Impetus4Change (I4C)

Where urban practitioners, social scientists and modellers co-create novel climate knowledge

aka Improving near-term climate predictions for societal transformation

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impetus4change.eu

@I4C_eu

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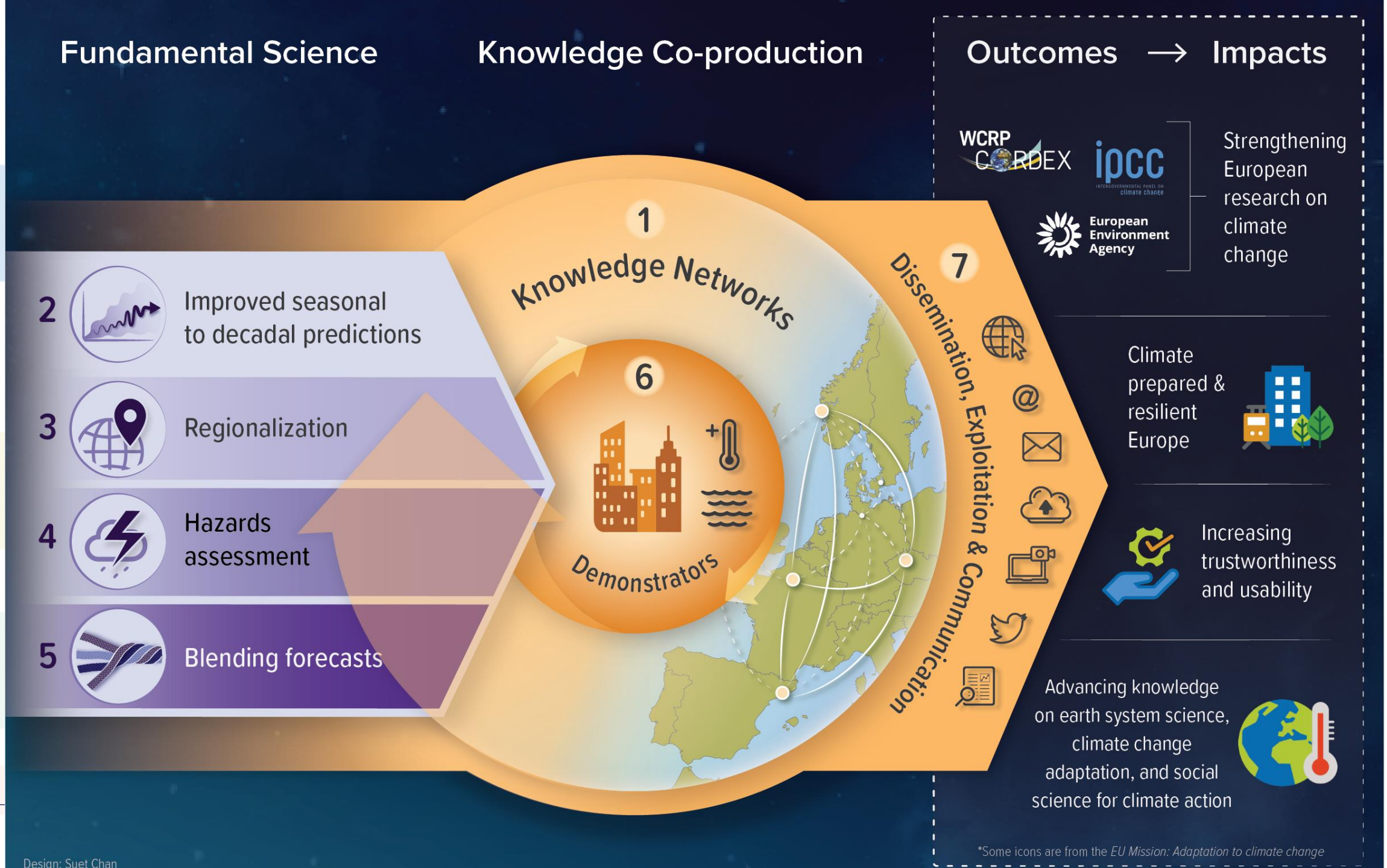
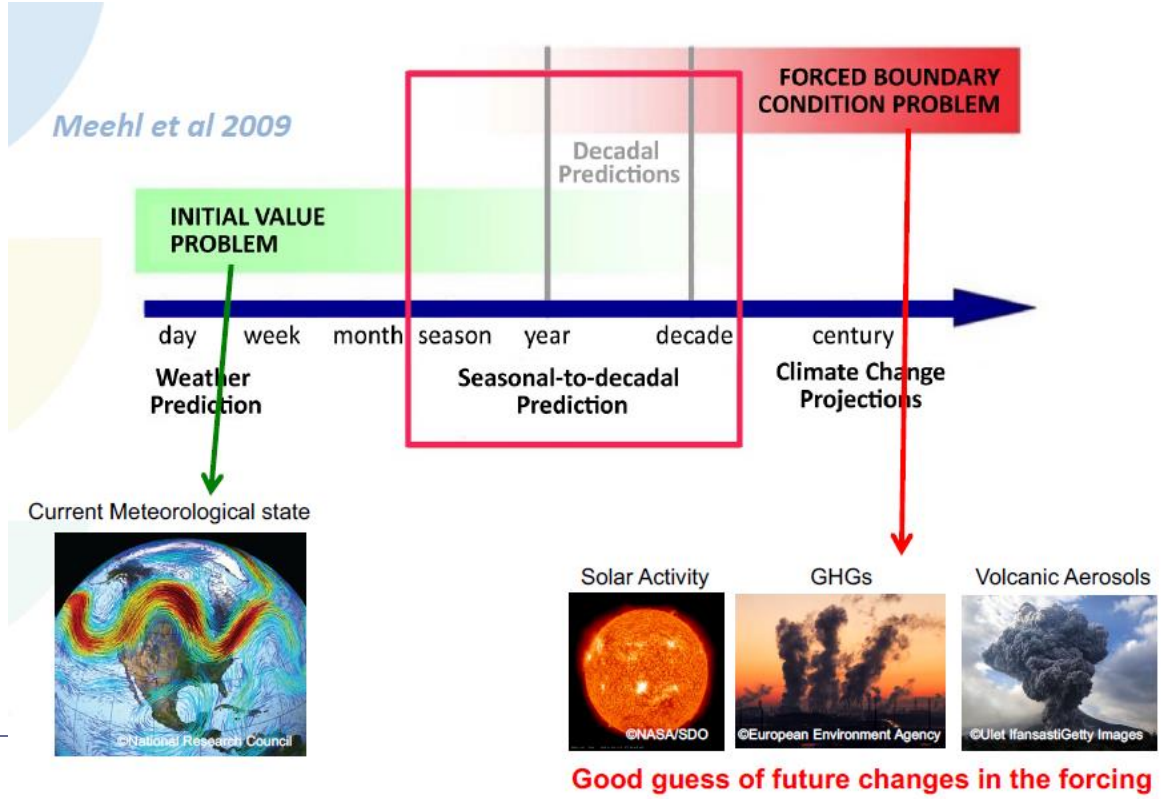
I4C Partners & Collaborators


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

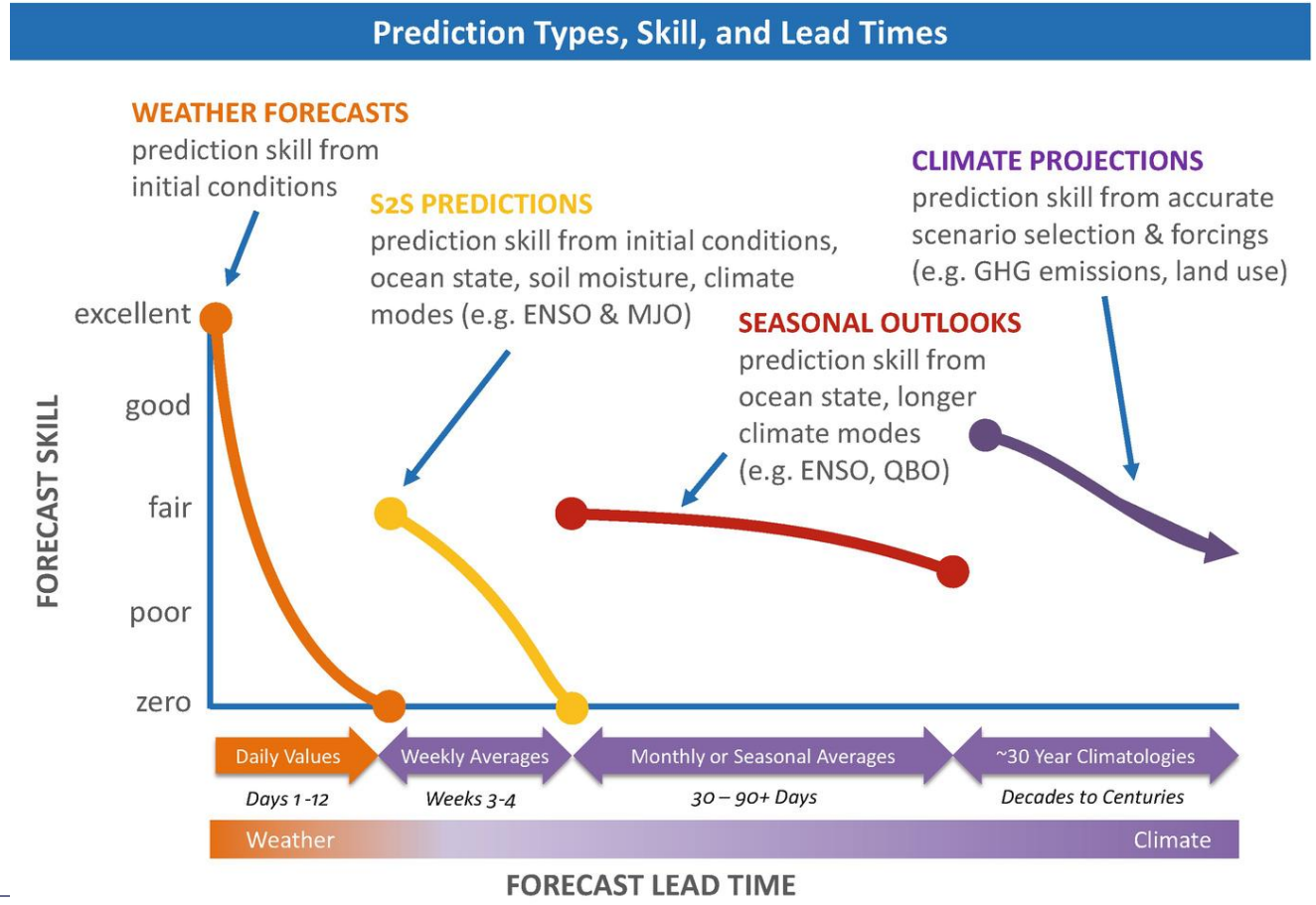
Improving S2D predictions (UiB)

- Understanding limitations in current prediction systems
- Novel filtering, supermodeling, and hybrid methods to mitigate model errors
- Performing and evaluating a new set of improved S2D predictions



Regionalization of climate predictions (CSIC)

- Statistical adjustment and downscaling
- CPRCM regional simulations
- CPRCM statistical emulators



Adapted from iri.columbia.edu/news/qa-subseasonal-prediction-project

S2S downscaling - Case study

Purpose: Delivering high-resolution predictions for the weeks of the 2024 Paris Olympics

Planned task: Conducting a sensitivity analysis to identify the optimal statistical downscaling methodology for the target weeks. The chosen method will be applied to downscale the forecast when the data is available.

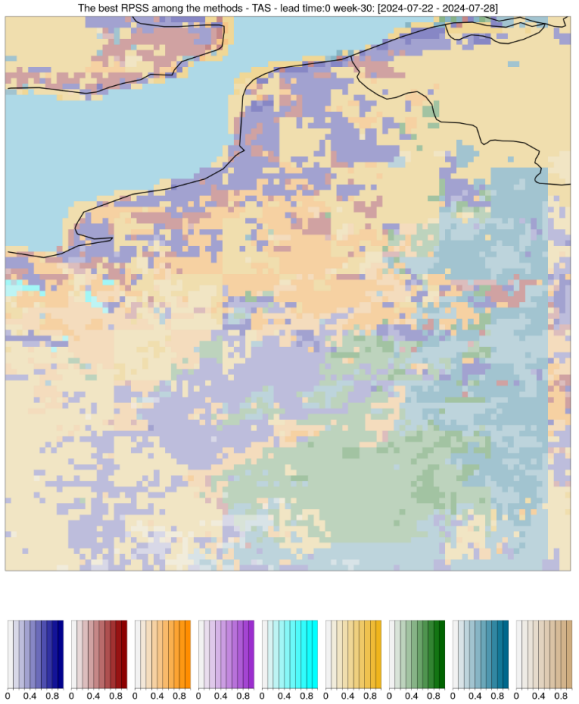
Provision time: 1, 2, 3, 4 weeks before the target weeks

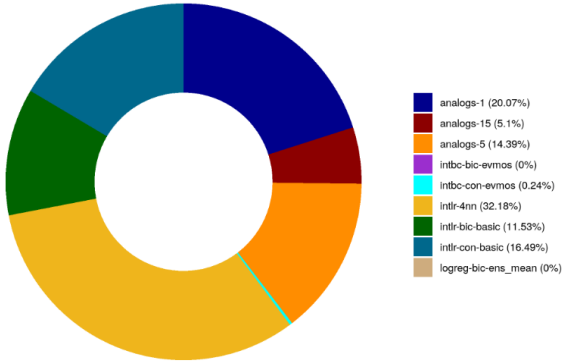
Variables: Temperature (max, min and mean)

Temporal resolution of the outputs: Weekly

Prediction system: CFSv2 (Res:~0.937°x~0.937°)

Reference data: CERRA/CERRALand (0.05° x 0.05°)





Summary

Paris olympics: Fri, Jul 26, 2024 – Sun, Aug 11, 2024

	Skill of the provided information				
	04.07.2024	11.07.2024	18.07.2024	25.07.2024	01.08.2024
Week 30: 26, 27, 28 of July				x	x
Week 31: 29, 30, 31 - July, 1, 2, 3, 4 - Aug					x
Week 32: 5, 6, 7, 8, 9, 10, 11 - Aug					

	Worse than climatology
	Low
	Moderate
	High

Use seasonal predictions !!!

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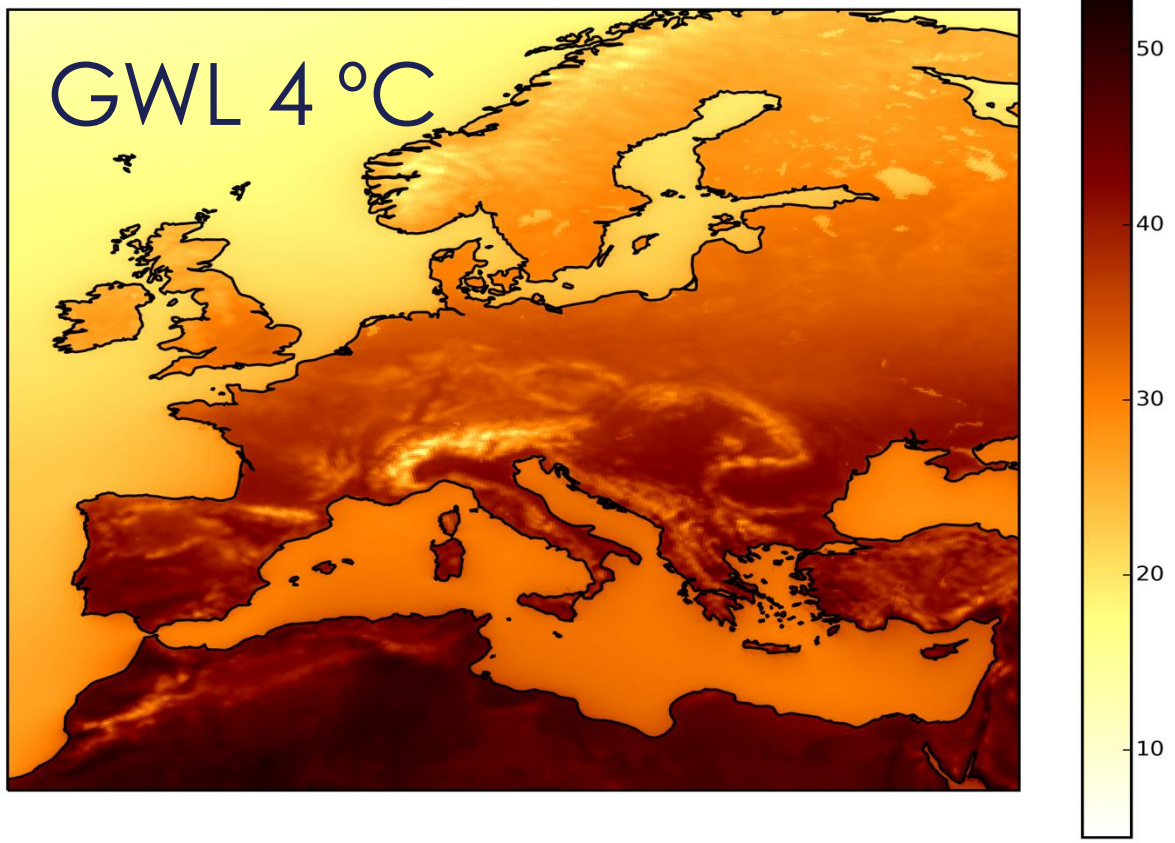
Indices in EURO-CORDEX

- 0.11° (~11 km) horizontal resolution
- 67 simulations
  8 GCMs
  12 ensemble runs total
  15 RCMs
- 19 general indices and 4 demonstrator-specific indices
- Indices as timeseries of 1980-2100 and for Global Warming Levels (GWLs)
- Indices available in NetCDF format

HW Annual mean across 67 simulations



Blending forecast across timescales

WP5

- Unveiling inconsistencies between predictions and projections
- Develop multi-method blending strategy

Two-phases approach

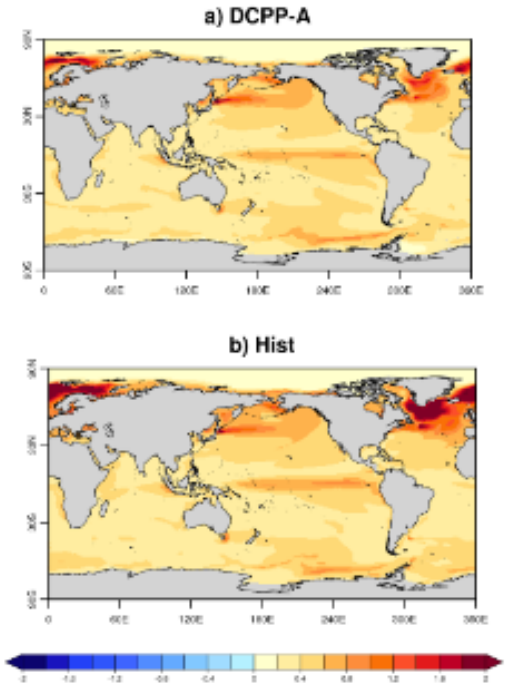
Phase 1: Identify inconsistencies to be tackled by blending

1. Characterize probabilistic and deterministic properties in the ensembles of predictions and projections (see figure)
2. Identification of the main inconsistencies in terms of the mean state and variability mode fingerprints

Phase 2: Develop different blending strategies

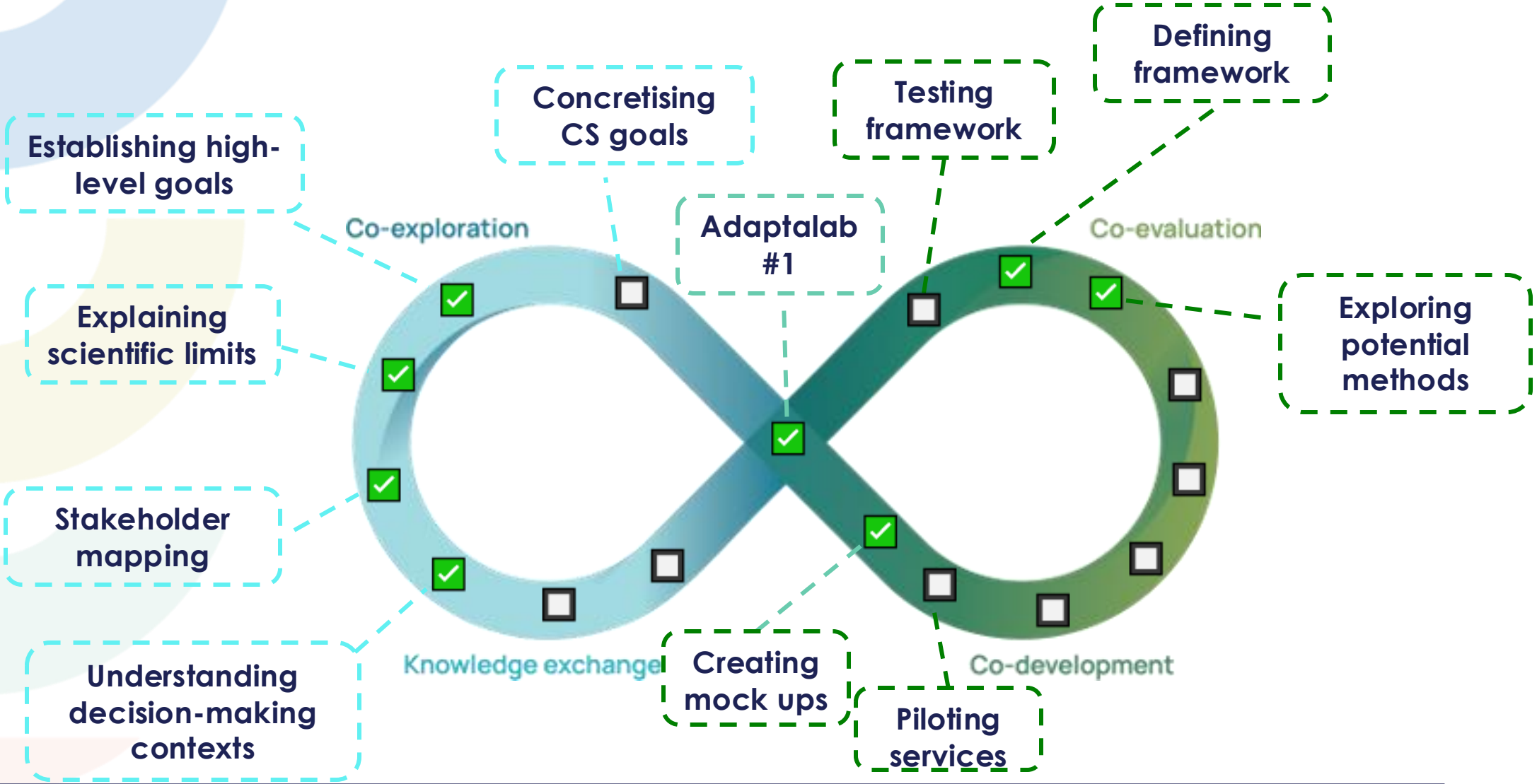
3. Blending predictions and projections based on similarities in (1) their mean state, (2) the phases of selected modes of climate variability and/or (3) their statistical properties

Intra-ensemble standard deviation for the surface temperature anomaly patterns



WP6 Coproduction of I4C Demonstrators

The coproduction process in I4C



Stakeholder mapping and co-exploration

Baulenas et al. (2023)
User Selection and Engagement for Climate Services Coproduction.
Weather, Climate and Society 15

What	Where	Whom	WHY	Which intensity	How
high-level goal conceptualization	defining the case	to include in the user selection	criteria for engaging which stakeholders	defining engagement intensity	iterate, adding the co- component to each step with the users

Co-design in Adaptalabs

Urban greening: parks, gardens, trees (1 of 2)

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Climate information that supports efforts to increase the coverage and resilience of urban green spaces

What could we collaborate on?

Supporting decisions at different timescales, and integrating with impact models (beyond I4C), for example:

- When to plant new trees?
- Where / when are future drought risks?
- How climate-compatible are existing & planned green spaces?
- What are future irrigation requirements?
- How can green spaces contribute to urban cooling / impacted by UHI?
- How will biodiversity be impacted in the future?

What can I4C offer?

Climate Info Availability & Skill	Historical - Weather	Near-future (weeks - months)	Future (months - years)	Projections (years - decades)
Temperatures (max/min/av.)				
Dry spells (# & duration)				
Precipitation				
Drought index				

Co- development: Catalogue of climate services

A deeper understanding of heat (2 of 2)

Climate information that provides a more holistic understanding of how urban heat will be affected by the combination of climate change and climate variation.

What do we need from you?

Some examples:

- Important thresholds (e.g. day time / night time temperatures and humidity levels that trigger protocols)
- Implementation dates (e.g. when climate shelters are operational, when time-shifting is permitted, when are streets resurfaced)
- Decision dates when implementation actions are decided (and reviewed)
- Input requirements for impact models

Who is this for?

Collaborators interested in, or responsible, for:

- Urban planning
- Public (environmental) health
- Housing
- Economic activity
- Energy poverty

What else could it lead to/interact with?

Example impact models and complementary data/information:

- High-resolution thermal mapping (e.g. street scale or UHI)
- Scenario testing for resilience interventions (green spaces, climate refuges etc.)
- Identifying at-risk locations (elderly residences, hospitals, schools, low-quality housing, tourist hubs etc.)
- Mortality/morbidity/well-being models

S2S for Barcelona

- Seasonal information to support climate shelters management in MAB

- S2S information for preparing and managing casals' activities in municipalities

- Greening Granollers – S2S for tree planting

PREDICCIONS CLIMÀTIQUES A CURT TERMINI PER A LA PRESA DE DECISIONS

DINS EL CONTEXT DE CRISI CLIMÀTICA S'ESPERA UN INCREMENT D'ESDEVENIMENTS CLIMÀTICS MÉS ALEATORIS I EXTREMS. PER AQUEST MOTIU, ÉS NECESSARI DISPOSAR DE NOUS INSTRUMENTS QUE PROPORCIONIN PREDICCIONS A CURT TERMINI PER DONAR SUPORT A LES DECISIONS D'ADAPTACIÓ ACTUALS I FUTURES.

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Predicció probabilística subestacional de temperatura

Setmana 1 15-21 Abril · Setmana 2 22-28 Abril · Setmana 3 29 Abril-5 Maig · Setmana 4 6-12 Maig

Barcelona

Probabilitat dels tercils

Per sobre del normal · Normal · Per sota del normal

Sobre I4C

Impetus4Change (I4C) és un projecte Horizon Europe format per més de 20 entitats líders en la recerca climàtica.

Per què necessitem prediccions climàtiques a curt termini?

Les previsions meteorològiques donen informació sobre els propers 7 dies aproximadament i les projeccions climàtiques proporcionen dades a llarg termini.

- Les prediccions subestacionals poden predir temperatures (donant informació fins a 4 setmanes vista) per donar suport a la planificació de riscos relacionats amb la calor.
- Els models climàtics descriuen què succeirà tenint en compte el canvi climàtic i la variabilitat climàtica a diferents escales temporals.

Els nostres objectius:

- Donar suport en la presa de decisions en la implementació d'accions d'adaptació allà on els impactes climàtics són més severs.
- Co-dissenyar amb els usuaris els serveis climàtics a escala local i regional.
- Millorar la qualitat, l'accessibilitat i la usabilitat de la informació climàtica a curt termini.

Com podem ajudar?

- Accés al nou pilot de serveis climàtics.
- Amb prediccions de temperatures setmanals de fins a 4 setmanes.
- Dades que inclouen valors màxims, mínims i mitjans.
- Amb avaluació de la qualitat de la predicció.
- A escala local, a resolucions de fins a 5 km.
- Finançat dins el marc del projecte I4C.

Com ho fem?

- Proporcionem fins a 5 prediccions.
- Cada predicció és de fins a 4 setmanes vista.
- Proporcionem sessions de formació.
- Per a un període temporal que va de juny a juliol.

Estàs interessat?

Aquestes prediccions climàtiques poden donar suport a les teves decisions?
Pots proporcionar-nos informació per a la millora del servei?

No ho dubtis, contacta'ns:

- Dragana Bojovic (dragana.bojovic@bsc.es)
- Pablo Martinez (pablo@300000kms.net)

Barcelona Supercomputing Center · 300.000 Km/s

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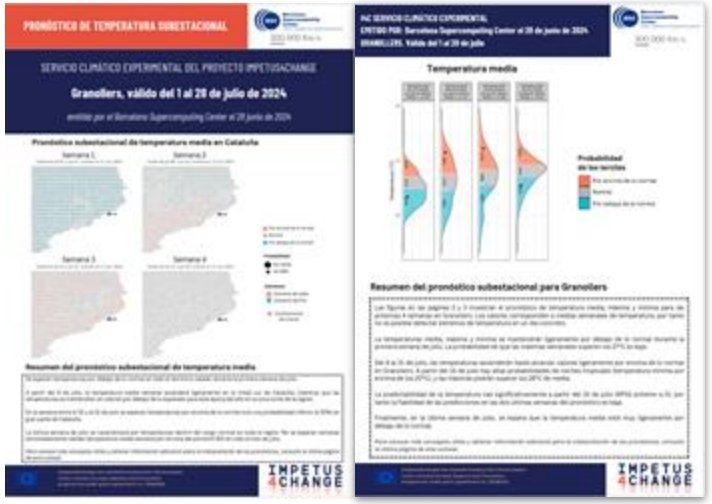

PRONÓSTICO DE TEMPERATURA SUBESTACIONAL

SERVICIO CLIMÁTICO EXPERIMENTAL DEL PROYECTO IMPETUS4CHANGE

Granollers, válido del 1 al 28 de julio de 2024

Pronóstico subestacional de temperatura media en Cataluña

Resumen del pronóstico subestacional de temperatura media

Temperatura media

Probabilidad de los terciles

Resumen del pronóstico subestacional para Granollers

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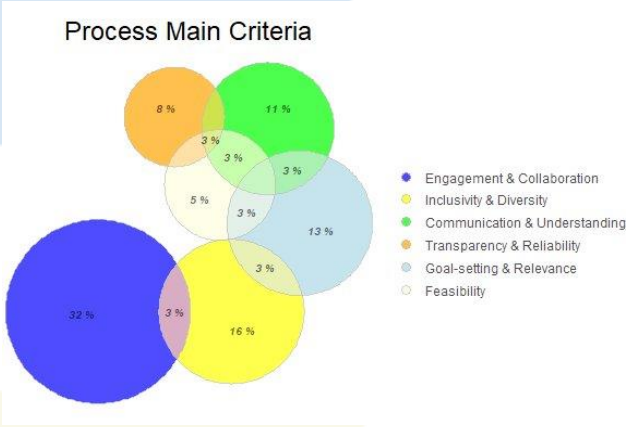
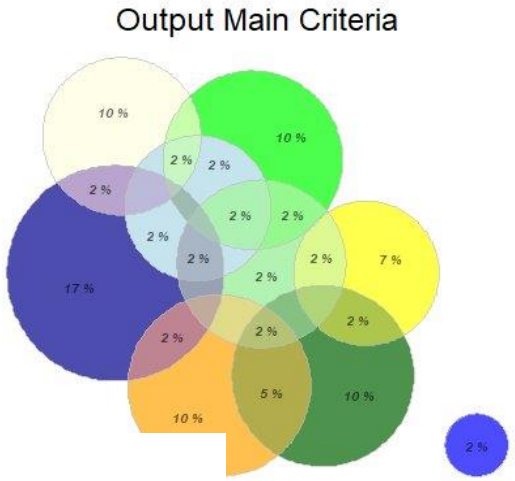
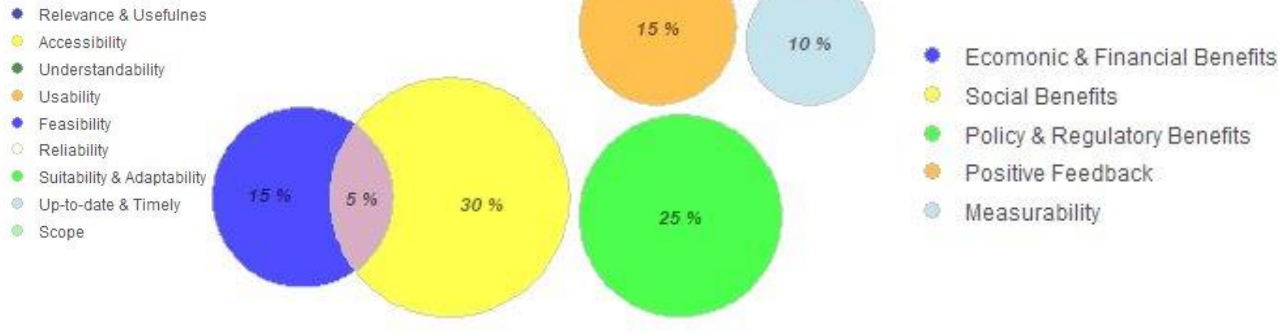
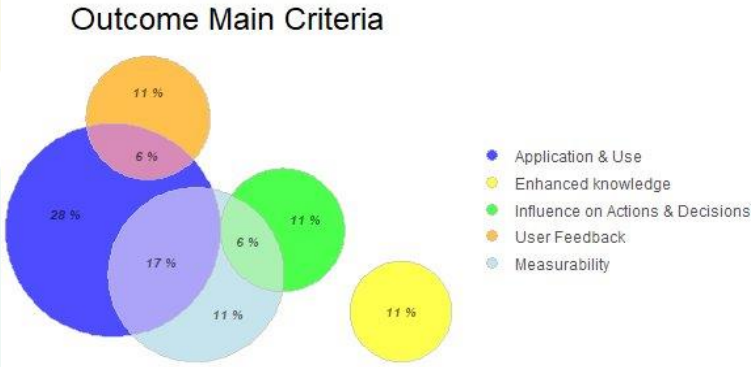
Co-evaluation









Evaluation vs valuation (from Findlater et al. 2021)

- Valuation ignores process and addresses only quantifiable outcomes
- It precludes learning because as it uses prior assumptions

THANKS!

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