

EIOPA roundtable on catastrophe models and physical risk

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NGO Climate Analytics

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Outline

- **What makes physical risk modelling difficult?**
- Overview of the ISIMIP database
- Overview of the Climate Impact Explorer
- Learnings on the use of open source data

Sources of uncertainty in climate impact modelling

IPCC WG III emissions scenarios (April 2022)

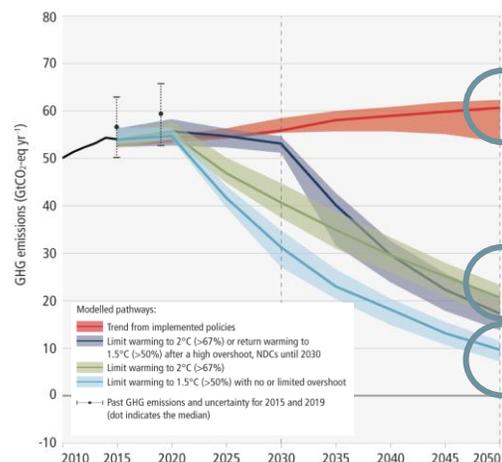


Fig. 3: WG III Emissionsszenarien

Extreme event similar to Low “Bernd”

Frequency
 x23
 x10
 x2
 x1.8

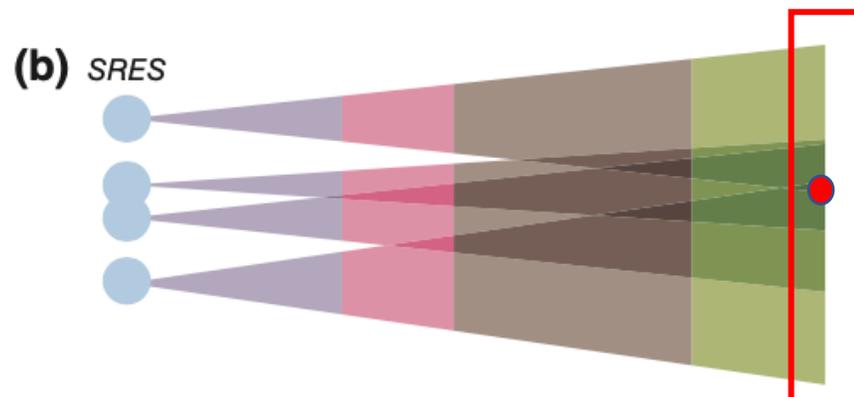
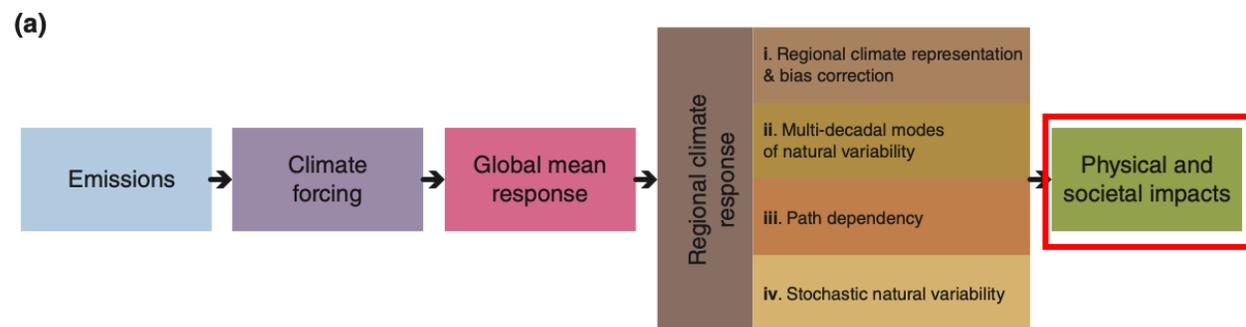


Fig. 4: Precipitation at Ahr / Erft



“Low Bernd” in 2021 is estimated to have caused approx. 5 Bn Eur insurance claims¹

From emissions to impacts – Sources of uncertainty



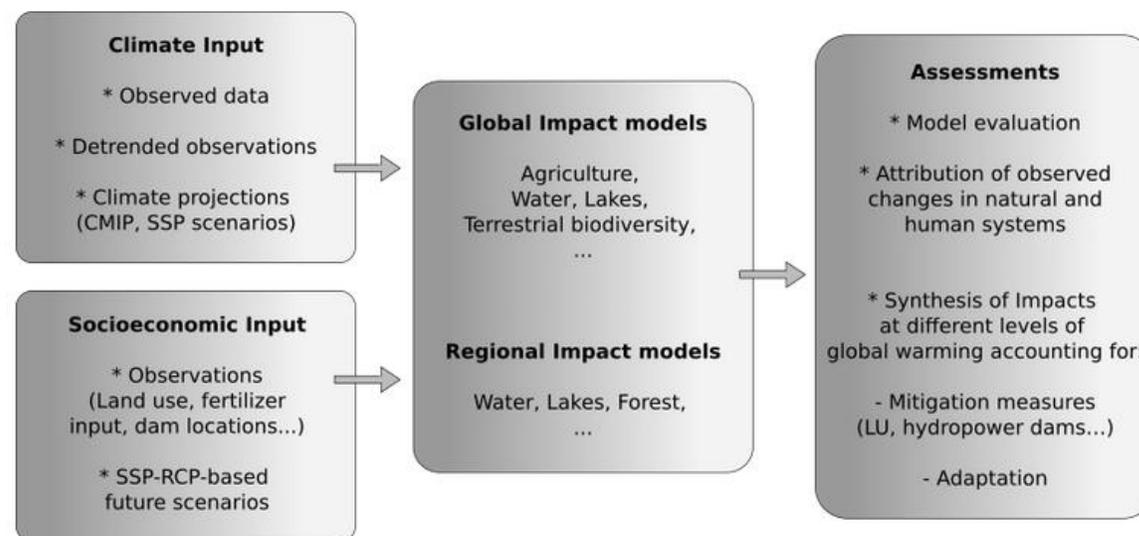
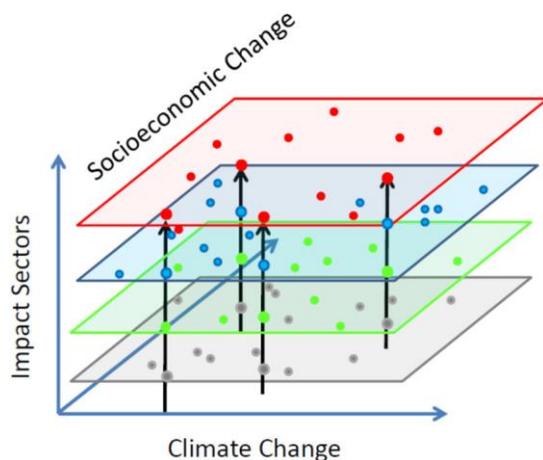
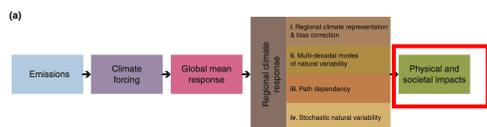
- From emissions to local impacts, a range of factors need to be incorporated that are all subject to considerable uncertainty
- Uncertainty increases further down the ‘impact modelling chain’, and can become very large at the end of the chain (societal impacts such as damages)
- Moreover, the difficulty of capturing local-scale processes and the random noise component characteristic of the climate system and impact-related processes lead to increased uncertainty at the local level

Outline

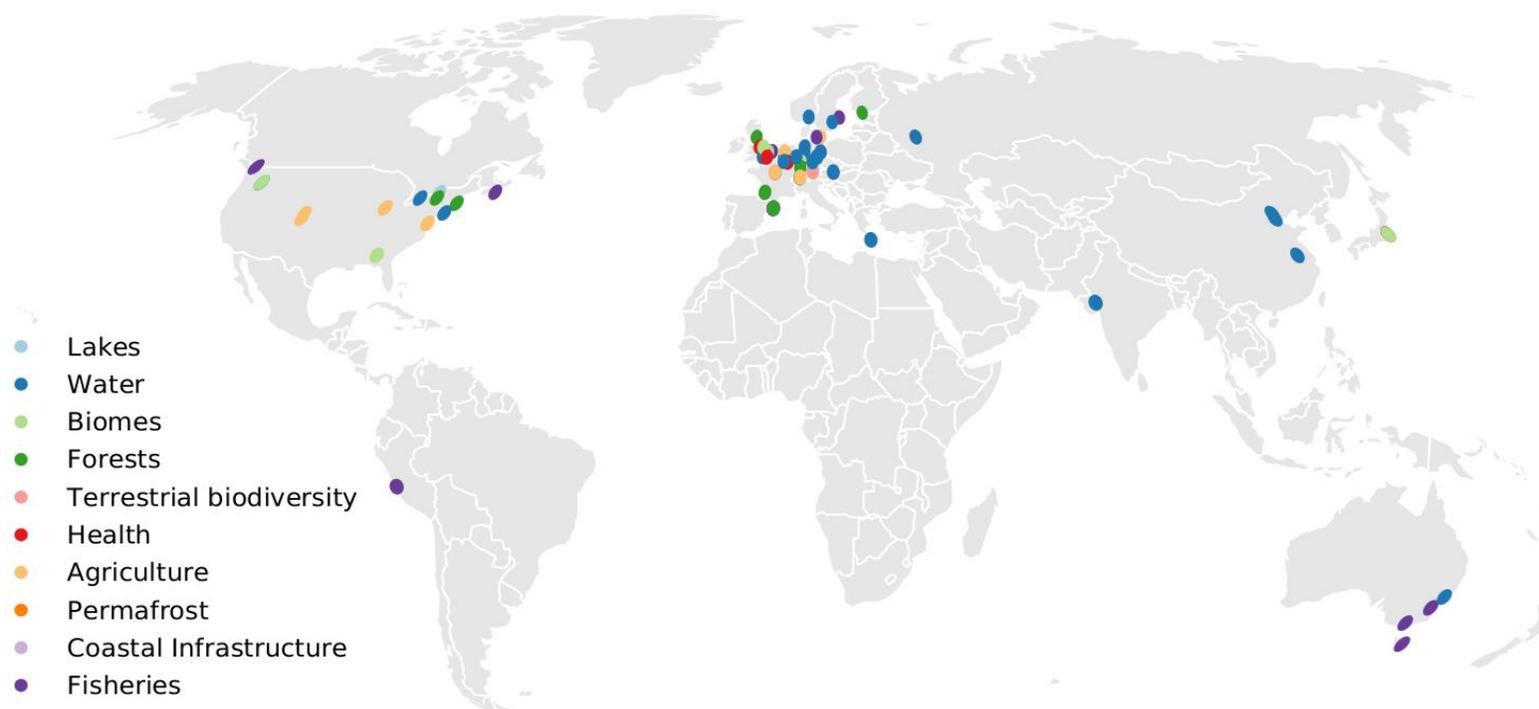
- Why is physical risk modelling so hard?
- **Overview of the ISIMIP database**
- Overview of the Climate Impact Explorer
- Learnings on the use of open source data

ISIMIP – Overview

- The **Inter-Sectoral Impact Model Intercomparison Project** was created to conduct research on climate impacts on multiple sectors and across the globe
- It has been a pioneering project because it has relied on **common experimental protocols and common input datasets**, thus allowing to compare results across impact modelling groups
- It explores sectoral impacts from both the climate and human forcings (land use, water management, etc.)



ISIMIP – Modelling groups



Community-driven effort based on voluntary participation of so far 100+ impact modelling groups worldwide, coordinated by the Potsdam Institute for Climate Impact Research

ISIMIP – Simulation rounds

ISIMIP Fast track (First release 2013-2016):

- future impacts (2010-2100)
- limited amount of sectors

ISIMIP 2a (2017-2020):

- historical impacts (1971-2010)

ISIMIP 2b (2017-2020):

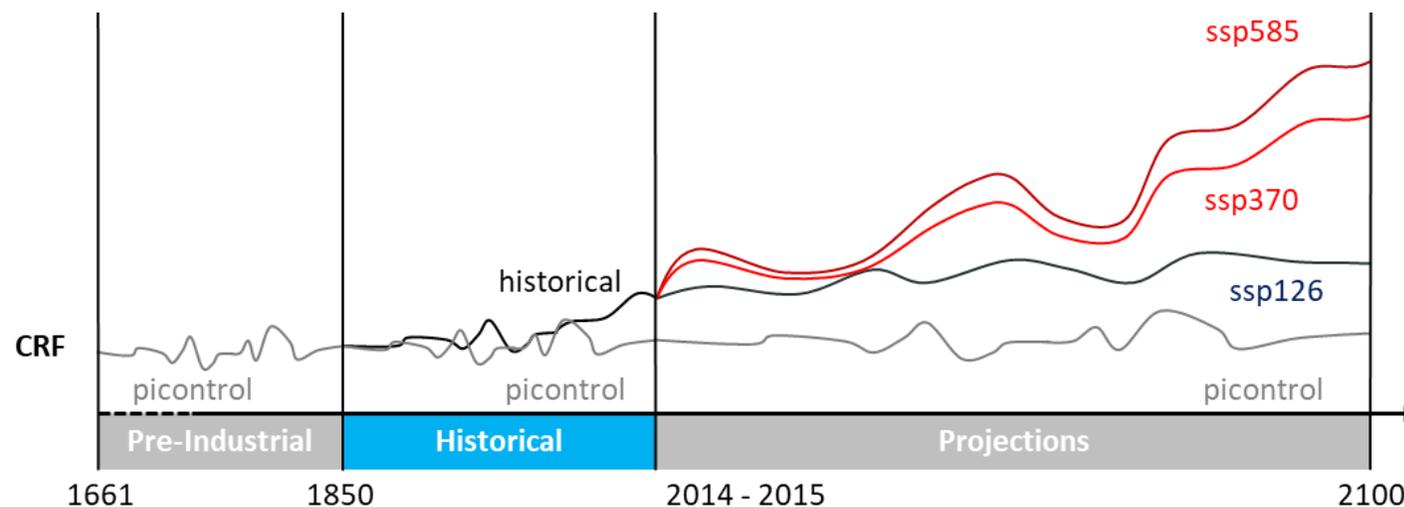
- future impacts (2010-2100)
- addition of more sectors

ISIMIP 3a (2020-):

- historical impacts (1971-2010)
- focus on detection & attribution

ISIMIP 3b (2020-):

- future impacts with a focus on adaptation



**Standardized variables and data format,
naming and structure**

ISIMIP – Sectoral coverage



Water (global)



Water (regional)



Fisheries



Energy



Regional forests



Global biomes



Agriculture



Agroeconomics



Terrestrial biodiversity



Permafrost



Coastal systems



Health



Lakes



Fire



Labor productivity

In development:



Water quality



Groundwater



Peatlands

- ISIMIP results have been used in **200+ scientific peer-reviewed publications** and key contributors to the WG2 of the IPCC (on Impacts and Adaptation)

ISIMIP – Resources

Welcome to the ISIMIP Repository

Here you will find data relating to the Inter-Sectoral Impact Model Intercomparison Project (ISIMIP). Use of these data are subject to the ISIMIP terms of use. Documentation of the impact models that provided impact simulations for this archive can be found in the ISIMIP Impact Model Database.

SEARCH THE ISIMIP REPOSITORY

Search for variable, sector, scenario, climate forcing, ...

ISIMIP [DATA](#) [SEARCH](#) [DOI](#) [METADATA](#) [CAVEATS & UPDATES](#) [DOCUMENTATION](#) [TERMS OF USE](#) [LOGIN](#)



Climate forcing
Climate and climate related forcing data for the **ISSM2a**, **ISSM2b**, **ISSM2c**, and **ISSM2d** simulation rounds.

Socioeconomic forcing
Socioeconomic datasets for the **ISSM2a**, **ISSM2b**, **ISSM2c**, and **ISSM2d** simulation rounds.

Static geographic information
Geographic data and information for the **ISSM2a**, **ISSM2b**, **ISSM2c**, and **ISSM2d** simulation rounds.

OUTPUT DATA



Agriculture sector
Output data from the **ISSM2a**, and **ISSM2b** simulation rounds.



Terrestrial biodiversity sector
Output data from the **ISSM2a**, and **ISSM2b** simulation rounds.



Biomes sector
Output data from the **ISSM2a**, and **ISSM2b** simulation rounds.



Lakes (global) sector
Output data from the **ISSM2a**, and **ISSM2b** simulation rounds.



Lakes (local) sector
Output data from the **ISSM2a**, and **ISSM2b** simulation rounds.



Fisheries & Marine Ecosystems (global) sector
Output data from the **ISSM2a** simulation round.



Fisheries & Marine Ecosystems (regional) sector
Output data from the **ISSM2a** simulation round.



Permafrost sector
Output data from the **ISSM2a**, and **ISSM2b** simulation rounds.



Water (global) sector
Output data from the **ISSM2a**, and **ISSM2b** simulation rounds.



Water (regional) sector
Output data from the **ISSM2a**, and **ISSM2b** simulation rounds.

If you want to get notified, when we find issues in the ISIMIP input and output data, please subscribe to our [caveats and updates mailing list](#). The archive of this mailing list can be accessed here.

In order to refine the portal and to improve user convenience we would appreciate your feedback on the portal. So, please use the portal for searching and downloading input data and collect feedback from your sector about experiences, pitfalls and things that should be improved.

Your feedback as well as any questions related to ISIMIP can be directed to info@isimip.org.

Search the ISIMIP Repository

Enter search query

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Sidebar view: Tree Facets

Show only the latest version Show specific versions with date constraints

Show archived files



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DOCUMENTATION

TERMS OF USE

LOGIN

- Agriculture
- Terrestrial biodiversity
- Biomes
- Regional forests
- Lakes (global)
- Fisheries and Marine Ecosy...
- Fisheries and Marine Ecosy...
- Permafrost
- Water (global)
- CLM40
- DBH
- H08
- JULES-B1

ISIMIP2a OutputData **water_global** GSWP3 historical CLM40 dis ToU CC BY 4.0 20220716

clm40_gswp3_nobc_hist_nosoc_co2_dis_global_daily
 Select dataset Attributes Files Configure download Download file list Download all files

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ISIMIP2a OutputData **water_global** GSWP3 historical CLM40 qtot ToU CC BY 4.0 20220716

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ISIMIP2a OutputData **water_global** GSWP3 historical CLM40 rootmoist ToU CC BY 4.0 20220716

clm40_gswp3_nobc_hist_nosoc_co2_rootmoist_global_daily

Main portal: <https://www.isimip.org/>

Protocol: <https://www.isimip.org/protocol/3/>

Repository: <https://data.isimip.org/>

Data folder: <https://files.isimip.org/>

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CIE – user interface

Climate impact explorer Explorer About Methodology Guide Download

Climate impacts

Explore how climate impacts will play out over time at current emissions reductions levels (according to the scenario used by the Network for Greening the Financial System) and in other policy relevant scenarios, and how they will affect different areas of the selected country or province at different levels of warming.

Select a country, indicator and a scenario to view projections.

COUNTRY: Germany PROVINCE: Select a province INDICATOR: Mean Air Temperature SCENARIO: NGFS current policies

Temporal average: Annual Spatial aggregation method: Area-weighted average

Absolute change in mean air temperature in Germany

This graph shows how absolute changes in Mean Air Temperature (expressed in degrees Celsius) will play out over time in Germany at different global warming levels compared to the reference period 1986-2006, based on the NGFS current policies scenario.

+ Compare to alternative scenario Download

5-95% confidence interval Indicative model results after 2060 - Read more about the limitations of the analysis
Source: ISIMIP

Scenarios

RCP2.6

RCP4.5

RCP6.0

RCP8.5

NGFS current policies

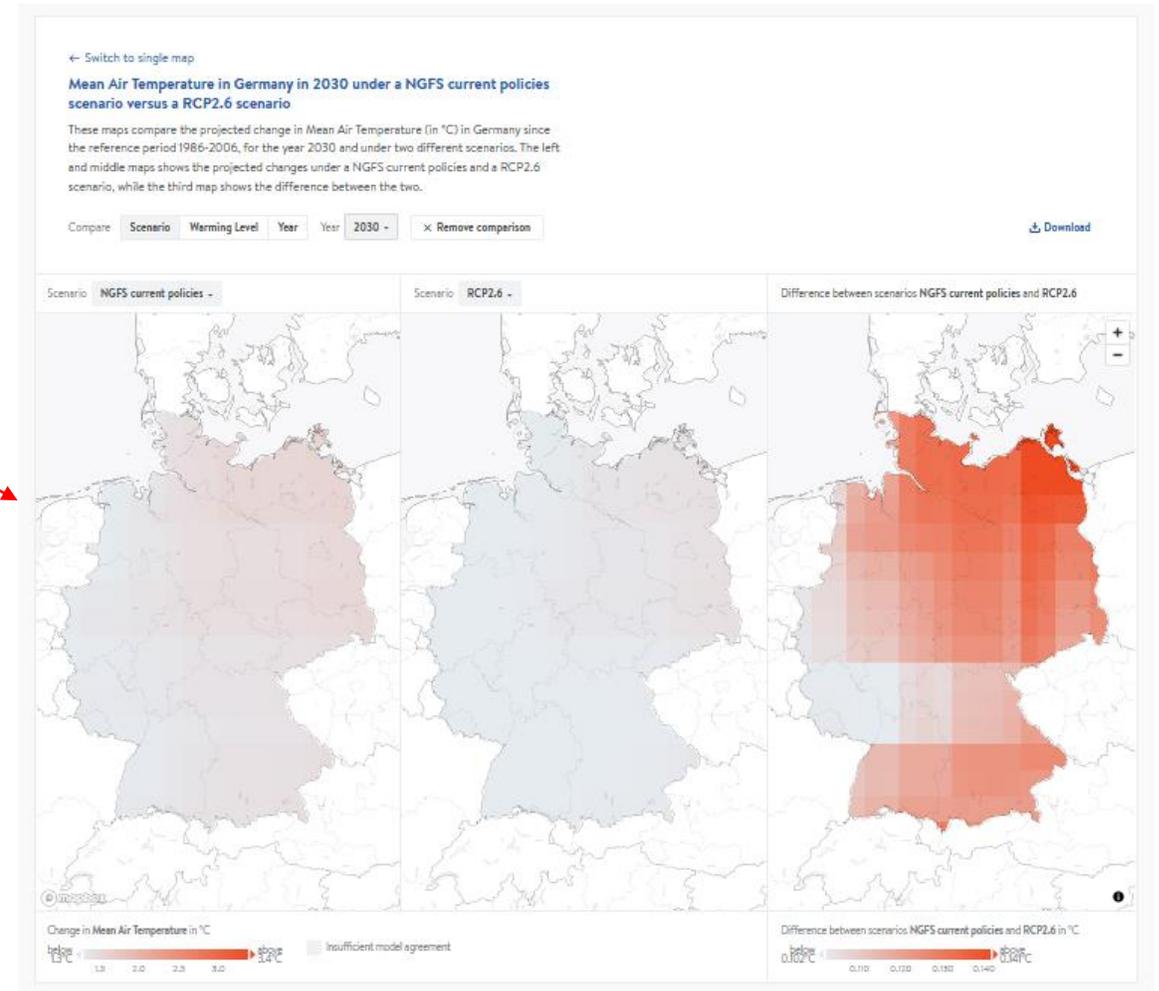
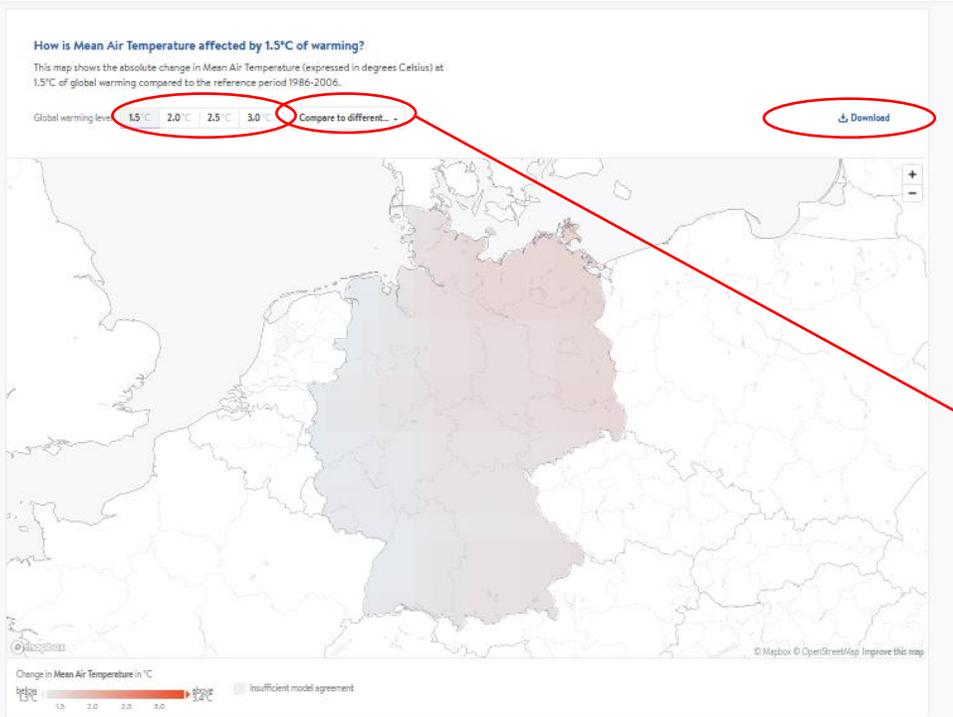
NGFS net-zero 2050

NGFS delayed transition

CAT current policies

<https://climate-impact-explorer.climateanalytics.org/>

CIE – user interface



About the data

How is "Mean Air Temperature" defined?

Limitations of the analysis

For more information go to methodology

You encountered a problem or have suggestions?

[Give feedback here](#) →

You want to help to improve this tool?

[Take our survey](#) →

User survey

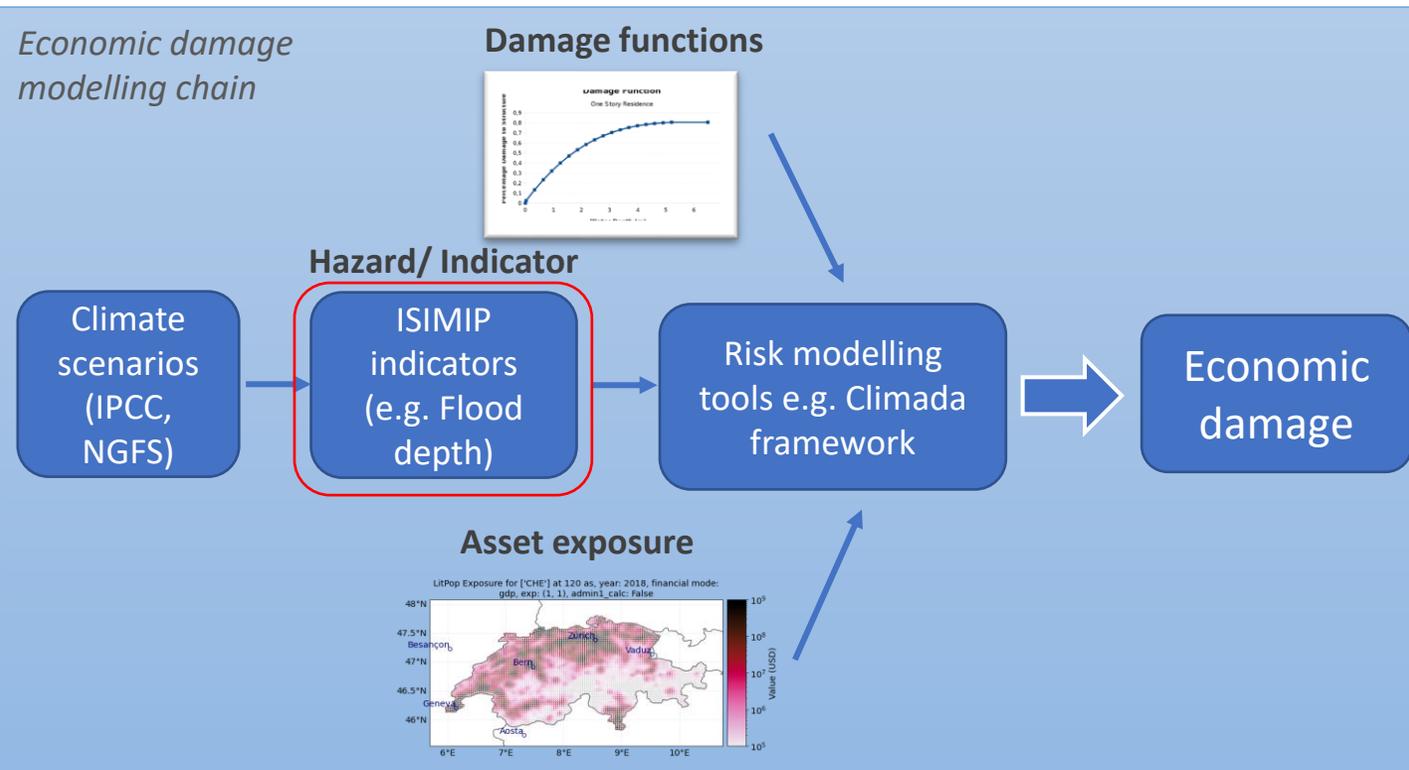
Climate Impact Explorer – data overview

- Provides impact projections for:
 - **8 scenarios:** 3 developed for the NGFS, 1 from the [Climate Action Tracker](#), and 4 Representative Concentration Pathways
 - **32 indicators from 5 sectors, including Economic Damages** (4). But also Climate (11), Extreme Events (8), Agriculture (5), Freshwater (4)
 - with a comprehensive estimate of the uncertainty range (especially its upper bound – worst case scenario)
- Possibility to **compare projections** for different scenarios, years or warming levels
- Projections are based on publicly available impact data (ISIMIP and Climada) generated primarily for research purposes, and visualized in a way tailored to the NGFS

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- Why is physical risk modelling so hard?
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Use of open source physical risk data



Challenges:

- Which model to choose?
- ISIMIP data was not produced specifically for economic damage calculation
- Global data vs. local resolution
- Validation of the open source data (other models, observations)
- To understand the data, reaching out to the modelling team is beneficial

Thank you for your
attention