

# Scientific gaps and topics to be considered by WCRP in preparation of IPCC assessment

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# Key points for future IPCC assessments

## ❖ Climate information for cities

- See Global Research and Action Agenda on Cities and Climate Change Science

<https://www.wcrp-climate.org/WCRP-publications/2019/GRAA-Cities-and-Climate-Change-Science-Full.pdf>

→ next IPCC SR in the AR7 on cities and climate change

→ Directly relevant for WCRP :

- need for an international and open-access observational framework for collecting key climate and socio-economic metrics at the city scale.
- Improving modelling capabilities is key to producing higher resolution data, predicting near term climate futures, and producing models that are customisable to specific cities

→ Related topic :

- "humanizing" climate models / improved representation of human activities / land surface processes (cities, irrigation, crop types)
- Systems approach to explore relevant and fit for purpose solutions for climate change mitigation and adaptation strategies.



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# Needs for future assessment:

## ❖ Better constraining the interplay between energy, water and carbon fluxes at the land surface

- improved theoretical and process based understanding, magnitude of feedbacks
- processes poorly represented in current global climate models (e.g. wildfire, abrupt permafrost thaw)

## ❖ Climate and biodiversity

- past, present, future
- links between biodiversity, ecosystem functions and services and climate (eg deforestation / reforestation, blue carbon, potential and limits of nature based solutions in a changing climate)

## ❖ Climate information for risk managers, co-design to help the use of climate information by risk managers :

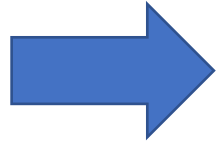
- build bridges between climate research and actuaries (ongoing work on climate stress tests for large investments and infrastructure projects)
- regional and sectoral climate information for climate proofing of large projects

# Current limitations for WG assessment

We are making progresses but still need to go one step further for

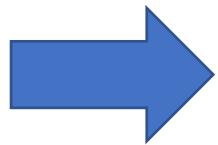
- ❖ Observations: sampling, length, multi-sources, accessibility, new needs at regional and local scales, human activity
- ❖ Models : biases, small scale processes, complexity, human activity
- ❖ Forcings : sampling, understanding, scenario uncertainties, specific focus for global/regional/local scale approaches, storylines.
- ❖ role of variability : signal/noise, mechanisms, interactions with trends

# In conclusion : reinforce recent progresses



Call for Earth system view (dynamics, physics; biogeochemistry + environment (including human effect) , biodiversity and « multi-discovery approaches »

- *Linkages between in situ/satellite, model/data, small/large scale, local/regional, new potential from autonomous platforms*
- *Improved understanding of « measurements », corrections, consistency between observations*
- *Integration of Satellite, instrumental, historical archives, paleoclimate archives*
- *Multi-factors (including anthropogenic) at local/regional scale*
- *Efforts on under sampled regions*



Call for Improved global/regional/local and Natural/anthropogenic integrations

- *Observation/model/methodologies/theoretical frameworks*
- *Quality assurance of data and climate information (documentation of models and observations, use of standards, generalised use of provenance)*
- *Assess the adequacy of the uncertainty estimates; learn from “reliability/trust” studies in weather and climate forecasting*
- *Interactions/dialogs/exchange platforms with other communities*
- *System approaches*