

Debunk this

One claim that is occasionally made regarding climate change is that the reason the Earth is warming is due to the additional body heat of a growing population (<http://goo.gl/J2DpLe>). We currently have approximately 7.5 billion people on Earth. On average the radiation emitted from each person is 100 W.

- a. Ignoring all other factors, please calculate the radiative forcing (RF) of heat emitted from humans to our planet in units of W/m². For a “control” state, you can consider a planet void of humans [ignore the fact that populations of other animals have changed].

- b. Estimate the change in surface temperature (ΔT) due to this extra heat from a baseline/control temperature of 288K. Assume no other changes to the surface energy budget and use the Stefan Boltzmann relationship below. To help you, I set up two equations, the first of which you can plug in $T_{\text{control}} = 288\text{K}$. The constant (σ) is $5.67 \times 10^{-8} \text{ W/m}^2/\text{K}$.

$$I_{\text{control}} = \sigma T_{\text{control}}^4$$

$$I_{\text{control}} + RF = \sigma T_{\text{experiment}}^4$$

$$\Delta T = T_{\text{experiment}} - T_{\text{control}}$$