Forecasting Carbon Emissions Across Continents

Author: Tulu

Introduction

In a world grappling with the urgent need for sustainable practices, the analysis of greenhouse gas (GHG) and carbon dioxide (CO2) emissions emerges as a critical lens through which we can comprehend and address our environmental impact. This report embarks on a journey through time and continents, meticulously examining the trends in emissions to unravel the complex interplay of human activities on our planet. The dataset at our disposal provides a comprehensive look into emissions at the country level, allowing us to categorize and compare the environmental footprints across different regions. From sector-specific contributions to the impact of economic factors, this analysis aims to uncover insights that are both informative and actionable.

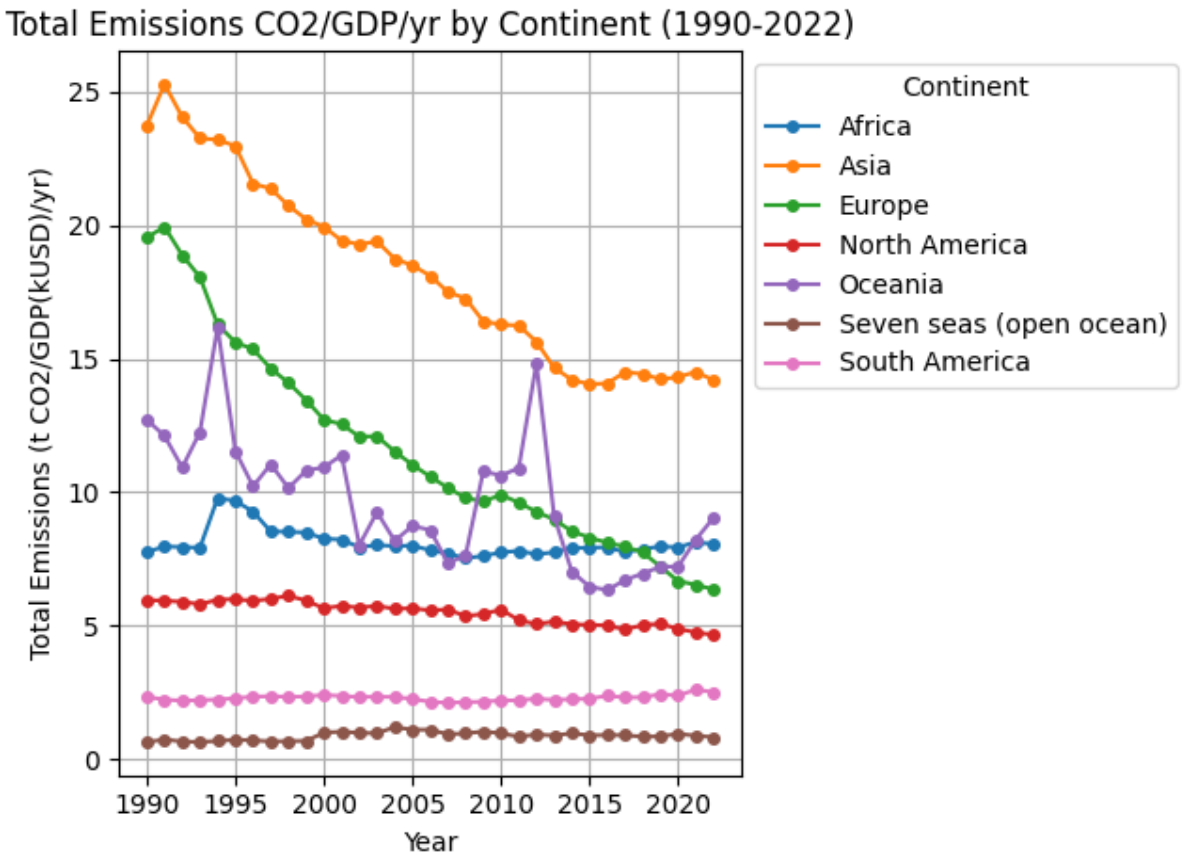
As we delve into the data, our focus extends beyond mere observation, incorporating advanced statistical and machine learning models. These tools empower us to extract meaningful patterns from the wealth of information, enabling a more profound understanding of the factors driving emissions.

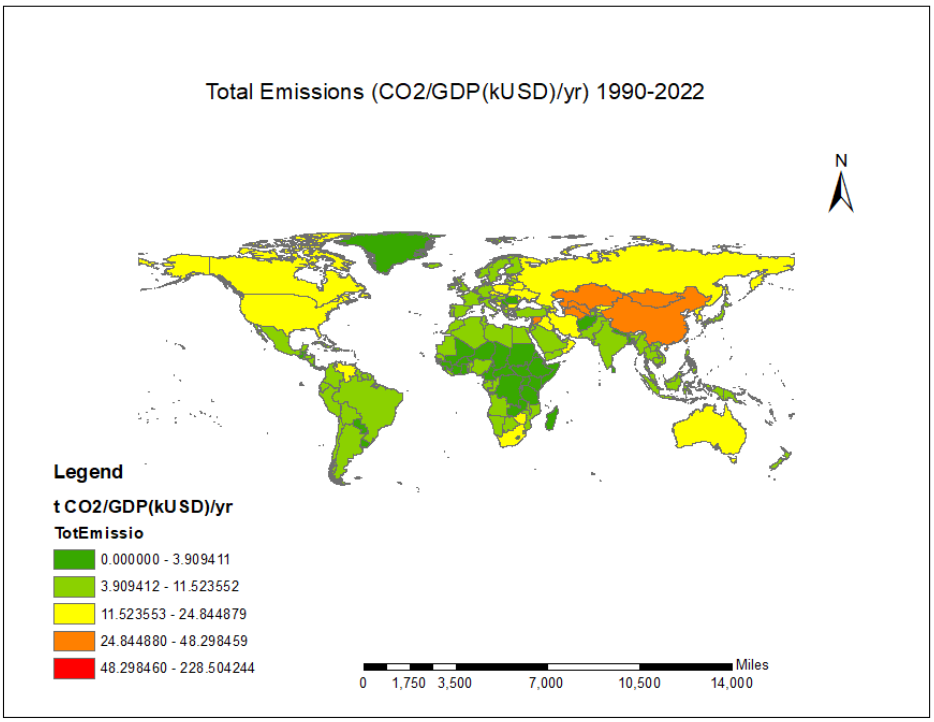
By dissecting the numbers, we aim to bring forth not just the challenges but also potential solutions, fostering a dialogue around the intricate balance between economic growth and environmental responsibility. In doing so, we bridge the gap between technical analyses and accessible insights, ensuring that our findings resonate with a diverse audience eager to comprehend the complexities of emissions and their implications.

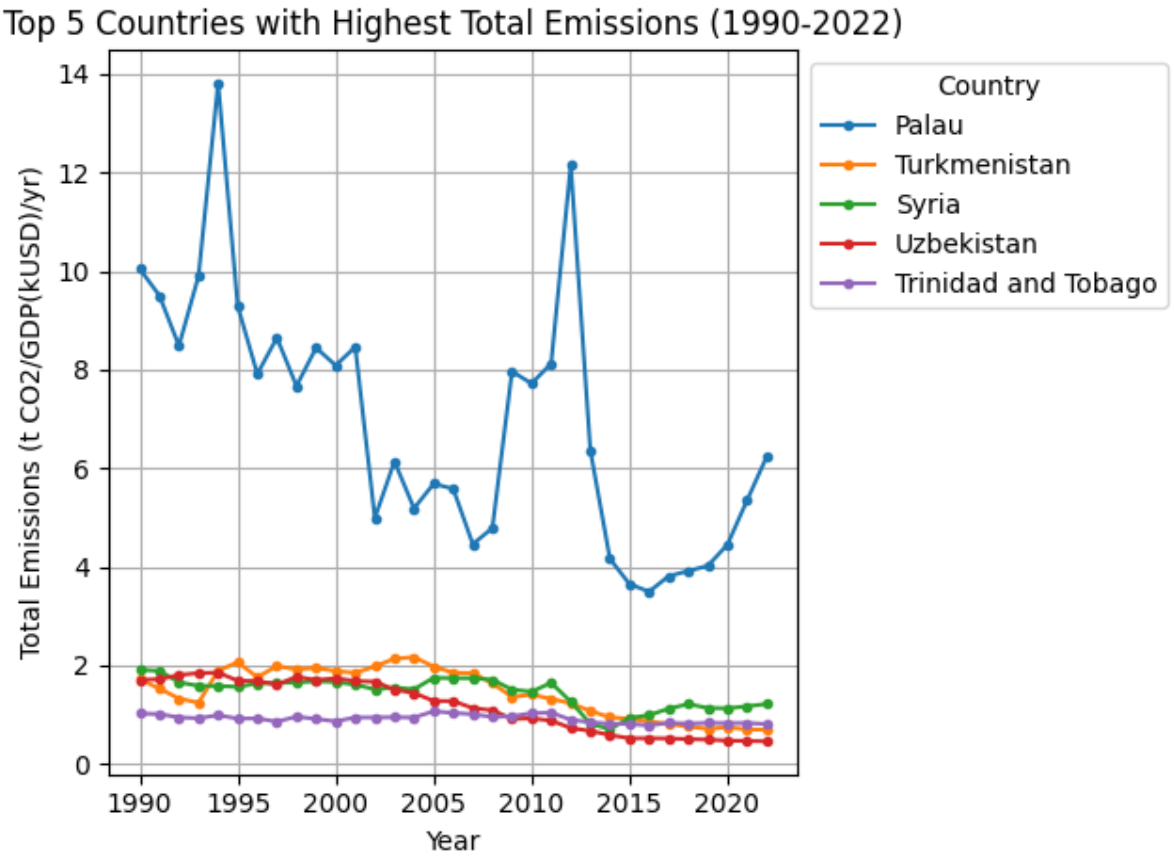
The continent-by-continent breakdown of emissions serves as a compass, guiding us through the global landscape of environmental impact. Each continent presents a unique story, and by comparing these narratives, we gain valuable perspectives on the varied challenges and opportunities in the pursuit of sustainability. This report sets the stage for a nuanced exploration of the intricate relationship between human activities, economic factors, and their cumulative effect on the health of our planet.

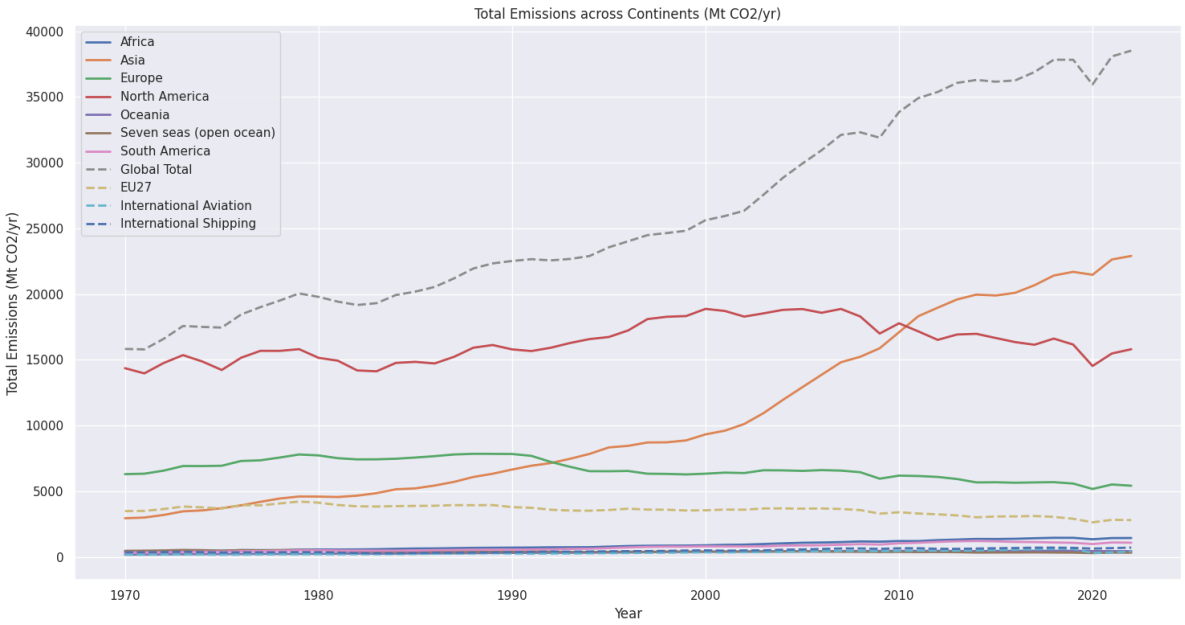
Key Findings

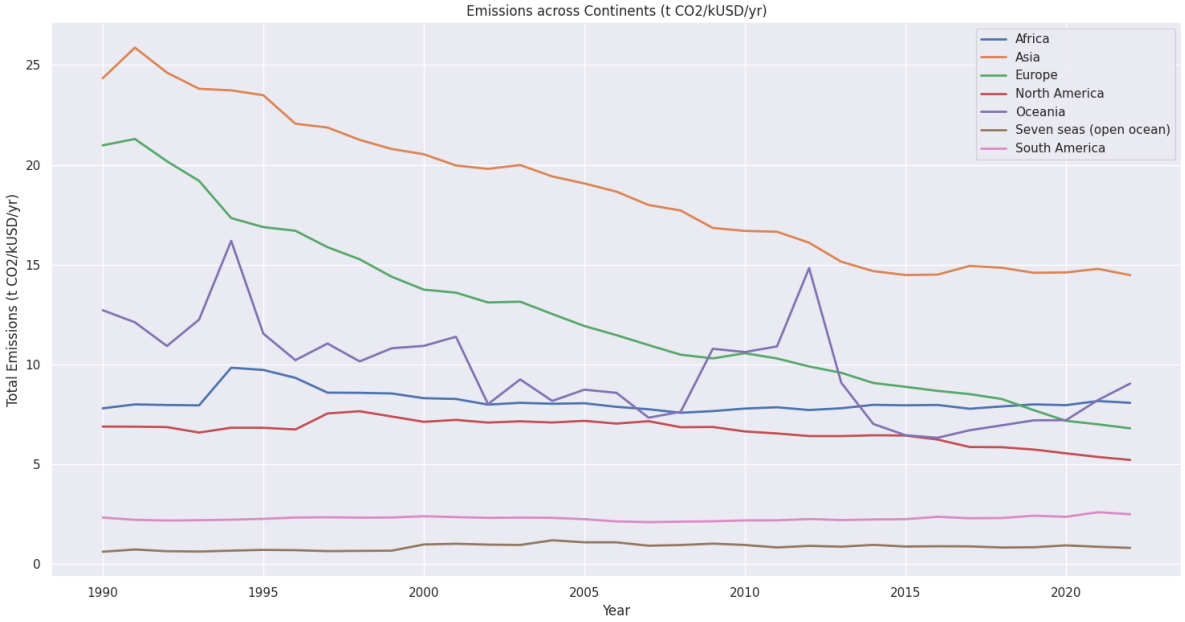
Fossil CO2 Emissions Trend

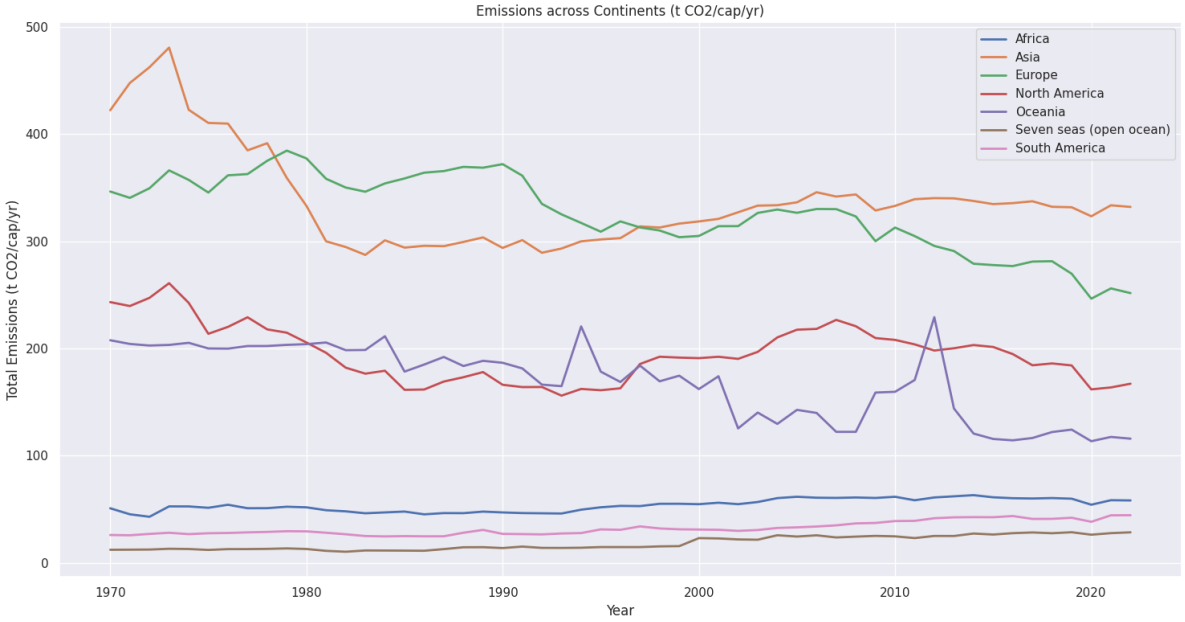


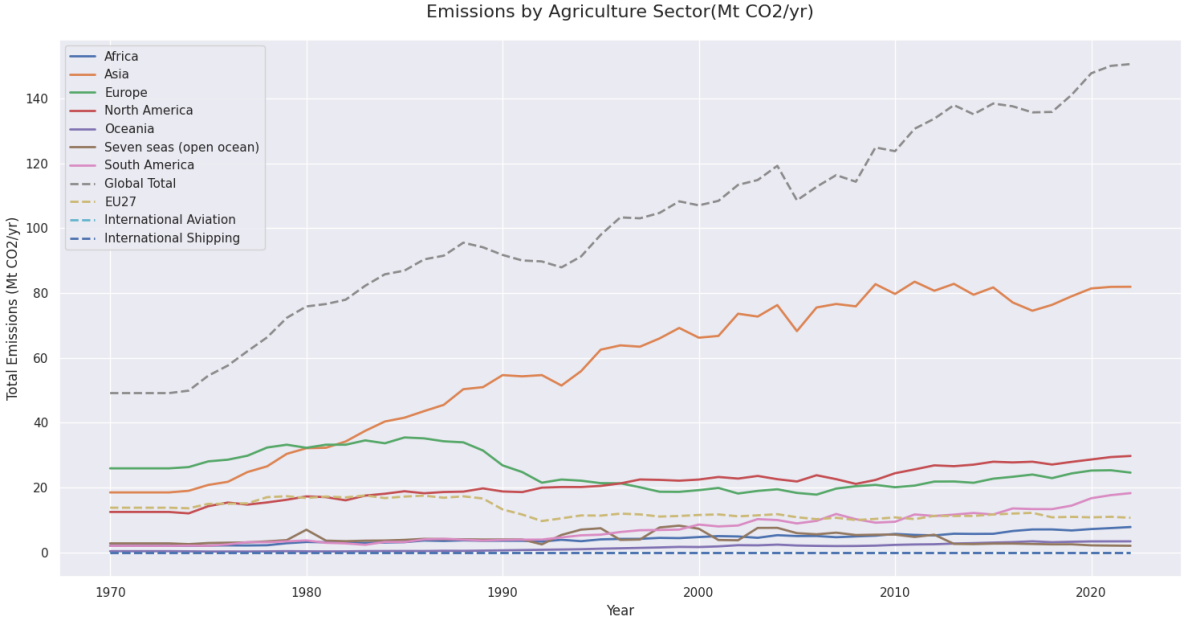

Total Emissions (CO2/GDP(kUSD)/yr) 1990-2022
N
Legend
t CO2/GDP(kUSD)/yr
TotEmissio
0.000000 - 3.909411
3.909412 - 11.523552
11.523553 - 24.844879
24.844880 - 48.298459
48.298460 - 228.504244
0
1,750
3,500
7,000
10,500
14,000
Miles

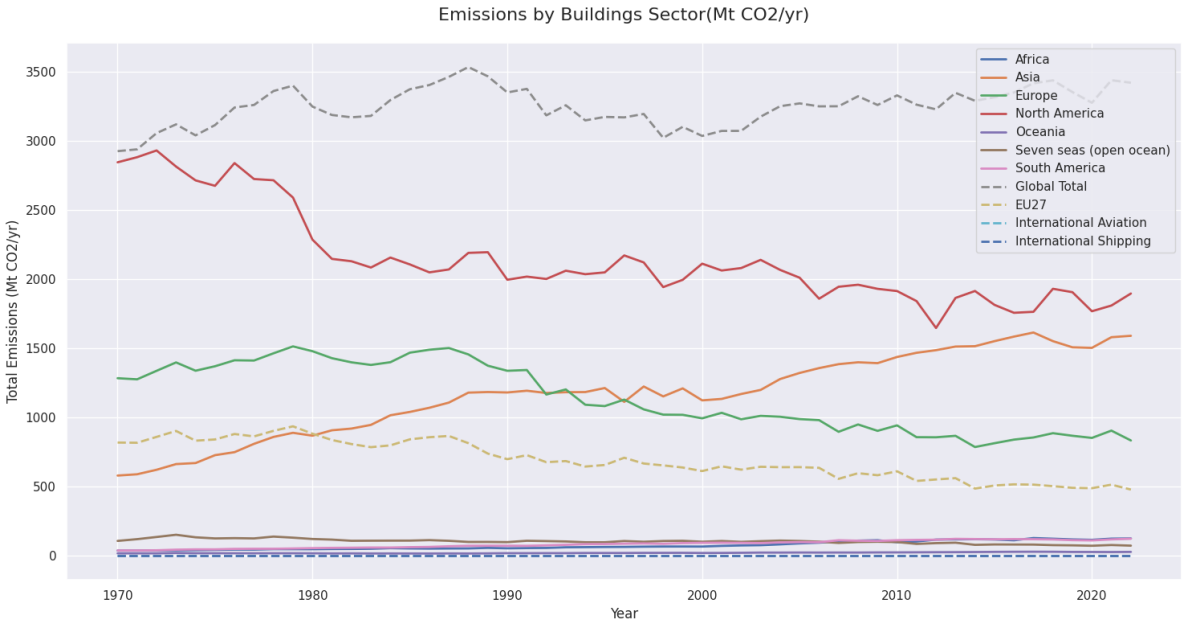

Top 5 Countries with Highest Total Emissions (1990-2022)
Total Emissions (t CO2/GDP(kUSD)/yr)
Year
Country
Palau
Turkmenistan
Syria
Uzbekistan
Trinidad and Tobago

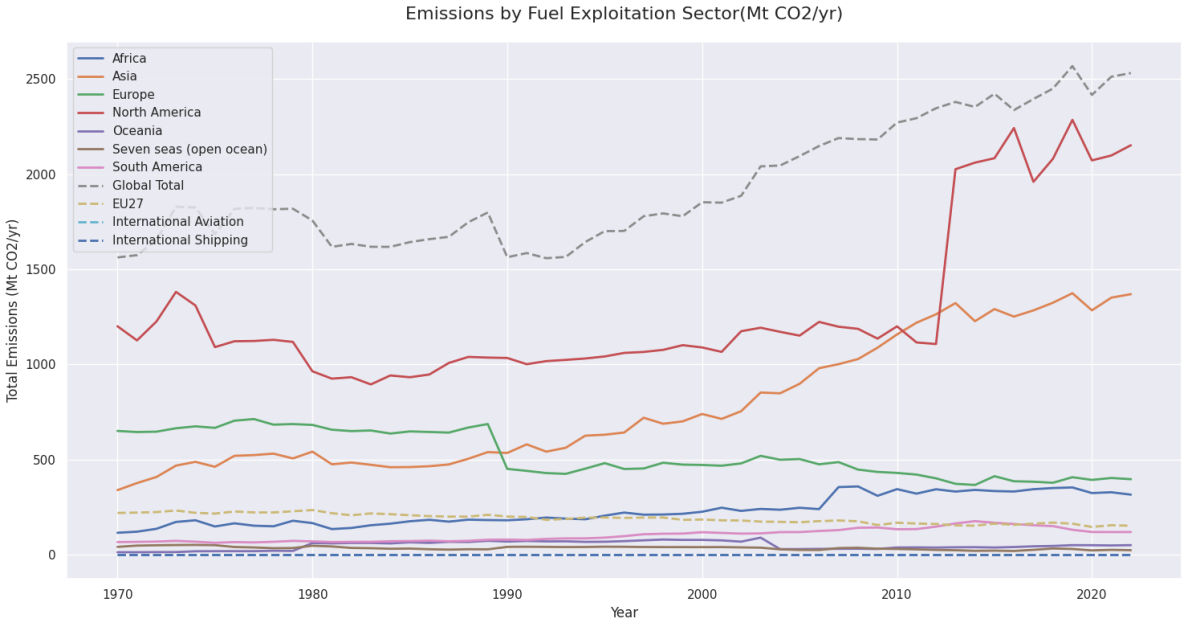

Total Emissions across Continents (Mt CO2/yr)
Africa
Asia
Europe
North America
Oceania
Seven seas (open ocean)
South America
Global Total
EU27
International Aviation
International Shipping
Total Emissions (Mt CO2/yr)
Year
0
5000
10000
15000
20000
25000
30000
35000
40000
1970
1980
1990
2000
2010
2020

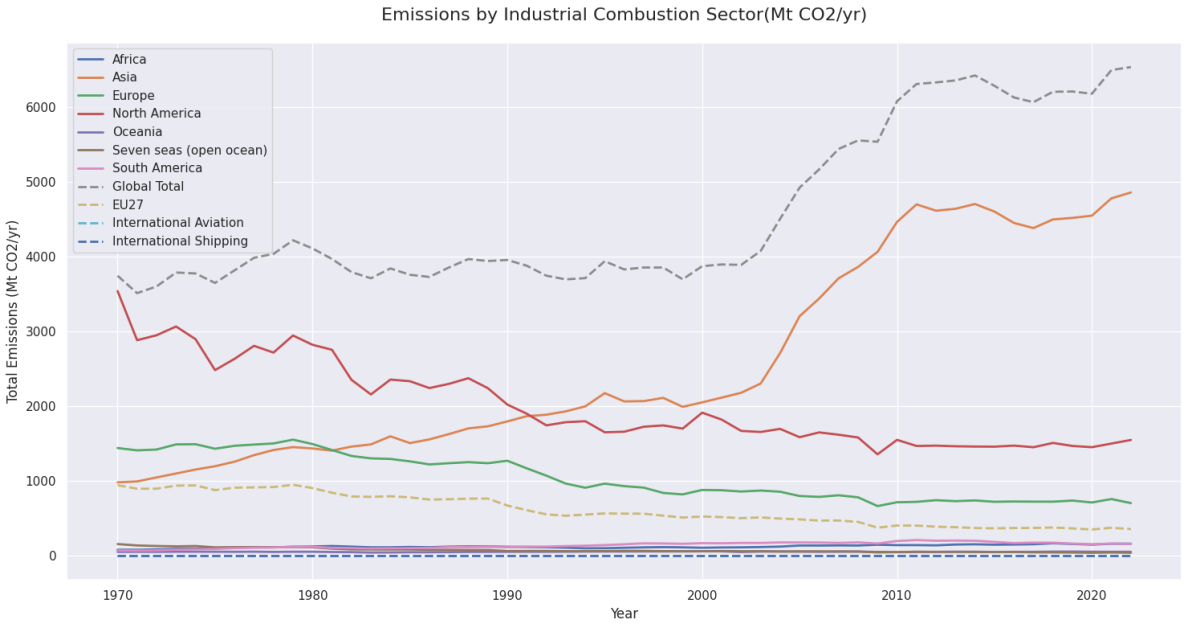

Emissions across Continents (t CO2/kUSD/yr)
Africa
Asia
Europe
North America
Oceania
Seven seas (open ocean)
South America
Total Emissions (t CO2/kUSD/yr)
Year
0
5
10
15
20
25
1990
1995
2000
2005
2010
2015
2020

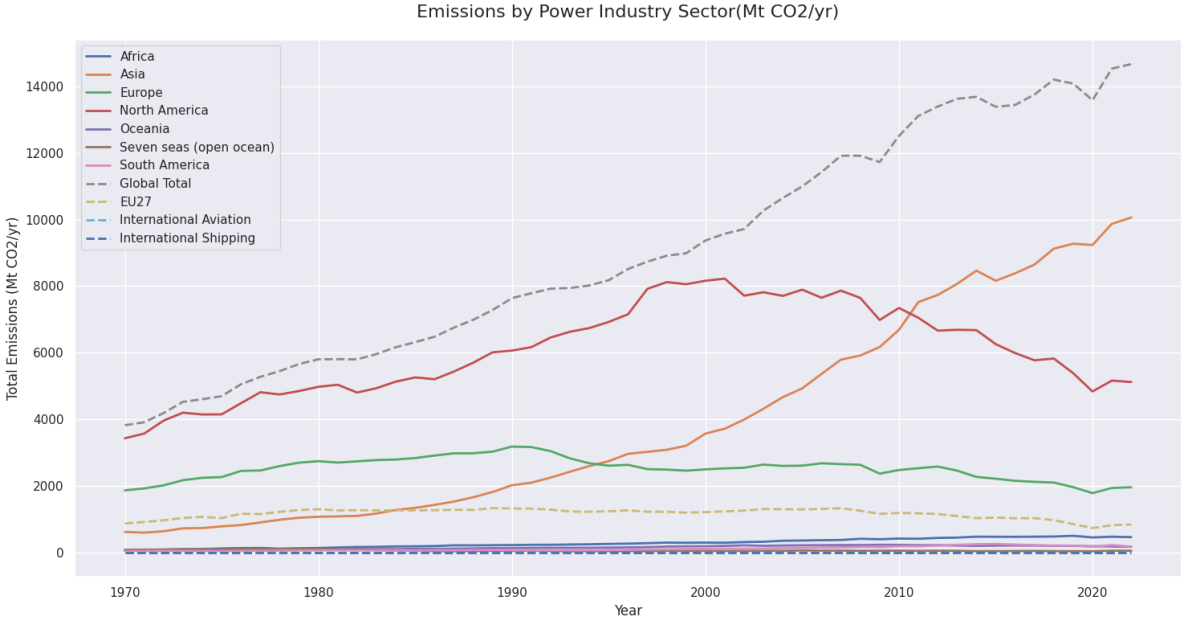

Emissions across Continents (t CO2/cap/yr)
Total Emissions (t CO2/cap/yr)
Year
Africa
Asia
Europe
North America
Oceania
Seven seas (open ocean)
South America
0
100
200
300
400
500
1970
1980
1990
2000
2010
2020

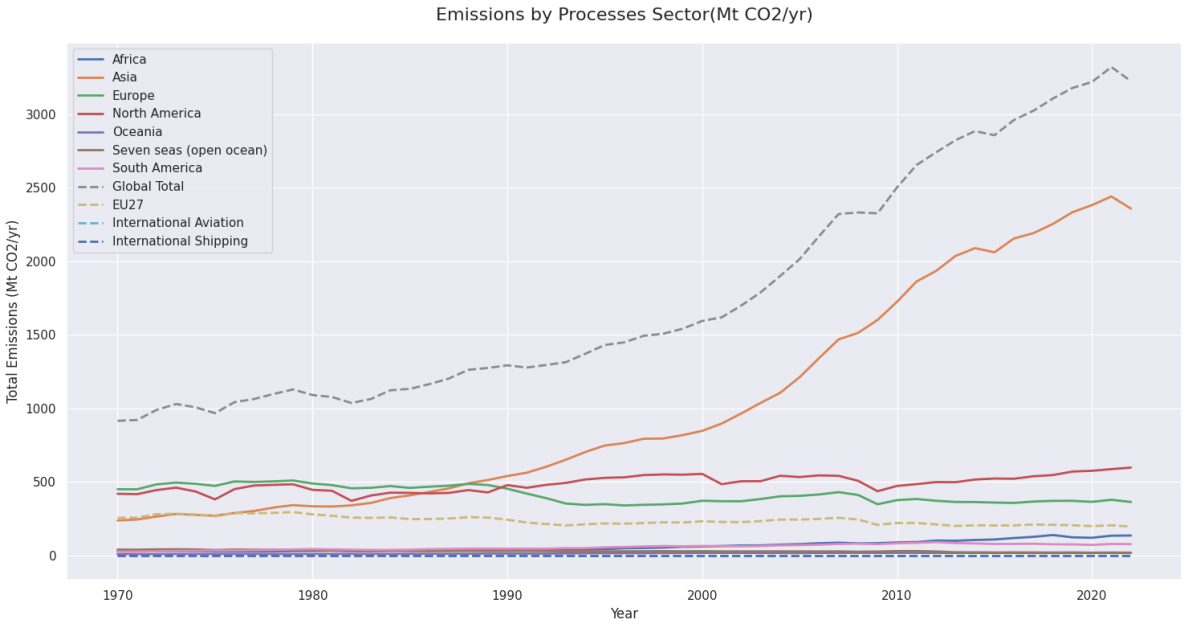

Emissions by Agriculture Sector(Mt CO2/yr)
Total Emissions (Mt CO2/yr)
Year
Africa
Asia
Europe
North America
Oceania
Seven seas (open ocean)
South America
Global Total
EU27
International Aviation
International Shipping
0
20
40
60
80
100
120
140
1970
1980
1990
2000
2010
2020


Emissions by Buildings Sector(Mt CO2/yr)
Total Emissions (Mt CO2/yr)
Year
Africa
Asia
Europe
North America
Oceania
Seven seas (open ocean)
South America
Global Total
EU27
International Aviation
International Shipping


Emissions by Fuel Exploitation Sector(Mt CO2/yr)
Total Emissions (Mt CO2/yr)
Year
Africa
Asia
Europe
North America
Oceania
Seven seas (open ocean)
South America
Global Total
EU27
International Aviation
International Shipping


Emissions by Industrial Combustion Sector(Mt CO2/yr)
Africa
Asia
Europe
North America
Oceania
Seven seas (open ocean)
South America
Global Total
EU27
International Aviation
International Shipping
Total Emissions (Mt CO2/yr)
0
1000
2000
3000
4000
5000
6000
1970
1980
1990
2000
2010
2020
Year


Emissions by Power Industry Sector(Mt CO2/yr)
Africa
Asia
Europe
North America
Oceania
Seven seas (open ocean)
South America
Global Total
EU27
International Aviation
International Shipping
Total Emissions (Mt CO2/yr)
0
2000
4000
6000
8000
10000
12000
14000
1970
1980
1990
2000
2010
2020
Year


Emissions by Processes Sector(Mt CO2/yr)
Africa
Asia
Europe
North America
Oceania
Seven seas (open ocean)
South America
Global Total
EU27
International Aviation
International Shipping
Total Emissions (Mt CO2/yr)
0
500
1000
1500
2000
2500
3000
1970
1980
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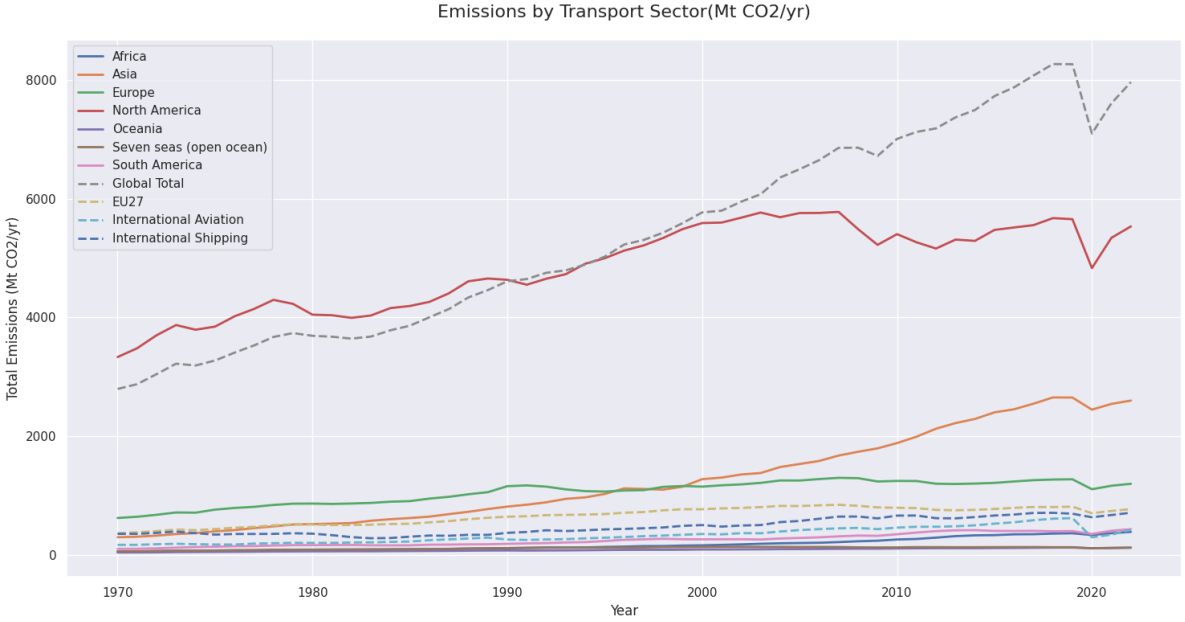
2000
2010
2020
Year


Emissions by Transport Sector(Mt CO2/yr)
Africa
Asia
Europe
North America
Oceania
Seven seas (open ocean)
South America
Global Total
EU27
International Aviation
International Shipping
Total Emissions (Mt CO2/yr)
0
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1970
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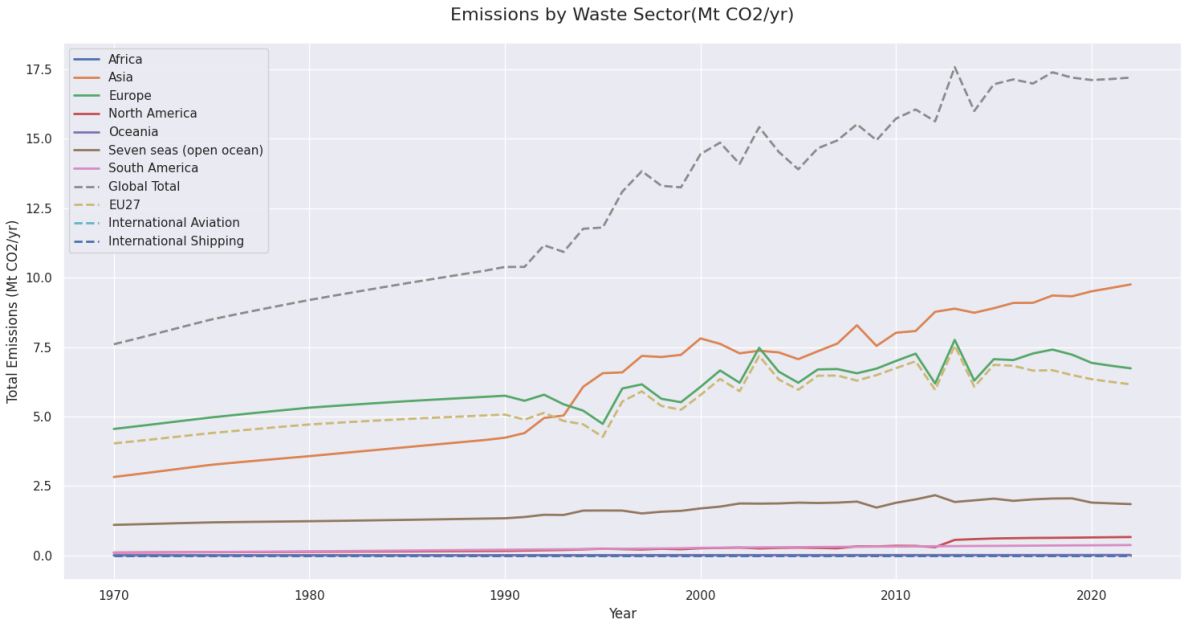
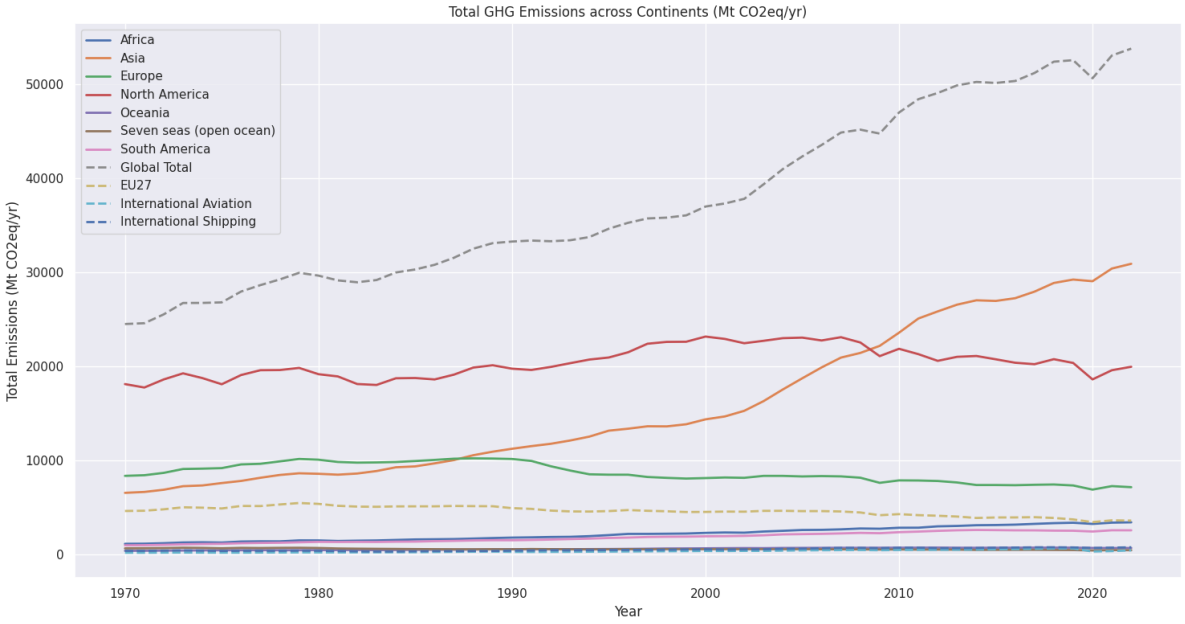
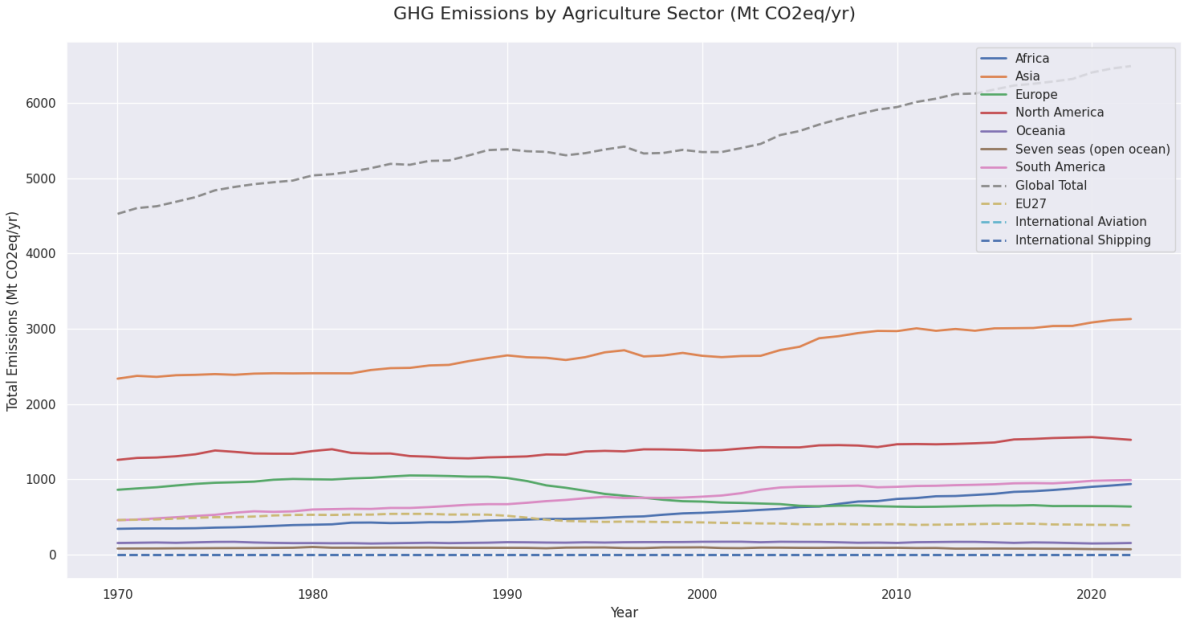
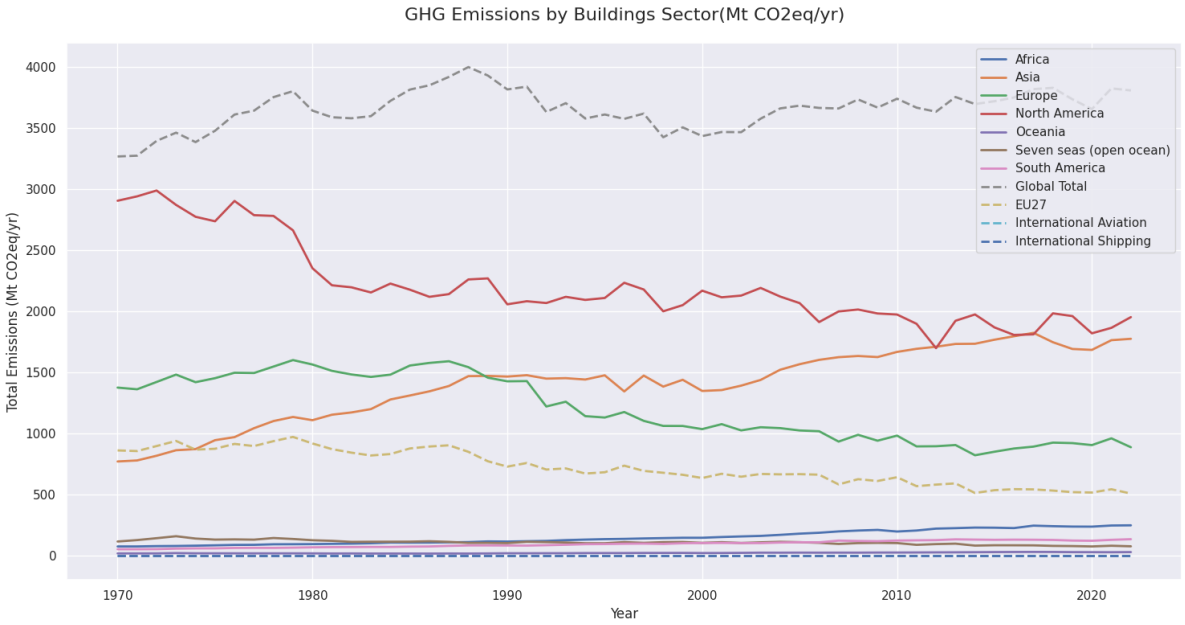
2020
Year


Emissions by Waste Sector(Mt CO2/yr)
Africa
Asia
Europe
North America
Oceania
Seven seas (open ocean)
South America
Global Total
EU27
International Aviation
International Shipping
Total Emissions (Mt CO2/yr)
17.5
15.0
12.5
10.0
7.5
5.0
2.5
0.0
1970
1980
1990
2000
2010
2020
Year

GHG Emissions Trend






GHG Emissions by Buildings Sector(Mt CO2eq/yr)
Total Emissions (Mt CO2eq/yr)
Year
Africa
Asia
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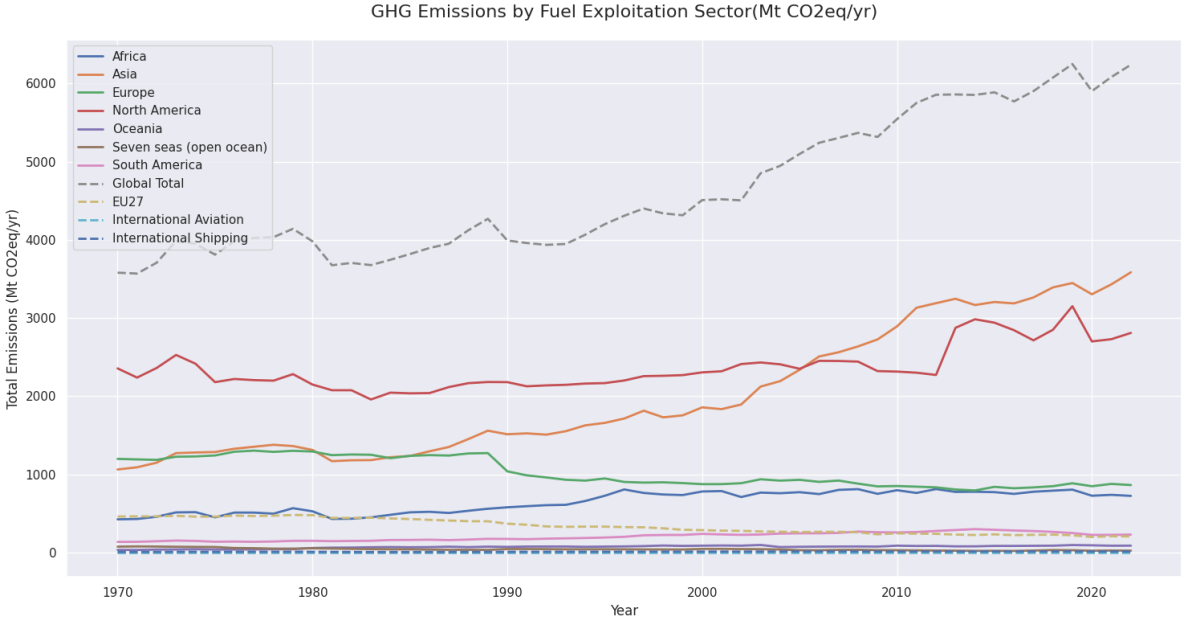
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Total Emissions (Mt CO2eq/yr)
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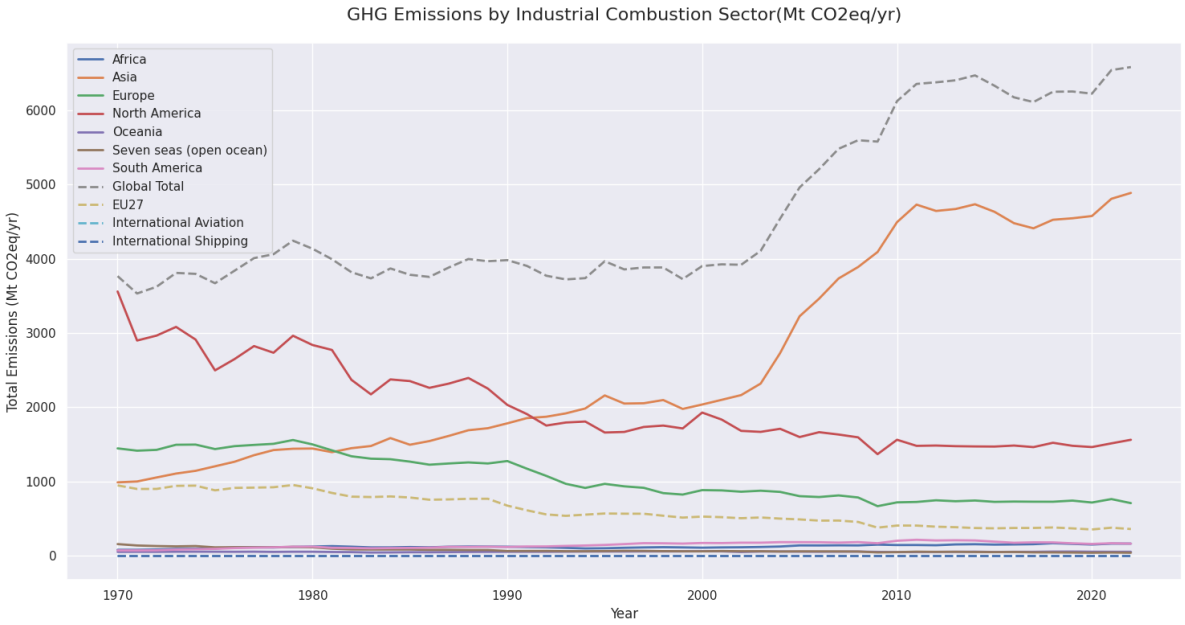
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Total Emissions (Mt CO2eq/yr)
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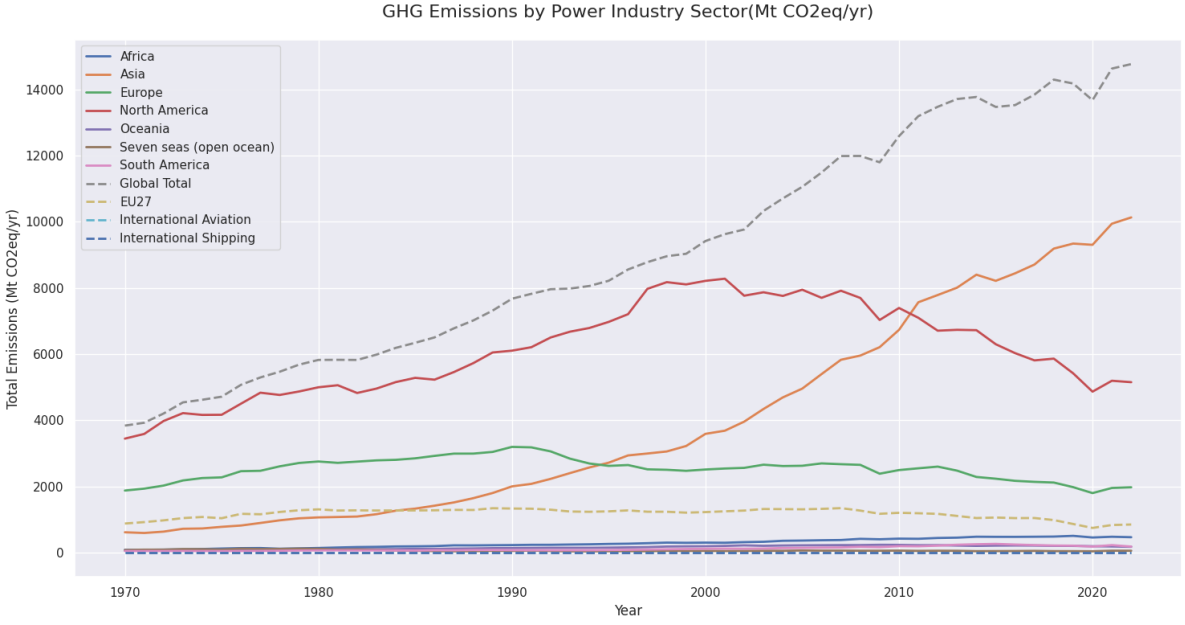
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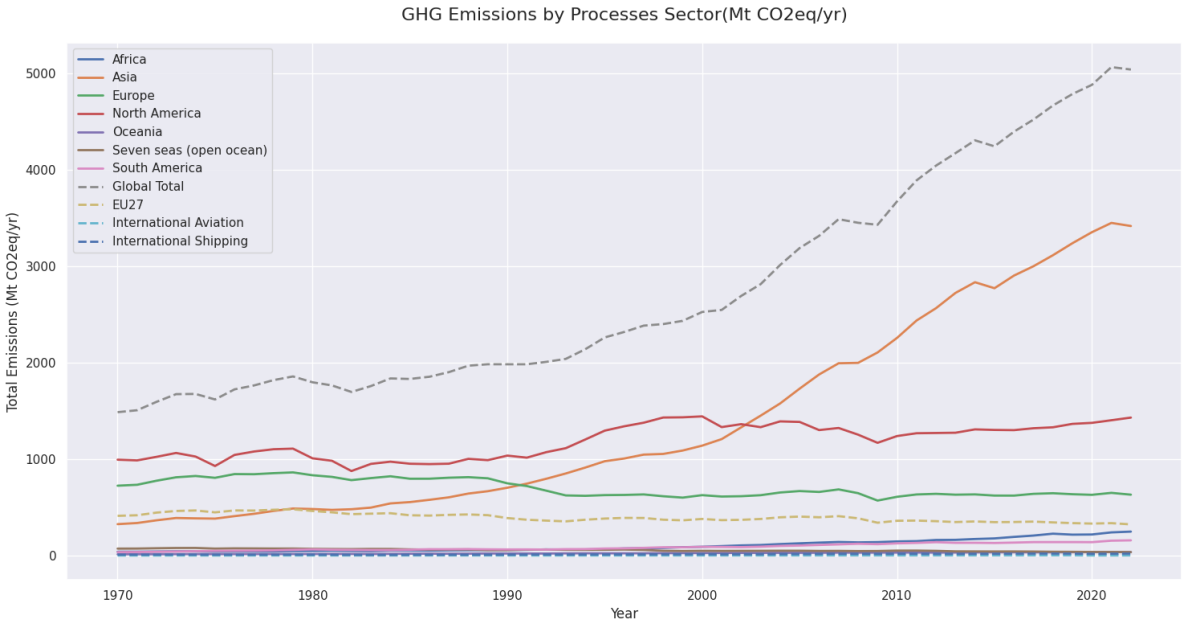
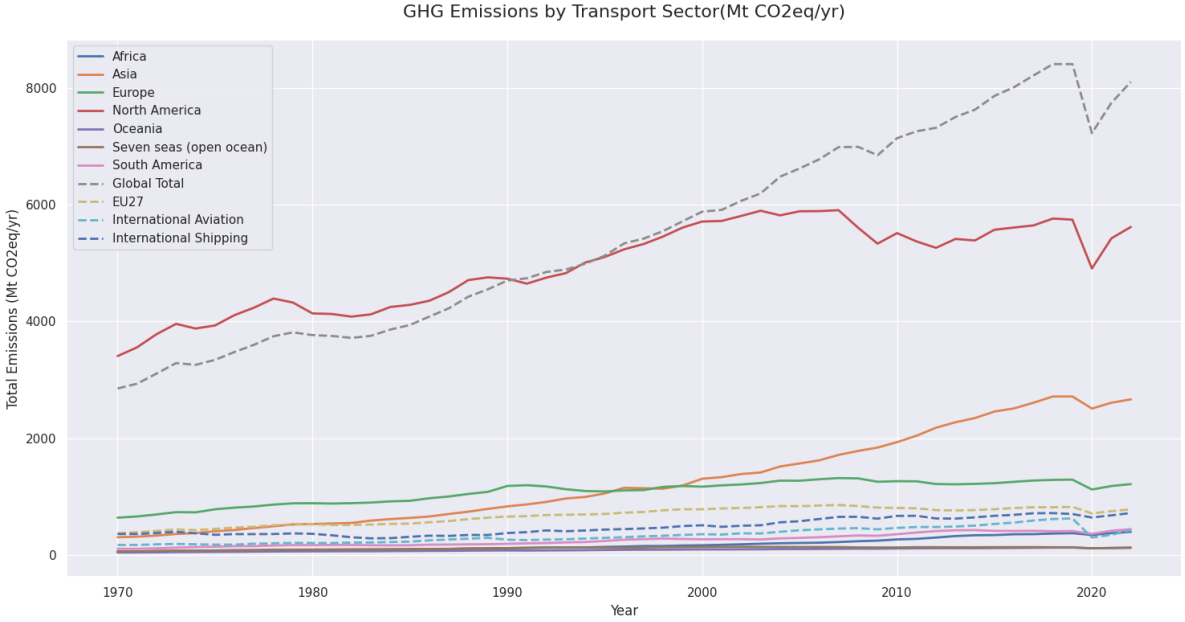
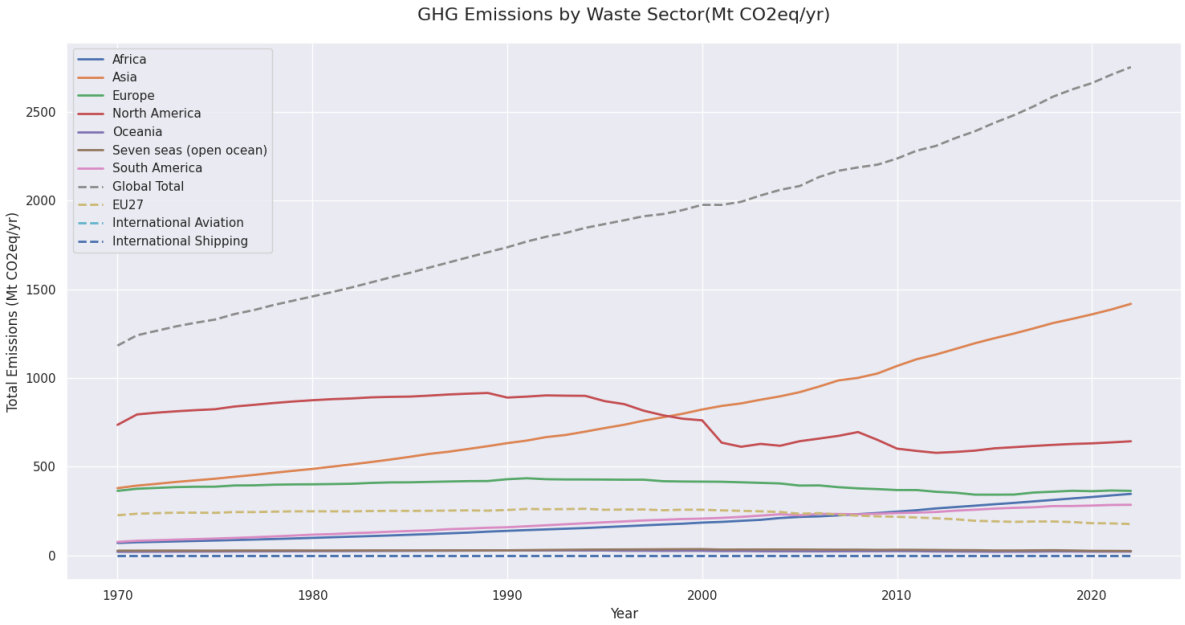

GHG Emissions by Processes Sector(Mt CO2eq/yr)
Africa
Asia
Europe
North America
Oceania
Seven seas (open ocean)
South America
Global Total
EU27
International Aviation
International Shipping
Total Emissions (Mt CO2eq/yr)
Year


GHG Emissions by Transport Sector(Mt CO2eq/yr)
Africa
Asia
Europe
North America
Oceania
Seven seas (open ocean)
South America
Global Total
EU27
International Aviation
International Shipping
Total Emissions (Mt CO2eq/yr)
Year


GHG Emissions by Waste Sector(Mt CO2eq/yr)
Africa
Asia
Europe
North America
Oceania
Seven seas (open ocean)
South America
Global Total
EU27
International Aviation
International Shipping
Total Emissions (Mt CO2eq/yr)
0
500
1000
1500
2000
2500
1970
1980
1990
2000
2010
2020
Year

Conclusion

Our analysis illuminates compelling trends in global emissions, underscoring the critical role of human activities in shaping the environmental landscape. Asia emerges as a focal point, showcasing the highest emissions across continents for both greenhouse gases (GHG) and carbon dioxide (CO2). Conversely, the open ocean stands out as a region with the lowest emissions, highlighting the importance of preserving these vast expanses. A pervasive pattern of increasing emissions unfolds across continents, sounding an alarm for concerted efforts in environmental stewardship. Delving into sector-specific contributions, industrial combustion, transport, and processes emerge as major culprits, emphasizing the need for targeted interventions in these domains. On the flip side, agriculture consistently emerges as the sector with the lowest contributions to emissions, paving the way for sustainable practices in this crucial aspect of human existence. These findings collectively underscore the urgency of global collaboration to mitigate emissions, fostering a harmonious balance between economic activities and environmental well-being.