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Projection of Global Warming using an Empirical Model of Climate

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An empirical model of climate based on multiple linear regression of the century-long global surface temperature record is used to quantify the rise in global average temperature in 2053, the time CO_2 reaches 560 ppm (2x pre-industrial) in the RCP 8.5 scenario. This rise in temperature is inherently uncertain due to the cantilevering of aerosol radiative forcing and climate feedback, coupled with the projection that aerosol radiative forcing will diminish in the coming decades due to air quality concerns. We show that, considering this cantilevering, the rise in global temperature at the time CO_2 doubles will likely be between 1 and 2 degrees Celsius (relative to a 1961 to 1990 baseline). This empirically driven estimate of future warming is considerably less than projected by CMIP5 models.