

## ***Interactive comment on “What could we learn about climate sensitivity from variability in the surface temperature record?” by James Douglas Annan et al.***

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I am gratified to see a resurgence of interest in the approach of inferring the sensitivity of global mean surface temperature anomaly  $T$  to sustained forcing from fluctuations in time series of  $T$  that is reflected in this manuscript and also in Cox et al. (2018) and Williamson et al. (2018). However I note some concerns with this manuscript as well as the two earlier papers. Unfortunately there is some sloppiness in definitions in the earlier papers that carries over to the present paper that makes it tough to evaluate the quantity  $\Psi$  and interpret the inferences drawn from that quantity. I also have some concerns over the treatment of the two compartment system that the authors may wish

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to take into consideration. At the end of the day, however, as the finding of the present manuscript is that the determination of the climate sensitivity by the approach of Cox et al. (2018) fails, perhaps some of these niceties are of secondary importance. Still, one might hope for more attention to detail.

In conclusion, despite the concerns raised here, the authors are to be applauded for revisiting the question of whether fluctuations in the observed record of global mean surface temperature can usefully constrain climate sensitivity. It seems as if the answer is no, at least so far, but I am not sure that the last word has been written.

Please also note the supplement to this comment:

<https://www.earth-syst-dynam-discuss.net/esd-2019-90/esd-2019-90-SC4-supplement.pdf>

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