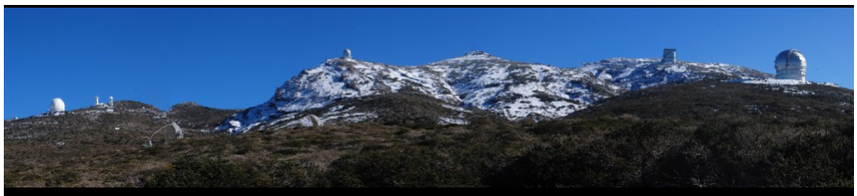

← A physicist for president? Responsible SciComm →

Some thoughts about science advice

Posted on March 24, 2020 by ...and Then There's Physics

I hope everyone is keeping well and listening to all the advice which, in the UK, is basically to stay at home and to only go outside for food, some exercise, or to go to work (where this cannot be done from home). Also, wash your hands. Although I am trying to work from home, it's not something I'm particularly good at at the best of times, and these are not exactly the best of times. As such, I have plenty of time for thinking about possible blog posts, but I find it hard to know what to actually write about. It seems that there are currently more important things to worry about that people misrepresenting climate science, but I don't really feel that I have the expertise to write about the current topic.

I also don't particularly like making associations between our current situation and how we might address climate change. What we're doing now might lead to a reduction in a emissions, but this isn't something to be particularly happy about. We'd really like to reduce emissions in ways that aren't nearly as disruptive and that don't lead to substantial suffering. What we're doing now isn't – in my view – a blueprint for climate action.

However, there are some aspects that I have found of interest. It certainly seems that we are capable of making difficult decisions, and committing substantial resrouces, when it becomes clear that we need to do so. We certainly seem to be doing things now that, until recently, many would probably have regarded as being impossible. Although there has been some pushback, it currently seems rather muted; most seem to accept the need for what we're doing.

The role that science advisors have played has also been interesting. Anyone involved in the public climate debate will be aware of the constant reminders that science can't tell us what to do. Although this is clearly true in a literal sense, it does seem as though this is a case where the scientific evidence makes it pretty obvious what needs to be done. Of course, it's not that we're now ignoring our values, it's that it's pretty obvious that a strategy that will lead to a large number of unavoidable deaths is simply not acceptable. So, maybe the linear model does essentially work in some circumstances?

The complication, however, is that we'd probably like to be making decisions that help us to avoid getting to the stage where what we need to do is obvious. However, if we haven't yet got to that stage, there will not only be more disagreement about what we should do, but it will also be more difficult to convince people to do things that might be inconvenient and disruptive. Maybe we'll come out of this whole situation with a better appreciation of the role of science advisors and a improved understanding of the need to sometimes make difficult decisions before it becomes obvious that we really need to do so?

On the other hand, maybe we'll see this as rather unprecedented and will simply hope that we never have to do anything like this again. Some combination of the two would be my preference; learn something from this about the role of effective science advice, while also hoping that we don't have to do anything like this again. Anyway, this is just some thoughts I've had about this. I'd be interested in what others think and, since this is a time of isolation and/or social distancing, feel free to use the comments as a pleasant communication channel.

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70 Responses to *Some thoughts about science advice*

Sean *says:*
March 24, 2020 at 7:13 pm

"We'd probably like to be making decisions that help us to avoid getting to the stage where what we need to do is obvious" — a good rule for life, perhaps?

Everett F Sargent *says:*
March 24, 2020 at 7:26 pm

Well, the current situation suggests something about air travel, in particular.

John Hartz *says:*
March 24, 2020 at 7:58 pm

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Yuval Noah Harari's opinion piece is heads and shoulders above others I have come across since the breakout od COVID-19. He adroitly lays out what humanity must do in order to avoid the millions of deaths that have occurred in past pandemics.

In the Battle Against Coronavirus, Humanity Lacks Leadership by Yuval Noah Harari, Time Magazine, Mar 15, 2020

Note: Noah Harari is a historian, philosopher and the bestselling author of Sapiens, Homo Deus and 21 Lessons for the 21st Century.

...and Then There's Physics *says:*
March 24, 2020 at 8:17 pm

JH,
Thanks, that is a good article.

RickA *says:*
March 24, 2020 at 8:50 pm

Unlike with a measured pandemic, reasonable people can disagree over the scope of the problem of global warming. Furthermore, reasonable people can disagree over the solution to the problem of global warming, no matter what level you think the problem amounts to.

To me, it seems obvious that we should be replacing our fossil fuel power plants with stage 4 passively cooled nuclear power plants and also recycling nuclear power plants, to reprocess the existing nuclear waste, because we know we can produce enough baseload power with nuclear power to replace the fossil fuel power. I would shoot for 80% nuclear power and 20% renewable power. We will need triple our current power if we run all our vehicles with electricity and have to heat with electricity (for all natural gas heating and cooking), so we need a lot more power if we eliminate fossil fuels.

But even though this is obvious to me – it is not so obvious to others. Hence the problem. The solution is just not that obvious – so we just muddle along and the world gets 80% of its energy from fossil fuels.

The USA could do this switchover in 15 to 20 years. All it takes is for people to decide on the obvious – we need more nuclear power and a lot more of it.

I have been advocating this since 2009, but have made zero progress.

Oh well – I will keep expressing my opinion and hope for the best.

John Hartz *says:*
March 24, 2020 at 9:17 pm

Effective solutions to both the COVID-19 pandemic and to man-made climate change have one big thing in common, i.e., they must be global. This means that international coordination and cooperation must be paramount. Does humanity have the collective will to do so?

John Hartz *says:*
March 24, 2020 at 9:19 pm

RickA: You need to go beyond expressing your opinion and hoping for the best. Join an activitst organization become active in it.

...and Then There's Physics *says:*
March 24, 2020 at 9:24 pm

Rick,

> *reasonable people can disagree over the scope of the problem of global warming. Furthermore, reasonable people can disagree over the solution to the problem of global warming, no matter what level you think the problem amounts to.*

This is sort of what I was getting at, though. Reasonable people can, of course, disagree about many things in many circumstances. Maybe we decide not to do anything too drastic and not to actively try to do anything to reduce emissions. Maybe we end up being lucky. We could find that alternatives start to dominate without much in the way of intervention (I actually think this is becoming more likely). Maybe we're lucky and climate sensitivity ends up being low. Maybe the impacts aren't as severe as we think they might be.

However, maybe we aren't, and our emissions keep rising, climate sensitivity ends up being high and the impacts end up being more severe than we expect. If the scientific evidence is broadly correct, then this is irreversible and we may well end up in a situation where it becomes obvious that we haven't done enough, that we've left things too late, and that we're essentially forced to do things that we'd really rather not do.

We might then decide that it would have been better to have taken this more seriously in the past and actively done more, even though the people who were disagreeing were all reasonable people.

David B Benson *says:*
March 24, 2020 at 9:32 pm

RickA — How about just plugging away at the idea that the world needs to move transportation, space heating as well as electricity entirely to low carbon electricity? Let the experts pick the choice of low carbon generators.

Lots of details are available:
https://bravenewclimate.proboards.com/board/4/energy

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John Hartz *says:*
March 24, 2020 at 9:43 pm

ATTP: Perhaps we should not assume that the majority of humankind is reasonable. Is there a commonly accepted definition of "reasonable" among behavioral scientists?

RickA *says:*
March 24, 2020 at 9:48 pm

ATTP:

Yes – you are correct. What you are saying is we don't know what the future holds. ECS could be on the low end or on the high end and if it is on the high end, we will be wishing we had done more in 2020. That is true.

However, we don't know today what ECS will turn out to be and that is why nothing is getting done.

Unlike with the pandemic, which is being measured every day and which we know is actually happening. Like with the high ECS case, don't we all wish we had done more in the past to prepare for a pandemic? But we didn't do more to prepare – did we. We didn't act until we actually knew we had a big problem – not just speculated that at some point in the future we might have a big problem.

That is human nature.

I still don't understand why a majority of the people don't advocate for nuclear power – but they don't. At least not yet. My guess is that once the problem is here and undeniable (which is not the case today), people will stop worrying about radiation and we will go nuclear in a big way. But that could take until 2050 or 2080 or 2100 (or it may never happen).

The sea has been rising for 20,000 years, and has risen 120 meters in that time, and nobody cared until 30 years ago (like 2 1/2 inches of SLR ago). People have been unknowingly moving to higher ground for millennium and it really hasn't been a problem – at least not one that people noticed. Now that we can measure the SLR, we are all of the sudden worried.

That too is human nature.

The solution to our problem is within our grasp – all we have to do is go nuclear (a known solution). Or we could try for fusion (an unknown solution which we have been working on for 50 years) or mostly renewable (another unknown solution which we are working on), or some other invention (say space based solar). Me – I say go for the known solution, and keep working on the better solutions.

However, I am in the minority (for now).

RickA *says:*
March 24, 2020 at 9:55 pm

David B Benson:

Yes – that is kind of what I am doing. I am just passively expressing my personal opinion of choice of low carbon solution (i.e. nuclear).

But of course the experts will weigh in with their opinions.

Which baseload (i.e. not intermittent) low carbon generator are you in favor of?

...and Then There's Physics *says:*
March 24, 2020 at 9:58 pm

Rick,

> *Unlike with the pandemic, which is being measured every day and which we know is actually happening. Like with the high ECS case, don't we all wish we had done more in the past to prepare for a pandemic? But we didn't do more to prepare – did we. We didn't act until we actually knew we had a big problem – not just speculated that at some point in the future we might have a big problem.*
>
> *That is human nature.*

Yes, but maybe we can try to at least learn something from these type of situations. On the other hand, maybe not.

daveburton *says:*
March 24, 2020 at 9:59 pm

[*ButCAGW -w*]

That's a mistake which can have deadly consequences. In South Korea, one person, who they're calling "Patient 31," didn't "believe in" the coronavirus emergency, and went on living her life as if she were not ill. Her irresponsibility has directly or indirectly caused the infection of about 2500 other people, so far.

[*ButCAGW -w*]

Be safe out there.

...and Then There's Physics *says:*
March 24, 2020 at 10:11 pm

Dave,

Symptons of the Universe
- Putting a spin on a PhD March 24, 2020

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- Idiot Tracker
- Graham Readfearn
- Skepticblog
- What'sUpWithThatWatts, et al.
- Rabett Run
- Watching the Deniers
- HotWhopper
- ThinkProgress - Medium
- Skeptical Science
- Wott's Up With That?
- Open Mind

> *Folks, this pandemic is not a false alarm. This is not another batch of superstitious paranoiacs, and scammers ginning up a fake "emergency" to pad their pockets. This one is real.*

Yes, I don't think many (any?) here would disagree. The earlier parts of your comment are less sensible, though.

David B Benson *says:*
March 24, 2020 at 10:26 pm

RickA — I live in the Pacific Northwest where we have an embarrassment of hydropower. That's not generally available. Countries in the European Union appear to be pushing for so-called green hydrogen https://bravenewclimate.proboards.com/thread/718/hydrogen-fuel being currently uninterested in nuclear power plants. However, former Soviet bloc countries continue to desire modern nuclear power plants to replace their aging ones.

I currently don't perceive a "best" technology for all localities.

RickA *says:*
March 24, 2020 at 10:36 pm

ATTP says "Yes, but maybe we can try to at least learn something from these type of situations. On the other hand, maybe not."

That would be nice and I am not against that.

Still – we have a real solution in hand (nuclear) – and it is being rejected. Why? Because it isn't green enough and people are afraid of radiation.

Someday, people will have to choose between CO_2 or radiation – because right now we are producing 80-85% (worldwide) of our energy with fossil fuel (i.e. CO_2 emitting). That is what we are choosing to do because we are not willing to use the only other in hand solution we have (nuclear power). That is just human nature and maybe with more education that will change (I am not holding my breath).

All the other speculative solutions are just pie in the sky and have not been invented yet (in my opinion). For mostly renewable, because solar and wind are intermittent, we need to invent giant grid level power storage, for at least 12 hours (i.e. nighttime – half the planet is always in nighttime), but maybe for a week or even longer (cloudy and not windy – it happens). We have not yet invented grid level power storage. A mostly renewable solution is not yet in hand – it is yet to be invented. And because mostly renewable is an intermittent solution you have to build out two systems (the backup for when it is dark and not windy). Ditto for fusion – not invented yet. We have put as much Hydro in place as we can (and some want to get rid of what we have for the environment). Some want to turn off our nuclear (20% of power generation in the USA) because they don't approve of nuclear power. Germany did turn off its nuclear power, because of Fukushima, and emits more CO_2 because of that decision. I personally am not aware of any other non-intermittent low carbon power generator other than nuclear. Humans can be stubborn.

I gave money to the B612 organization – to try to look for asteroids which could hit Earth, which are too small for NASA to be searching for. So people do try to plan ahead. But if an asteroid was heading for Earth within the next five or 10 years, we really aren't ready for that problem either. We would be wishing we had done more to prepare, just like with every other type of disaster. An asteroid strike on Earth would be as big a problem as global warming or even bigger – what are we doing to prepare for that? It is just a matter of time until another one hits.

There are a lot of potential disasters to allocate resources towards.

...and Then There's Physics *says:*
March 24, 2020 at 10:40 pm

Rick,
It doesn't have to be everything versus climate change. That climate change might be something we should be taking seriously (as I think it is) doesn't mean that there aren't other things we should take seriously too. That a viable alternative to fossil fuels is rejected by many (nuclear) doesn't suddenly mean that we shouldn't take climate change seriously.

RickA *says:*
March 24, 2020 at 10:50 pm

David B Benson:

Yes – Hydro is great. I wish we could get more, but I think we have about tapped out hydro (at least in the USA).

I live in Minnesota and we have some hydro here. We have a lot of wind in Minnesota also. Not so great for solar (we have an average of like 4 hours of light in Minnesota) and snow on the panels is a problem. But most of our power is fossil fuel based in Minnesota. A lot of natural gas is used for heating during winter. We have two nuclear power plants and generate 20% of all our power with nuclear. It doesn't take up much space either – good high density power generation. I would like to see 4 or 6 more nuclear power plants in Minnesota. Not likely to see that anytime soon. People are just too afraid of radiation – even though they love to go out in the sun and get a tan (people are a bit weird).

RickA *says:*
March 24, 2020 at 10:53 pm

ATTP:

Oh – I agree. I do take climate change seriously.

That is why I advocate for nuclear power as my solution for the problem.

It would generate all the power we need, and it is low carbon emitting. Problem solved!

Alas – not many are willing to build more of it (even fourth generation much safer designs).

David B Benson *says:*
March 24, 2020 at 11:02 pm

RickA — For Minnesota consider following the plans in Finland to use a new nuclear power plant for CHP, combined heat and power. This might help you to convince others.

RickA *says:*
March 24, 2020 at 11:40 pm

David:

Yes – that is a good idea. I think downtown Minneapolis has some combined heat and power now, but it is fossil fuel based.

David B Benson *says:*
March 24, 2020 at 11:49 pm

Something to read while you are house-bound:
https://atomicinsights.com/atomic-show-269-robert-bryce-a-question-of-power/

angech *says:*
March 25, 2020 at 12:29 am

John Hartz says:
"ATTP: Perhaps we should not assume that the majority of humankind is reasonable. Is there a commonly accepted definition of "reasonable" among behavioral scientists?"
–
Looked it up in Wiki for you JH
Reasonable, adjective. Definition. Behavioural scientist, actions thoughts and ways of behaviour of a behavioral scientist.
–
Reasonable behaviour would suggest mitigation and curve flattening akin to Climate philosophy here being driven by consideration of the well being of all human beings.
Sensible behaviour would dictate letting the process run its course, obtain sufficient herd immunity and mitigate the social and economic devastation occurring that is wrecking everyone's lives.
–
Well not mine actually, Being in retirement is sort of like suffering from the corona virus shutdown permanently. Except for the shortage of life's essentials. Sigh.
–
Still months or more of uncertainty. Dead cat bounce on the stock market today.
Buy if they find a cure or the death rate drops below 1% of confirmed cases.
Reasonable or sensible behaviour John?
I think the money wins.

angech *says:*
March 25, 2020 at 12:30 am

That was quick!😉

Jon Kirwan *says:*
March 25, 2020 at 12:32 am

I just have a short comment.

I've seen the substantial changes in lifestyle that the hoi polloi are taking, here in the US, in very, very short order. A matter of days, in fact. This means that an entire society of hundreds of millions of people can, in fact, change their behavior **overnight**. So any argument to the contrary is disproved by what I see, right now.

What isn't clear is how long it can be sustained. So while I see abundant proof here that people can suddenly shift their personal actions quite literally "like the winds," the question would be how various vulnerable groups are impacted by it and whether or not all of it can be carried on for extended times.

But it has been an interesting lesson to me. I know one thing. We can change. And fast. The only issues are planning out how to help vulnerable people to better cope with such changes and how to sustain those changes over a longer term.

But now I know that psychological "arguments" that we cannot make these kinds of changes quickly are completely without value. They are simply wrong.

Keith McClary *says:*
March 25, 2020 at 12:38 am

"The sea has been rising for 20,000 years, and has risen 120 meters in that time, and nobody cared until 30 years ago (like 2 1/2 inches of SLR ago). People have been unknowingly moving to higher ground for millennium and it really hasn't been a problem – at least not one that people noticed."

That's because it pretty much stopped rising 6,000 years ago.

RickA *says:*
March 25, 2020 at 1:03 am

Keith:

Sure. But nobody noticed anything from 6000 years ago to 1990 either.

8 inches in the 20th century wasn't too much of an issue, at least that I heard of.

Paul Pukite (@WHUT) *says:*
March 25, 2020 at 1:32 am

One aspect of the pandemic is that everyone with any math acumen is becoming aware of contagion models such as the SIR compartmental model, where S I R stands for Susceptible, Infectious, and Recovered. The Infectious part of the time progression within a population resembles a bell curve that peaks at a particular point indicating maximum contagiousness. We hope that this either peaks early or that it doesn't peak at too high a level.

One other area that these compartmental models come up is in the modeling of oil depletion, where the S I R model corresponds to Sequestered (in the ground), Identified (i.e. discovered), and Recovered (i.e. extracted). This has been progressing over the course of decades, with the global peak of the discovered oil occurring by the end of the 1960's and on a downhill trajectory since then — a slow but relentless extraction drawdown with the citizenry barely being aware of this fact. Nowhere near as sudden as what we're going through now as the full S I R coronavirus cycle completes in a matter of months. And this virus cycle may recur again, but the S I R version for oil will not — as oil does not reproduce.

John Hartz *says:*
March 25, 2020 at 4:24 am

RickA:

Please document the source of your assertion that SLR was 8 inches in the 20th century.

Keith McClary *says:*
March 25, 2020 at 4:55 am

RickA:
"But nobody noticed anything from 6000 years ago to 1990 either."

That's what I said, there wasn't much SLR since 6000 years ago – it was all from 20,000 to 6,000 years ago. Sea level declined from 900AD to 1900AD (according to conventional scientists) but has shot up since then.

...and Then There's Physics *says:*
March 25, 2020 at 7:40 am

Interesting, and somewhat relevant, article about climate and coronavirus, by Eric Schliesser and Eric Winsberg. Eric and I wrote a joint post last year about extreme weather event attribution, and Willard did a post about Eric's Memes.

Marco *says:*
March 25, 2020 at 8:30 am

"The earlier parts of your comment are less sensible, though."

They're not less sensible, they're outright malicious. Dave is blaming people who warn about the negative impacts of climate change for others being asinine about the current pandemic.

...and Then There's Physics *says:*
March 25, 2020 at 9:03 am

Marco,
Ahh, yes. I have to admit that I started glossing over Dave's comment when I got to the second paragraph.

Steven Mosher *says:*
March 25, 2020 at 9:07 am

"This means that international coordination and cooperation must be paramount. Does humanity have the collective will to do so?"

no, they don't have it.

pendantry *says:*
March 25, 2020 at 9:29 am

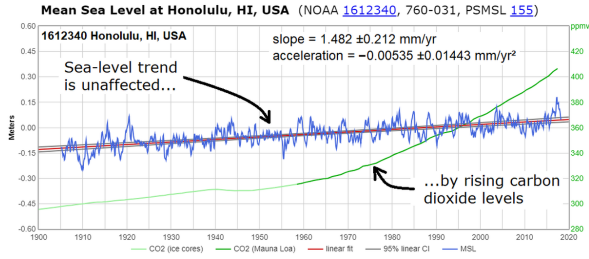
> *It certainly seems that we are capable of making difficult decisions, and committing substantial resrouces, when it becomes clear that we need to do so.*

Homo fatuus brutus does so **only** when it becomes clear that it needs to do so. Therein lies the problem.

daveburton *says:*
March 25, 2020 at 9:46 am

John Hartz wrote, "RickA: Please document the source of your assertion that SLR was 8 inches in the 20th century."

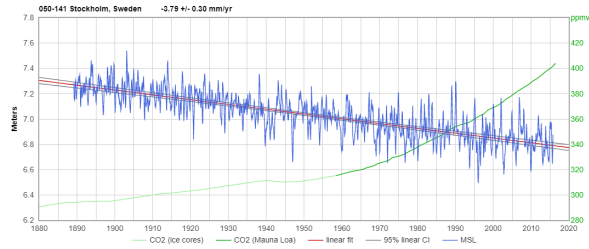
That's about right, for locations with little or no vertical land motion, like Honolulu:



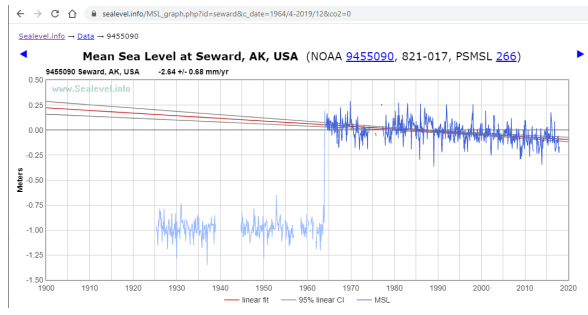
1.482 ±0.212 mm/yr × 100 yrs / (25.4 mm/in) = 5.00 to 6.67 inches.

So, yes, it's pretty close to 8 inches over 100 years.

Of course, that doesn't apply to locations with a lot of vertical land motion, like New Orleans (sinking) and Stockholm (rising):



Vertical land motion can make a very big difference. Here's a location which got three feet of sea-level rise during the 20th century... and it was all on the same day (56 years ago on Friday):



...and Then There's Physics *says:*
March 25, 2020 at 9:50 am

Dave,
I appreciate that we are in rather unprecedented times and it would be nice to be accomodating and pleasant to others. However, there is a limit to what I'm willing to have posted in the comments on my blog. Non-expert assessments of sea level rise comes pretty close (and is possible) over the limit of what I'm willing to accomodate.

Paul Pukite 🌏 (@WHUT) *says:*
March 25, 2020 at 10:54 am

Dave Burton glosses over the geophysics in his goal to add to the FUD. Global sea-level rise will change the earth's moment-of-inertia and this will impact the earth's length-of-day (LOD) deviations, which can be measured with extreme accuracy. Check this post to see how precisely delta LOD can be modeled by lunisolar tidal forces, with the rest due to multidecadal changes

https://geoenergymath.com/2019/02/13/length-of-day/

Prince Charles get well.

RickA *says:*
March 25, 2020 at 12:03 pm

John Hartz:

https://en.wikipedia.org/wiki/Sea_level_rise

"Since at least the start of the 20th century, the average global sea level has been rising. Between 1900 and 2016, the sea level rose by 16–21 cm (6.3–8.3 in).[2]"

The citation is to USGCRP (2017). "Climate Science Special Report. Chapter 12: Sea Level Rise". science2017.globalchange.gov. Retrieved 2018-12-27.

Chubbs *says:*
March 25, 2020 at 12:28 pm

One common climate/covid response: the desire to second-guess experts, by overestimating ones own expertise/ability. Some good climate examples above.

John Hartz *says:*
March 25, 2020 at 1:25 pm

Rick A: You stated "20th Century", not 116 years.

Dave_Geologist *says:*
March 25, 2020 at 1:32 pm

And how many hundreds did you have to search through, Dave, to find the ones you liked? Or did you just copy some denier "talking points" that are already in circulation?

BTW Hawaii is a volcanic island. They sink as they cool. That's how coral atolls form – Darwin had it sussed 150 years ago, around the same time the greenhouse effect was first understood. Apparently some people are slow on the uptake. 150 years slow.

It will sink faster in due course as it moves away from the hotspot. Then the rate of sinking will decline exponentially. But even now, any fixed marker will (other things being equal) sink isostatically under the load of the huge shield volcano. Even when an island is getting taller, that's by adding more lava on top. The stuff that was already there gets pulled downwards as the underlying lithosphere sinks and displaces asthenosphere due to the increased load and, short term, due to evacuation of magma chambers.

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jeffnsails850 *says:*
March 25, 2020 at 1:42 pm

ATTP: "That a viable alternative to fossil fuels is rejected by many (nuclear) doesn't suddenly mean that we shouldn't take climate change seriously."

It means we should take climate as seriously as those who dismiss viable alternatives. It means that there is a consensus that political motivation and economics trump "action" on both sides of the divide. It means that we have a consensus that this isn't really an existential threat (otherwise nobody would be anti-nuke advocates) and any press or blog posts to the contrary can be legitimately dismissed.
All of that is compatible with the argument that climate change is, indeed, serious. But it means we clearly have plenty of time to chat about solutions.

...and Then There's Physics *says:*
March 25, 2020 at 2:03 pm

Jeff,

> *It means we should take climate as seriously as those who dismiss viable alternatives.*

Why? Surely how seriously you decide to take it shouldn't be based on what others are doing?

> *It means that we have a consensus that this isn't really an existential threat (otherwise nobody would be anti-nuke advocates) and any press or blog posts to the contrary can be legitimately dismissed.*

There is a huge range of outcomes between *existential* and nothing to worry about for the moment. Just because some people reject what you regard as the optimal solution doesn't mean that it isn't something that we should be taking seriously now – IMO.

John Hartz *says:*
March 25, 2020 at 2:13 pm

ATTP: Jeff Snails' most recent comment is clearly in the running for this thread's coveted "Gobbledygook Award". .

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bobdroege *says:*
March 25, 2020 at 2:58 pm

It's just too late for Nuclear, and too expensive, takes too long to build plants, and we need to reduce fossil fuel emissions like yesterday.

Where were the pro nukes 30 years ago when the first IPCC reports came out? It could have made a difference then.

Obviously not putting their buts where their mouths are, like I was, like actually working in a Nuclear Power Plant.

Used to be pro-nuke, now not so much.

Paul Pukite 🌏 (@WHUT) *says:*
March 25, 2020 at 3:15 pm

Chubbs said: *"One common climate/covid response: the desire to second-guess experts, by overestimating ones own expertise/ability. Some good climate examples above."*

In the case of the Imperial College versus Oxford University contagion models, there is evidence from what they have written that they are at opposite ends of the spectrum — @EEID_oxford said *"...we do not know the parameter p – tho we argue for it to be small."*

The gap is huge. Everyone wants Oxford to be right, but the data points to Imperial.

Dave_Geologist *says:*
March 25, 2020 at 5:19 pm

At the risk of second-guessing experts, the obvious contrary indicator would be the fact that several papers which counted asymptomatic vs symptomatic vs. hospitalised cases, in countries that enforced strict lockdowns and rigorous testing and contact-tracing, found that only about half were asymptomatic, that several tens of percent of those required ICU treatment, and that low-single-figures percent died. And that in all countries, of those traced and tested, or reported fever and tested, only a smallish fraction had Covid-19. So presumably we have to believe that not only has there to be a large pool of untested asymptomatic, but that they chose to stay home and were not among those screened and quarantined when they arrived in, say, Shenzen or Beijing.

Or we could assume that the consensus is most probably right.

Some resources on the WHO mission to China for those who are interested and have not come across them:

Geneva news conference (an hour, and an hour of Q&A).

Beijing press conference the previous day (transcript)

Report of the WHO-China Joint Mission on Coronavirus Disease 2019 (COVID-19)

Brief summary

David B Benson *says:*
March 25, 2020 at 5:42 pm

Impressive image:
https://www.theguardian.com/environment/2020/mar/25/global-efforts-on-ozone-help-reverse-southern-jet-stream-damage

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Ben McMillan *says:*
March 25, 2020 at 6:06 pm

Iceland random testing is interesting. They suggest 0.8% of general population infected but only 0.1% have tested positive through the health system. Suggests about a factor of 10 cases that won't be caught in typical Western systems under current conditions (because, at least in UK, you will only be tested if in hospital or rich+famous). Rigorous tracing/testing would find many of these.

https://www.government.is/news/article/2020/03/15/Large-scale-testing-of-general-population-in-Iceland-underway/

So the idea of some huge number of asymptomatic cases (and thus low mortality) seems unlikely, even if you assume that China/South Korea got their numbers wrong because they didn't screen competently (but if they are so incompetent, how have they brought infections under control?).

Mal Adapted *says:*
March 25, 2020 at 6:21 pm

RickA:

> *However, we don't know today what ECS will turn out to be and that is why nothing is getting done.*

RickA is here to propagate disinformation again. "We" (i.e. the IPCC) know ECS is at least 1.5 and probably more than 2 °C. "We" (voters of nominally democratic nations) are seeing severe weather records broken at short intervals, with ever more tragic consequences. There's more than enough evidence to support immediate collective action to decarbonize our economy. Nothing substantive is getting done primarily because of the firm grip fossil fuel wealth has on our governments. Our national policies are driven by the long-term investment strategy of the Koch Klub. Under the relentless onslaught of lobbying and propaganda, lukewarmism and outright denial are politically dominant.

Apparently RickA yet to achieve the insight of one-time mercenary climate disinformer Jerry Taylor:

> *...even if the skeptic narratives are correct, the old narrative I was telling wasn't an argument against climate action. Just because the costs and the benefits are more or less going to be a wash, he said, that doesn't mean that the losers in climate change are just going to have to suck it up so Exxon and Koch Industries can make a good chunk of money...I regret a lot of it. I wish I had taken more care and done more due diligence on the arguments I had been forwarding.*

Sadly, RickA has yet to perform due diligence, and Exxon and Koch Industries are still making a good chunk of money by socializing the climate-change cost of their products. But while RickA may never regret his casual disregard for truth, in the US there are signs the fossil-fuel capitalist stranglehold can be loosened. The prominent Republican Party advisor Frank Luntz, who in the early 2000s urged the GOP to seize on the irreducible uncertainties of climate science, had his epiphany when his Los Angeles home was threatened by 2017's wildfires:

> *But the reality of climate change is increasingly too hard to ignore. "The courageous firefighters of L.A., they saved my home, but others aren't so lucky," he said as he recounted the tale during a Senate testimony on Thursday. "Rising sea levels, melting ice caps, tornadoes, and hurricanes more ferocious than ever. It is happening."*

Luntz recently warned the party (emphasis original):

> ***Voters believe the U.S.* must *change direction on climate policy*.**

Let's hope they start voting that way.

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jeffnsails850 *says:*
March 25, 2020 at 6:22 pm

"Why? Surely how seriously you decide to take it shouldn't be based on what others are doing?"

We aren't talking about me, I can't permit a nuke. We're talking about decision makers in government. That's the group that advocates are loudly insisting must refuse new and shut down existing viable CO2-free emissions options. In favor of an alternative that nobody is seriously implementing because it's known to be not viable for baseload.
Decision makers are taking climate change as seriously as the advocates, they're opening natural gas pipelines throughout the developed world and, where advocates have the most political power, are shutting down nuclear. That's a lukewarm approach, not an alarmist one.

RickA *says:*
March 25, 2020 at 6:59 pm

Mal Adapted:

I am all for collective action to decarbonise the economy. I just think nuclear is the way to do it.

Not a mostly renewable approach, which take up a bunch of space, is intermittent and which uses fossil fuel as backup. I would rather just build out nuclear to replace fossil fuel and be done with it.

But this in hand solution is being rejected in favor of an approach which hasn't been invented yet.

Oh well.

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daveburton *says:*
March 25, 2020 at 7:11 pm

Dave_Geologist asked, *"And how many hundreds did you have to search through, Dave, to find the ones you liked? … BTW Hawaii is a volcanic island. They sink as they cool…"*

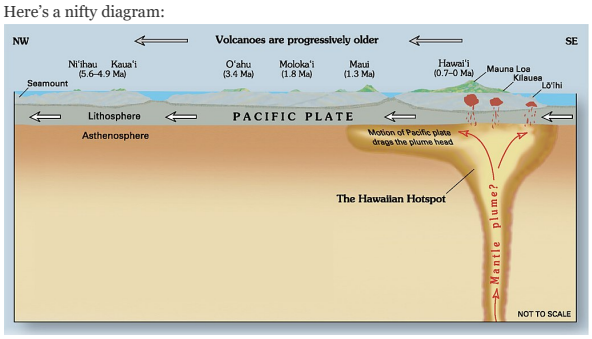
Honolulu is on Oahu, which is an old, tectonically-stable island.

Well, like all the Hawaiian islands, it is moving horizontally, to the NW, about three inches per year. But not vertically.

The Hawaiian Islands are strung out in a line from NW (oldest) to SE (newest). Hawaii, a/k/a the "Big Island," (at the SE end of the line) is newest, and has four active volcanoes, because it is over the "hot spot." NW of it is Maui, which is 2nd-newest, and it has one active volcano. Then come Lanai, Moloka'i, Oahu, and Kauai, in that order. None of them have any active volcanoes.

Oahu is several million years old, which is about four times the age of the Big Island. The volcanoes on Oahu are believed to have been inactive for well over a million years.

Here's a nifty diagram:



Peltier's ICE-6G (VM5a) estimate is that Honolulu is experiencing 0.10 mm/yr uplift. Ref:
http://www.atmosp.physics.utoronto.ca/~peltier/datasets/Ice6G_C_VM5a_O512/drsl.PSMSL.ICE6G_C_VM5a_O512.txt

As you can see, the CORS plot is very flat:
https://geodesy.noaa.gov/cgi-cors/CorsSidebarSelect.prl?site=hnlc&option=Time%20Series%20(long-term)

SONEL's analysis indicates that Honolulu is subsiding (rather than rising), but just 0.39 ±0.18 mm/yr:
http://www.sonel.org/spip.php?page=gps&idStation=693
Screenshot:

All those numbers are **tiny**: +0.10 and -0.39 are opposite sign but not far apart (a difference of less than two inches per century). In other words, the models and measurements agree that Oahu experiences little vertical land motion.

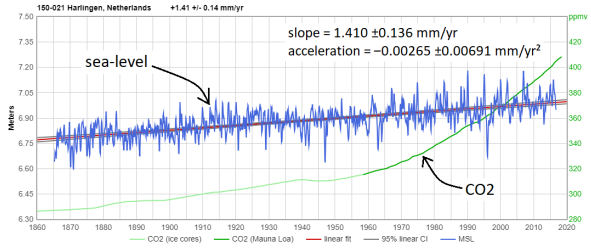
Oahu is also a near-ideal location for measuring sea-level. Not only does it experience little or no vertical land motion, it also gets only small tides, and its mid-Pacific location is near the pivot point of the east-west Pacific "teeter-totter," so it is little affected by ENSO "slosh."

The one thing atypical about Honolulu's sea-level measurement record is its very high quality. The trend there (about +1½ mm/year = 6 inches/century) is perfectly typical.

Dave_Geologist continued, *"They sink as they cool… It will sink faster in due course as it moves away from the hotspot… But even now, any fixed marker will (other things being equal) sink isostatically under the load of the huge shield volcano."*

Oahu moved away from the hot spot more than a million years ago. If it is still sinking at all it is doing so very, very slowly.

If Oahu were sinking that would mean the measured rate of sea-level rise at Honolulu is exaggerated. That doesn't seem to be the case, because its trend is very typical. E.g., here's one of the best measurement records in Europe, showing almost exactly the same 1½ mm/year trend:



Mal Adapted *says:*
March 25, 2020 at 8:47 pm

Ricka:

> *I am all for collective action to decarbonise the economy. I just think nuclear is the way to do it.*

You have a single idea for collective action: "more nukes". I'm all for building carbon-neutral capacity too, and I think nuclear should be among the investment options for all private (i.e. market) and collective (i.e. government) choices, when all costs and benefits are analysed. Are you really "all for" decarbonisation, if "more nukes" is your only solution? If you're serious, I have three questions for you:

– Who should provide the capital for what will always be risky investments in any energy project, carbon-neutral or not?

– Would you expect the financial calculus to change, if some fraction of the marginal social cost of carbon is internalized in energy prices?

– What's your position on carbon taxes, such as the Carbon Fee and Dividend supported by James Hansen *inter alia*?

IOW: can you think outside your nuclear micro-box?

RickA *says:*
March 25, 2020 at 10:27 pm

Mal:

1. Private investors – with perhaps some incentive provided by government.
2. Nope – any additional costs would simply be passed on to the customers (as always).
3. I am against carbon taxes.

Dave_Geologist *says:*
March 26, 2020 at 10:27 am

Dave: pro tip. Next time you try to second-guess someone outside your field about his field, don't just select some bits and bobs that you, in your lack of understanding, think makes you right and the expert wrong. As has been recommended to RickA, do *due diligence*.

Start with a simple one. Find a map of the Hawaii-Emperor seamount chain. Do you notice something? They get smaller and lower as you go NW. Wonder why? Maybe the hotspot got hotter? Hmm, there's a way to check that. The hotter it is the higher the *potential temperature* (Term Of Art – due diligence recommended). That has consequences for the magma type and for the mineralogy and geochemistry of the erupted lavas. I'll leave investigating that as an exercise for the student. As I didn't know the answer offhand I did a quick Google. As a teaser there has been some variation over time, but the analysis is recent and is not in the peer-reviewed literature. However, given the school it comes from, I'd lay a strong bet that it stands up.

However the more fundamental drivers are thermodynamics, material balance, isostasy and kinetics (thermal diffusion and the time constant for the inelastic part of the isostatic response). Mainly cooling of the underlying asthenosphere as the lithosphere moves away from the hotspot, and thickening of the lithosphere by basal accretion as the thermal boundary layer moves to greater depths due to vertical diffusion of heat as the system re-equilibrates. I remember that the thermal time constant is in the order of 50 m.y. for the exponential subsidence phase but not the exact number. I could Google it, but for fun will see what I used in my most recent peer-reviewed paper on the topic (it was thirty years ago, but at a high level these numbers have been known since the late 1970s and changed only in detail, details which are smaller than the differences from one basin or ocean to another). Ah, 62.8 m.y., from Le Pichon & Sibuet (1981). Why that one? Probably because McKenzie's seminal 1978 paper was a bit more driven by complicated places where 3D effects are possible, whereas LS81 had had access to a long transect out into the open Atlantic. But in any case, it is too slow to be relevant to anything shorter-lived than a coral reef. There are departures from exponential for the first 20 m.y. anyway due to complicated stuff that's site-specific, and on that time scale Oahu is still in its pram. In the Complicated Local Stuff Still Happening stage of its life.

The cross-section is pretty but simplified and, as the embedded caption says, not to scale. Even if it was, the things we're talking about are too tiny to see. And the westward extension of the plume head goes much further, with the 3-4% reduction in dV/Vs extending to Oahu and a separate hot blob under Kauai. Yep, Complicated Local Stuff Still Happening.

That was fun. By chance ('cos i wanted to see if I'd garnered any more cites – vanity searching), I found that my 1987 paper gets a cite in a 2017 textbook. How cool is that?

I see you picked another cherry. I'll ignore that since you failed to respond wrt the first cherry. The reason why no cherry is enough, nor a whole basket, is the same reason it would be very stupid to draw conclusions about the average height, weight and BMI of New Yorkers from the person who stamped your passport at the airport. I'll leave working out why as an exercise for the student.

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daveburton *says:*
March 26, 2020 at 5:19 pm

Dave_Geologist, I'm not 100% sure, but I think your point is that you believe Peltier's ICE-6G (VM5a) model is wrong, and Honolulu is subsiding. Is that right?

How fast?

> "If you can't quantify it, you don't understand it."
> – *Peter Drucker*

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dikranmarsupial *says:*
March 26, 2020 at 6:06 pm

"It is wrong to suppose that if you can't measure it, you can't manage it – a costly myth."

W. Edwards Deming, The New Economics, page 35.

Mal Adapted *says:*
March 26, 2020 at 8:03 pm

jeffnsails850:

> *We're talking about decision makers in government. That's the group that advocates are loudly insisting must refuse new and shut down existing viable CO2-free emissions options.*

Maybe that's who you're talking about, while crediting a few anti-nuclear activists with more political power than they have. I'm talking about the voters of nominally democratic countries, who ultimately choose their decision makers, and are now demanding decarbonization **by every feasible means**.

Jeffn' is apparently fooled by the same cognitive motivator Richard Muller is: "conservative" political ideology, expressed as antipathy toward anti-AGW "advocates" allegedly represented by former US Democratic Senator, Vice-President and Presidential candidate Al Gore Jr. Like RickA, the only carbon-neutral alternative jeffn' considers feasible is nuclear energy, so he deploys straw anti-nuclear activists to stand for all who advocate decarbonization, period.

Here's where we start talking about decision makers in government: like Muller and RickA, jeffn' has at best a shallow grasp of the relation between politics and economics. All three blame their straw cultural adversaries for keeping the marginal cost of climate change external to the price of fossil carbon on energy markets, while paying no attention to the capitalists behind the curtain. All three have succumbed to the big US Republican Party lie of the early aughts: in the financial thrall of the fossil-fuel industry, and fearing that the Democrats had gotten ahead of them on the issue with voters, the GOP leadership began insisting that AGW was a hoax, and anyone who acknowledged the consensus of climate science specialists must be a liberal environmentalist; and that science's default champion Al Gore, who was already receding into history despite his comparatively sound grasp of climate science, was not only wrong but an ecofascist committed to world Soshulizm, or something! IOW, by making AGW a sociopolitical identity matter in the USA, the Republican Party generated positive ROI for its underwriters. This isn't a conspiracy theory, guys. The capture of the GOP by carbon capital in't a very well-kept secret, with ample documentation in the public record – see previous cites. It's all been (unsurprisingly) found legal, anyway.

In fairness to our three staunch culture warriors, strawman rhetoric has worked as well on them as on the present governing plurality of US voters. Since 2008, few if any GOP candidates for office have dared to acknowledge the scientific consensus publicly, and the current US government empowers politicians who are skilled at deflecting our attention from the curtain. Here's my favorite ex-professional-disinformer Jerry Taylor speaking from experience again, in a 2017 interview with E&E News:

> *[EEN]* ***What's the most important thing to keep in mind now about energy policy/climate change?***
>
> *[JT] Well, the main reason that the United States has not acted as aggressively to reduce greenhouse gas emissions has to do with the Republican Party. Unfortunately, this issue has become an ideological issue, which is a little silly. How you feel about free markets and individual liberty has nothing to do with how you feel about atmospheric physics.*

He speaks plainly enough here – I'm glad he's not working for the bad guys anymore! I've cited signs "conservative" cultural identity may be opening up for AGW, as reality inexorably emerges above the din of bespoke disinformation. Admittedly I'm cognitively motivated, by hope of halting the the large-scale anthropogenic transfer of fossil carbon to the atmosphere sooner rather than later. So here's hoping. Meanwhile, culture warriors will grind their #butNuclear axe (gotta love metaphor) to their hearts' content.

Dave_Geologist *says:*
March 27, 2020 at 8:50 am

My point, Dave, is my final paragraph. The round, red things which grow in myriads on trees but where some people seem to think that one, two or even ten especially delicious orbs tells you something about all the *Prunus subg. Cerasus* in the world. Especially misguided if the taster has a taste for under-ripe or over-ripe fruit, not the kind the rest of the world eats and which represents 99.999999% of production. Or even 97% of production.

The rest was just fun. As, TBF, was the 97% 😉 .

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jeffnsails850 *says:*
March 27, 2020 at 2:03 pm

Mal: "I'm talking about the voters of nominally democratic countries, who ultimately choose their decision makers, and are now demanding decarbonization by every feasible means."

Germany is shuttering nuclear power and increasing natural gas pipelines and turbines. France is being pressured to shutter its nukes, for zero environmental benefit, and it's government is issuing the appropriate press releases in agreement while also increasing natural gas pipelines and turbines.
In the US, a handful of politicians are writing "100% Renewable" plans suitable for glowing coverage in the New York Times before entering long-term shelf storage while the politicians build more natural gas pipelines and turbines.
I'm looking forward to your description of places where democracy is resulting in faster production of nukes. China is rapidly building them because their politicians are notably uninterested in the latest from the Guardian.
As I said, democracy is devolving to a lukewarm consensus- nice pats on the head for the alarmists, nuke-free policies for the rabid, and rapid deployment of fossil fuel alternatives to coal due to the low price of natural gas. Speaking of price, Hawaii and Cuba's reliance on oil for electricity generation doesn't look too bad right now.

Willard *says:*
March 27, 2020 at 3:51 pm

> They're not less sensible, they're outright malicious.

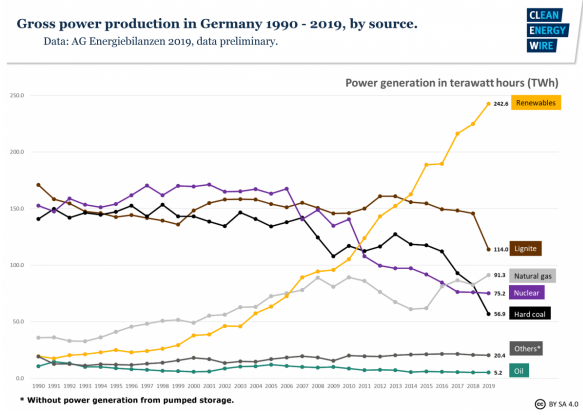
They've been edited.

Folks. Some. Thoughts. About. Science. Advice.

Please.

"But Nukes" drive-by done, JeffN.

Ben McMillan *says:*
March 27, 2020 at 3:57 pm



[Source]: https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/statistical-review/bp-stats-review-2019-china-insights.pdf

[*Edited the image's link (it needs to end with ".png" etc)and added "source" to appease the WP parser. -W*]

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dikranmarsupial *says:*
March 27, 2020 at 5:54 pm

dave burton Why is it that when a double axis diagram is plotted with CO_2 on one vertical axis and something else on the other vertical axis, the CO_2 curve uses the full range, but the "other" doesn't?

There is a way to do this properly, namely to work out what trend in sea level rise you would expect to see from the increase in CO_2, and then scale the axes so that the two signals have the same apparent trend if the rise in sea level actually matches that expected from the increase in CO_2.

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daveburton *says:*
March 27, 2020 at 6:10 pm

dikranmarsupial asked, *"dave burton Why is it that when a double axis diagram is plotted with CO_2 on one vertical axis and something else on the other vertical axis, the CO_2 curve uses the full range, but the "other" doesn't?"*

I'm glad you asked.

Choosing the "best" Y-axis scale is a tricky. For my sealevel.info graphs, I chose the Y-axis scales as follows:

● The number of horizontal grid lines was chosen to be nine (including the top and bottom), to match NOAA's sea-level graphs.

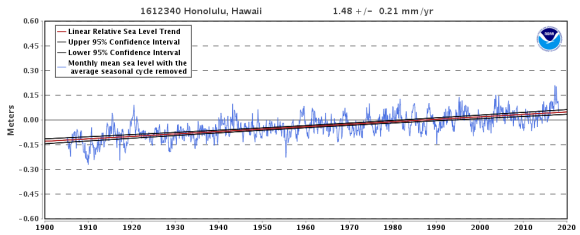
● The number of horizontal grid lines for CO2 was chosen to be the same as the number for sea-level, so the two graphs could share the same grid lines.

● The green CO2 scaling (in ppmv, on the right) was chosen to fit nicely on a graph with nine 20 ppmv increments, leaving room for growth to 440 ppmv (probably about eleven years from now).

● The black Y-axis sea-level scale (in meters, on the left) was chosen to match NOAA's graphs.
The scaling NOAA chose allows a consistent vertical scale for most locations. I.e., it is broad enough to "work" for most sites.

The way my code draws the vertical axis, there are always nine labeled points. By default, they are 0.15 meters apart, which is what NOAA generally uses. But when that would result in any of the traces not fitting on the graph, the vertical axis increments are increased: to 0.20, 0.25, 0.30, etc., per increment, as necessary, to make everything fit. (That's what NOAA soes, too.)

0.15 meters per increment was NOAA's choice for most of their MSL graphs, but I think it was a reasonable one, which is why I used it, too.



It's a compromise, of course. If you make the default increment much larger than that, so that fewer graphs would require non-standard scaling, to get better consistency between the graphs for the different sites, then for the most typical graphs everything looks almost like a horizontal line. Not good.

OTOH, if you make the increment as small as you possibly can for each graph, so that the traces are scaled to "use" maximum possible vertical range (like I did for CO2), then when you compare the graphs of different sites most of them would look pretty much the same. The graph thumbnail sheets on my site would become quite misleading, because the graphs for the sites with the highest rates of SLR would look just like the graphs for the sites with lowest positive rates of SLR. Only the sites where MSL is falling would look distinctly different — also not good.

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dikranmarsupial *says:*
March 27, 2020 at 7:21 pm

"The green CO2 scaling (in ppmv, on the right) was chosen to fit nicely on a graph with nine 20 ppmv increments, leaving room for growth to 440 ppmv (probably about eleven years from now)."

As I said, that is bogus because the sea level data (i) doesn't fit nicely in that sense and (ii) is noisy – only the trend is really relevant, so the noise makes it look like it takes up more than the scale than it actually does.

Choosing the axes is not tricky. I have given you a fair recipe. Do you have any objections to it?

Willard *says:*
March 27, 2020 at 7:58 pm

> I'm glad you asked.

Of course you are, Dave. That allows you to peddle more of "but sea levels."

You really should know better, Dikran.

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daveburton *says:*
March 27, 2020 at 10:32 pm

dikranmarsupial wrote, *"...only the trend is really relevant, so the noise makes it look like it takes up more than the scale than it actually does."*

Well, I don't really agree that only the trend is relevant, and I don't agree that what you call "noise" is irrelevant. The blue data are actual, measured data, not noise. In fact, they are already somewhat smoothed, because they are monthly MSL averages.

If you compare graphs of sea-level measurements for two nearby sites, you'll find that the month-to-month variations are very similar. That should tell you that you're looking at real water level changes, not "noise."

In some cases, that makes it possible to deduce pretty good estimates of sea-level in the absence of local data. For instance, Miami Beach had a tide gauge with 47 yrs of data, but it was decommissioned in 1981. That's unfortunate, because sea-level is a hot issue at Miami Beach.

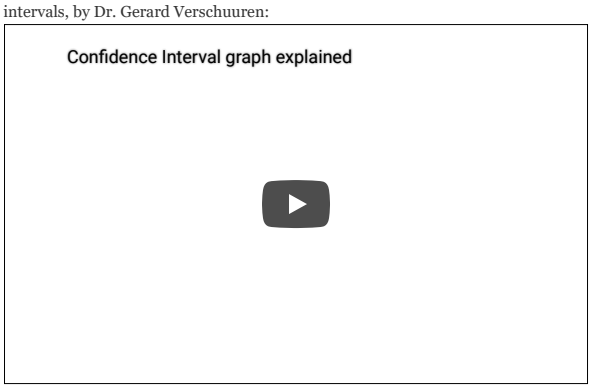
However, that old 47-year record is still very useful, because we can compare it to the same period at Key West, and see that they were *VERY* similar, except that Miami Beach consistently recorded 1/2 mm/yr more subsidence than Key West.

So, even though we don't have measurements for the last 39 years at Miami Beach, we can use the data from Key West's exceptionally high quality measurement record, and add 1/2 mm/yr for the difference in rates of subsidence, to get a good quality estimate of the sea-level trend at Miami Beach. Neat, eh?

Some locations exhibit much greater month-to-month variations than do others, which is also interesting. However, I do have options to smooth the data, if you wish, with running boxcar or triangle filters. If the large month-to-month variations have caused my code to scale the vertical axis at more than 0.15 meter per division, you can use the smoothing options to remedy that.

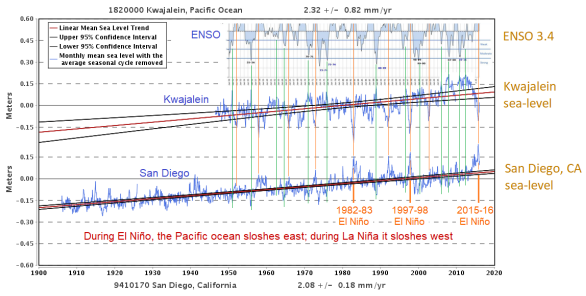
In addition, I should point out that there's not just one trend. NOAA only shows a linear regression on their graphs, but my site also calculates, and gives you the option of graphing, quadratic regressions, for detection of acceleration/deceleration. (At most locations it's not much different from the linear trend, which is presumably why NOAA doesn't bother with it.)

Also, in addition to the confidence intervals, for either the linear or quadratic trend (or both), I have options for displaying prediction intervals. Here's a nice explanation of the difference between confidence intervals and prediction intervals, by Dr. Gerard Verschuuren:



There are other interesting things in the fine details of the sea-level measurements, too. For instance, some sites also show striking ENSO effects. During El Niño, the easterly Pacific trade winds diminish, causing the Pacific ocean to "slosh" to the east. You can see that in the eastern Pacific sea-level measurement records, as a strong correlation with ENSO. Conversely, in the western Pacific, sea-levels fall during El Niño (which can contribute to bleaching events on the GBR).

Here's a graph which contrasts an ENSO index with sea-levels at San Diego, Calif. (eastern Pacific) and Kwajalein (western Pacific). Note that San Diego and Kwajalein look like mirror images of each other (except for the long-term trend):



dikranmarsupial wrote, *"I have given you a fair recipe. Do you have any objections to it?"*

Yes, I have a few.

1. I don't want to obfuscate the differences in trends between different locations.

As I mentioned in my previous comment, if I were to scale all the graphs to take up the entire vertical axis, then in the thumbnails all the graphs showing positive sea-level rise would look pretty much the same, regardless of whether their trends are 0.1 mm/year or 10 mm/year.

Likewise, all the graphs showing negative sea-level rise would look the same, regardless of how fast it is.

2. I don't want data to disappear above and below the graph area.

3. It would be an unnecessary departure from NOAA's practice.

I've learned the hard way that some people are very hostile to my work, and quick to accuse me of bad faith. As long as I scale my graphs like NOAA does, I have a pretty good defense ("why are you complaining about my graphs, and not about NOAA's?").

If I thought NOAA's practice was unreasonable then I would depart from it, and endure the heat. But I don't. Their tide gauge analyses and graphs seem to me to be high quality work by competent oceanographers, and the choices they've made about how to scale their graphs seem reasonable.

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