

# Global Climate Change and Health

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**At the 2023 Legislative Event**

**Texas United Women in Faith and Texas Impact**

**January 30, 2023**

# Global Climate Change and Health

- **BLOCK 1: Climate Change – Historical Underpinnings**
- **BLOCK 2: Climate Change – Precursors, Drivers, Health Connections**
- **BLOCK 3: Extreme Heat and Health: Texas Focus**

## BLOCK 1

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# Global Climate Change: Historical underpinnings and the birth of a new Epoch

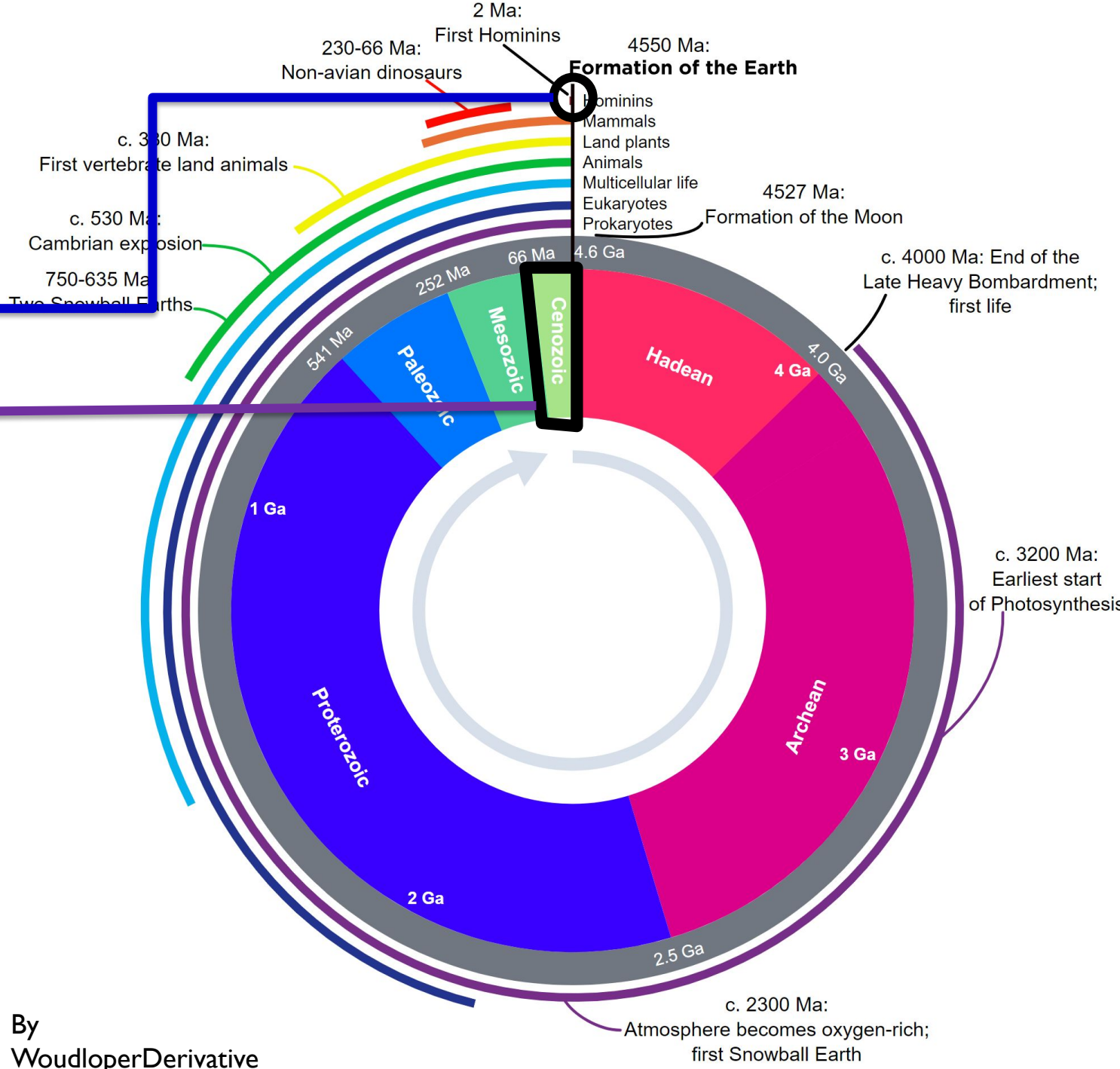
# “In 3 Seconds”



Three Seconds,” Spencer Sharp, Film4Climate Global Video Competition

The wise one...(?)

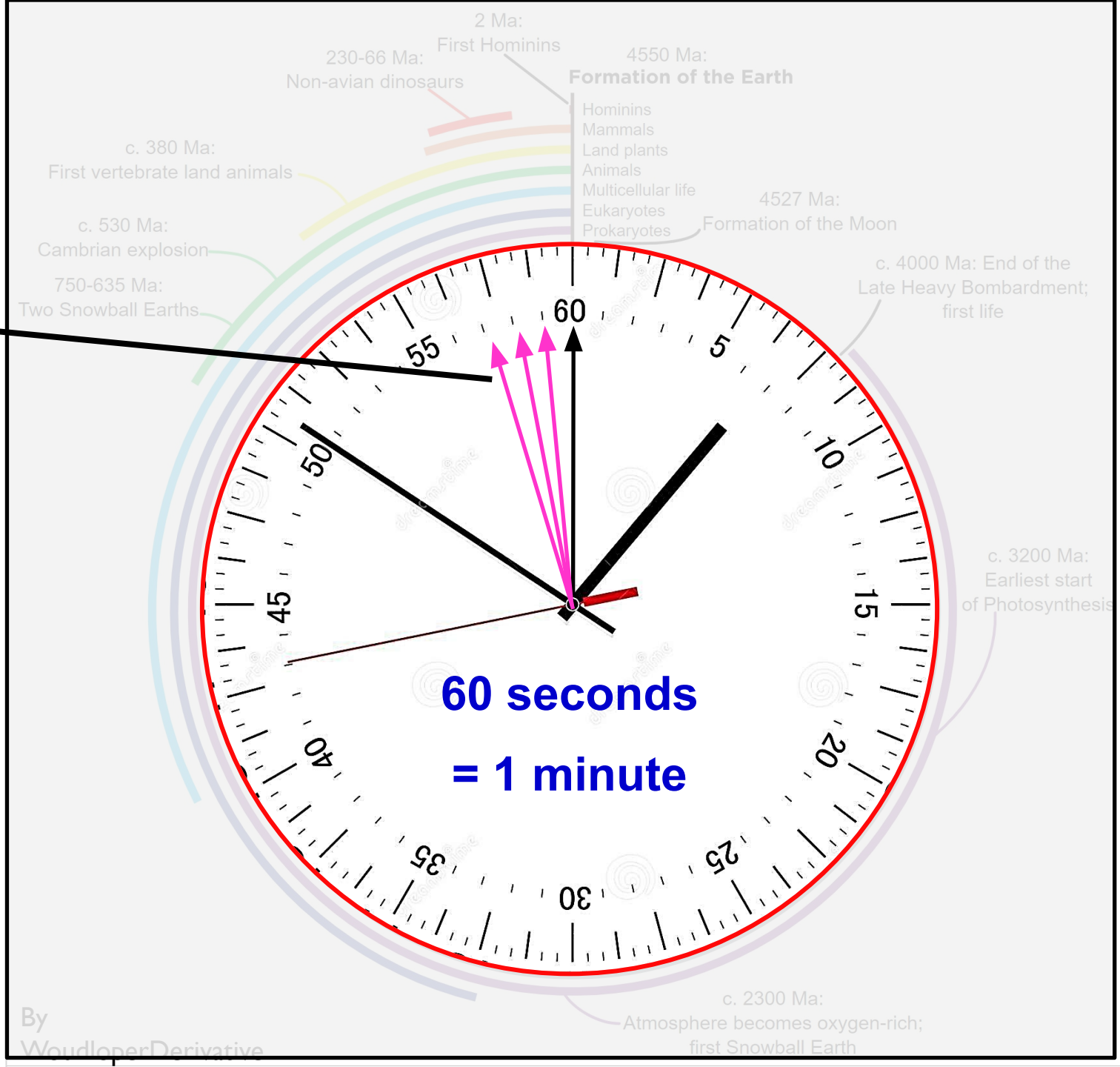
Era	Period & Subperiod	Epoch & Subepoch	Age	Age (Ma)	GSSP
Cenozoic	Quaternary	Holocene		0.012	NGRIP, Greenland Vrica, Calabria, Italy
		Pleistocene	L	'Tarantian'	
			M	'Ionian'	
			Early	'Calabrian'	
	Tertiary	Neogene	Pliocene	Gelasian	Monte San Nicola, Sicily
				Piacenzian	
				Zanclean	
				Messinian	
				Tortonian	
		Miocene		Serravalian	
				Langhian	
				Burdigalian	
				Aquitanian	
				23.03	
		Oligocene		Chatian	
				Rupelian	
				33.9	
		Eocene		Priabonian	El Kef, Tunisia
				Bartonian	
				Lutetian	
				Ypresian	
	Paleogene	Paleocene		Thauetian	
				Selandian	
				61.7	
				Danian	
				65.5	



By WoudloperDerivative

The wise one...(?)

Era	Period & Subperiod	Epoch & Subepoch	Age	Age (Ma)	GSSP
Cenozoic	Quaternary	Holocene		0.012	NGRIP Greenland Calabria, Italy
				0.126	
		Pleistocene	L	'Iarantian'	
			M	'Ionian'	
			Y	'Calabrian'	
	Cenozoic	Pliocene		1.806	Monte San Nicola, Sicily
				2.588	
				3.600	
				5.332	
				7.246	
		Miocene		11.608	
				13.65	
				15.97	
				20.43	
				23.03	
		Oligocene		28.4	
				33.9	
				37.2	
				40.4	
				48.6	
		Eocene		55.8	
				58.7	
				61.7	
				65.5	



# The birth of a new Epoch...Are we there yet?

**Quaternary Period with the Holocene Epoch**

Eonothem/ Eon	Erathem/ Era	System/ Period	Series/ Epoch	Stage/ Age	millions of years ago
Phanerozoic ↑ ↓	Cenozoic ↑ ↓	Quaternary ↑ ↓	Anthropocene <sup>1</sup>		1950 CE
			Holocene		0.0117
			Pleistocene	Upper	0.126
				Middle	0.781
				Calabrian	1.806
				Gelasian	2.588

## The Holocene Epoch:

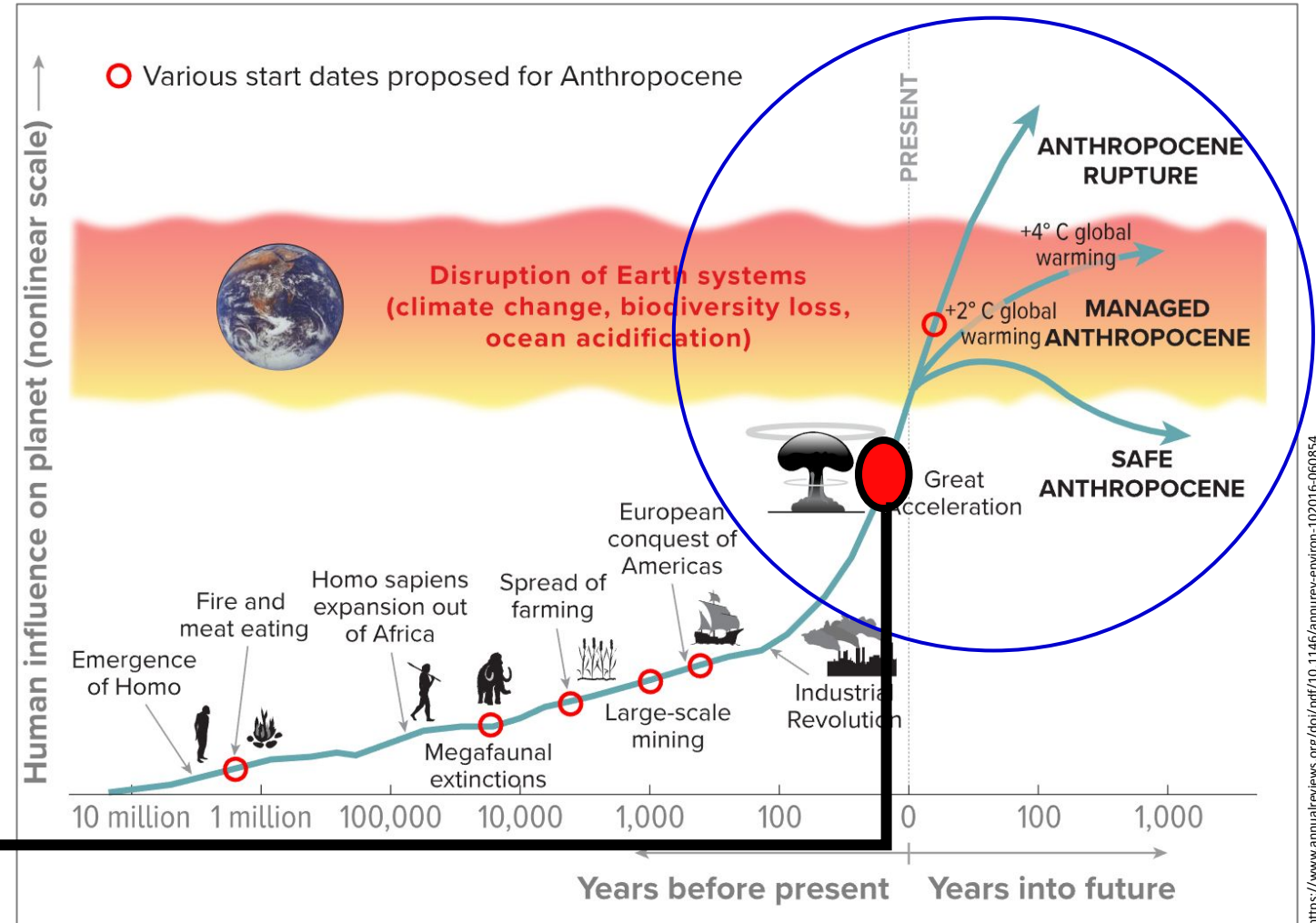
- Holocene has witnessed all of humanity's recorded history
- development of human knowledge & technology
- Humanity has greatly influenced the Holocene environment
  - Increase in mean global temperatures
  - Habitat destruction, pollution
  - ongoing mass extinction of plant and animal species



# Defining the start of a new Epoch: The *Anthropocene*

- The **current geological age**, viewed as the period during which human activity has been the dominant influence on climate and the environment.

...placed in the mid-20th century coinciding with and resulting from the **'Great Acceleration'**





# Defining the start of a new Epoch: The *Anthropocene*

## Population Growth

### POPULATION OF THE EARTH

Number of people living worldwide since 1700 in billions



## Globalization

## Industrialization

First industrial  
revolution



Second industrial  
revolution



Third industrial  
revolution



1969

First program-  
mable logic  
controller (PLC)

Introduction of  
electronics and IT  
for higher auto-  
matization of  
production

Fourth industrial  
revolution?



2014

Real time, self  
optimizing  
connected  
systems

so far < 10%  
advanced

Time

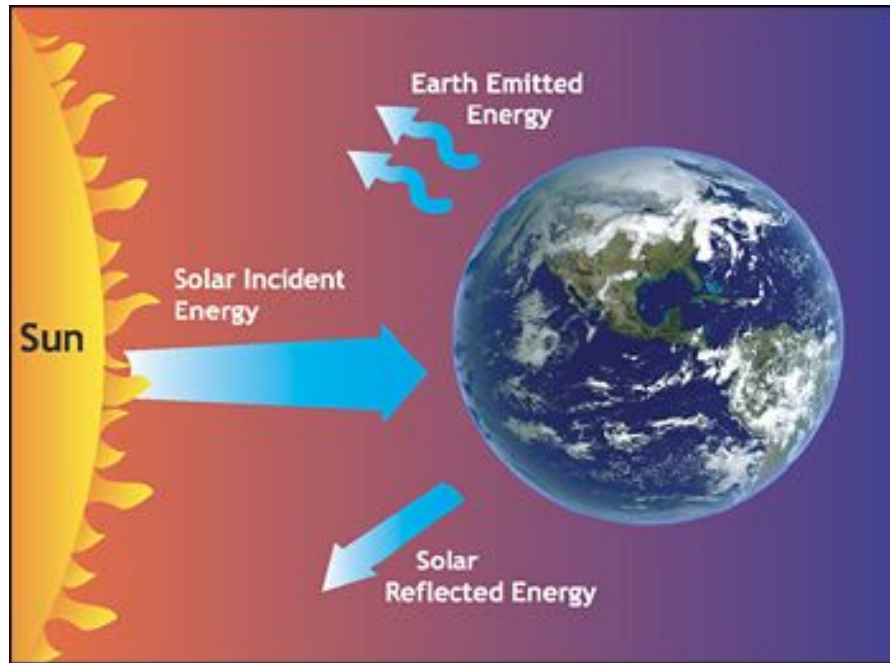
## BLOCK 2

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# Global Climate Change: Precursors, drivers, and connections to Health

# Climate Change Precursors (Natural)

## Solar Radiation



<http://planetfacts.org/wp-content/uploads/2011/03/solar-radiation.jpg>

- Solar Irradiance: solar energy received per unit area; follows 11-year cycles
- **Consensus:** global warming cannot be explained by natural causes alone

## Volcanic Activity



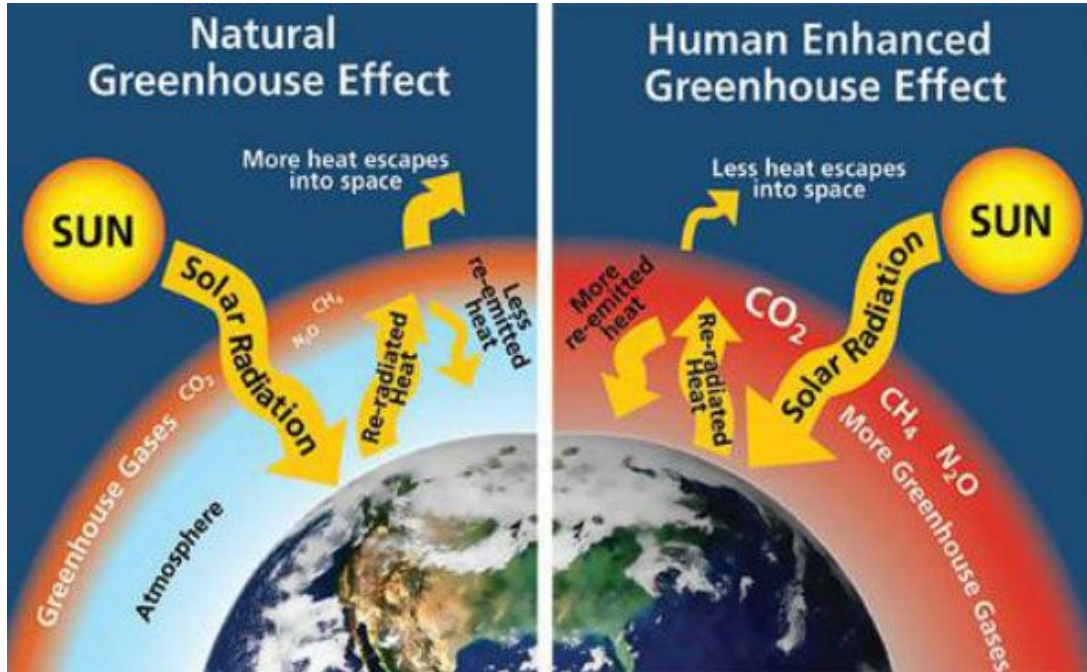
<http://volcano.oregonstate.edu/sites/default/files/Cleveland-Nasa-Volcano.jpg>

- Volcanic eruptions - both cooling and warming effects
- **Consensus:** Volcanic activity has a low overall contribution to climate change



# Climate Change Precursors (Human-caused)

## Greenhouse Gases



<http://volcano.oregonstate.edu/sites/default/files/Cleveland-Nasa-Volcano.jpg>

- Greenhouse gases trap heat in the atmosphere and warm the planet.
- **The main gases:** carbon dioxide, methane, nitrous oxide, water vapor, fluorinated gases

## Land Use

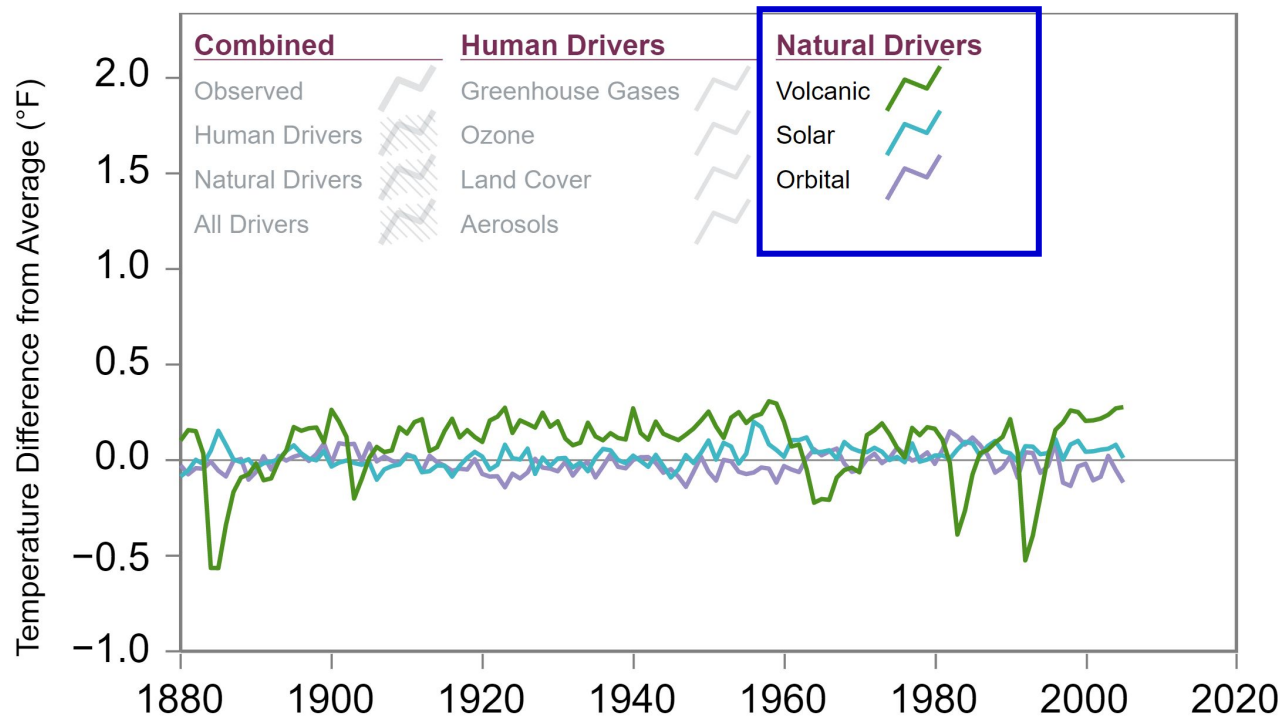


<http://planetfacts.org/wp-content/uploads/2011/03/solar-radiation.jpg>

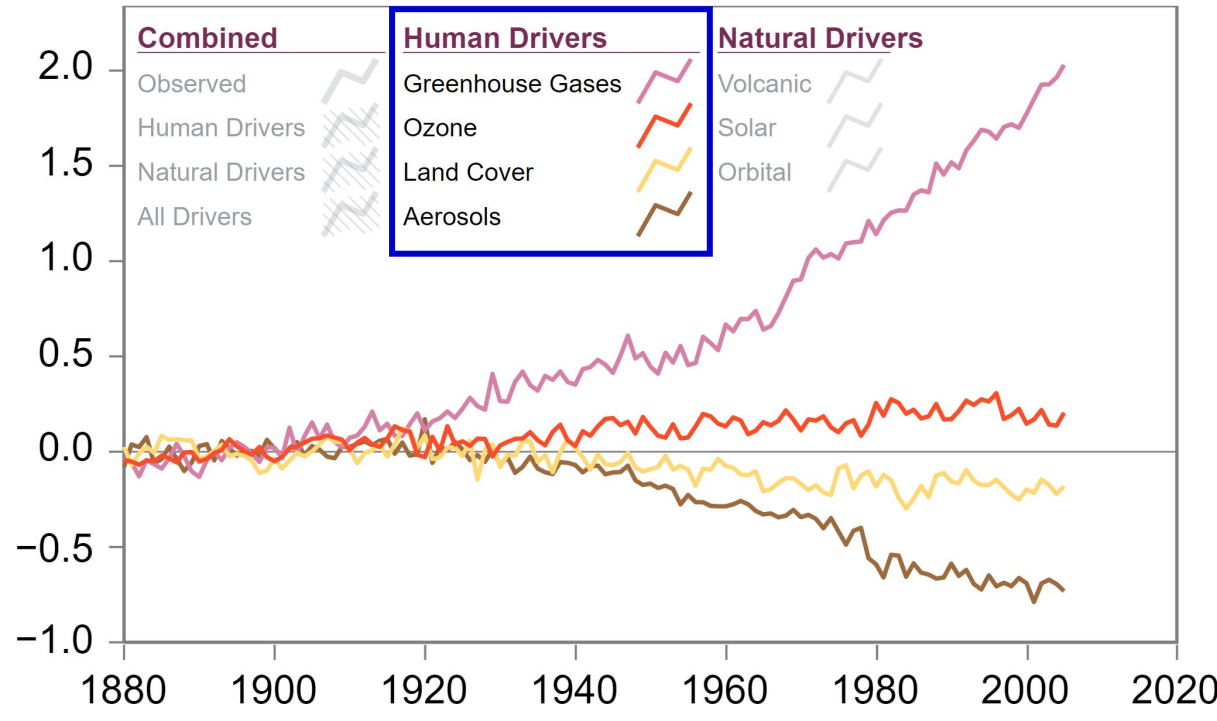
- Deforestation: urban sprawl and agriculture
- Agriculture produce greenhouse gases
- Agriculture and forestry can remove carbon dioxide from the atmosphere

# Climate Change Drivers – contributions to temperature increase

## Natural Drivers



## Human Drivers

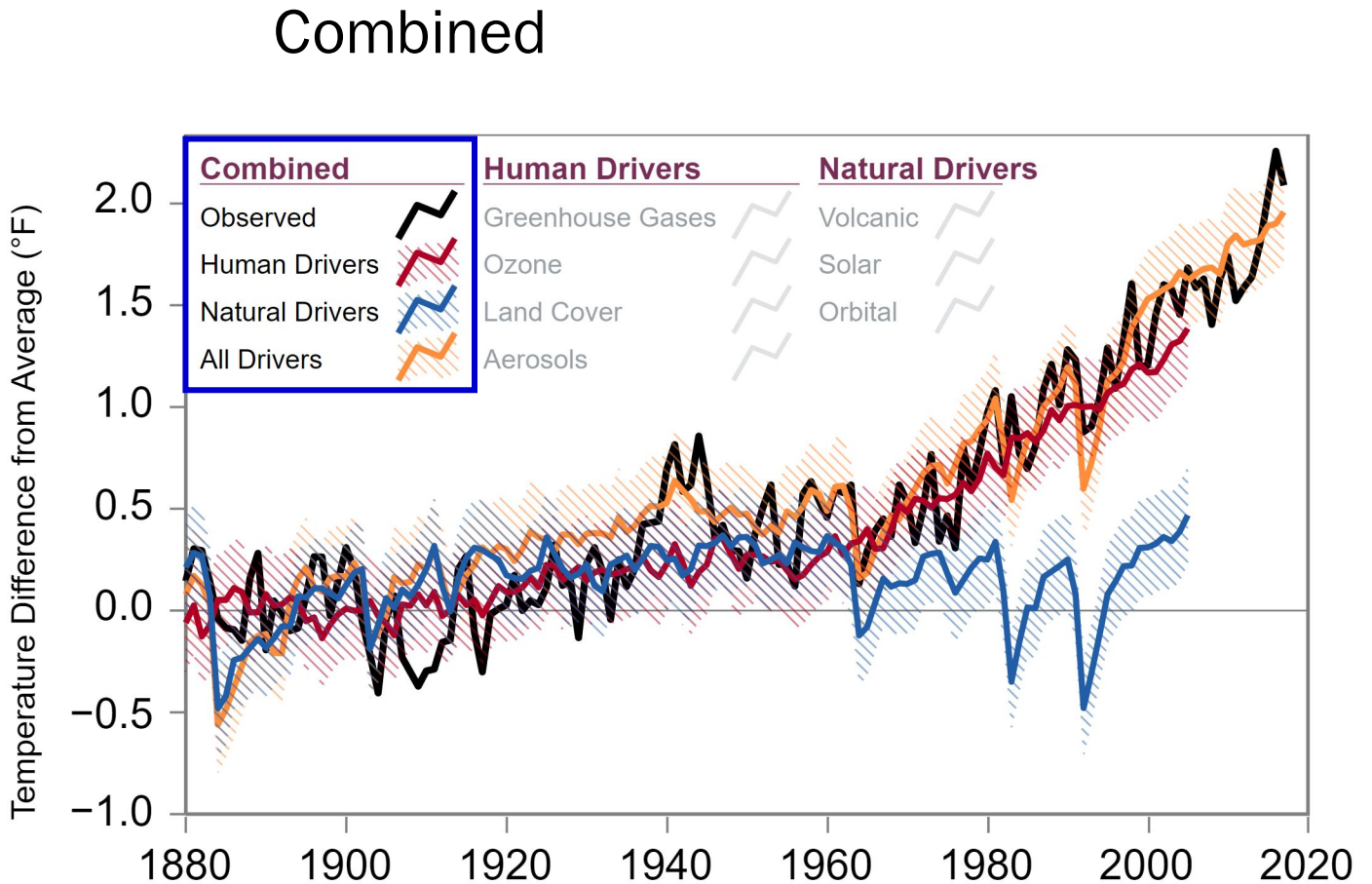
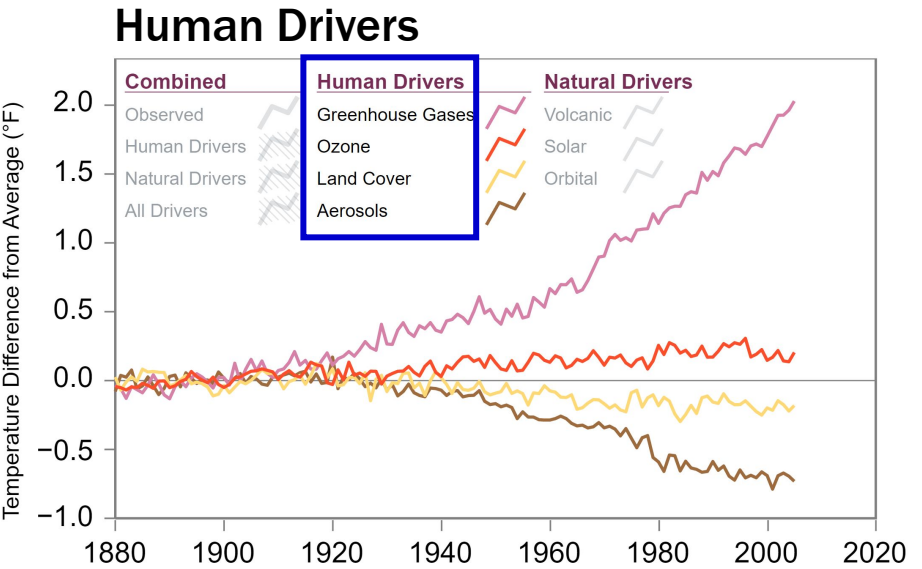
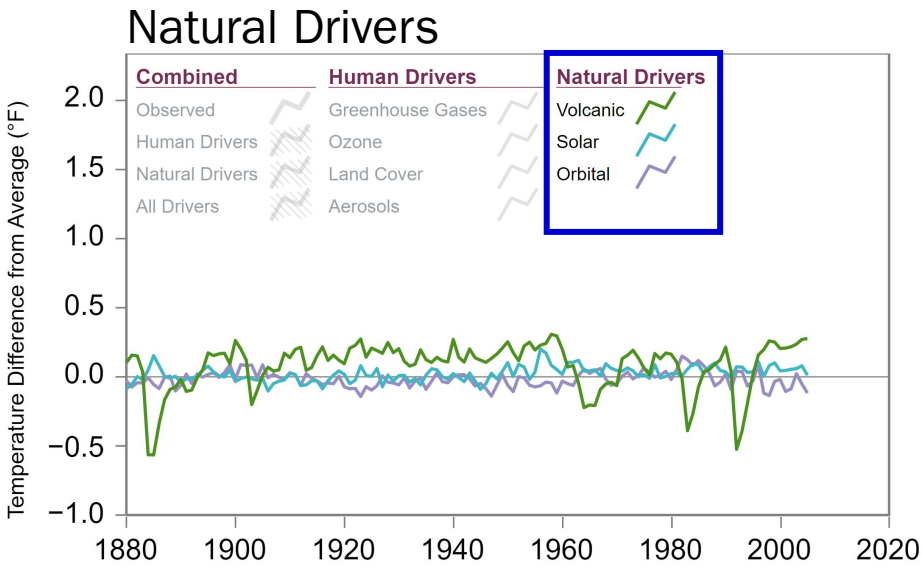


The US Global Change Research Program





# Climate Change Drivers – contributions to temperature increase





# Climate Change and Weather: The pathways to health effects



[https://www.sciencenews.org/sites/default/files/main/blogposts/ticker\\_rainforest\\_free.jpg](https://www.sciencenews.org/sites/default/files/main/blogposts/ticker_rainforest_free.jpg)

## Overall Atmospheric & Land Warming

warming trend in the global land cover & the atmosphere



[http://www.rfi.ro/sites/default/files/articol/anomalie\\_vremii\\_galati\\_plouat\\_trei\\_zile\\_doua\\_luni\\_elena\\_mateescu\\_anm.jpg](http://www.rfi.ro/sites/default/files/articol/anomalie_vremii_galati_plouat_trei_zile_doua_luni_elena_mateescu_anm.jpg)

## Heavy Precipitation

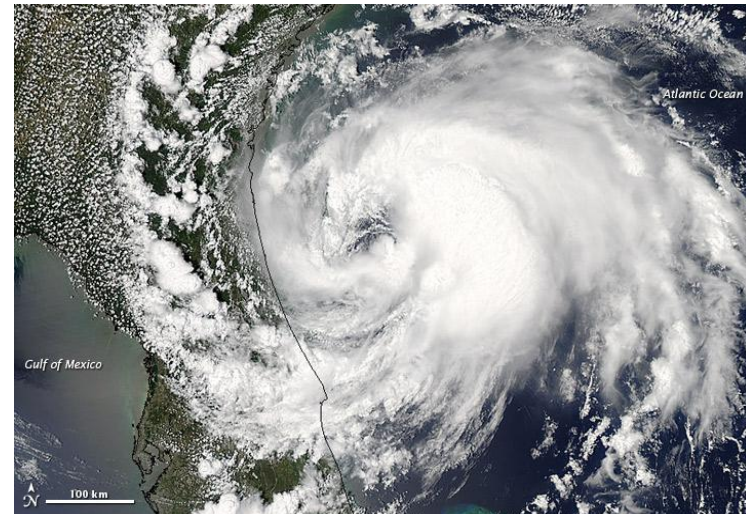
occurring in more intense events



[http://assets.inhabitat.com/wp-content/blogs.dir/1/files/2016/02/Climate\\_Change\\_Melting\\_Icebergs.jpg](http://assets.inhabitat.com/wp-content/blogs.dir/1/files/2016/02/Climate_Change_Melting_Icebergs.jpg)

## Ocean Warming & Cooling

warming trend in the oceans



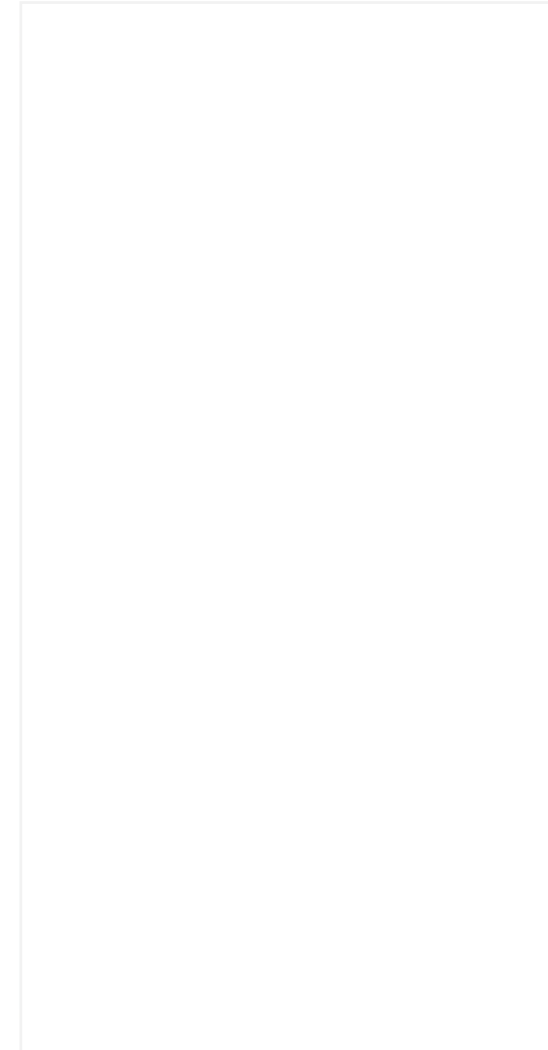
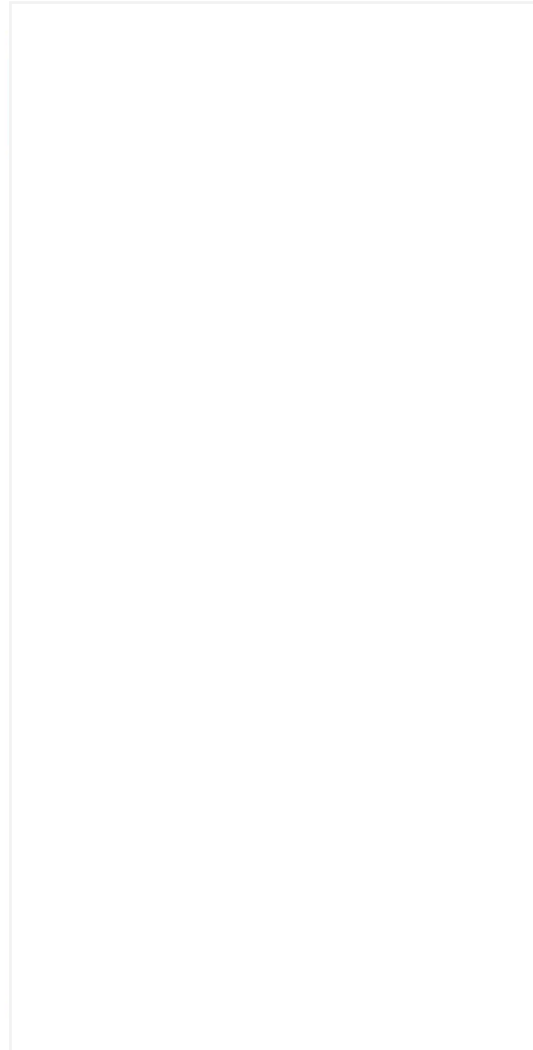
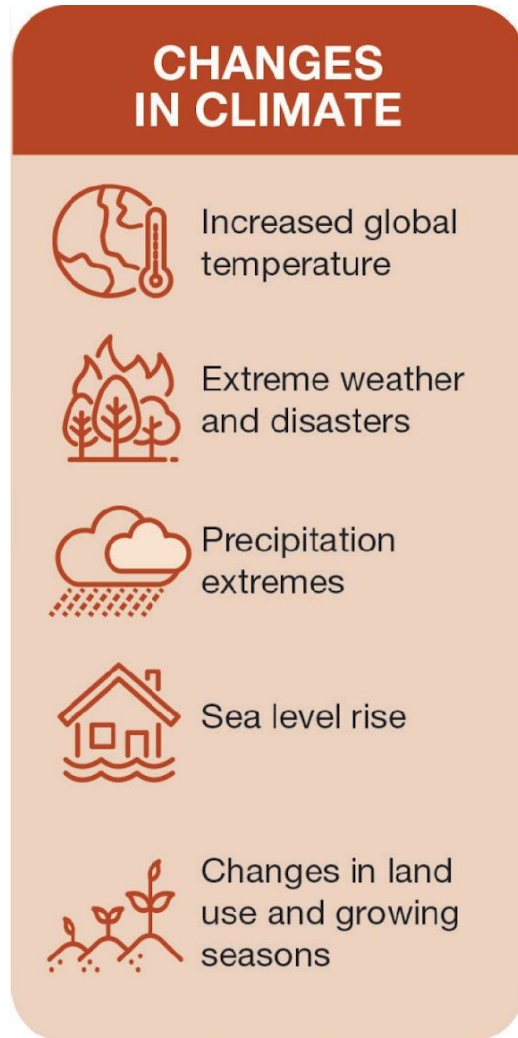
[http://eoimages.gsfc.nasa.gov/images/imagerecords/78000/78120/beryl\\_amo\\_2012148.jpg](http://eoimages.gsfc.nasa.gov/images/imagerecords/78000/78120/beryl_amo_2012148.jpg)

## Extreme Weather

increasing in frequency & intensity



# Climate Change Health Connections



## BLOCK 3

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# Extreme Heat and Health (Texas Focus)

# Extreme Heat and Health (Texas Focus)

## EFFECTS OF CLIMATE CHANGE



Extreme heat



Air and water pollution



Reduced food and water quality



Changes in infectious diseases and vector transmissions



Increasing allergens

## HEALTH IMPACTS



Heat related illness



Cardiovascular disease, stroke, and other chronic conditions



Injuries and death



Mental and neurological disorders



Zoonotic, vector- and water-borne diseases



Respiratory diseases and asthma

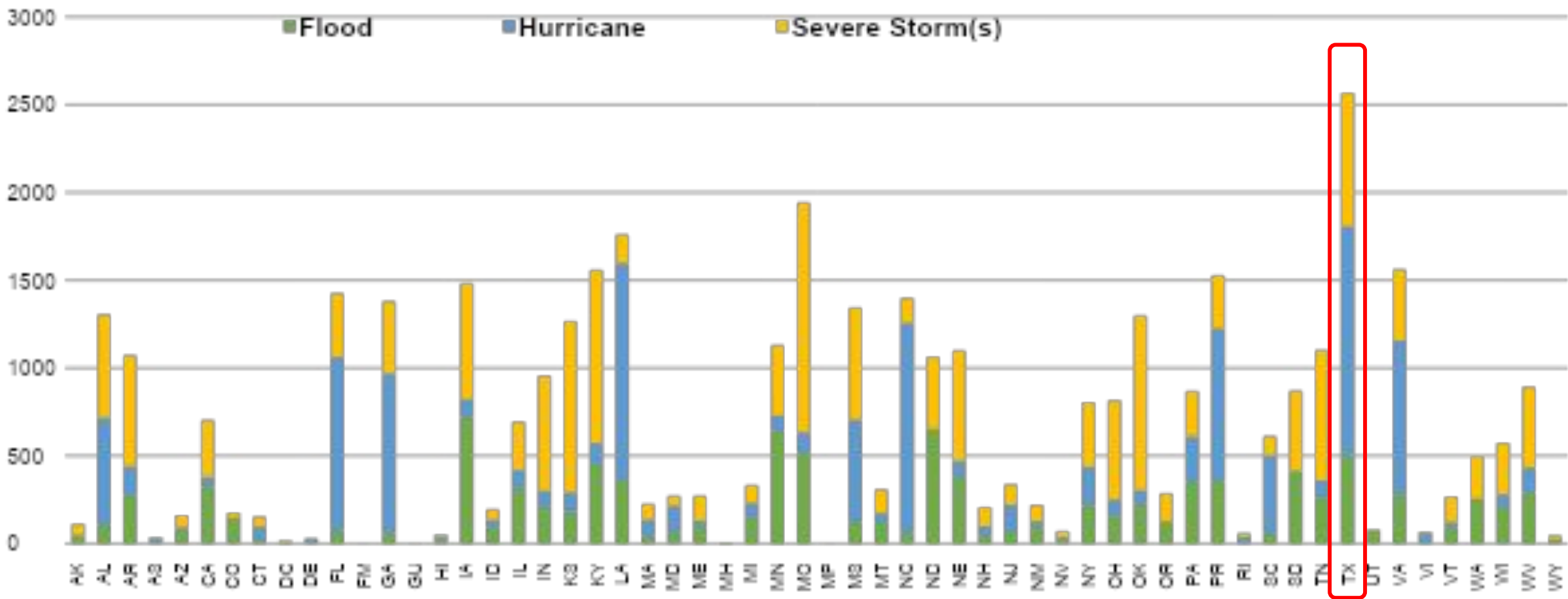
# Extreme Heat and Health (Texas Focus)

- ❑ **Heat/Heatwave**: can increase the risk of other types of disasters...
- ❑ **Sever storms**, rainstorms accompanied with a combination of...tornadoes, hail, strong winds, lightning and flooding
  - **Floods**...waters that submerge dry land. The most common disaster in Texas
- ❑ **Drought**: abnormally extended periods of dry weather due to lack of adequate precipitation.
- ❑ **Fires**: uncontrolled fires typically occurring in rural areas with combustible vegetation.
- ❑ **Hurricanes**, storms with rapid rotation, heavy rainfall, and strong winds formed over tropical bodies of water, are the second most common natural disaster affecting Texas



# Extreme Heat and Health (Texas Focus)

Disaster Declarations by State (FEMA): Top 3 disaster types



# Extreme Heat and Health (Texas Focus)

The New York Times

2011

As Texas Dries Out, Life  
Falters and Fades



Credit: Dan Borris for The New York Times.

*"A dry river bed in Comal County, Tex., in July."*

HOUSTON★CHRONICLE

2022

When will the Texas heat wave  
end? Houston  
meteorologist...on what to know



Credit: Mark Mulligan/Staff photographer.

*"Performer...dumps a bottle of water onto his head between songs, Wed., July 13, 2022, in southwest Houston."*

★THE TEXAS TRIBUNE

2040-50 ?

Texas' heat index could reach  
125 degrees over the next 30  
years, study finds



Credit: Jason Garza for The Texas Tribune.

*"I don't think we're prepared," one South Tex. mayor said of temperature increases."*

In Conclusion...

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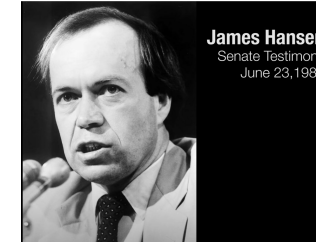
**Things we can do...**



# Knowledge is empowering, but...

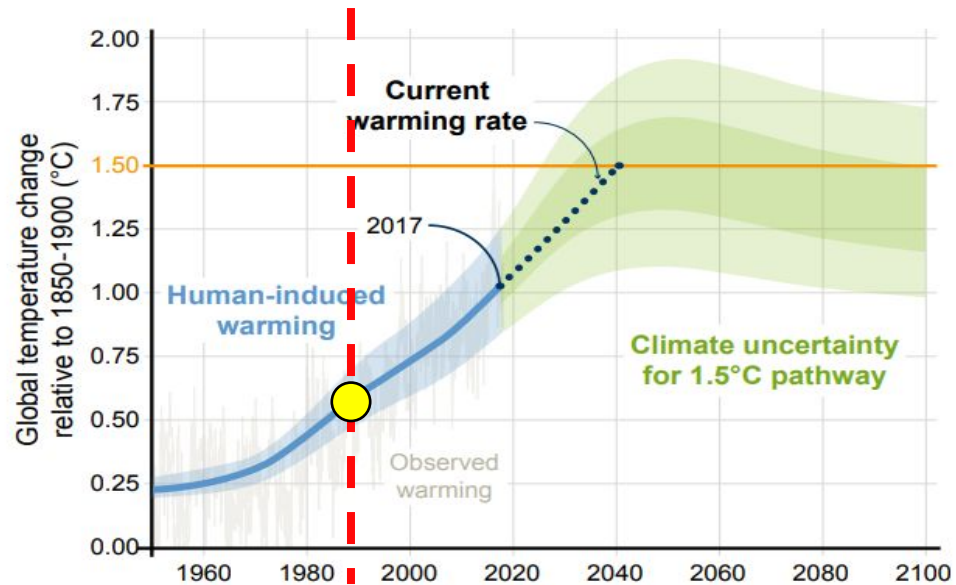
- June 1988 (~35 years ago)
- Global temperature ~0.6° C (1.1° F) above preindustrial avg.
- At the time, hottest 12-month period ever seen

<https://www.washingtonpost.com/climate-environment/2022/01/13/global-temperature-record-climate-change/>

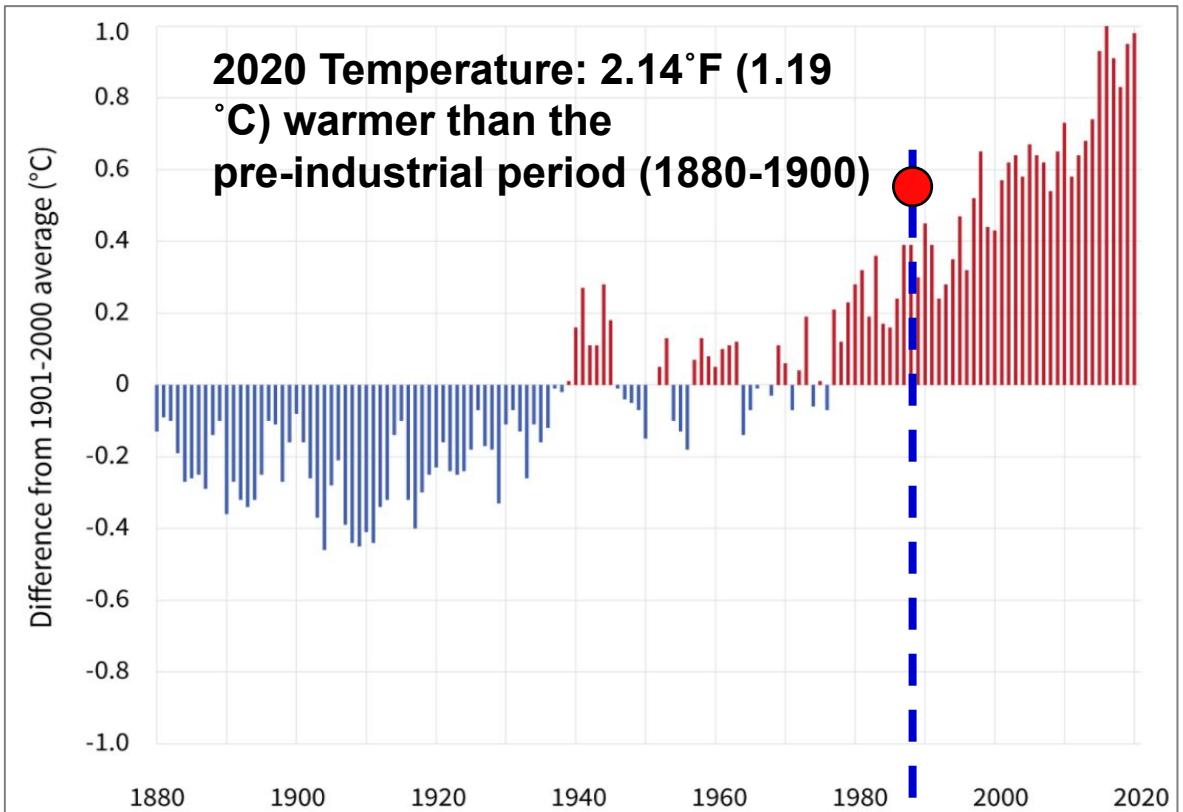


## FAQ1.2: How close are we to 1.5°C?

Human-induced warming reached approximately 1°C above pre-industrial levels in 2017

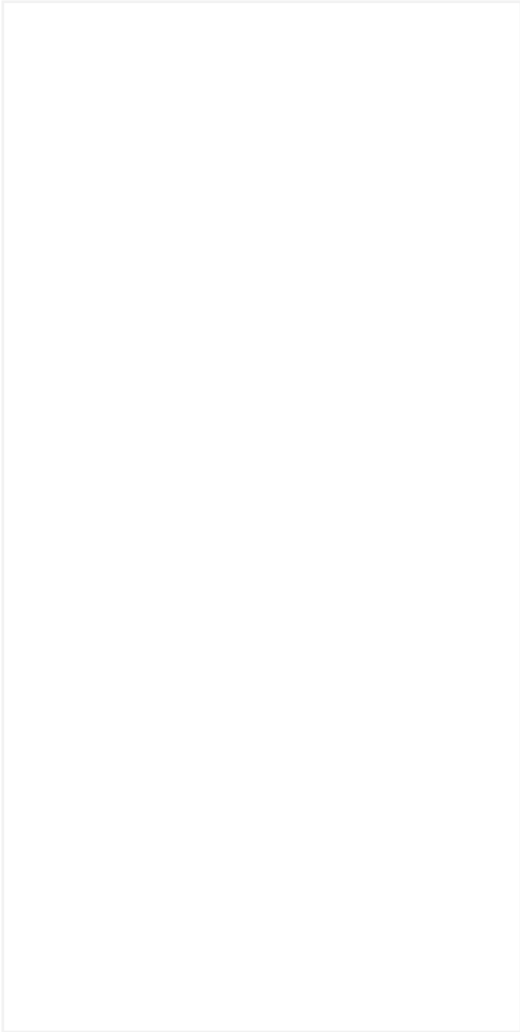
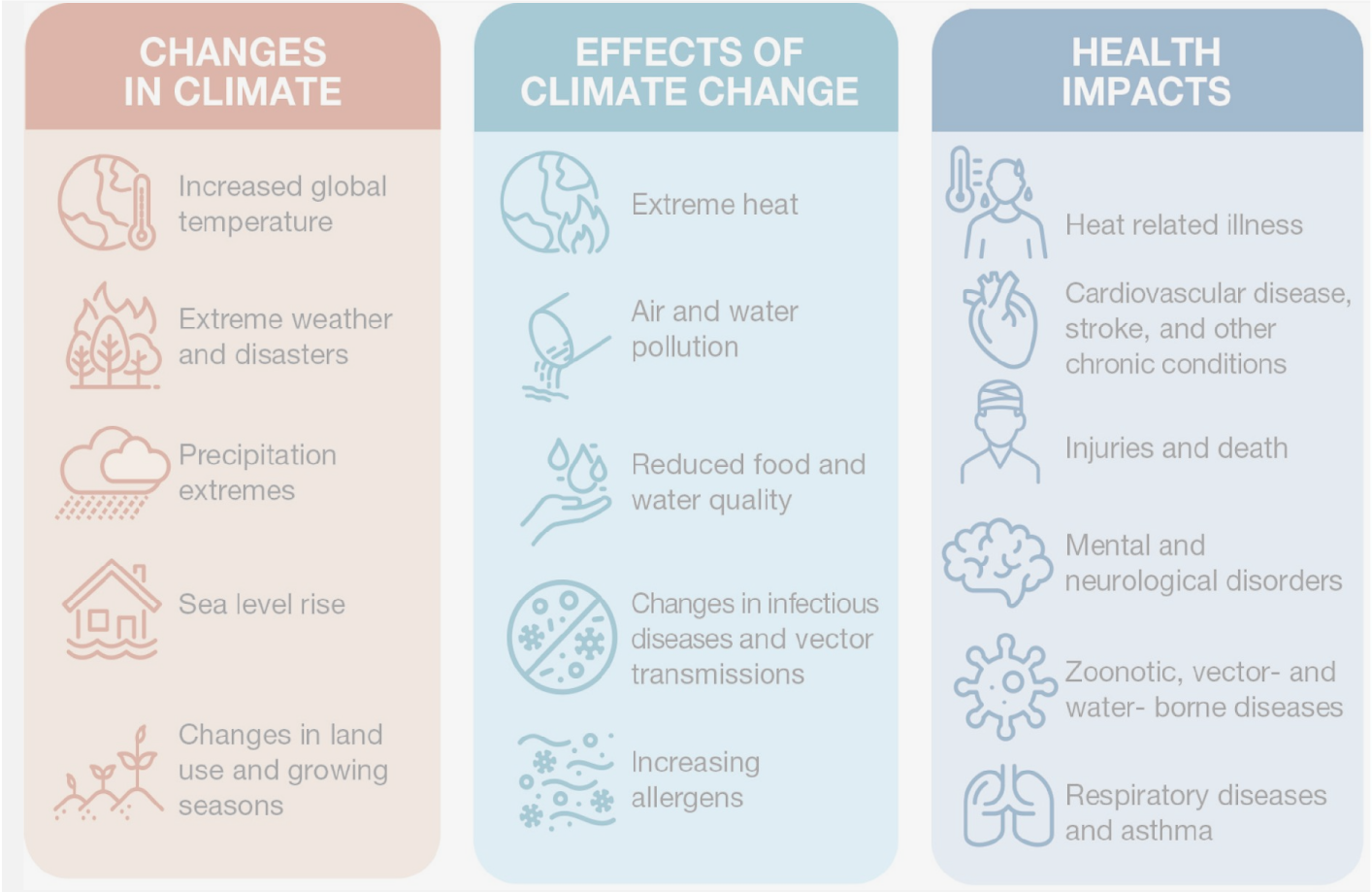


<https://www.ipcc.ch/sr15/faq/faq-chapter-1/>



<https://www.climate.gov/news-features/understanding-climate/climate-change-global-temperature>

# Things we can do...



# Welcome to The *Anthropocene*



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**Love Globally, Lead Locally**

Appreciations