



Diagnosing the radiative forcing from a millennium historical model integration – evaluation of a commonly used method

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A commonly applied method for calculating radiative forcing from model integrations is the two-step procedure where first the climate feedback parameter is found by a regression between the net radiative balance and the surface temperature, and this is then used for calculating the effective radiative forcing year by year (Gregory et al. 2004; Forster and Taylor 2006).

We investigate the performance of the method on a 1000 year long model integration where the applied forcing is approximately known. Generally the performance of the model is acceptable with a mean bias of 0.22 Wm^{-2} and a detrended rms value of 0.29 Wm^{-2} . The bias has a trend $-0.04 \text{ Wm}^{-2} \text{ century}^{-1}$. This trend is not present in a run with an energy balance model without a deep ocean and from this we conclude that the trend is related to improper spinup of the original model.