Global CO_2 Emissions in 1997

true   true   true

Abstract

Abstract goes here

Background

Carbon Emissions

Carbon emissions refer to the release of carbon, particularly carbon dioxide (CO_2), into the atmosphere. This process primarily occurs through the burning of fossil fuels such as coal, oil, and natural gas, as well as through deforestation and various industrial processes. CO_2 is a greenhouse gas, meaning it traps heat in the Earth's atmosphere and contributes to the greenhouse effect, which leads to global warming and climate change.

In our report we are trying to understand the trend of the atmospheric CO2 by asking the following research question:

> *Is there a significant upward trend in atmospheric CO2 levels over time?*

Null Hypothesis

There is no significant upward trend in atmospheric CO2 levels over time. $H_0 : \beta_1 \leq 0$ Where: β_1 is the trend coefficient over time in a linear regression model of the form $CO2_t = \beta_0 + \beta_1 \cdot t + \epsilon_t$. $CO2_t$ is the atmospheric CO_2 level at time t.

Measurement and Data

Measuring Atmospheric Carbon

In this study, we will use the Mauna Loa Atmospheric CO_2 Concentration time series dataset that is a available in `R`. The time series of 468 observations of the monthly Atmospheric concentrations of CO_2 from 1959 to 1997 expressed in parts per million (ppm) which is reported in the preliminary 1997 SIO (Keeling and Whorf, 1997).

The data where collected at the Mouna Loa Observatory which located on the islancd of Hawaii at an elevation of 11,135 feet above sea level (ESRL global monitoring laboratory - mauna loa observatory, n.d.).

The values for February, March and April of 1964 were missing and have been obtained by interpolating linearly between the values for January and May of 1964.

The Keeling Curve is a graph of the accumulation of carbon dioxide in the Earth's atmosphere based on continuous measurements taken at the Mauna Loa Observatory on the island of Hawaii from 1958 to the present day. The curve is named for the scientist Charles David Keeling, who started the monitoring program and supervised it until his death in 2005 (Keeling Curve, 2024)

Historical Trends in Atmospheric Carbon

Models and Forecasts

Linear Models

ARIMA Models

Forecasts

Conclusions

Refrences

ESRL global monitoring laboratory - mauna loa observatory n.d. Available at https://gml.noaa.gov/obop/mlo/
Keeling, **C D** and **Whorf**, **T P** 1997 Scripps institution of oceanography (SIO), university of california, la jolla, california USA 92093-0220.
Keeling Curve 2024. *Wikipedia*. Available at https://en.wikipedia.org/w/index.php?title=Keeling_Curve&oldid=1223091306 [Last accessed 10 July 2024].