

Trends in CO₂ Emissions and Temperature Variability

Focused on North and South America

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1. Introduction

2. Used Data

3. Methodology

4. Analysis Results

4.1 CO2 Emissions in North America

4.2 Temperature Trends

4.3 Correlation between Emissions and Temperature

5. Conclusion

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- CO2 emissions and regional temperatures have changed significantly over recent decades.
 - The report examines temporal trends in North and South America.
 - Key focus: Contributors, regional differences, and the relationship between emissions and temperatures.

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- Two datasets from *Our World in Data*:
 1. Global monthly average surface temperatures (1960–present).
 2. Annual CO2 emissions by region (1750–2023).
 - Both datasets are licensed under Creative Commons BY.

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- Data retrieval, cleaning, and transformation.
- Filtering for North and South America.
- Combining temperature and emissions data.
- Regression analysis (linear and polynomial models).
- Visualization of trends and correlations.

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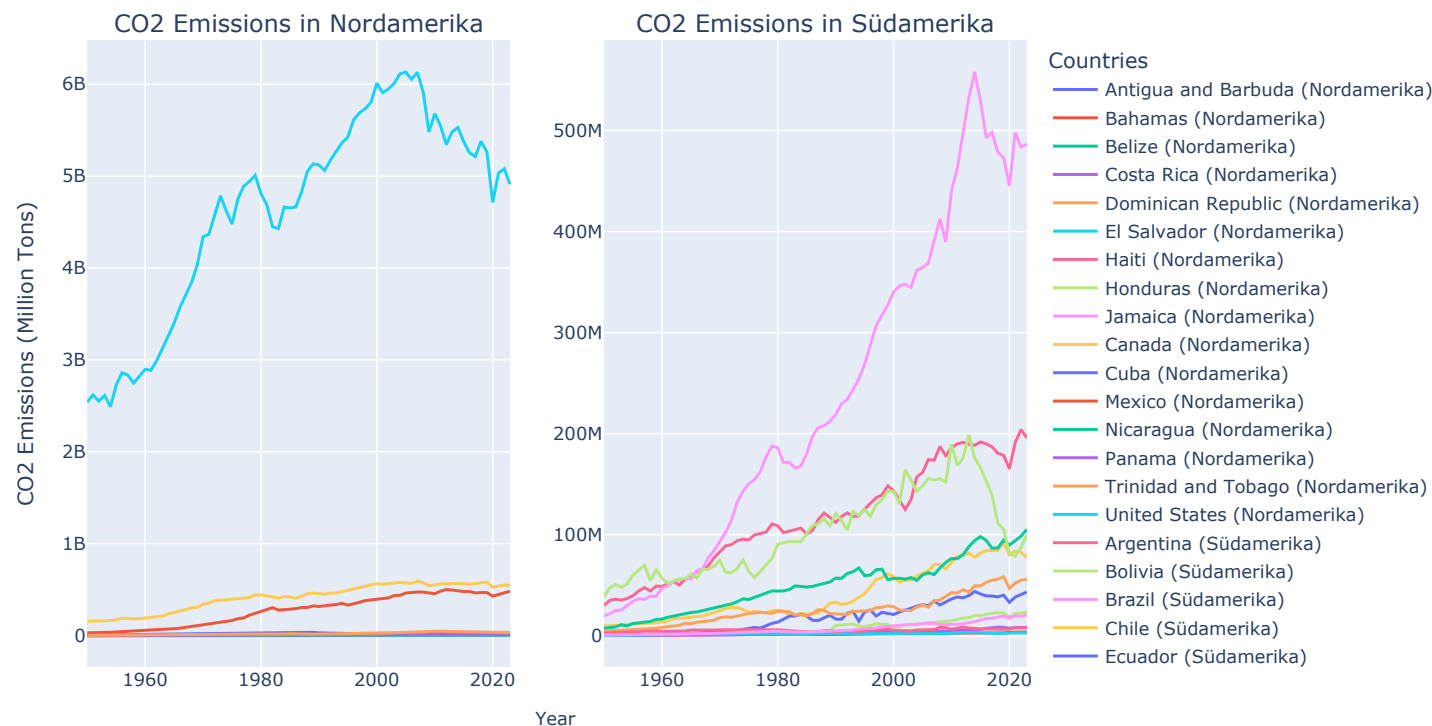
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CO2 Emissions in North America

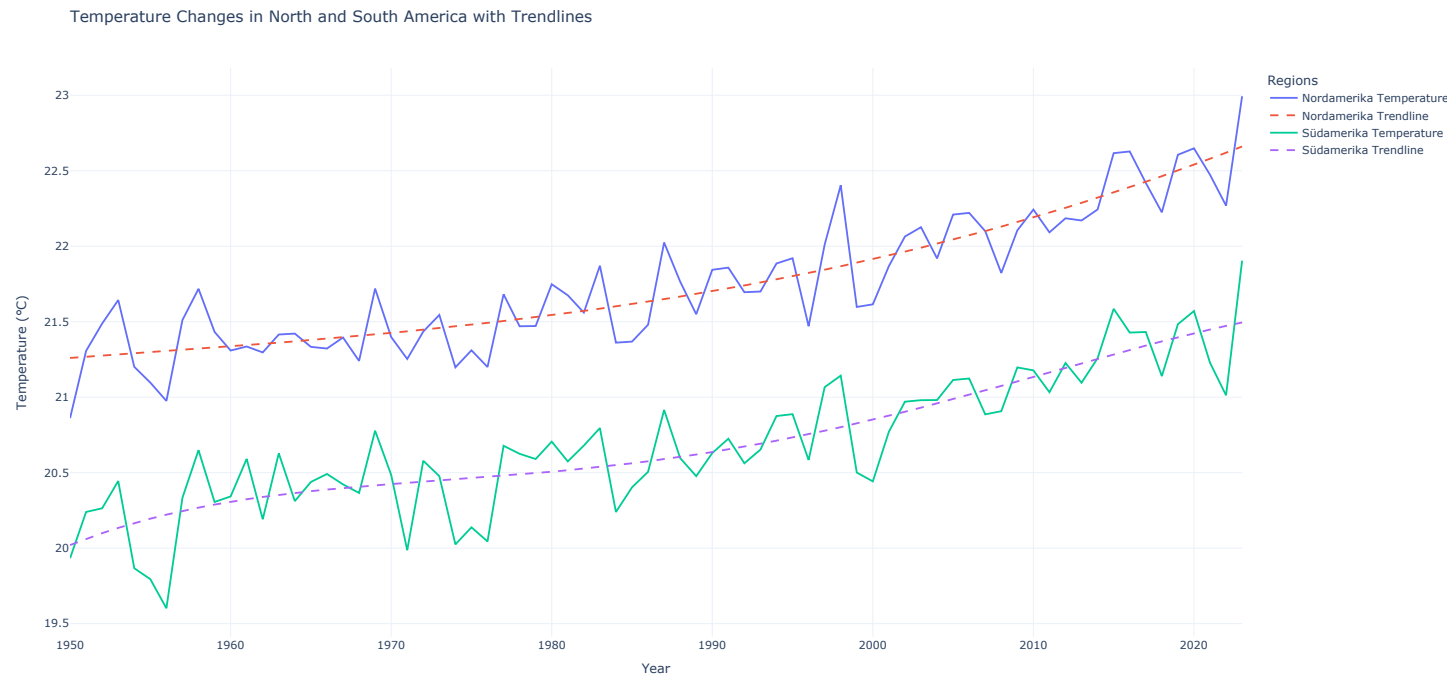
- The US is the primary contributor, peaking in 2007 (6 billion metric tons).
- Decline post-2007 due to renewable energy and efficiency improvements.
- Canada and Mexico contribute less to total emissions.

CO2 Emissions by Country: North America vs. South America



Temperature Trends

- North America: Gradual temperature increase.
- South America: Slightly faster temperature rise compared to North America.
- Consistent temperature fluctuations around regression lines.



Correlation between Emissions and Temperature

- Positive correlation observed in both regions.
- North America: Stronger correlation due to higher emissions.
- South America: Slower but significant trends.

Temperature vs. CO2 Emissions (Polynom-Regressionsgrad = 3)



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- Clear link between rising CO₂ emissions and increasing temperatures.
- North America: Higher emissions and noticeable warming.
- South America: Slower but significant increases.
- Urgent need for emission reductions to mitigate climate impacts.