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Constraining climate sensitivity

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Studies attempting to constrain climate sensitivity by comparing models with recent observations report a wide range of distributions, most of which fail to exclude a high upper bound. Here we show that much of this variation arises from different prior assumptions regarding climate sensitivity before any physical or observational constraints are applied. This apparent arbitrariness can be resolved by focussing on the intended purpose of the forecast: although uncertainty in long-term equilibrium warming remains high, the 10-90% range of uncertainty in climate sensitivity relevant to forecasts of 21^{st} century transient warming is $1.3-4.6^{\circ}$ C with a median of 2.5° C, in close agreement with the "traditional" range. We explore some ramifications of this result, including whether this implies that some of the impacts community could benefit by working with transient, rather than equilibrium, scenarios.