OBSERVING
OBSERVING
MODELING
compute co2 contribution to quarter-layer absorption matrix

\[ \text{len} = 1 \times k_p \]
\[ \text{do } k = 0, k_x \]
\[ \text{do } i = 1, i_x \]
\[ \text{sfac}(i, k) = \text{duco2}(i, k) \]
\[ \text{enddo} \]
\[ \text{enddo} \]
\[ \text{do } k = 0, k_x \]
\[ \text{do } i = 1, i_x \]
\[ \text{ulog}(i, k) = \text{alog10}(\text{duco2}(i, k)) + 2.70668 \]
\[ \text{plog}(i, k) = \text{alog10}(\text{nx}(i, k)) \]
\[ \text{enddo} \]
\[ \text{enddo} \]

***** call lwco2 to compute tcof values

\[ \text{call lwco2(tcof}(1, 0), \text{ulog}(1, 0), \text{plog}(1, 0), \]
\[ \text{txdegk}(1, 0), \text{len}) \]

\[ \text{calculate external mode velocities} \]

\[ \text{do } i = 2, i_m1 \]
\[ \text{ubar}(i) = -(p(i, j+1, 1) - p(i, j, 1)) \times \text{dyur}(j) \]
\[ \text{vbar}(i) = (p(i+1, j+1, 1) - p(i, j+1, 1)) \times \text{dxur}(i) \]
\[ \text{enddo} \]

\[ \text{calculate advective coefficients at the west} \]
\[ \text{and north faces of the } "u,v" \text{ box by combining} \]
\[ \text{external & internal modes with a grid factor} \]

\[ \text{fx} - \text{dyur}(j) \times \text{csur}(j) \times \text{csj}(j+1) \]
\[ \text{do } k = 1, k_m \]
\[ \text{do } i = 2, i_m1 \]
\[ \text{fwn}(i, k) = ((\text{uc1in}(i, k, jpt1} \]
\[ \text{+uc1in}(-1, k, jpt1)) \times \text{0.5 + ubar}(i)) \times \text{csur}(j) \]
\[ \text{dvln}(i, k) = ((\text{vc1in}(i, k, jpt2) \]
\[ \text{+vc1in}(-1, k, jpt2)) \times \text{0.5 - vbar}(i)) \times \text{csur}(j) \]
\[ \text{enddo} \]
\[ \text{enddo} \]

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\[ \text{+vc1in}(-1, k, jpt2)) \times \text{0.5 - vbar}(i)) \times \text{csur}(j) \]
\[ \text{enddo} \]
\[ \text{enddo} \]
A petabyte is a lot of data.

20 petabytes: the amount of data processed by Google per day.
OBSERVING
MODELING
ANALYZING
WE’VE KNOWN WHAT WE NEED TO KNOW TO DO SOMETHING ABOUT THIS FOR A VERY LONG TIME.
Let’s write another report
WHAT WE KNOW

Based on the evidence, about 97% of climate scientists agree that human-caused climate change is happening.

See the facts »
The science literacy/knowledge deficit model

The public is willing and able to process information if it is available. Therefore, a lack of public support is caused by a lack of information available to the public.
Public apathy over climate change is often attributed to a *deficit in comprehension*. The public knows *too little science*, it is claimed, to understand the evidence or avoid being misled.
We conducted a study to test this account and found no support for it. Members of the public with the highest degrees of science literacy were not the most concerned about climate change. Rather, they were the ones among whom cultural polarization was greatest.
Explainig climate change science & rebutting global warming misinformation

Scientific skepticism is healthy. Scientists should always challenge themselves to improve their understanding. Yet this isn't what happens with climate change denial. Skeptics vigorously criticise any evidence that supports man-made global warming and yet embrace any argument, op-ed, blog or study that purports to refute global warming. This website gets skeptical about global warming skepticism. Do their arguments have any scientific basis? What does the peer reviewed scientific literature say?
The SIX AMERICAS of global warming

Sept. 2012
n=1,058

Alarmed 16%
Concerned 29%
Cautious 25%
Disengaged 9%
Doubtful 13%
Dismissive 8%

Highest Belief in Global Warming
Most Concerned
Most Motivated

Lowest Belief in Global Warming
Least Concerned
Least Motivated
The SIX AMERICAS of global warming

- Alarmed: 16%
- Concerned: 29%
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Sept. 2012
n=1,058

Highest Belief in Global Warming
Most Concerned
Most Motivated

Lowest Belief in Global Warming
Least Concerned
Least Motivated
After the polar bear ... we’re next
Nearly every human on the planet already has the values they need to care about climate change.
YEARS
OF LIVING DANGEROUSLY
COMING TO SHOWTIME IN 2014
PLAY TRAILER
People are afraid of the solutions

Climate solutions raise long-held fears:

taxes, tyranny, economic hardship.
Estimated % of adults who think global warming is mostly caused by human activities, 2014

Display model output: Global warming is caused mostly by human activities
Estimated % of adults who support requiring utilities to produce 20% electricity from renewable sources, 2014

Display model output: Require utilities to produce 20% electricity from renewable sources
Our carbon choices matter

![Graph showing carbon emissions (GtC) over time with RCP 8.5 and RCP 4.5 scenarios.](image-url)
Georgetown Goes All In on Renewable Energy

by Jim Malewitz | March 18, 2015 | 37 Comments

A Central Texas city is waving goodbye to fossil fuels.

Georgetown’s municipal utility on Wednesday unveiled plans to abandon traditional electricity sources like coal and gas power plants, instead exclusively tapping wind and solar energy to meet all of its customers’ power needs. It is the state’s first city-owned utility to make that leap.

“It was really primarily a price decision,” said Keith Hutchinson, the city’s spokesman.
Texas Wind Power Sets New Record

in News Departments > New & Noteworthy
by NA Windpower on Friday 23 October 2015

Wind generation output in the Electric Reliability Council of Texas (ERCOT) region hit a new high on the early morning of Oct. 22.

ERCOT says wind power reached a record-setting 12,238 MW of output at 12:48 a.m., and the wind generation accounted for 36.83% of the grid operator's overall load at the time. The previous wind record, 11,467 MW, was reached on Sept. 13.
Only when our clever brain and our human heart work together in harmony can we achieve our full potential.

- Jane Goodall
THANK YOU!

www.katharinehayhoe.com