



Past warming trend constrains future warming in CMIP6 models



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I heard that some new CMIP6 models project strong future warming. Are these projections likely?

I'm glad you asked. We have a new paper about it in Science Advances (it's Open Access)
<https://advances.sciencemag.org/content/6/12/eaaz9549>

Cool! Could you summarize the key findings?

Sure! Several new CMIP6 climate models project stronger future warming and have higher sensitivity (ECS) than previous model generations.

Do they agree with the present-day observations?

Not necessarily. We show that most of these models overestimate observed warming. As a result, their higher future warming projections are less likely

How did you arrive to that conclusion?

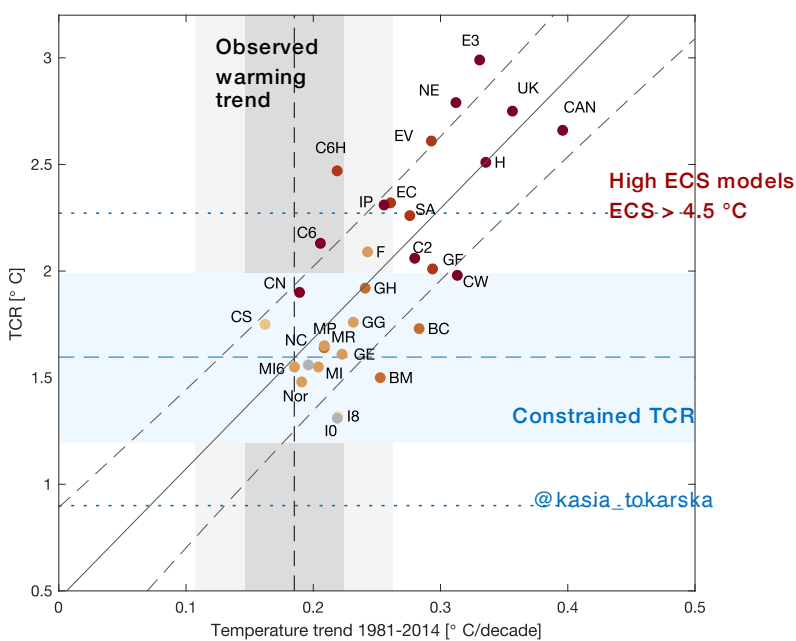
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Projected future warming is correlated with the simulated warming trend during recent decades (1981-2014 and 1981-2017) across CMIP5 and CMIP6 models.

This correlation allows us to provide observational-constraints on future warming and TCR values

Do you have a figure that shows it?

Fig.2. Sci. Adv.



So the warming constrained by the observations is lower?

The observationally-constrained CMIP6 median global warming in high emission scenario (SSP 5-8.5) is 1.46 °C, which is over 16 % lower by 2050 compared to the raw CMIP6 median warming of 1.74 °C, using 1994-2014 baseline

What about warming in ambitious mitigation scenarios?



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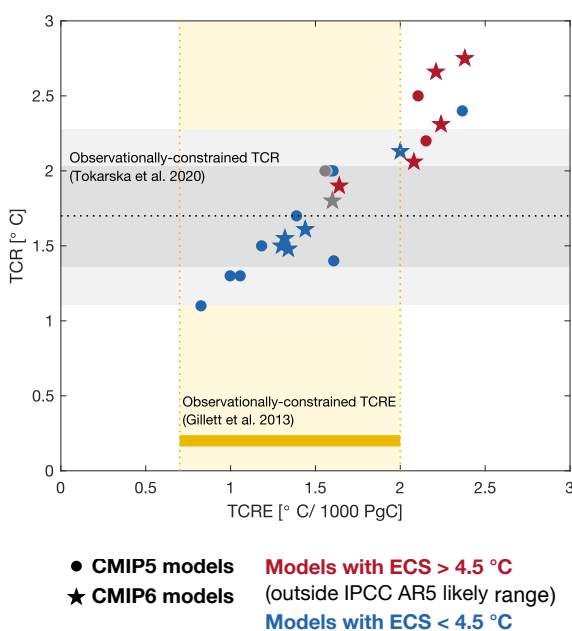
In an ambitious mitigation scenario (SSP1-2.6), the observationally-constrained warming likely range in CMIP6 models is consistent with reaching the Paris Agreement target

So this does not mean that climate change is not serious. But there is little evidence that warming will be stronger than we thought?

Yes, exactly!

Observationally-constrained CMIP6 warming is consistent with previous IPCC assessments based on CMIP5

What about remaining carbon budgets? Are they smaller?



High ECS CMIP6 models do not imply that remaining carbon budgets are lower, because responses of some high ECS models are less likely. Also, some of the TCRC values in high ECS models are outside of the observationally-constrained TCRC

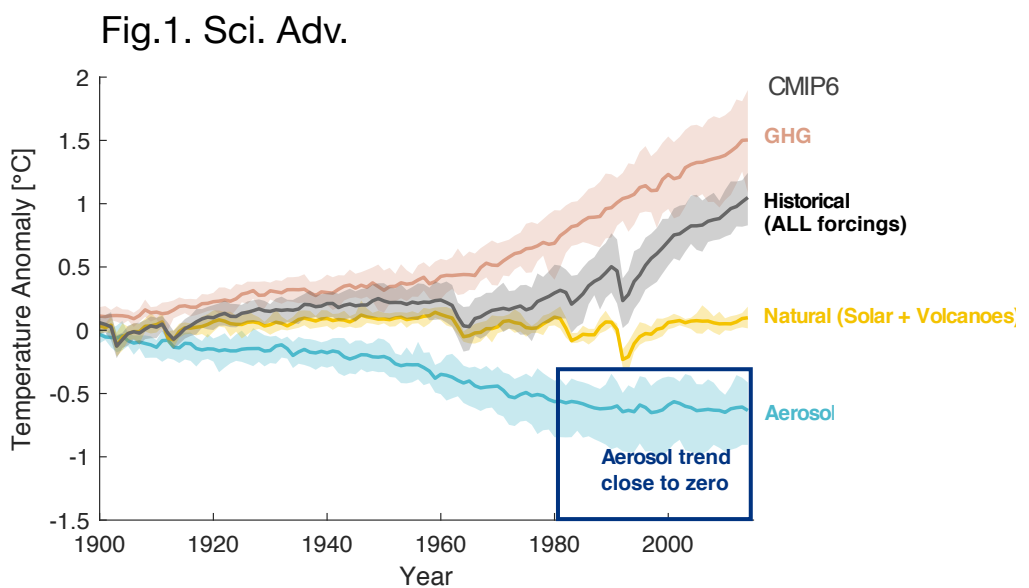


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Why do you use only the post 1981 period for your constraint?

The post-1981 warming is subject to fewer uncertainties than the earlier period.

The greenhouse-gases dominate the observed warming signal, and the cooling trend (global mean) from aerosols is close to zero



Thanks for the explanation!

You are most welcome!
If you'd like to chat more, you can contact me directly or on Twitter
@kasia_tokarska

Also, check out our paper:
<https://advances.sciencemag.org/content/6/12/eaaz9549>

Sure, will do!