OS-Climate (Open Source Climate)

Introduction to OS-Climate's physical risk and resilience ecosystem

May 2023

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OS-Climate: Introduction

Innovation through collaboration: Overview

OS-Climate (Open Source Climate) is a non profit community of collaboration and action developing free, open source data and analytics tools to help rapidly scale finance and investment in the transition to a resilient, low carbon world.

Community members comprise a broad range of financial institutions, financial data and service providers, and tech firms providing a world class ecosystem for collaboration, supported by the Linux Foundation. Later this year, we will extend the community to real economy corporations.

The members and partners are jointly building end-to-end software tools for Physical Risk & Resilience, Sector Alignment of investment portfolio, and Transition Scenario Analysis.

The analytic tools are supported by a Data Commons backbone, which is federating data relevant to climate decision making from around the globe.

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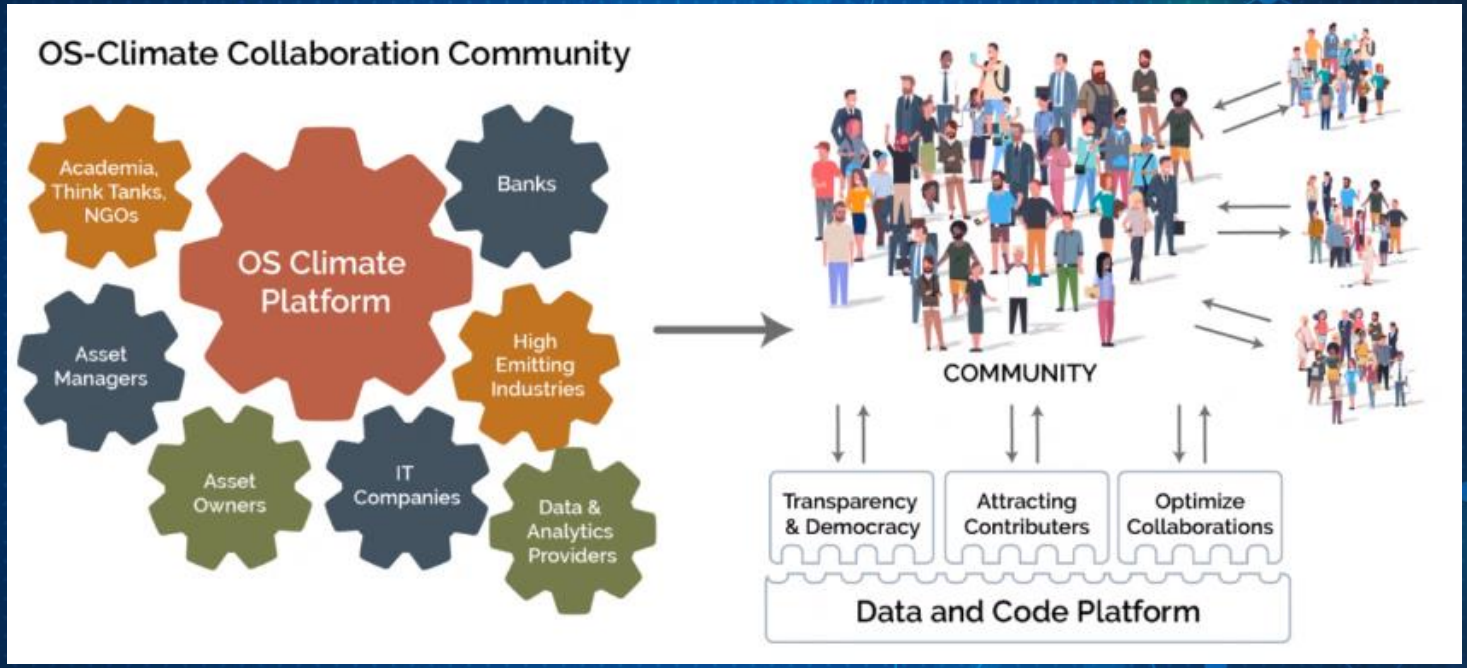
OS-Climate: Introduction

The Linux Foundation: a “co-op” for community-based collaboration



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OS-C’s members and partners collaborate in building the “pre-competitive” layers of data and code that they and the public need. This avoids wheel-reinvention, frees up resources for top-of-stack innovation, and acts as a powerful force multiplier.

OS-Climate Introduction

Our Stakeholders

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PREMIUM MEMBERS

BNP PARIBAS
Goldman Sachs
Capgemini

GENERAL MEMBERS

Allianz
amazon
Amundi ASSET MANAGEMENT
BNY MELLON
EY Building a better working world
LSEG
THE NET-ZERO ASSET OWNER ALLIANCE
ORTEC FINANCE
Red Hat
S&P Global

ASSOCIATE MEMBERS

CLIMATE POLICY INITIATIVE
OpenEarth
World Benchmarking Alliance
INSTITUT POLYTECHNIQUE DE PARIS
FINPUBLICA Finance Leaders For The Public Good

PARTNERS & DATA PROVIDERS

JUPITER
riskthinking.AI
URGENTEM!
World Resources Institute

OS-Climate: Physical Risk & Resilience

Range of use cases (1/2)

Enhancing knowledge within organizations

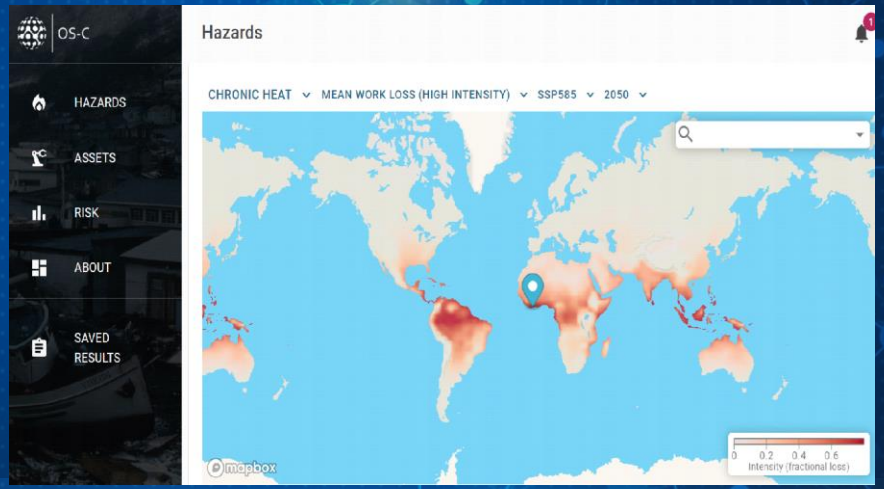
Portfolio risk measurement / scenario analysis

Operational risk management

Origination of loans / investments

Disclosures

Resilience & adaptation planning & finance[1]



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[1] ***There is significant potential to leverage and extend OS-C models and know-how to impactful applications by governments, economic development agencies, NGOs, and academia.***

OS-Climate: Physical Risk & Resilience

Range of use cases (2/2)

Members such as BNP Paribas are already applying OS-Climate toolkits internally:

- To identify and mitigate risk in within multi million asset lending portfolios and to support disclosure needs.
- To build on the pre-competitive layers of data and technology in OS-C tools with additional elements, for proprietary uses such as in credit stress testing and pre-origination risk checks, and to foster dialogue with clients to achieve a shared understanding of risk.

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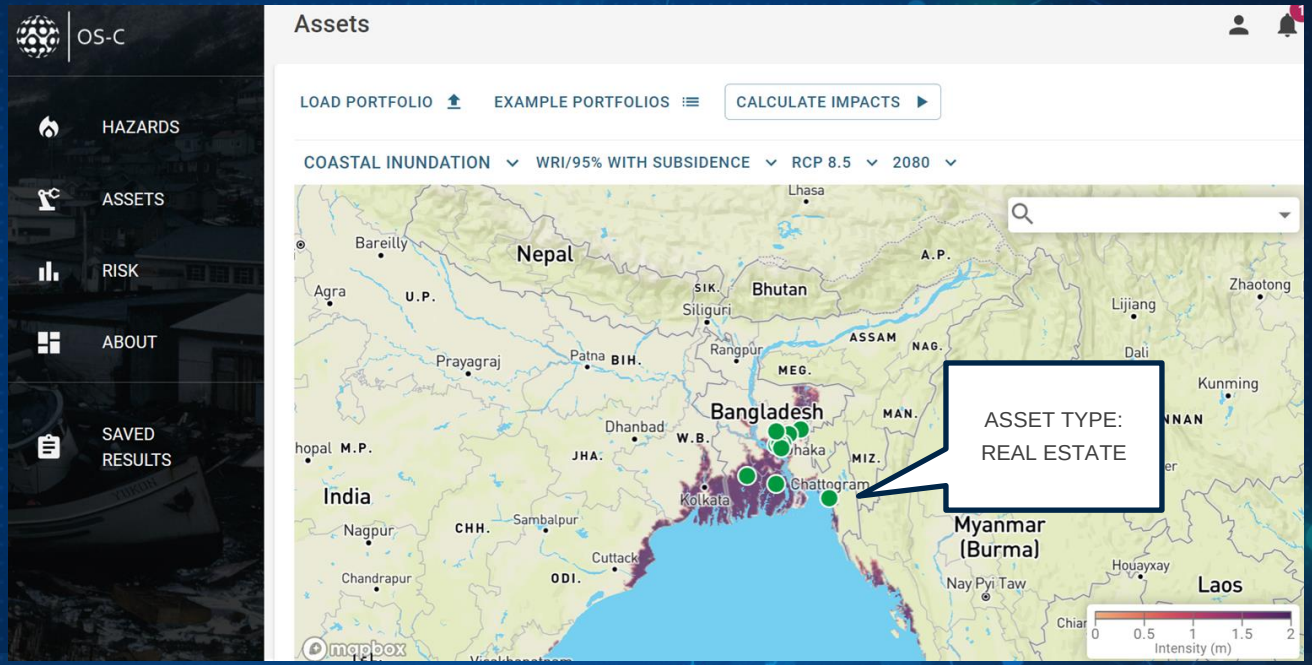
OS-Climate: Physical Risk & Resilience Tool

Sandbox UI example

Temporal and spatial measurement of assets at risk



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The tool connects data for a portfolio of assets to climate hazard models, then visualise the portfolio and the modelling outputs, drilling into each asset to view specific impacts. All the code for linking assets to climate & vulnerability models is an unrestricted public good.

OS-Climate: Physical Risk & Resilience

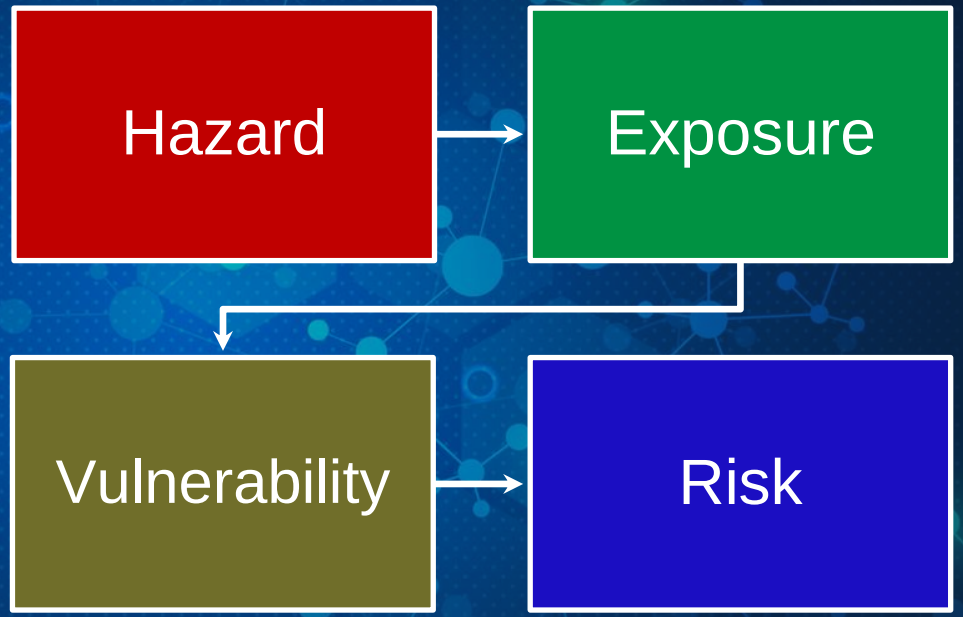
Model building blocks in the end-to-end solution

Reference tools, data & expertise for measurement of physical risk climate hazard and asset damage & vulnerability.

A modular ('plug & play') approach to the risk measurement building blocks.

Gathering asset data and structuring climate models in a usable and understandable format.

(At least) the first three building blocks in the chain are pre-competitive (i.e., ripe for collaboration) for financial institutions, and some elements of risk models can be too.



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OS-Climate: Physical Risk & Resilience

Public good use cases

The extended OS-C community is beginning to leverage the OS-Climate tools, initially created for corporate use cases, to serve pressing philant:

- The newly created Sustainable Africa Consortium1 will localize OS-Climate's data and PRR Tool with climate and vulnerability models for agricultural production in Africa, to assess risk and potential mitigation strategies.
- "Consortium Members will leverage OS-Climate's ecosystem for collaborative development through its shared open data mesh infrastructure, Data Commons, and Data Exchange.

[1] *Sustainable Africa consortium members include: Sustainable Solutions For Green Growth, Green Energy Mission Africa, Climate Risk Research Foundation, Earth Daily & Linux Foundation OS-Climate*

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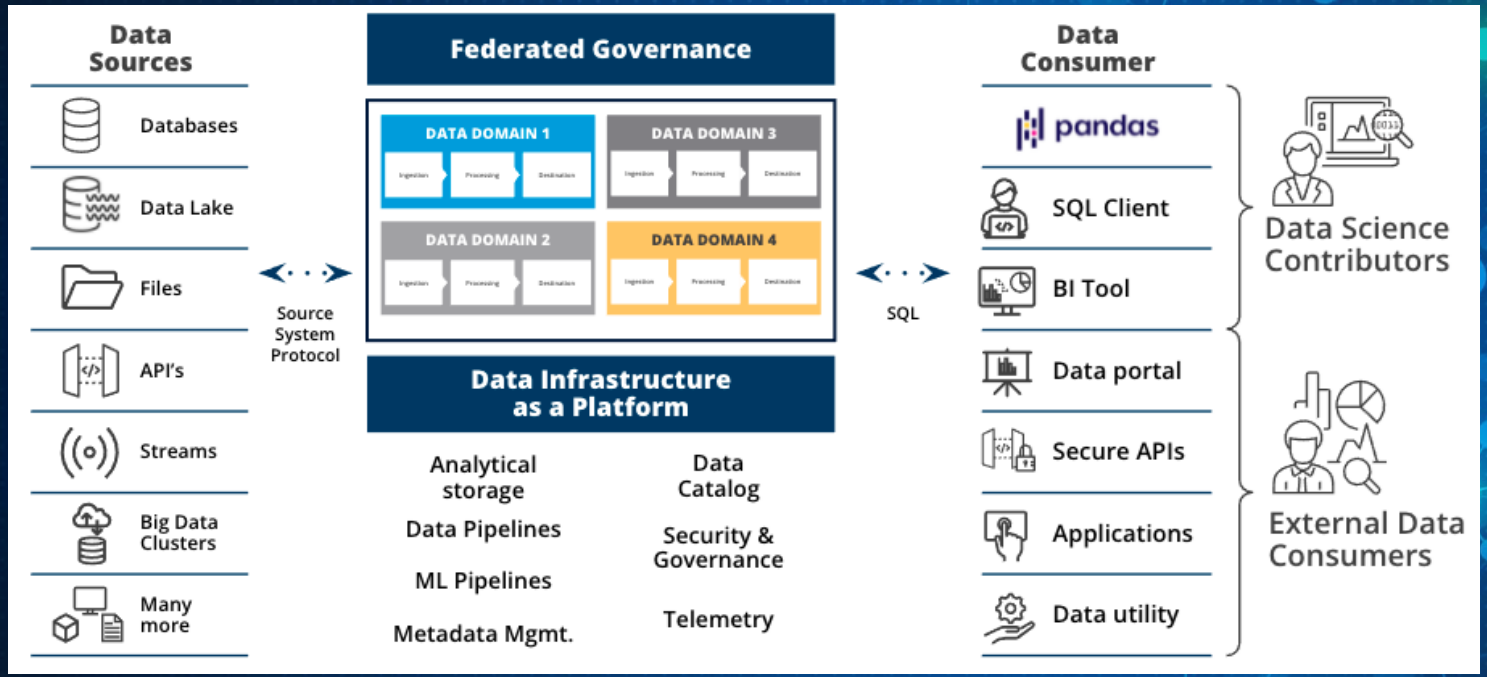
OS-Climate: Introduction to Data Commons / Data Mesh

Inputs for OS-C Tools >> a public data utility



Self-service data infrastructure

Decentralized data "product" ownership

Federated governance

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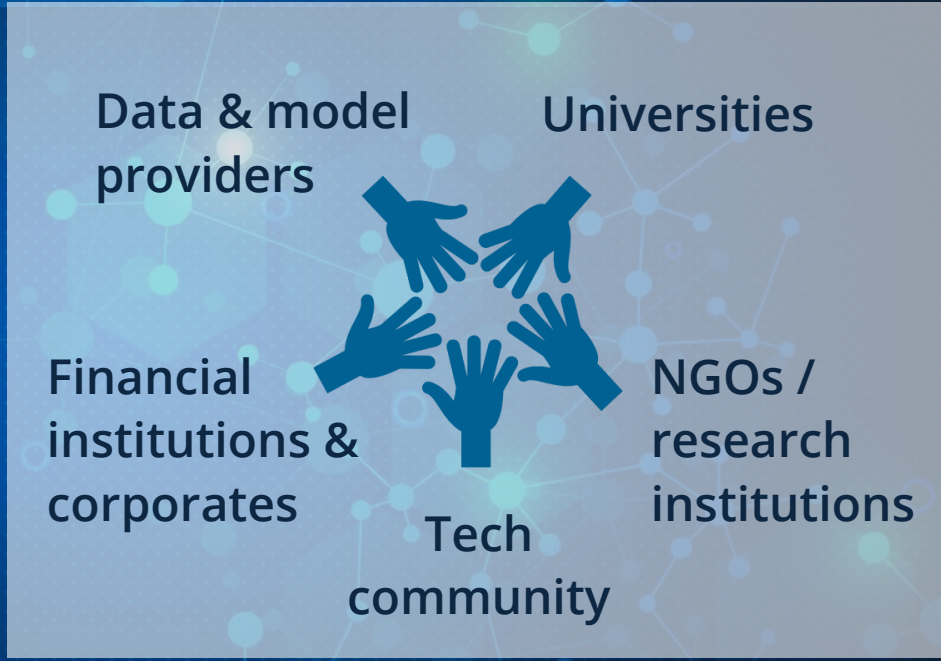
The Data Commons architecture and infrastructure is data agnostic: while initially designed for climate-related data, it is just as suitable for other environmental data such as biodiversity and nature-based assets and for broader ESG data.

OS-Climate: Physical Risk & Resilience

Conclusions

Through its open source end-to-end tooling, OS-C aims to accelerate the quality and accessibility of physical risk measurement -- and identification of resilience and adaptation opportunities -- around the globe.

Open source collaboration reduces barriers to entry, eliminates costly wheel reinvention across the industry, generates a common language, and provides access to world class research & expertise.



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OS-Climate: Open Source Breakthrough for Climate-Aligned Finance & Investing

OS-C welcomes new members/partners

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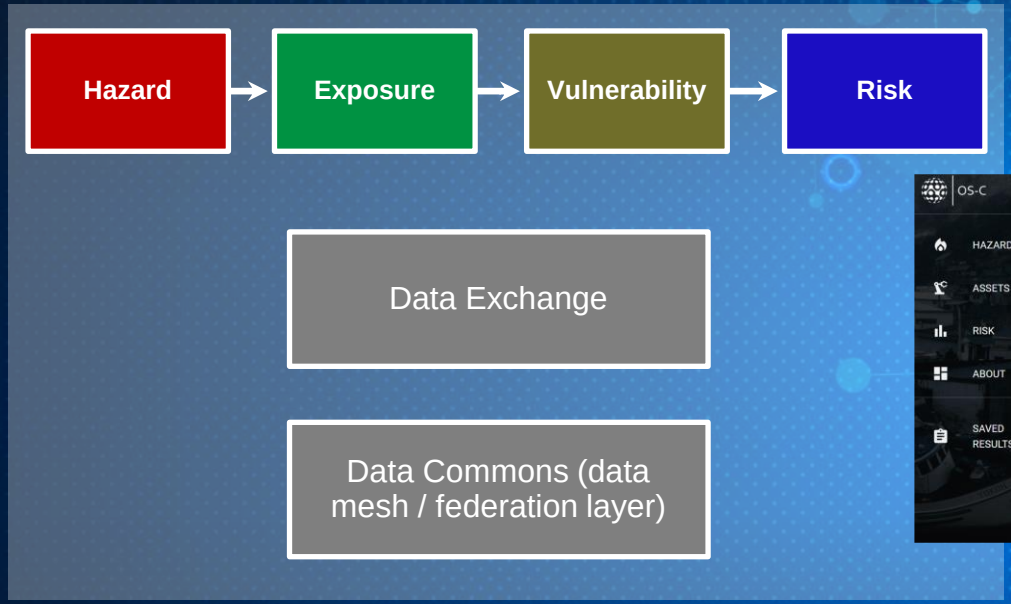
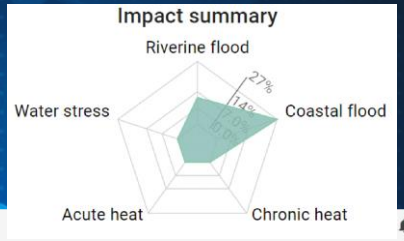
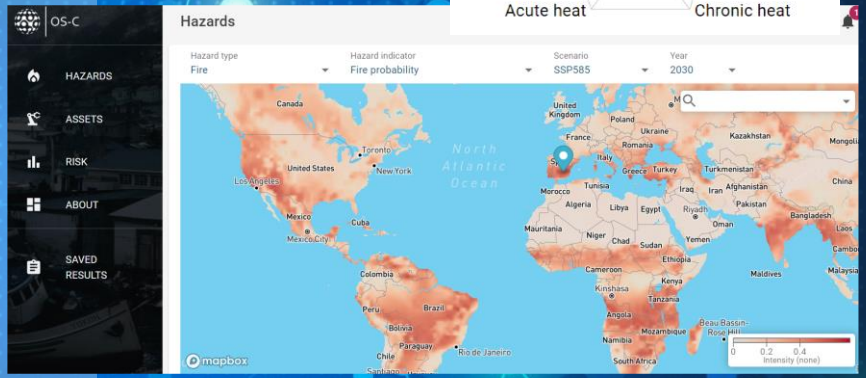
Appendix: Physical Risk & Resilience One Pager







ECOSYSTEM FOR COLLABORATION

GATHERING & STRUCTURING DATA & MODELS IN ONE PLACE

"CO-OP" TO SHARE PRE-COMPETITIVE LAYERS OF WORK

MODULAR, END-TO-END, OPEN CODE

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Appendix: Useful Links

OS-Climate Links:

- The OS-C physical risk code package is available through the OS-C GitHub along with a Sandbox (Beta) UI and methodology documents to help users visualize climate models and get started on the topic.**But valuation may also be a function of repeated disruption impacting on the desirability of a region/property**
- Visit our open-source code repository for video recordings of tool demos, documentation, models, and methodology. Contact admin@os-climate.org for more information. Home - OS-Climate
- **Flood reference mode:** OS-C includes an end-to-end reference model implemented for flood damage functions. Model covers riverine and coastal inundation. The implementation applies the European Commission public damage functions which range from residential real estate to transport type assets to a varying degree of coverage (refer to Global flood depth-damage functions - Publications Office of the EU (europa.eu)) for input types. This gives expected damage functions for assets in terms of % damage (or flood depth output) and then needs to be interpreted by a user into an economic value loss/LTV impact.
- **Heat reference mode:** OS-C also has a reference model for chronic heat risk. Models are detailed in Github; physrisk/src/physrisk/models at main · os-climate/physrisk · GitHub
- **Tooling:** The tool is combining hazard, vulnerability and financial components is hosted on the OS-C Openshift platform: https://github.com/os-climate/physrisk

Other links of interest:

- IPCC: Summary for Policymakers — Global Warming of 1.5 ºC (ipcc.ch)
- The Biodiversity Data Puzzle | WWF [paper makes a case to leverage OS-Climate's Data Commons for biodiversity data]
- Assessing Physical Climate Risks for the European Bank for Reconstruction and Development's Power Generation Project Investment Portfolio | World Resources Institute (wri.org)

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Appendix: Physical Risk & Resilience

Example Data needs

	Hazard	+	Exposure	+	Vulnerability	=	Risk
Type of data	**Climate indicators**		**Asset-level data**		**Damage function**		**Quantified impact**
Example (an acute risk)	***Flood depth by return period***		***Lat/lon Value***		***Fractional damage/disruption***		***valuation risk***
Example (a chronic risk)	***Degree days above reference***		***Number of employees***		***Productivity/ heat***		***Loss of wages/revenue***

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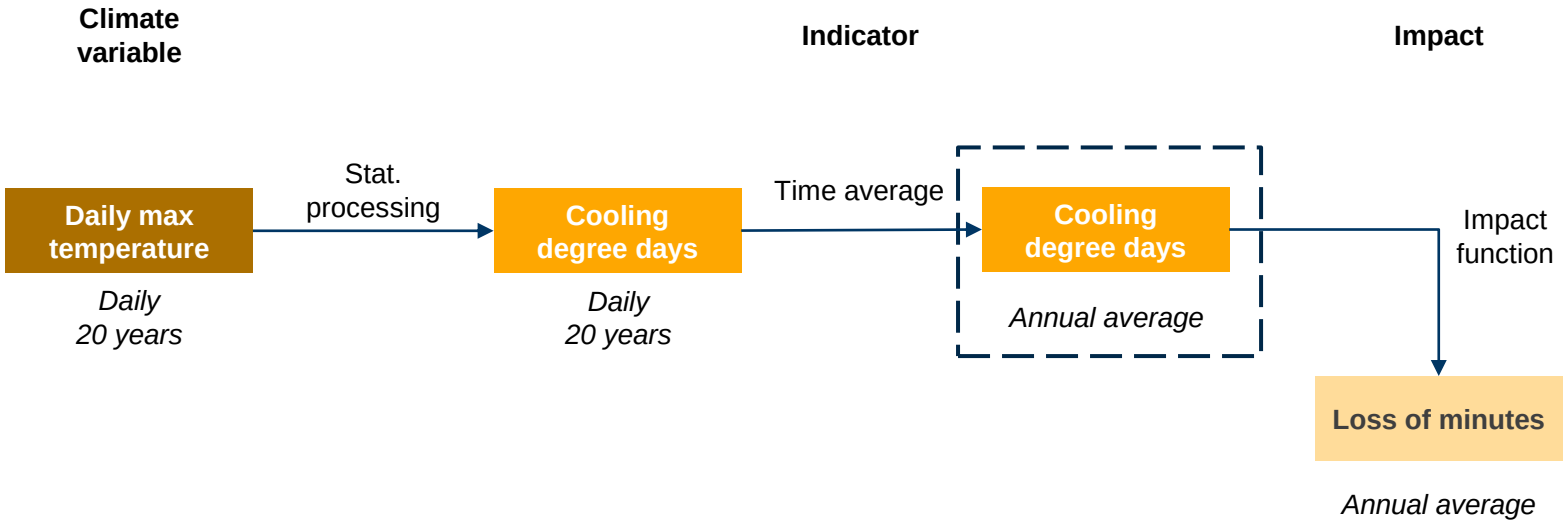
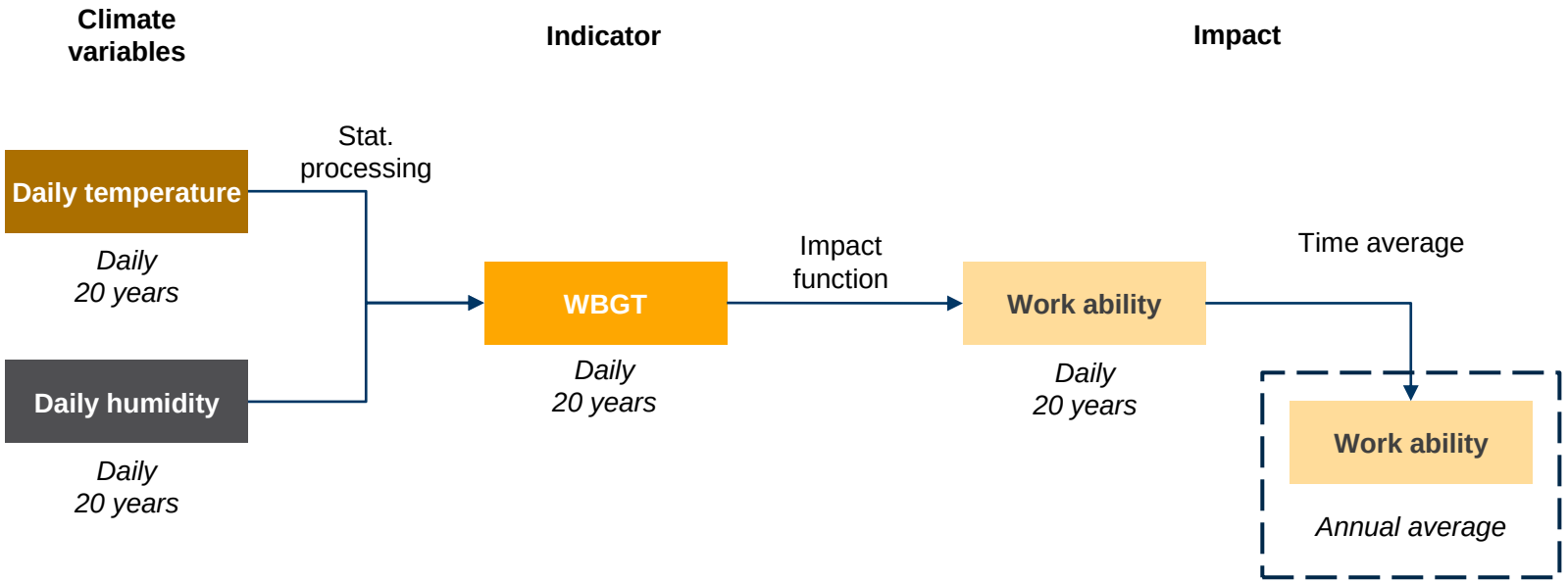
The business case for government agencies, research & academic institutions, etc. to contribute data to OS-Climate is that the Data Commons enables their data to have much greater climate impact -- by making it accessible and actionable for the financial sector and business.

Appendix: Chronic heat model example (1/3) : Cooling degree days and labour availability



Appendix: Chronic heat model example (2/3): WBGT and labour availability



WGBT: = Wet Bulb Globe Temperature

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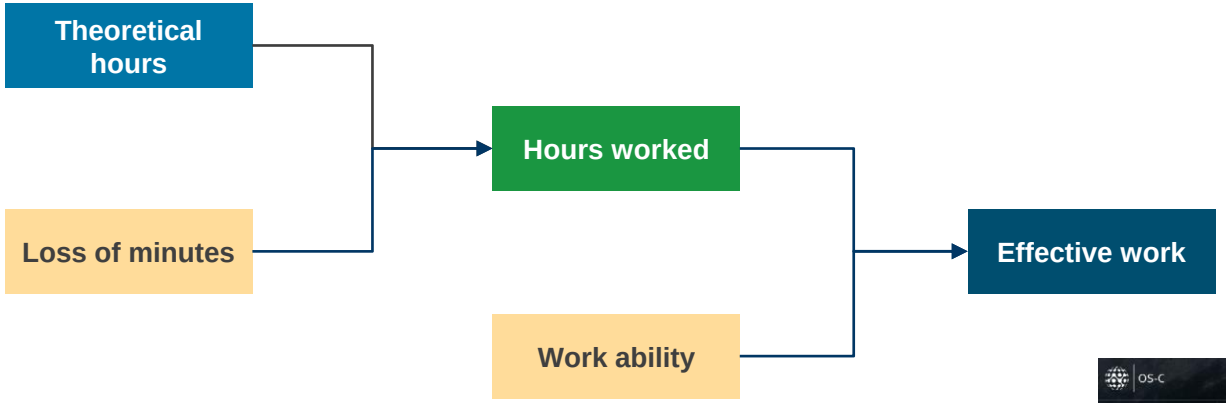
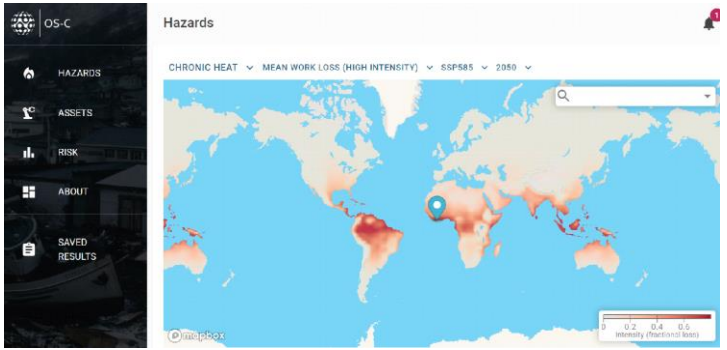
Appendix: Chronic heat model example (3/3): Aggregation



Theoretical hours - Effective work = Lost hours



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