ONE HEALTH Knowledge-Café

Webinars | Dicussions | Online courses | Networkings

is supported by DAAD exceed

with financial support from Federal Ministry for Economic Cooperation and Development

Climate Change and Health

1:30 PM - 3:00 PM GMT |
7:30 AM Central America/ Mexico
7:15 PM NPT |2:30 PM CET |5:30 AM PST
|8:30 AM WA |10:30 AM CL

25th March 2021 |
Thursday

SPEAKERS

" Climate change and health

This presentation will give an overview of the reasons why understanding climate change is essential for those who wish to promote public health. It will provide a framework for understanding how to address both topics as well as concrete examples of health issues directly impacted by climate change and ways they can be addressed.

Dr Jennifer Crowe
Universidad Nacional, Heredia, Costa Rica

" Air pollution and COVID-19 risk

Air pollution can increase the risk of severe COVID-19 disease and COVID-19 mortality. An increasing number of studies are being conducted worldwide, mostly based on an ecological assessment of available data. While more accurate cohort based research is needed to further understand the mechanistic aspects, preventive action should be undertaken toward exposure reduction.

Dr Roberto G Lucchini
School of Public Health, Florida International University, USA, and University of Brescia, Italy

One Health Knowledge Café

- A collaborative effort of more than 11 individuals representing CIH partners and alumni
- Represents Asia, Africa, Europe, South America and North America
- Brings together the expertise and network of researchers and professionals from various disciplines, countries and expertise to enable cross learning, sharing and network building
- Monthly talks, webinars, online courses, discussions
- Supported by LMU^{CIH} through DAAD/Exceed Program, funded by BMZ

Speakers

Dr Jennifer Crowe
Universidad Nacional, Heredia, Costa Rica

She holds a Master’s degree in Public Health and a Doctorate in Public Health and Epidemiology

She served as Research Coordinator at the University of Washington´s Pacific Northwest Agricultural Safety and Health Center.

Currently,

- Researcher at the Regional Institute for Studies in Toxic Substances (IRET),and
- Regional Coordinator of the Central American Program for Health, Work and Environment (SALTRA) at the National University in Costa Rica.

Served for seven years as a coordinator of the international consortium CENCAM, dedicated to international and interdisciplinary research on chronic kidney disease of unknown origin.

Her other research interests include workplace heat exposure, antibiotic resistance, and climate change and health.

Climate Change and Health

Climate change and health

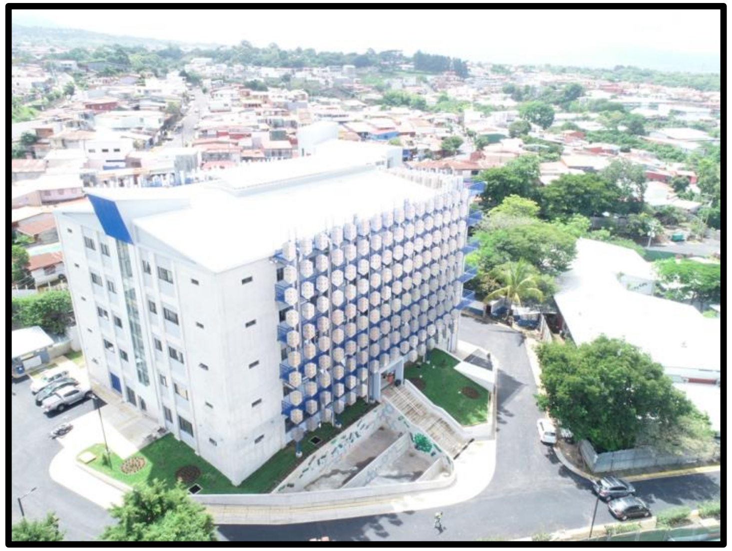
Jennifer Crowe, MSc, PhD
IRET-SALTRA
Universidad Nacional
Costa Rica
25 marzo 2021

IRET

Pan American Health Organization

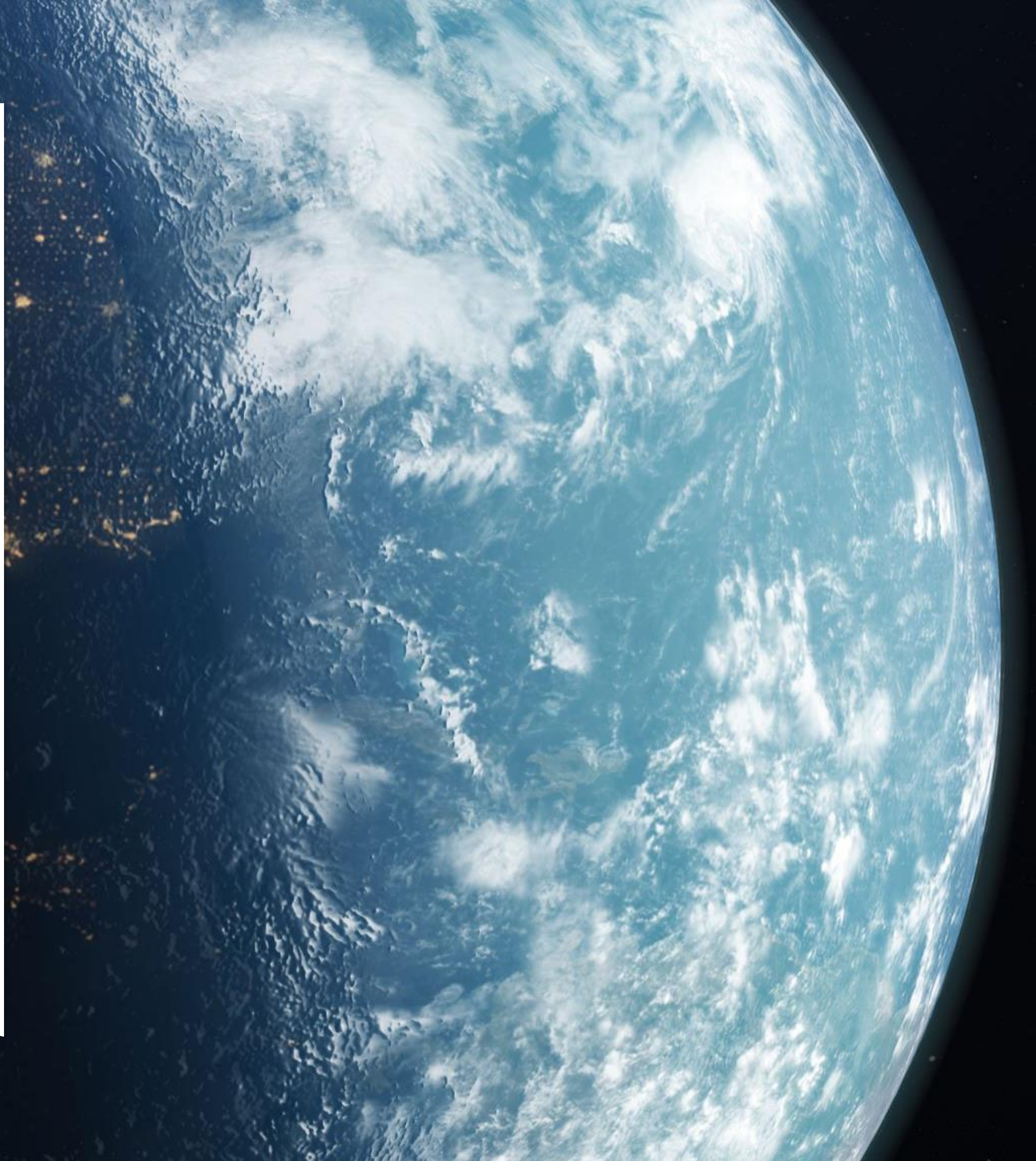
World Health Organization
REGIONAL OFFICE FOR THE Americas

SALTRA
PROGRAMA SALUD, TRABAJO y AMBIENTE EN AMÉRICA CENTRAL



Climate change and health: **5 main take-home messages**

1. **We should expect events that are more:**
   - **Frequent**
   - **Severe**
   - **Long lasting**
2. **Climate change amplifies existing public health problems.**
3. **Not everyone contributes equally to the problem nor suffers the same consequences.**
4. **Policy requires working across disciplines/agencies and recognizing “co-benefits”**
5. ***(COVID-19 is a good example of all of this)***



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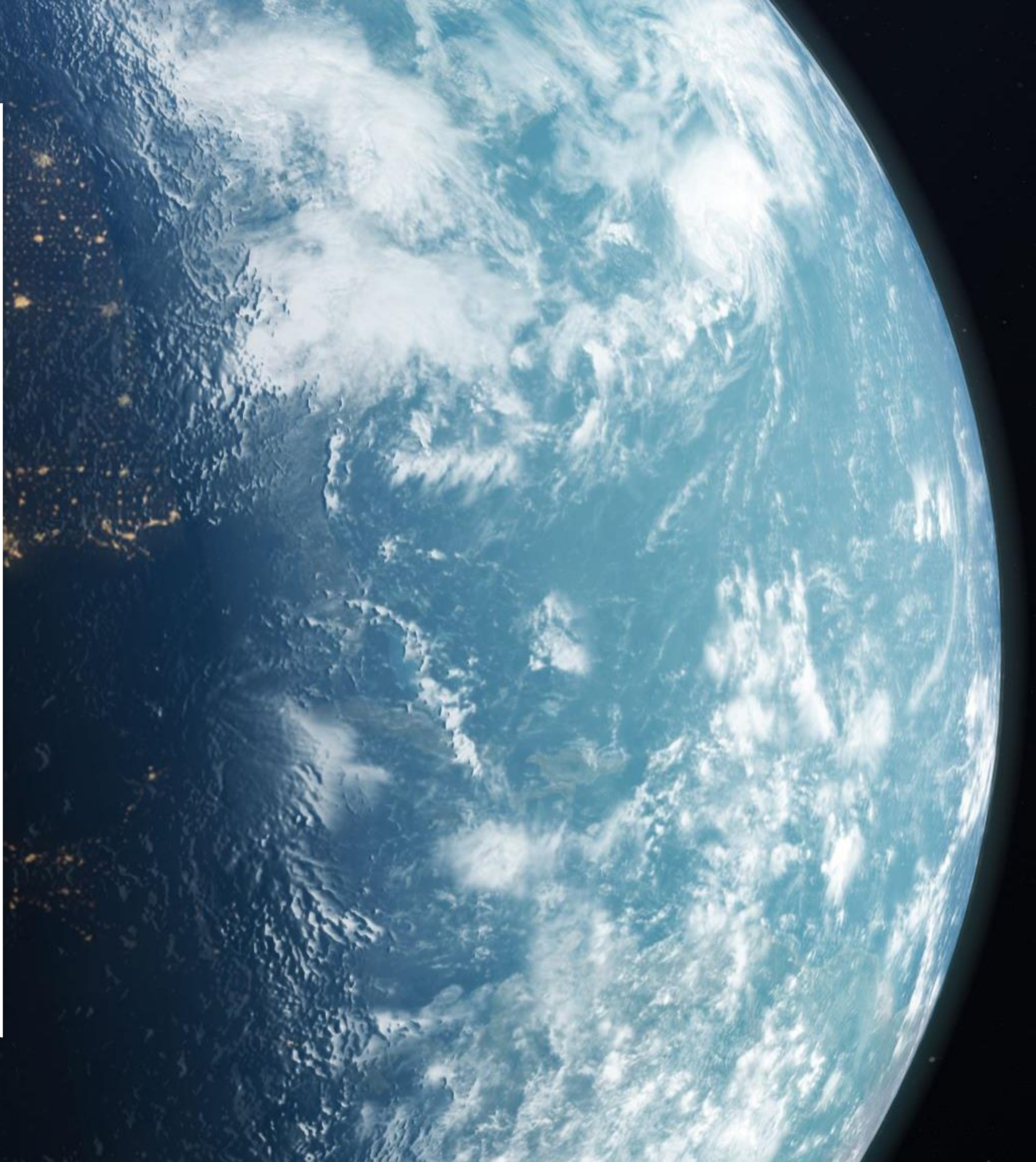

Definitions

- “Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.”
- “Climate change is a change in the usual weather found in a place.”

https://www.who.int/about/who-we-are/frequently-asked-questions

https://www.nasa.gov/audience/forstudents/k-4/stories/nasa-knows/what-is-climate-change-k4.html

How do we know (think) will happen in the future?

- WG I- assesses the physical scientific aspects of the climate system and climate change.
- WG II - assesses the vulnerability of socio-economic and natural systems to climate change, negative and positive consequences of climate change, and options for adapting to it…. the inter-relationship between vulnerability, adaptation and sustainable development.
- WG III - assesses options for mitigating climate change through limiting or preventing greenhouse gas emissions and enhancing activities that remove them from the atmosphere.
- The Task Force on National Greenhouse Gas Inventories (TFI) - oversees the IPCC National Greenhouse Gas Inventories Programme (IPCC-NGGIP).
- Assessment Reports (AR5)

https://www.ipcc.ch/

What will the future look like?

Table SPM.2 | Projected change in global mean surface air temperature and global mean sea level rise for the mid- and late 21st century relative to the reference period of 1986–2005. {12.4; Table 12.2; Table 13.5}

		2046–2065		2081–2100	
	Scenario	**Mean**	***Likely* range[c]**	**Mean**	***Likely* range[c]**
Global Mean Surface Temperature Change (°C)[a]	RCP2.6	1.0	0.4 to 1.6	1.0	0.3 to 1.7
	RCP4.5	1.4	0.9 to 2.0	1.8	1.1 to 2.6
	RCP6.0	1.3	0.8 to 1.8	2.2	1.4 to 3.1
	RCP8.5	2.0	1.4 to 2.6	3.7	2.6 to 4.8
	Scenario	**Mean**	***Likely* range[d]**	**Mean**	***Likely* range[d]**
Global Mean Sea Level Rise (m)[b]	RCP2.6	0.24	0.17 to 0.32	0.40	0.26 to 0.55
	RCP4.5	0.26	0.19 to 0.33	0.47	0.32 to 0.63
	RCP6.0	0.25	0.18 to 0.32	0.48	0.33 to 0.63
	RCP8.5	0.30	0.22 to 0.38	0.63	0.45 to 0.82

IPCC WG1AR5 Summary for Policy Makers; Disponible en:
http://www.climatechange2013.org/images/report/WG1AR5_SPM_FINAL.pdf

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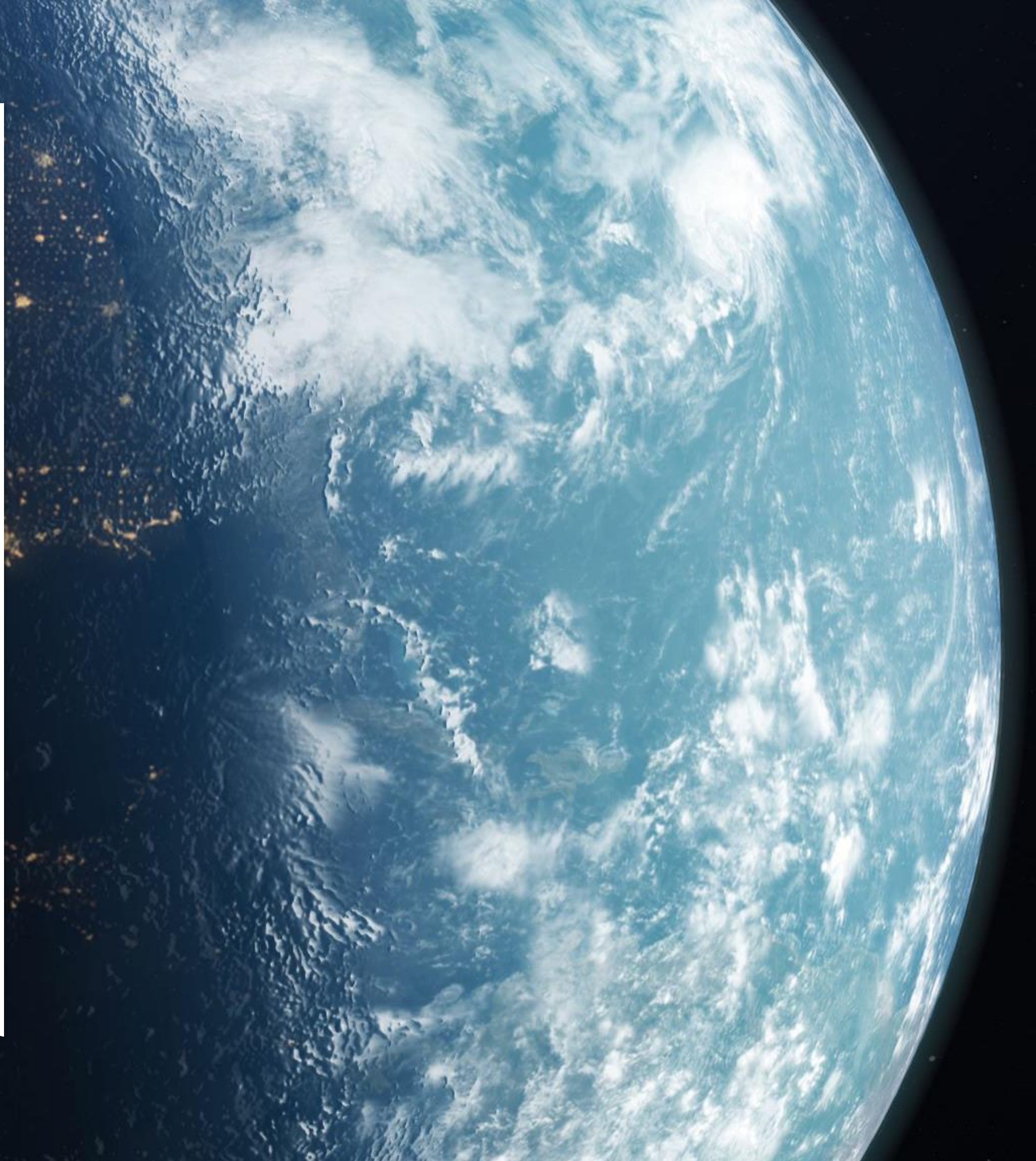
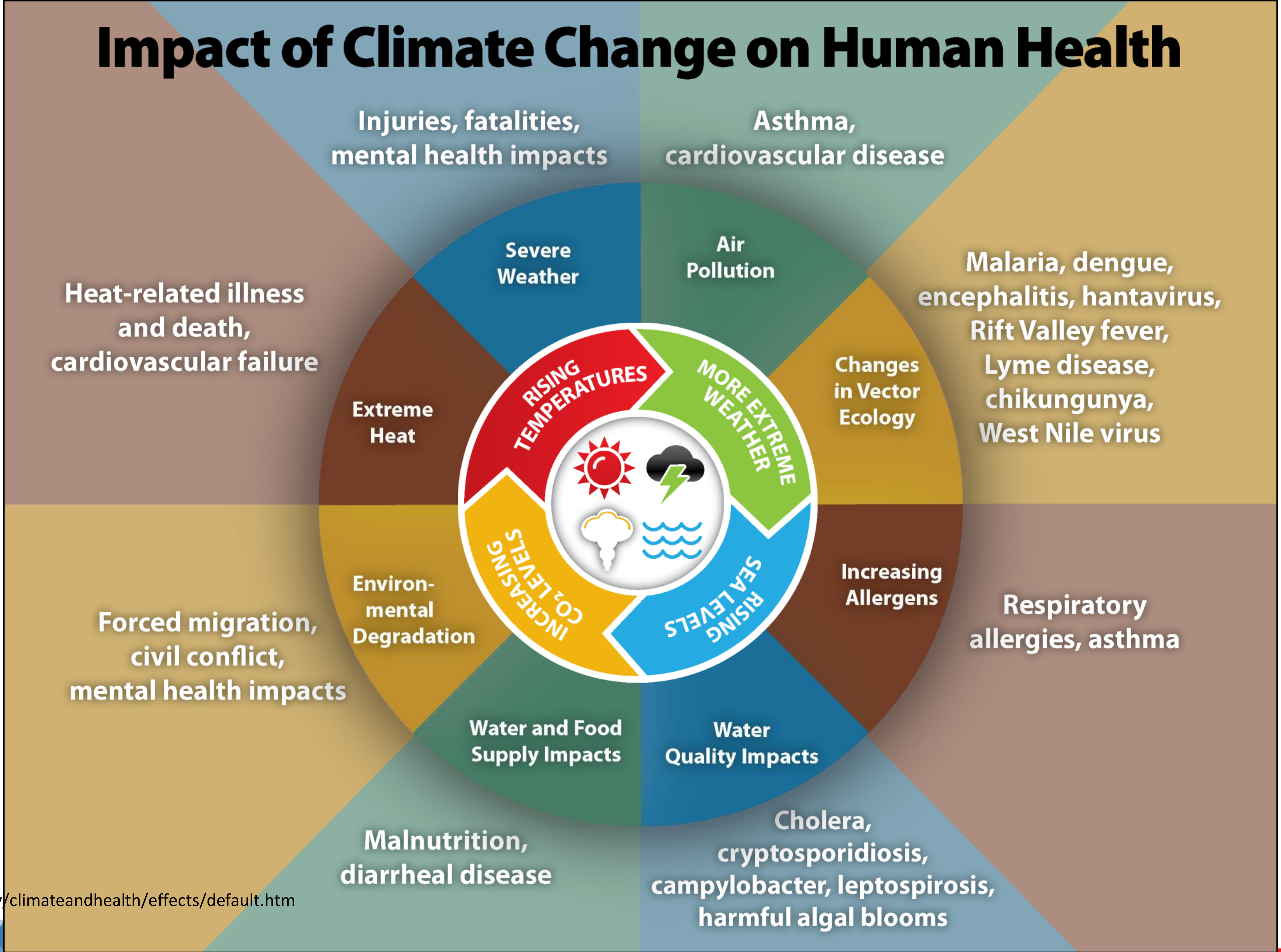




CDC: https://www.cdc.gov/climateandhealth/effects/default.htm

Does 2°C make a difference?

(a) Change in average surface temperature (1986–2005 to 2081–2100)

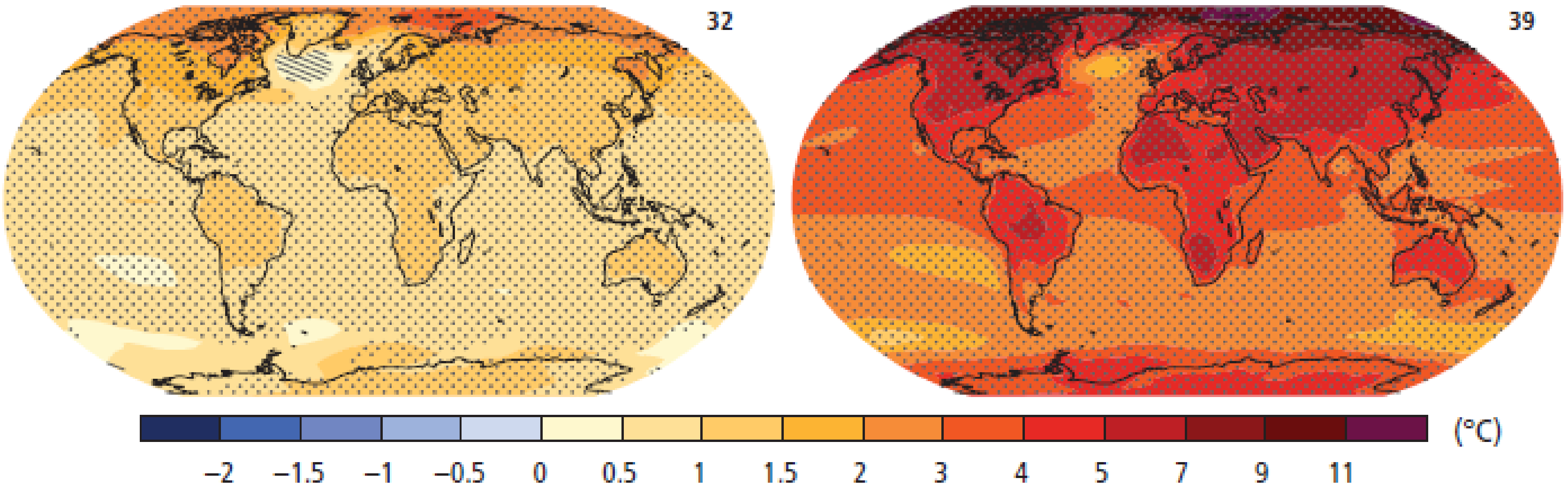
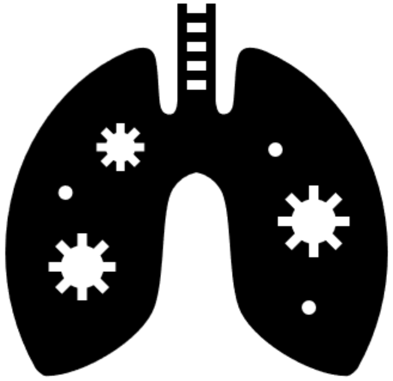


Figure SPM.7 | Change in average surface temperature **(a)** and change in average precipitation **(b)** based on multi-model mean projections for 2081–2100 relative to 1986–2005 under the RCP2.6 (left) and RCP8.5 (right) scenarios. The number of models used to calculate the multi-model mean is indicated in the upper right corner of each panel. Stippling (i.e., dots) shows regions where the projected change is large compared to natural internal variability and where at least 90% of models agree on the sign of change. Hatching (i.e., diagonal lines) shows regions where the projected change is less than one standard deviation of the natural internal variability. *{2.2, Figure 2.2}*



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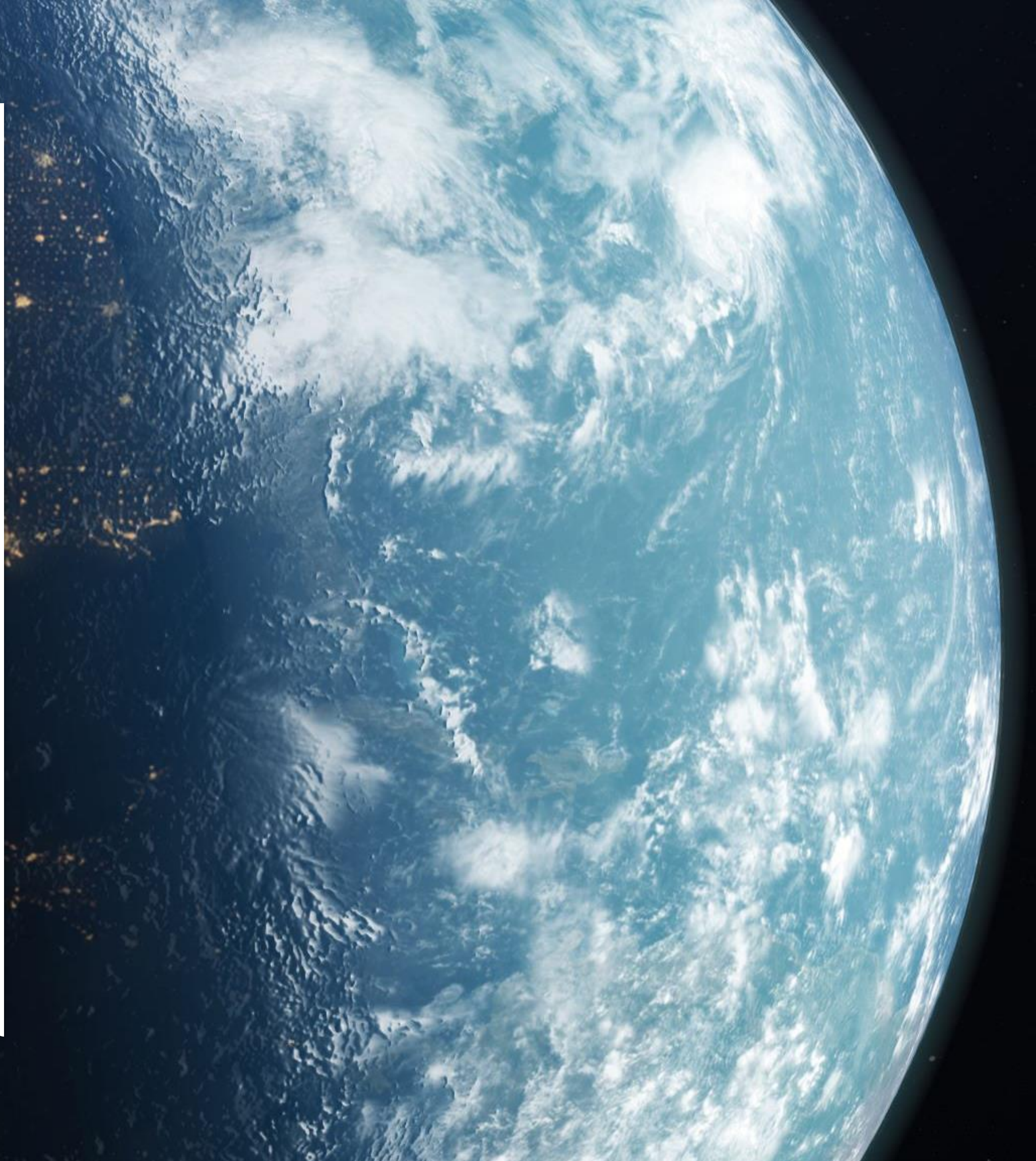
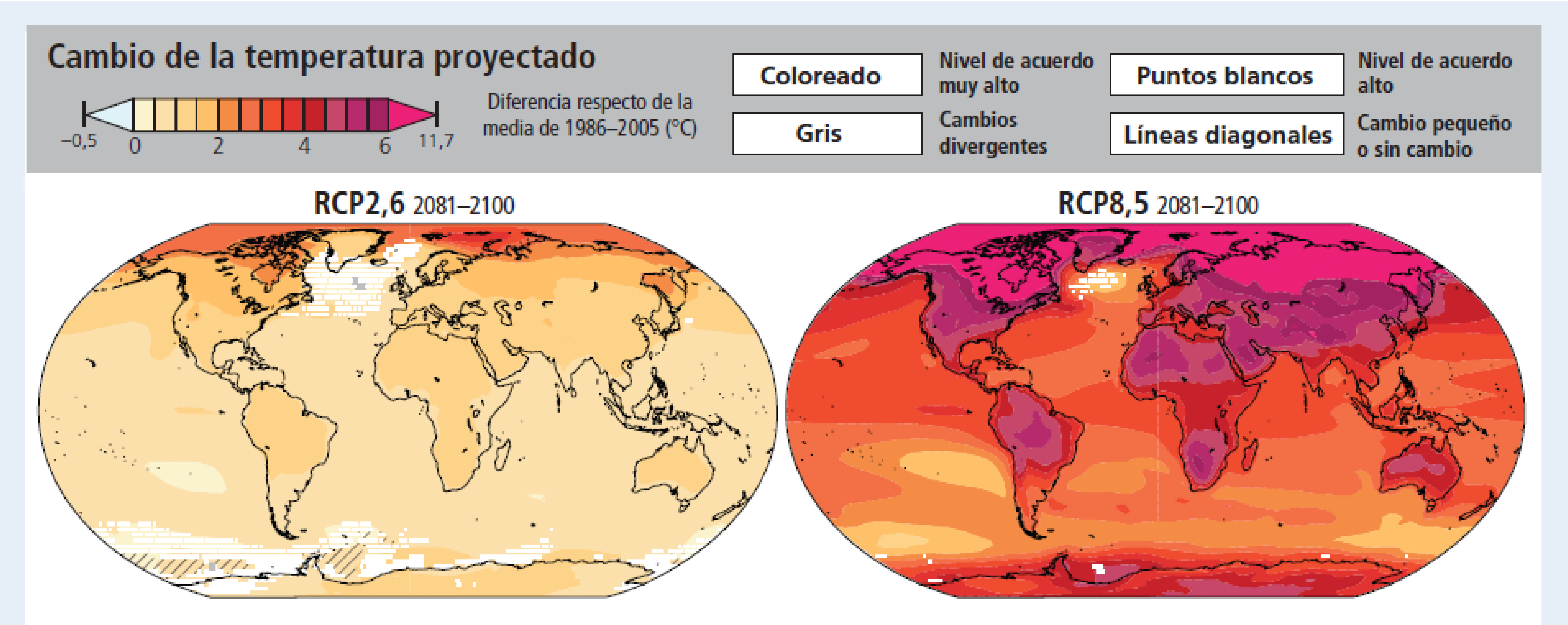


Environmental Justice

- "...the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. This goal will be achieved when everyone enjoys:
    - The same degree of protection from environmental and health hazards, and
    - Equal access to the decision-making process to have a healthy environment in which to live, learn, and work."

C)



IPCC, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp.

https://www.ipcc.ch/pdf/assessment-report/ar5/wg2/ar5_wgII_spm_es.pdf

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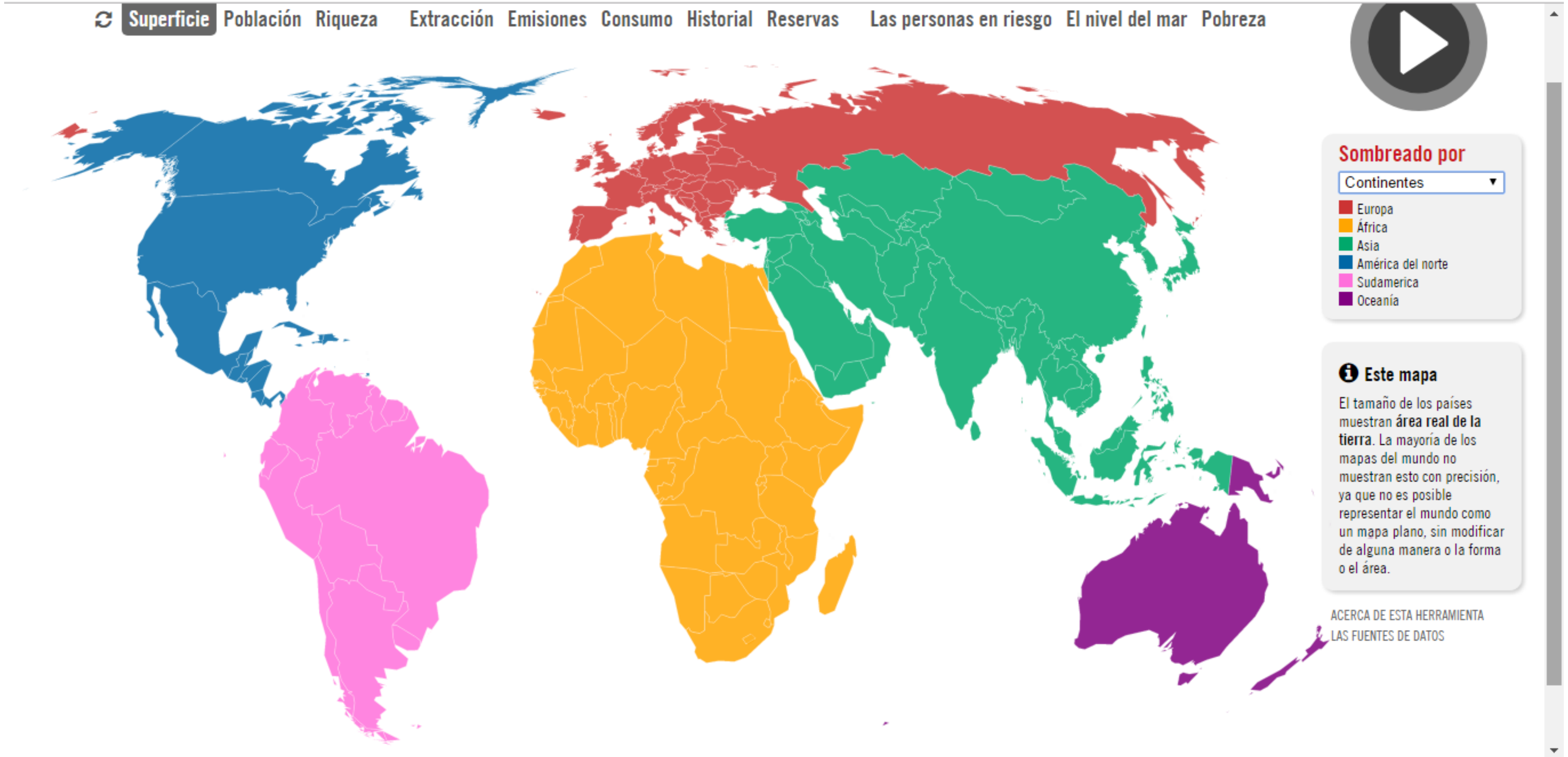

http://www.carbonmap.org/?lang=es#intro

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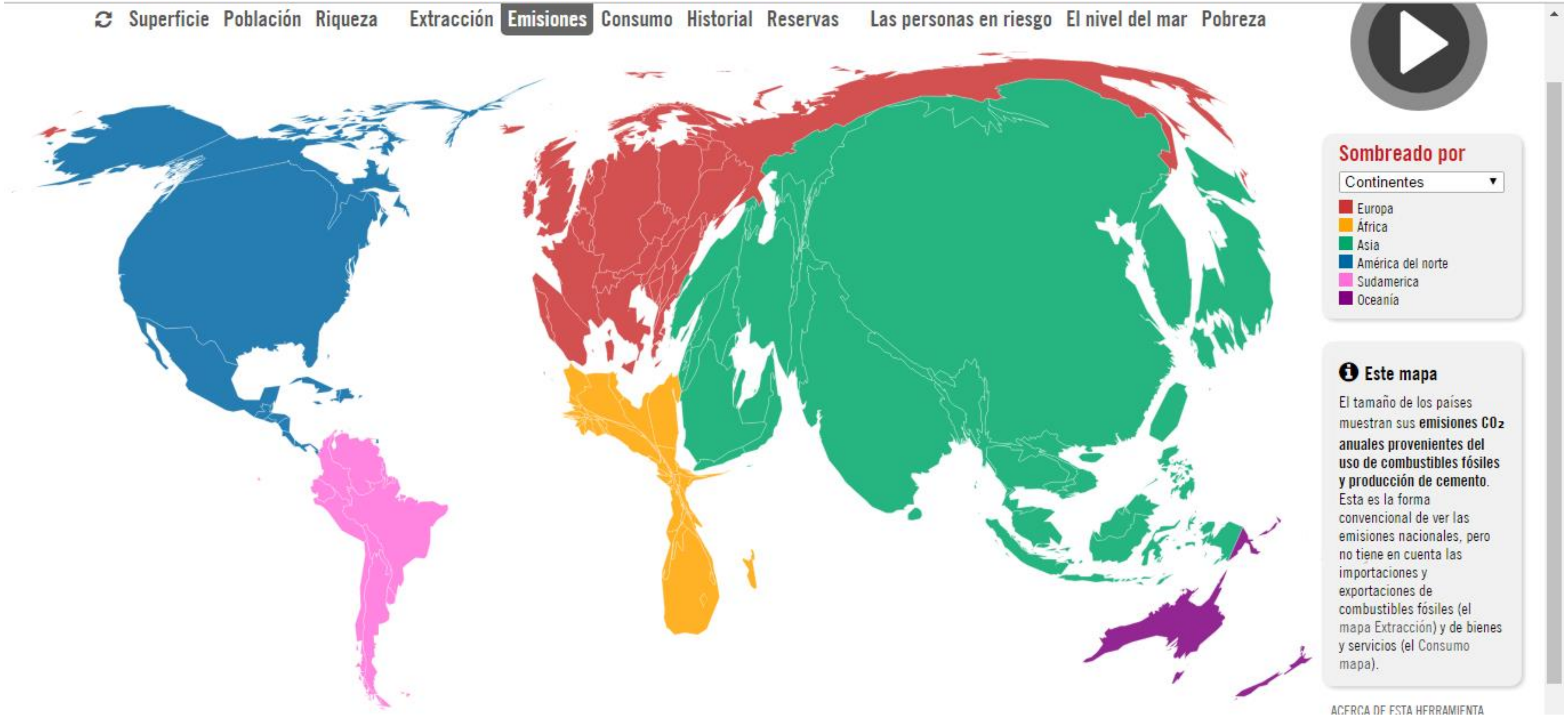

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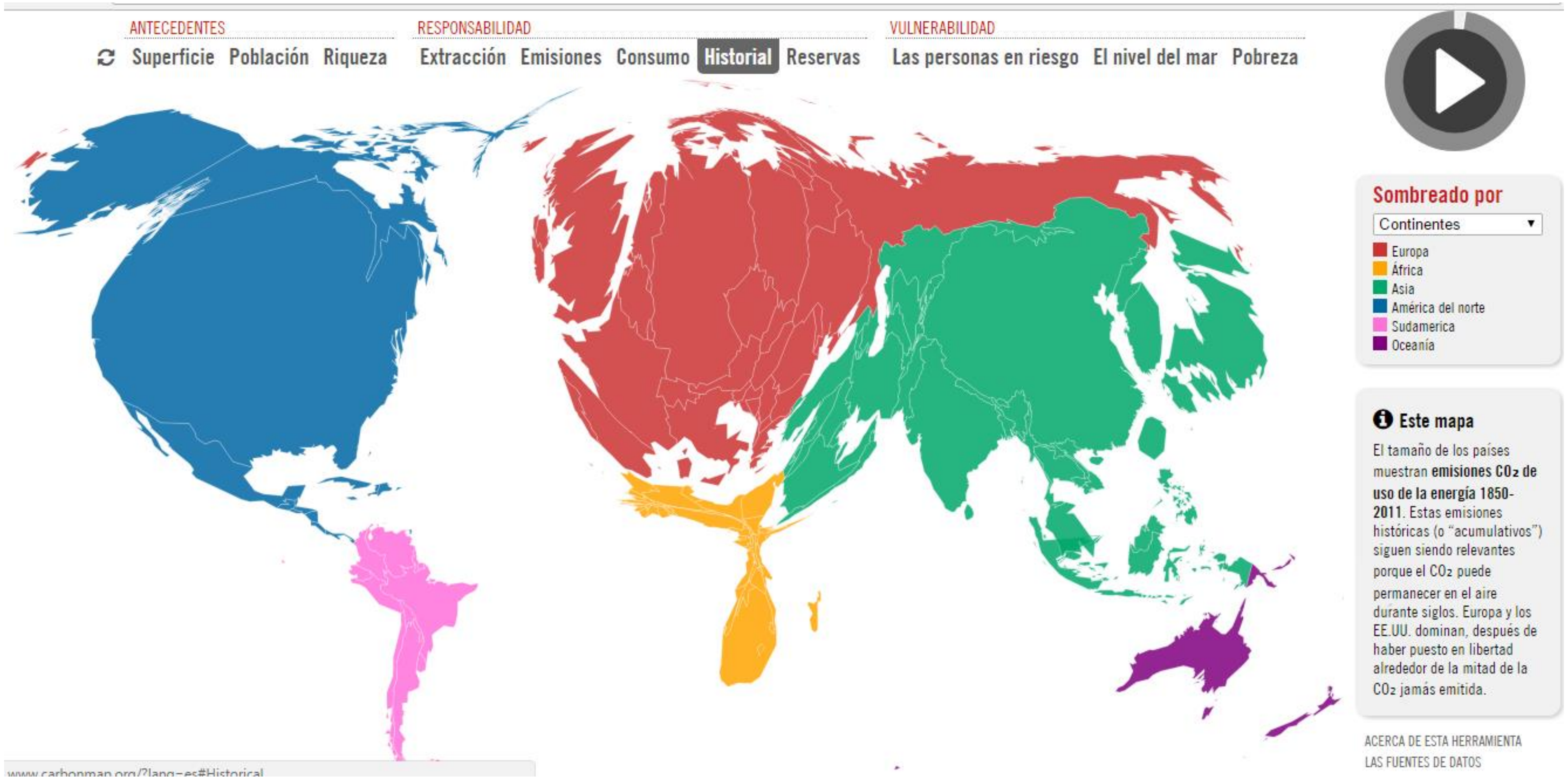
ANTECEDENTES
Superficie Población Riqueza
RESPONSABILIDAD
Extracción Emisiones Consumo Historial Reservas
VULNERABILIDAD
Las personas en riesgo El nivel del mar Pobreza
Sombreado por
Continentes
Europa
África
Asia
América del norte
Sudamerica
Oceanía
Este mapa
El tamaño de los países muestran **emisiones CO_2 de uso de la energía 1850-2011**. Estas emisiones históricas (o "acumulativos") siguen siendo relevantes porque el CO_2 puede permanecer en el aire durante siglos. Europa y los EE.UU. dominan, después de haber puesto en libertad alrededor de la mitad de la CO_2 jamás emitida.
ACERCA DE ESTA HERRAMIENTA
LAS FUENTES DE DATOS
www.carbonmap.org/?lang=es#Historical

ANTECEDENTES

Superficie Población Riqueza

RESPONSABILIDAD

Extracción Emisiones Consumo Historial Reservas

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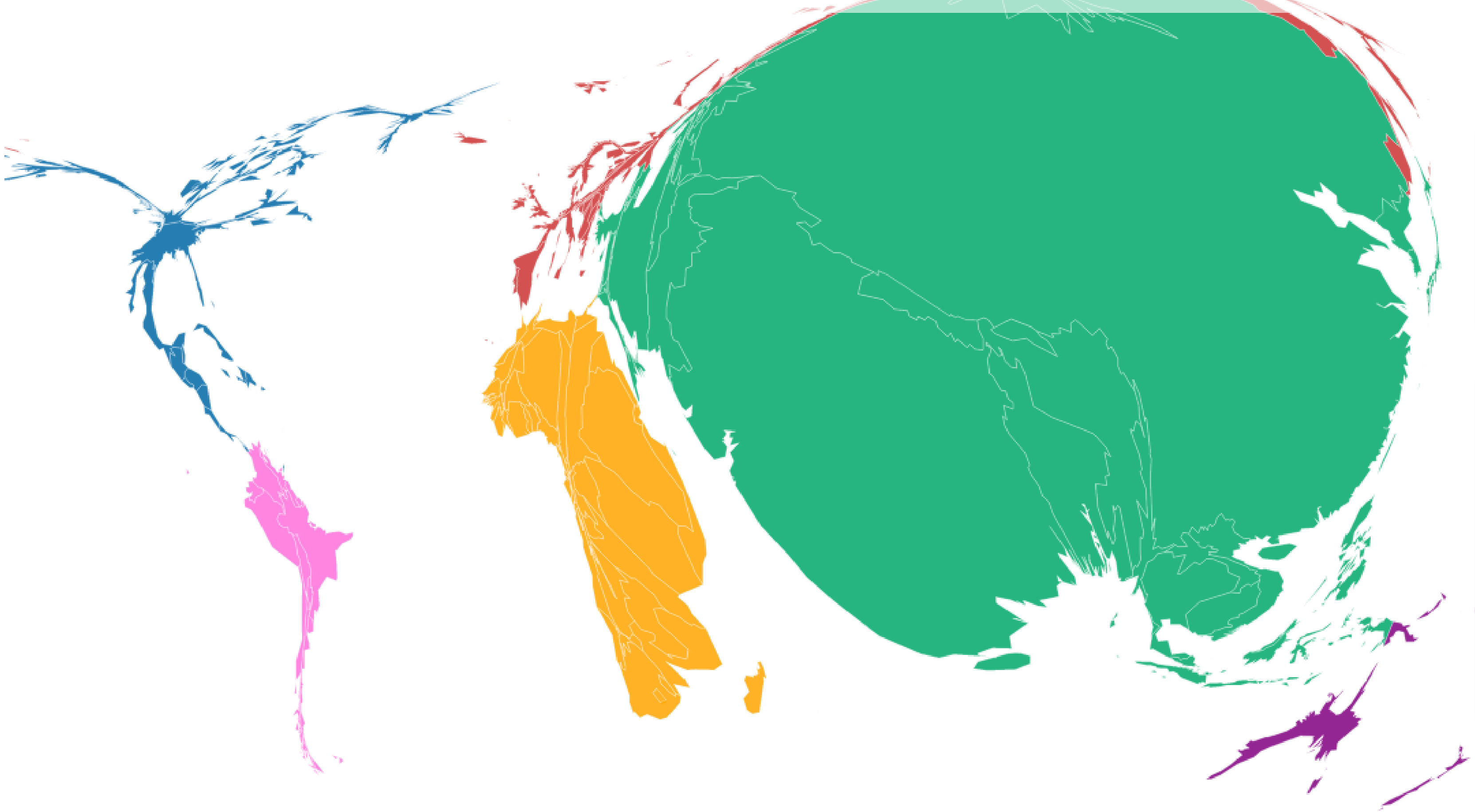

Sombreado por

Continentes

- Europa
- África
- Asia
- América del norte
- Sudamerica
- Oceanía

Este mapa

El tamaño de los países muestran que el número de **personas heridos, que quedaron sin hogar, desplazadas o que requieren ayuda de emergencia debido a las inundaciones, las sequías o las temperaturas extremas** en un año típico. Se espera que el cambio climático exacerbe muchas de estas amenazas.

ACERCA DE ESTA HERRAMIENTA

LAS FUENTES DE DATOS

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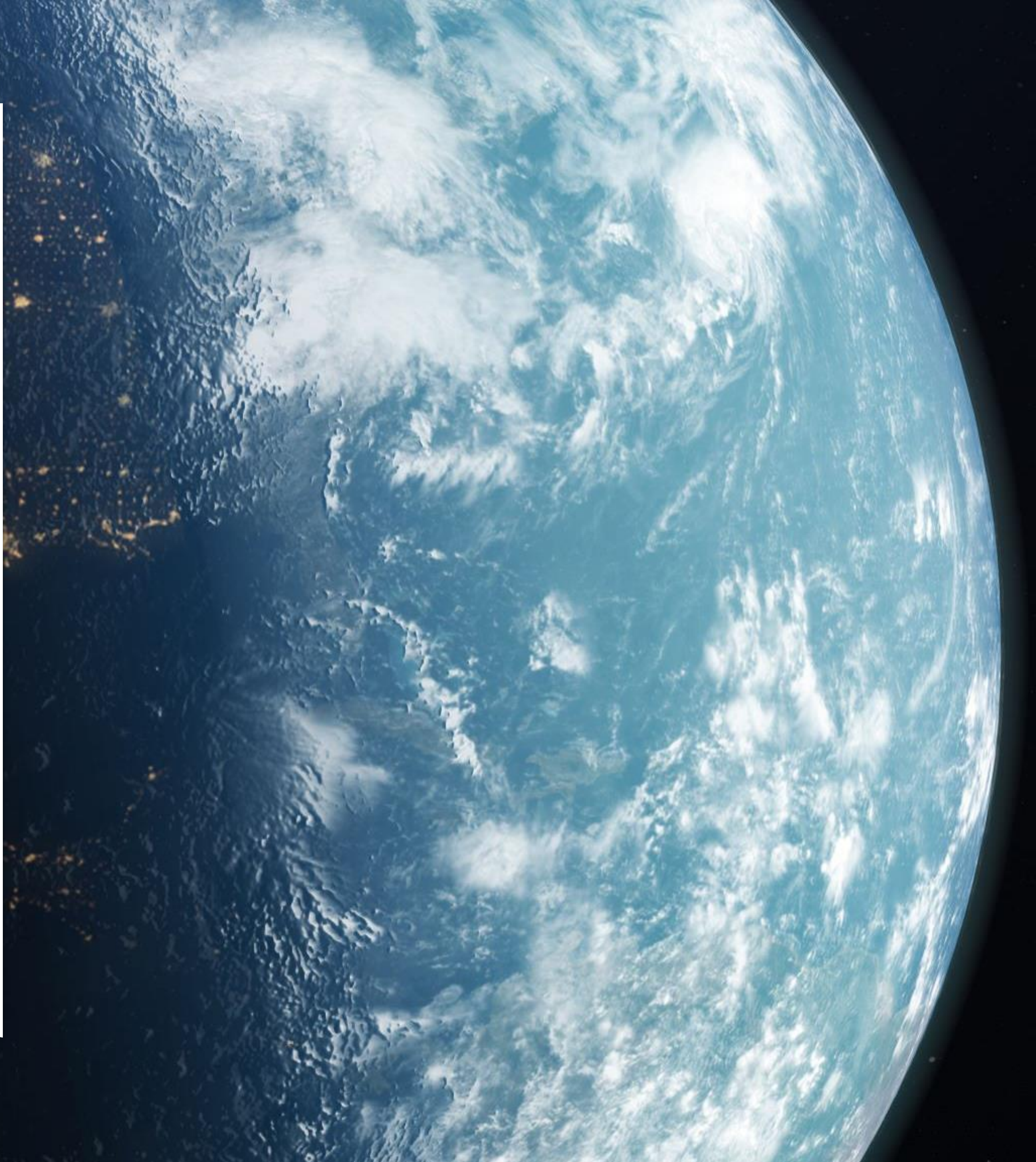
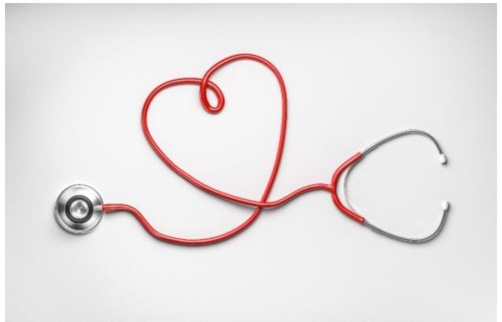


What can we do from a public health perspective?

Three important concepts:

1. Mitigation
2. Adaptation
3. Co-benefits



“Tackling climate change could be the greatest global health opportunity of the 21st century.”

Lancet 2015

https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(15)60931-X/fulltext

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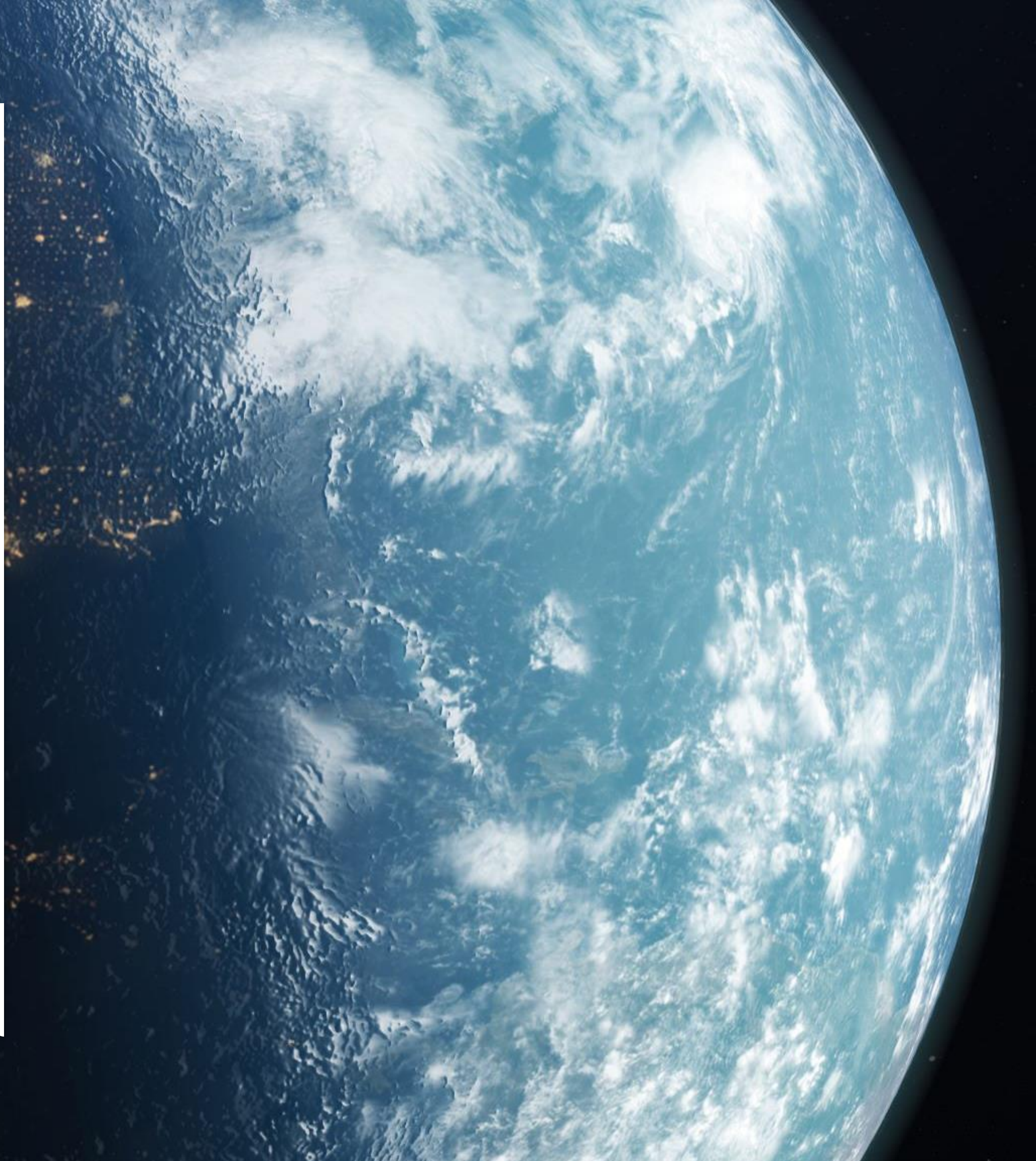

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COSTA RICA

2021
Año de las Universidades Públicas por la conectividad como derecho humano universal
Bicentenario de la Independencia de Costa Rica

Thank you for your attention!

Jennifer.crowe@una.cr

SALTRA
PROGRAMA SALUD, TRABAJO y AMBIENTE EN AMÉRICA CENTRAL

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COSTA RICA

Pan American Health Organization

World Health Organization
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Speakers

Dr Roberto G Lucchini
School of Public Health,
Florida International University, USA,
and University of Brescia, Italy

Dr. Lucchini received his medical degree from the University of Brescia, Italy, in 1987

He served as a

- MD at the Occupational Health Clinic of the Spedali Civili of Brescia, Italy.
- Professor of Occupational Medicine at the University of Brescia
- Director of the Division of Occupational and Environmental Medicine at the Icahn School of Medicine at Mount Sinai, New York.
- Director of the World Trade Center Data Center

Currently,

- Professor at the School of Public Health, Florida International University,
- Consulting for the Italian embassies in Washington, DC, USA and in Brasilia, Brazil as specialist in occupational health and safety for the covid-19 prevention and case management.
- Conducting studies on the risk factors for covid-19 disease severity and mortality, including occupational and environmental exposure to airborne particulates and air pollution.

Air Pollution and COVID-19 Risk

COVID-19 INCIDENCE AND EXCESS MORTALITY IN LOMBARDY, ITALY: AN ECOLOGICAL STUDY WITH FOCUS ON THE ROLE OF SOCIOECONOMIC AND ENVIRONMENTAL FACTORS

Roberto G Lucchini[1,2]

1) University of Brescia, Italy
2) Florida international University

Robert Stempel College of Public Health & Social Work

UNIVERSITY OF BRESCIA

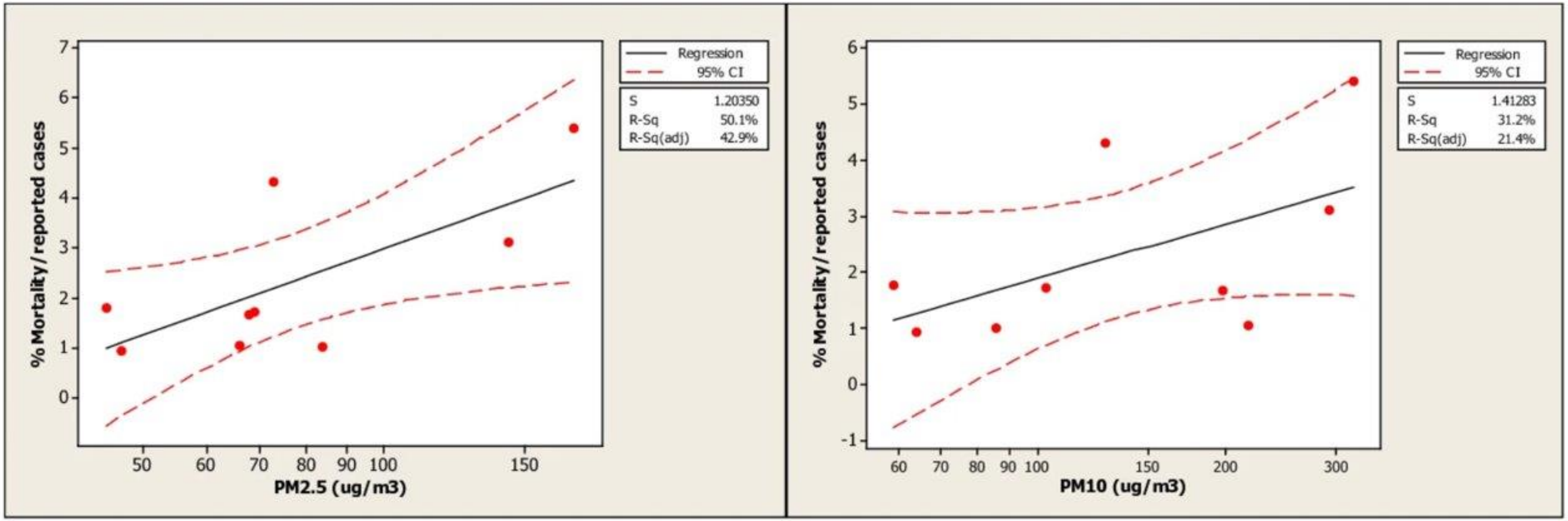
Environmental exposure to PM2.5 and PM10

Increasing literature shows that airborne particles may facilitate the virus diffusion and increase the risk for COVID-19 disease severity, progression and mortality

- Domingo et al., Influence of airborne transmission of SARS-CoV-2 on COVID-19 pandemic. A review. Environmental Research, Volume 188, September 2020,

- Wu, X et al. 2020. Air pollution and COVID-19 mortality in the United States: Strengths and limitations of an ecological regression analysis. *Science advances*, *6*, p.eabd4049

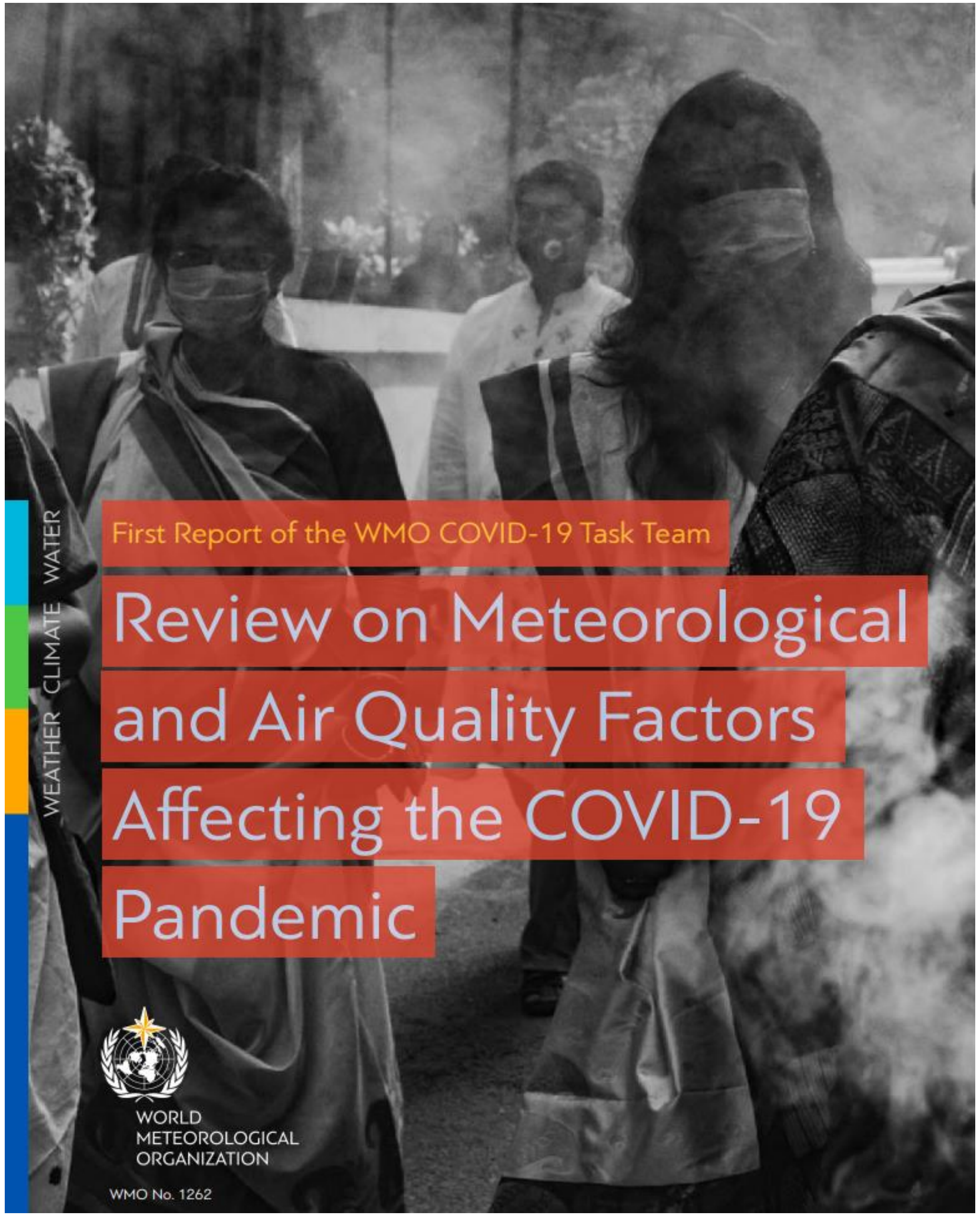
$PM_{2.5}$	PM_{10}



(a) **(b)**

Linear regression fitted line plots for **a** $PM_{2.5}$ and **b** PM_{10}

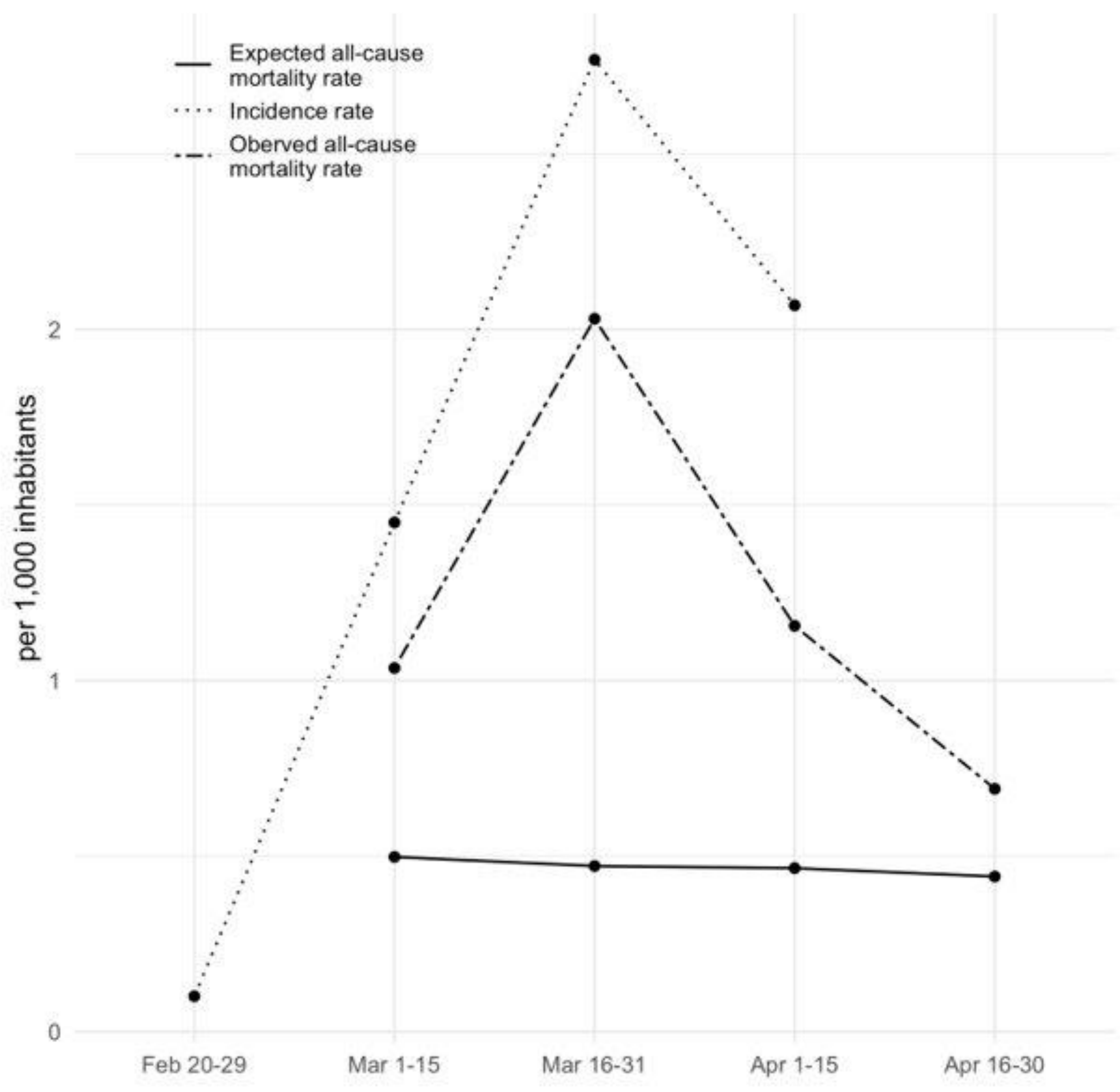
Gupta et al. **Air pollution aggravating COVID-19 lethality? Exploration in Asian cities using statistical models**. *Environment, Development and Sustainability* (2020)



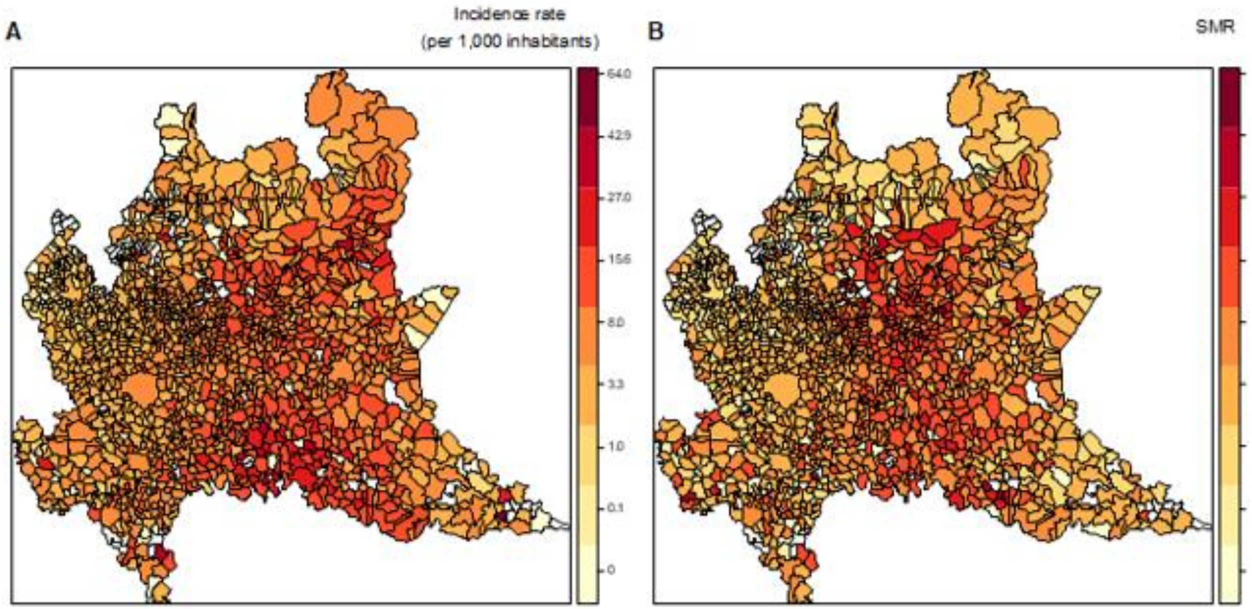
[doc_num.php (wmo.int)](doc_num.php (wmo.int))

Evidence of chronic and short-term exposure to air pollution exacerbating symptoms and increasing mortality rates consistent with early studies of COVID-19 mortality rates, but these results need to be confirmed and consolidated by controlling for individual-level risk factors.

Process-based modelling studies anticipate that COVID-19 transmission may become seasonal over time, suggesting Meterological and Air Quality factors may support monitoring and forecasting of COVID-19 in the coming months and years.



De Angelis et al. **COVID-19 incidence and excess mortality in Lombardy, Italy: an ecological study on the role of air pollution, meterological factors, demographic and socioeconomic variables.** Environ Res. 2021 Apr; 195: 110777. PMCID: PMC7826113



High COVD19 incidence and mortality in the industrial parts of the Lombardy region

	Mean (SD)	Median (Q1, Q3)
Number of observed deaths (Mar-Apr 2020)	27.3 (123.6)	11.0 (4.0, 25.0)
Number of expected deaths (Mar-Apr 2020)	11.0 (63.7)	4.4 (2.0, 9.8)
Standardized Mortality Ratio (SMR)	2.9 (2.2)	2.4 (1.5, 3.8)
Number of COVID-19 cases	41.5 (184.4)	16.0 (5.5, 40.0)
Demographic, socioeconomic and community variables		
Population size	6,495.7 (33826.1)	2,842.0 (1227.5, 6033.5)
Population density (inhabitants per Km2)	564.7 (787.9)	269.8 (101.0, 745.6)
Sex ratio	98.2 (5.4)	97.9 (95.0, 101.0)
Proportion of population over 75 years old	9.8 (3.3)	9.3 (7.7, 11.3)
Average family size	2.4 (0.2)	2.4 (2.3, 2.5)
House crowding index	0.4 (0.3)	0.3 (0.2, 0.5)
High to low education ratio	133.4 (48.8)	126.4 (100.8, 157.3)
Income per capita (€)	14,449.6 (2,770.6)	14,311.0 (12,824.2, 16,017.2)
Percentage of private mobility use	68.0 (7.3)	68.5 (63.6, 73.1)
Number of beds in nursing homes	43.0 (222.2)	0.0 (0.0, 60.0)
Distance to the closest hospital (meters)	5,976.6 (3856.1)	5,443.1 (3426.8, 8090.2)
# employees in bars, restaurants and catering per capita (per 1000 inhabitants)	16.9 (30.3)	11.2 (7.7, 16.9)
# employees in health and social assistance per capita (per 1000 inhabitants)	0.5 (0.6)	0.3 (0.0, 0.7)
# employees in sports, entertainment and recreational activities per capita (>0.9 vs ≤0.4 per 1000 inhabitants)	0.8 (0.0)	0.6 (0.0, 1.1)

	Mean (SD)	Median (Q1, Q3)
Meteorological factors		
Winter (Feb-Apr 2020) average temperature (°C)	7.6 (2.0)	8.3 (7.5, 8.7)
Winter (Feb-Apr 2020) average humidity (%)	68.7 (6.2)	68.7 (63.5, 75.1)
Estimates of recent and historical environmental PM concentrations		
Recent (Nov-Dec 2019) PM2.5 (µg/m3)†	18.9 (5.3)	19.4 (16.9, 21.8)
Recent (Nov-Dec 2019) PM10 (µg/m3)†	21.6 (6.3)	22.5 (18.6, 25.7)
Historical winter PM2.5 (µg/m3)§	27.3 (8.3)	28.7 (23.2, 32.9)
Historical yearly PM2.5 (µg/m3)	18.6 (4.8)	19.8 (15.6, 22.1)
Historical winter PM10 (µg/m3)§	31.1 (8.5)	32.6 (26.2, 37.2)
Historical yearly PM10 (µg/m3)	21.8 (5.4)	22.7 (18.2, 25.8)
Average annual $PM_{2.5}$ (µg/m^3)	18.6 (4.8)	19.8 (15.6, 22.1)
Average annual PM_{10} (µg/m3)	21.8 (5.4)	22.7 (18.2, 25.8)
Average annual NO2 (µg/m3)	33.0 (13.0)	33.0 (25.5, 40.0)

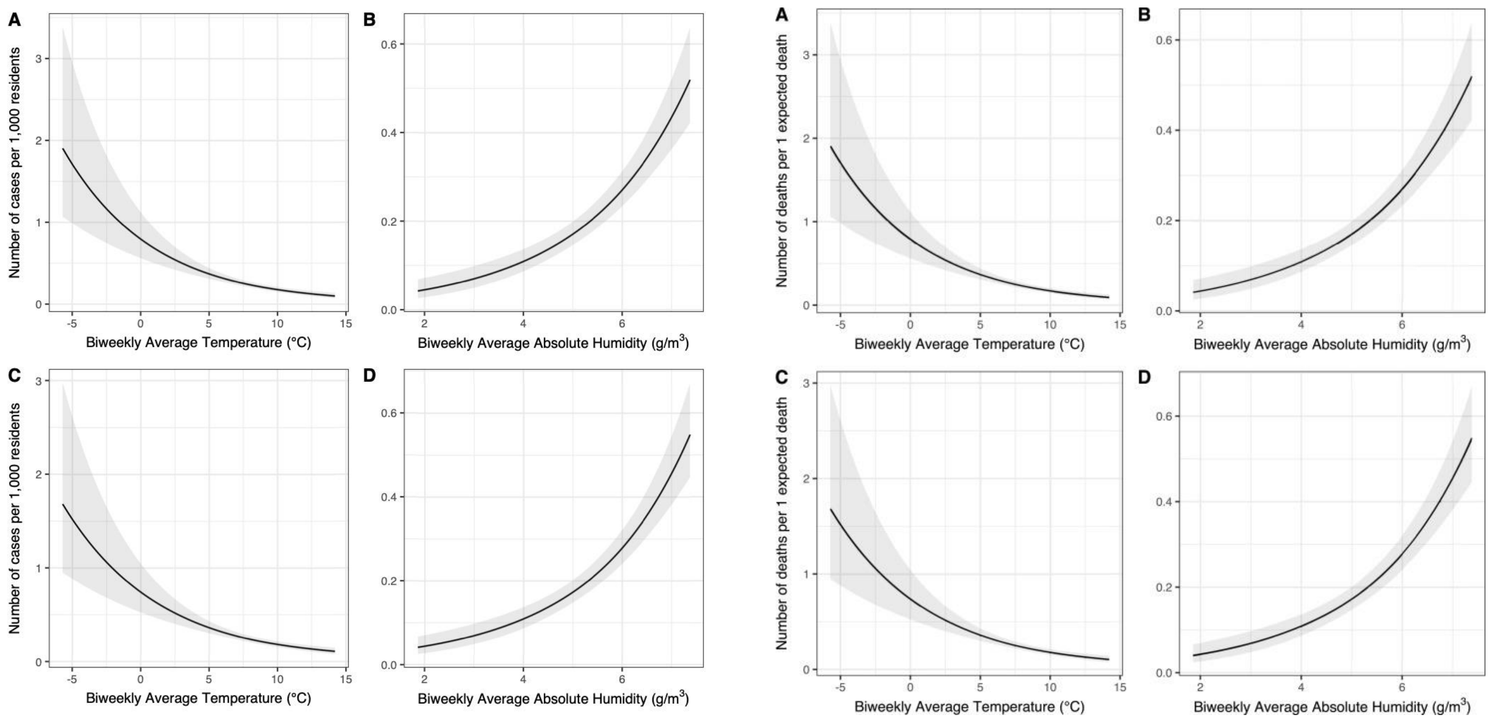
[univariate negative binomial mixed effect models]	Incidence Rate Ratio	95% CI	p-value
Recent and historical estimates of environmental PM concentrations			
Recent (Nov-Dec 2019) PM2.5 (μg/m^3)†	0.98	0.94 – 1.03	0.43
Recent (Nov-Dec 2019) PM10 (μg/m^3)†	1.08	1.03 – 1.13	<0.01
Historical winter PM2.5 (μg/m^3)§	1.01	0.97 – 1.06	0.59
Historical yearly PM2.5 (μg/m^3)	1.12	1.07 – 1.18	<0.01
Historical winter PM10 (μg/m^3)§	1.04	0.99 – 1.09	0.11
Historical yearly PM10 (μg/m^3)	1.11	1.06 – 1.17	<0.01
Pre-lockdown estimates of environmental PM concentrations			
Pre-lockdown (Jan-Feb 2020) PM2.5 (μg/m^3)‡	1.13	1.08 – 1.18	<0.01
Pre-lockdown (Jan-Feb 2020) PM10 (μg/m^3)‡	1.08	1.03 – 1.13	<0.01

[univariate negative binomial mixed effect models]	SMR	95% CI	p-value
Recent and historical estimates of environmental PM concentrations			
Recent (Nov-Dec 2019) PM2.5 ($\mu g/m^3$)†	1.02	0.98 – 1.06	0.27
Recent (Nov-Dec 2019) PM10 ($\mu g/m^3$)†	1.06	1.02 – 1.10	<0.01
Historical winter PM2.5 ($\mu g/m^3$)§	1.05	1.02 – 1.09	<0.01
Historical yearly PM2.5 ($\mu g/m^3$)	1.10	1.06 – 1.14	<0.01
Historical winter PM10 ($\mu g/m^3$)§	1.06	1.02 – 1.10	<0.01
Historical yearly PM10 ($\mu g/m^3$)	1.08	1.05 – 1.12	<0.01
Pre-lockdown estimates of environmental PM concentrations			
Pre-lockdown (Jan-Feb 2020) PM2.5 ($\mu g/m^3$)‡	1.09	1.05 – 1.13	<0.01
Pre-lockdown (Jan-Feb 2020) PM10 ($\mu g/m^3$)‡	1.03	1.00 – 1.07	0.09

	Model with PM2.5			Model with PM10		
	IRR*	95% CI	p-value	IRR*	95% CI	p-value
Demographic, socioeconomic and community variables						
Population size†	0.90	0.83 – 0.98	0.01	0.90	0.83 – 0.98	0.01
Population density†	0.92	0.83 – 1.01	0.07	0.92	0.84 – 1.01	0.10
Sex ratio‡	0.99	0.94 – 1.05	0.83	1.00	0.94 – 1.05	0.87
Proportion of population over 75 years old‡	1.08	1.01 – 1.15	0.02	1.09	1.02 – 1.16	0.01
Average family size‡	1.01	0.95 – 1.08	0.79	1.03	0.97 – 1.10	0.33
House crowding index (high vs low)	0.93	0.84 – 1.03	0.19	0.92	0.83 – 1.02	0.12
High to low education ratio†	0.76	0.72 – 0.81	<0.01	0.76	0.72 – 0.81	<0.01
IRPEF per capita‡	1.19	1.12 – 1.27	<0.01	1.18	1.11 – 1.26	<0.01
Percentage of private mobility use‡	0.85	0.81 – 0.88	<0.01	0.85	0.81 – 0.89	<0.01
Number of beds in nursing homes (> 80 vs 0)	1.49	1.32 – 1.69	<0.01	1.49	1.32 – 1.68	<0.01
Distance to the closest hospital‡	0.92	0.87 – 0.97	<0.01	0.92	0.88 – 0.97	<0.01
Number of employees in bars, restaurants and mobile catering activities per capita (>14 vs ≤9 per 1000 inhabitants)	1.11	1.00 – 1.23	0.04	1.12	1.02 – 1.24	0.02
Number of employees in health and social assistance activities per capita (>0.6 vs 0 per 1000 inhabitants)	1.02	0.92 – 1.14	0.70	1.02	0.92 – 1.14	0.66
Number of employees in sports, entertainment and recreational activities per capita (>0.9 vs ≤0.4 per 1000 inhabitants)	1.18	1.07 – 1.30	<0.01	1.18	1.07 – 1.31	<0.01
Air pollutants concentrations						
PM (per 10 μg/m³)	1.58	1.31 – 1.90	<0.01	1.34	1.16 – 1.55	<0.01
NO_2 (per 10 μg/m³)	0.93	0.88 – 0.99	0.02	0.95	0.89 – 1.00	0.07

	Model with PM2.5			Model with PM10		
	SMR*	95% CI	p-value	SMR*	95% CI	p-value
Demographic, socioeconomic and community variables						
Population size†	0.92	0.86 – 0.98	0.01	0.92	0.86 – 0.98	0.01
Population density†	1.12	1.04 – 1.22	<0.01	1.13	1.04 – 1.22	<0.01
Sex ratio‡	1.00	0.96 – 1.04	0.97	1.00	0.96 – 1.05	0.99
Proportion of population over 75 years old‡	1.01	0.96 – 1.06	0.76	1.01	0.96 – 1.07	0.75
Average family size‡	1.00	0.95 – 1.06	0.98	1.01	0.96 – 1.07	0.63
House crowding index (high vs low)	0.95	0.87 – 1.03	0.22	0.94	0.87 – 1.03	0.18
High to low education ratio†	0.75	0.72 – 0.79	<0.01	0.75	0.72 – 0.89	<0.01
IRPEF per capita‡	1.16	1.10 – 1.22	<0.01	1.15	1.09 – 1.21	<0.01
Percentage of private mobility use‡	0.93	0.90 – 0.96	<0.01	0.93	0.90 – 0.96	<0.01
Number of beds in nursing homes (> 80 vs 0)	1.27	1.16 – 1.40	<0.01	1.27	1.16 – 1.40	<0.01
Distance to the closest hospital‡	0.98	0.95 – 1.02	0.44	0.99	0.95 – 1.03	0.49
Number of employees in bars, restaurants and mobile catering activities per capita (>14 vs ≤9 per 1000 inhabitants)	1.12	1.03 – 1.22	<0.01	1.13	1.04 – 1.23	<0.01
Number of employees in health and social assistance activities per capita (>0.6 vs 0 per 1000 inhabitants)	0.96	0.88 – 1.06	0.43	0.96	0.88 – 1.05	0.42
Number of employees in sports, entertainment and recreational activities per capita (>0.9 vs ≤0.4 per 1000 inhabitants)	1.15	1.06 – 1.25	<0.01	1.15	1.06 – 1.25	<0.01
Air pollutants concentrations						
PM (per 10 $\mu g/m^3$)	1.23	1.05 – 1.44	<0.01	1.06	0.94 – 1.20	0.31
NO_2 (per 10 $\mu g/m^3$)	0.94	0.90 – 0.99	0.01	0.96	0.92 – 1.01	0.08

Lower temperature and higher humidity increase the COVID 19 incidence and mortality rates



COVID-19 increased risk estimates

Lombardy study

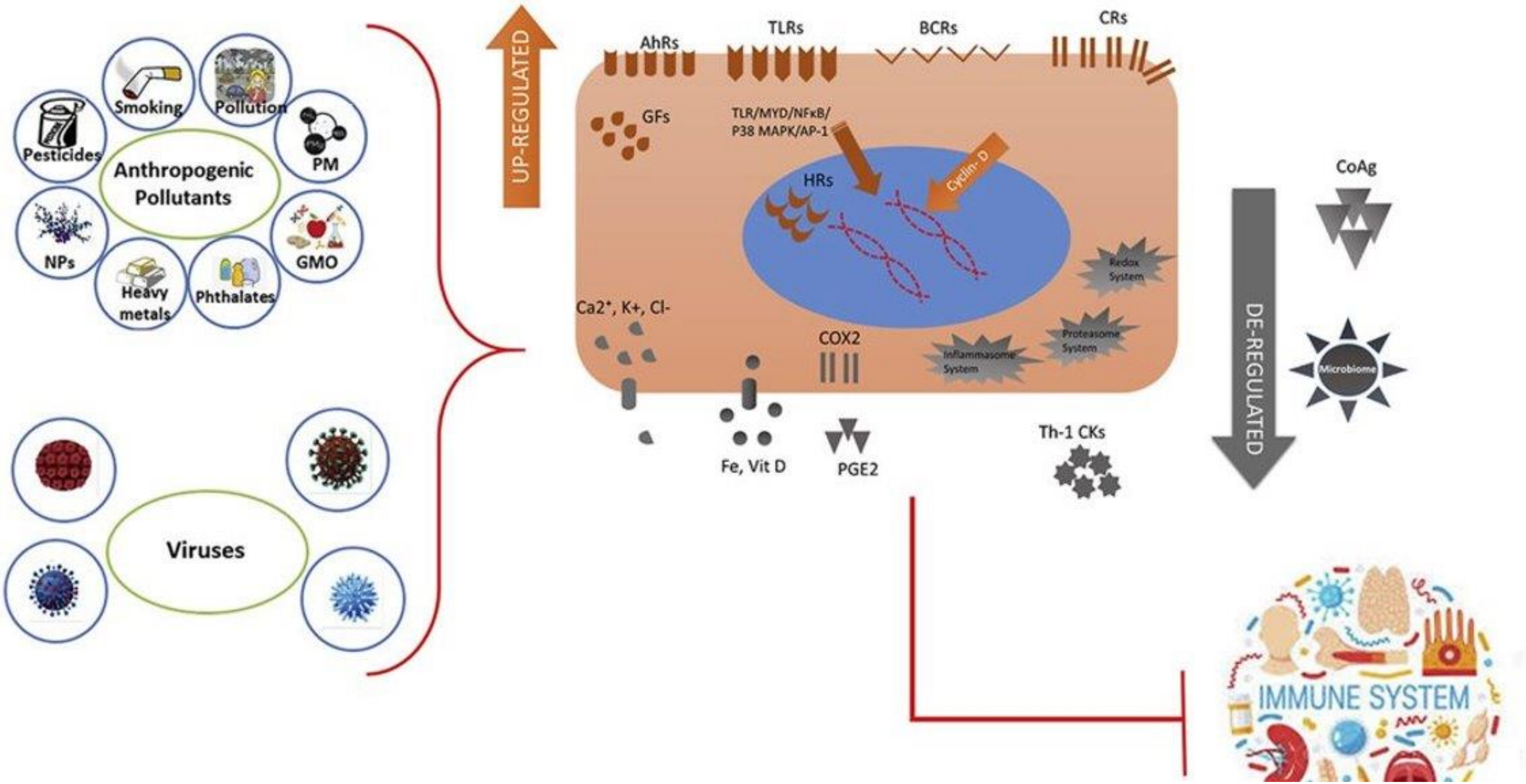
- An increase of 10 $\mu g/m^3$ in the mean annual concentrations of $PM_{2.5}$ and PM_{10} over the previous years was associated with a 58% and 34% increase in COVID-19 incidence rate, respectively.
- Similarly, a 10 $\mu g/m^3$ increase of annual mean $PM_{2.5}$ concentration was associated with a 23% increase in all-cause mortality.

USA study (Wu et al., 2020)

- increase of 1 $\mu g/m^3$ in $PM_{2.5}$ associated with **8%** increase in the COVID-19 death rate (95% CI: 2%, 15%)

Tsatsakis et al. COVID-19, an opportunity to reevaluate the correlation between long-term effects of anthropogenic pollutants on viral epidemic/pandemic events and prevalence Food and Chemical Toxicology, Volume 141, July 2020, 111418 https://doi.org/10.1016/j.fct.2020.111418

- Developmental and long-term low-dose exposure to chemical mixtures (fossil fuel derivatives, exposure to particle matters, metals, UV–B radiation, ionizing radiation) is linked to imunodeficiency
- Immunodeficiency contributes to chronic diseases and the current Covid-19 pandemics
- Environmental chemicals and microorganisms may share similar molecular pathomechanisms: Aryl hydrocarbon receptors (AhR) pathway



Smoking
Pollution
Pesticides
PM
Anthropogenic Pollutants
NPs
GMO
Heavy metals
Phthalates
Viruses
UP-REGULATED
AhRs
TLRs
BCRs
CRs
GFs
TLR/MYD/NFκB/
P38 MAPK/AP-1
HRs
Cyclin- D
Redox System
Ca2+, K+, Cl-
COX2
Inflammasome System
Proteasome System
Fe, Vit D
PGE2
Th-1 CKs
CoAg
DE-REGULATED
Microbiome
IMMUNE SYSTEM

CONCLUSION

- Significant contribution of pre-lockdown PM2.5 to the incidence of severe COVID19 disease in Lombardy, Northern Italy
- In the highly industrialized provinces of Brescia and Bergamo, where mining, steel and metallurgic operations are active since last century
- Small increases of PM contribute to COVID19 disease and mortality worldwide
- Limitation: ecological design, lack of data on occupational exposure
- Need for cohort studies to improve exposure metrics and address preexisting comorbidities
- Need to include occupational exposure and to investigate among workers with occupational lung disease

Upcoming Webinars

Date	Topics
29 April, 2021	Considerations and Interrelationships between Development, Economy and Pandemics from One Health Perspective
27 May, 2021	Vaccines and Treatments for COVID-19: Progress Since 2020
24 June, 2021	Epidemiology of COVID-19 and Risk Communication Approaches

Note: Topics and schedule is subject to changes, please refer to CIH websites for the announcements and speakers

Webinar Recording will be available via:

www.cih.lmu.de