

GCOS Adaptation Task Team (GATT) Report to the GCOS Steering Committee

How can GCOS best support adaptation
in the UNFCCC space?

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Why a GCOS Adaptation Task Team (GATT)?

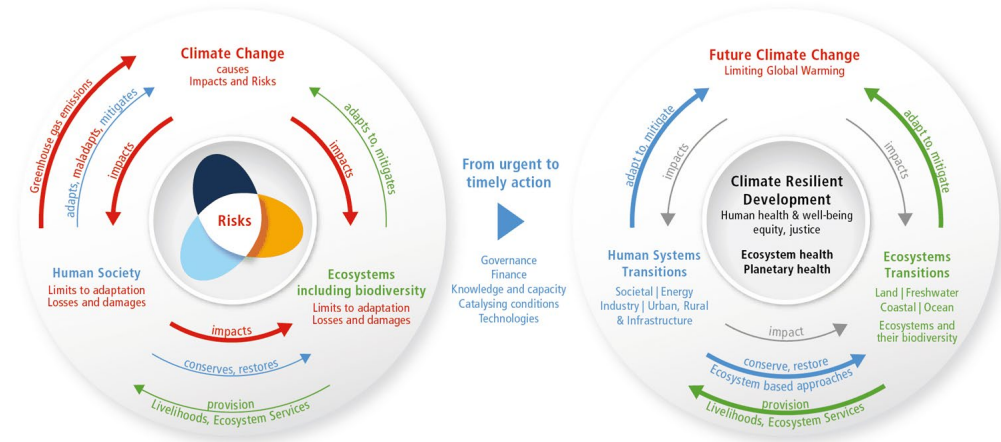
- The Paris Agreement established the **Global Stocktake** as a tool to track global efforts on adaptation/mitigation in the climate change space
- GCOS has been involved in support of activities of WGI of the IPCC. A new focus is required to support the activity of WGII, to address the issues of **impacts** and **adaptation**

From climate risk to climate resilient development: climate, ecosystems (including biodiversity) and human society as coupled systems

(a) Main interactions and trends

(b) Options to reduce climate risks and establish resilience

Adaptation is the action that leads to limiting the consequences of a warming climate. The combination of *hazard* exposure, *vulnerability* to the impact and *adaptive capacity* defines the climate risk



The risk propeller shows that risk emerges from the overlap of:





GCOS 2016 Implementation Plan

- Relevant actions for consideration

Action G1: Produce guidance and best practice for adaptation observations

Action G2: Identify indicators for adaptation and risk

In 2019 small scoping-groups were established within GCOS-TOPC and GCOS-SC
Suggested: Improved understanding of climate change impacts and adaptation through provision of geospatial data inputs relevant to:

- bio-geophysical modelling (***observations for adaptation***)
- assessment of climate-related risk (***observations for adaptation***)
- Use of existing ECVs to extract information on the spatiotemporal development of adaptation (***observations of adaptation***)

In 2021, the GCOS Adaptation Task Team (GATT) was established to include the other two GCOS panels, the AOPC, OOPC in considering adaptation and impact

GCOS 2022 Implementation Plan

- Further relevant actions

Action C4: New and improved reanalysis products

Action F3: Improve monitoring of coastal and Exclusive Economic Zones

Action E1: Foster regional engagement in GCOS

Action F4: Improve climate monitoring of urban areas

Action F1: Responding to user needs for higher resolution, near real time data



How can GCOS develop a **mechanism** to continuously evaluate the suitability (in terms of spatial and temporal resolution) of existing GCOS ECVs for adaptation application (observations for and of adaptation)?

Are there any **current observation** capabilities for ECV parameters that might become useful in specific adaptation contexts?

Are there any **new ECVs** (parameters not in current GCOS suite) and additional GCOS observation capabilities for adaptation, that are needed and that future global observations could support?



Main findings 1/2

Many ECVs are relevant for adaptation

Global Datasets of ECV supporting climate models and reanalysis are vital for adaptation, providing the global and regional information to complete local information

Challenges: information for adaptation is often

- **local** in nature;
- it needs **high resolution in time and space** and local data, to observe **climate extremes**;
- must be put in a larger context, requiring **consistency at least at the regional scale**; it should be spatially and temporally **homogenous**, with long term **time consistency**;

Other needs:

- available in **near-real time**;
- it needs **quality aspects** (such as completeness of documentation, accessibility, long-term maintenance, information on independent evaluation, overall assessment of their fitness for purpose and examples of use);
- it needs to be compatible with **non-climatic** (e.g. socio-economic, demographic, technological and environmental) data sources.



How to connect “top down” global approach with “bottom up” perspective?

Reanalysis acts as an **integrator of observations**, providing consistent information with no gaps in space and time. **This makes it one of the most relevant dataset for many adaptation applications.** GCOS actions to improve reanalysis products should be prioritised (see GCOS action C4), including increasing resolution, improving biases, supporting the development and implementation of regional reanalysis and approaches to regionalisation, as well as reducing data latency

How to provide a review of critical sectors and collect their needs? A complete assessment cannot be done by GCOS alone need that GCOS develops a process of prioritising areas for action

- Engage with relevant stakeholders
- Approach 1: Review of the critical sectors that require GCOS data identified in the National Adaptation Plans. □

Critical sectors that are frequently prioritised:

- **Agriculture (climatic information on precipitation, temperature, soil moisture, etc.).**
- **Water resources (river flow, lake, and reservoir storage).**
- **Cities, settlements, and infrastructure (climatic information on precipitation patterns, floods, temperature, etc.).**
- **Coastal zones (climatic information on sea level rise, storm surge, etc.)**
- **Health and well-being.**
- **Ecosystems services and biodiversity.**
- **Energy systems**



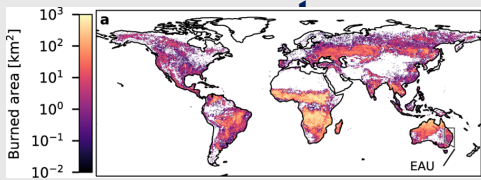
Approach2: critical sectors applied in the AR6 WGII Summary for Policymakers

SYSTEM TRANSITIONS	REPRESENTATIVE KEY RISKS	NEAR-TERM ADAPTATION OPTIONS	RELEVANT SDGs ¹	EXAMPLE STAKEHOLDERS
LAND & OCEAN ECOSYSTEMS	Coastal socio-ecological systems	Coastal defence and hardening Integrated coastal zone management	9,13 1,11,13,14,15	National, state & local/city governments; coastal landholders and asset owners; subsistence and small-scale aquaculture, fishers; commercial aquaculture, fishers; ecosystem & coastal zone managers; insurance sector; relevant UN agencies
	Terrestrial & ocean ecosystem services	Sustainable forest management ² Sustainable aquaculture Agroforestry Biodiversity management and ecosystem connectivity	1,2,3,5,6,10,11,12,13,15 1,2,3,5,6,8,9,10,11,12,13,14,15 1,2,3,5,6,7,8,10,11,12,13,15 3,6,11,12,13,15	National, state & local/city governments; subsistence and small-scale aquaculture, fishers, agriculture; commercial aquaculture, fishers, agriculture; landscape fire and emergency services agencies; insurance sector; forest managers; ecosystem & coastal zone managers; relevant UN agencies
	Water security	Sustainable water management Water use efficiency & water resource management	3,6,8,9,10,11,13 3,5,6,7,10,11,12,13,15,16	National, state & local/city governments; water agencies including allocators; relevant UN Agencies
	Food security	Improved cropland management, including weather and climate forecasting Crop insurance Transformational adaptation (e.g., relocation) Efficient livestock systems and supply chains	1,2,5,6,7,8,9,10,12,13,16 1,2,3,5,8,12,13,15	National governments; food security policymakers (national and relevant UN agencies); rural & subsistence producers; commercial producers; insurance sector; supply chain managers



- Connect with a community of experts
- Define a set of case studies: Observations in support of..

CASE 1 Forest wildfire

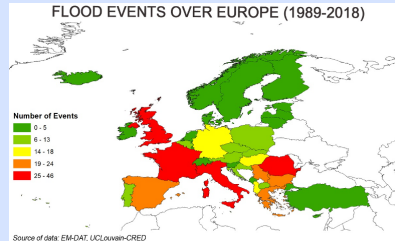


Richardson et al.,
2022

For national and local government, landscape managers, emergency services including fire agencies and the insurance sector.



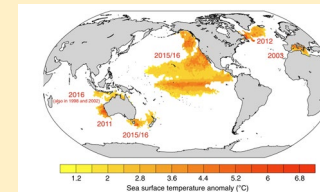
CASE 2 Urban Pluvial Flooding



For planners, civil servants, civil protection, administrators and the insurance sector, among others.



CASE 3 Ocean extremes



Frölicher & Laufkötter, 2018

For all economic activities dependent on ocean and sea coasts, e.g. from fishing and agriculture to exploitation of natural resources; planning and implementing coastal zone policies





CASE 1 : Observations in support of forest wildfire management and adaptation

Context on what information is needed to inform adaptation planning

- Vulnerability of human settlements and natural ecosystems to severe wildfire events
- Observed trends in wildfire severity, impact and extent
- IPCC: Risk of wildfires is likely to increase
- Significant opportunities for forest management (adaptation) to minimize wildfire risk and mitigate emissions

List of currently available ECVs

- See next slide

Gaps and future opportunities

- Need of integrating ECVs with other data sources
- High resolution data that faithfully presents spatial gradients in fuel structure and conditions (moisture), topography and land cover as well as weather and climate.

Summary of Data Needs. Data used to:

- **Monitor changes in wildfires** over space & time
- **Model the spatial and temporal evolution of wildfire risk** at multiple scales and how that risk could change in the future
- Construct **wildfire vulnerability indices**.
- **Calibrate and/or validate** wildfire models or vulnerability indices

Variables for:

- **vegetation recovery** from wildfire in burned areas
- supporting **measures to reduce fire damage** to communities (buffer zones around communities)
- **smoke modeling** for health services preparedness

6 Applications

17 ECVs (Fire, Cloud properties, Srf T, Srf wind speed and direction, Srf water vapour, Precipitation, upper-air T, upper-air water vapour, upper-air winds, soil moisture, evaporation from land, land cover, lighting, aerosol properties, LAI, FAPAR, Above ground biomass)

30 ECV Products

ECVs for Adaptation: one example

Use	Application	Description for Adaptation	ECV	ECV Products	Adequacy. Based on current requirements
ASSIST FIRE AGENCIES TO ADAPT AND RESPOND TO IMPLICATIONS OF CLIMATE CHANGE (I.E., MORE SEVERE FIRES)	FIRE DETECTION AND BEHAVIOR: Faster and more accurate detection of fire and behaviour can enable more effective response by fire agencies	The location and time of fire occurrence	Fire	Active fires	Y
		Is the area burnt increase/decreasing with time and where	Fire	Burned area	Y
		number and size of PyroCb occurrence - can indicate erratic fire behaviour	Cloud properties	cloud top temperature, cloud optical depth, cloud top height	N
		Is the intensity of fire changing with time and where	Fire	Fire radiative power	Y

50 m (G) fire managers/extinction services ; 200 m (B) fire risk assessment; 25,000 m (T) Climate modelers

15 min (G) fire management; active fire detection; ATM; 120 min (B) AM; 1 d (T) ATM & C modelers



Short Term (i.e. until summer 2023)

To request the GATT members to continue their analysis for the case studies to be presented at the cross-GCOS Panel meeting in June, 2023 and to submit thematic paper(s) to BAMS.

Ensure that there is enough expertise in adaptation in each of the panels. The panels should continue to report on the adequacy of reanalysis systems and their gaps for adaptation



Longer term recommended actions (2023 / 2024)

Hold an adaptation workshop with major implementers and supporters of adaptation as well as thematic experts.

The aim: to identify what are the most important datasets and climate information, what are the major gaps, and whether the existing GCOS ECVs/products including their spatial and temporal specifications are adequate for adaptation.

A group of experts will be mobilised to produce a report



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Thank you!

Questions are welcome.