

Supplementary Information (SI)

Halogenated Greenhouse Gases Made Global Warming Primarily

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This supplementary document includes the following additional data (Figures S1, S2 and S3):

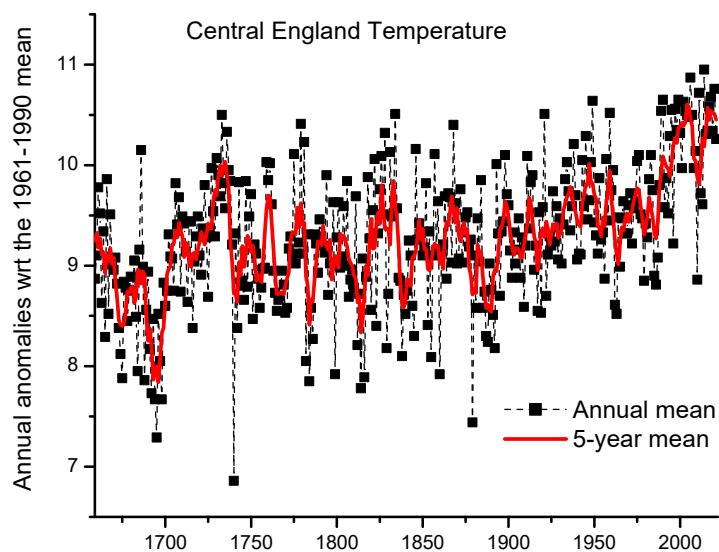


Figure S1. Annual temperature anomalies relative to the 1961-1990 average of the Central England, which is representative of a roughly triangular area of the United Kingdom enclosed by Lancashire, London and Bristol. The UK Met Office's HadCET data, which began in 1659, is the longest available instrumental record of temperature in the world¹.

As stated in the text, to remove the ENSO and volcanic effects from the observed GMST data, we simply adopt the empirical model developed by Lean and Rind^{2,3}, in which the natural contributions to the GMSTs were 0.2° C warming during major ENSO events in 1997–98, and about 0.3° C cooling in 1992 following the large Pinatubo volcanic eruption. For land surface air temperature (LSAT) at NH extratropic (latitudes 30°N–90° N), this same approach was used to remove the natural El Niño and volcanic effects. However, the natural contributions to the LSATs at NH extratropic were 0.5° C warming during major ENSO events in 1997–98, and about 0.6° C cooling in 1992 following the large Pinatubo volcanic eruption. These are shown in Figures S2 and S3 below.

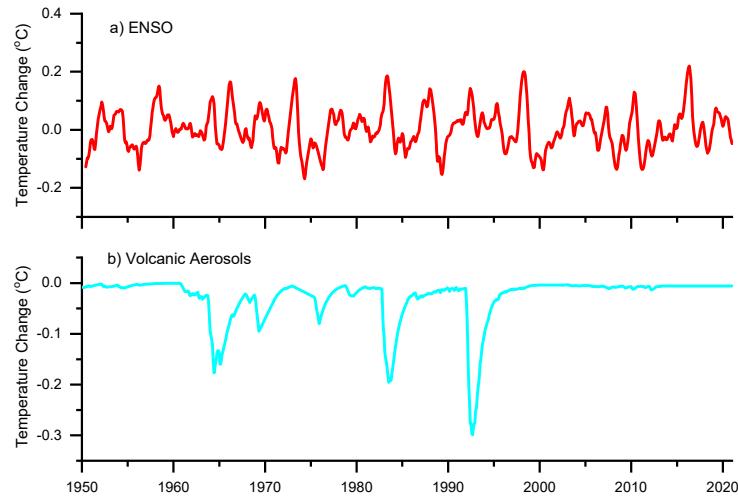


Figure S2. Contributions of natural ENSO and volcanic aerosols to observed GMSTs.

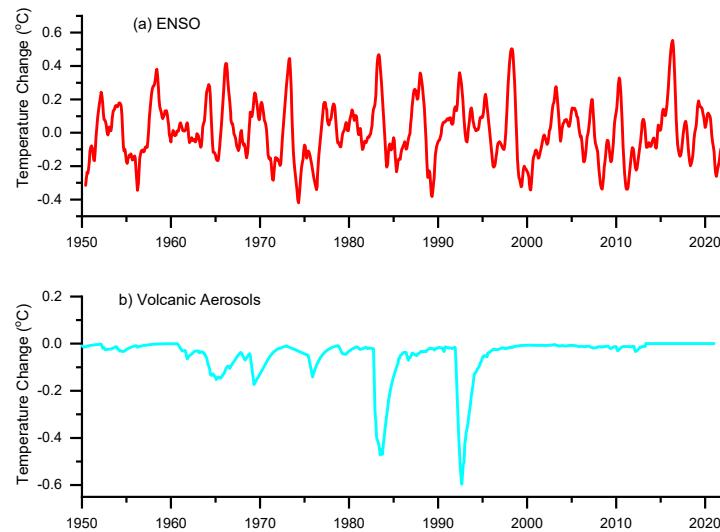


Figure S3. Contributions of natural ENSO and volcanic aerosols to observed LSATs at NH extratropic (30°N-90° N).

References:

- 1 Parker, D. E., Legg, T. P. & Folland, C. K. A new daily central England temperature series, 1772–1991. *International Journal of Climatology* **12**, 317–342, doi:<https://doi.org/10.1002/joc.3370120402> (1992).
- 2 Lean, J. L. & Rind, D. H. How natural and anthropogenic influences alter global and regional surface temperatures: 1889 to 2006. *Geophysical Research Letters* **35**, doi:<https://doi.org/10.1029/2008GL034864> (2008).
- 3 Lean, J. L. & Rind, D. H. How will Earth's surface temperature change in future decades? *Geophysical Research Letters* **36**, doi:<https://doi.org/10.1029/2009GL038932> (2009).