

Pathway to regular and sustained delivery of climate forcing datasets workshop: 28-31 October 2024, ECMWF Reading

A Perspective on Sustained Mode or “Operationalisation”

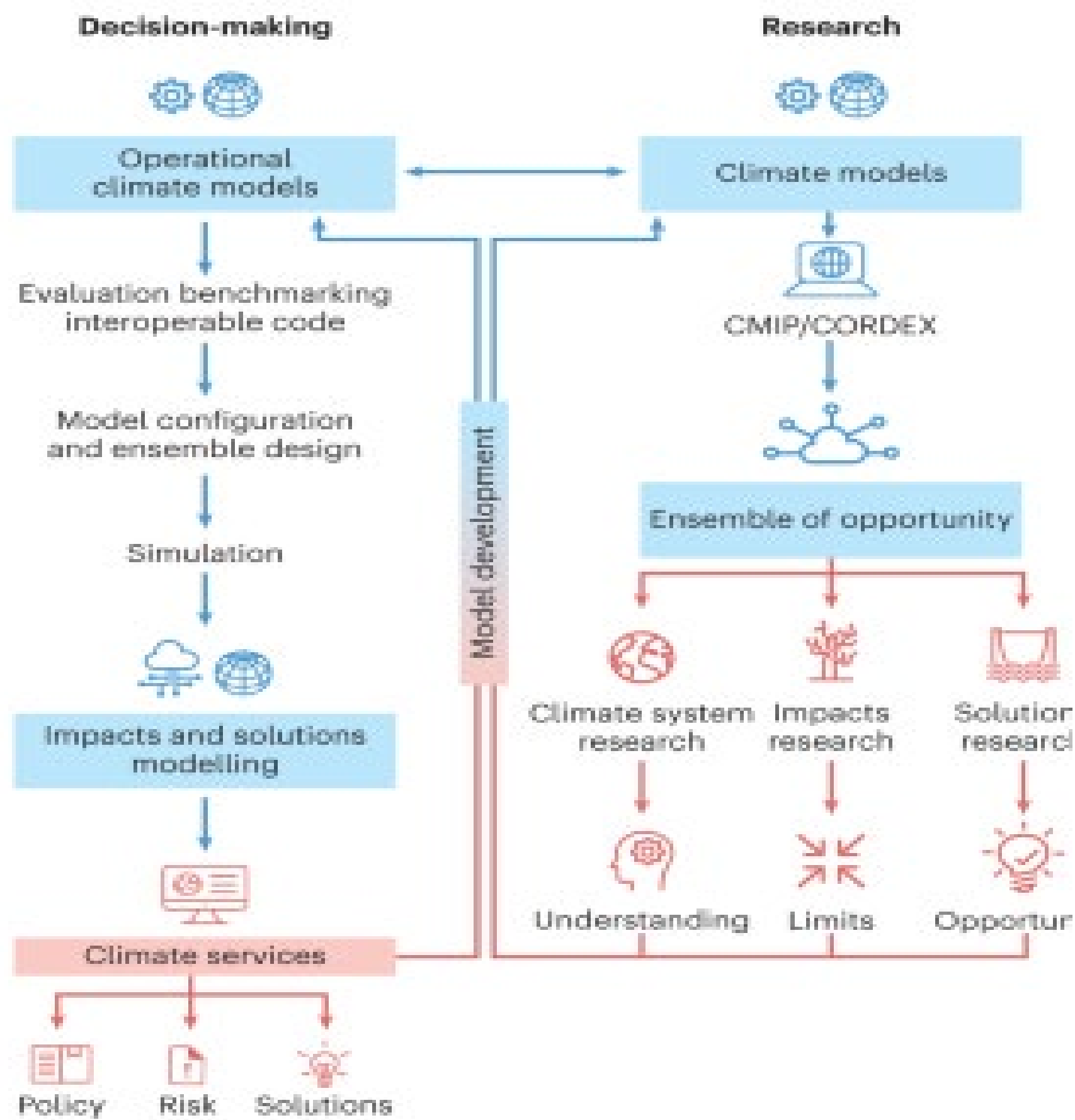
Helene Hewitt with input from many others in CMIP, CORDEX, WCRP, ESMO, WGCM, WGNE, IAMC, Francisco Doblas-Reyas, Anna Pirani

Why are we discussing this?

Several of the highest profile CMIP applications have become “operational”:

- State estimate of current policy in the Global Stocktake every 5 years.
- Climate service activities (e.g., Copernicus Climate Change Services, Climate.gov, NOAA Regional Climate Services)
- DestinE ambitions

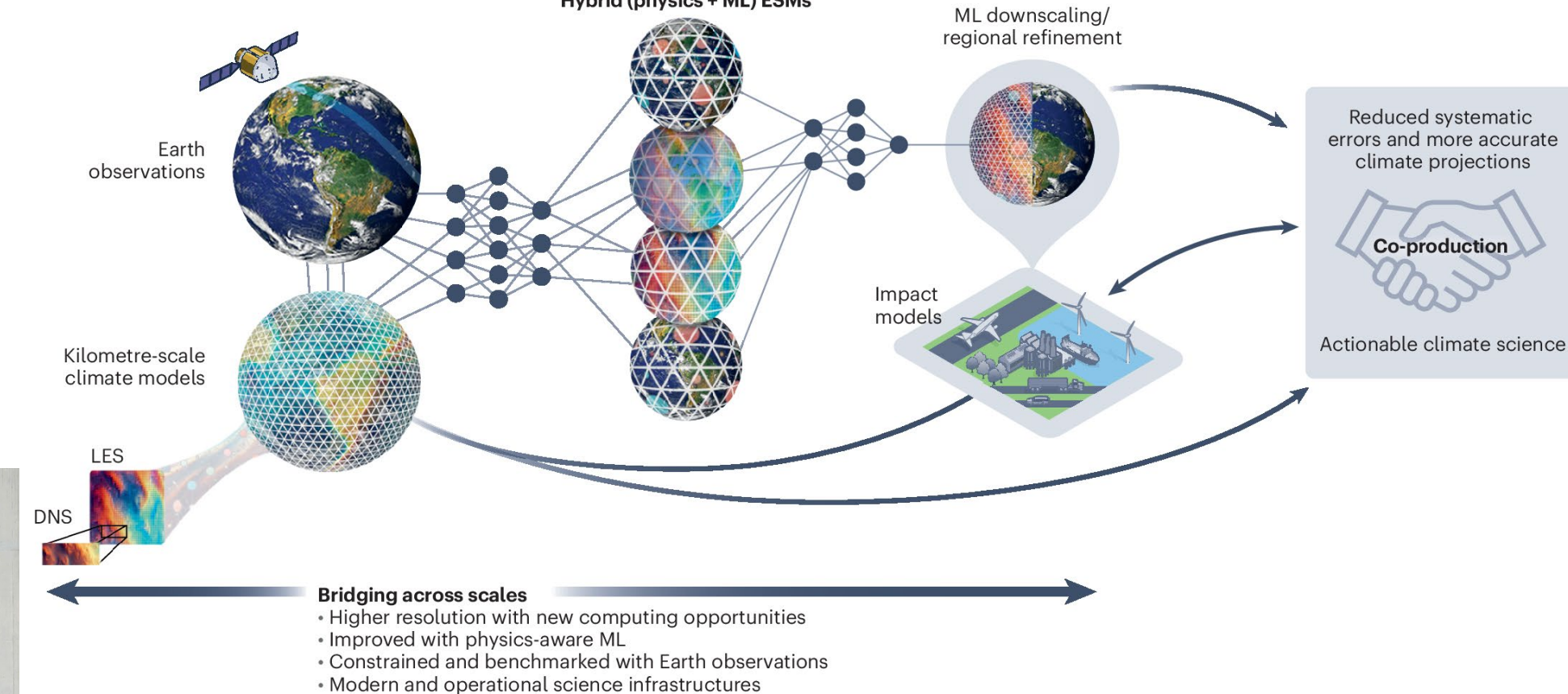
Addressing this need for regular delivery has been highlighted by some prominent researchers....



Jakob et al. (2023)

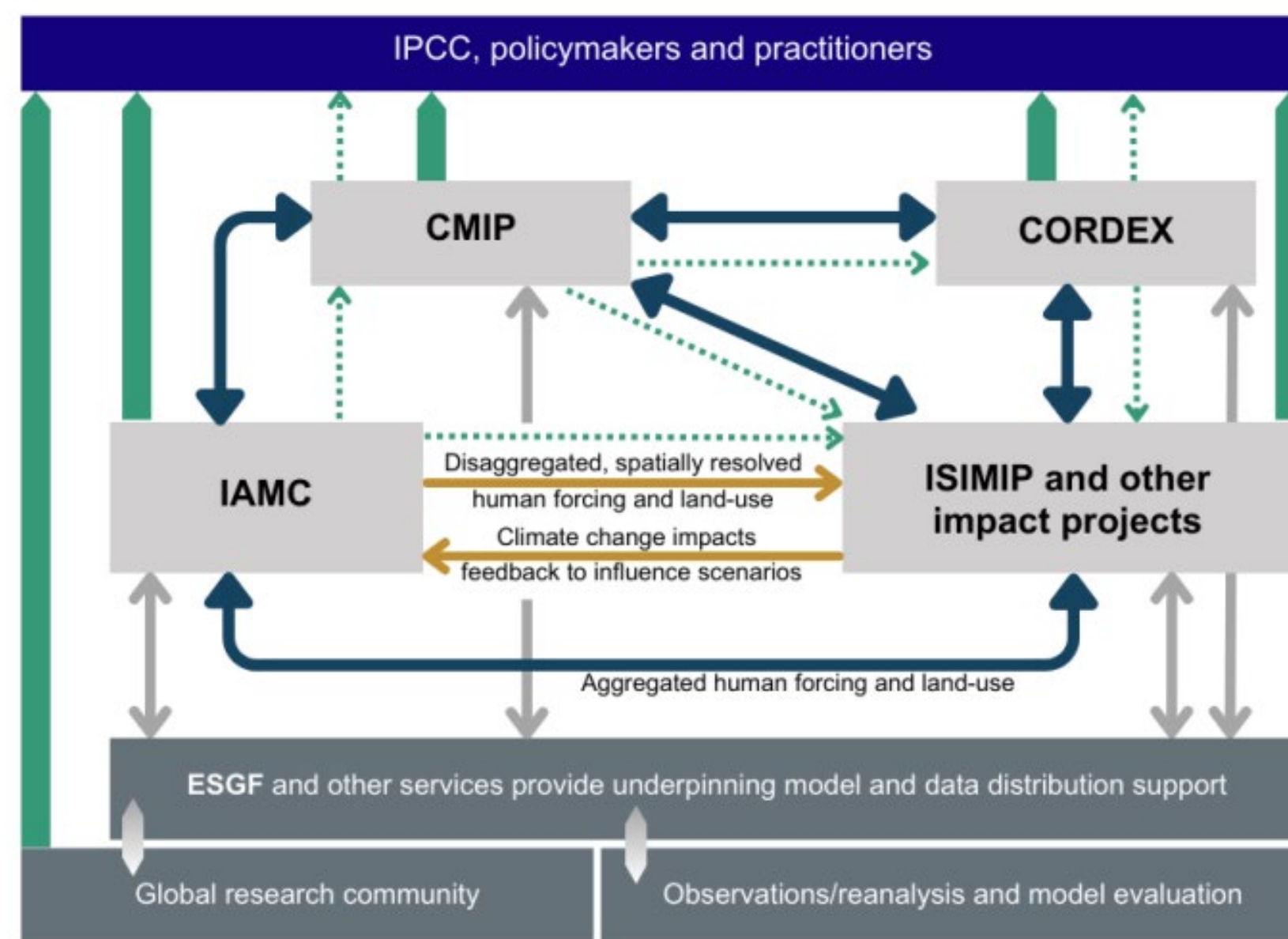


Stevens (2024)



“More timely climate projection updates are required so that the impact of changes to past and likely future emission trajectories due to global events like pandemics, wars, climate policy changes, global economic disruptions, or natural shocks such as a major volcanic eruption, can be accounted for so that the best climate information is available for events like the annual Conference of the Parties (COP) or the Global Stocktakes. Such a process should include yearly updating and quality control of forcing datasets based on historical and near-real-time observations, a process to produce rapidly updatable policy-relevant scenarios that reflect actual emissions, recent events, and climate policy changes, as well as the operationalization of policy-relevant

Eyring et al. (2024)



Jones et al. (2024)

WCRP Scoping group

- Small group, chaired by Helene Hewitt (CMIP Panel Co-chair) and Greg Flato (WGCM Co-chair) to report back on scoping of:
 - The need for a long-term, sustained CMIP mode
 - Stakeholders
 - Viable mechanisms
 - Funding
 - Timing
- Report in a relatively short time frame (by April 2025) but going (very) slowly.

What could be under discussion for a sustained mode?

- Forcings
- Scenarios
- Updated simulations
- Data request
- Benchmarking/metrics output

Not the rapid frequency of a weather forecast – annual or longer

How might a sustained mode look?

- On an annual basis:
 - *Extension* of historical forcings (what about harmonisation?)
 - New scenarios produced (IAM Community)
 - *Extension* of historical simulations?
- Every 5 (?) years:
 - *Update* of historical forcings (ie, allow changes to pre-date the current year)
 - Full suite of ScenarioMIP type experiments
- ⁶ Research benefiting from infrastructure, pulling through new science

Difficulties with extensions/updates of forcing in current status

- Research funding – where is next grant coming from?
- Volunteer effort (or at least in margins)
- Lack of resilience – single points of failure and limited options for backfilling
- Some effort is directed towards updates rather than just extensions
– is this necessary?

Are there stakeholders interested in a sustained mode?

- Copernicus Climate Change Services (C3S)?
- WMO Annual to decadal forecast?
- Detection and attribution?
- Data sharing via WMO WIPPS to extend global reach of climate services?
- What are the viable funding mechanisms reflecting the global diversity of funding for existing CMIP activities?

Is there a viable mechanism for a sustained mode?

- WMO lead centre style?
- Dedicated globally distributed climate projections centres?
- C3S and other funding?

Decadal prediction as an operational activity

Annual to decadal climate prediction

LC-ADCP (UKMO)



The Lead Centre for Annual-to-Decadal Climate Prediction collects and provides hindcasts, forecasts and verification data from a number of contributing centres worldwide.

Different names of the 2nd tier WIPPS centres

- RSMC
- RCC
- RSHC
- Global Producing Centre (**GPC**)
- Lead Centre (**LC**)



5 GPCs-ADCP

14 Contributing Centres

- The similar requirements to be designated as GPCs-ADCP are applied
- Maintained by LC-ADCP

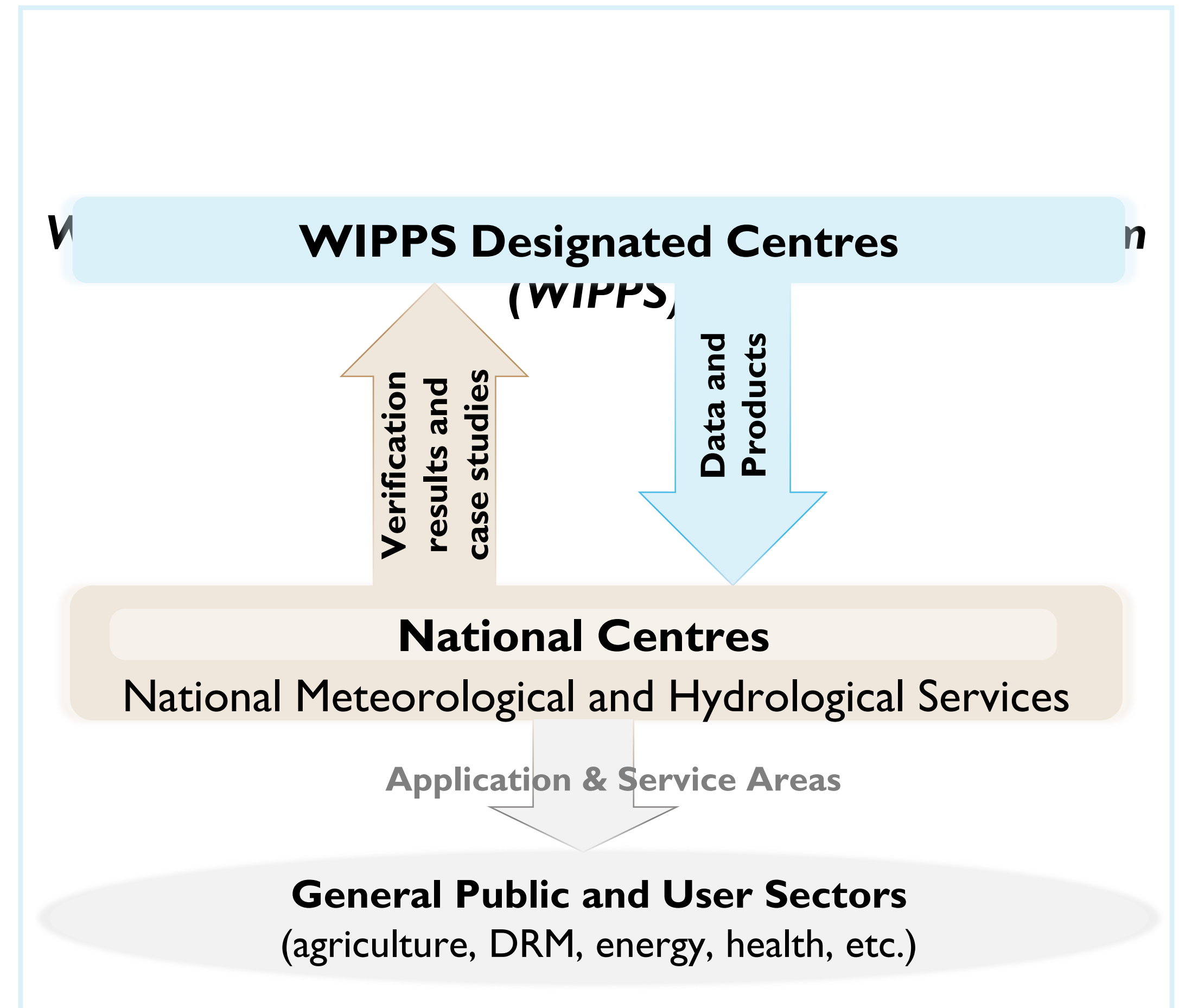
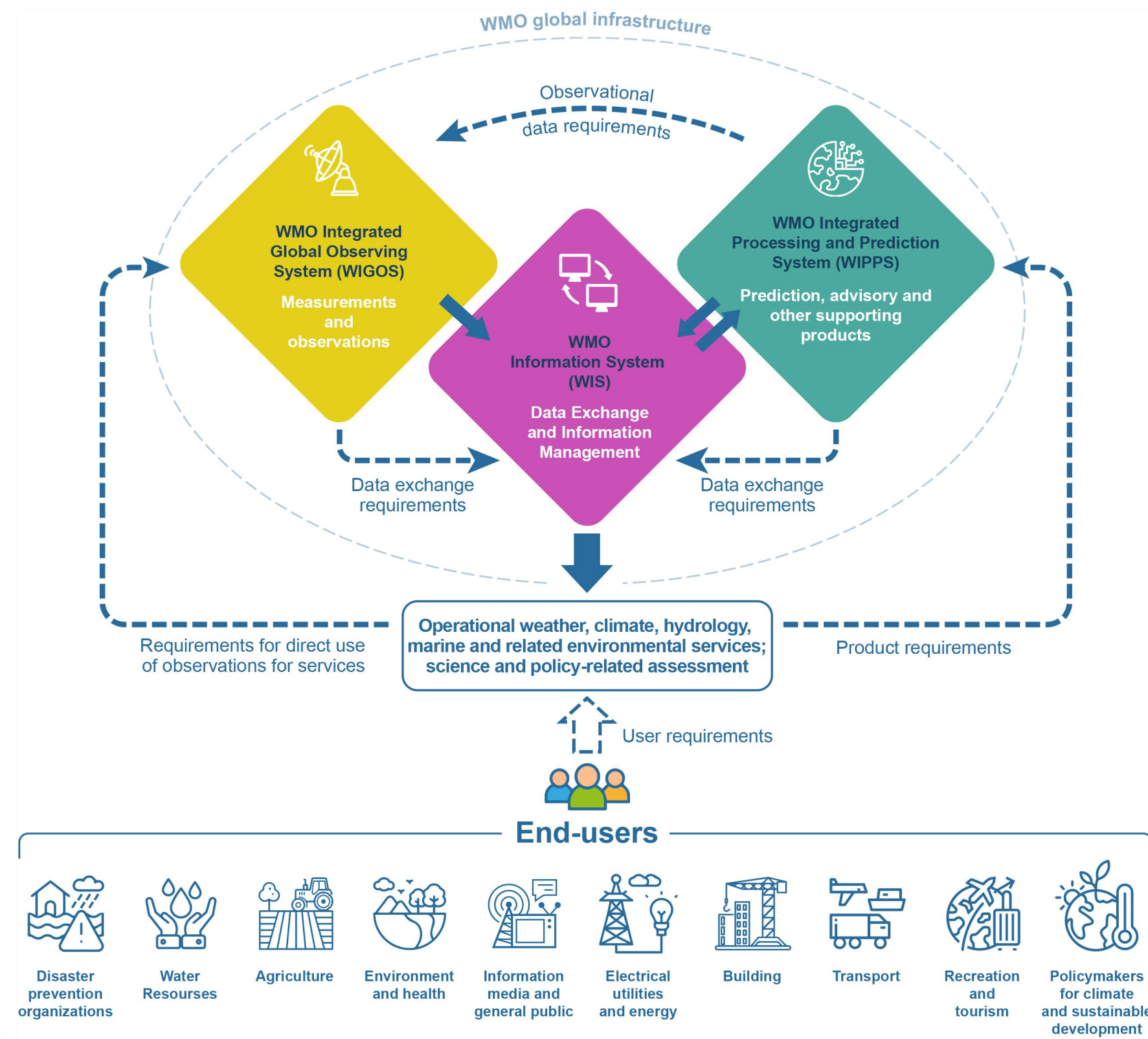
Summary

- There are stakeholders for regular production of some CMIP outputs
- Working towards a 'sustained mode' gives us the best chance of taking the whole community with us
- In spite of the increasing calls for a sustained mode, governance and funding mechanisms are unclear
- Particular issues for forcing are around extensions versus updates, funding, ...
- Research will remain crucial within CMIP answering new science questions, pulling through to anything which is produced regularly

Thank You

The usual operational context: WMO infrastructure

Aims to 1) make operationally available products related to weather, climate, hydrology, etc. among WMO members and relevant operational organisations and 2) establish a global network of operational centres operated by WMO members.



WIPPS web portal

The [web portal](#) has been designed to improved data discoverability and accessibility

The screenshot displays the WIPPS web portal interface, which is designed for data discoverability and accessibility. The main header reads "Designated WIPPS Centres Web portal for the WMO Integrated Processing and Prediction System".

Key Features and Annotations:

- Summary Statistics:** 141 centres/networks and 23 activities.
- Interactive Map:** A world map showing the locations of designated WIPPS centres, with an annotation "interactive map".
- Geo-statistics:** A donut chart showing the distribution of activities across regions (RA I 13, RA II 13, RA III 8, RA IV 26, RA V 11, RA VI 50), with an annotation "geo-statistics on the selected activities".
- Filtering Options:**
 - Filter by Region:** Buttons for regions I, II, III, IV, V, and VI.
 - Filter by WIPPS Activities:** A search bar and a list of activities including:
 - World Meteorological Centre
 - Global deterministic numerical weather prediction
 - Limited-area deterministic numerical weather prediction
 - Global ensemble numerical weather prediction
 - Limited-area ensemble numerical weather prediction
 - Global numerical long-range prediction
 - Annual to decadal climate prediction
 - Numerical ocean wave prediction
 - Global numerical ocean
- WIPPS Products:** A list of products available from ECMWF, including:
 - Graphical display, ECMWF website
 - Product inventory. Open data from ECMWF are available for a wide range of products at 0.4 degrees resolution.
 - Information and documentation
 - Geopotential height, 850 hPa [Inventory] [WIS Metadata]
 - Geopotential height, 500 hPa [Inventory] [WIS Metadata]
 - Geopotential height, 250 hPa [Inventory] [WIS Metadata]
 - Temperature, 850 hPa [Inventory] [WIS Metadata]
 - Temperature, 500 hPa [Inventory] [WIS Metadata]
 - ♥ indicates mandatory products.
- Information about RSMC ECMWF:** A section providing details about the RSMC ECMWF (Global deterministic numerical weather prediction), including the website link and the principal GIS (Exeter). It also mentions that the centre was designated in 2017.
- Useful links:** A list of links, including a full list of designated WIPPS (GDPFS) centres and the WIPPS Community site.
- list of designated centres:** A list of designated WIPPS centres, including:
 - WMC Beijing
 - WMC Exeter
 - WMC Melbourne
 - WMC Montreal
 - WMC Moscow
 - WMC Offenbach
 - WMC Tokyo
- selectable list of all GDPFS activities:** A list of activities that can be selected for filtering.
- easy access to data products:** A section providing information about the availability of data products.
- quick info on the centre, incl. focal point:** A section providing information about the RSMC ECMWF, including the principal GIS (Exeter) and the focal point (Mr. David Richardson).

Mandatory products depicted by the Manual are listed here. Each links to a GISC of the WIS.