

M U N I
S C I

03 Seminar

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Content

- 1. Evaluation of global CO₂ emissions in relation to global mean surface temperature rise**
- 2. Evaluation of the contribution of CO₂ concentrations from your state**

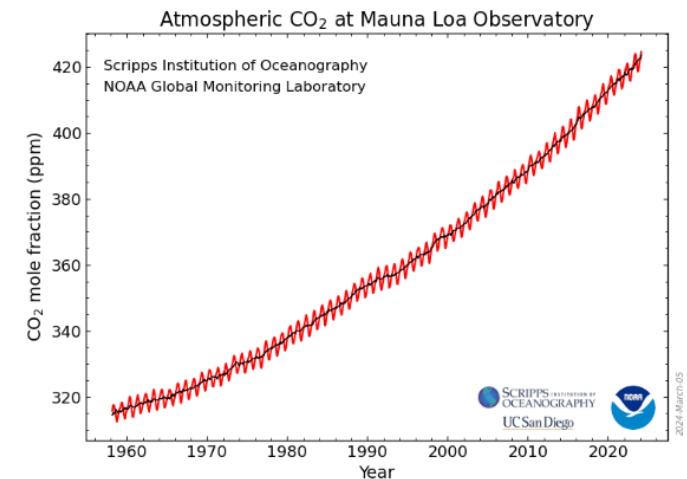
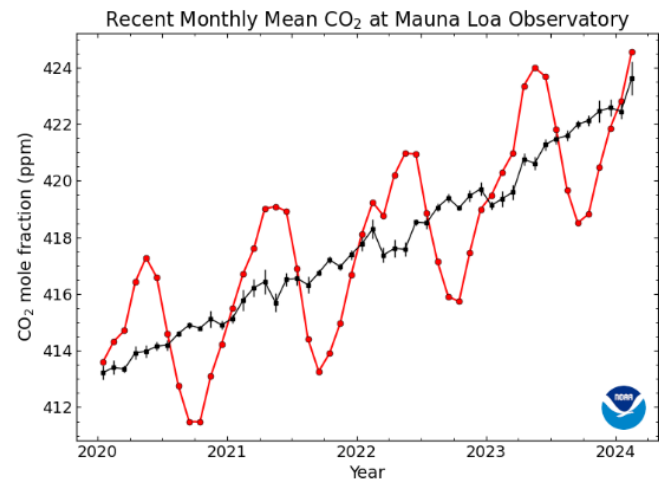
CO₂ emissions

- Anthropogenic CO₂ sources are part of our everyday activities and include those from power generation, transportation, industrial sources, chemical production, petroleum production, and agricultural practices. Many of these source types burn fossil fuels (coal, oil, and natural gas), with CO₂ emissions as a byproduct.

Monthly Average Mauna Loa CO₂

February 2024: 424.55 ppm
February 2023: 420.30 ppm
Last updated: Mar 05, 2024

Monthly mean carbon dioxide measured at Mauna Loa Observatory, Hawaii. The carbon dioxide data on Mauna Loa constitute the longest record of direct measurements of CO₂ in the atmosphere.



Task assignment

- In the assignment, you will create a graph in Excel according to the instructions.
- You download data on global CO₂ emissions and then create a graph from this data. You will then do the same for your state.
- You can see how your state's CO₂ emissions have contributed to global warming at the link provided.

Please upload the finished exercise (worksheet) to the Information System (Study Materials – Homework Vaults) until March 25, 2024.

Task assignment

- open this link: [CO₂ and Greenhouse Gas Emissions Data Explorer - Our World in Data](#)
- choose the items in the menu as shown:
- then click on download



Task assignment

- a menu will open and download full data in .csv format according to the image
- save the downloaded CSV file to your chosen folder

The screenshot displays the 'CO₂ and Greenhouse Gas Emissions Data Explorer' interface. The main chart is titled 'Annual CO₂ emissions' and shows 'Carbon dioxide (CO₂) emissions' in billion tonnes from 1750 to 2022. A 'DOWNLOAD' menu is open over the chart, offering options for visualization and data. The 'Data' section is highlighted with a red box, showing the option 'Full data (CSV)' with a download icon and the description 'The full dataset used in this chart.' The interface includes filters for 'GAS OR WARMING' (CO₂), 'ACCOUNTING' (Territorial), 'FUEL OR LAND USE CHANGE' (All fossil emissions), and 'COUNT' (Per country). A search bar and a list of selected regions (European Union (27) and World) are also visible.

Task assignment

- open the CSV file and then save it as an Excel workbook

The screenshot illustrates the steps to save a CSV file as an Excel workbook. The 'File' menu is open, and the 'Save As' option is highlighted. The 'Save As' dialog box is open, showing the current folder and the file name. The 'Save as type' dropdown is set to 'CSV (textový soubor s oddělovači)'. The 'Save' button is highlighted.

1. Soubor

2. Uložit jako

3. Procházet

4. Uložit jako typ

5. Sešít Excelu s podporou maker

Entity,Code,Year,Annual COâ,, emissions
Afghanistan,AFG,1949,14656
Afghanistan,AFG,1950,84272
Afghanistan,AFG,1951,91600
Afghanistan,AFG,1952,91600
Afghanistan,AFG,1953,106256
Afghanistan,AFG,1954,106256
Afghanistan,AFG,1955,153888
Afghanistan,AFG,1956,183200
Afghanistan,AFG,1957,293120
Afghanistan,AFG,1958,329760
Afghanistan,AFG,1959,384571
Afghanistan,AFG,1960,413885
Afghanistan,AFG,1961,490798
Afghanistan,AFG,1962,688594
Afghanistan,AFG,1963,706736
Afghanistan,AFG,1964,838551
Afghanistan,AFG,1965,1006917

Task assignment

- open the saved Excel and follow the steps in the image

The image shows a screenshot of Microsoft Excel with the 'Data' tab selected. A red box labeled '1' highlights column A. Another red box labeled '2' highlights the 'Data' tab in the ribbon. A third red box labeled '3' highlights the 'Text do sloupců' (Text to Columns) button. A fourth red box labeled '4' highlights the 'Další >' (Next) button in the 'Průvodce převodem textu do sloupců (1/3)' dialog box.

1: highlight column A

2

3

4

Entity, Code, Year, Annual COâ,, emissions									
Afghanistan	AFG	1949	14656						
Afghanistan	AFG	1950	84272						
Afghanistan	AFG	1951	91600						
Afghanistan	AFG	1952	91600						
Afghanistan	AFG	1953	106256						
Afghanistan	AFG	1954	106256						
Afghanistan	AFG	1955	153888						
Afghanistan	AFG	1956	183200						
Afghanistan	AFG	1957	293120						
Afghanistan	AFG	1958	329760						
Afghanistan	AFG	1959	384571						
Afghanistan	AFG	1960	413885						
Afghanistan	AFG	1961	490798						
Afghanistan	AFG	1962	688594						
Afghanistan	AFG	1963	706736						
Afghanistan	AFG	1964	838551						
Afghanistan	AFG	1965	1006917						
Afghanistan	AFG	1966	1091159						
Afghanistan	AFG	1967	1281865						
Afghanistan	AFG	1968	1223391						
Afghanistan	AFG	1969	941232						
Afghanistan	AFG	1970	1670397						
Afghanistan	AFG	1971	1893554						
Afghanistan	AFG	1972	1530347						
Afghanistan	AFG	1973	1635454						
Afghanistan	AFG	1974	1913152						

Task assignment

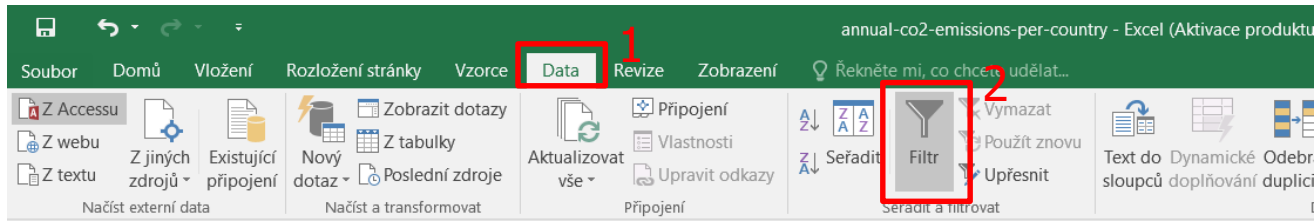
- check the comma in the menu, then click next and then finish

The screenshot shows the Microsoft Excel interface with the 'Data' tab selected. A dialog box titled 'Průvodce převodem textu do sloupců (2/3)' is open, allowing the user to specify delimiters for text conversion. The 'Oddělovače' (Delimiters) section has 'Čárka' (Comma) checked. The 'Náhled dat' (Data preview) section shows a preview of the data with columns: Entity, Code, Year, Annual CO2 emissions. The 'Další >' button is highlighted.

Entity	Code	Year	Annual CO2 emissions
Afghanistan	AFG	1949	14656
Afghanistan	AFG	1950	84272
Afghanistan	AFG	1951	91600
Afghanistan	AFG	1952	91600
Afghanistan	AFG	1953	106256

Task assignment

- subsequently, it is necessary to filter the world data (you can rename the columns)



annual-co2-emissions-per-country - Excel (Aktivace produktu)

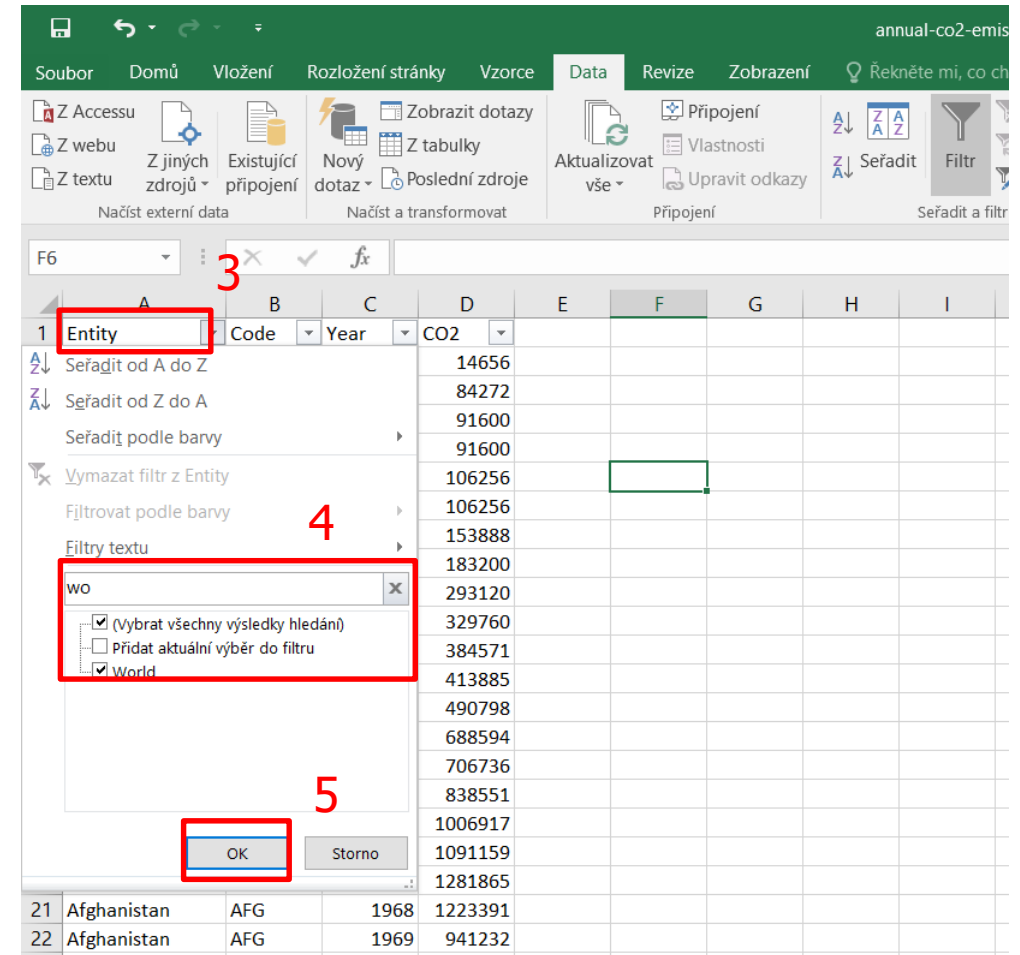
Soubor Domů Vložení Rozložení stránky Vzorce **Data** Revize Zobrazení Řekněte mi, co chcete udělat...

Z webu Z jiných zdrojů Existující přípojení Nový dotaz Poslední zdroje Zobrazit dotazy Z tabulky Poslední zdroje Aktualizovat vše Připojení Vlastnosti Upravit odkazy Seřadit Filtr Vymazat Použít znovu Uprěsnit Text do Dynamické Odebr sloupců doplňování dupliční

Načíst externí data Načíst a transformovat Připojení Seřadit a filtrovat

A1 Entity

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Entity	Code	Year	CO2									
2	Afghanistan	AFG	1949	14656									
3	Afghanistan	AFG	1950	84272									
4	Afghanistan	AFG	1951	91600									
5	Afghanistan	AFG	1952	91600									
6	Afghanistan	AFG	1953	106256									
7	Afghanistan	AFG	1954	106256									
8	Afghanistan	AFG	1955	153888									
9	Afghanistan	AFG	1956	183200									
10	Afghanistan	AFG	1957	293120									
11	Afghanistan	AFG	1958	329760									
12	Afghanistan	AFG	1959	384571									
13	Afghanistan	AFG	1960	413885									
14	Afghanistan	AFG	1961	490798									
15	Afghanistan	AFG	1962	688594									
16	Afghanistan	AFG	1963	706736									
17	Afghanistan	AFG	1964	838551									
18	Afghanistan	AFG	1965	1006917									
19	Afghanistan	AFG	1966	1091159									
20	Afghanistan	AFG	1967	1281865									
21	Afghanistan	AFG	1968	1223391									
22	Afghanistan	AFG	1969	941232									
23	Afghanistan	AFG	1970	1670397									
24	Afghanistan	AFG	1971	1893554									



annual-co2-emis

Soubor Domů Vložení Rozložení stránky Vzorce **Data** Revize Zobrazení Řekněte mi, co ch

Z webu Z jiných zdrojů Existující přípojení Nový dotaz Poslední zdroje Zobrazit dotazy Z tabulky Poslední zdroje Aktualizovat vše Připojení Vlastnosti Upravit odkazy Seřadit Filtr Vymazat Použít znovu Uprěsnit Text do Dynamické Odebr sloupců doplňování dupliční

Načíst externí data Načíst a transformovat Připojení Seřadit a filtrovat

F6

	A	B	C	D	E	F	G	H	I
1	Entity	Code	Year	CO2					
2	Afghanistan	AFG	1949	14656					
3	Afghanistan	AFG	1950	84272					
4	Afghanistan	AFG	1951	91600					
5	Afghanistan	AFG	1952	91600					
6	Afghanistan	AFG	1953	106256					
7	Afghanistan	AFG	1954	106256					
8	Afghanistan	AFG	1955	153888					
9	Afghanistan	AFG	1956	183200					
10	Afghanistan	AFG	1957	293120					
11	Afghanistan	AFG	1958	329760					
12	Afghanistan	AFG	1959	384571					
13	Afghanistan	AFG	1960	413885					
14	Afghanistan	AFG	1961	490798					
15	Afghanistan	AFG	1962	688594					
16	Afghanistan	AFG	1963	706736					
17	Afghanistan	AFG	1964	838551					
18	Afghanistan	AFG	1965	1006917					
19	Afghanistan	AFG	1966	1091159					
20	Afghanistan	AFG	1967	1281865					
21	Afghanistan	AFG	1968	1223391					
22	Afghanistan	AFG	1969	941232					

Task assignment

- highlight the filtered data and paste (as values) it into a new sheet

	A	B	C	D	E	F	G	H
1	Entity	Code	Year	CO2				
29771	World	OWID_WF	1750	9305937				
29772	World	OWID_WF	1751	9407229				
29773	World	OWID_WF	1752	9505168				
29774	World	OWID_WF	1753	9610490				
29775	World	OWID_WF	1754	9733580				
29776	World	OWID_WF	1755	9793468				
29777	World	OWID_WF	1756	9909914				
29778	World	OWID_WF	1757	10093936				
29779	World	OWID_WF	1758	10216358				
29780	World	OWID_WF	1759	10338854				
29781	World	OWID_WF	1760	10514331				
29782	World	OWID_WF	1761	10747885				
29783	World	OWID_WF	1762	10952198				
29784	World	OWID_WF	1763	11191592				
29785	World	OWID_WF	1764	11396982				
29786	World	OWID_WF	1765	11643486				
29787	World	OWID_WF	1766	11876080				
29788	World	OWID_WF	1767	12152509				
29789	World	OWID_WF	1768	12466936				
29790	World	OWID_WF	1769	12780074				
29791	World	OWID_WF	1770	13097216				
29792	World	OWID_WF	1771	13369488				
29793	World	OWID_WF	1772	13623507				
29794	World	OWID_WF	1773	13808138				
29795	World	OWID_WF	1774	14012415				
29796	World	OWID_WF	1775	14338920				
29797	World	OWID_WF	1776	14654124				
29798	World	OWID_WF	1777	14959537				
29799	World	OWID_WF	1778	15243483				

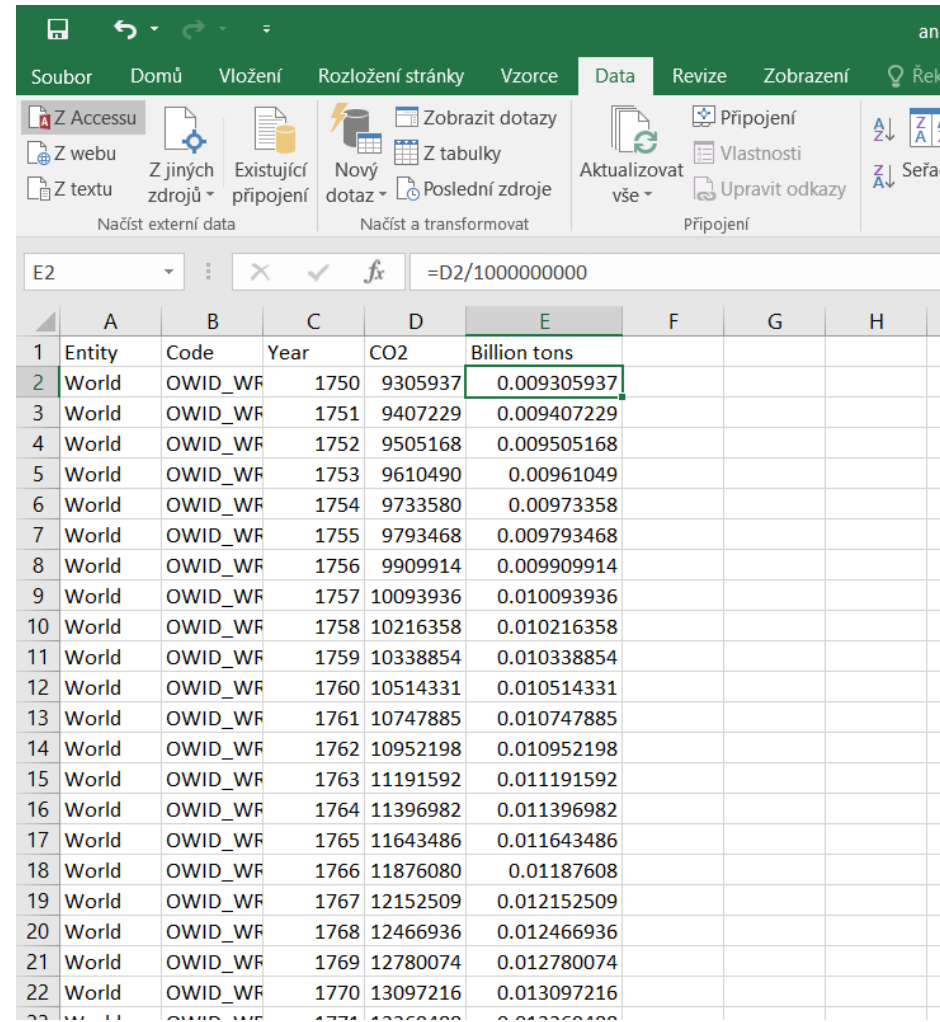
annual-co2-emissions-per-countr

	A	B	C	D	E	F
1	Entity	Code	Year	CO2		
2	World	OWID_WF	1750	9305937		
3	World	OWID_WF	1751	9407229		
4	World	OWID_WF	1752	9505168		
5	World	OWID_WF	1753	9610490		
6	World	OWID_WF	1754	9733580		
7	World	OWID_WF	1755	9793468		
8	World	OWID_WF	1756	9909914		
9	World	OWID_WF	1757	10093936		
10	World	OWID_WF	1758	10216358		
11	World	OWID_WF	1759	10338854		
12	World	OWID_WF	1760	10514331		
13	World	OWID_WF	1761	10747885		
14	World	OWID_WF	1762	10952198		
15	World	OWID_WF	1763	11191592		
16	World	OWID_WF	1764	11396982		
17	World	OWID_WF	1765	11643486		
18	World	OWID_WF	1766	11876080		
19	World	OWID_WF	1767	12152509		
20	World	OWID_WF	1768	12466936		
21	World	OWID_WF	1769	12780074		
22	World	OWID_WF	1770	13097216		
23	World	OWID_WF	1771	13369488		
24	World	OWID_WF	1772	13623507		
25	World	OWID_WF	1773	13808138		
26	World	OWID_WF	1774	14012415		
27	World	OWID_WF	1775	14338920		
28	World	OWID_WF	1776	14654124		
29	World	OWID_WF	1777	14959537		
30	World	OWID_WF	1778	15243483		

annual-co2-emissions-per-countr List1

Task assignment

- now it is necessary to convert the values in tons to billion tons (Gt)



The screenshot shows the Microsoft Excel interface with the 'Data' tab selected. The formula bar displays the formula $=D2/1000000000$. The table below shows data for CO2 emissions in billion tons.

	A	B	C	D	E	F	G	H
1	Entity	Code	Year	CO2	Billion tons			
2	World	OWID_WF	1750	9305937	0.009305937			
3	World	OWID_WF	1751	9407229	0.009407229			
4	World	OWID_WF	1752	9505168	0.009505168			
5	World	OWID_WF	1753	9610490	0.00961049			
6	World	OWID_WF	1754	9733580	0.00973358			
7	World	OWID_WF	1755	9793468	0.009793468			
8	World	OWID_WF	1756	9909914	0.009909914			
9	World	OWID_WF	1757	10093936	0.010093936			
10	World	OWID_WF	1758	10216358	0.010216358			
11	World	OWID_WF	1759	10338854	0.010338854			
12	World	OWID_WF	1760	10514331	0.010514331			
13	World	OWID_WF	1761	10747885	0.010747885			
14	World	OWID_WF	1762	10952198	0.010952198			
15	World	OWID_WF	1763	11191592	0.011191592			
16	World	OWID_WF	1764	11396982	0.011396982			
17	World	OWID_WF	1765	11643486	0.011643486			
18	World	OWID_WF	1766	11876080	0.01187608			
19	World	OWID_WF	1767	12152509	0.012152509			
20	World	OWID_WF	1768	12466936	0.012466936			
21	World	OWID_WF	1769	12780074	0.012780074			
22	World	OWID_WF	1770	13097216	0.013097216			
23	World	OWID_WF	1771	13360488	0.013360488			

Task assignment

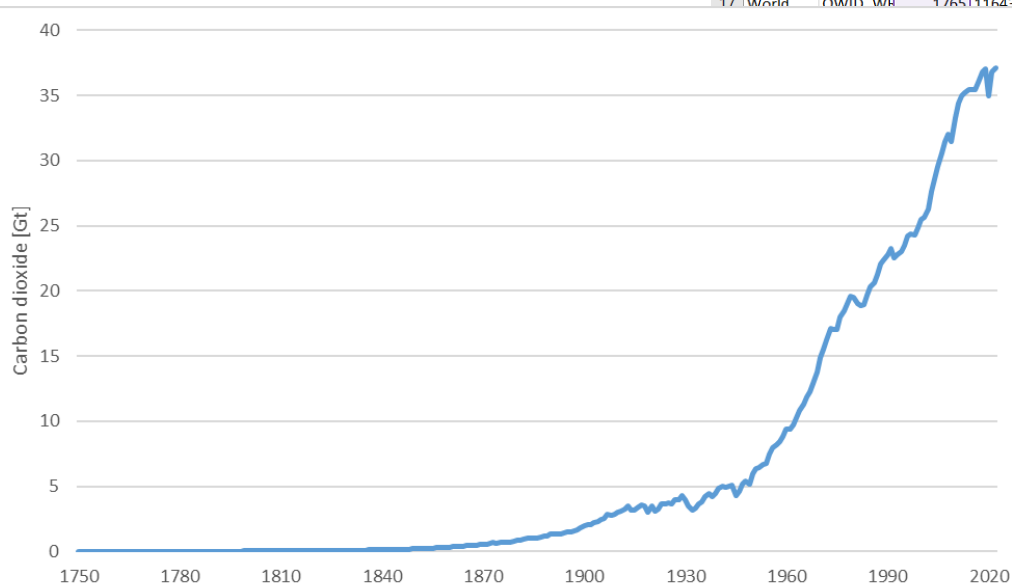
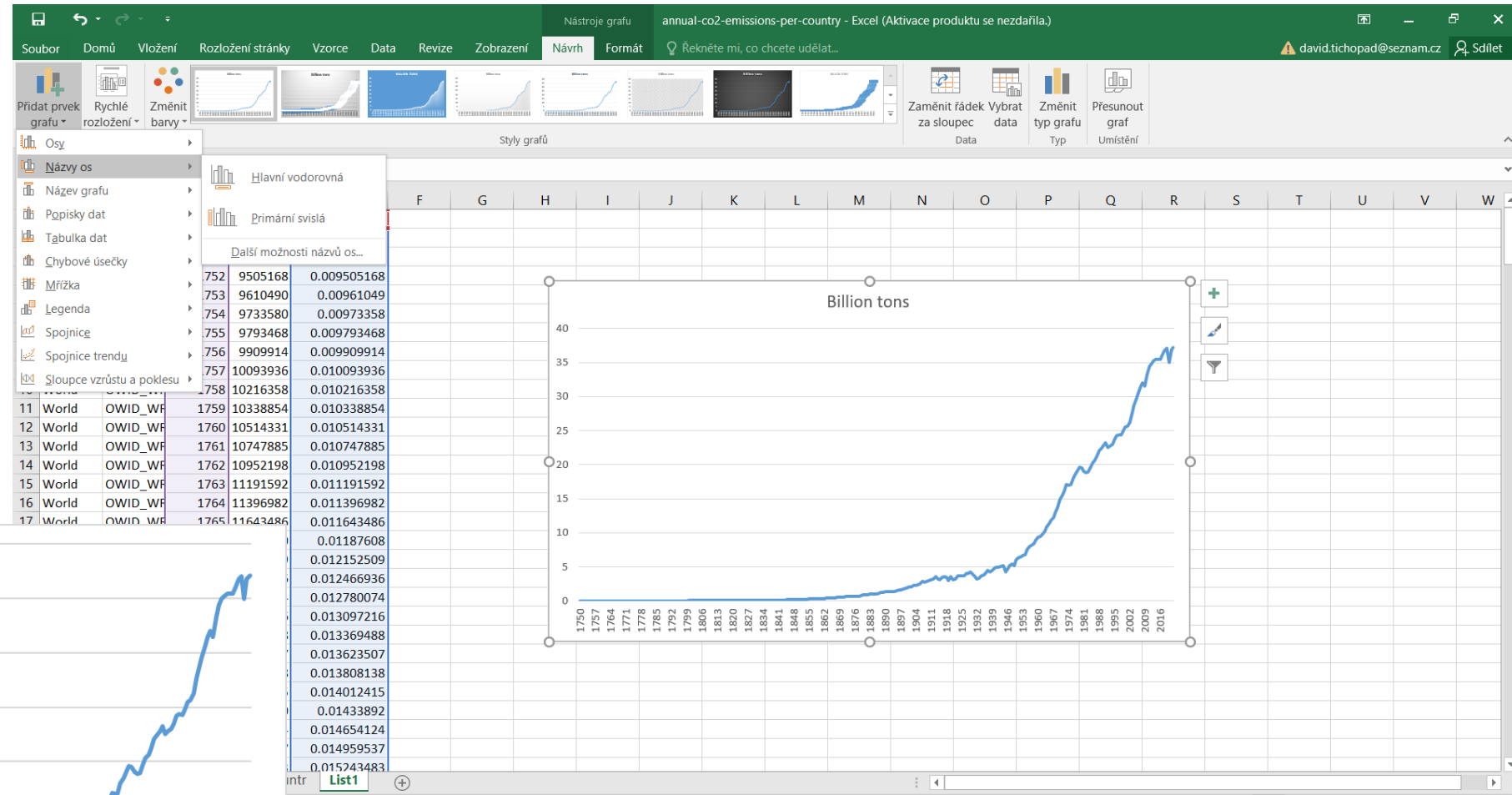
- now we will create a graph - highlight the columns according to the image via ctrl

The screenshot shows the Excel interface with a table of CO2 emissions data and a 'Vložit graf' (Insert Chart) dialog box. The dialog box is open to the 'Doporučené grafy' (Recommended Charts) tab, showing a 'Spojnicový' (Line) chart type selected. The 'OK' button is highlighted with a red box and the number 6.

Entity	Code	Year	CO2	Billion tons
World	OWID_VF	1750	9305937	0.009305937
World	OWID_VF	1751	9407229	0.009407229
World	OWID_VF	1752	9505168	0.009505168
World	OWID_VF	1753	9610490	0.009610490
World	OWID_VF	1754	9733580	0.009733580
World	OWID_VF	1755	9793468	0.009793468
World	OWID_VF	1756	9909914	0.009909914
World	OWID_VF	1757	10093936	0.010093936
World	OWID_VF	1758	10216358	0.010216358
World	OWID_VF	1759	10338854	0.010338854
World	OWID_VF	1760	10514331	0.010514331
World	OWID_VF	1761	10747885	0.010747885
World	OWID_VF	1762	10952198	0.010952198
World	OWID_VF	1763	11191592	0.011191592
World	OWID_VF	1764	11396982	0.011396982
World	OWID_VF	1765	11643486	0.011643486
World	OWID_VF	1766	11876080	0.011876080
World	OWID_VF	1767	12152509	0.012152509
World	OWID_VF	1768	12466936	0.012466936
World	OWID_VF	1769	12780074	0.012780074
World	OWID_VF	1770	13097216	0.013097216
World	OWID_VF	1771	13369488	0.013369488
World	OWID_VF	1772	13623507	0.013623507
World	OWID_VF	1773	13808138	0.013808138
World	OWID_VF	1774	14012415	0.014012415
World	OWID_VF	1775	14338920	0.014338920
World	OWID_VF	1776	14654124	0.014654124
World	OWID_VF	1777	14959537	0.014959537
World	OWID_VF	1778	15243483	0.015243483

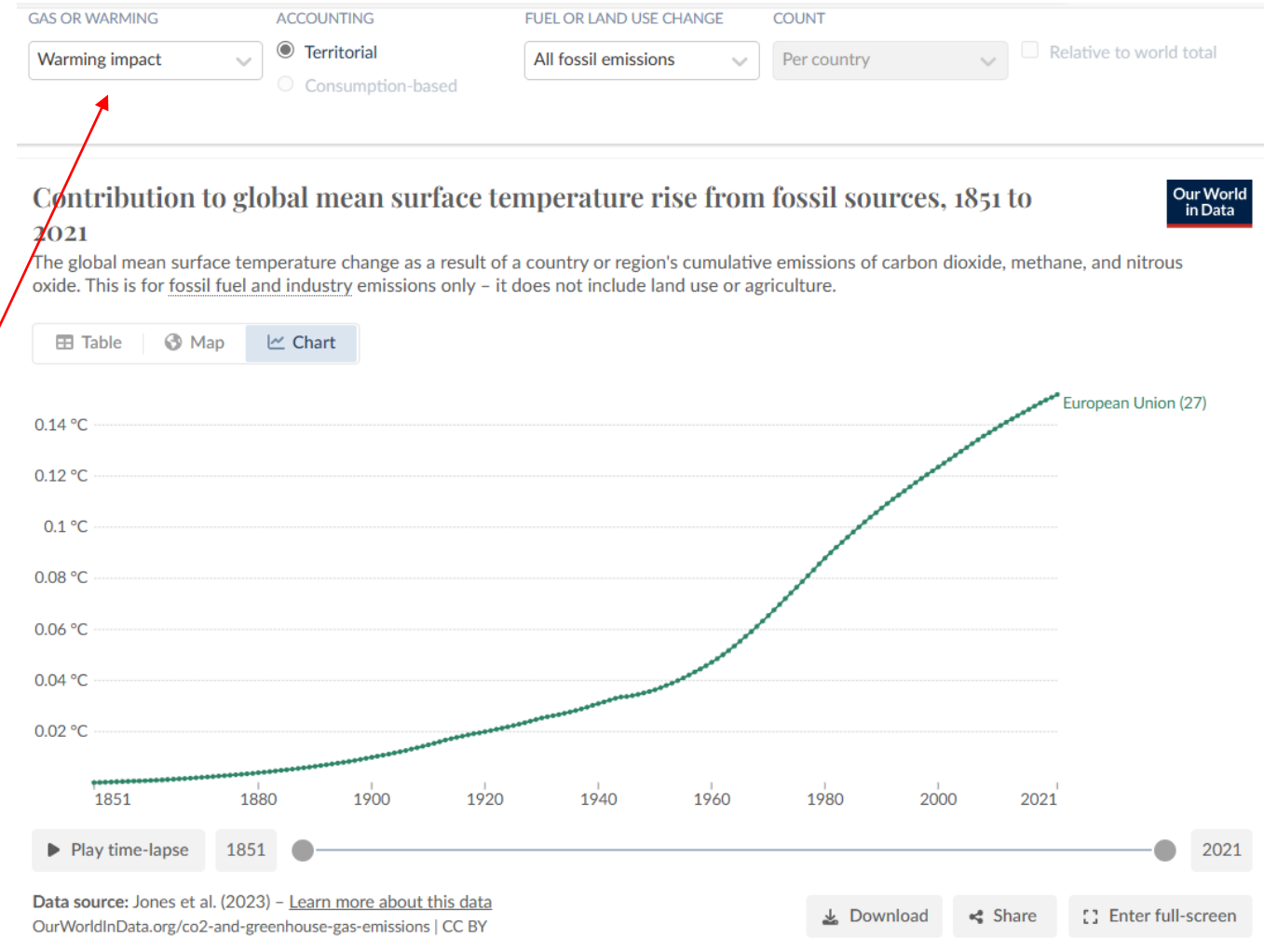
Task assignment

- you can now further modify the graph, for example add labels as shown in the image



Task assignment

- Now also try for your country (select your country instead of world in the filter)
- Then check out the page in the link provided on how world and your country's CO₂ emissions contribute to global warming



Thank you for your attention