



**GLOBAL CLIMATE
OBSERVING SYSTEM**



GCOS SC-31

INF. 7.8

(18.VI.2024)

GCOS STEERING COMMITTEE THIRTY FIRST SESSION

GCOS SC-31, 2–5 July 2024
WMO, Geneva, Switzerland

GCOS Climate Indicators – Report on progress

1. Introduction

This information document addresses the Decision GCOS SC-30/4 (2022): “The Steering Committee decides that GCOS Secretariat works with WMO/Climate Services to explore the adoption of additional climate indicators. These new indicators could, for instance, cover new domains, reflect the earth cycles, and/or address extremes.”

The GCOS Steering Committee 31 is requested to provide their view and guidance to the GCOS Secretariat, especially on the fact-sheet template and proposed timeline for the development and inclusion of additional indicators, as defined by the Cross Panel Group held in Bonn during the 2023 GCOS Joint Panel Meeting (JPM), 26-30 June 2023.

2. Discussion at the GCOS JPM, Bonn, June 2023

A cross-panel group of 16 experts, chaired by Karina von Schuckmann (OOPC) and Martin Herold (TOPC), discussed the proposal of new climate indicators at the 2023 GCOS Joint Panel Meeting (JPM), held in Bonn on 26-30 June 2023.

Participants were asked to indicate which were the main elements that should be part of the definition of global climate indicators and what the purpose of such a GCOS Indicator should be. Participants also provided feedback on the descriptions of the 5 criteria currently used: relevance, representativeness, traceability, timeliness and data adequacy.

These are the main points of the discussion:

- The history of the GCOS global climate indicator framework and the rationale behind GCOS Steering Committee Decision were presented.
- It was clarified that the global climate indicator framework governance depends on WMO Services, not exclusively on GCOS.
- It was highlighted the role of the climate indicators as elements of the science-policy nexus.
- Panel members presented 11 proposals for new indicators, justifying their relevance and explaining how they complied with the rest of criteria.

These are the main outcomes:

- The definition of a global climate indicator was revised (see Section 3 below).
- The description of the 5 criteria to identify the global climate indicators was refined (see Section 4 below).
- The new proposed indicators were ranked to establish a preliminary prioritization (see Section 5 below).

3. Definition of a Global Climate Indicator

Based on the discussion, the following proposition for a definition for the global climate indicators was achieved:

A global climate indicator informs on the observed change in the state of the Earth climate system in an easy-to-understand way for policymakers and the public. A global climate indicator is based on robust, scientific-sound and timely data and methods, and emphasizes detectable change in the state of the climate system in a comprehensive and holistic way across space and temporal scales.

4. Definition of the Criteria

Based on the discussion, the existing criteria for the following proposition were refined as proposed here below:

1. **Relevance:** A global climate indicator should inform on observed change in the state of the Earth climate system in an easy-to-understand way relevant for policymakers and the public. The indicator should also serve to guide on observing system gaps across time and space scales.
2. **Representativeness:** The climate indicator represents change in the Earth climate system at global scale and can be also used at regional scale. The indicator integrates detectable change in the state of the climate system in a comprehensive and holistic way and will have value across temporal scales.
3. **Traceability:** Each indicator should be calculated using commonly endorsed and transparent scientific-sound methods.
4. **Timeliness:** It should be possible to calculate the indicator regularly, annually at least, and with a short lag between the end of the period and the publication of the data.
5. **Data adequacy:** The data and method needed for the indicator must be sufficiently robust, verified and accessible.

5. Propositions of new Global Climate Indicators

The interactive discussion led to a set of propositions for the following new potential indicators:

- TOPC: Ecosystem drought, Phenology, Terrestrial carbon storage, Extreme Fires, Terrestrial water storage;
- AOPC: Globally averaged number of cold & warm days; Precipitation; Tropospheric Ozone; Global methane concentration;
- OOPC: Earth energy imbalance; Ocean oxygen content.

All propositions were presented in detail, followed by common Q&A, before then moving to an interactive allocation approach. After careful discussion, the following 3 new indicators have been brought forward:

- Earth energy imbalance
- Ecosystem drought
- Terrestrial carbon storage.

A fact-sheet for each of the 3 indicators needs to be prepared for further internal evaluation and discussion.

6. Fact-sheet template

The fact-sheet should address key questions in support to the approval of the proposed indicators, it should build on a sound scientific basis but should be written with a simple narrative for communication and dissemination purposes.

The proposed fact-sheet's structure can be:

1. Introduction, with a brief summary describing the background, including complementary with existing indicators.
2. A short description, responding to the question: what is 'new indicator name'?
3. A sound justification – providing scientific evidence – responding to the question: why is 'new indicator name' important?
4. How is 'new indicator name' measured (including data sources, level of operability)?
5. A paragraph (or a matrix) showing how the new indicator matches with the 5 criteria.
6. What easy-to-communicate information can deliver (message to bring to the general public and decision makers)?

7. Proposed Timeline

Time	Activity	Responsible
Q4 2024	Prepare Fact-Sheet	GCOS Sec + Panel Experts
Q1 2025	Present the findings and proposals to WMO Services for their consideration.	GCOS Sec
Q2 2025	Discuss the need and development of information sheets (e.g., policy brief style) for informing on current indicators, and for the proposed ones.	Panel Experts
Q4 2025	Present the new indicators at the Earth Information Day, UNFCCC COP-30	GCOS Sec + GCOS Chair
Q4 2025	Face the opportunity of regionalization of global climate indicators in the future (to be discussed).	Panel Experts
