

Explainer

A plain language explainer for decision-makers about research from the Climate Science for Service Partnership (CSSP) Brazil

The Brazil Climate Portal: an easy-to-use data visualisation tool

A new website, the Brazil Climate Portal (<http://pclima.inpe.br/>), has been set up to produce visualisations of climate projection data: data from model simulations estimating how the Earth's climate may change in future years or decades. These data can be used by climate scientists and stakeholders to visualise and communicate the potential impacts of global warming on Brazil to support climate policies and actions.

Importance

Global warming is changing the Earth's climate and increasing the occurrence of extreme events across the globe: continued warming is predicted to have a profound effect on the people and environment of Brazil. Potential impacts for Brazil include:

- Increased wildfires (Burton et al., 2021) and land burnt by wildfires (Wu et al., 2021)
- Increased heatwaves, and associated heat stress (Bitencourt et al., 2020)
- Greater rainfall variability (Alves et al., 2020)
- Less rainfall over the Amazon (Richardson et al., 2018)
- More intense rainfall events causing more flash floods and landslides (Marengo et al., 2021)
- Reduced sugarcane yield (Flack-Prain et al., 2020).

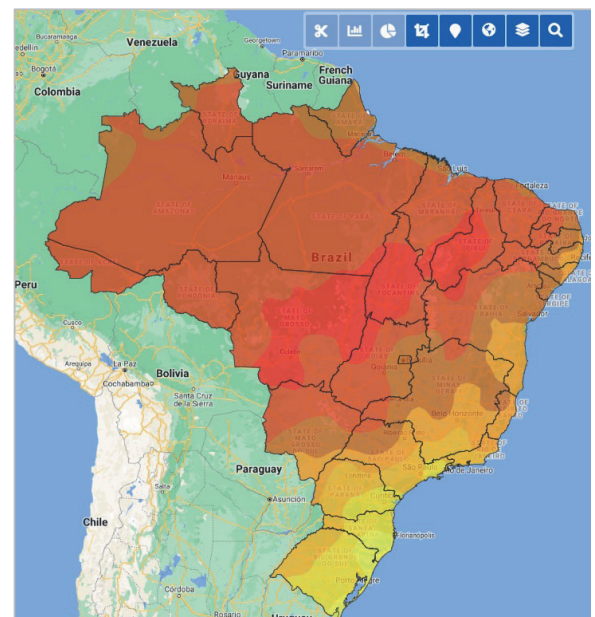
Approach

Climate projections estimate how the climate may change in the future due to different greenhouse gases emission trajectories. They are created using climate models, which simulate the Earth's climate system, including the atmosphere, ocean, land and ice. Assumptions about future pathways of human activities drive the results of climate simulations; activities such as:

- Economic development
- Population growth
- Greenhouse gas emissions

The Brazil Climate Portal holds the results of climate models that have been run using different scenarios, or pathways (Collins et al., 2013).

The Brazilian Climate Portal has been developed by the National Institute for Space Research in Brazil (INPE).



▲ This visualisation from the Brazil Climate Portal shows the modelled average annual maximum temperature across Brazil, using data from the Helix project under the SWL1.5 scenario.

Maps and time series showing how meteorological variables change in each projection can be created using the in-built visualisation tool.









The data can then be downloaded with the click of a button.

Explainer

Find more climate resources at www.viewpoint-brazil.org

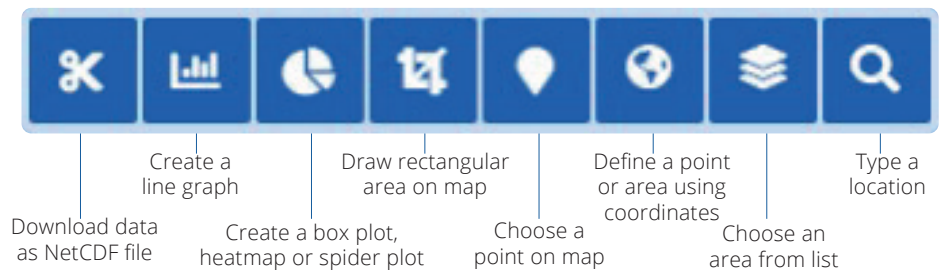
How it works

Users can produce plots and download climate data by setting the following options:

	Conjunto de dados CMIP6	Dataset: data is available from different global climate models such as those from CMIP6 (the Coupled Model Intercomparison Project 6) and from regional models such as those from the projETA.
	Modelo HADGEM3-GC31-MM	Model: Each dataset contains results from multiple models, so the user chooses which model they want to display data for.
	Experimento R11I1P1F3	Experiment: Regional and atmospheric models only simulate a section of the Earth or the climate system: these models must be provided with boundary conditions. The user must decide which experiment, or model, to use to provide these boundary conditions.
	Cenários SSP126	Scenarios: Each model has run under a set of assumptions of how human activities will change throughout the simulation - called scenarios. There are four scenarios available to choose corresponding to historical data, and three scenarios with varied greenhouse gas emissions.
	Período PRÓXIMO (2011/2040)	Timeslice: Users choose the period they would like the data to be displayed for.
	Tipo ANOMALIA	Type: Users choose whether to display average values, or anomalies (the difference between the simulated and historical mean values).
	Variáveis TEMPERATURA MÁXIMA	Variables: Users choose which meteorological variable to display.
	Frequência ANUAL	Frequency: Users choose whether to display annual, seasonal or monthly values.

This produces a map showing the required meteorological variable across Brazil.

The toolbar (right) can then be used to produce time series and box plots for specific areas or regions.



Next steps

Visit the Brazil Climate Portal (<http://pclima.inpe.br/>) to explore or download climate projection data for Brazil. The website includes a step-by-step guide on how to use the visualisation tool, as well as an API to generate URLs to download specific datasets quickly and easily.

The Brazil Climate Portal has been developed by the National Institute for Space Research in Brazil, INPE.

References

- Alves et al. (2020), DOI: 10.1002/joc.6818 | Bitencourt et al. (2020), DOI: 10.1002/joc.6877
 Burton et al. (2021), DOI: 10.1002/cli2.8 | Collins et al. (2013) p1036 IPCC AR5 WG1
 Flack-Prain et al. (2020), DOI: 10.1111/gcbb.12797 | Marengo et al. (2021), DOI: 10.3389/fclim.2021.610433
 Richardson et al. (2018), DOI: 10.1002/2017GL076520 | Wu et al. (2021), DOI: 10.1016/j.oneear.2021.03.002