

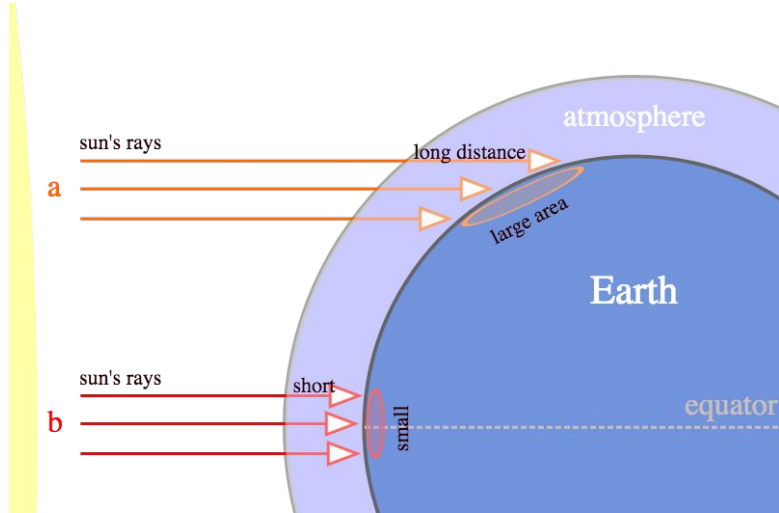
Solar Radiation & Earth's Energy Budget

Sloane Garelick

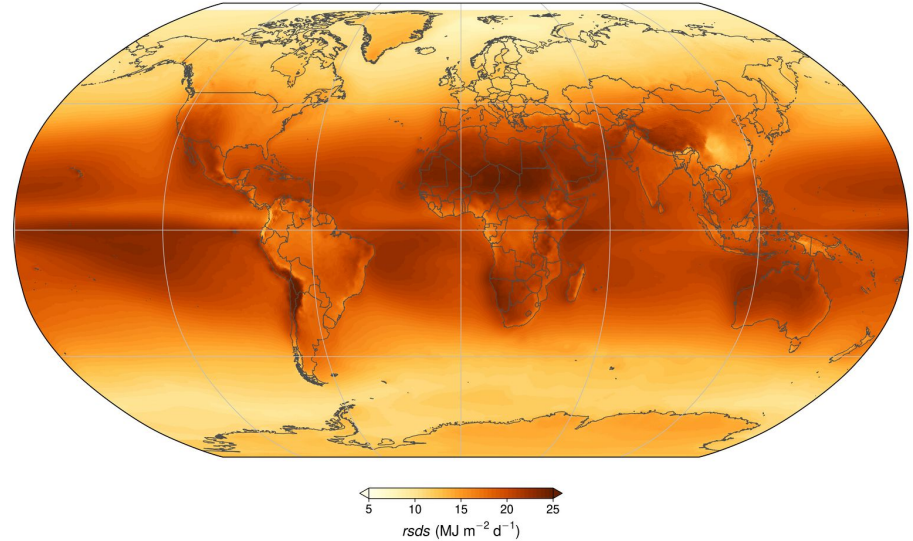


Climatematch
Academy —

Incoming Solar Radiation



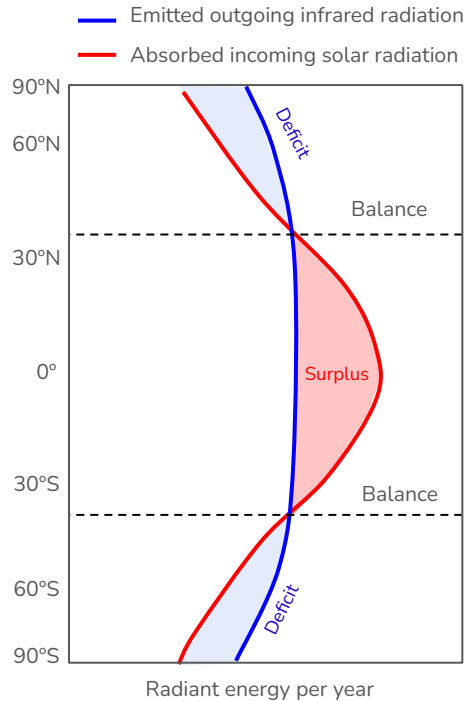
World map of surface downwelling solar radiation for the period 1981-2010 based on the CHELSA-BIOCLIM+ data set



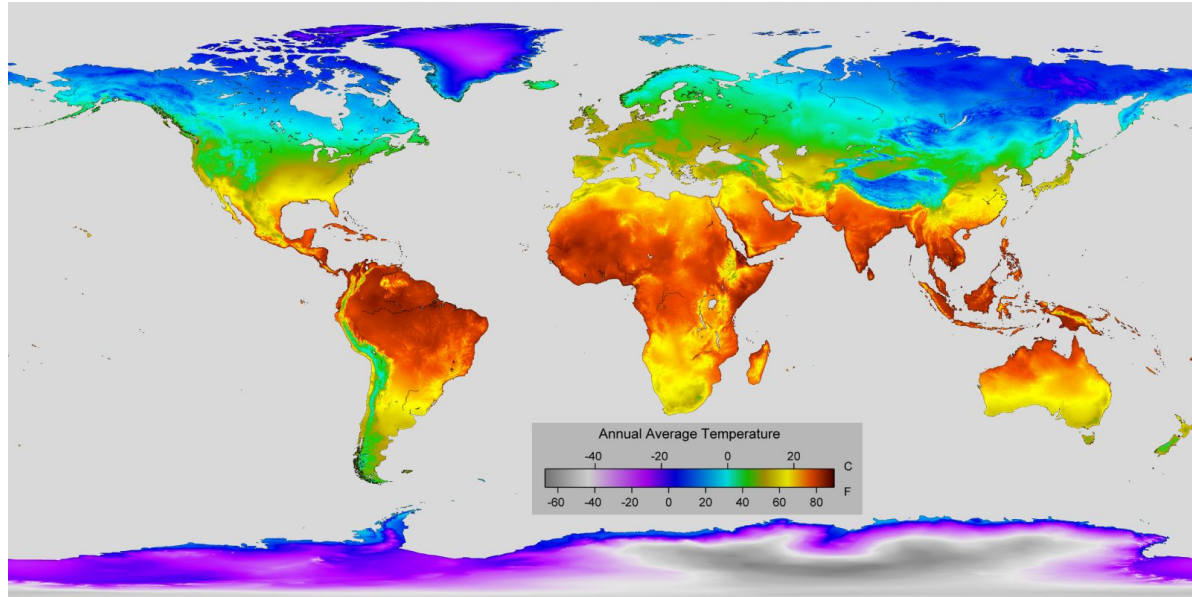
(Greenmind 1980, CC BY-SA 4.0; Peter Halasz, CC BY-SA 3.0)



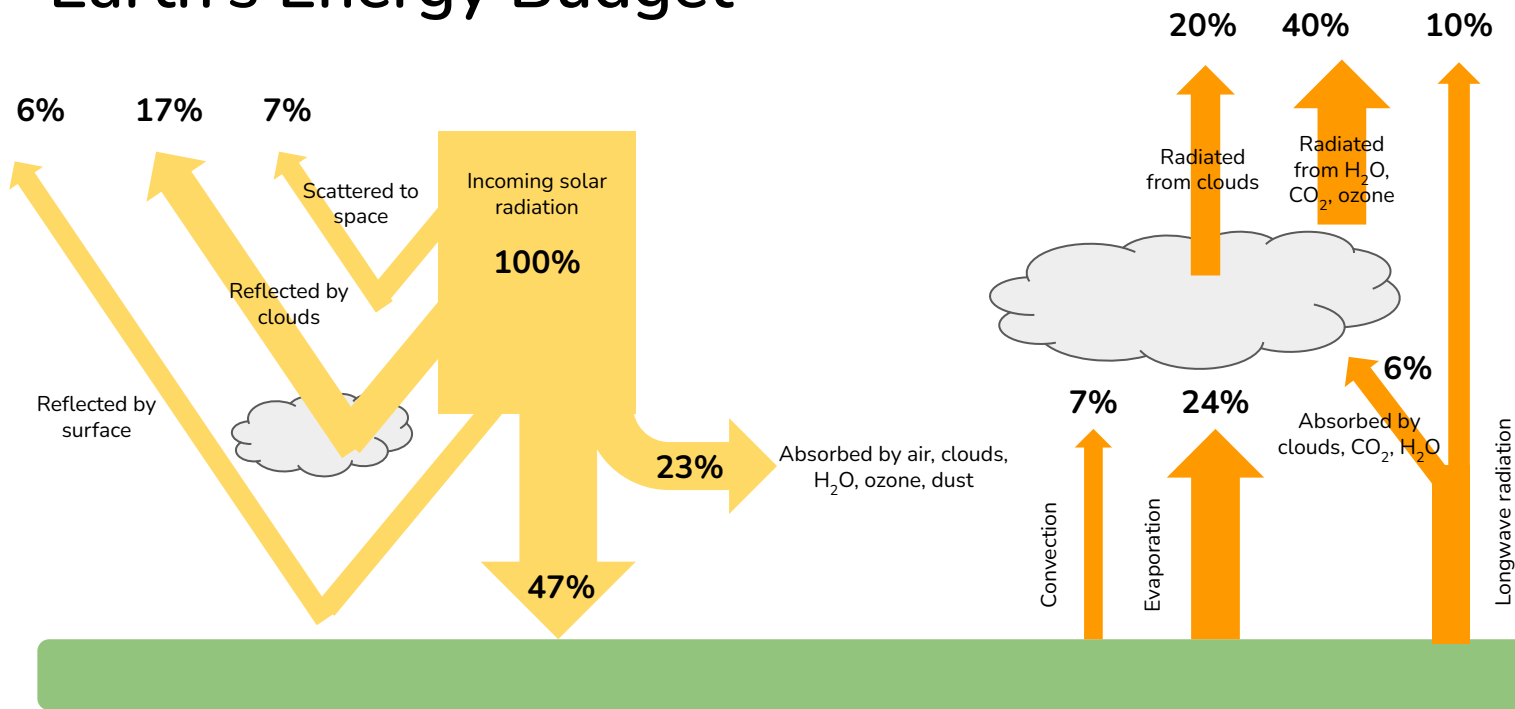
Solar Radiation and Temperature



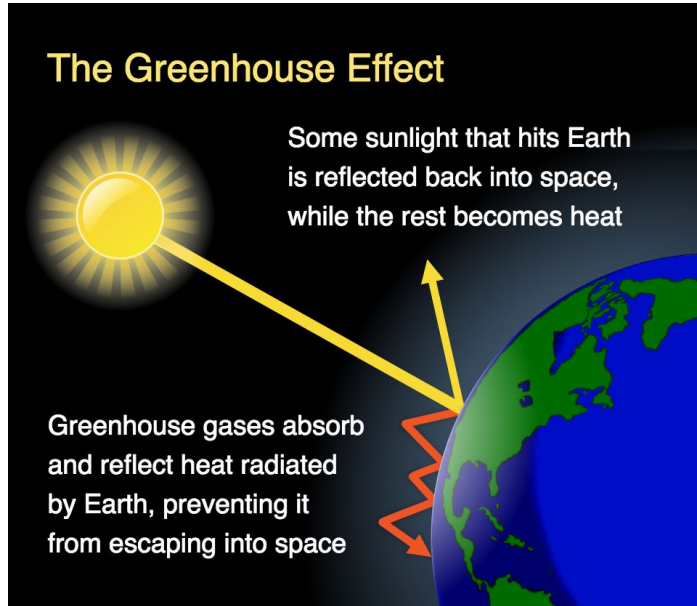
(Robert A. Rohde / Berkeley Earth, CC BY 4.0)



Earth's Energy Budget



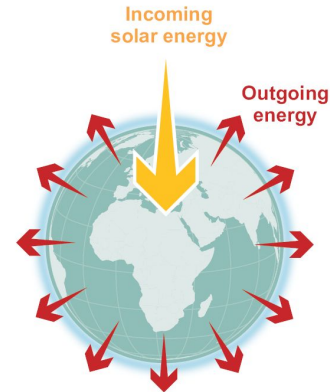
Human impact on Earth's energy budget



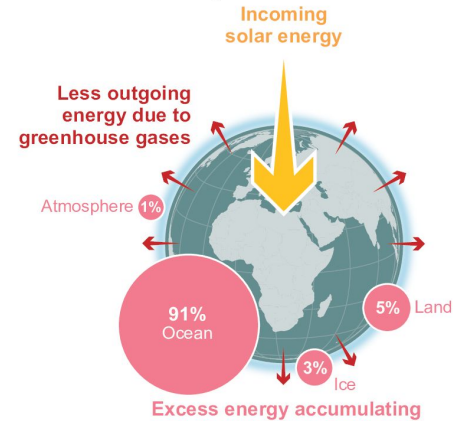
FAQ 7.1: The Earth's energy budget and climate change

Since at least 1970, there has been a persistent imbalance in the energy flows that has led to **excess energy being absorbed by different components of the climate system**.

Stable climate: in balance



Today: imbalanced



(Efrazil, CC BY-SA 4.0; AQ 7.1 Figure 1 in IPCC, 2021: Chapter 7. In: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change, Forster, P., et al.,)

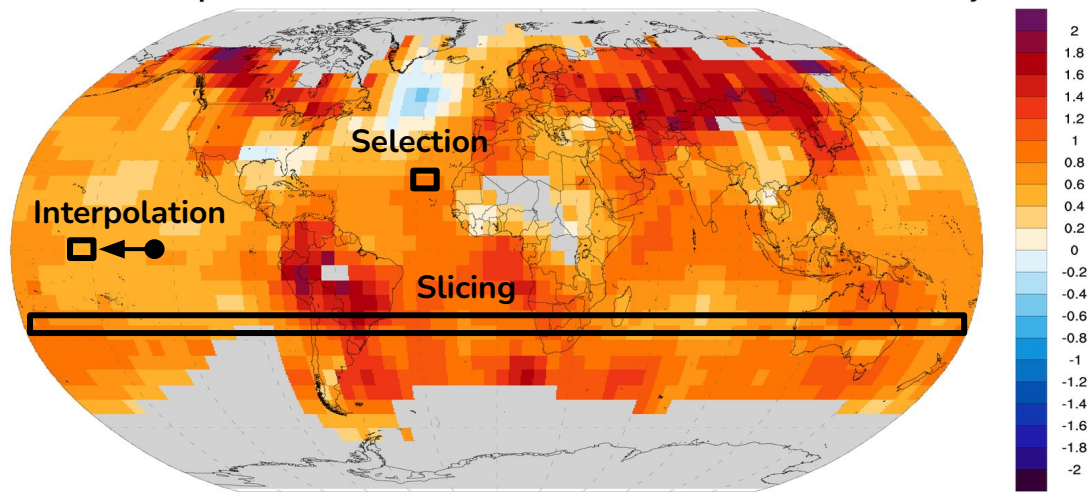
FAQ 7.1, Figure 1 | The Earth's energy budget compares the flows of incoming and outgoing energy that are relevant for the climate system. Since at least the 1970s, less energy is flowing out than is flowing in, which leads to excess energy being absorbed by the ocean, land, ice and atmosphere, with the ocean absorbing 91%.



Tutorial 2: Selection, Interpolation and Slicing

1901-2011 Temperature Trend

°C/century



- To assess global variations in climate variables, such as temperature and incoming solar radiation, it's useful to be able to extract and compare subsets of data from a larger dataset
- In this tutorial, we will explore multiple computational tools in Xarray that allow us to select and compare data from a specific spatial and temporal range

(Greenmind 1980, CC BY-SA 4.0)

