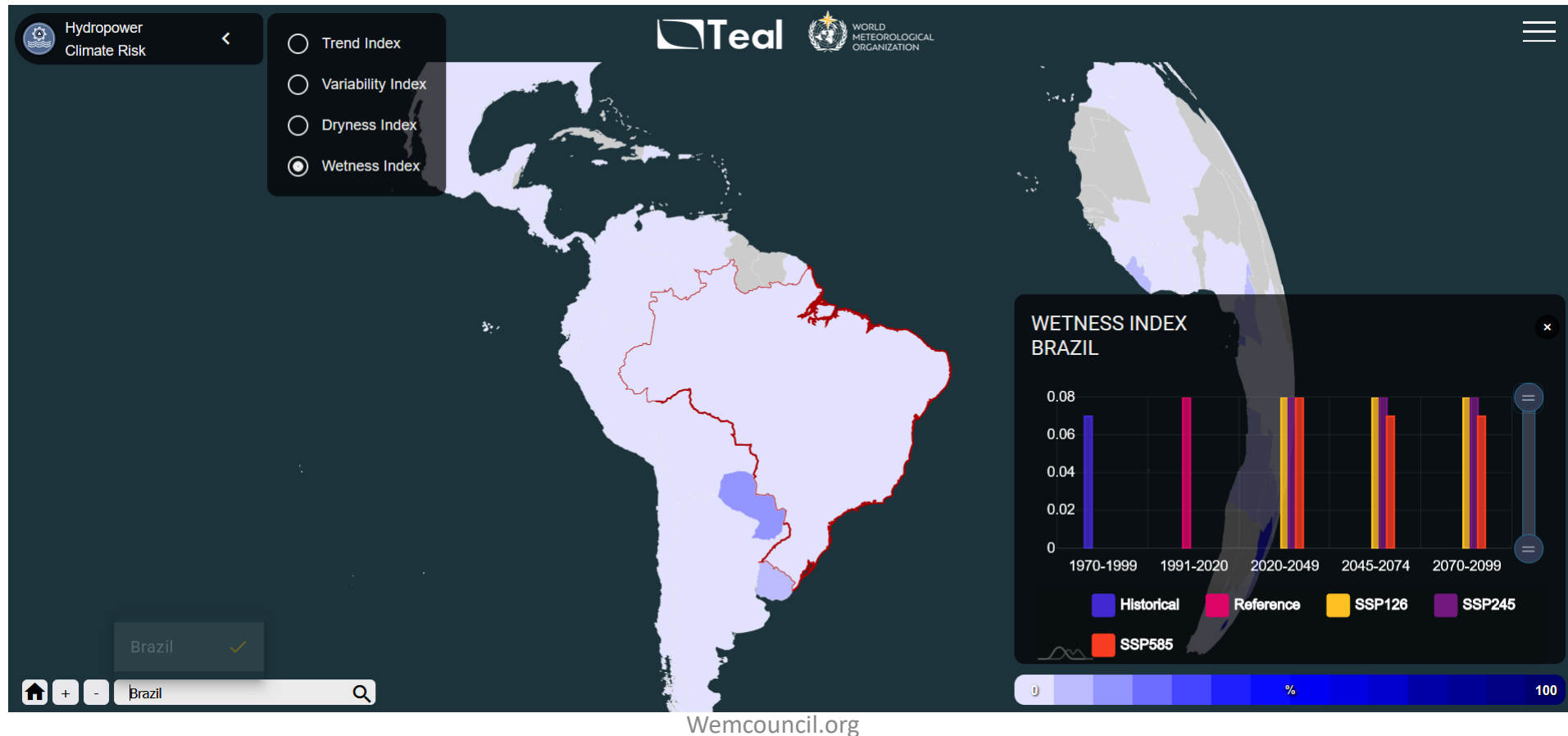


## Tealbot – a chatbot with extra chart features & statistics



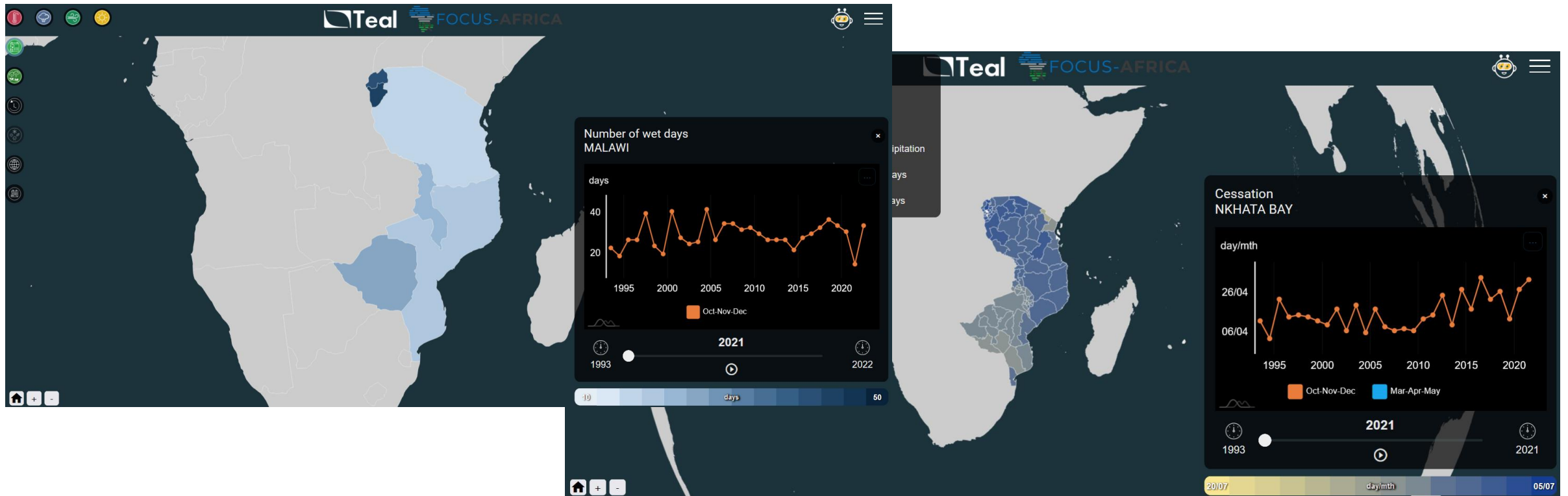


## WMO Risk resilience Teal - country search, bespoke indicators



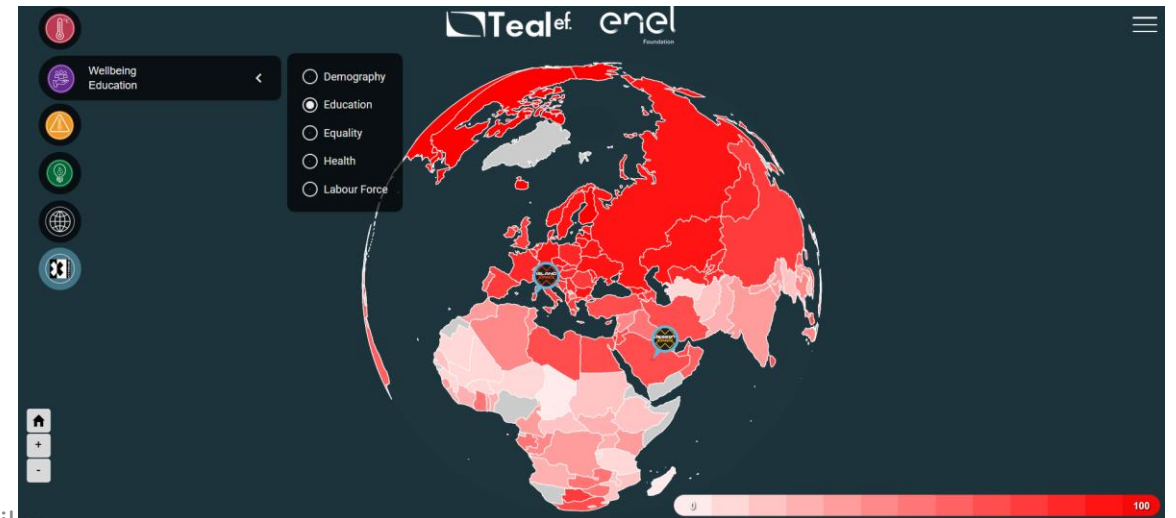
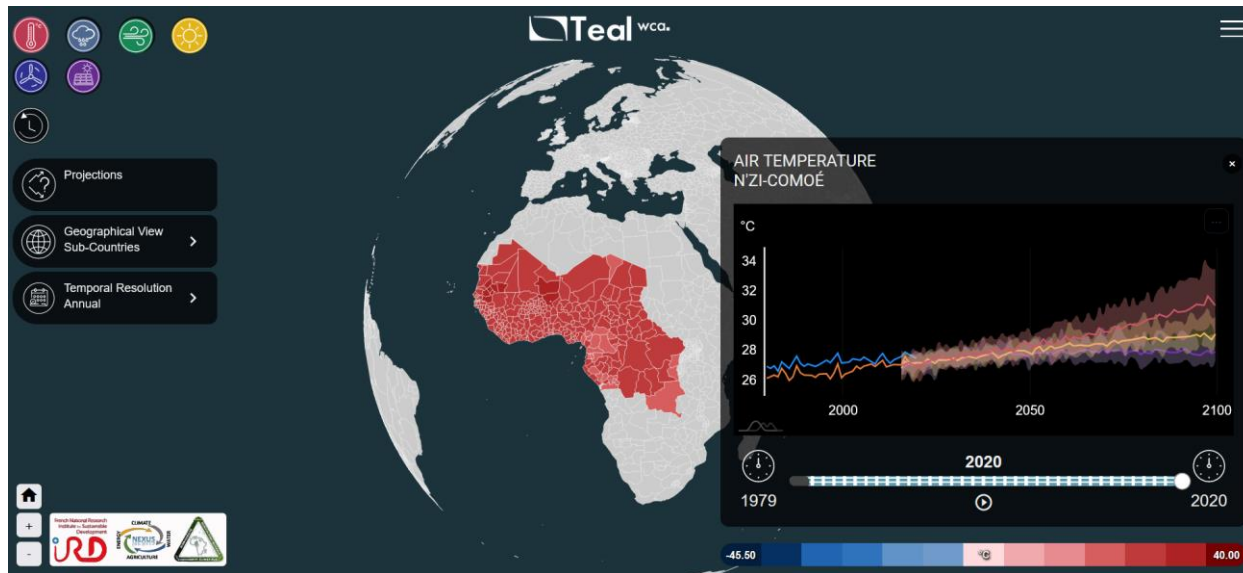


EU FOCUS-Africa project Teal new indicators and features currently being developed with partners





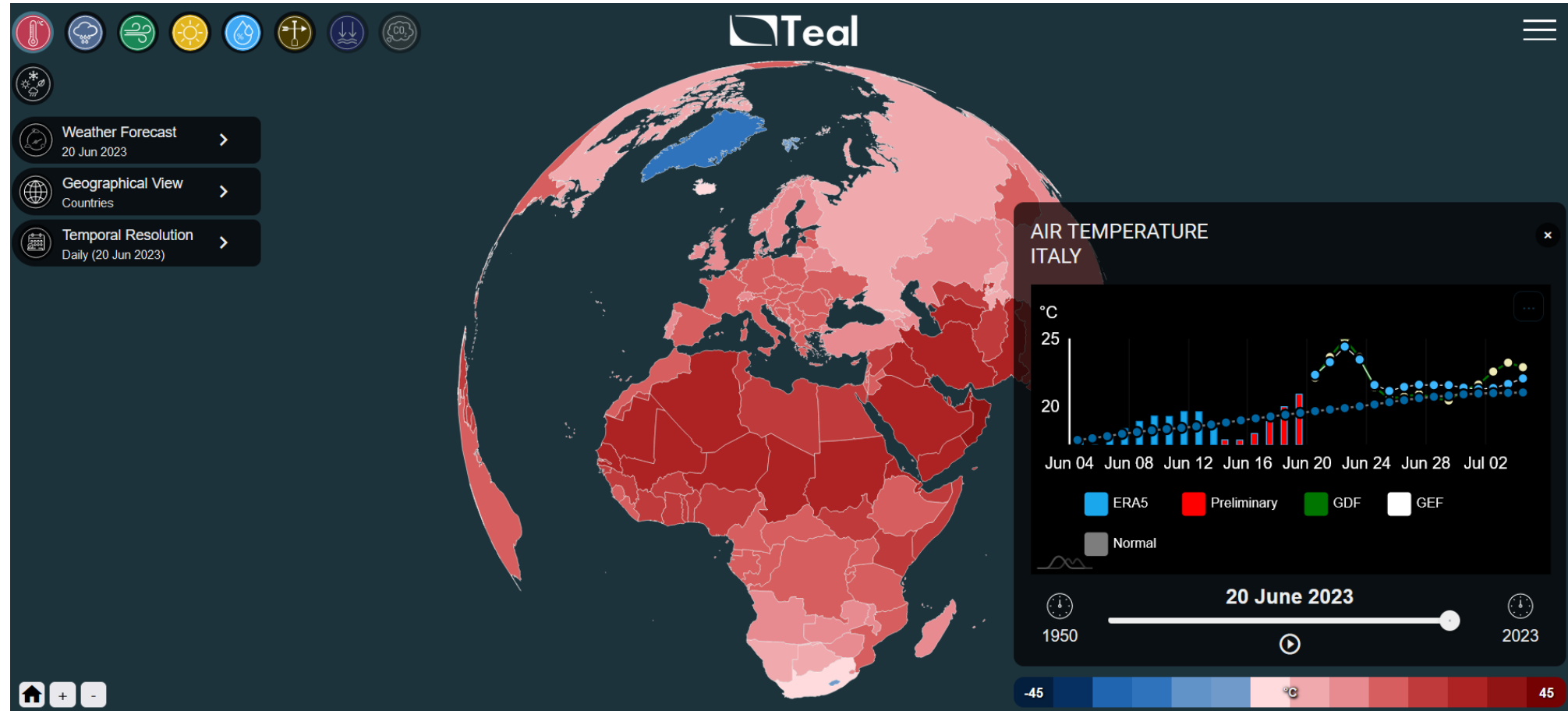
West and Central Africa Teal illustrates use for energy variables  
Enel Foundation Teal included point data and socioeconomic data tailored to user requirements



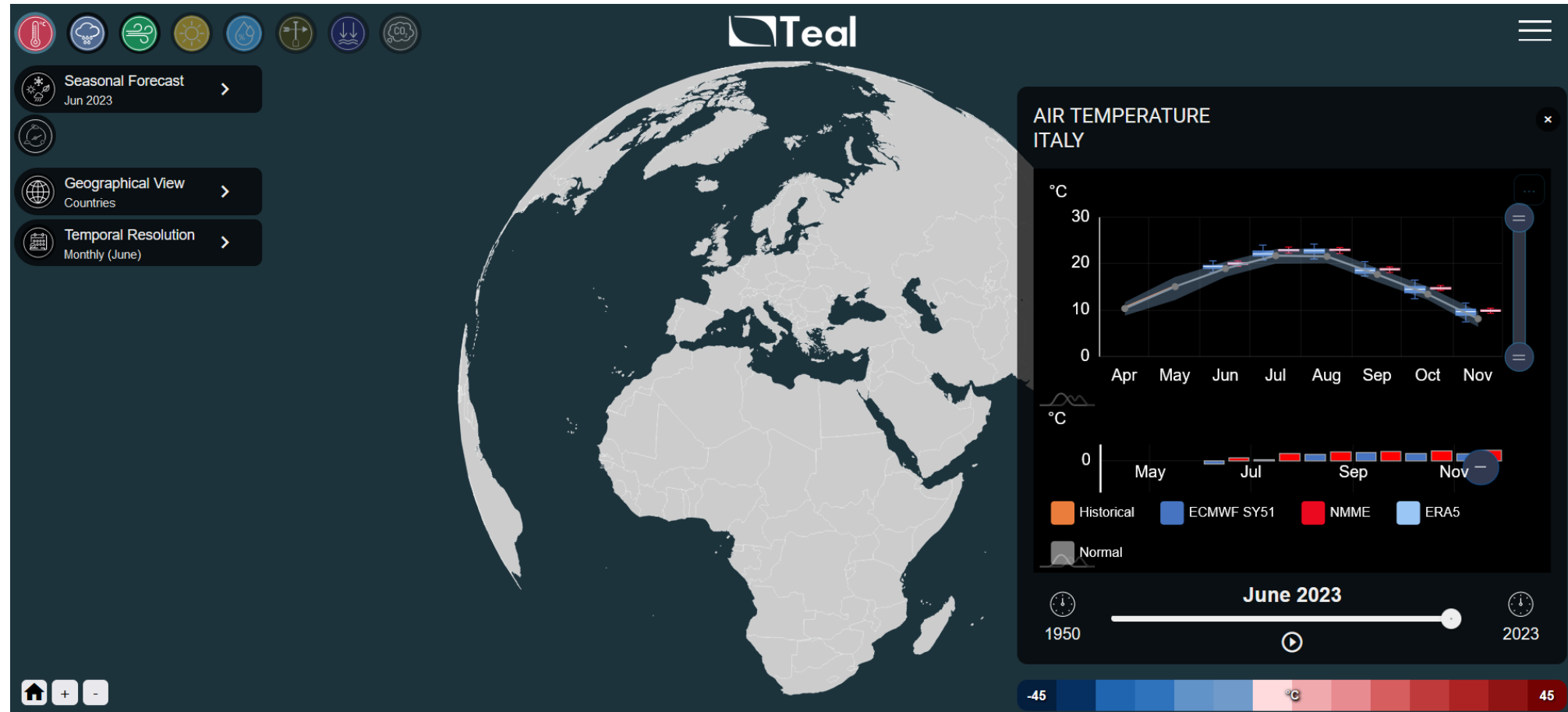


- Developed forecast modules through collaborations on the SECLI-FIRM project
- Forecasts are on non-public versions of Teal through ICS
- Demo version for ICEM to illustrate
- Forecast visualisation combines climatological data from era5 and forecast data











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## Challenges



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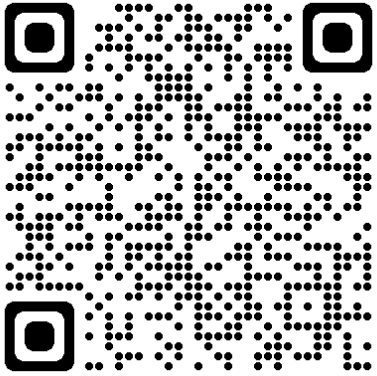


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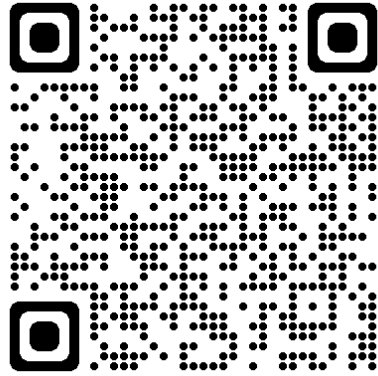


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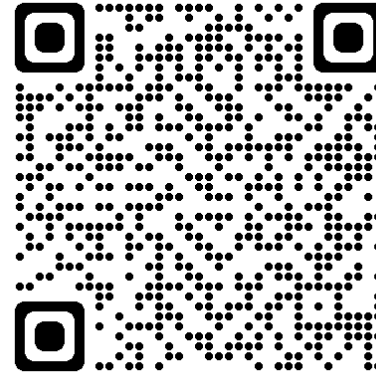
# Group challenges



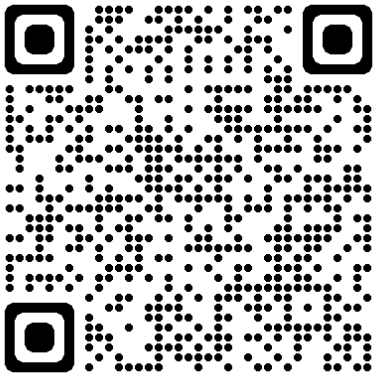
[tealtool.earth](https://tealtool.earth)



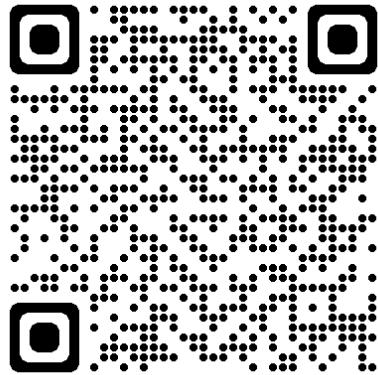
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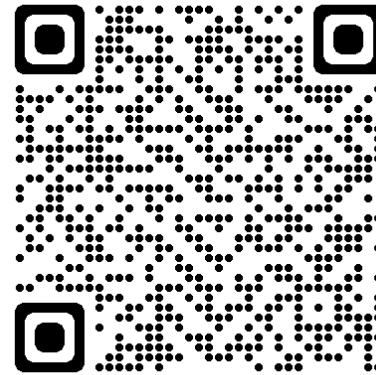
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[fa-test.tealtool.earth](https://fa-test.tealtool.earth)

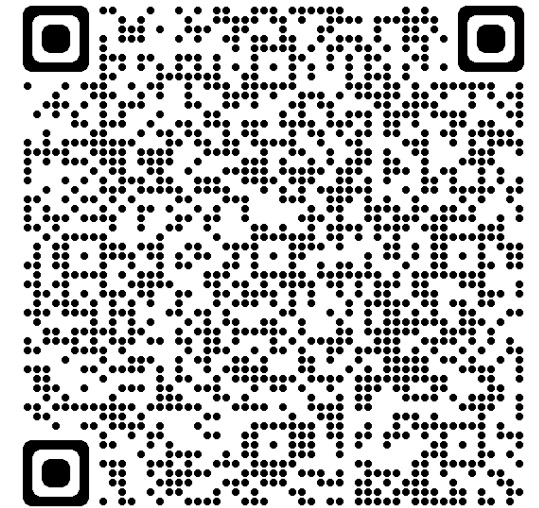


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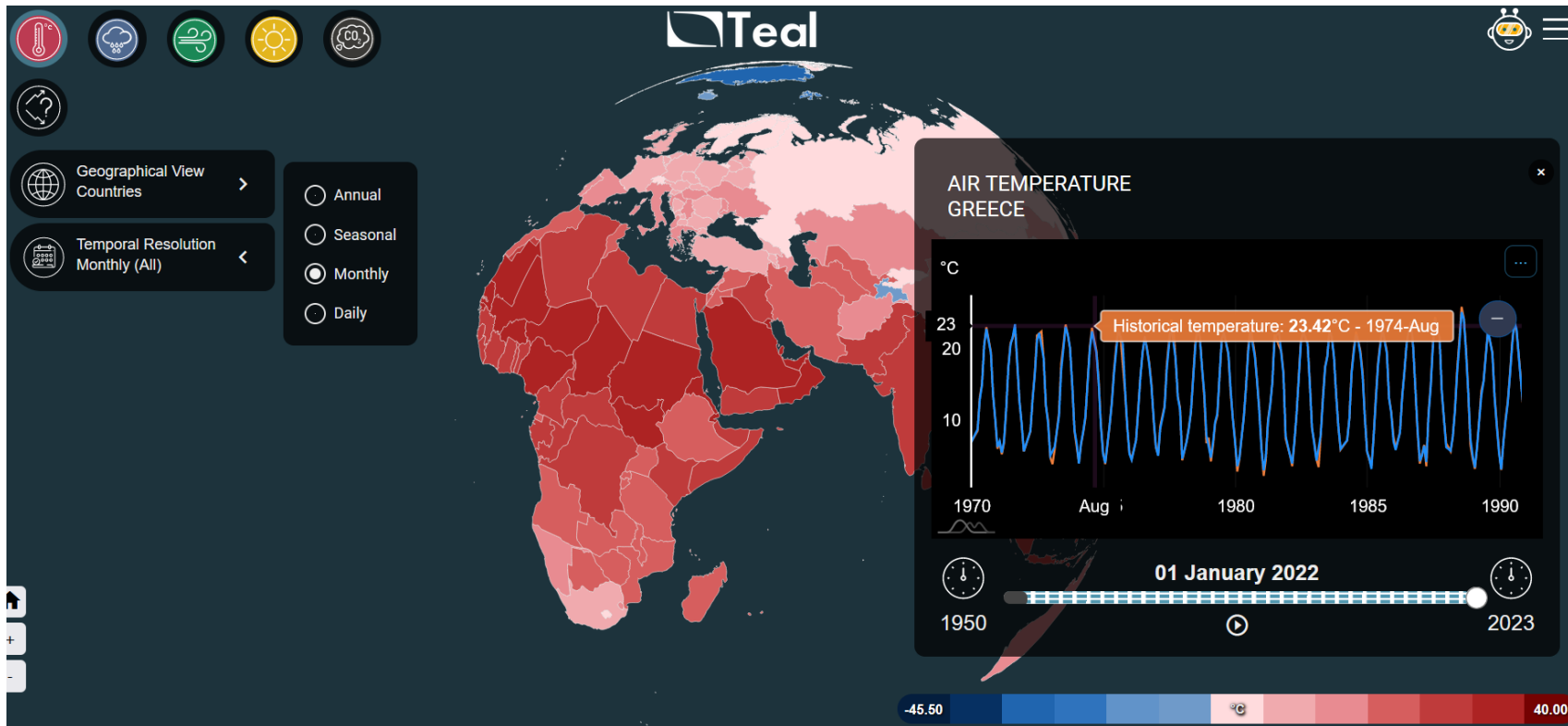


[demo.tealtool.earth](https://demo.tealtool.earth)

[Wemcouncil.org](https://Wemcouncil.org)



Slides with challenges  
pwd: ICEMtealtest



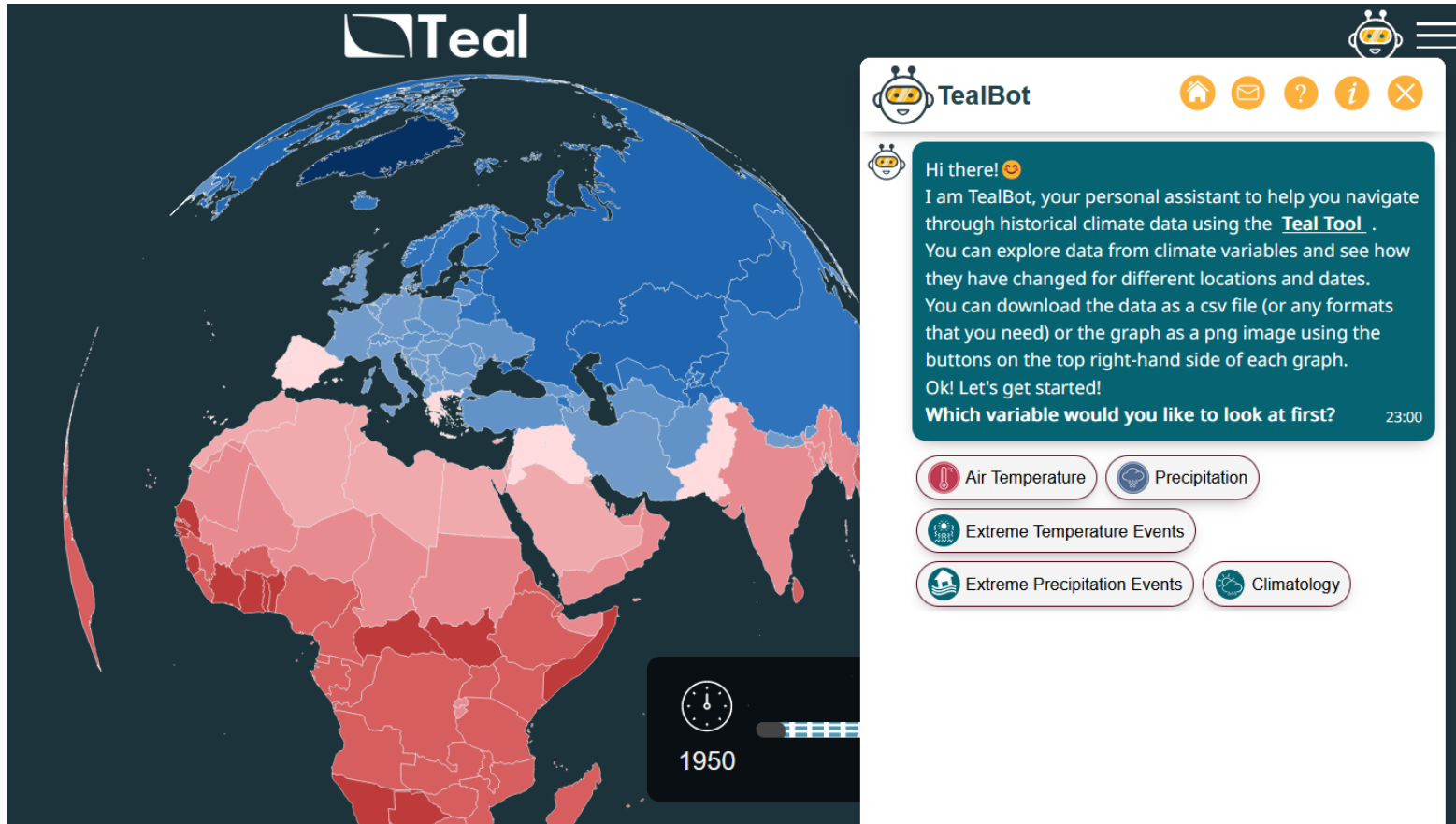
Who has the coldest and warmest birth date for the country and month they were born?

<https://tealtool.earth>

Hint - Historical monthly temperature data



# Challenge A

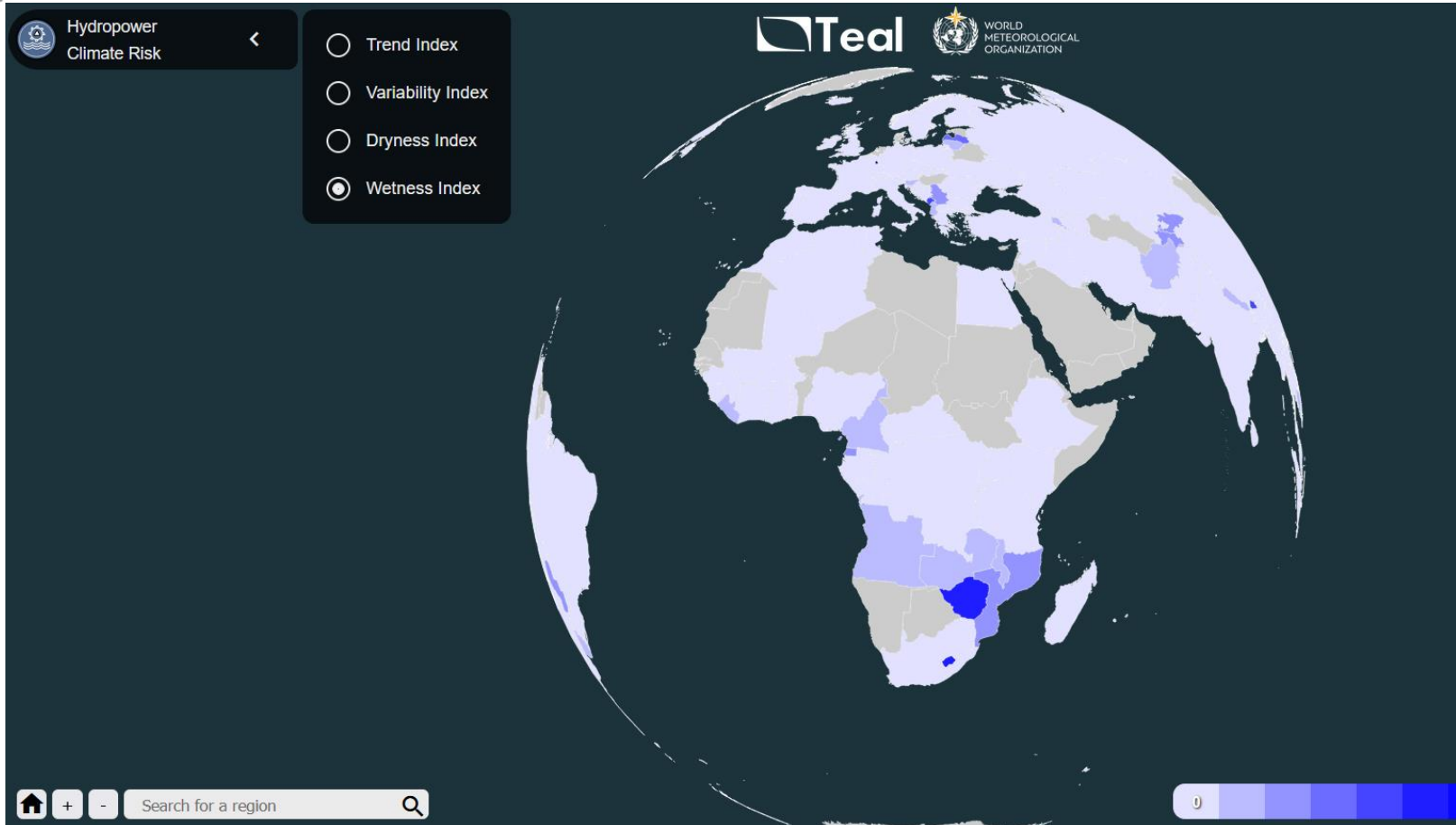


What is the monthly average temperature and rainfall for Italy in the month of June?

<https://tealtool.earth>  
Hint - TealBot Climatology



# Challenge B



Find the  
reference  
wetness index  
for Zambia

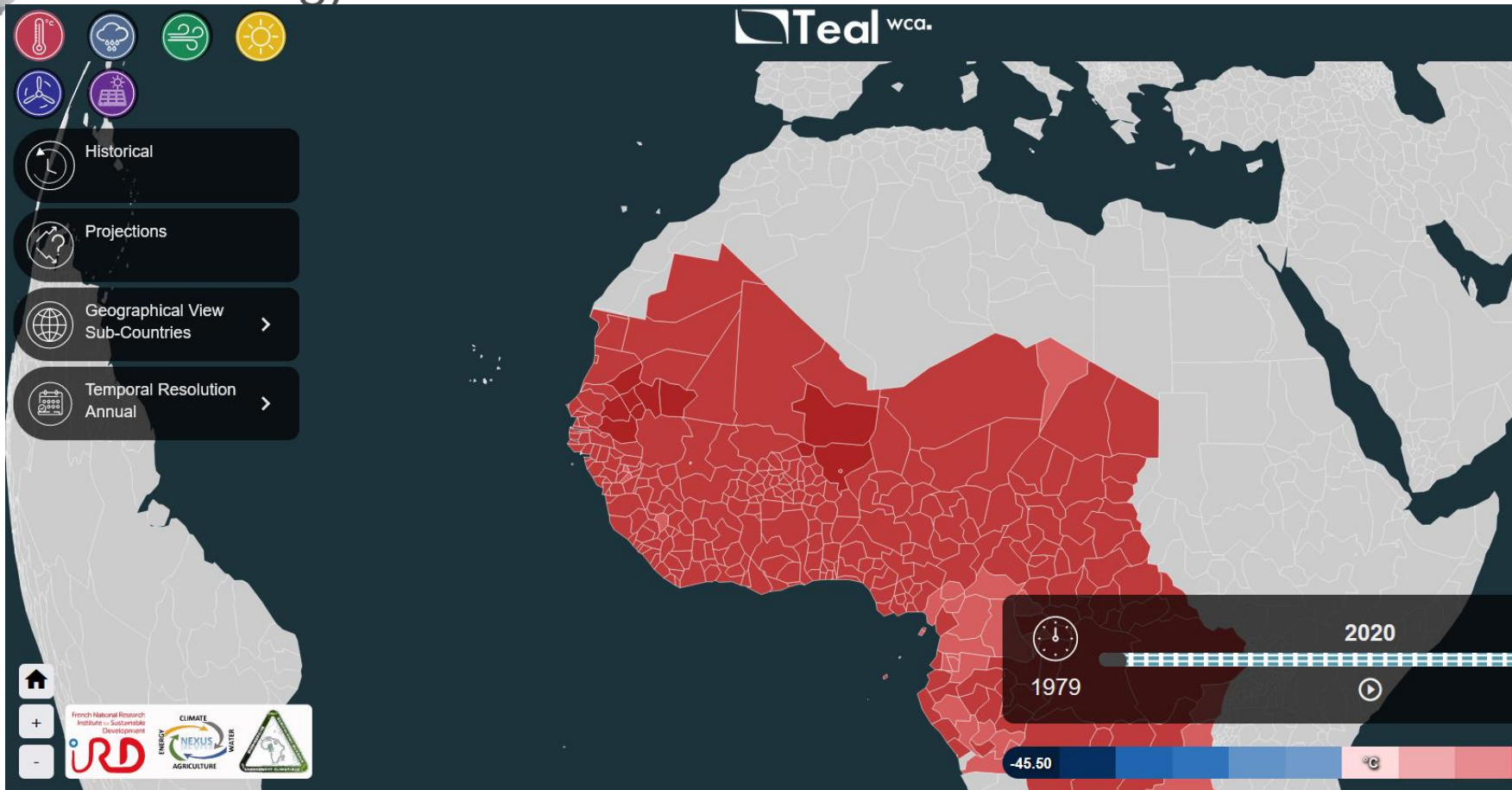
<https://wmo.tealtool.earth>

Hint - Use search box for country name





# Challenge C

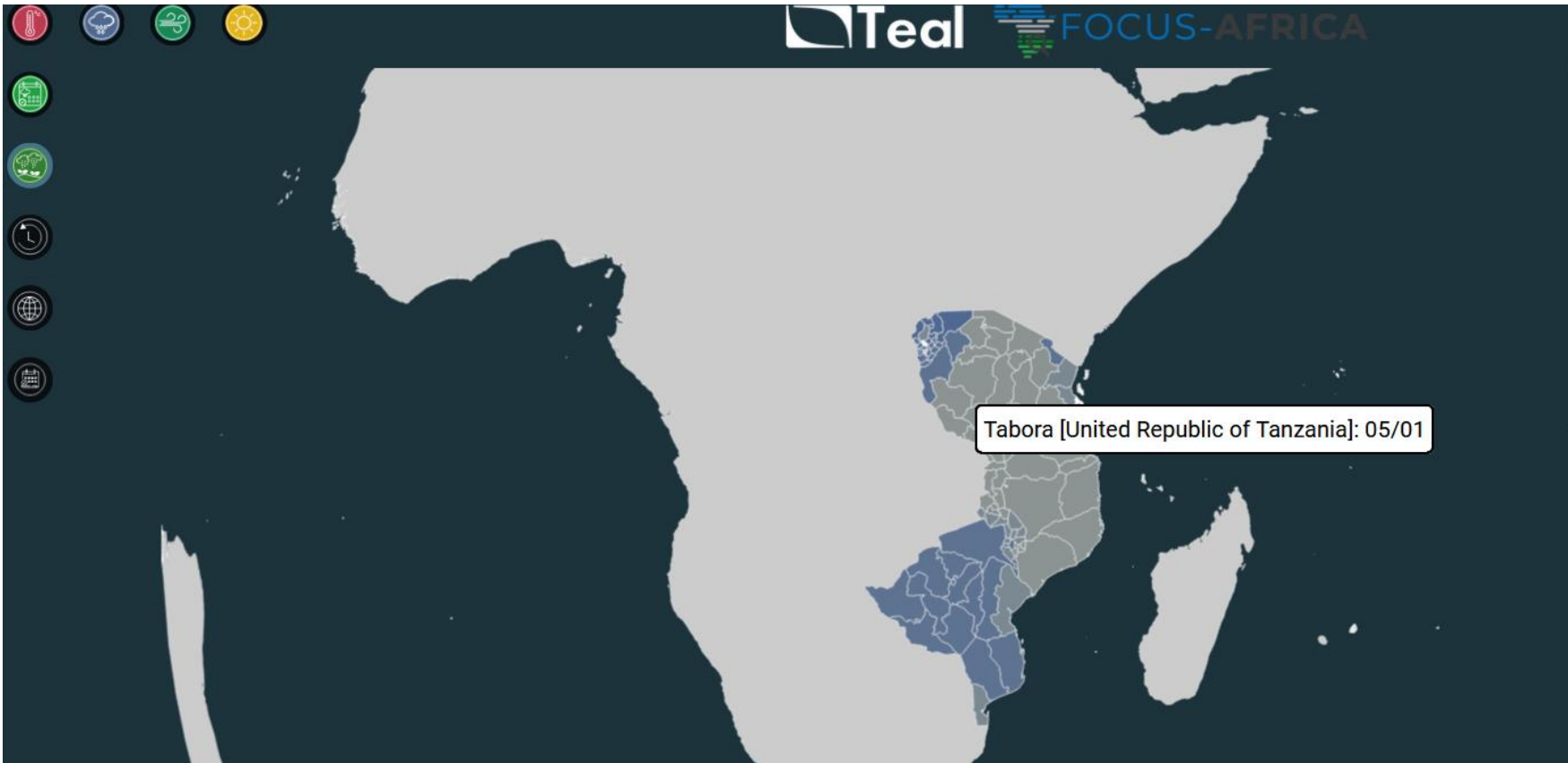


<https://wca.tealtool.earth>

Hint – Projections annual temperature data

Find the air temperature in Northern region of Ghana in 2050 for the 'sustainability' SSP126 climate change scenario





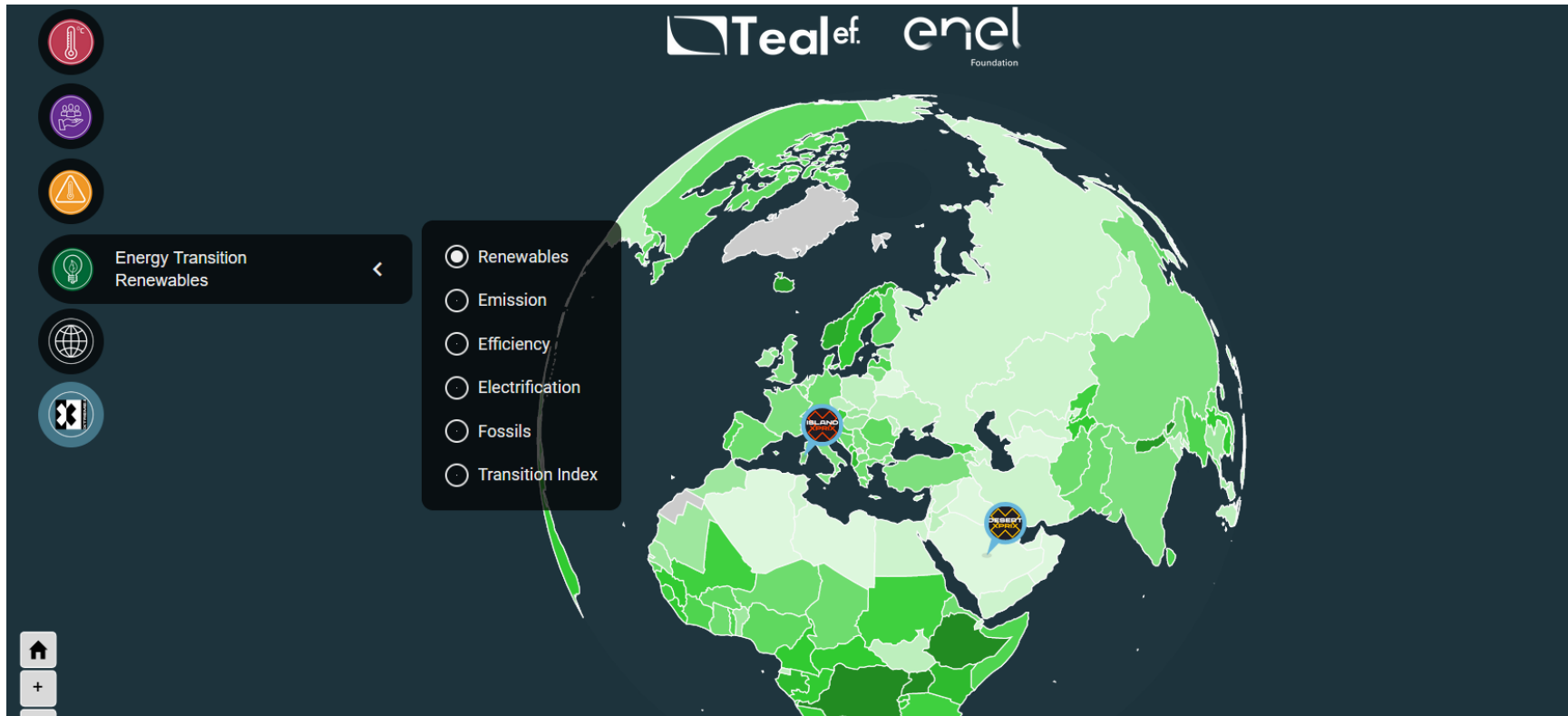
Find the Onset  
date for 2000  
October-  
November-  
December  
rainy season in  
Tabora region  
of Tanzania

<https://fa-test.tealtool.earth>

Hint – AgriMet Indicators Sub-country



# Challenge E



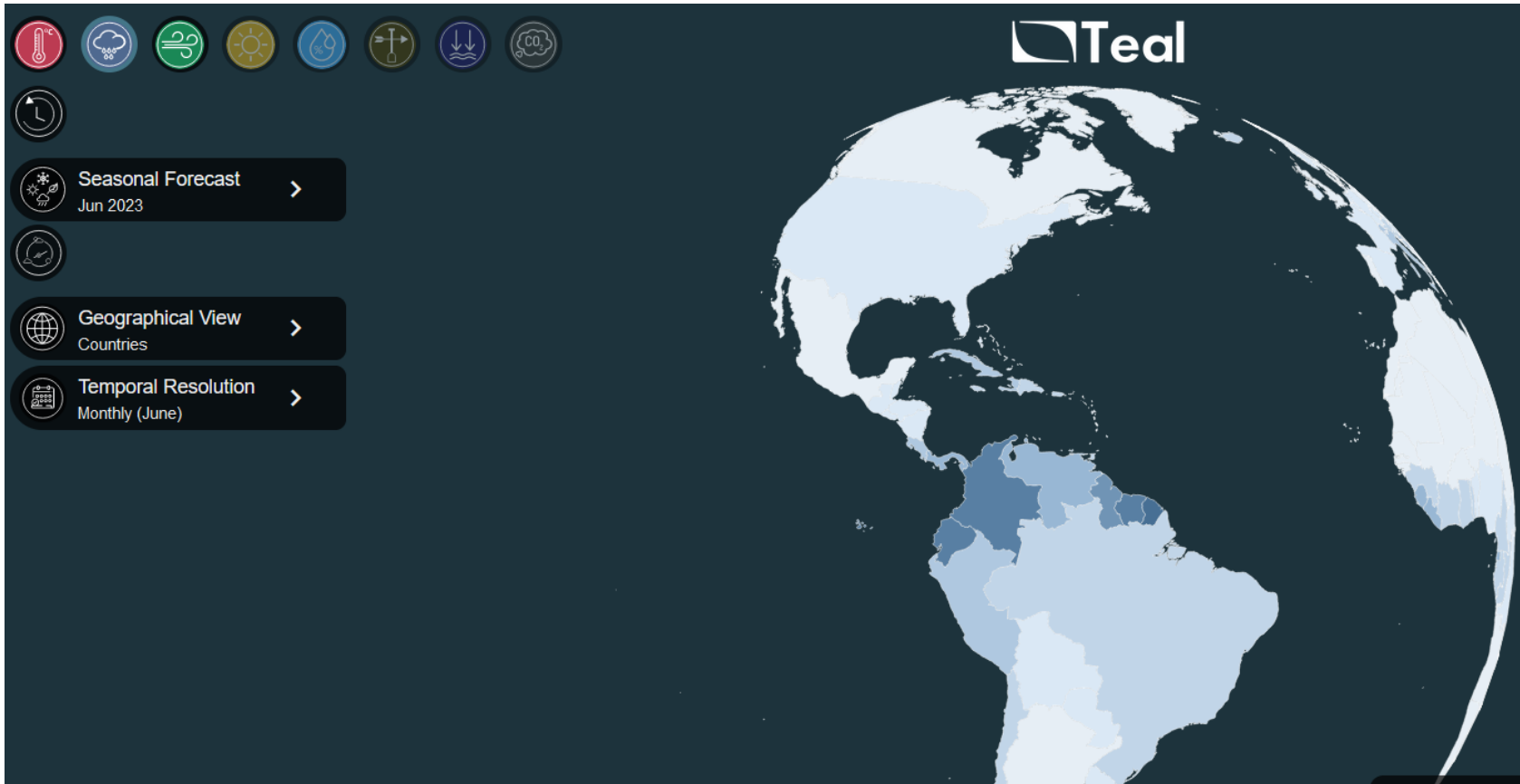
Find values for  
Energy  
Transition  
renewables in  
the location of  
the Extreme E  
2022 Desert X-  
Prix

<https://ef.tealtool.earth>

Hint – Point data for Extreme E events



# Challenge F



<https://demo.tealtool.earth>

Hint – Seasonal forecast monthly precipitation data

Are anomalies  
for seasonal  
forecasts for  
Colombia for  
June  
2023 positive  
(more rain than  
usual) or  
negative (less  
rain than  
usual)?



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## Answers and feedback



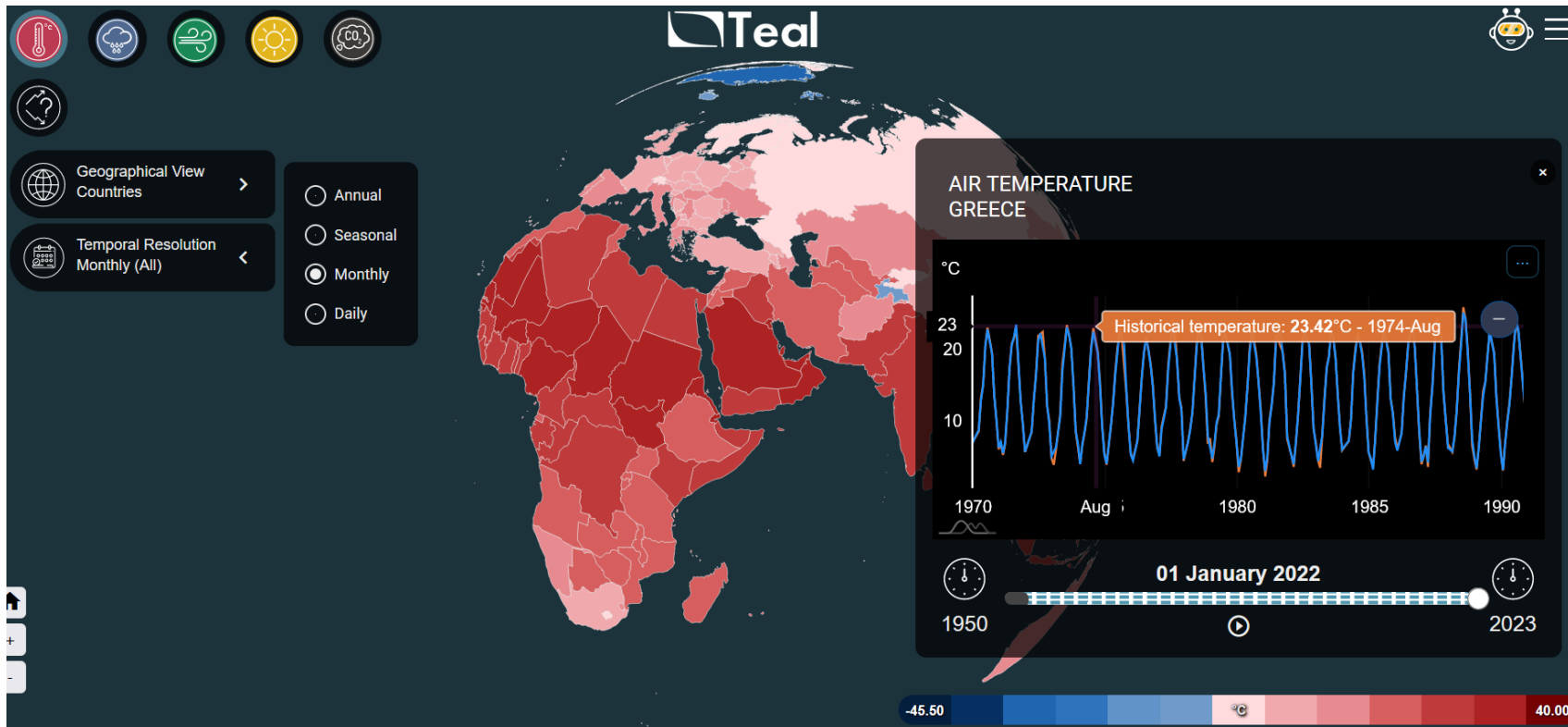
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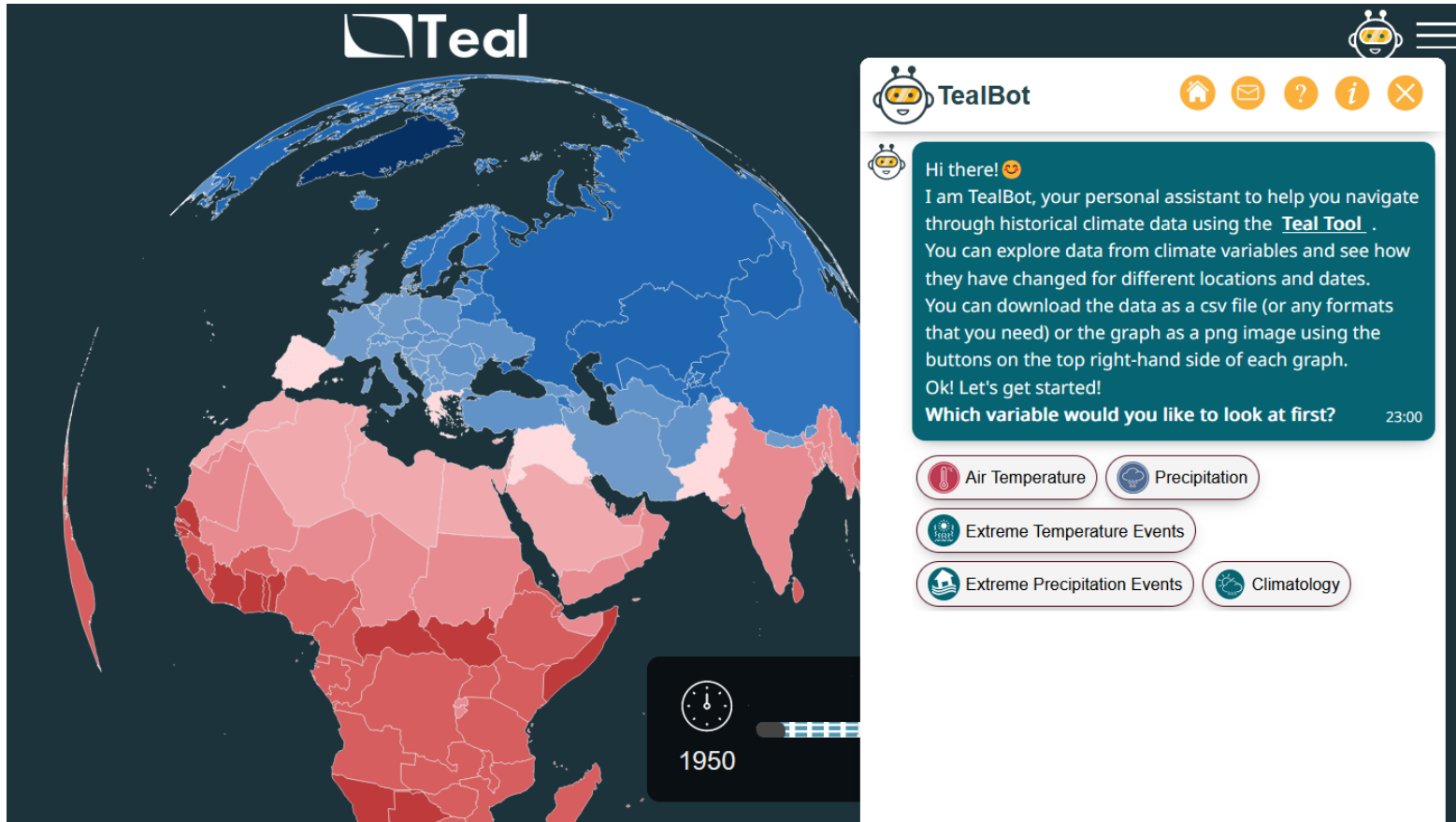
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<https://tealtool earth>

Hint - Historical monthly temperature data

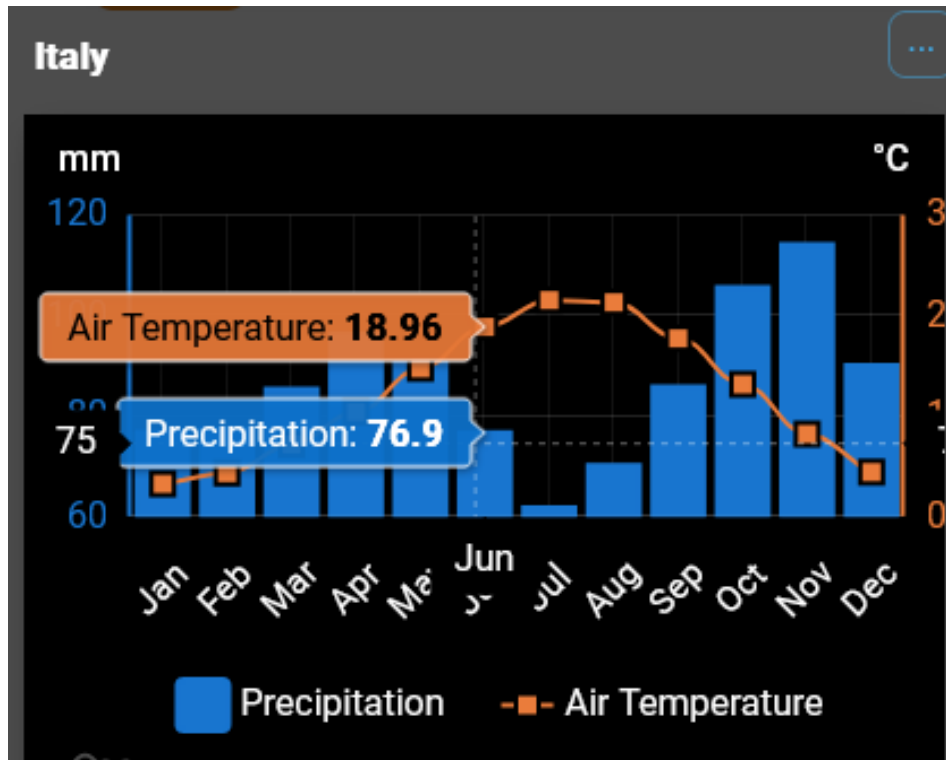


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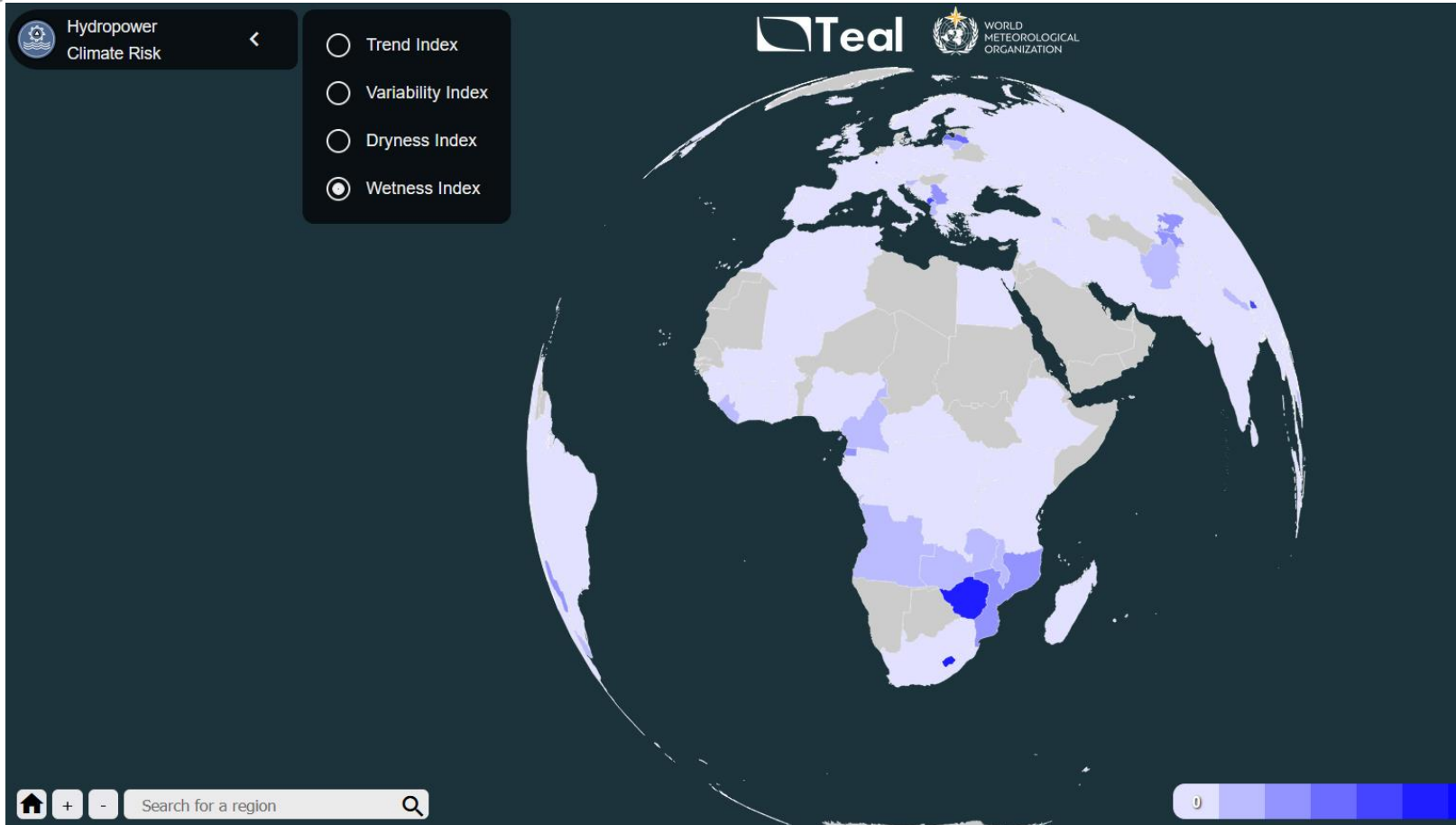
category	per	temp
Jan	77.06	3.33
Feb	77.59	4.41
Mar	85.53	7.24
Apr	96.52	10.48
May	90.83	14.84
Jun	76.9	18.96
Jul	62.01	21.63
Aug	70.41	21.41
Sep	86.06	17.82
Oct	105.81	13.24
Nov	114.42	8.29
Dec	90.35	4.5

TealBot chart or data download gives Temp 18.96°C, ppn 76.9mm





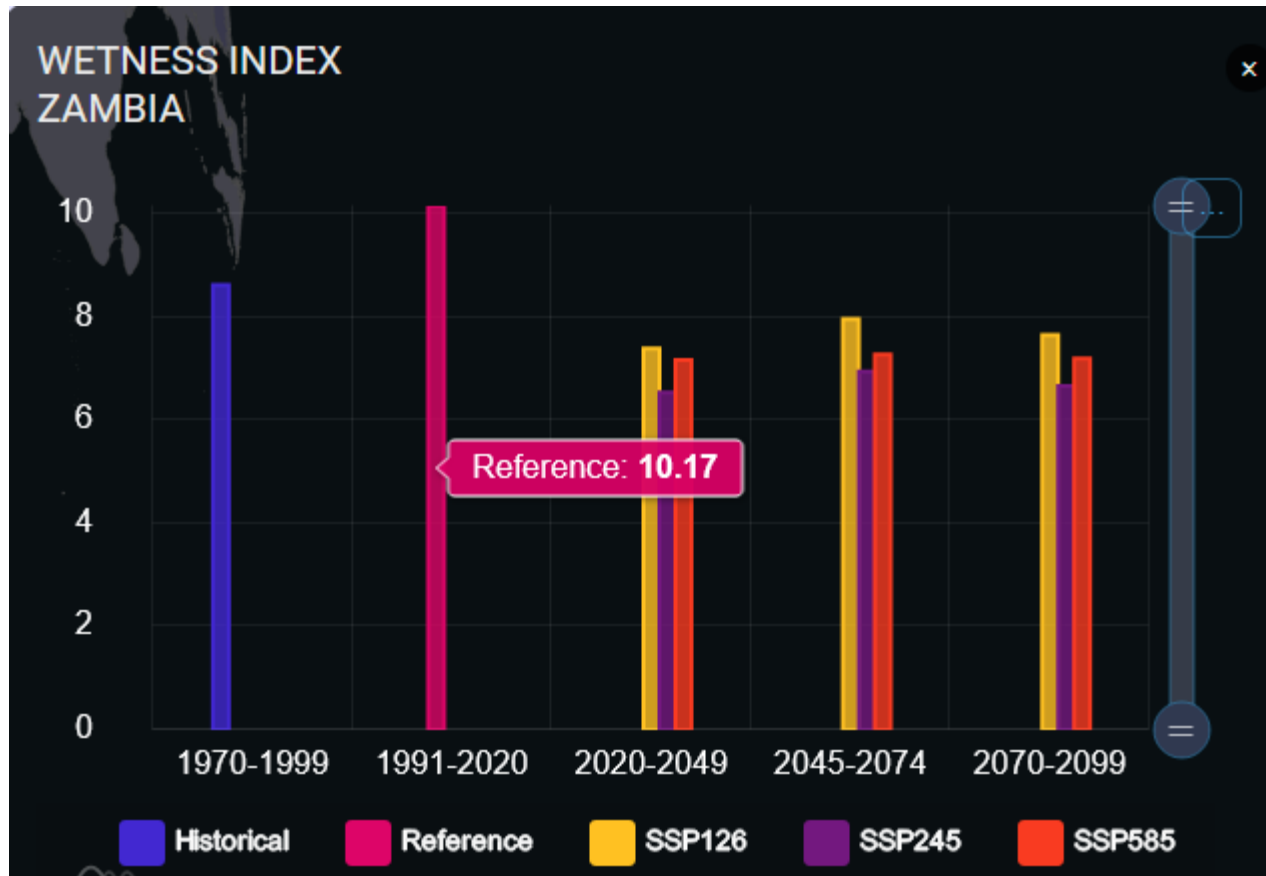
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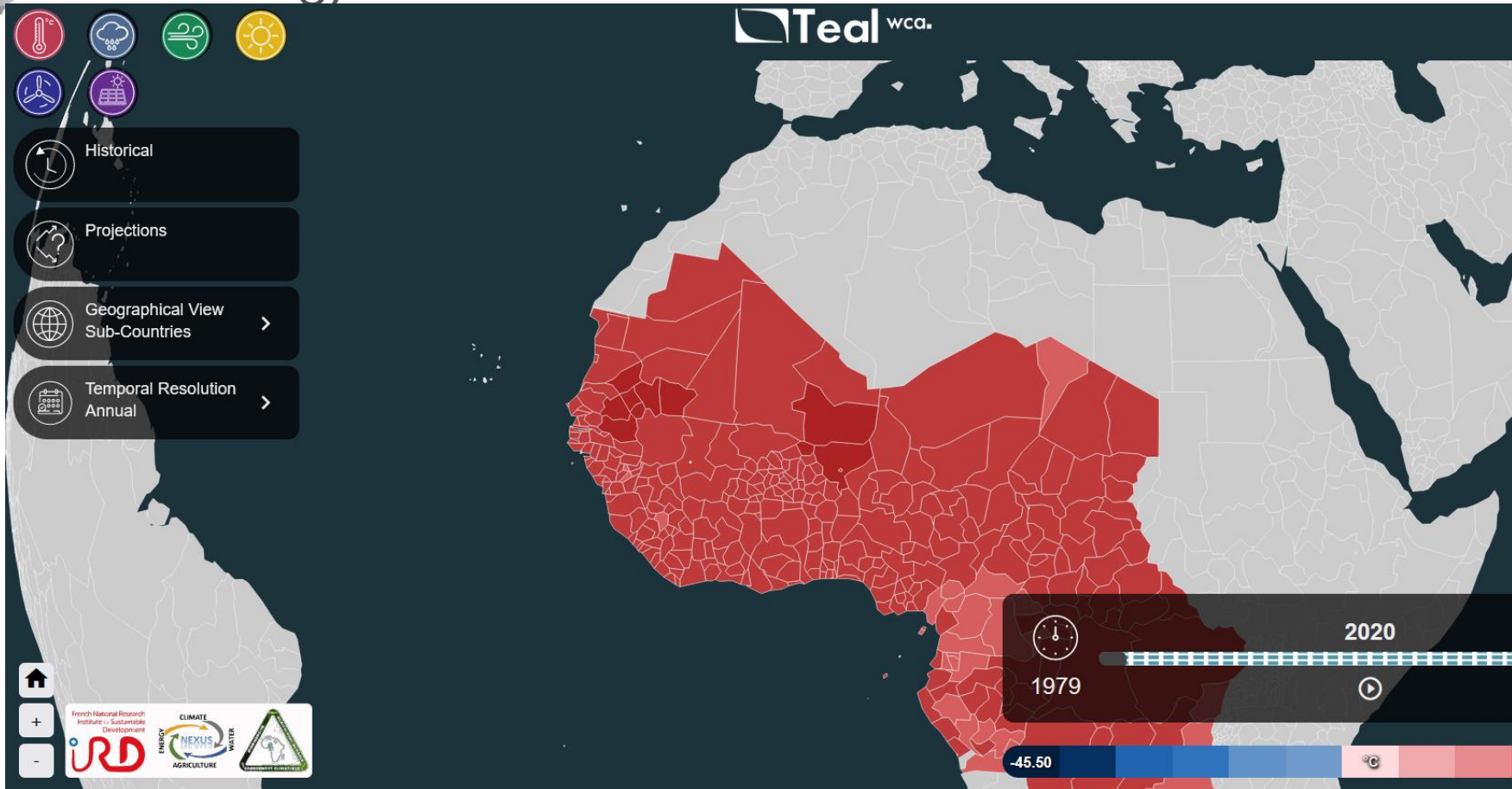
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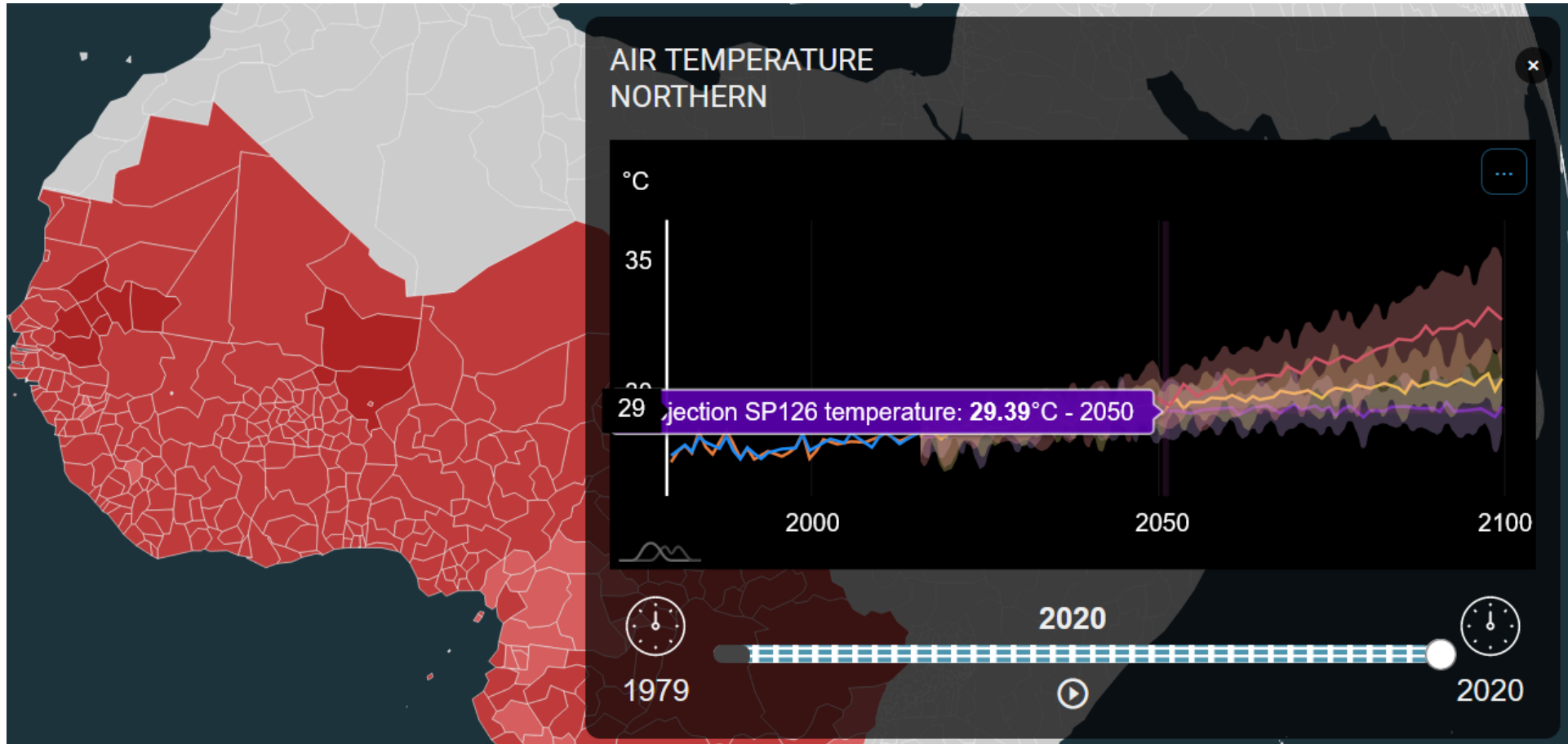
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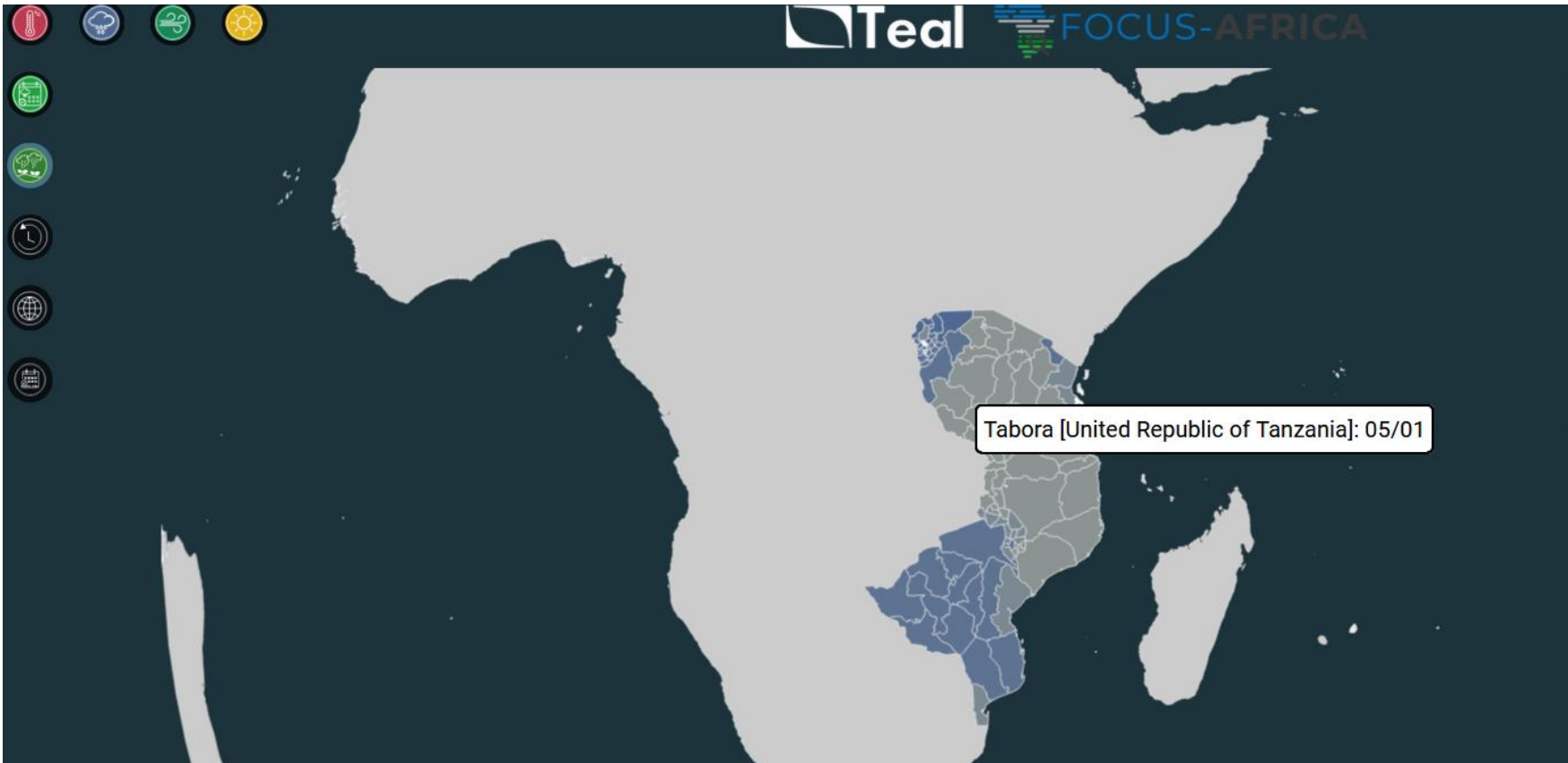


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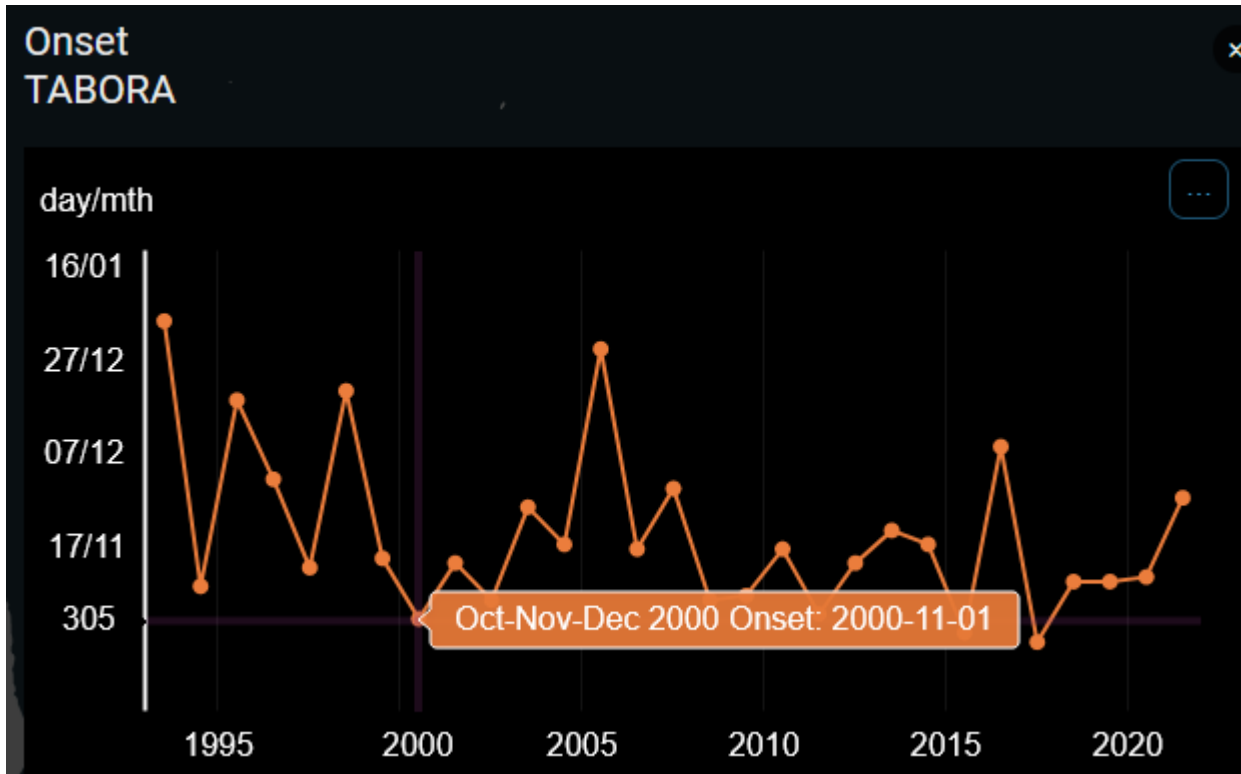




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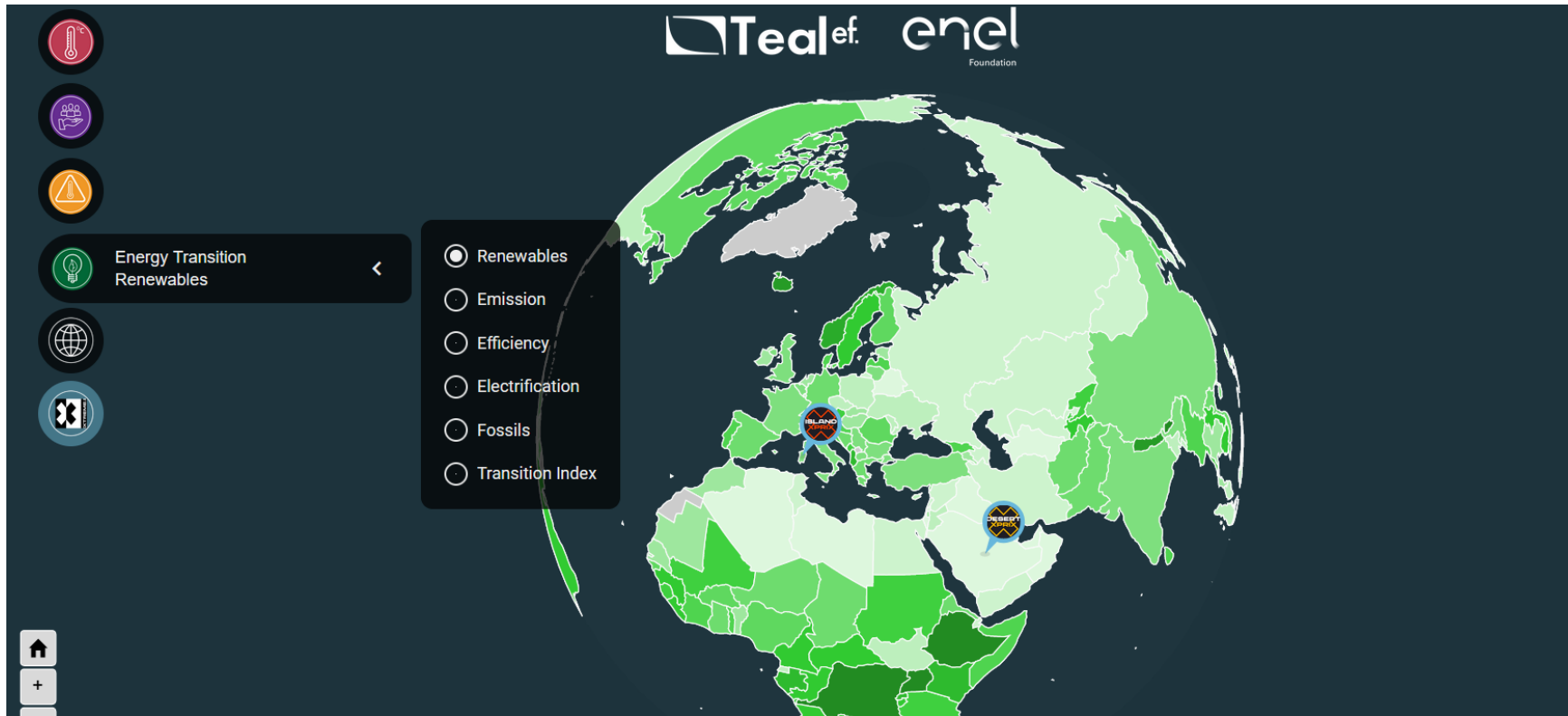
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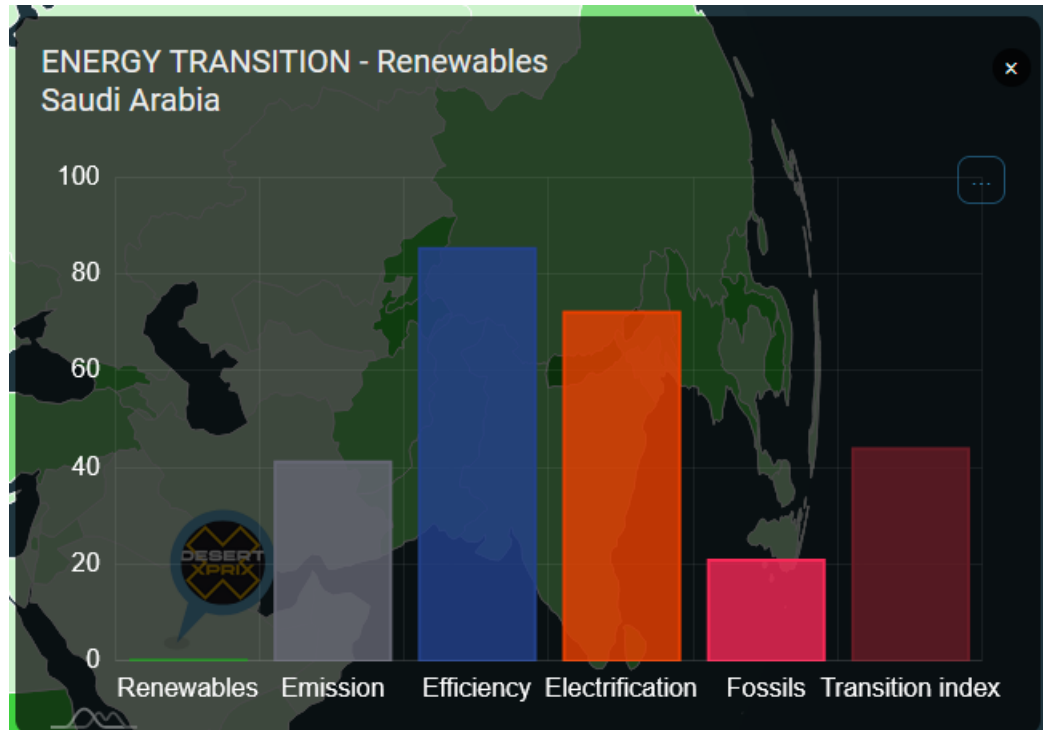


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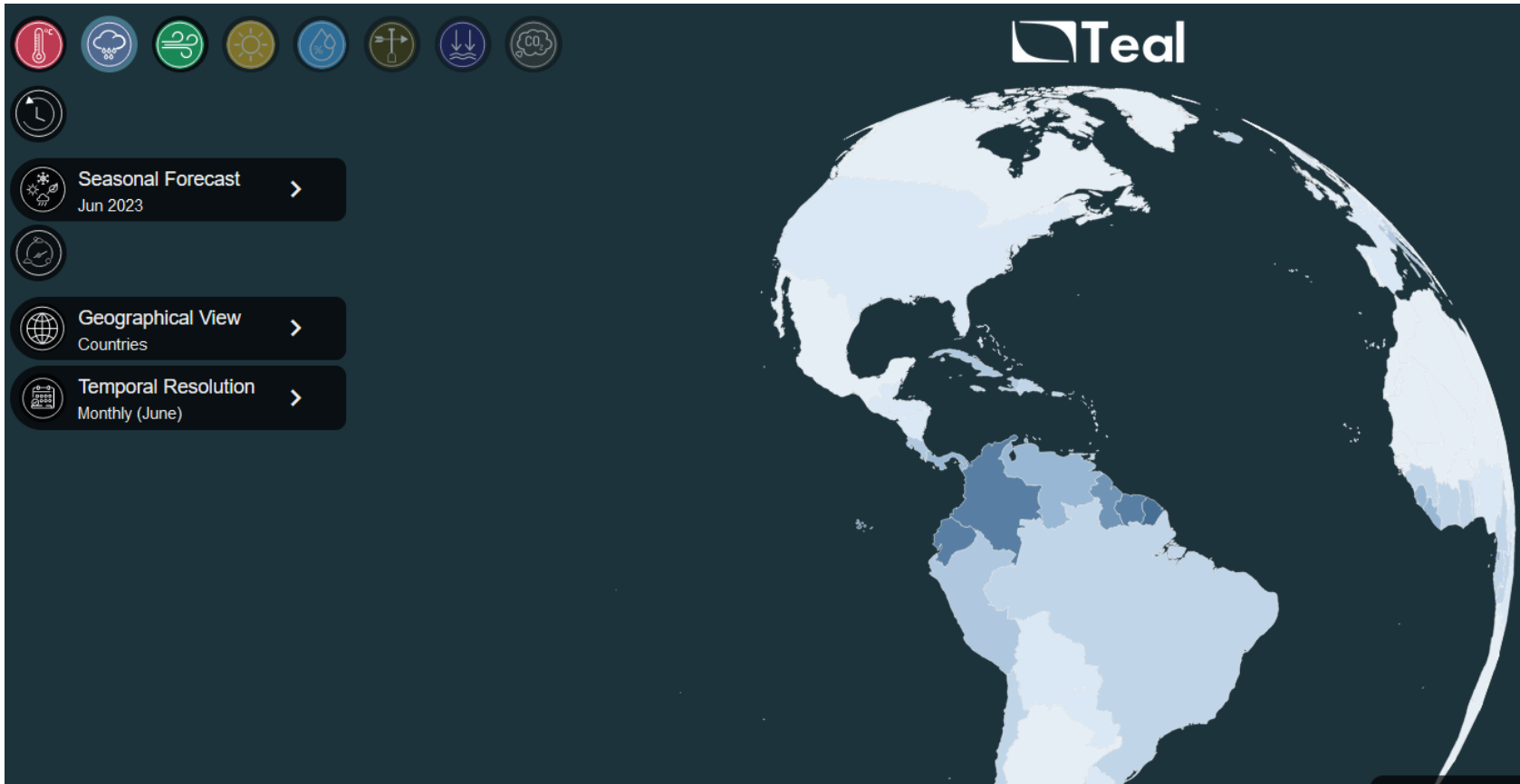


TEAL-graph.html

category	value
Renewables	0.282881179713009
Emission	41.2572843202959
Efficiency	85.4283512157635
Electrification	72.2412387567391
Fossils	20.9606457357466
Transition index	44.0340802416516



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<https://demo.tealtool.earth>

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