



## **Rethinking the lower bound on aerosol radiative forcing**

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Based on research showing that in the case of a strong aerosol forcing, this forcing establishes itself early in the historical record, a simple model is constructed to explore the implications of a strongly negative aerosol forcing on the early (pre 1950) part of the instrumental record. This model, which contains terms representing both aerosol-radiation and aerosol-cloud interactions well represents the known time history of aerosol radiative forcing, as well as the effect of the natural state on the strength of aerosol forcing. Model parameters, randomly drawn to represent uncertainty in understanding, demonstrates that a forcing more negative than  $-1.0 \text{ W m}^{-2}$  is implausible, as it implies that none of the approximately 0.3 K temperature rise between 1850 and 1950 can be attributed to northern hemispheric forcing. The individual terms of the model are interpreted in light of comprehensive modeling, constraints from observations, and insights from the literature, to provide further support for the less negative (  $-1.0 \text{ W m}^{-2}$  ) lower bound. These findings suggest that aerosol radiative forcing is less negative and more certain than is commonly believed.