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Supplement of

A new production-based model for estimating emissions and banks of ODSs: application to HCFC-141b

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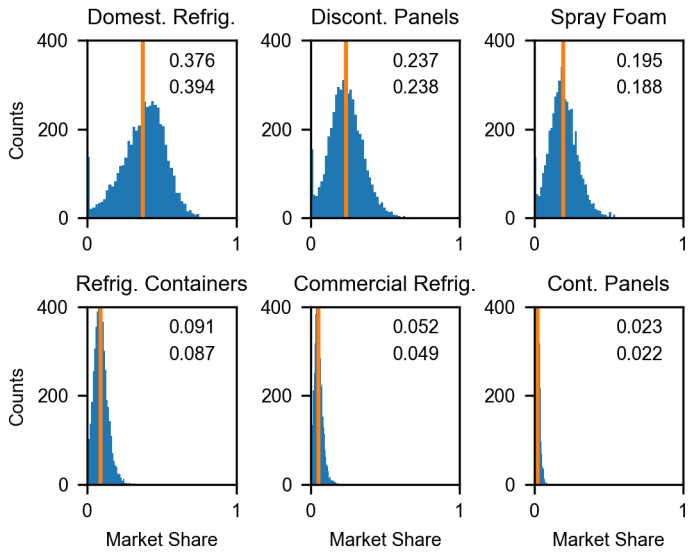

Figure S1. Probability distribution functions of market share for the 6 largest markets in 2008 for the Latin America and the Caribbean region. Abscissas represent fraction of market share with ordinates providing a histogrammed distribution with 5000 total cases run. The numbers in the boxes represent the prescribed mean of the distribution (lower number) and the mean the model calculates after taking the normalization approach described in Sect. 2 (upper number). The vertical orange line represents the mean of the distribution shown.

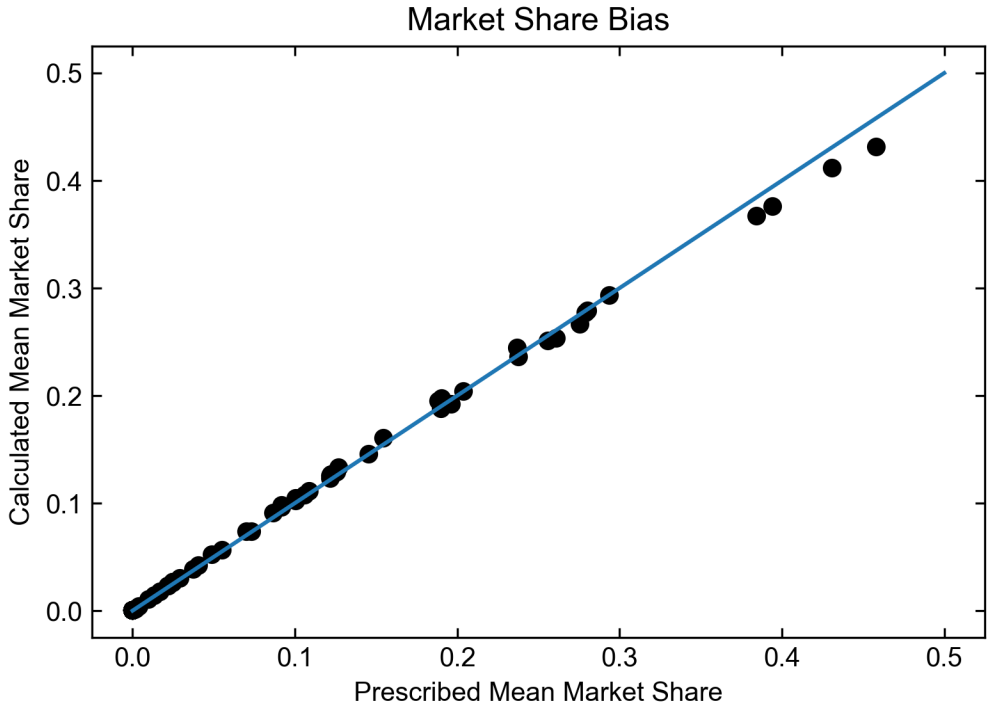

Figure S2. A comparison of the prescribed market share with what the model calculates using the Monte Carlo model discussed in Sect. 2. The deviation from the one-to-one line shown represents the bias inherent in this approach. These points are for the 2008 market share values across all regions before refrigeration uses are phased out.

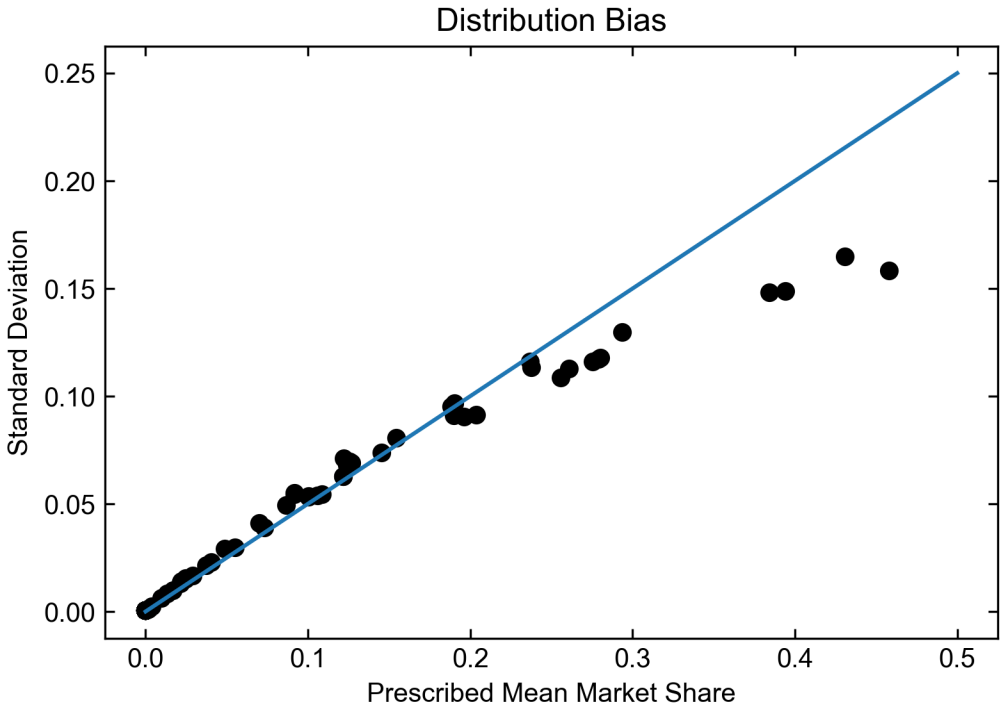

Figure S3. The calculated market-share standard deviations as calculated by the model versus the prescribed mean market share values for the same case as shown in Figure S2. The prescribed standard deviation is 50% of the market share value, with the deviation from the line shown representative of the bias in this approach.

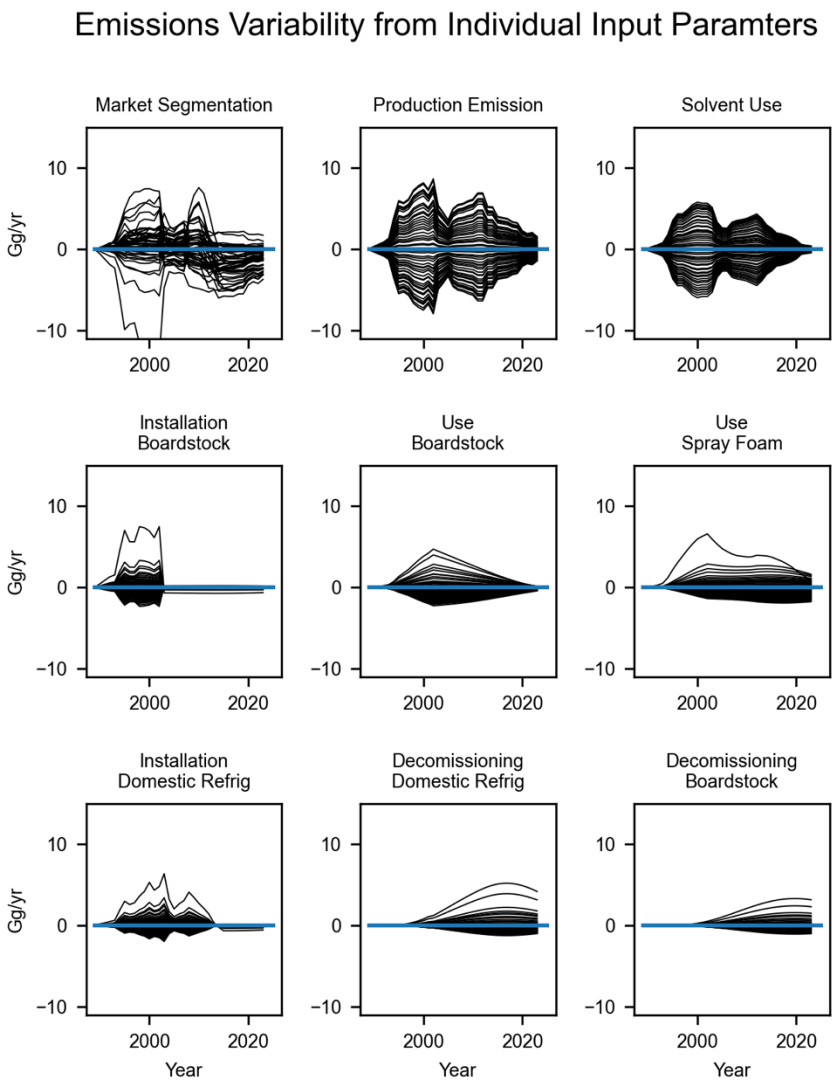

Figure S4. Response of calculated emissions to 50 Monte Carlo simulations in which input parameters were varied one at a time. The 9 parameters shown here lead to the greatest emissions changes in terms of mean standard deviation of the time series over 1989 through 2024. Each curve represents the emissions time series calculated with the baseline input parameter (i.e., values from Tables 1 and 2) subtracted from the time series with the varied time series input parameter; each varied parameter is determined by its prescribed probability distribution function.

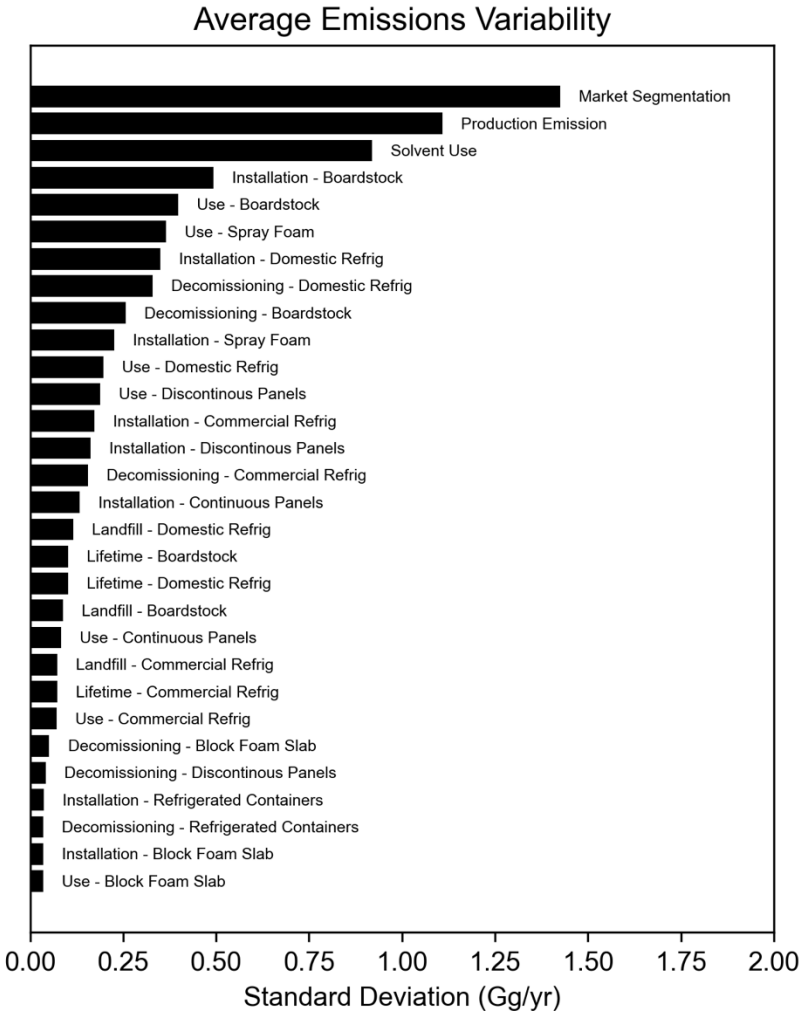

Figure S5. The average standard deviation of emissions for time series as calculated in Figure S4 over 1989 through 2024 due to changes in each input parameter; results are arranged from most significant to least for the 30 most significant parameters. Values are calculated from 50 Monte Carlo simulations.

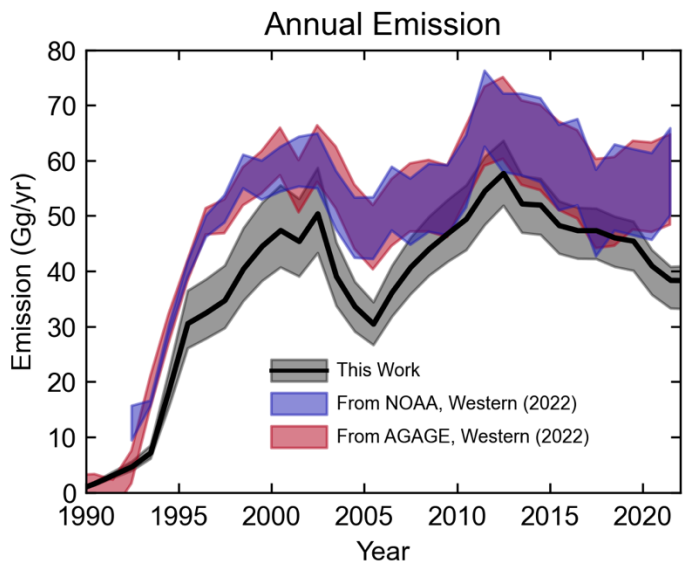

Figure S6. Global emissions calculated as for Fig. 6, but with values for the Northeast Asian region taken from Wang et al. (2015). "Refrigeration" values are applied to our domestic and commercial refrigeration as well as refrigerated containers. "Pipeline" values are applied to our pipe-in-pipe values, and "sheet" values are applied to our discontinuous and continuous panel markets. All other values are the same as in Tables 1 and 2. We allow emissions to continue after decommissioning at the rate we specified in Table 2. Results are calculated from 500 Monte Carlo runs.

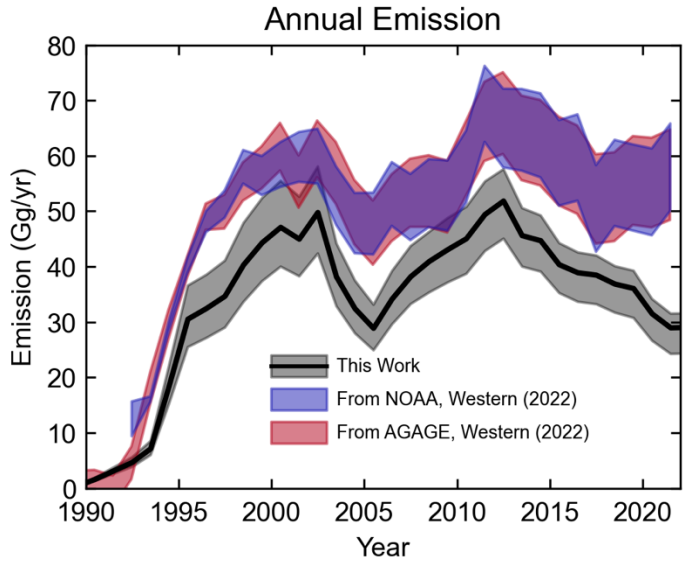

Figure S7. Same as Fig. S6 except the decommissioning emission factors for the Northeast Asian region are taken from Table 2 rather than from Wang et al. (2015).

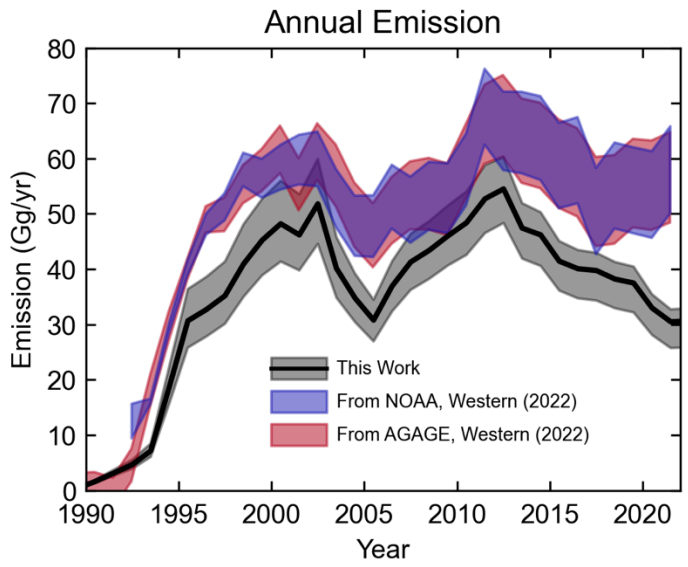

Figure S8. Global emissions calculated as for Fig. 6, but with lifetime values for the Northeast Asian region taken from TEAP (2019). All other values are the same as in Tables 1 and 2.