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Corrigendum: Solar geoengineering modeling and applications for mitigating global warming: Assessing key parameters and the urban heat island influence

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KEYWORDS

solar geoengineering, UHI global warming estimates, UHI footprint, heat pollution, land-cover/land-use, drought relief, reservoir evaporation, Paris Accord suggested goals

A corrigendum on
Solar geoengineering modeling and applications for mitigating global warming: Assessing key parameters and the urban heat island influence

by Feinberg, A. (2022). *Front. Clim.* 4:870071. doi: 10.3389/fclim.2022.870071

In the published article, there was an error. The percentage of the forcing (used in Table 2) was unclear and should be removed from the **Abstract**.

A correction has been made to **Abstract**. This sentence previously stated:

"The UHI reverse forcing requirements are assessed with amplification estimates of 3.1 and 5.2, yielding 7.6% to 12.7% of gross global warming (corresponding to forcing percentages of 16% to 27%) could be due to the urbanization effect, respectively."

The corrected sentence appears below:

"The UHI reverse forcing requirements are assessed with amplification estimates of 3.1 and 5.2, yielding 7.6% to 12.7% of gross global warming could be due to the urbanization effect, respectively."

A correction has been made to the **Introduction**, paragraph 4. This sentence previously stated:

"This 12.7% gross warming equates to a forcing of 27.3% (see Table 2 in Section Assessing the Influence of Urbanization on Global Warming)."

The corrected sentence appears below:

"This 12.7% gross warming equates to a percentage of the forcing (see Table 2 details in Section Assessing the Influence of Urbanization on Global Warming)."

There was an error. Percentage of the forcing (used in Table 2) is unclear to the reader and should be further clarified in the **Introduction**.

A correction has been made to **Introduction**, paragraph 5. This sentence previously stated:

"The author's prior geoengineering modeling results (Feinberg, 2020) agree with the current findings in this paper which is 7.6% gross warming and forcing of 16.2% (section Assessing the Influence of Urbanization on Global Warming) for the urbanization global warming influence."

The corrected sentence appears below:

"The author's prior geoengineering modeling results (Feinberg, 2020) agree with the current findings in this paper which is 7.6% gross warming and a percentage of the forcing (see Table 2 details in section Assessing the Influence of Urbanization on Global Warming), for the urbanization global warming influence."

In the original article, there was a mistake in Table 1 as published. Forcing percentage in Table 2, Col 4, the column should have a clearer label as the denominator of 2.38 Wm^{-2} comes from a GHG forcing reference in Table 1. The corrected Table 1 appears below.

In the original article, there was a mistake in Table 2 as published. Forcing in Table 2 includes feedback per Equation 23 and this was missed. The corrected Table 2 appears below.

In the published article, there was an error. In Equation 26 an extra term A_E was added after the second equal sign.

A correction has been made to Results, "Heat Pollution From Dark Surface"

This equation previously stated:

$$\Delta p_T(watts) = \Delta P_T(watts/m^2)A_E = \frac{S_o}{4}A_T A_E X_C H_T\left[(\alpha'_T - \alpha_T)\right] = 340\frac{W}{m^2}(4046m^2)(0.47)(1)(0.125) = 80,820\,watts$$

The corrected equation appears below:

$$\Delta p_T(watts) = \Delta P_T(watts/m^2)A_E = \frac{S_o}{4}A_T X_C H_T\left[(\alpha'_T - \alpha_T)\right] = 340\frac{W}{m^2}(4046m^2)(0.47)(1)(0.125) = 80,820\,watts$$

The authors apologize for these errors and state that this does not change the scientific conclusions of the article in any way. The original article has been updated.

Publisher's note

References

Feinberg, A. (2020). Urban heat island amplification estimates on global warming using an albedo model. *SN Appl. Sci.* 2, 2178. doi: 10.1007/s42452-020-03889-3

TABLE 1 Suggested model GMEEB* estimates and other values.

Parameter	Period	Model Value	Source
ΔP_{Rev}, required reversal	1950–2019	*5.11 Wm^{-2}	(Feinberg, 2021b)
ΔP_T reverse forcing target T goal	1950–2019	*1.47 Wm^{-2}	(Feinberg, 2021b and Section 2.3)
A_F feedback value	1950–2019	*2.15	(Feinberg, 2021b)
$\Delta P_{Rev}/A_F$ GHG forcing	1950–2019	*2.38 Wm^{-2}	(Butler et al., 2020)
f re-radiation parameter	2019	*0.62	(Feinberg, 2021b)
X_C solar irradiance	2019	*0.47	(Hartmann, 2013 and Section 2.4)
UHI heat amplification H_T	1950–2019	3.1, 5.2	(Feinberg, 2020, and Section 3.4)
albedo of the Earth	2019	*0.30	(Feinberg, 2021b)
average albedo of land	2014	0.25	(He, 2014, see Section 3.4)
mitigating UHI albedo	1950–2019	0.2	(Feinberg, 2020, see Section 3.4)
UHI average albedo	2014	0.12	(Sugawara and Takamura, 2014, see Section 3.4)

TABLE 2 UHI Global warming estimates (1950–2019).

HT	Forcing & Feedback ΔP_{RevU} (WM^{-2})	Global Warming Percent $\Delta p_{Revu}/\Delta P_{Rev}$	Percentage of GHG Δp_{Revu} 2.38Wm^{-2}** Forcing
1	0.125	2.4%	5.3%
3.1	0.387	7.6%	16.2%
5.22*	0.65	12.7%*	27.3%*

*Zhang et al.'s (2021) results, **see Table 1 and Section 2.3.
** See Table 1 and Section The Reverse Forcing Goal.