TRACCS

TRAnsformer la modélisation du Climat pour les services ClimatiqueS

TRansformative Advances in Climate modelling for Climate Services

Retraite IPSL CMC

November 17th 2022 – Masa Kageyama – Samuel Morin

PEPR exploratoire

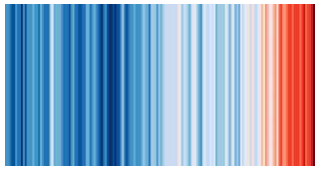
PEPR: Programme et équipements prioritaires de recherches exploratoires,

instrument du PIA pour

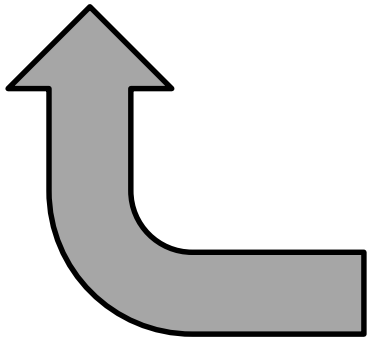
« construire ou consolider un leadership français dans des domaines scientifiques liés ou susceptibles d'être liés à une transformation technologique, économique, sociétale, sanitaire, environnementale, etc, et considérés comme prioritaires aux niveaux national ou européen ».

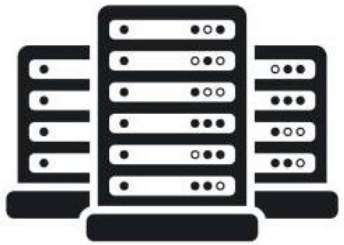
PIA: Programme d'investissements d'avenir (PIA), piloté par le Secrétariat général pour l'investissement (SGPI), mis en place par l'État pour financer des investissements innovants et prometteurs sur le territoire, afin de permettre à la France d'augmenter son potentiel de croissance et d'emplois. De l'émergence d'une idée jusqu'à la diffusion sur le marché d'un produit ou service nouveau, le PIA intervient sur tout le cycle de vie de l'innovation et fait le lien entre la recherche publique et le monde de l'entreprise.

Climate change

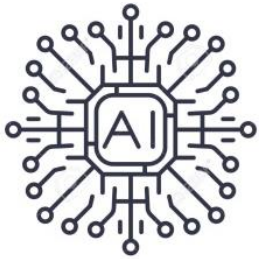


Climate modelling

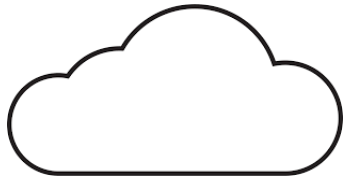




Next-gen HPC

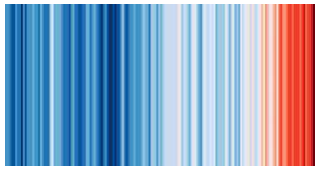


More AI



Better physics & ESM

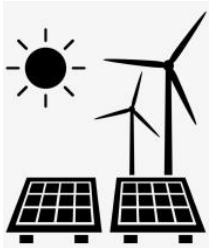
Climate change



Climate modelling

Need for local information (using AI)

Need for sectoral information

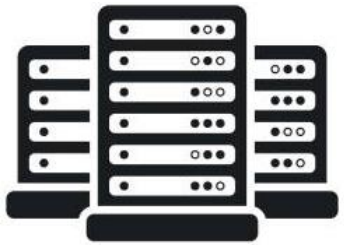


Training & Outreach

Climate services co-constructed with institutional / industrial stakeholders

Adaptation plans
Support to 'GREC'
Climate policies

Improved models



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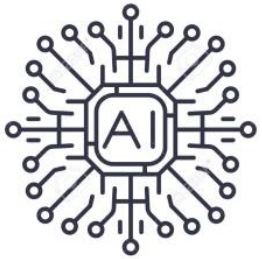

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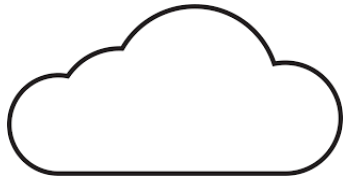
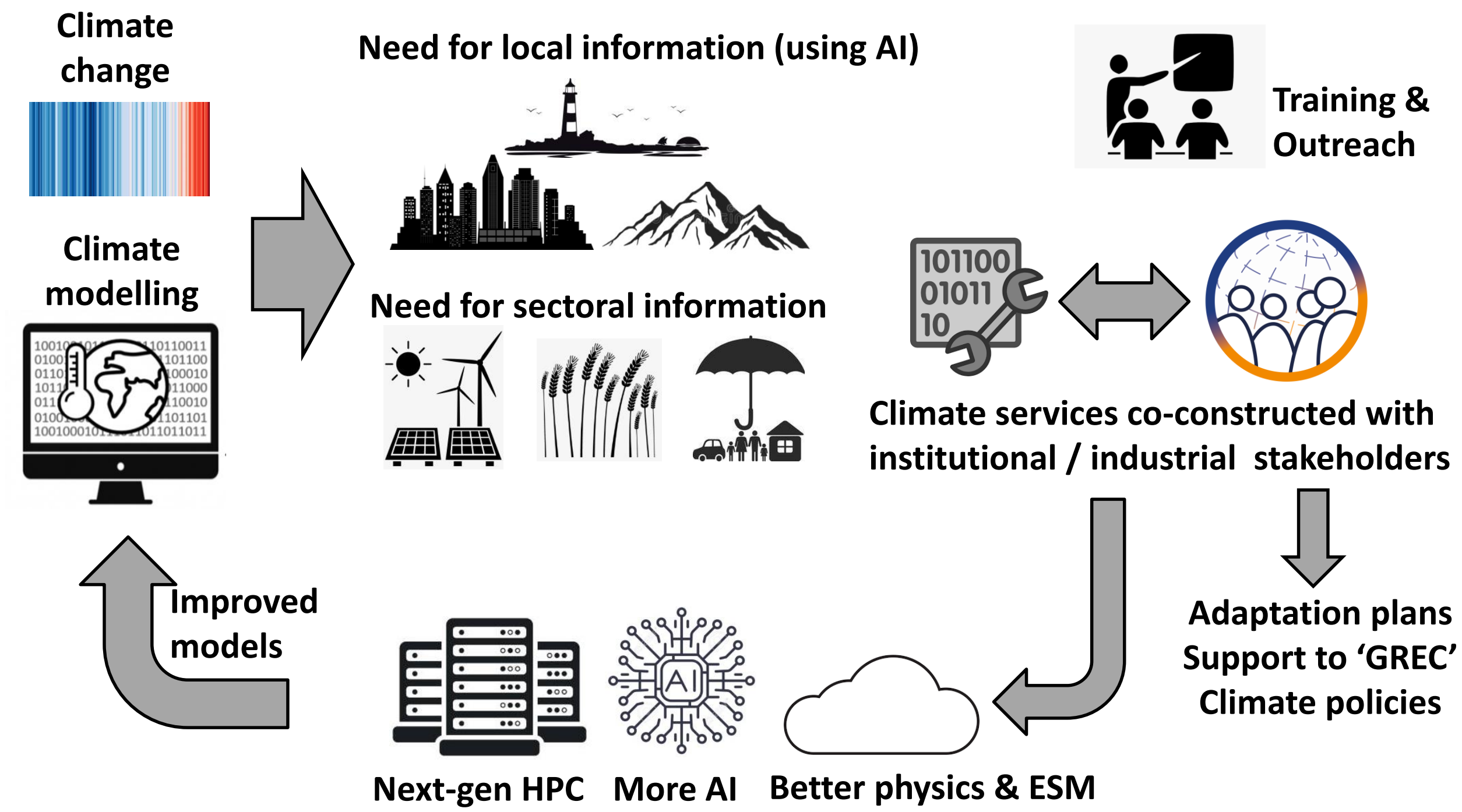


Better physics & ESM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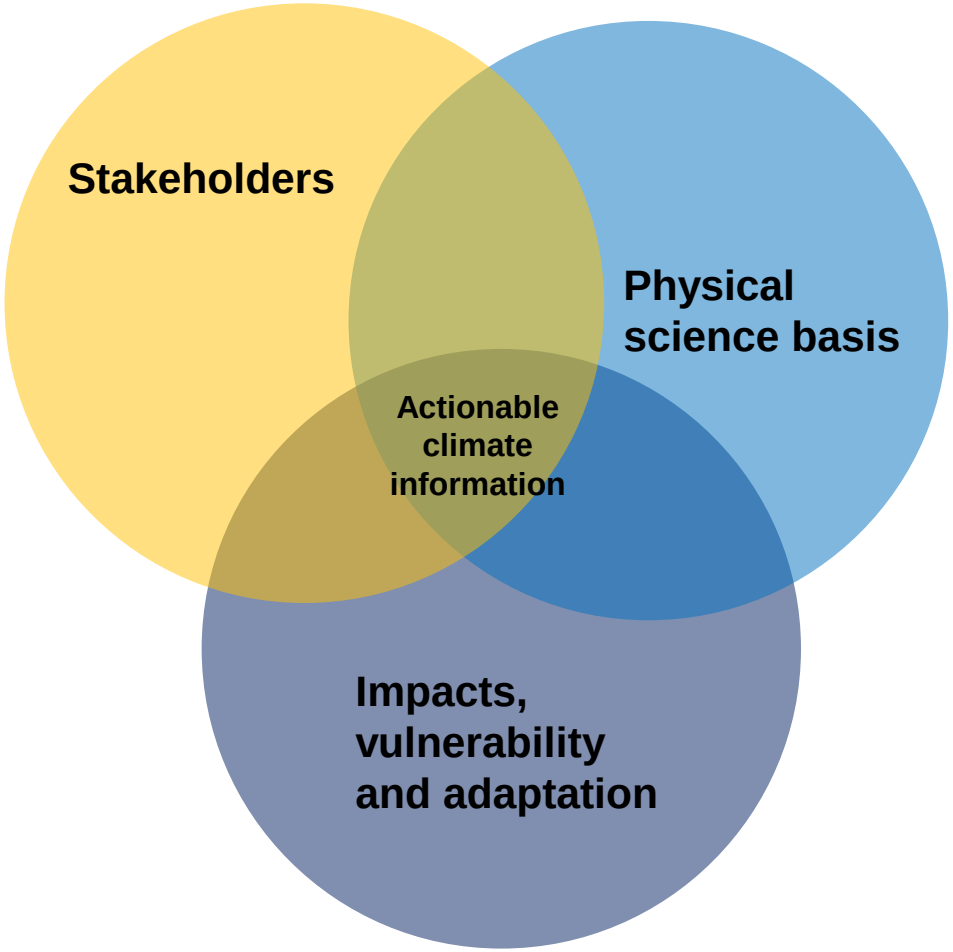
TRACCS :
TRansformative Advances in Climate modelling for Climate Services



TRACCS main objectives

1/ Foster actionable climate change information co-designed between the scientific community and relevant stakeholders

to meet the users needs, from policy makers to industries, services and the general public

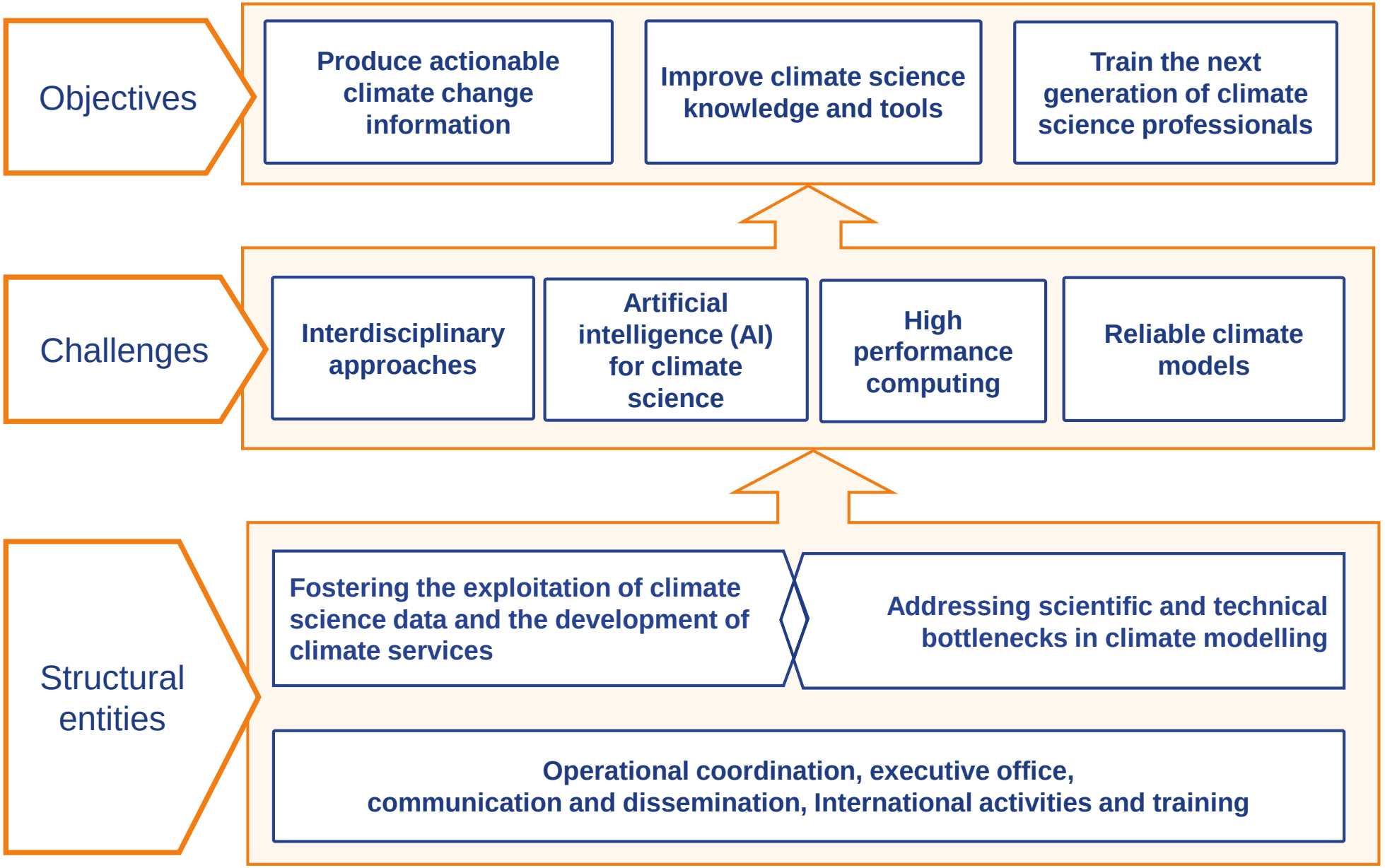
2/ Improve knowledge and tools on climate change processes, impacts and risks, from the global to the local scale

to deliver the best possible climate information for decision making;

3/ Train the next generation of professionals in model development, data distribution, climate service co-production, use and support of climate services

to ensure the sustainability of this enlarged climate science ecosystem.

TRACCS : Objectives, challenges, structural entities



PIL: Operational coordination, executive office, communication and dissemination – M. Kageyama, S. Morin
International activities, training – L. Bouilloud, P. Braconnot

Fostering the exploitation of climate science data and the development of climate services

S. Anquetin, L. Terray, R. Vautard

« Impacts, adaptation and vulnerabilities »

- **PC 1** Co-design with stakeholders
- **PC 2** Brokerage of data & methods
- **PC 3** Territorial information
- **PC 4** Extreme events

Addressing scientific and technical bottlenecks in climate modelling

O. Boucher, J. Deshayes, G. Durand, D. Salas y Melia

« The physical science basis »

- **PC 5** New computing paradigms
- **PC 6** Calibration & uncertainties
- **PC 7** Physical processes
- **PC 8** Biogeochemistry
- **PC 9** Polar ice sheets
- **PC 10** km-scale climate information

AO1 – Interdisciplinary approaches for climate change impacts, adaptation and services

AO2 – Evaluation of climate interventions

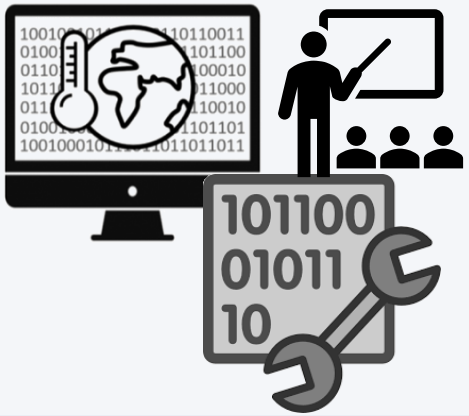
AO3 – AI for climate sciences

AO4 – Model evaluation

Fostering the exploitation of climate science data and the development of climate services

PC1. Co-design with stakeholders

PC2. Brokerage of data & methods



PC3. Territorial information

PC4. Extreme events

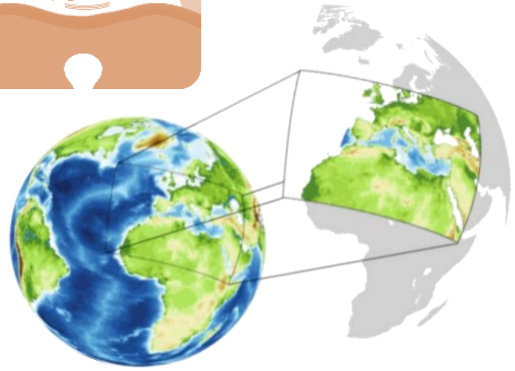
Future climate risks in France and elsewhere

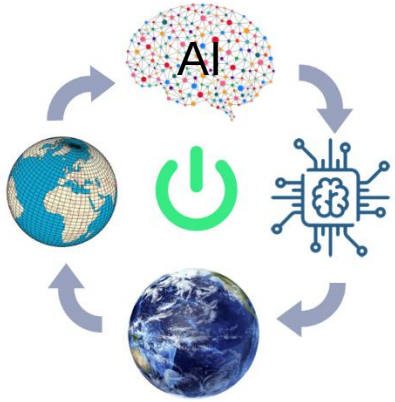
- **Actionable climate change information** for key sectors and territories (France mainland & overseas, foreign countries)
- **Special focus on extreme events**: quantification, attribution, compounds, future evolution
- Transformative, **interdisciplinary and transdisciplinary** advances towards climate services

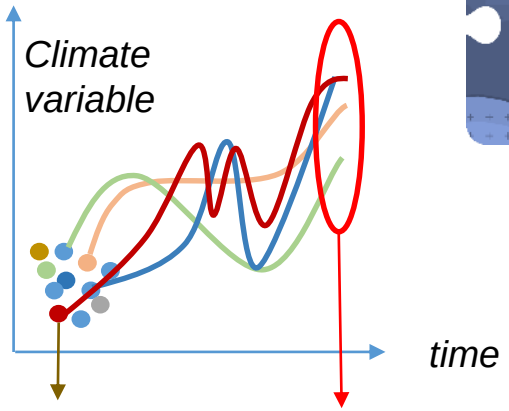
Addressing scientific and technical bottlenecks in climate modelling

PC5. New computing paradigms	PC6. Calibration & uncertainties	PC7. Physical processes	PC8. Biogeo-chemistry	PC9. Polar ice sheets	PC10. km-scale climate information

Transformative advances
in model design
- increased use of AI,
- addressing new HPC frameworks,
- quantifying confidence levels







Calibration, parameter secltion

Distribution of values, including extremes

TRACCS will develop and contribute
- a consistent set of improved climate models
- operating across all spatial (100-1 km scale) and temporal scales of the climate system,
- enabling long simulations & large ensembles.

Robust basis for science and climate services

TRACCS Organization ; 8 years ; 51 M€

Operational coordination, executive office, communication and dissemination
International activities, training – 6.2 M€

Fostering the exploitation of climate science data and the development of climate services
« Impacts, adaptation and vulnerabilities »

PC 1 to 4 – 10,1 M€

Addressing scientific and technical bottlenecks in climate modelling
« The physical science basis »

PC 5 to 10 – 24,7 M€

Calls for projects

10 M€

AO1 – Interdisciplinary approaches for climate change impacts, adaptation and services

AO2 – Evaluation of climate interventions

AO3 – AI for climate sciences

AO4 – Model evaluation

Projets structurants

esm 2025
Earth System Models for the future

4C

OptimESM
Optimal high resolution Earth System Models for exploring future climate change

➔ Des projets
au service du modèle de l'IPSL

Climaviation
Action de recherche sur Aviation et Climat