



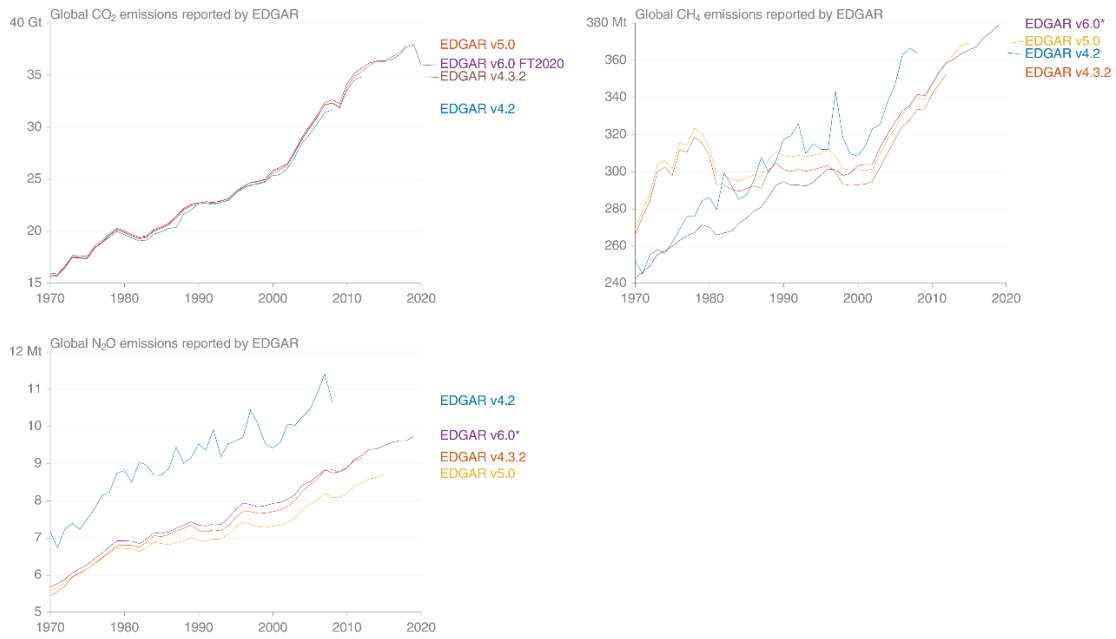
Supplement of

A comprehensive and synthetic dataset for global, regional, and national greenhouse gas emissions by sector 1970–2018 with an extension to 2019

Jan C. Minx et al.

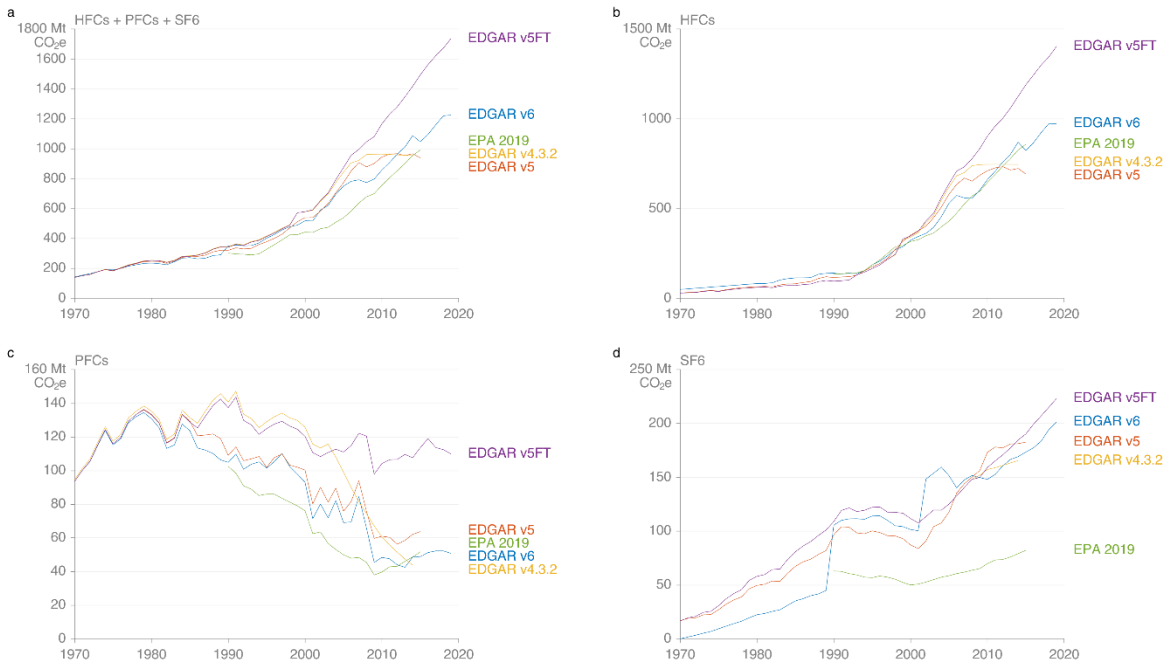
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28 **Figure S1 - Comparison of emission estimates for CO₂-FFI, CH₄ and N₂O for EDGAR version 4.2, 4.3.2, v5 and v6.**
29 **Emissions are reported per year in native units.**

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32 **Figure S2 - Comparison of emission estimates for total fluorinated gases and groups of species from different versions**
33 **of the EDGAR database (v4.3.2, v5, v6), the EDGARv5FT produced by Olivier and Peters (2020), and US-EPA (2019):**
34 **Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs) and Sulphur hexafluoride (SF₆).** To enable comparison with US-
35 **EPA data emissions are reported in MtCO₂eq per year using global warming potential from IPCC AR4 (Forster et al.,**
36 **2007).**

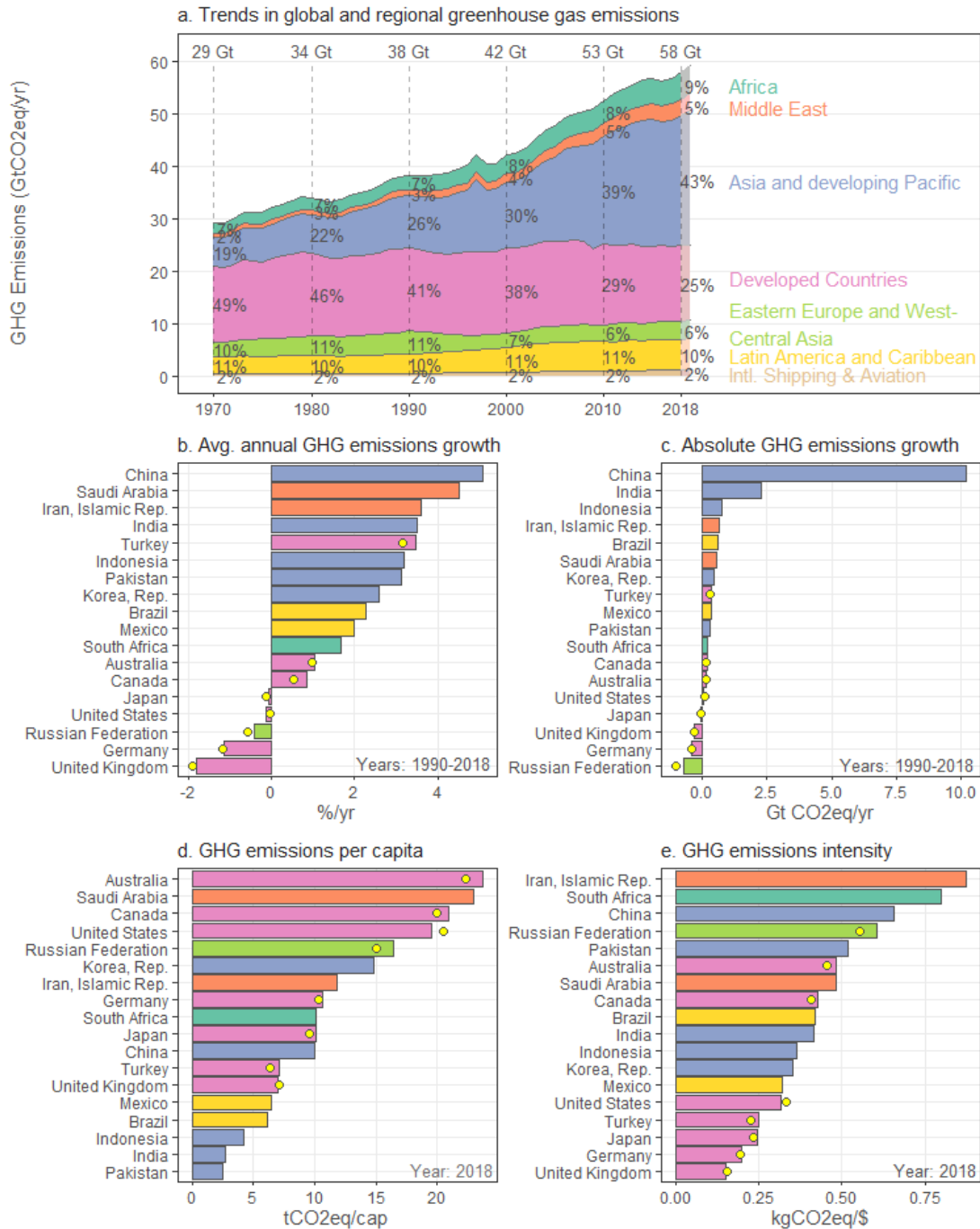
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Table S1 - Average annual anthropogenic GHG emissions and emissions growth by decade/year and world region for 1970-2018: Aggregate GHG emission trends are reported in GtCO₂eq converted based on global warming potentials with a 100-year time horizon (GWP-100) from the IPCC Sixth Assessment Report (Forster et al., 2021).

	Africa		Middle East		Asia & Developing Pacific		Developed Countries		Eastern Europe and West-Central Asia		Latin America & Caribbean		International Aviation & Shipping	
	Levels	Growth	Levels	Growth	Levels	Growth	Levels	Growth	Levels	Growth	Levels	Growth	Levels	Growth
2018	5.0		3.2		25		14		3.5		5.6		1.4	
2009-2018	4.6	1.9%	2.8	2.8%	23	2.3%	15	-0.5%	3.3	1.2%	5.7	0.2%	1.2	2.2%
2000-2009	3.8	2.1%	2.0	4.6%	16	5.4%	16	-0.5%	3.0	1.3%	5.3	1.9%	1.0	3.5%
1990-1999	3.1	2.3%	1.3	3.9%	11	2.7%	16	0.3%	3.3	-5.9%	4.1	2.1%	0.75	3.0%
1980-1989	2.4	2.0%	0.92	3.3%	8.5	3.5%	15	0.4%	3.9	1.0%	3.5	0.7%	0.58	1.9%
1970-1979	2.1	1.6%	0.84	3.9%	6.3	2.7%	15	1.3%	3.2	3.0%	3.4	0.7%	0.57	0.4%
1970	2.0		0.66		5.7		14		2.9		3.3		0.55	

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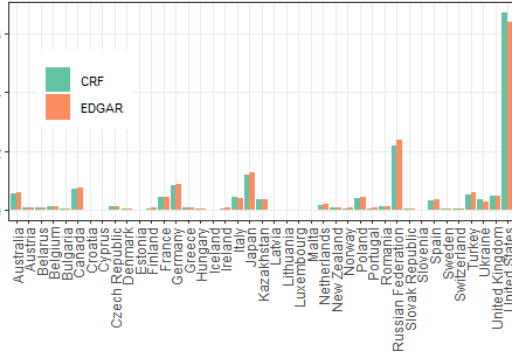


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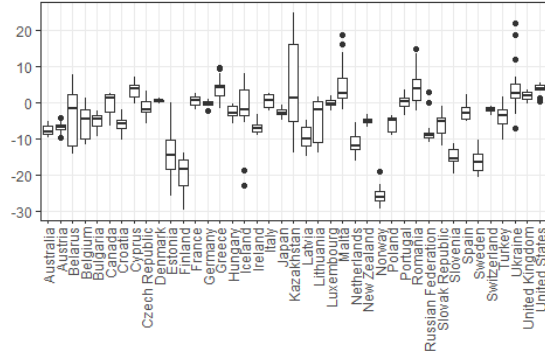
43 **Figure S3 – Changes in regional GHGs from multiple perspectives including county contributions:** Panel a: Regional
 44 GHG emission trends (in GtCO₂eq yr⁻¹) for the time period 1970–2018 with an initial estimate for 2019. Transparent colour for
 45 2019 estimate indicates its preliminary nature and lower confidence associated with it. GHG emissions from international
 46 aviation (AIR) and shipping (SEA) are not assigned to individual countries and shown separately. Panels b and c: Average
 47 annual changes in GHG emissions for largest emitters (75% of global emissions) for the reporting period 1990–2018 in relative
 48 (% annual change) and absolute terms (GtCO₂eq yr⁻¹). Panels d and e: GHG emissions per capita and per GDP in 2018 for the
 49 largest emitters (75% of global emissions). GDP estimated using constant international purchasing power parity (USD 2011).
 50 The yellow dots in panels b–e show emissions data for 2018 from UNFCCC-CRFs (2021) that were accessed through Gütschow
 51 et al. (2021a). Note that panels b–e do not include CO₂-LULUCF emissions, because uncertainties are too large for presentation
 52 at that level. Emissions are converted into CO₂-equivalents based on global warming potentials with a 100 year time horizon
 53 (GWP-100) from the IPCC Sixth Assessment Report (Forster et al., 2021).

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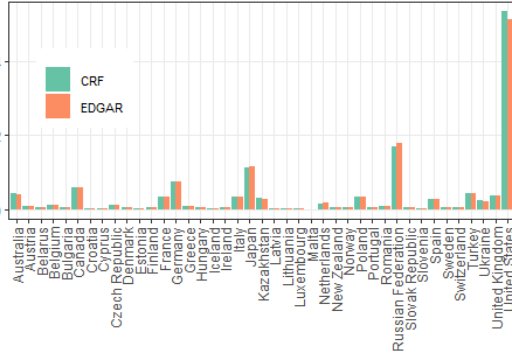
2018 GHG data in GtCO₂eq/yr



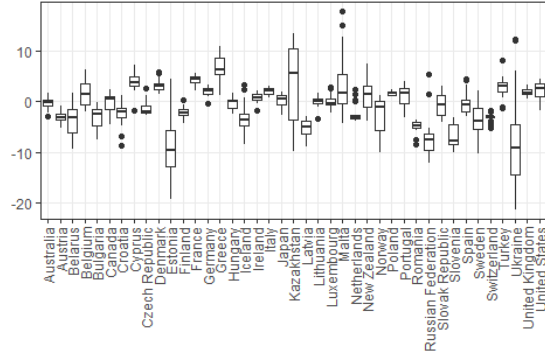
Differences between EDGARv6 and CRF data for GHG (in %)



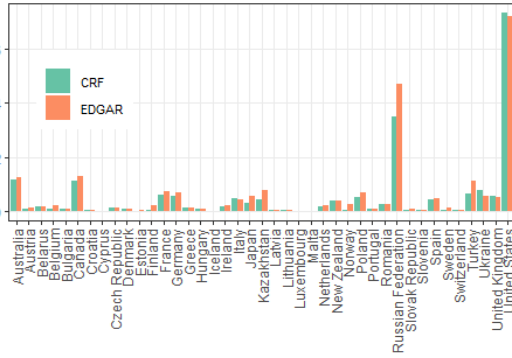
2018 CO₂-FFI data in GtCO₂eq/yr



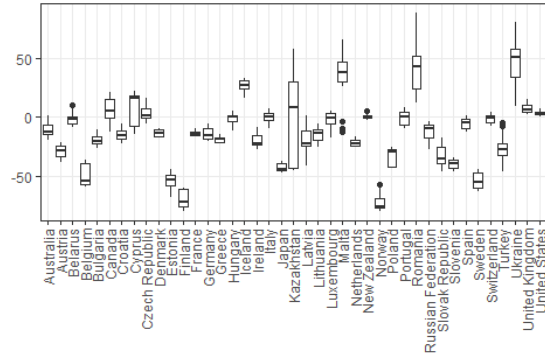
Differences between EDGARv6 and CRF data for CO₂-FFI (in %)



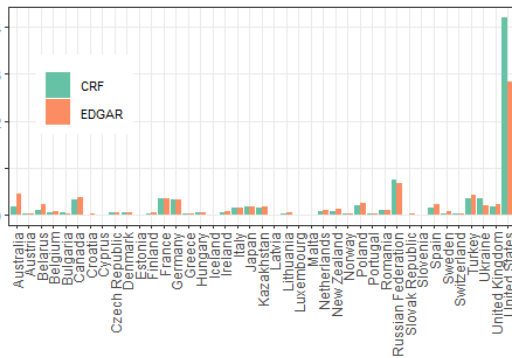
2018 CH₄ data in GtCO₂eq/yr



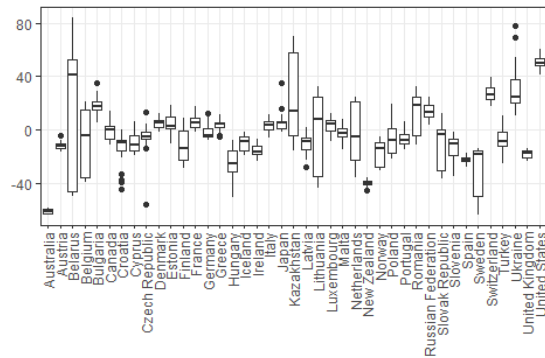
Differences between EDGARv6 and CRF data for CH₄ (in %)



2018 N₂O data in GtCO₂eq/yr



Differences between EDGARv6 and CRF data for N₂O (in %)

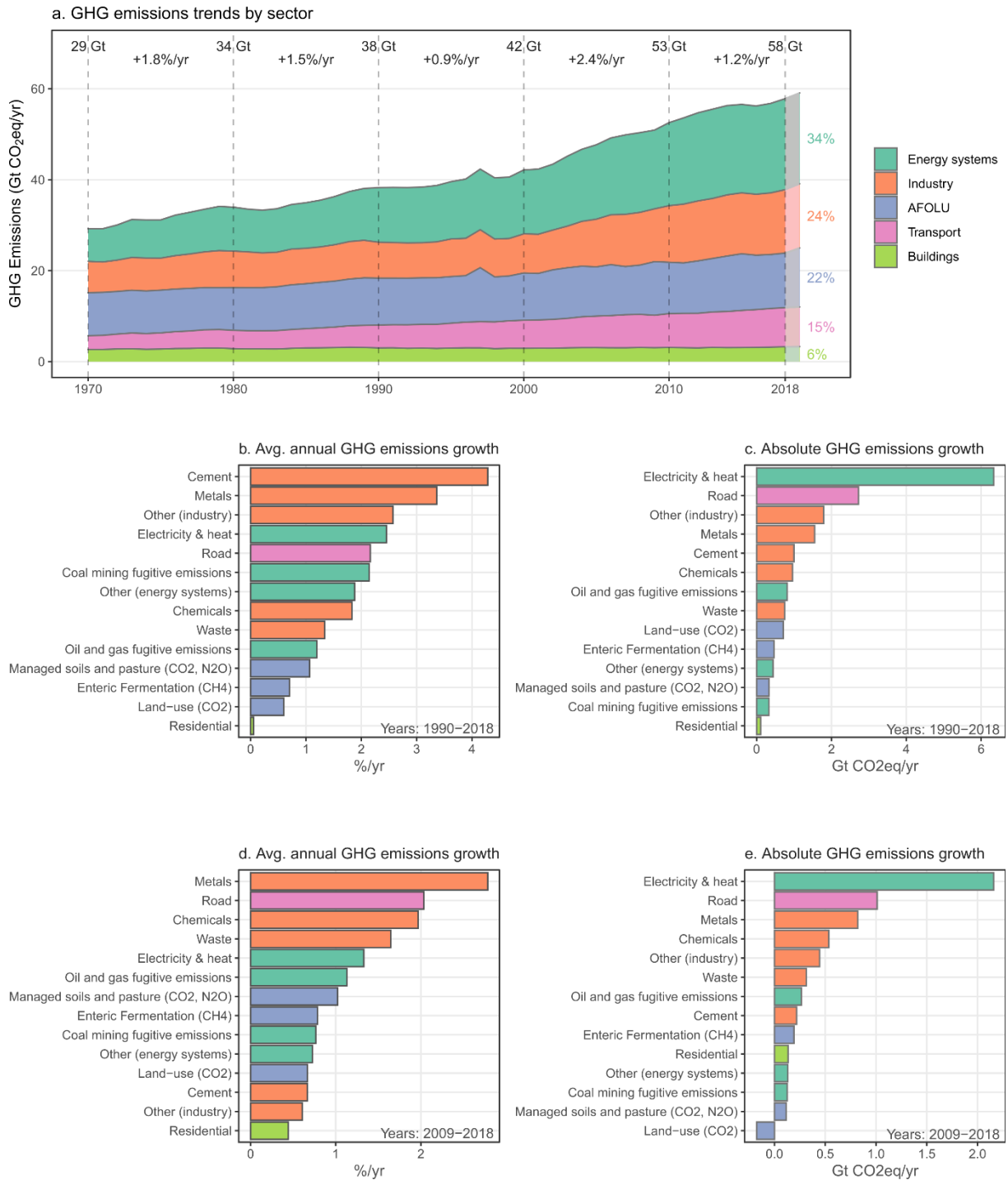


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56 **Figure S4 - Differences between the EDGAR data presented in this paper and the data reported by the Annex I**
57 **countries of the Kyoto Protocol to the UNFCCC via the common reporting framework (CRF):** The left hand panels
58 depict the 2018 data of both datasets in GtCO₂eq/yr by country for total GHG, CO₂-FFI, CH₄ and N₂O. The right hand plots for
59 each country for total GHG, CO₂-FFI, CH₄ and N₂O. Emissions are converted into CO₂-equivalents based on global
60 warming potentials with a 100 year time horizon (GWP-100) from the IPCC Sixth Assessment Report (Forster et al., 2021).
61 Data reflects most recent UNFCCC CRFs (UNFCCC, 2021) which were accessed through Gütschow et al. (2021).
62

64 **Table S2 - Average annual anthropogenic GHG emissions and emissions growth by decade and major sector for 1970-2018: Aggregate GHG emission trends are reported in GtCO₂eq**
 65 **converted based on global warming potentials with a 100-year time horizon (GWP-100) from the IPCC Sixth Assessment Report (Forster et al., 2021).**

Average annual emissions levels (GtCO ₂ eq yr ⁻¹) and emissions growth (%)												
	Energy Systems		AFOLU		Industry		Transport		Buildings		International Aviation & Shipping	
	Levels	Growth	Levels	Growth	Levels	Growth	Levels	Growth	Levels	Growth	Levels	Growth
2018	20		12		14		7.3		3.3		1.4	
2009-2018	19	1.2%	12	0.7%	13	1.5%	6.7	2.0%	3.1	0.6%	1.2	2.2%
2000-2009	16	2.8%	11	0.8%	10	4.1%	5.8	1.8%	3.0	0.6%	1.0	3.5%
1990-1999	13	1.5%	10	0.0%	8.1	0.9%	4.7	2.0%	3.0	-0.2%	0.75	3.0%
1980-1989	10	2.1%	9.9	1.2%	7.9	0.5%	3.7	2.3%	2.9	1.5%	0.58	1.9%
1970-1979	8.4	3.3%	9.4	-0.2%	7.3	1.9%	3.0	3.9%	2.8	1.2%	0.57	0.4%
1970	7.2		9.5		6.9		2.5		2.7		0.55	

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72 **Figure S5 – Changes in sectoral GHGs from multiple perspectives including sub-sector contributions:** Panel a: Trends
 73 in total annual anthropogenic GHG emissions (in GtCO₂eq) 1970-2018 with an extension to 2019 by major economic sector.
 74 Transparent colour for 2019 estimate indicates its preliminary nature and lower confidence associated with it. AFOLU refers
 75 to GHG emissions from agriculture, forestry and other land-use change. Panels b and c: Largest sub-sectoral (90% of total
 76 emissions) average annual changes in GHG emissions for the reporting period 1990-2018 in relative (% annual change) and
 77 absolute terms (GtCO₂eq yr⁻¹). Panels d and e: Largest sub-sectoral (90% of total emissions) average annual changes in GHG
 78 emissions for the reporting period 2009-2018 in relative (% annual change) and absolute terms (GtCO₂eq yr⁻¹). Emissions are
 79 converted into CO₂-equivalents based on global warming potentials with a 100 year time horizon (GWP-100) from the IPCC
 80 Sixth Assessment Report (Forster et al., 2021).

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