

CIBERTIC²⁰²⁵

Por CUDI

Congreso Internacional de Ciberseguridad,
Tecnologías, Innovación y Ciencia

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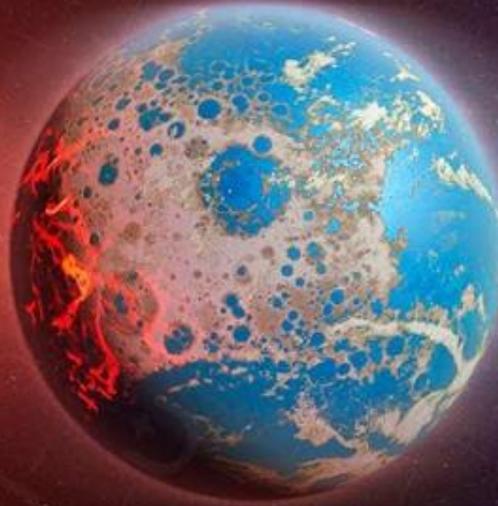
Hotel Barceló

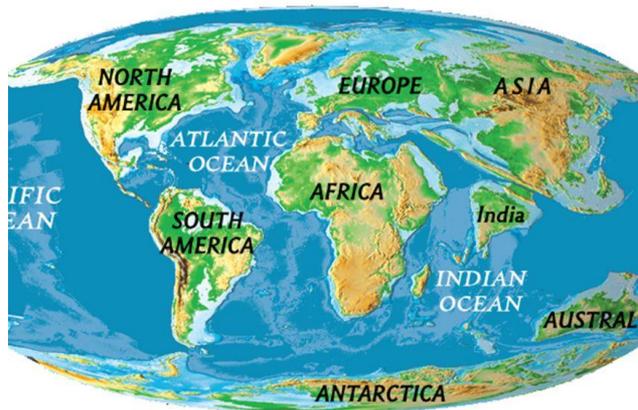
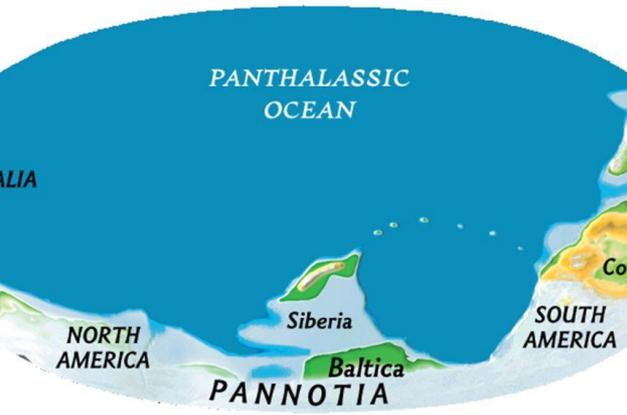
Innovar para cuidar: cambio climático, inteligencia artificial y colaboración global en salud pública

Una mirada interdisciplinaria para enfrentar los desafíos sanitarios del siglo XXI



HISTORY OF EARTH

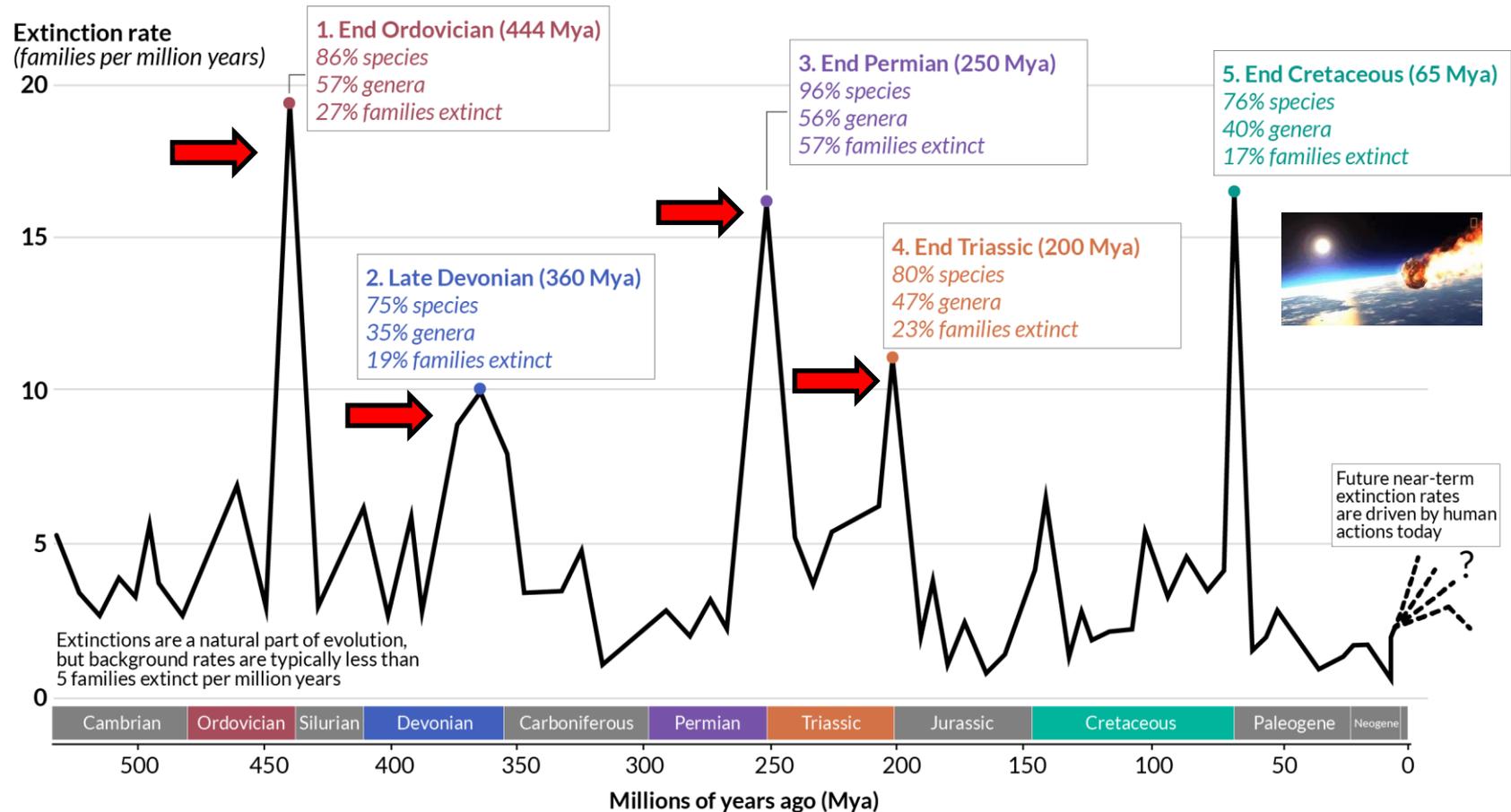






'Big Five' Mass Extinctions in Earth's History

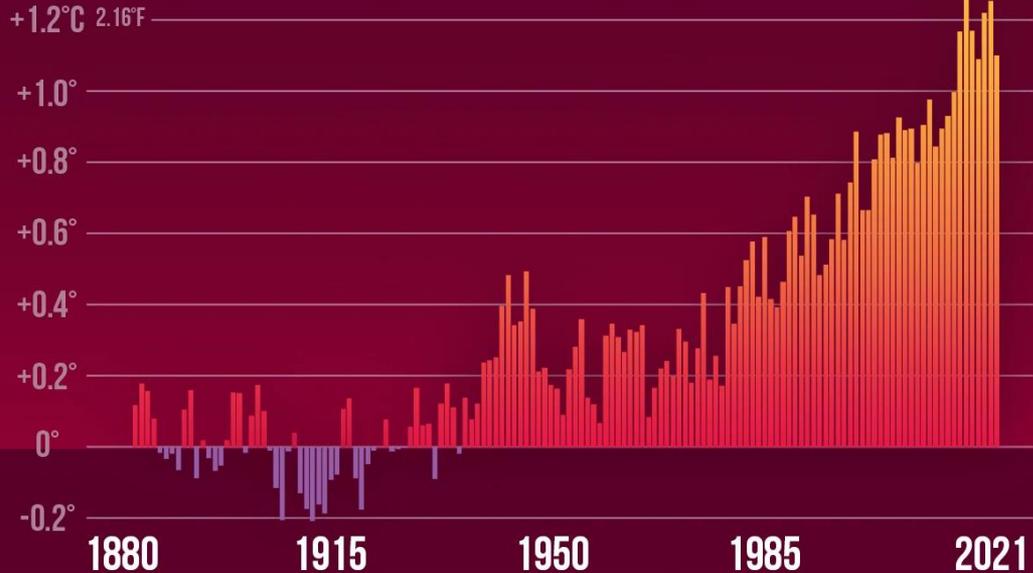
A mass extinction is defined by the loss of at least 75% of species within a short period of time (geologically, this is around 2 million years).



Calentamiento Global vs. Cambio Climático

El **calentamiento global** se refiere al calentamiento a largo plazo del planeta.

GLOBAL TEMPERATURE DEPARTURE FROM 1881-1910 AVERAGE



Source: NASA GISS & NOAA NCEI global temperature anomalies averaged and adjusted to early industrial baseline (1881-1910). Data as of 1/13/2022.

CLIMATE CENTRAL

¿Qué es el Cambio Climático?



El **cambio climático** se refiere a la gama más amplia de cambios que están ocurriendo en nuestro planeta.



CLIMATE RISKS: 1.5°C VS 2°C GLOBAL WARMING

EXTREME WEATHER

100% increase in flood risk. VS **170%** increase in flood risk.

SPECIES

6% of insects, **8%** of plants and **4%** of vertebrates will be affected. VS **18%** of insects, **16%** of plants and **8%** of vertebrates will be affected.

WATER AVAILABILITY

350 million urban residents exposed to severe drought by 2100. VS **410 million** urban residents exposed to severe drought by 2100.

ARCTIC SEA ICE

Ice-free summers in the Arctic at least once **every 100 years.** VS Ice-free summers in the Arctic at least once **every 10 years.**

PEOPLE

9% of the world's population (700 million people) will be exposed to extreme heat waves at least once every 20 years. VS **28%** of the world's population (2 billion people) will be exposed to extreme heat waves at least once every 20 years.

SEA-LEVEL RISE

46 million people impacted by sea-level rise of 48cm by 2100. VS **49 million people** impacted by sea-level rise of 56cm by 2100.

OCEANS

Lower risks to marine biodiversity, ecosystems and their ecological functions and services at 1.5°C compared to 2°C.

CORAL BLEACHING

70% of world's coral reefs are lost by 2100. VS Virtually **all coral reefs** are lost by 2100.

COSTS

Lower economic growth at 2°C than at 1.5°C for many countries, particularly low-income countries.

FOOD

Every half degree warming will consistently lead to lower yields and lower nutritional content in tropical regions.

Efectos del cambio climático.

Climate change

Health risk

Vulnerability factors

- Demographic
- Geographical
- Biological factors & health status
- Sociopolitical
- Socioeconomic
- Health system capacity
- Gender & equity

Climate-related hazards

- Extreme weather events
- Heat
- Sea level rise
- Air pollution
- Vector distribution & ecology
- Water scarcity
- Reduced food production

Exposure

- People & communities
- Health workforce
- Infrastructure
- Energy systems
- Water systems
- Food systems
- Health systems

Environmental threats and GHG emissions

Health outcomes



Injury and mortality from extreme weather events



Heat-related illness



Respiratory illness



Water-borne diseases and other water-related health impacts



Zoonoses



Vector-borne diseases



Malnutrition and food-borne diseases



Noncommunicable diseases (NCDs)



Mental and psychosocial health



Impacts on health care facilities



Effects on health systems

Health systems & facilities

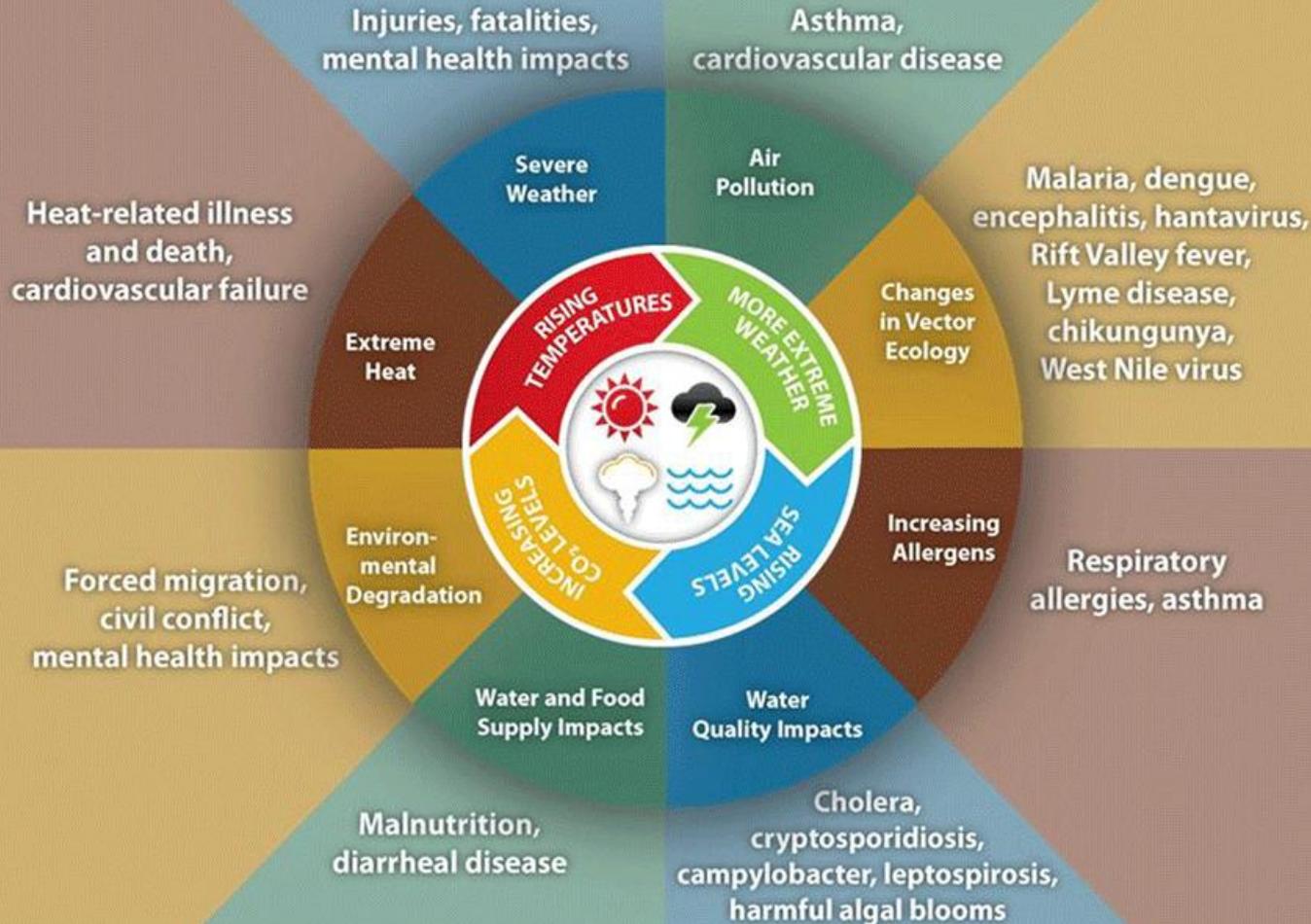
Impacto del cambio climático sobre la salud pública

Expected impacts of climate change in 2050



Impactos del cambio climático en Latinoamérica

Impact of Climate Change on Human Health



Impactos del cambio climático en términos de salud pública en Latinoamérica

El papel de la tecnología

- Teledetección y monitoreo satelital para prevenir y gestionar riesgos climáticos
- Modelos predictivos con inteligencia artificial para anticipar brotes sanitarios
- Sistemas de Información Geográfica (SIG) para análisis territorial y toma de decisiones
- Plataformas digitales para vigilancia epidemiológica en tiempo real
- Ciberseguridad y gobernanza de datos sanitarios

HOW GIS HELPS IN CLIMATE CHANGE STUDIES

GIS IN CLIMATE CHANGE: TRACKING A WARMING PLANET

📌 Why Use GIS in Climate Studies ?
GIS helps scientists analyze environmental changes, track temperature shifts, and predict future climate impacts using geospatial data.

🔧 KEY GIS APPLICATIONS IN CLIMATE CHANGE STUDIES

1 Temperature Change Monitoring 📈

- GIS analyzes historical & real-time temperature data to detect warming trends.
- Helps track heat islands in urban areas and global warming effects.



2 Sea Level Rise & Coastal Erosion 🌊

- Uses satellite data & digital elevation models (DEM) to monitor rising sea levels.
- Predicts which coastal cities are at risk of flooding.



3 Deforestation & Carbon Storage 🌳

- GIS tracks forest loss & greenhouse gas emissions.
- Helps design reforestation & carbon offset projects.



4 Extreme Weather & Natural Disasters ⚡

- Maps storm patterns, drought zones, and wildfire-prone areas.
- Helps governments plan disaster response strategies.



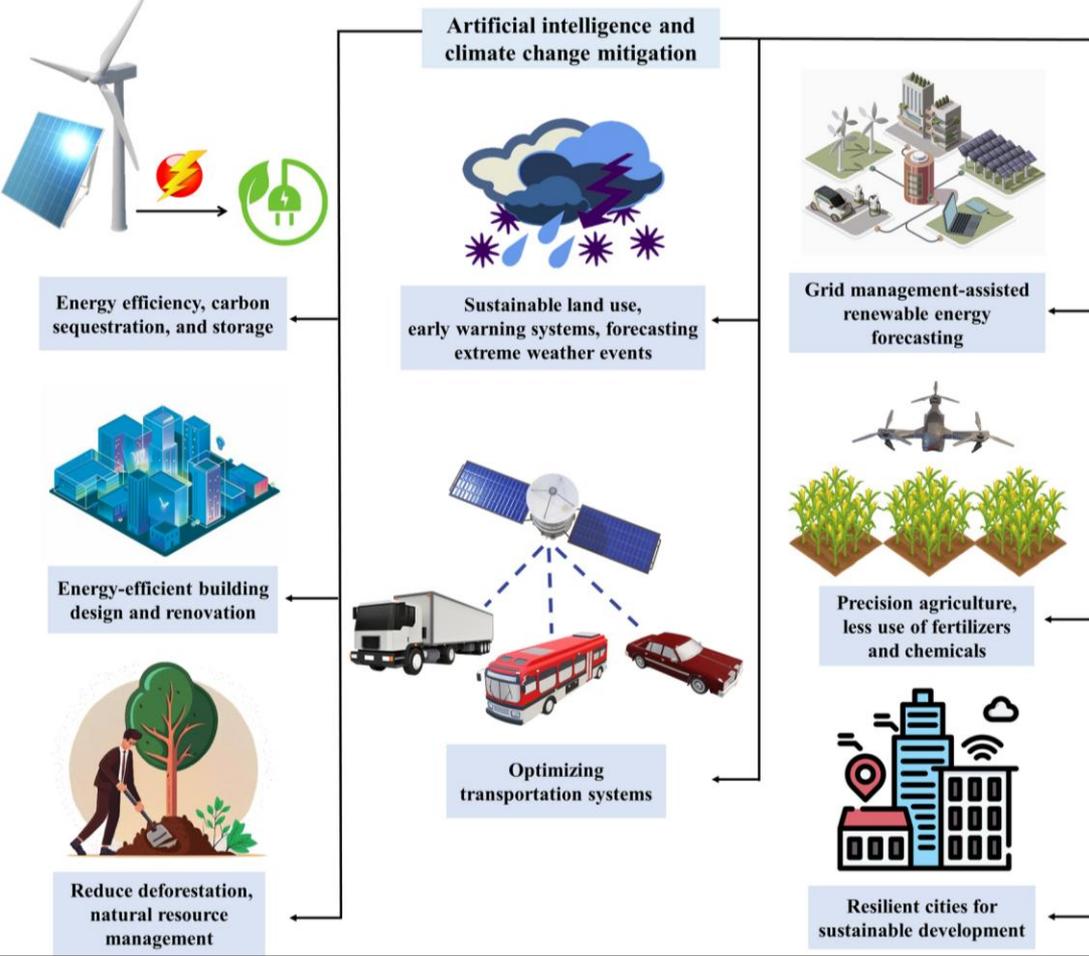
Real-World GIS Applications in Climate Studies

- Antarctica Ice Sheet Monitoring – GIS tracks glacial melting rates.
- Urban Climate Adaptation – Helps cities develop heat-resistant infrastructure.
- Renewable Energy Planning – Identifies optimal locations for solar & wind farms.

🌟 **FUN FACT: NASA & NOAA USE GIS TO CREATE GLOBAL CLIMATE MODELS PREDICTING FUTURE CLIMATE SHIFTS !**



Aplicaciones de Inteligencia Artificial



- Predicción de expansión de enfermedades vectoriales según condiciones ambientales
- Análisis de grandes volúmenes de datos climáticos y sanitarios
- Soporte a decisiones clínicas en eventos de emergencia
- Reconocimiento de patrones y alertas tempranas en zonas de riesgo
- Apoyo a la planificación de recursos sanitarios frente a eventos extremos

Colaboración global y ciencia ciudadana

- Integración de redes regionales de monitoreo (ej. Academia Copernicus México)
- Recolección de datos a través de plataformas abiertas y participativas
- Fortalecimiento de capacidades locales en tecnología aplicada
- Difusión de buenas prácticas y estandarización de protocolos
- Involucramiento ciudadano para vigilancia y respuesta comunitaria

Red **CLARA**

Cooperación Latino Americana
de Redes Avanzadas



Conclusiones

- El cambio climático es una amenaza creciente para la salud pública, especialmente en regiones vulnerables.
- La tecnología, especialmente la inteligencia artificial y los SIG, ofrece herramientas clave para anticipar, responder y planificar.
- La colaboración interinstitucional y la participación social son esenciales para enfrentar estos desafíos de manera efectiva y sostenible.

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