



Is FAIR Sufficient for Interactive Data Services?

Ensuring Sustainability and Reliability of the IPCC WGI Interactive Atlas

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Introduction to the IPCC WGI Interactive Atlas

The Interactive Atlas is part of the WGI AR6 and was assessed according to the IPCC procedures

- It is transparent:
 - The code of the products is published
 - Provenance is provided from scientific input data to data products
- It is FAIR
(see Iturbide, M. et al.: <https://doi.org/10.1038/s41597-022-01739-y>)
- It's sustainable based on the in-kind contribution from IFCA/CSIC

The screenshot shows the top section of the IPCC WGI Interactive Atlas website. At the top left is the IPCC logo (Intergovernmental Panel on Climate Change) and the text 'IPCC Working Group I (WGI): Sixth Assessment Report'. Below this is the title 'IPCC WGI Interactive Atlas' and a descriptive paragraph: 'A novel tool for flexible spatial and temporal analyses of much of the observed and projected climate change information underpinning the Working Group I contribution to the Sixth Assessment Report, including regional synthesis for Climatic Impact-Drivers (CIDs)'. To the right is a globe with a temperature scale from +1.5°C to +4°C and a legend for 'Temperature' and 'Precipitation'. Below the globe are three buttons: 'Errata and problem reporting', 'License, data and citation', and 'Contact'. At the bottom are three main navigation buttons: 'Simple (CLIMATE FUTURES)' (with a globe icon and a diagonal line through it), 'Advanced' (with a globe icon), 'REGIONAL INFORMATION', 'REGIONAL SYNTHESIS' (with a bar chart icon), and 'DOCUMENTATION' (with a document icon).

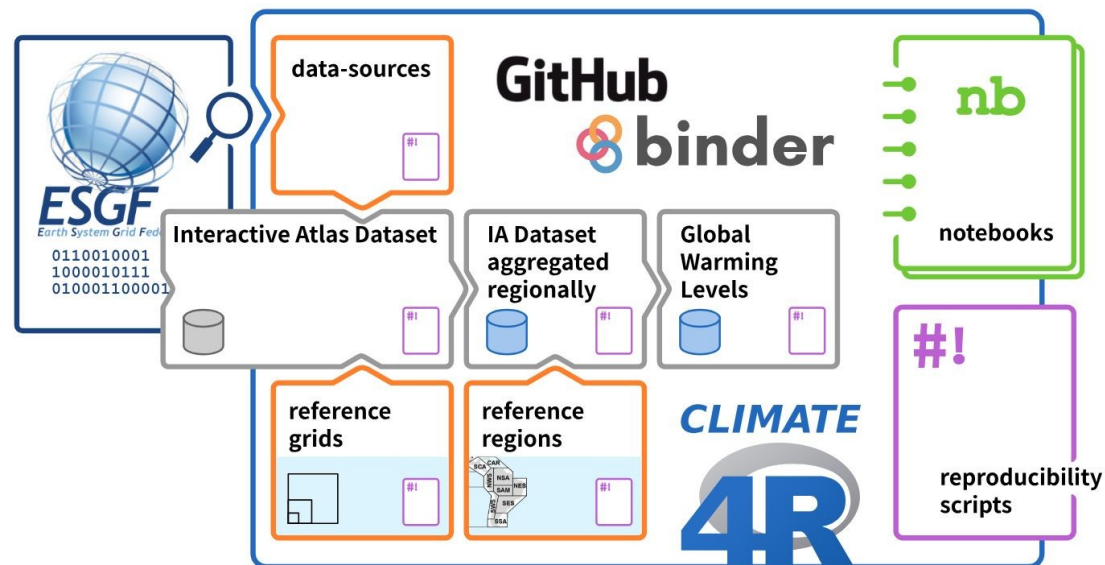


Reproducibility

The **provenance** information details and the provided scripts and notebooks make the Atlas products reproducible:

- Scientific input datasets are provided externally through ESGF
- Intermediate and final datasets produced by the Atlas are preserved by the Atlas

2021: At the time of the IPCC WGI AR6 publication, Atlas products were reproducible.



Reproducibility in 2026

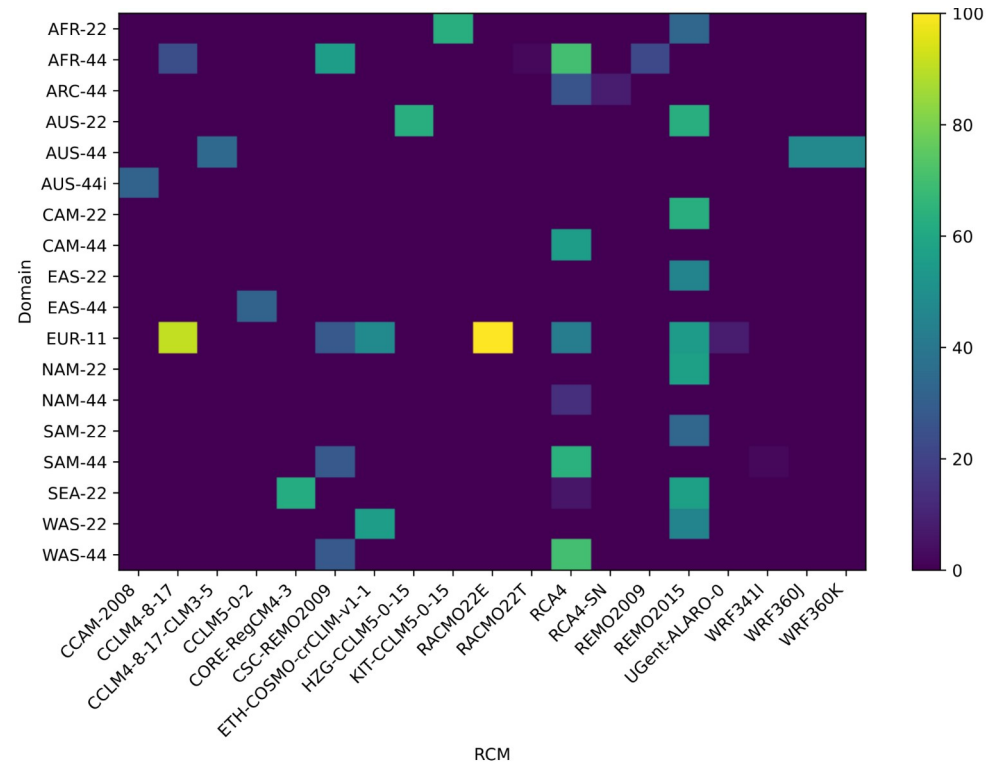
The Interactive Atlas used data from different projects disseminated through ESGF.

Missing Datasets per project

Project	Datasets used in IA	Datasets available 2026
CMIP5	174	106 (61%)
CORDEX	4454	2774 (62%)

Input datasets are lost across several experiments, affecting many Interactive Atlas products.

CORDEX: Missing Datasets per RCM and domain



Reliability

The commitment of IFCA/CSIC ensures:

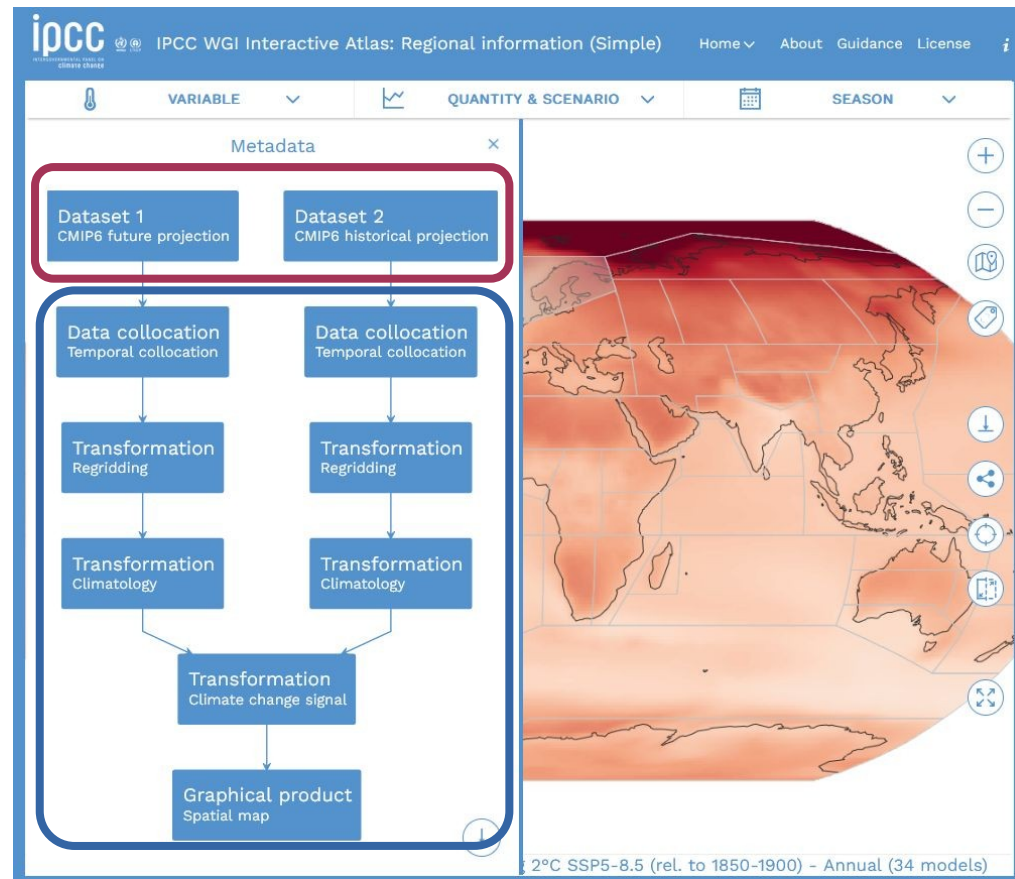
- The Interactive Atlas as data service is reliable and sustainable.
- The final data remain reproducible from intermediate to final datasets

The lack of such a commitment for the scientific input data means:

- The reproducibility from scientific input to final data desintegrates over time

As IPCC reports assess the state of knowledge on climate change, loss of access to the science referenced undermines their credibility.

Paper analogy: A peer-reviewed paper referenced in the IPCC AR6 disappears.



Conclusion: Is FAIR Sufficient for Interactive Data Services?

No, sustainable and transparent Data Services need in addition:

- long-term institutional commitment to maintain its functionality, security, and usability
- sustained stewardship of the digital sources from scientific input to product
- coordinated, long-term engagement from all partners across the data analysis chain

Plans for improvements of the Interactive Atlas in AR7 include:

- expand content: add data from WGII (Impact, Adaptation, Vulnerability)
- sustained reproducibility: use scientific input data long-term preserved at an IPCC Data Distribution Centre (DDC) Partner or at an external data center
- provenance documentation: use the Complex Citation approach to publish it and enable credit attribution to scientific input data

Scientific Data

Data Analysis /
Assessment

Data Product /
Service

These findings are particularly critical for the credibility of IPCC assessments, but are also relevant for cross-domain interoperability approaches.



<https://interactive-atlas.ipcc.ch>

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