- Transcript of Lecture by Dr John Christy to the Irish Climate Science Forum
- Given by Zoom on January 21st, 2021

This is an edited version of the original, computer produced, transcript of the talk to correct errors that did not match the actual words of the presenter and/or changed his meaning. (Joe Anderson, BE 1967.)

Dr John R Christy is the Distinguished Professor of Atmospheric and Earth Sciences and Director of the Earth System Science Center at the University of Alabama in Huntsville. Since November 2000 he has been Alabama's State Climatologist. In 1989, Dr Christy (with Dr Roy Spencer) developed a global temperature dataset from satellite microwave data, awarded NASA's Medal for Exceptional Scientific Achievement in 1991, and in 1996 they received a Special Award by the American Meteorological Society. In January 2002, Dr Christy was inducted as a Fellow of the American Meteorological Society. He has served as a Contributor and Lead Author in several IPCC Reports, has provided testimony to several congressional committees, and serves on the US EPA's Science Advisory Board.

-
- 00:00

  Prof John R Christy
- Professor, Atmospheric & Earth Sciences
- Director, Earth System Science Center, University of Alabama, Huntsville, Alabama USA
-

  Slide 1
  00:01 Okay, thank you, Jim. It's good to see you and the others there and it's a pleasure for me to speak to you.
- I think this might be the first presentation I have made that is sort of to a worldwide audience, and so this is kind of interesting and and fun to do.
- So we're going to talk about & update some of those claims we tested a couple of years ago and see how the science has advanced or not advanced as the case may be.
- Next slide.
-

  Slide 2
- 00:31 Okay, so dealing with climate change claims in 2021 can be extremely frustrating, because you hear things said all over the place about it.
  And so we're going to look at some of those that we can test. Most of them we can't really test; the data just aren't there to answer questions about whether, you know, a certain flock of birds landed here rather than there because of climate change or something like that. We're going to look at ones that we can test and the results indicate there really is no climate crisis.
- Next slide.
-

  Slide 3

- 01:01 So the theory of greenhouse warming I'm going to start off with is how do you detect a very tiny influence on a massive climate system.
- Next slide
-

  Slide 4
- 01:12 So here's a cartoon of the climate system and look at the atmosphere there, that bluish part that radiates downward about 100 units of energy, (one unit is about 3.4 Watts), but just hundred units of energy coming down to surface of the earth and about 105 backup, and other heat is transported as well.
  So if you're on the surface of the earth, looking up, you see 100 units of energy coming down, radiated from clouds, aerosols, molecules of all kinds.
  And the amount due to the extra carbon dioxide and greenhouse gases is less than one unit of that. So you've got these dozens and dozens of units and they vary by 1, 2, 3, or 5 units apiece and we're trying to figure out what a portion of one unit might do to this very complicated system.
- Next slide.
-

  Slide 5
- 02:04 So think of the surface temperature as a battle between things that heat up and things that cool - like a tug of war.
  So you see how big those are and notice that they are not static. They change all the time, even in the global average they get bigger and smaller.
- Next slide
-

  Slide 6
- 02:22. As they change the temperature goes up or down. Now, what do humans do? Well we're that little bitty guy on the end and you can imagine that, if that little guy is pushing a little bit more, could one of the others change their response? And that really boils a lot of the issues about climate change, down to what it really is. What is the true response of the climate system to that little extra pull right there you see.
- Next Slide.
-

  Slide 7
- 02:54. So we're going to test the claim that the current global warming is significant, and that it is caused entirely by the extra greenhouse gases that human economies emit as they enhance their well being. You know, is that true?
  You've heard it many times that all of the warming in the last 40 to 50 years is due to humans and so we're going to test some of those claims.
- Next slide.
-

  Slide 8
- 03:19 So, well to be real scientists you have to do things with numbers and you have to measure things. So Ross McKitrick and I, a couple years ago, looked for a variable that was very clean, that was a very clear and clean test for this hypothesis about global warming, where to test models and what they say.
- Next slide.

-

  Slide 9
- 03:43 And so we should be able to see that response variable in all of the models.
- Next slide

  Slide 10
- 03:54 And that response variable is not there when the extra greenhouse gases are not there, so you know the experiment and control are always different.
- Next slide.
-

  Slide 11
- 04:03 And this metric cannot be used in tuning and development of the model, and that is something that some of you might not realize, but a lot of times, some of these climate modelers validate their models with a a variable that they actually use to tune the model with. Surface temperature is one of those variables that models are tuned to.
  And then they come back and say, "See my model matches the surface temperature so it must be right." Well that's not science. And finally,
- Next slide.
-

  Slide 12
- 04:34. these observations should come from multiple independent sources.
  In other words, you wouldn't want a climate model group to also build the data set of observations and then have them compare. There might be a little bit of conflict of interest there.
  So, independent groups measuring and creating these measurements.
- Next slide.
-
- Slide 13
- So what we found, as I told you about a couple years ago, was that this atmospheric layer, that's about 30 to 40,000 feet in the tropics, is just a big loud sound that says, this is what global warming is supposed to do in the models.
  If you look at the cross section there, the South Pole is on the Left , North Pole is on the right and the stratosphere is at the top. So this is a cross section of the vertical atmosphere and there you see, right in the tropics between 30 and 40,000 feet this very obvious area of rapid warming, and this is a Canadian model by the way, - we were just talking about that.
  This should already have happened. In other words, these are the results, I will show you from models that are trying to reproduce what's happened in the last 40 years.
- Next slide.
-

  Slide 14
- 05:50 So here's the claim, and the hypothesis is that significant warming should already have occurred to change our climate. That should already be in the models and in the real world. So let's go to test that now.
- Next slide.

-

Slide 15

- 06:06 These are brand new results. You have not seen these before. These are 39 of the CMIP6 models.
And if you look carefully, you can might find your favorite model. There on the bottom, you can see a couple. There on the bottom left about the sixth and seventh over (with Can prefix) are two Canadian models right there.
There are a number of Chinese models also now. So the average of all of those models, and they're all pretty consistent here, is about four tenths of a degree per decade should have happened by this time. In other words, that is a test that we can now go and do. By the way, those two Canadian models are way up there.
In fact, I think we did a little study and if the model came from the English speaking world it was always pretty high. I don't know why that is.
There you see the UK model and the Access model from Australia and so on.
- Next slide.

- Slide 16
- 07:06 So what did the real world do? Now, this is a very simple hypothesis test. The real world came out with 17 100ths (0.17deg) of a degree per decade.
Observation experiment versus the observation you see in typical scientific world we would say, well, our hypothesis has failed, that all 39 of them had failed.
Even the Russia models are going a warmer now than they used to.
So we have a pretty clear picture here that models are not doing well and don't let someone say "Oh, but that's the air up there at, you know, 30 to 40,000 feet. That doesn't matter - we live at the surface".
Remember, a climate model is a system of physical attributes. Physics operates, and if you don't get a major part of the world of the system correct, you cannot say my system is modeled correctly.
And this is a very important part of the atmosphere, because this tells you how you release heat to outer space.
- Next slide.

Slide 17

- 08:11 So here is the last picture I showed you. These were the CMIP5 models and you can see that we did the test on them, the average was significantly different & Ross McKittrick and I published a paper just this year, I mean 2020, about this very metric with the new CMIP6 models and sure enough, they are significantly different, highly significantly different than what the observations show.
Now kind of fix your eyes on that chart and I'm going to go to the CMIP6 models. So fix your eyes for a moment on that chart and now let's go right to CMIP6.
- Next slide.
-

Slide 18

- 08:50 Now I think if you saw something change, it was the variability of these models Look how much they bounce up and down.
Relative the last picture, the variance is quite high in these new models. In fact, on

average, the variance is four times that of the real world. Now, if you look at the green arrow in the green observations you see that the real world doesn't stray too far from the long term trend. That's a system that has lots of negative feedbacks, that once it gets away from the mean state, it comes back.
If you look at the models, they stray very far, which indicates they don't have the negative feedbacks in the proper proportion, that the negative feedbacks don't kick in until they're way too hot.
Now that has a very important point when you talk about adding a gradual forcing of extra greenhouse gases. Seems as you add an extra forcing you are not being able to provide a negative feedback against that forcing and you see that the trends then go two and a half times too fast. In fact there in the blue box notice in the second line I say when you go to the next 30 years the trend gets even higher than it has been for the last 40 years.
But we don't see that in the observations, in fact, this coming year, the satellite data that we've been looking at, because of La Nina, the temperature has fallen back a good bit.
Next slide.

- Slide 19
- 10:28 So one of the things, and I showed this last time, that we found is that, regarding those feedback processes, when we see that the atmosphere column warms up by a degree models send out only 1.4 Watts.
  The real earth sends out 2.6 Watts. That's a very strong negative feedback. In other words it's real hard for the global atmosphere, the real atmosphere, to get much hotter than it is because it sheds so much heat. Whereas in the models, they trap heat. They trap more heat than the real world does, so that's how their temperature can continue to rise over time.
  So the flow of energy is misrepresented in these models. I just showed you that the the models don't match the past and they really don't agree with each other on the future. But now you see that the energy flow, the basic physics of it, are not maintained in the largest scale, the global scale.
- Next slide.
- Slide 20
- 11:30 Now this is kind of interesting and new. The red line is the observational absolute temperature of this layer and it's about 231 Kelvin.
- 11:40 And you can see, it goes along - it doesn't bounce up very much at all.
- 11:44 It's fairly level - there’s not much of a trend there, but you can see some of the models have large variances as we mentioned before, but look at the spread.
- 11:54 Now, remember, this is the absolute temperature and there are physics in the models.

- 12:01 that require the absolute temperature to be correct. For example, if a black body is radiating, it's sigma T to the fourth formula has to be right.

- 12:11 So if you have a layer that's emitting then it's opaque and sometimes this layer up there does become almost opaque, so that it radiates nearly as a black body. Certain kind of clouds or water vapor get up there.

- 12:25 That range of temperatures among the models is from 143 Watts to 268 Watts an average that's a huge range and

- 12:35. can stray very far from the fundamental physical number of 159 Watts for that black body So this tells you again another energy story here. It is that the the energy

- 12:48 exchanges and representations in the models just aren't matching up because the temperatures aren't matching up with their absolute values. Next slide

-

-
- Slide 21
- 13:00 So if we go 120 year experience experiment. Here in 1980 we start with our observations you see they're just muddling along a little bit.

- 13:09 But if we look at two other scenarios for the climate models and you can say that we are one third of the way in this period to 2100. One third of the way it's only a few years away, 79 years away.

- 13:22 We already have one third in the can, and you can see the models are off. They're just not replicating what we've already done.

- 13:32. You know in any other science, if you have a period of time you're testing and you go through the first period and you're already off by a factor of two and a half, on the rate of warming,

- 13:44 you say I better stop. I'm going to go back and see if I can fix something. That isn't the way in climate models. They let it go, because the scary story is the one that seems to get the most attention.

- 13:57 Next slide.
-

  Slide 22
- 13:59. So this this next couple of slides are going to be a little bit difficult to understand, so i'll try to just explain what's going on here.

- 14:10 We are going to introduce an equilibrium climate sensitivity or ECS that's just an index temperature that says how hot will the world be.

- 14:19 if you instantaneously double CO2 and let it go for another 100 or 200 years or so, but instantaneously double CO2 and ask what's the ultimate temperature going to be when equilibrium is reached.

- 14:31And so climate models have done that. You know you can't do that in the real world, you can't just double CO2 instantaneously but climate models can and they calculate a sensitivity there in the second paragraph of 1.8 to 5.6 degC. My goodness, that is a factor of three.

- 14:49 What is the climate sensitivity if models have a factor of three variants on it. So with such a huge range

- 14:58 they they came up with this idea called Emergent Constraint. It's a strange term, Emergent Constraint, that's supposed to help them figure out which
-
- 15:08 model might have the best ECS. Now empirically when we use real data, you know to calculate the sensitivity, it varies from 1.0 to 2.3 and a lot of them fall in about 1.6.

- 15:21 and that is outside the range you see the climate models up there. The real world is outside the range of those climate models. Next slide.
-

Slide 23

- 15:32 So this emergent constraint, I said, is a strange term that simply means let's look at something in a climate model, a characteristic in a climate model,

- 15:42 that's sort of related to ECS. Then we go to the real world and figure out what that characteristic is, and then for the model whose characteristics match

- 15:55 we will say that model has the best ECS. So, for example, if you have cloud cover and you have observations of cloud cover you look at all the models

- 16:06. and the model with the best cloud cover that matches the real world, you say okay that's the model with the best ECS. Now my explanation is very, very simple here and I'm sure others will not appreciate

- 16:20. what i'm trying to do, but just to be as simple as possible.

- 16:25   It seems that going through this process of finding some kind of tangential metric that might validate your model is just not very smart to me.

- 16:38 So Ross and I, Ross McKittrick and I, this year, this past year I mean, used an obvious metric; well how about an emergent constraint, like the global temperature trend.

- 16:48. Why not use something very obvious that is related to the ECS, to the equilibrium climate sensitivity, like the global atmospheric temperature trend. Next Slide.

  Slide 24
- So our results shows this in the squares at the top.

- 17:03 There are two layers to the atmosphere we're looking at here. Satellites produce one mid troposphere & one lower troposphere. So the

- 17:11 mid troposphere, I believe, is the open circles and squares are the lower troposphere, the solid circles and squares.

- 17:20Anyway, so the models kind of group themselves.

- 17:25And there's one kind of big group that's up there at very high ECS (that's on the vertical axis.)

- 17:32 And the emergent constraint is on the horizontal axis, so you can see the emergent constraint is the trend of their troposphere.

- 17:41 Either the lower or middle, depending on solid or open.

- 17:47 Then there is a group of models have a less ECS - the blue in there - and so we put square crosses at the mean of those two groups and then extrapolated down to 00 from the lower group, because if you had no climate sensitivity, you would have no trend right.

- 18:06. And so the real trends are those two arrows there those vertical arrows for the mid troposphere and the lower troposphere so that is the emergent constraint in the real world, and when you use the model based

- 18:24. relationship of ECS to our characteristic, the trend you come out

- 18:31 with is a 1.4 to 1.7 value. Okay so that's a little complicated and you might have to go back to read the paper to.

- 18:41. grasp this on such short notice, but the idea is we took a characteristic the global atmospheric temperature trend and related that to ECS in the models.

- 18:51 And then use that relationship to say well here's the real global atmosphere and what is it's ECS, and it comes out to the low value. Next Slide.

- Slide 25

- 19:02 So what we've come, you know, the models represent our level of understanding or, more importantly, our level of misunderstanding about the system

- 19:13 and about how the impacts of greenhouse gases affect the climate.

- 19:17 So as hypotheses, do they they succeed in describing the attributes of the physical climate system so well, we can use them for policy to take money out of your pocket book.

- 19:28 Well I've shown you models fail to reproduce the past and pretty significantly, by the way.

- 19:34 Models fail to reproduce the accurate energy flows, and this is the guts of how the climate system works that's how the energy flows between places.

- 19:44. And finally models disagree with each other about the future so which model are you going to pick. If you pick the Canadian one we're all gonna FRY.

- 19:51 So that's the model section. Next slide.
-
- Now let's go on to the weather that people really care about. We're going to show it's not becoming more extreme or dangerous

- Slide 26
- 20:00 and people are getting smarter by the day in dealing with weather problems.
- Next slide.
-
- Slide 27
- So you've heard the stories in the media, of course, that all extreme weather is getting worse and it's your fault.

- 20:15 And remember, the media wants to get eyeballs, your eyeballs, on their web page or on their TV or so on, so it's got to have something dramatic on it.

- 20:23 Whether it's true or not, is a different question but it's got to be a dramatic visual and what gives you more dramatic visuals than tornadoes and hurricanes and droughts and floods and fires, you know that's great stuff for the video. Next slide
-
- Slide 28
- Let's check this out.

- 20:40 Here's some headlines about the Atlantic hurricane season of 2020. It's devastating, breaks all time record Gulf coast, and my state is on the Gulf coast, is battered. Well we didn't have much damage here at all on the Gulf coast.

- 20:57 Notice in the Guardian, they're easy to pick on by the way for finding false statements, the Guardian here says:

- 21:04 Dozens of people have died this year as Theta becomes 29th major storm. Now think about Covid. We're talking about millions of people dying from this disease but, but what does the Guardian do?

- 21:16 Dozens of people have died. It's a pretty small number. Next slide.
-
- Slide 29
- Let's look at the numbers. On the left, you see the Atlantic hurricane season 2020 is in the blue.

- 21:26 And it is above the red average. Now in 1933 you can see the number was much higher. This is the accumulated cyclone energy.

- 21:38 This is the best metric because it tells you not only how long the hurricane lived, how fast it was, how devastating it was. So it adds up all that energy. This is the best way to describe a hurricane season.

- 21:52 In 1933 there was about 50% more ACE(Accumulated Cyclone Energy) than in 2020. So 2020 was not the worst year for hurricane energy. Now go to the north Pacific,

- 22:04 where lots of hurricanes are, it's barely above half of average. Not much happening to the north Indian Ocean. So when you add the total northern hemisphere

- 22:16 it was below average. You can't make a story out of that, can you? The year 2020 year was below average in the northern hemisphere and then, if you go global,

- 22:26 you'll find it was even further below average. So the hurricane season for 2020 was not anything to write home about. In fact, it was a little quieter than usual. Next slide.
-
- Slide 30
- So if you look at a time series, this is where 2020 ended up in global ACE. It's almost at the bottom.

- 22:48 Interestingly, the coolest northern hemisphere year was 1992. That was the year with the most hurricane energy and that tells you something about hurricanes.

- 22:58 That it's not how hot it is, it's do you have a contrast in temperature, and it's that contrast in temperature that creates the energy that wants to solve that gradient in temperature.

- 23:10   Next slide.
-

- Slide 31
- 23:13 Tornadoes. The United States has the most documented tornadoes, and so we keep pretty good track of them.
- 23:21 And you see that for the last 67 years the first half of that period averaged about 56 tornadoes a year, the second half, about 34 tornadoes a year.
- 23:30. How can you make a story out of that? Well it's pretty tough, except to say it looks like tornadoes are declining.
- 23:38 Now I'm a climatologist and study things for long periods of time. I would not be surprised if tornadoes turned around and went up again.
- 23:46 It's just what they do. It's a very nonlinear chaotic kind of system, especially in totals of these things so I'm just saying you don't see here and increase obviously in tornado production. Next slide.
-
- Slide 32
-
- 24:01 Droughts and Floods. So the flood is a blue. We have no real trend at all. Some months have a lot in the United States, some months have a little.
- 24:10. And in terms of areas of the United States and drought, if there is any trend in there it's slightly lessening. In other words, droughts are becoming less
- 24:20 over time, at least in the United States. But the high variability is historically there and it's not that there is any long term change at all in droughts and floods. Next slide.
-

  Slide 33
- 24:31 What about high temperatures? These are the records, the number of stations that had record high temperatures by year.
- 24:41 And so you see here that if you want to talk about record high temperatures in the United States you've got to go back to the 1930s.
- 24:47 that's where the real story is. In fact 14 of the top 15 years with the most heat records occurred before 1960. Here again is just simple evidence that indicates the extreme weather, the extreme hot days,
- 25:05 the number we're experiencing now is the same as it was 120 years ago. Next slide.
-

  Slide 34

- 25:12 Global Drought. We see here, there was kind of a bump there in 1983 that was related to some of the things El Nino did that year but, overall, the trend is flat. That droughts are not increasing globally, as you can see here. Next slide.
- Slide 35
- 25:30 Oh! Wildfires. If you lived in the United States this past year, especially August and September and October, it was just story after story of the

- 25:37 terrible fires out in the West, California. Again the Guardian, they're always great to attack. "California is wildfire hell; how 2020

- 25:47 became the state's worst ever fire season. Hmm, worst ever? Wonder what that means? Does it mean like there's never been a year with more fires than 2020.

- 26:00 That's kind of what it means. And other stories there you see about "record fires", "4 million acres" and so on, like that.

- 26:07 And see, like, you have a video of that fire. But that's just something that really catches your eyes and that's what the news really depends on. Next slide.
-
- Slide 36
- Well let's go back about 400 years and look at North America, fires and you can see here the coverage of the fires.

- 26:23 The are quite a bit all the way up till European settlement and the basic idea here is that Europeans when they built stuff and had farms, they didn't want their stuff to burn up.

- 26:35. So they figured out how to stop fires. Prior to this time, when the fire was started by lightning or Native Americans it burned and burned and burned till the fall rains came. So places just got burned up like crazy. Europeans didn't like that so

- 26:51 they put out fires and got pretty good at it,

- 26:54 not thinking about what they were ultimately doing, other than just saving their own stuff. California became state in 1850 and you can see there that there are some pretty big wildfire extents back in 1850. Next slide.
- Slide 37
- 27:14 This is me on some my property, a little bit of property in California foothills.
- The places that burn up all the time.

- 27:21 Look at what one of the most thorough studies did there on the top paragraph on the right, the blue. It says pre European burn area was four and a half to 12 million acres in California per year.

- 27:35 That was the average four and a half to 12 million acres every year.

- 27:42 But as I said, once Europeans got in there and they practiced fire suppression, boy that number went way way down.

- 27:49 That means a lot of stuff that was dry and dead didn't burn up and so it's laying around and, in fact, after the 2012 to 2015 drought in the Sierra of California

- 28:02 the forest were weakened. The bark Beatles came in, because the trees did not have the proper defense, being in a weakened state, and they kill the trees. In fact in places 80% of the trees were
-
- 28:14 killed, but they were left standing and they dried out because California did not like you to touch any kind of Mother Nature stuff and so you couldn't take out a dead tree.

- 28:25 So now you got 150 million dead dead trees in your forests and like I said in places it was 80% killed.

- 28:37 2020 took care of a lot of those dead trees.Iit doesn't take much of a fire in a very dry, dead, wood forest for something to get going.

- 28:49 And so, that is the situation they're living with, and even then, even then, the total acreage in California was less than four and a half million acres it was not the worst ever fire season, because it didn't even make it up to the average over the last 10,000 years. Next slide.
-

Slide 38
- 29:10 And so I showed this cartoon before. If you want to buy or build a house in the foothills of California, you know you're putting it in the midst of a bunch of matchsticks ready to go.

- 29:22 Okay next slide.
-

Slide 39
- 29:24And then globally everyone's getting into the act now about putting out fires, and so you see that globally, the amount of acreage burned has been falling.

- 29:34 In the top one year by year, satellite estimates now show these falling and then the lower one decade by decade indicates the same thing, that

- 29:44 the amount of forest fires and wildfires are declining because people are applying fire suppression techniques. It's probably not a good thing, because some, especially in California.

- 29:55. A lot of those biomes depend on burning every three years. That's the way they live and stay healthy, if they burn every three years. And yet that's been not allowed, and so that has really changed the problem out there. Next slide.
-

Slide 40

- 30:10 Snow. Someone said about snow, "It is never going to happen again". Well you know we have satellites and they look down and see how much snow coverage there is in the northern hemisphere.

- 30:20 And it goes up and down year to year but, as you can see, there is no trend at all. It still snows in the northern hemisphere and about the same amount every year.
- Next slide.
-

Slide 41

- 30:36 We look at Arctic Sea ice. Now you got to kind of turn your brain around, if you look at the upper left picture, today is on the left and 10,000 years ago is on the right.

- 30:45 So, if you look at past the past few thousand years, or from 10,000 to 3000 years or so,

- 30:53 ice in the Arctic, was very low. The coverage is very low, big open space expanses of sea ice all the time for thousands of years and it's only been in the last 1500 years that you see the concentration of sea ice is increasing,

- 31:07 peaking at the Little Ice Age, which ended about 170 years ago, about 1850. So the sea ice in the Arctic reached its maximum

- 31:18 amount or extent about 175 years ago.

- 31:24 And it has bounced back since then. There at bottom right it's another picture of the same thing. This shows low values of sea ice on top high on the bottom and you see that low values really dominated the period 6000 to 8000 years ago.

- 31:40 So we're in a coldish period in terms of the Arctic right now. On the bottom left is the last,

- 31:47. (How many years? I believe it's the last about 40 years.)

- 31:52 40 years. The blue is the Arctic, northern hemisphere, and it declined as we've all been made aware of. The red is the sea ice around the Antarctic.

- 32:03 And the sea ice around the Antarctic has shown an increase up to 2014, then a series of huge storms came that busted up the ice and sent it to lower latitudes where it melted

- 32:13 and really dropped it to about 2017 to a low amount, and since 2017 it's been struggling back up and, if you look very, very carefully at the very last thin

- 32:28 red line there, the monthly value, it's above average again back in Antarctica. The two basins are very different. Antarctica has no boundary. It

- 32:39 goes to the equator, you know, because there's just water as you go toward the equator from Antarctica, so it can grow if it wants to.

- 32:47 Arctic Sea ice is pretty much confined. I mean it's in that Arctic basin there and it doesn't have much way to go out. It can only go down and back to normal, back down and back to normal so it's a different kind of metric there. Next slide.
-

Slide 42
- 33:02 When you look at sea level, sea level depends on how much ice is on land and if it melts it fills up the sea and the sea goes up. So if you look at last 5 million years on the top,

- 33:13 for the first two of those million years about 10 to 25 meters higher than it is today.

- 33:20 Then we went in to this Ice Age type of cycle, up and down, up and down, getting the amplitude bigger and bigger and the lowest point, lower and lower, until the very last one just 20,000 years ago

- 33:32 where sea level went way dow. If you look at the bottom left you see that sea level in these past 24,000 years was 120 meters lower than what it is now. Florida was twice as big as it is now because of that

- 33:48 Continental Shelf.

- 33:50 Then the sea level rose rapidly as the ice age ice
- 33:56 melted, especially in the North American continent, and sea level rose rapidly, and I mean rapidly like

- 34:08 about 12 and a half centimeters per decade for 8000 years.

- 34:16 Now what's it now? Two and a half to three centimeters per decade.

- 34:20 8000 years it was four or five times that, and, you know, the world did OK, as far as I can tell. Now let's look at the last 10,000 years on the bottom right.

- 34:32 On the left it's a sea level, you gotta look very carefully, but on the left, if you look carefully, you will see.

- 34:38 that about 1000 years ago the sea level was two to three meters higher than it is today, and then it fell, as you go to the right,

- 34:46 down to current day. And, if you look very, very carefully at the very right hand bit you see what's happened

- 34:54 in the last 200 years. There's been a little bit turned back up, in other words for for most of the sea ice or sea level records, we have the lowest level in the last 10,000 years or 8000 years, was reached about

- 35:11 1850 or 1860 and then that's when sea level started to rise again about 1860 and that's what we'll see in the next slide.
-

Slide 43
- 35:20 So about 1860 it started rising. If you look at the lower left you see that that's what's happened last 120 years. It is a pretty

- 35:29 rapid rise there about 1920 to 1960 or 1930 to 1960, a similar rise to the rise we've seen in the last four years.

- 35:41 Models have tried to reproduce the real sea level, but you can see in the green words there, it says actual model result and you see just a very minor change and sea level,

- 35:54 nothing like what actually happened. And then they do what they call "post-hoc corrections" which means, you know, really my model didn't do too well and what can I jimmy - one thing in the output. I'm going to take the output and

- 36:05 play with it and see if I get better answer and you see it didn't quite get to what needed to be.

- 36:13 But what it says, if we look at the column there it tells you that two to three meters higher 7000 years ago six to nine meters higher 130,000 years ago 10 to 25 meters higher

- 36:25 33 million years ago and that the glaciers in the past 10,000 years reach their highest extent, and therefore the sea level the lowest level around 1850.

- 36:37. And then sea level started rise at that point, and then you see the two rates of rise, the first one we can't blame on humans - that's just Mother Nature melting ice - and

- 36:48 the second one, though, it is popular to blame on humans. About 70% of that rise is due to added water from this melting ice and about 25% from the thermal expansion of the upper layer of the ocean, if you look at that top line that's the last

- 37:05 25 years or so, and we see

- 37:10 satellites have gotten into this piece of information that rises about three centimeters per decade.

- 37:17 And last if you look at the last five years it's just not much rise at all so we're.

- 37:24 not seeing that kind of rapid accelerating sea level rise that folks have been talking about.

- 37:32 So you know if you're talking about three centimeters a decade that's 30 centimeters per

- 37:38 100 years you also are talking about this much sea level.

- 37:45 I wonder if humanity can handle that if given 100 years. You know, I suppose, they can. In fact what we worry about here in Alabama on the Gulf coast is not

- 37:57 an inch per decade, it's 20 feet in six hours and that's what happens when a hurricane comes, and let me tell you, if you're ready for 20 feet of rise and six hours you can handle 30 centimeters in 100 years. Next slide.
-

  Slide 44
- 38:14 And then, most important for human folks, is that we see on the left the wealth we have and we see that the wealth that is lost to these kind of weather disasters and so on, it's actually been declining.
  So we get smarter about how we build things. In the upper right we've really gotten smarter, because here are the climate related deaths from weather type events.
  It has plummeted. We just know better, how to deal with the weather, how to forecast, how to warn people and to build things better, and so we've seen these - both plots on the right, show the amount of deaths have been declining. Now remember what the Guardian said: “Dozens”. “Dozens of people have died from these hurricanes”. When you look in the past, and you see hundreds of thousands of people had died before. Next slide.
-

  Slide 45
- 39:13. So progress toward eradicating poverty is going to keep going on, and you can't eradicate poverty without energy and energy today is primarily from carbon and that's going to continue. Next slide.
-
- Slide 46
- So I mentioned this before, but it's just such a remarkable comment it is still with me, that a very wealthy environmentalist, I mean very wealthy, said the Chinese lifted 400 million people out of poverty by building a coal fired power plant every week. Next slide.
-
- Slide 47
- and that was bad. He thought that was bad because it puts CO_2 in the air. Next slide.

- Slide 48

- But you know it was viewed as good by those 400 million people, and because they're no longer living in that kind of abject poverty. In 2020 China's coal use rose to its highest level in the last five years

- 40:07 and the record cold temperatures, this really hit them this year, the record cold temperatures in parts of China in early 2021 actually froze up some of the windmills and so their power production went way down from those renewable sources.
  They had blackouts and terrible situations because their energy, any energy,
- that depends upon the renewables was just not going to come through when it really, really got cold and people really, really needed it. Next slide.

-

  Slide 49
- 40:38 So there is just an undeniable force that no one wants to be poor and we're going to see the rest of the world continuing on that plan of development, that they don't want to be poor and you and I aren't going to stop them. Next slide.
-
- Slide 50
- The EIA is now a kind of a global warming aficionado.
  They used to be very factual and didn't have comments about things like this, but now the reports are full of "we've got to stop CO_2 and so on", but even they look at real numbers and so they show that the amount of CO_2 will actually keep growing and won't be peaking before 2040. Next slide.

-

  Slide 51

  41:20 And this was the exercise I did for the US Congress when they were asking "Well if we had this legislation that removed

- 41:27 this much CO_2 from the air, you know is that going to change the climate?" you know, "if we move this much CO_2 will that change the plan?" I said I'll make it simple for you. Let's just eliminate the entire United States: no people no cars, no factories, nothing. Let's just eliminate it.

- 41:46 And that's the impact, if you believe the climate models; that the impact is less than what we see bouncing around month to month in the global temperature.

- 41:56 anomalies. So, no, even if you make the United States go away today, not just some little legislative thing about making cars go 40 miles per gallon rather than 30 mpg I mean just take us off the face of the earth.

- 42:11. We will not impact the climate enough to notice it. Next slide.
-

  Slide 52
- 42:16 So the three points that I wanted to leave you with today are:

- (1) The established global warming theory significantly misrepresents the impact of extra greenhouse gases. We'v got to get that point across. It's really hard because we're just outgunned and out moneyed by those who want an alarming story. But we'v got to keep to the scientific method, demonstrating that theories, or hypotheses I should say, can be tested and they often fail.
- (2) Second, that the weather, that really affects people most is not becoming more extreme or dangerous and we actually know how to handle a lot of this now.
- (3) Progress in eradicating poverty, based on accessible and affordable energy, which is carbon today, is continuing, and you can see, this chart that NOAA put out, and also by the global warming policy foundation (that looks like Josh's handwriting there at the bottom). All of these tremendous agreements that we've been told, have happened.
- Do you see any impact at all that they've had on that rising CO2 line? I don't see any, in other words, the world is going to keep going on this carbon diet because that is the most accessible way for folks to be taken out of poverty in the world today and that's going to continue, no matter what we think or do. Next slide.
-

  Slide 53
- 43:37 So in 2019, this is what I told the group:
- "The average American is smarter than you think. They recognize it when an elitist is exaggerating a story, the end result of which is to deny this average guy some aspect of life, he or she wants and needs (while the elitist maintains a luxurious lifestyle).
  Now this is my comment for the day after the election here in the United States:
- (By the way, things are going on fine as far as I can tell them. No one's running out in the streets here demonstrating or anything).

- "2021 the average American is going to learn what a political party who wants to eliminate carbon usage is going to mean for their lives.
- However, if re election is still a main driving force of the current party, perhaps this party will look for hard evidence to find excuses for not punishing the electorate with higher and higher energy prices".
- In other words, I kind of suspect that there's going to be people in the administration, no matter how loud they talk about climate alarm, who say, "You know, we want to be reelected in four years, and you really can't do that if you make a lot of people mad by taking money out of their pockets and giving them nothing in return" and that happens when you increase gasoline prices.
  You get the same gasoline but with more money, so therefore you got nothing in return. You lost. Your wealth went down. And so they're going to have to worry about keeping the electorate at least somewhat happy. Next slide.
-

  Slide 54
- 45:14 Now you can imagine that some of these things I said are very controversial over here and I bet in Europe, you know, you have heard many of these kind of things.
  And so, when someone like me demonstrates that claims of climate campaigners are exaggerated or false you're going to be isolated, denigrated, criticized from the climate establishment and major media.
  And now in 2021 the elected Federal Government is going to be joining in on trying to

criticize folks like me, and all I can come back with is facts. I think you saw slide after slide what I was showing you with numbers, you know the real facts of the situation. Those don't seem to matter at this point, but I think somehow they are eventually. They're going to get into the system and they're going to make a difference, I hope.

- Next slide.
- Slide 55
- 46:01 All right, believe that's it, so thank you very much for having me, and I hope you enjoyed the talk today.
- Slide 56
- There is this additional slide at the end of the presentation that he did not show or comment on.
- It appears to illustrate his point that over the last 50 years there has not been a discernible uptrend in Tropical Storm & Hurricane activity globally as measured by storm-days per year.