

Human Impacts of Global Climate Change

Instructor: Ken Verosub, Distinguished Professor Emeritus, UC Davis
Eight sessions (1/19 to 3/9); Wednesdays (12:00 to 1:30);
Lecture with discussion at the end

Course Description

“We’re all gonna die; we’re all gonna drown; we’re all gonna fry; we’re all gonna freeze.”
Media coverage of climate change got you confused?? This eight-session course will look at each aspect of global climate change (warming, sea-level rise, drought, flooding, extreme weather, etc.) using simple, basic language – no sophisticated mathematical formulas, no fancy theoretical models, no impractical policy proposals, no magic bullets. Just plain talk. For each topic we will look at the underlying causes, current observations and trends, future expectations and (realistic) mitigation methods. By the end of this course, you should be better able to understand global climate change and to follow its evolution into the next decade.

Topical Outline (Syllabus)

Week 1 (1/19) – Our current understanding of global climate change and its uncertainties

History of the discovery of climate change -- When did it begin?

Brief introduction to greenhouse gases

Climate modeling and its problems – clouds, moisture, etc.

Known unknowns and unknown knowns

Global circulation

Concept of tipping points

Are we there yet?

Week 2 (1/27) -- Higher temperatures

Global patterns -- Heat domes

Local anomalies

Various places then and now – Sahara, Siberia, etc.

Temperature trends and recent record highs

Consequences of warmer temperatures

Energy resources (i.e., air conditioning) and health issues

Melting of permafrost

Potential for emergence of ancient diseases

Melting of ice sheets and glaciers -- What we have learned recently

State of the Arctic Ocean and why it matters

Week 3 (2/2) -- More extreme weather

Increased precipitation -- Recent floods in Germany, China and elsewhere

More frequent storms

Hurricanes and typhoons

Greater climate variability
 Persistent polar vortices
Coping with flooding from rivers and streams

Week 4 (2/9) – Rising sea level

Global patterns and local anomalies
Impacts on low-lying infrastructure (sewage treatment plants, coastal roads)
Bay Area at risk -- Foster City, Bel Marin Keys
Cities at risk -- Miami, New York City, Amsterdam, Barrow (Alaska)
Countries at risk -- Maldives, Micronesia
Climate refugees
Large-scale engineering
 Thames River Barrier, Afsluitdijk (Holland), Project Mose (Venice)

Week 5 (2/16) – Impacts on plants and animals

Crop yields -- Winners and losers
Effect on food supply in Africa and Asia
Wine production -- grapes and temperature
 Napa Valley, Champagne, finding new opportunities
Animal migration patterns
Spawning grounds
 Salmon runs – timing and water temperature

Week 6 (2/23) – Too much and not enough water

Droughts – Current crises in California and on the Colorado River
Wildfires -- Increased frequency and intensity
 Other causes besides climate change
 Protecting your house and yourself
Floods
 Hundred-year floods and atmospheric rivers
 Lessons learned and not learned
 Levees and set-backs
 Why relocation is so hard to do

Week 7 (3/2) – Too many people

Population – the ultimate driver of climate change?
What happened after the Black Death of 1347?
 Dan Brown's *Inferno*
What is demographics?
 Population profiles
 Understanding the past and predicting the future
The key to population control
 Is there hope?

Week 8 (3/9) – Is there a way forward?

Kyoto Protocols and Paris Agreement -- Too little, too late

The crux of the problem -- Why we all can't "just get along"?

Current goals and progress report

Threat from coal-fired power plants

Dealing with carbon dioxide -- Carbon sequestration

Cooling the planet -- Solar radiation management

Is "clean energy" a myth? Nuclear, solar, wind, and tidal