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PŘEDSTAVENÍ PROJEKTU I4C
&
ADAPTALAB 2025

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Funded by the European Union

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Impetus4Change (I4C): Improving near-term climate predictions for societal transformation

impetus4change.eu

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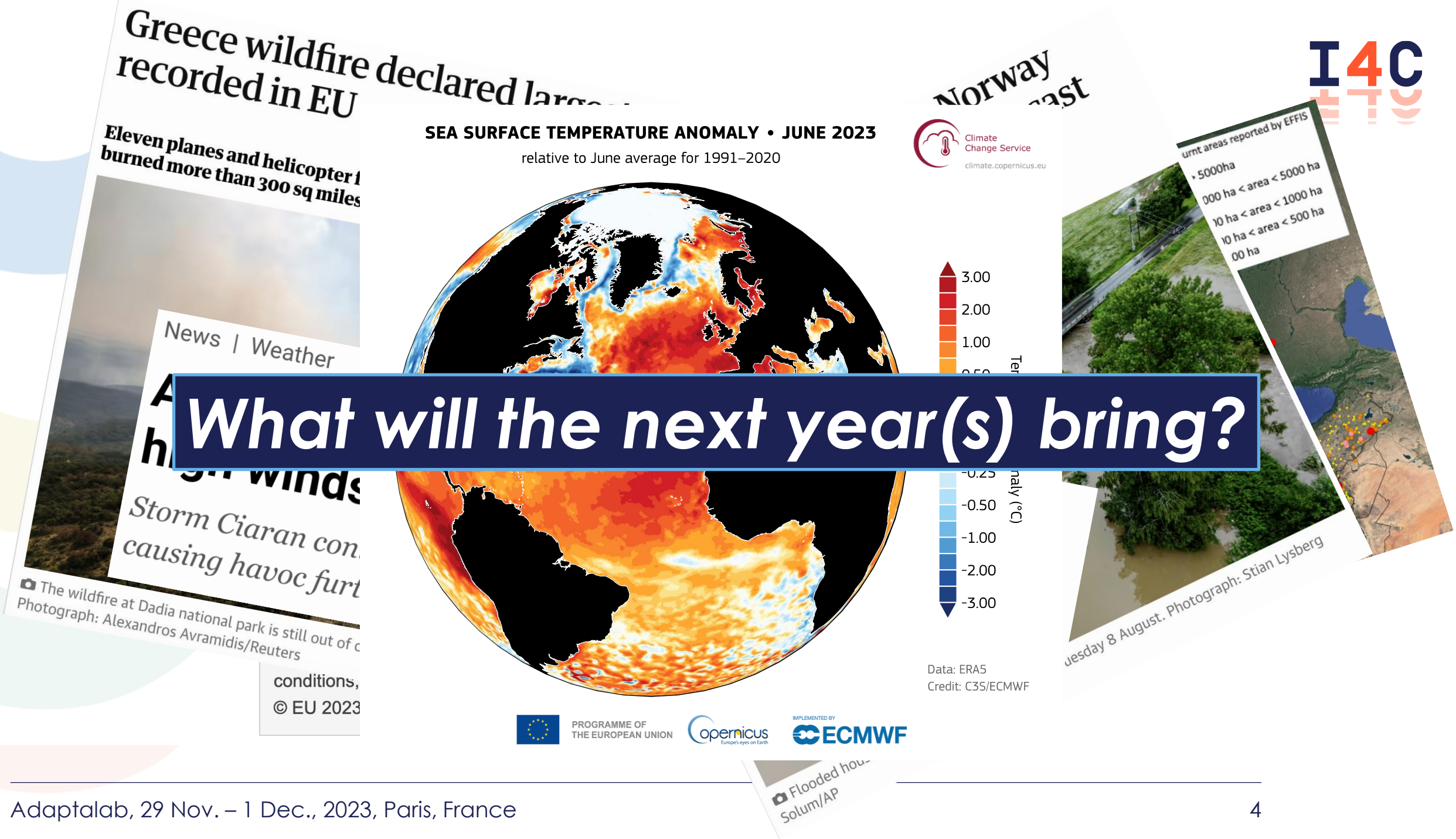
This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No 101081555

NORCE

BJERKNES CENTRE for Climate Research

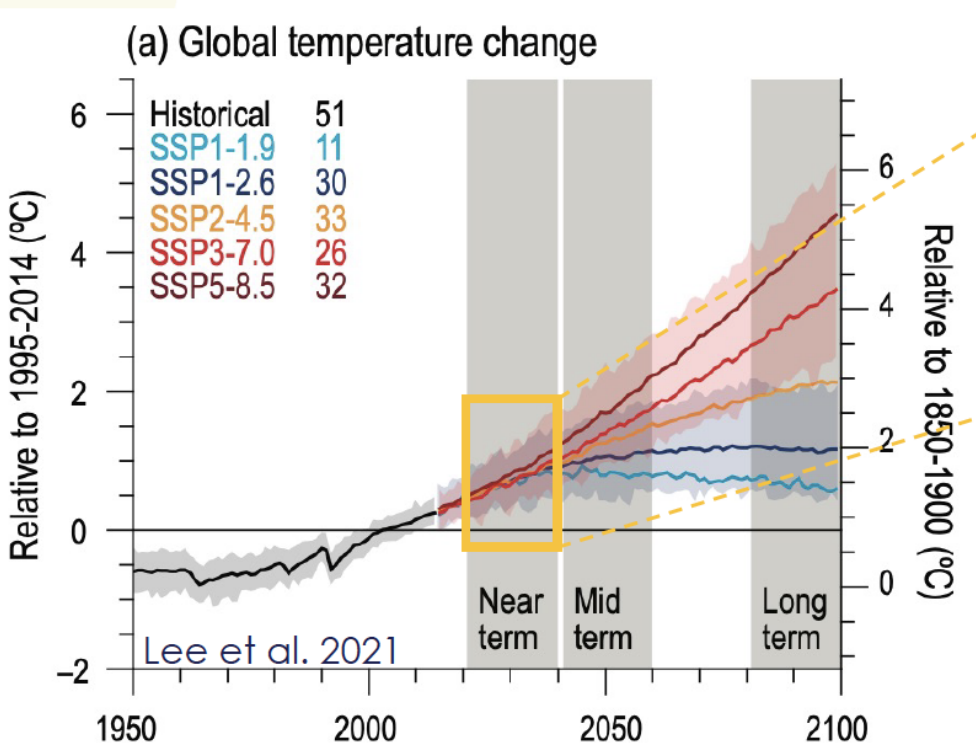
I4C Partners & Collaborators

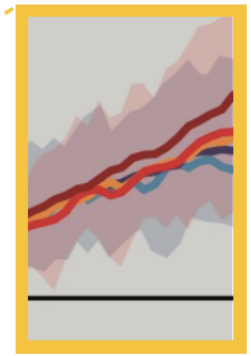


What will the next year(s) bring?

Some background on “near-term” climate change

- **Near-term** climate is now - ~2035





- Small difference amongst scenarios
- Uncertainy is dominated by **climate internal variability**

2023 - 2035

The Internal climate variability is intrinsic to the climate system, generated by interactions of its components

Some background on “near-term” climate change

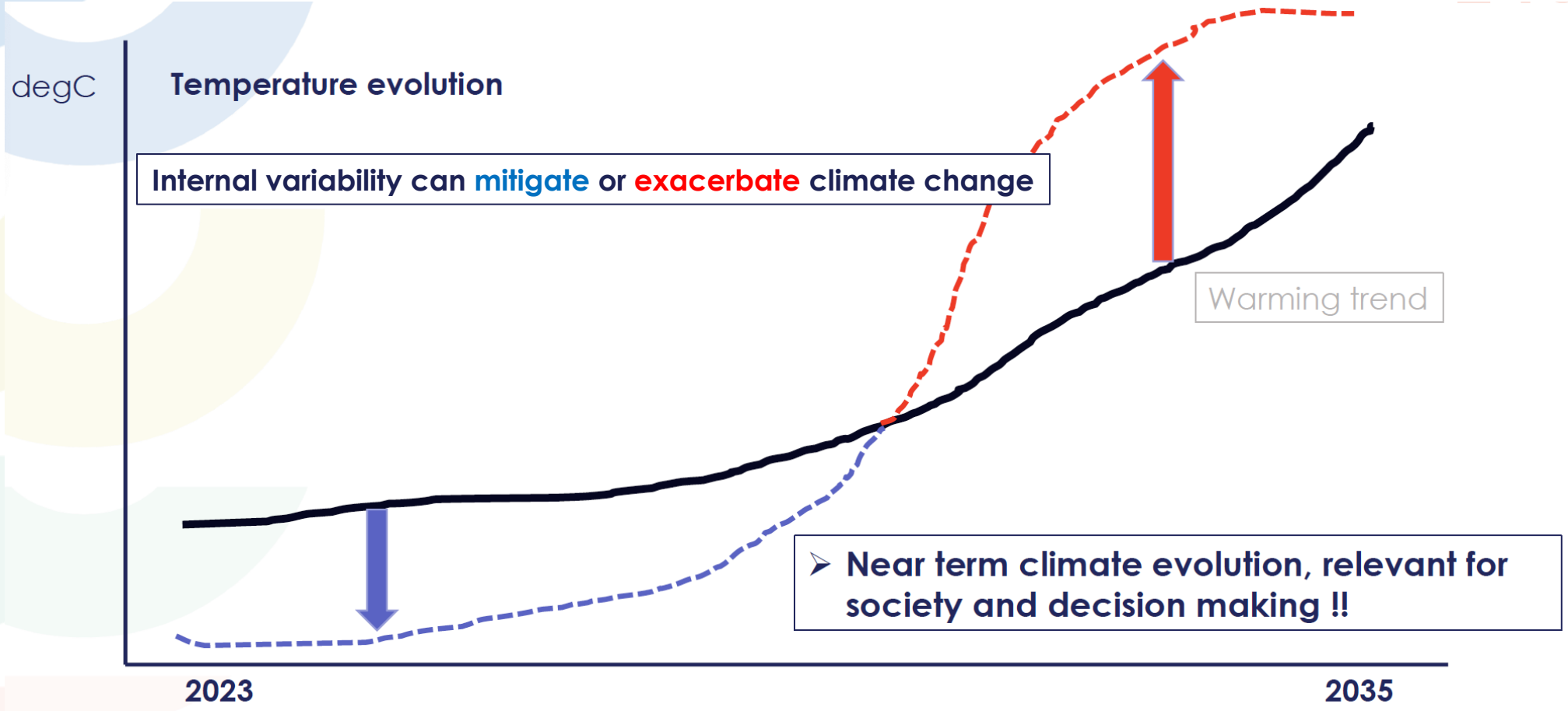
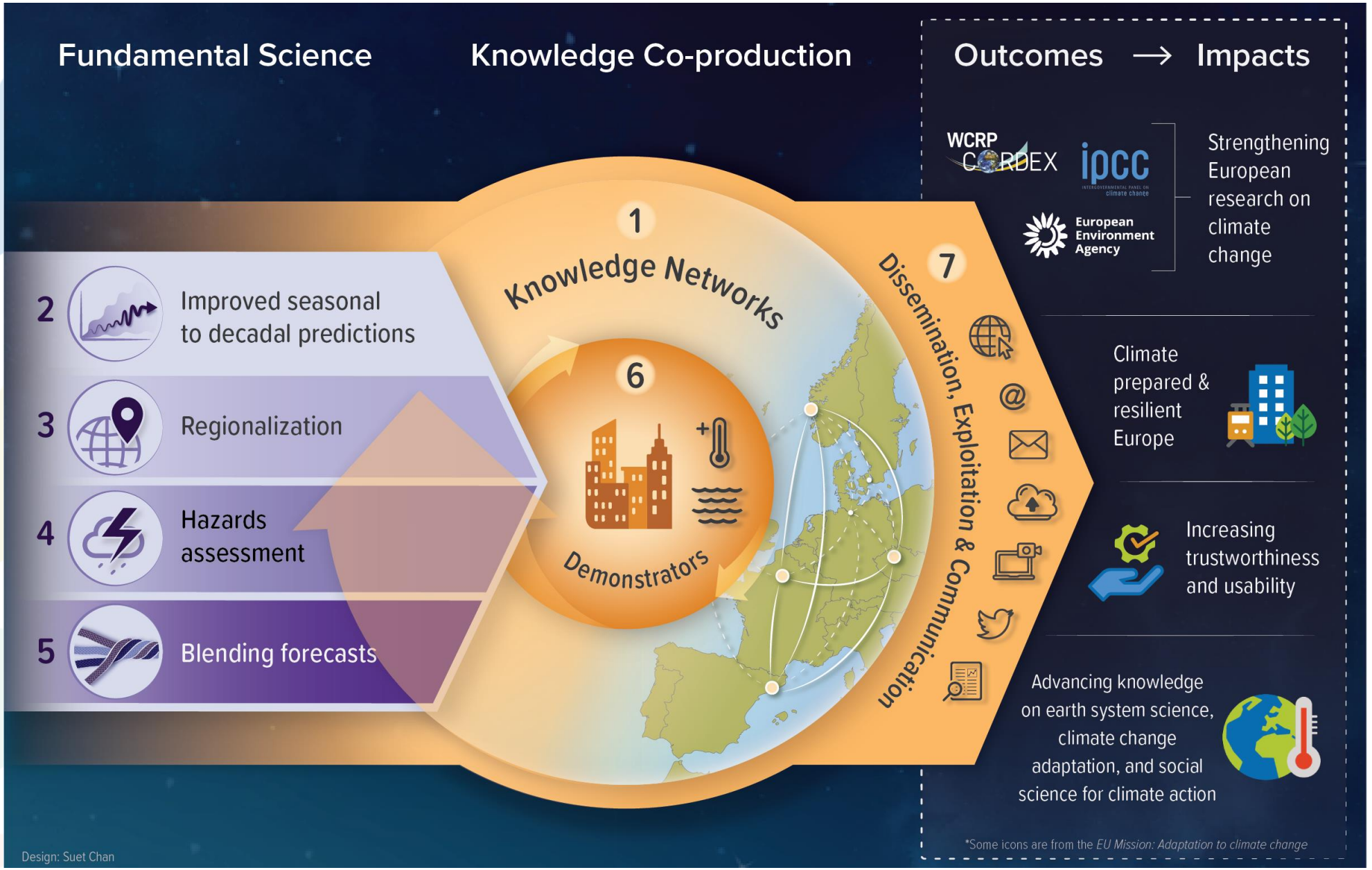


Figure courtesy of Emilia Sanchez-Gomez (CERFACS)


Fundamental Science
Knowledge Co-production
Outcomes → Impacts
2
Improved seasonal to decadal predictions
3
Regionalization
4
Hazards assessment
5
Blending forecasts
1
Knowledge Networks
6
Demonstrators
7
Dissemination, Exploitation & Communication
WCRP
CORDEX
ipcc
European Environment Agency
Strengthening European research on climate change
Climate prepared & resilient Europe
Increasing trustworthiness and usability
Advancing knowledge on earth system science, climate change adaptation, and social science for climate action
Design: Suet Chan
*Some icons are from the EU Mission: Adaptation to climate change

Our urban areas are an integral part of the solution to climate change

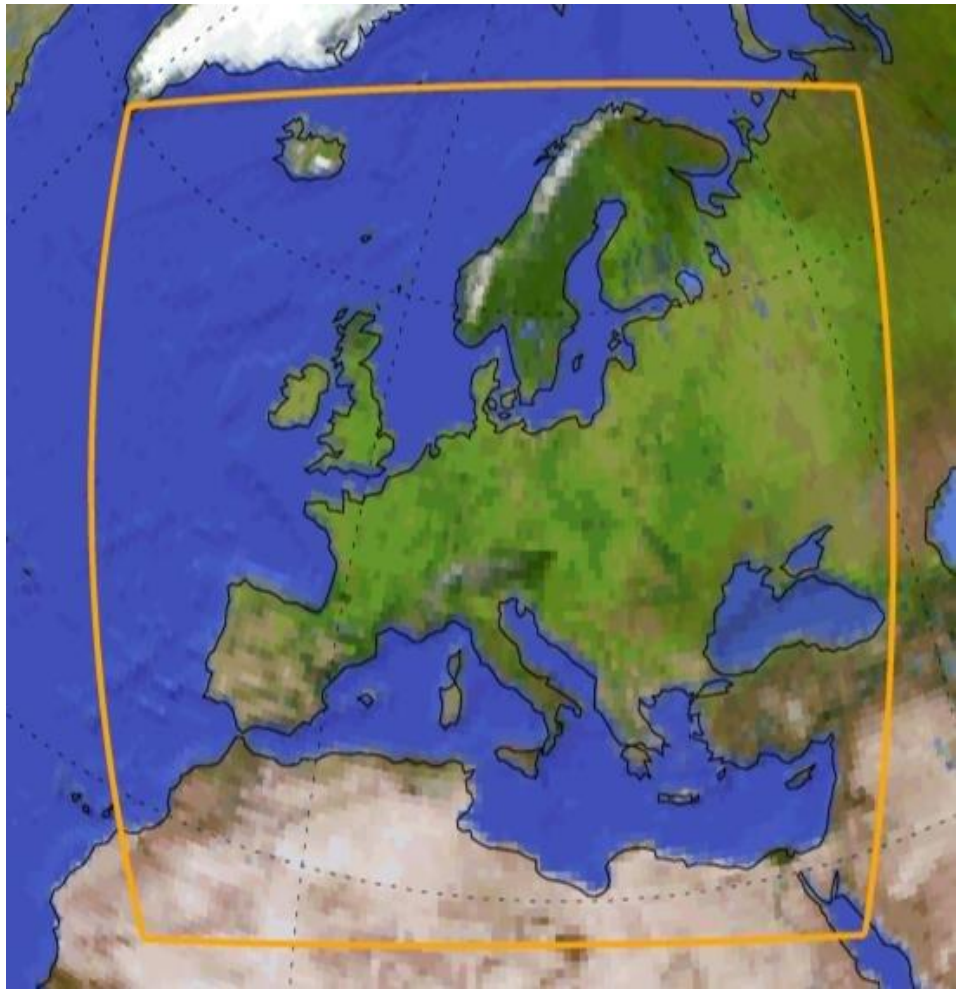
Hazard Indices

- Worked with demonstrators from start of project to develop list of hazard indices
- 19 general indices and 4 demonstrator-specific indices
- All calculated indices will be available through an online toolkit
- Details of indices given in Deliverable 4.1 report (delivered in June 2023)

1. EURO-CORDEX - full European domain
2. Existing convection permitting climate model (CPCM) simulations – various domains
3. Calculate from simulations and emulations from WP3 – three domains

Indices in EURO-CORDEX

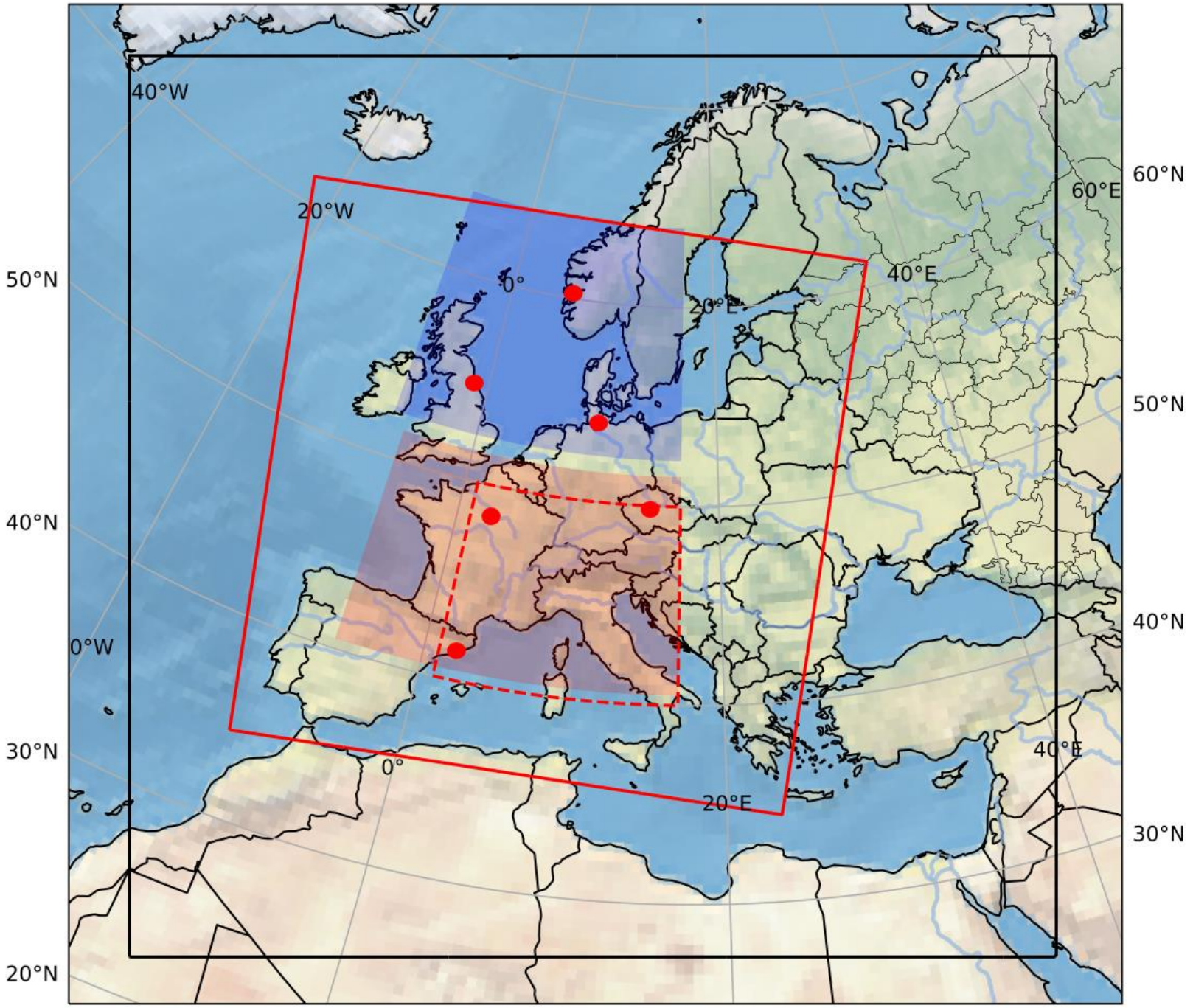
- 0.11° (~11 km) horizontal resolution
- 67 simulations
  - 8 GCMs
  - 12 ensemble runs total
  - 15 RCMs
- 412 by 424 grid points
  (Some variation in different models)
- Indices as timeseries of 1980-2100 and for Global Warming Levels (GWLs)
- Indices available in NetCDF format



EURO-CORDEX Calculation Status

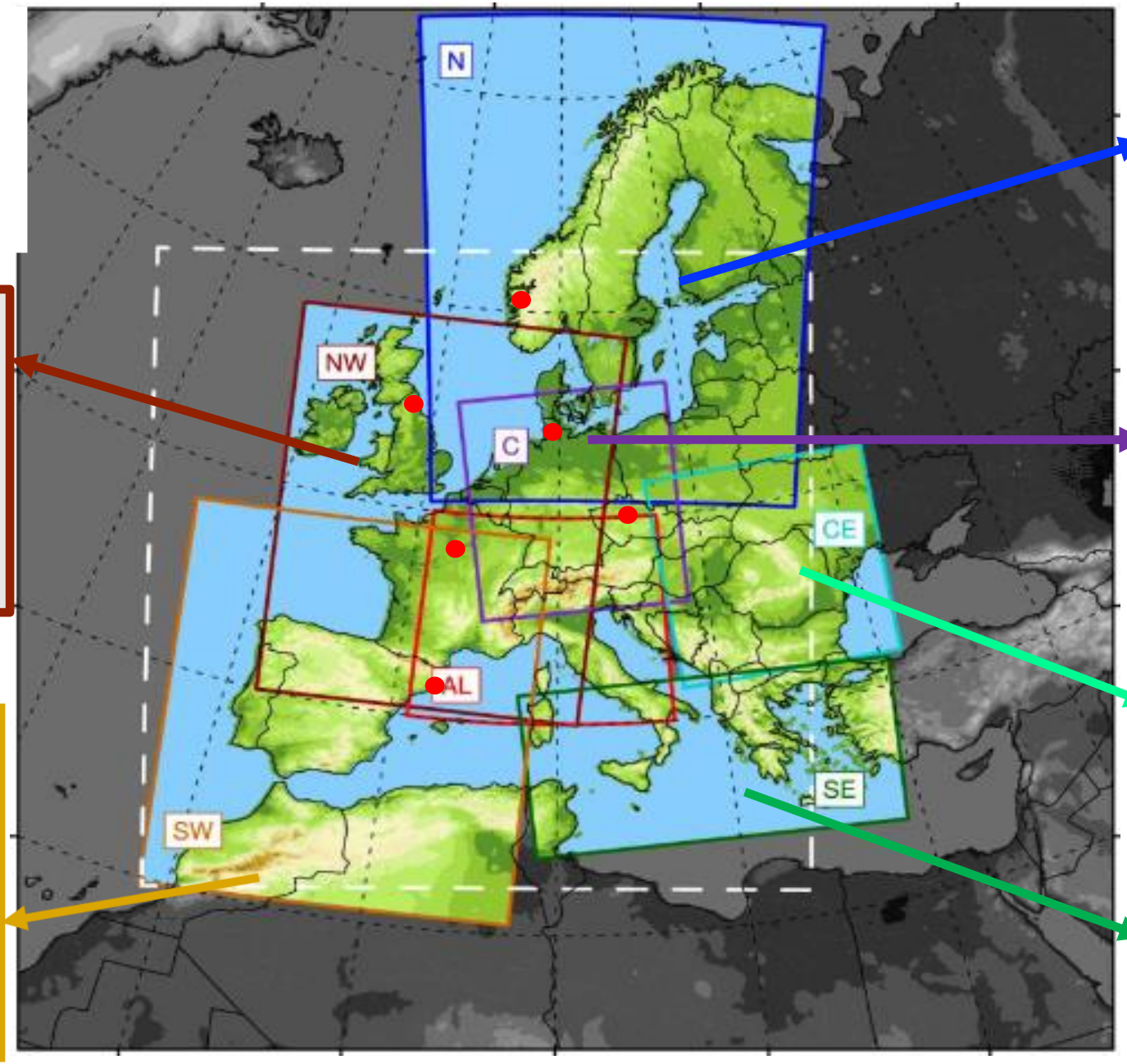
Hazard Index	Status
TNnTrop Annual	Complete
TNnEqua Annual	Complete
Tx25 Annual	Complete
HW Annual	Complete
HEvent Annual	Complete
EHF (Excess Heat Factor)	In Progress
NOAA Heat index (HI)	Complete
CDD Annual	In Progress
HDD Annual	In Progress
PrRnn	Complete
RX1day Annual	Complete
Rnnmm Annual	Complete

Hazard Index	Status
CWD Annual	Complete
RxHhr	Complete
RHhrTmm	Complete
SPI 6 months	Complete
NDD	Complete
DF Decadal	Complete
FWI	Complete
Q100 Annual	Complete
Météo France Index	Complete
H-ASI	Complete
Meteo Cat Heat Events	Complete



Defined domains for the **NEW CP simulations**, CMIP6 driven!

CP simulations from CORDEX-FPS CONV: ready-to-use!!



NEU-3:
1. MPI-M-MPI-ESM-LR_ r1i1p1_GERICS-REMO2015_v1
2. ICHEC-EC-EARTH_ r12i1p1_HCLIMcom-HCLIM38-AROME

NWE-3:
1. CNRM-CERFACS-CNRM-CM5 _r1i1p1_CNRM-AROME41t1
2. ECMWF-ERAINT_ r1i1p1_KNMI-HCLIM38h1-AROME

CEU-3:
1. MPI-M-MPI-ESM-LR_ r1i1p1_GERICS-REMO2015_v1

CEE-3:
1. MOHC-HadGEM2-ES_ r1i1p1_ICTP-RegCM4-7
2. ICHEC-EC-EARTH_ r12i1p1_SMHI-HCLIM38-AROME

SW-3:
1. ICHEC-EC-EARTH_ r12i1p1_CLMcom-CMCC-CCLM5-0-9

SWE-3:
2. IPSL-CM6A-LR_ r1i1p1f1_IPSL-RegIPSLv1

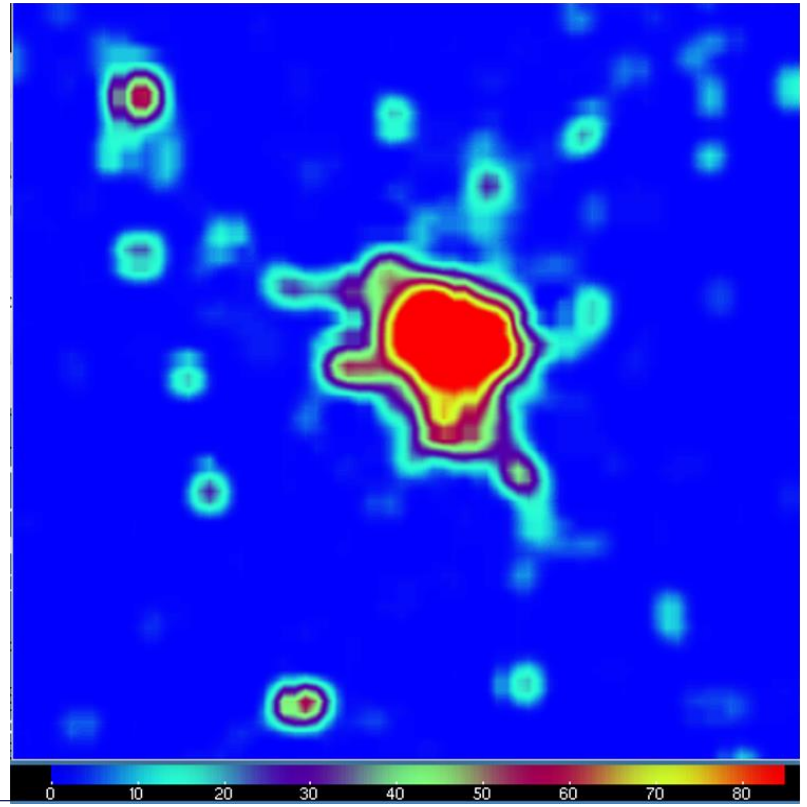
SEE-3:
1. MOHC-HadGEM2-ES_ r1i1p1_ICTP-RegCM4-7

Urban Heat Islands: a methodology to distinguish between city and countryside

(thanks to: Johannes De Leeuw, ICTP and Rita Nogherotto CNR-ISAC, ICTP)

- City outlines selected using the urban fraction mask from CLM4.5 (used by RegCM4.7 CORDEX-FPS CONV simulation)
- City tag is given where the city fraction > 40%
- Countryside tag is given to the points where city fraction <10% in the domain.

City fraction for Paris in CLM 4.5

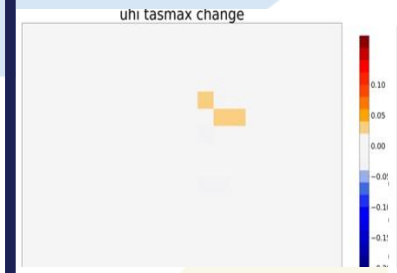


Urban Heat Islands: Fire Weather Index

PARIS

EUR-11

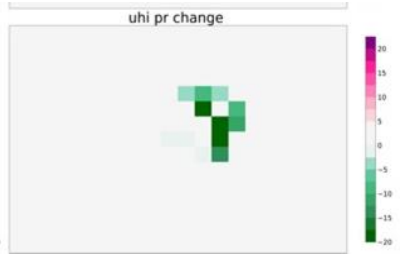
TASMAX



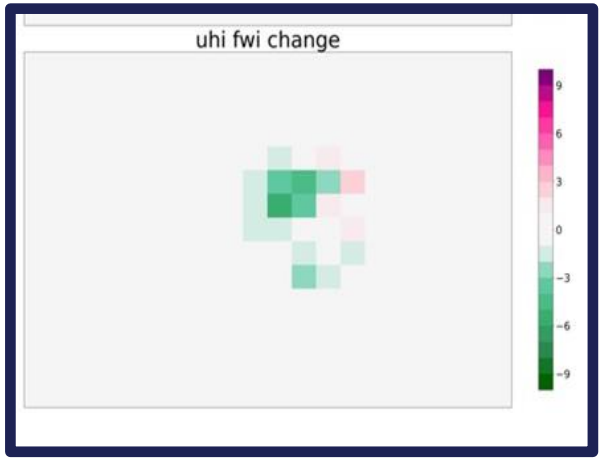
HURS

SFCWINDMAX

PR

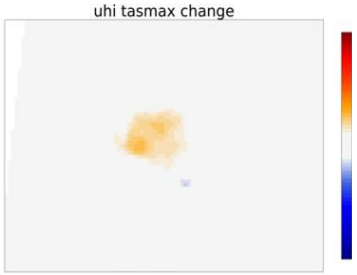


FWI

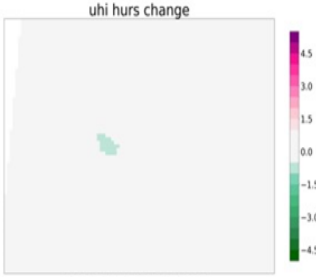


ALP-3

TASMAX

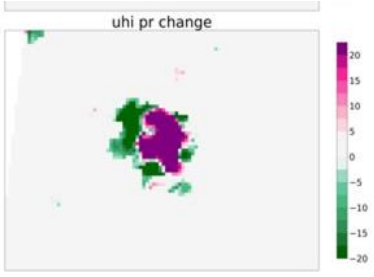


HURS

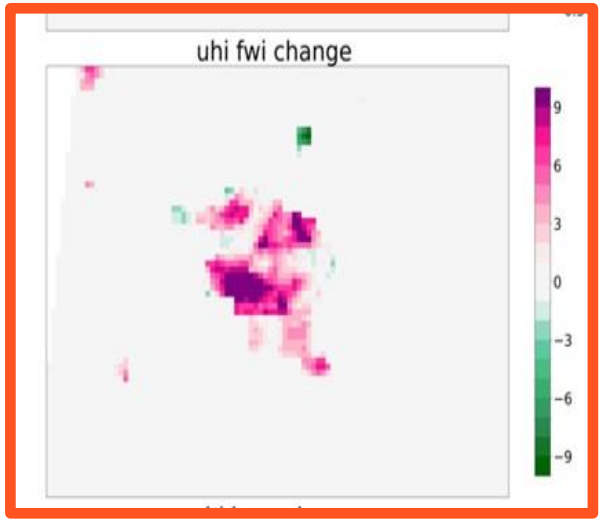


SFCWINDMAX

PR



FWI



~~What information can I4C provide?~~ What can we do together, in partnership?

- Recent extreme summers over Europe have many asking what next year(s) will bring; I4C can help and provide guidance.
- Improved information about the ***near-term*** effects of climate change in your local area that provide the scientific basis for decision-making/planning
- Tailored information on extreme events, their frequency and magnitude (by sector, type of event or by impact).
- We develop this information together; I4C wants to work with you.
- Adaptalabs are an opportunity to share experiences with and learn from each other.

Two weeks after storm "Hans"

Photo: Bård Bøe

I4C Climate Adaptalab 2

11-13 March 2025, Barcelona

impetus4change.eu

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Background information and group assignment

What is a climate service?

A climate service is a resource that delivers essential climate-related information, data, and expertise to individuals, organizations, and communities. Its goal is to enhance understanding, preparation, and response to the challenges posed by climate change. Effective climate services appreciate the importance of context and provide tailored insights to support informed decision-making, risk assessment, and adaptation strategies in the real world.

Through working closely with local stakeholders, the services developed within I4C aim to support urban adaptation planning. In particular, the information should be tailored to address hazards and impacts arising from near-term climate change in each demonstrator city (Barcelona, Paris, Bergen, Prague) or test bed city (Newcastle and Hamburg). Further, the co-production process underlying the development of the climate services is equally important to consider, as it will be used as a framework for the application of co-production of climate services in other use contexts.

Climate services tackle different challenges and respond to different needs; they thus come in various formats, such as:

What is a mock-up?

A climate service mock-up is a prototype that offers a first view of the appearance and functionality of the intended climate service platform or app. Mock-ups help to refine ideas and collect feedback before the actual development of the climate service begins. They are typically created by groups including some or all of stakeholders, researchers, designers and developers. ,

Some of the elements of mock-ups could include:

1. **Format and Aim:** Exploring and clarifying ideas for the climate service's information format, how it will be accessed, and how it could inform decision making.
2. **User Interface (UI) Elements:** Imagining how users navigate through different aspects, what graphical features are included, and how the climate information, menus and other aspects might be displayed on the selected medium.
3. **Data Presentation:** Clarifying what climate data will be delivered and how depending on the chosen format – e.g., depicting or sketching temperature graphs, precipitation maps or trends; or drafting an outline of a training manual – to ensure user-friendly comprehension.
4. **Development process:** Specifying how the climate service will be co-produced and tested with stakeholders to ensure quality, reliability and its fitness for purpose.
5. **Visual Design:** Showcasing colour palette, typography, imagery to ensure a pleasing interface that is congruent with the climate service's branding and intent.

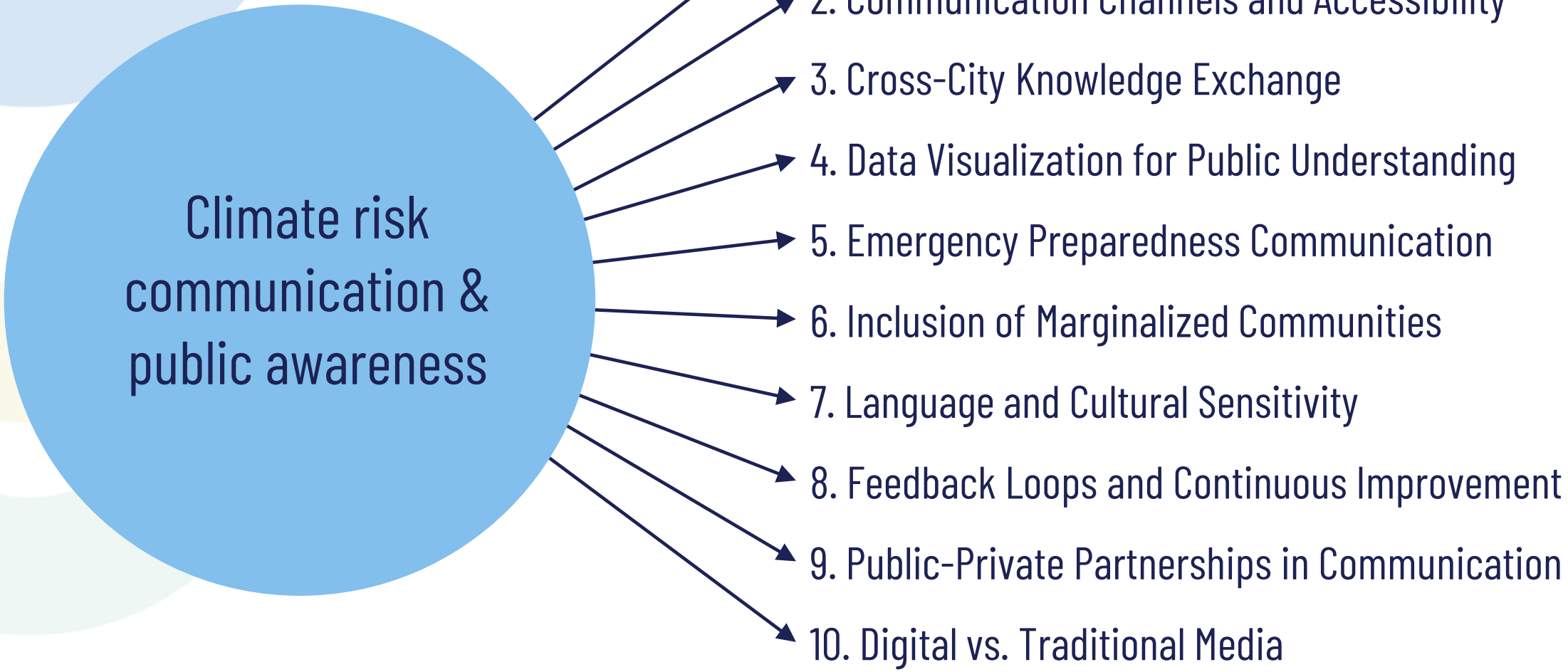
Flood risk & coastal protection

Climate risk communication & public awareness

Drought management

Disaster preparedness & Emergency response


Flood risk &
coastal protection
1. Critical infrastructure at risk
2. Nature-based solutions
3. Community-preparedness & response
4. Cross-sector collaboration
5. Data-driven risk mapping
6. Long-term policy integration
7. Flood risk and housing vulnerability
8. Cultural heritage and protection from flooding
9. Economic impact modelling of flood events
10. Sustainable flood management through urban design


Climate risk communication & public awareness
1. Sector-Specific Training Needs:
2. Communication Channels and Accessibility
3. Cross-City Knowledge Exchange
4. Data Visualization for Public Understanding
5. Emergency Preparedness Communication
6. Inclusion of Marginalized Communities
7. Language and Cultural Sensitivity
8. Feedback Loops and Continuous Improvement
9. Public-Private Partnerships in Communication
10. Digital vs. Traditional Media


Drought management
1. Water Resource Allocation
2. Green Infrastructure for Heat Reduction
3. Prioritizing Drought and Heat Interventions
4. Stakeholder Engagement
5. Cross-City Learning and Adaptation
6. Climate Data Integration in Drought Planning
7. Public Awareness and Education on Drought
8. Monitoring and Early Warning Systems
9. Equitable Water Management
10. Collaboration between Public and Private Sectors


Disaster preparedness & Emergency response
1. Improving Disaster Response Processes
2. Integrating Heat Mitigation into Emergency Planning
3. Community Resilience and Engagement
4. Adapting to Multiple Hazards
5. Training and Simulation Exercises
6. Cross-City Knowledge & Experience Sharing

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