Supplementary Material for:

A Plume-in-Grid Approach to Characterize Air Quality Impacts of Aircraft Emissions at the Hartsfield-Jackson Atlanta International Airport

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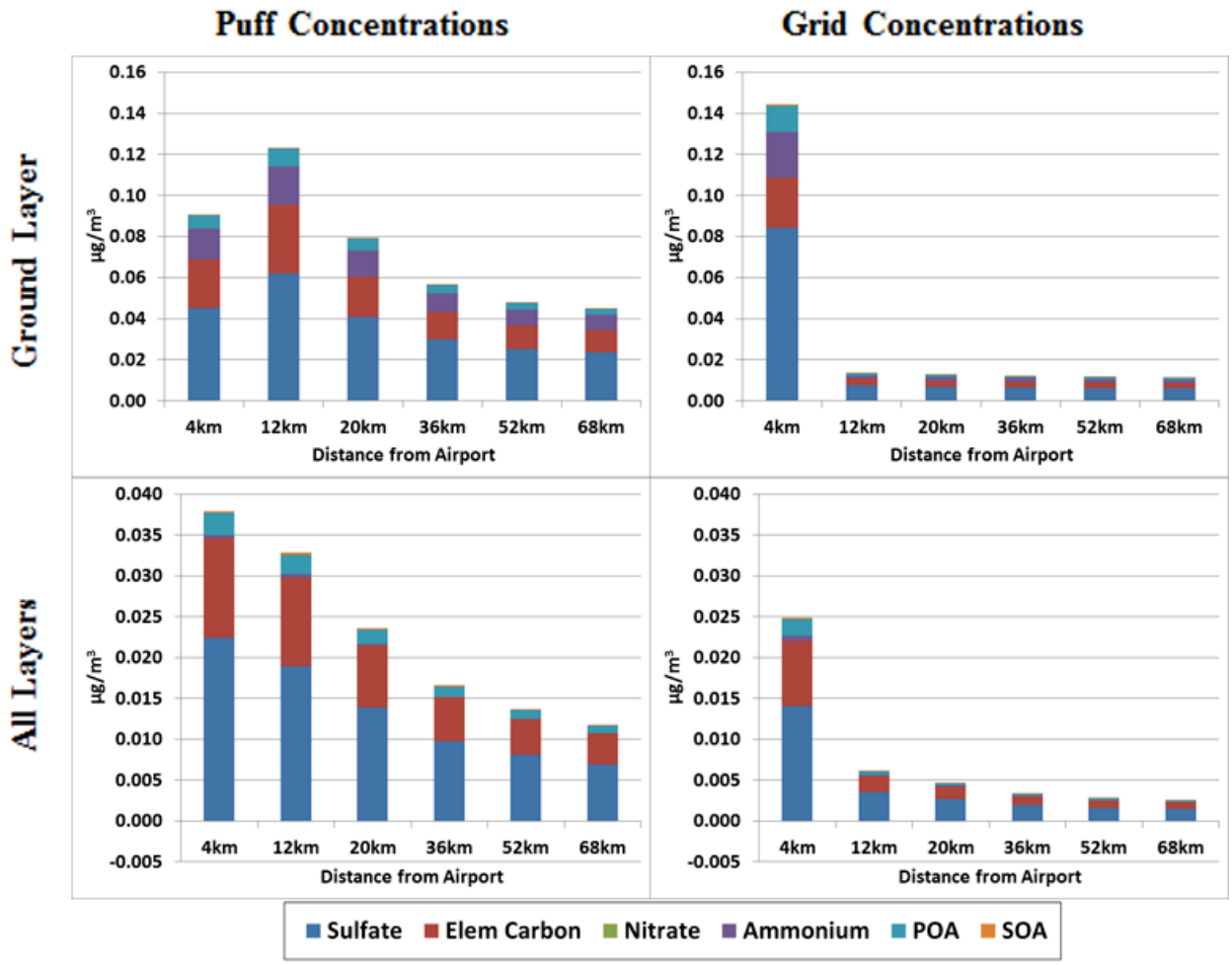


Figure S1: Median concentration of $PM_{2.5}$ component species in puffs and in aircraft contribution to grid cells at various distances in modeled surface layer, and in all layers. The analysis includes all grid cells in each concentric ring as we go outward from the airport, so puffs or grid cells in each bar are also are used to calculate the results at all greater distances from the airport. Note that the vertical axis scale varies by graph.

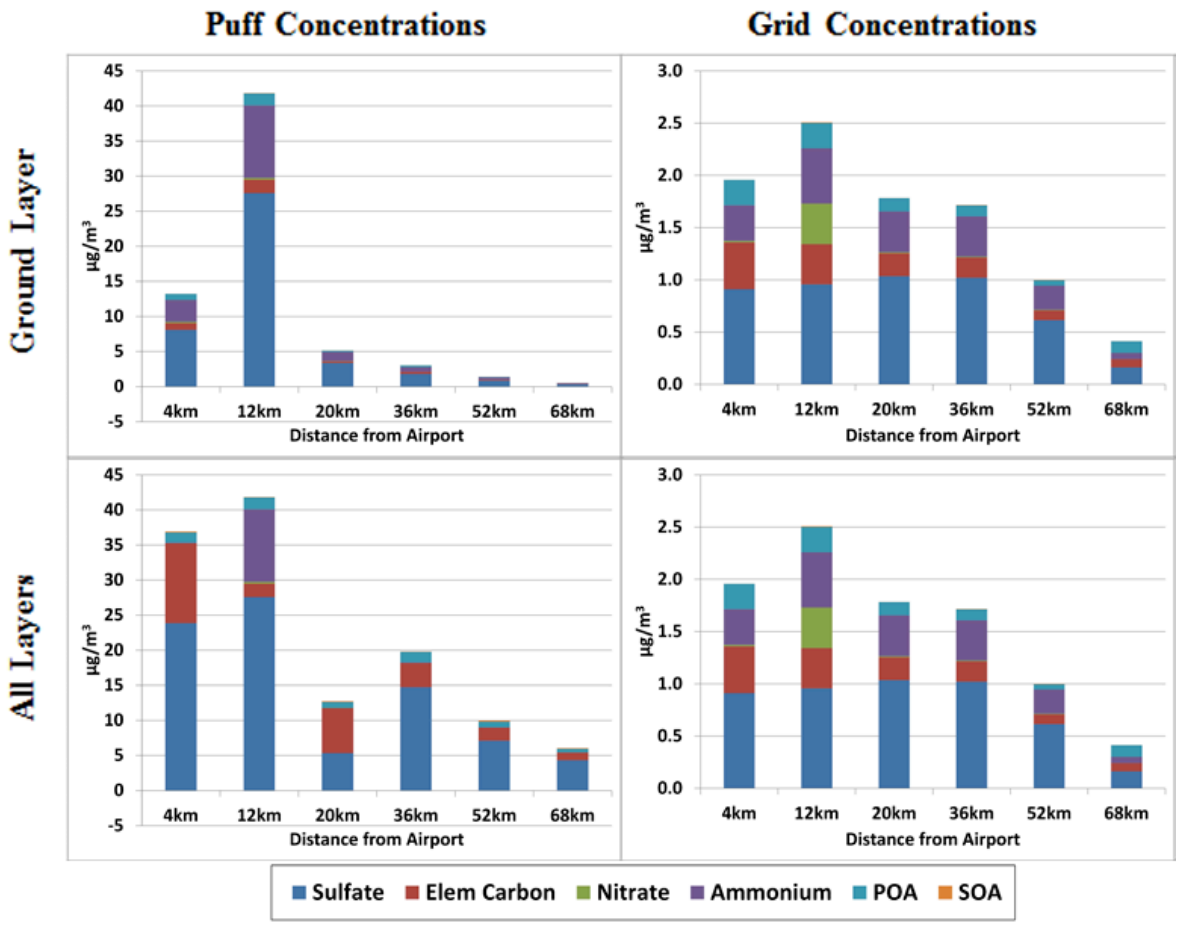


Figure S2: Maximum concentration of $PM_{2.5}$ component species in puffs and in aircraft contribution to grid cells at various distances in modeled surface layer, and in all layers. The analysis includes only those grid cells in the outer-most ring as we go outward from the airport, and thus no overlap of grid cells in each bar. Outliers are not excluded, so these bars represent the highest puff and grid concentrations in each ring observed in the entire model run. Note that the vertical axis scale varies by graph.

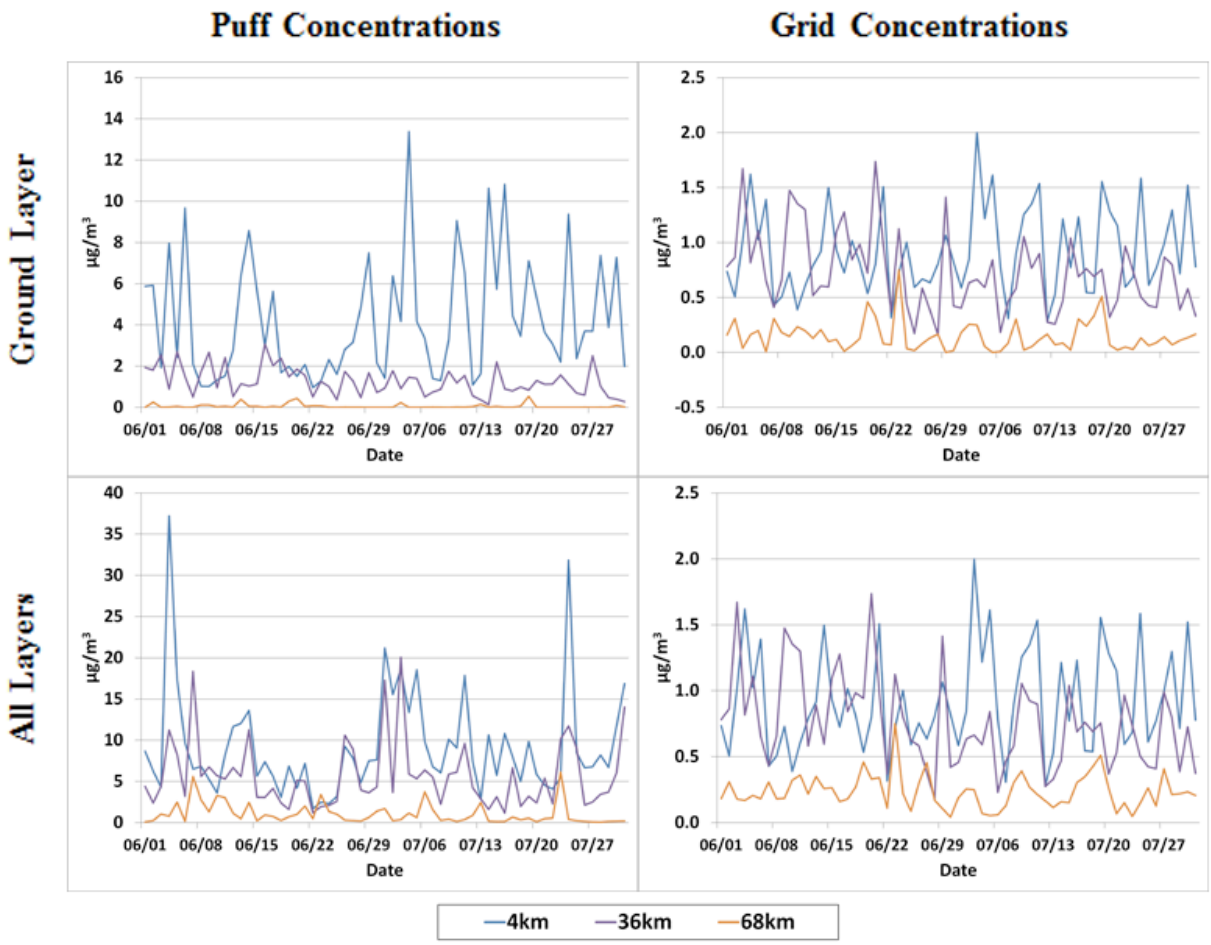


Figure S3: Daily variability in maximum $PM_{2.5}$ concentrations in puffs and in airport contribution to grid cells at various distances in modeled surface layer, and in all layers. The analysis includes only those grid cells in the outer-most ring as we go outward from the airport, and thus no overlap of grid cells in each colored line. Note that the vertical axis scale varies by graph.

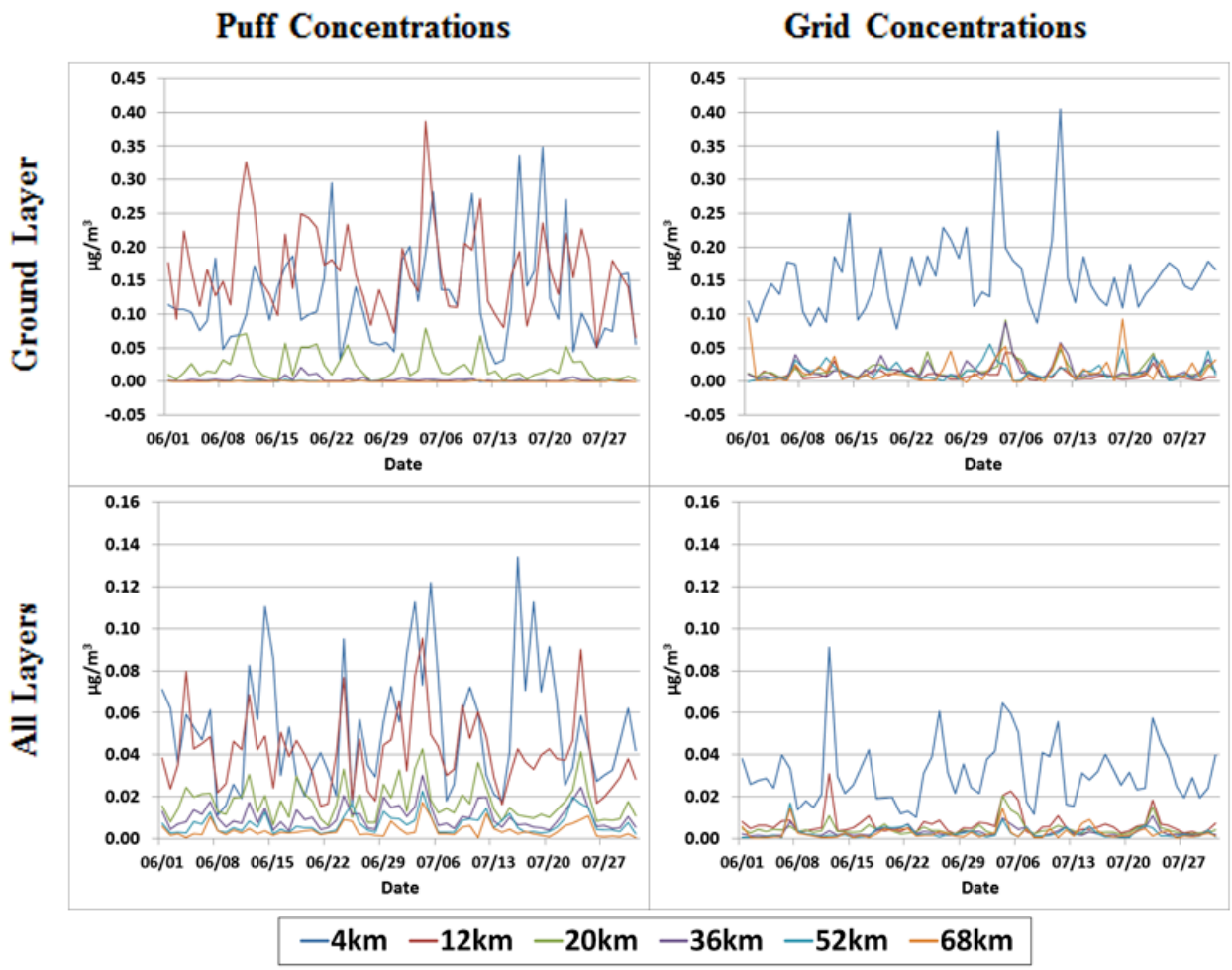


Figure S3a: Daily variability in median $PM_{2.5}$ concentrations in puffs and in airport contribution to grid cells at various distances in modeled surface layer, and in all layers. The analysis includes only those grid cells in the outer-most ring as we go outward from the airport, and thus no overlap of grid cells in each colored line. Note that the vertical axis scale varies by graph.

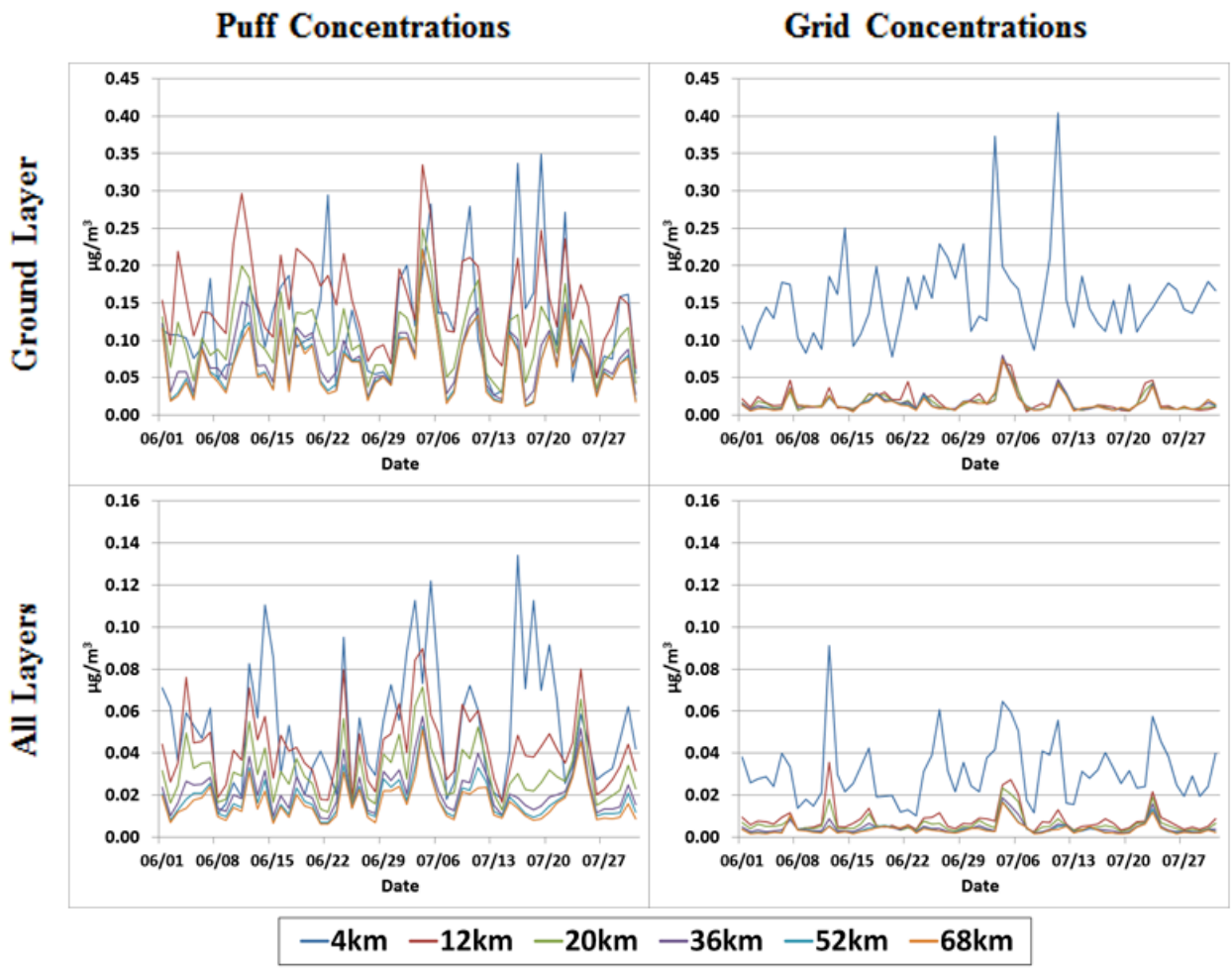


Figure S4: Daily variability in median $PM_{2.5}$ concentrations in puffs and in airport contribution to grid cells at various distances in modeled surface layer, and in all layers. The analysis includes all grid cells in each concentric ring as we go outward from the airport, so puffs or grid cells in each colored line are also are used to calculate the results at all greater distances from the airport. Note that the vertical axis scale varies by graph.

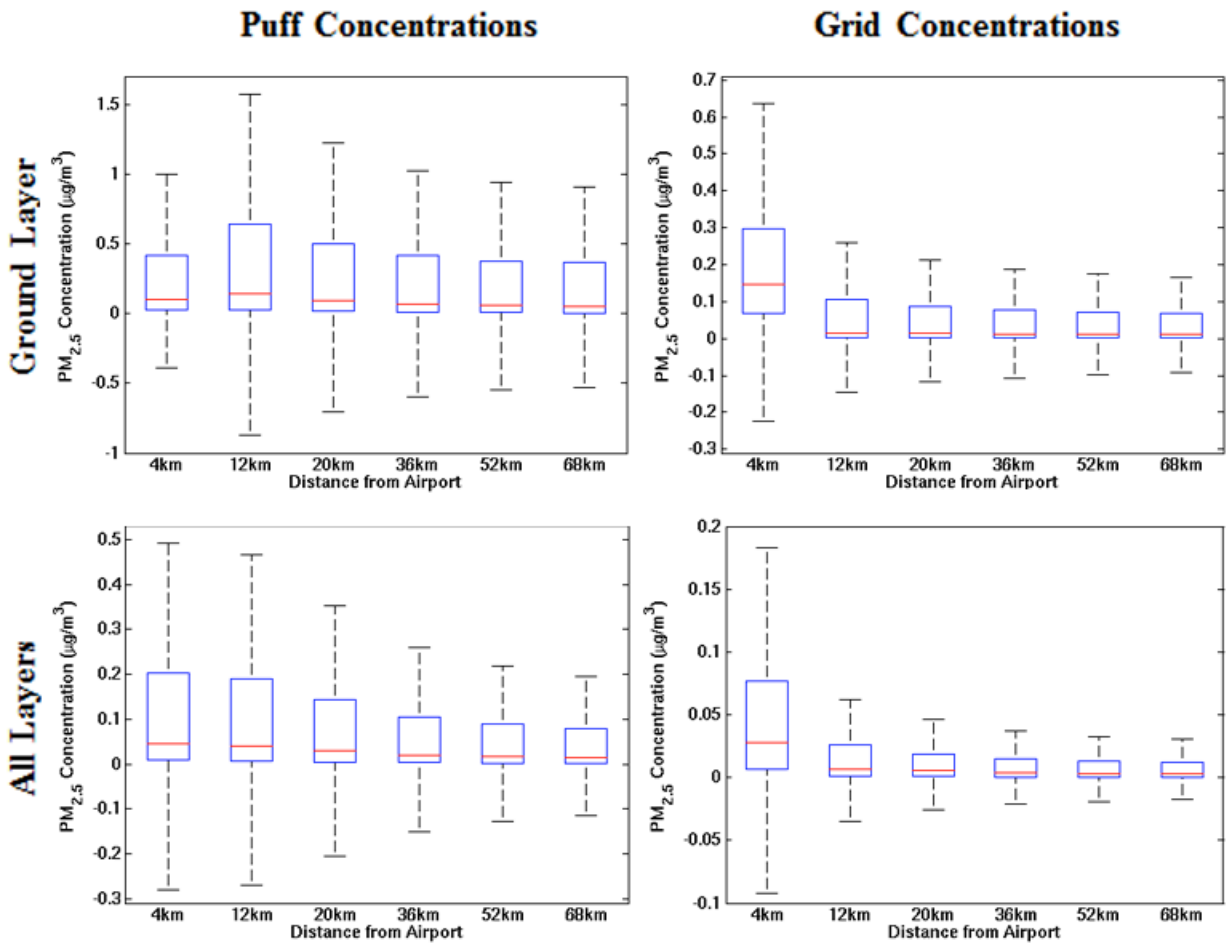


Figure S5: Box-and-whisker plots (excluding outliers) of $PM_{2.5}$ concentrations in puffs and in aircraft contribution to grid cells at various distances in modeled surface layer, and in all layers. The analysis includes all grid cells in each concentric ring as we go outward from the airport, so puffs or grid cells in each box and whisker are also are used to calculate the results at all greater distances from the airport. Note that the vertical axis scale varies by graph.

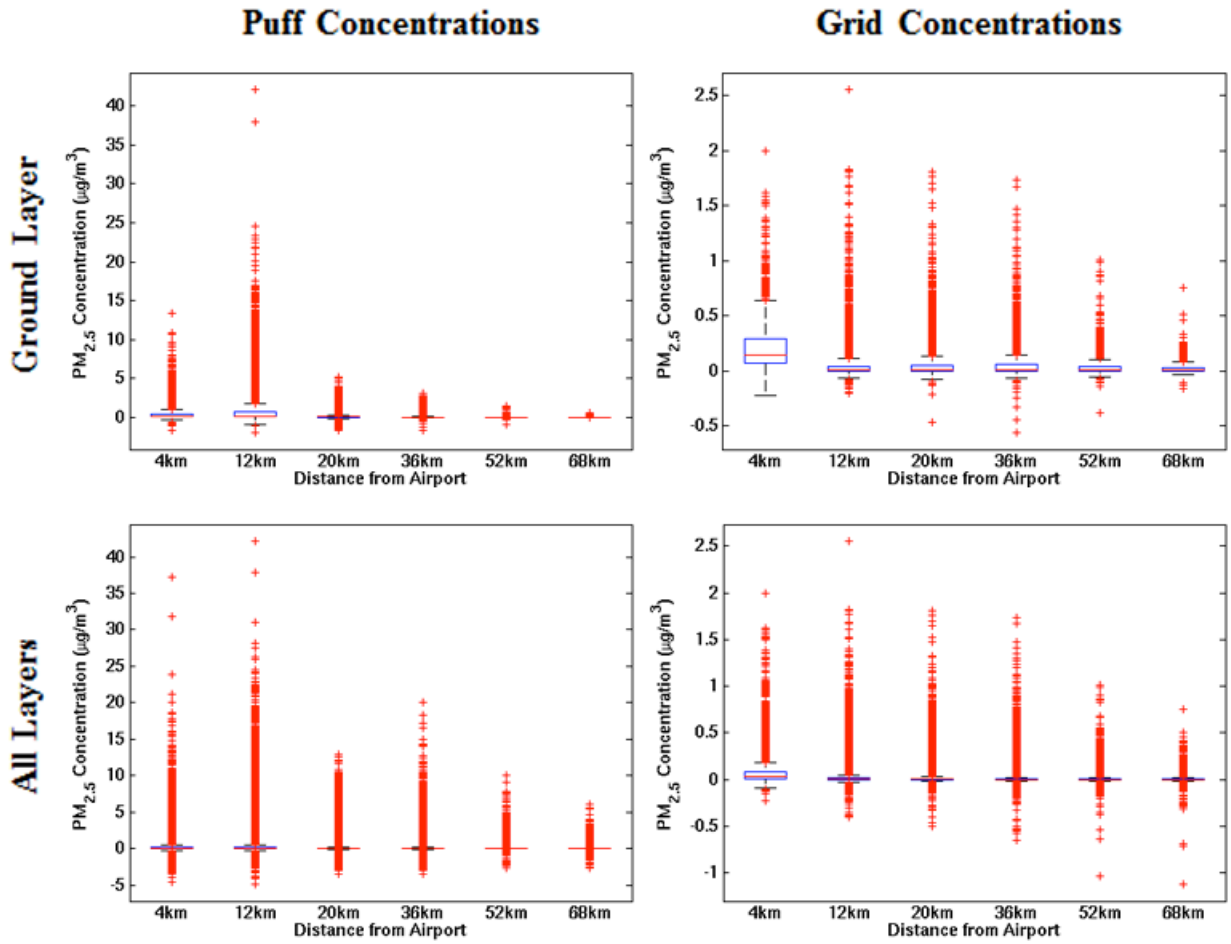


Figure S6: Box-and-whisker plots (including outliers) of $PM_{2.5}$ concentrations in puffs and in aircraft contribution to grid cells at various distances in modeled surface layer, and in all layers. The analysis includes only those grid cells in the outer-most ring as we go outward from the airport, and thus no overlap of grid cells in each bar. Note that the vertical axis scale varies by graph.

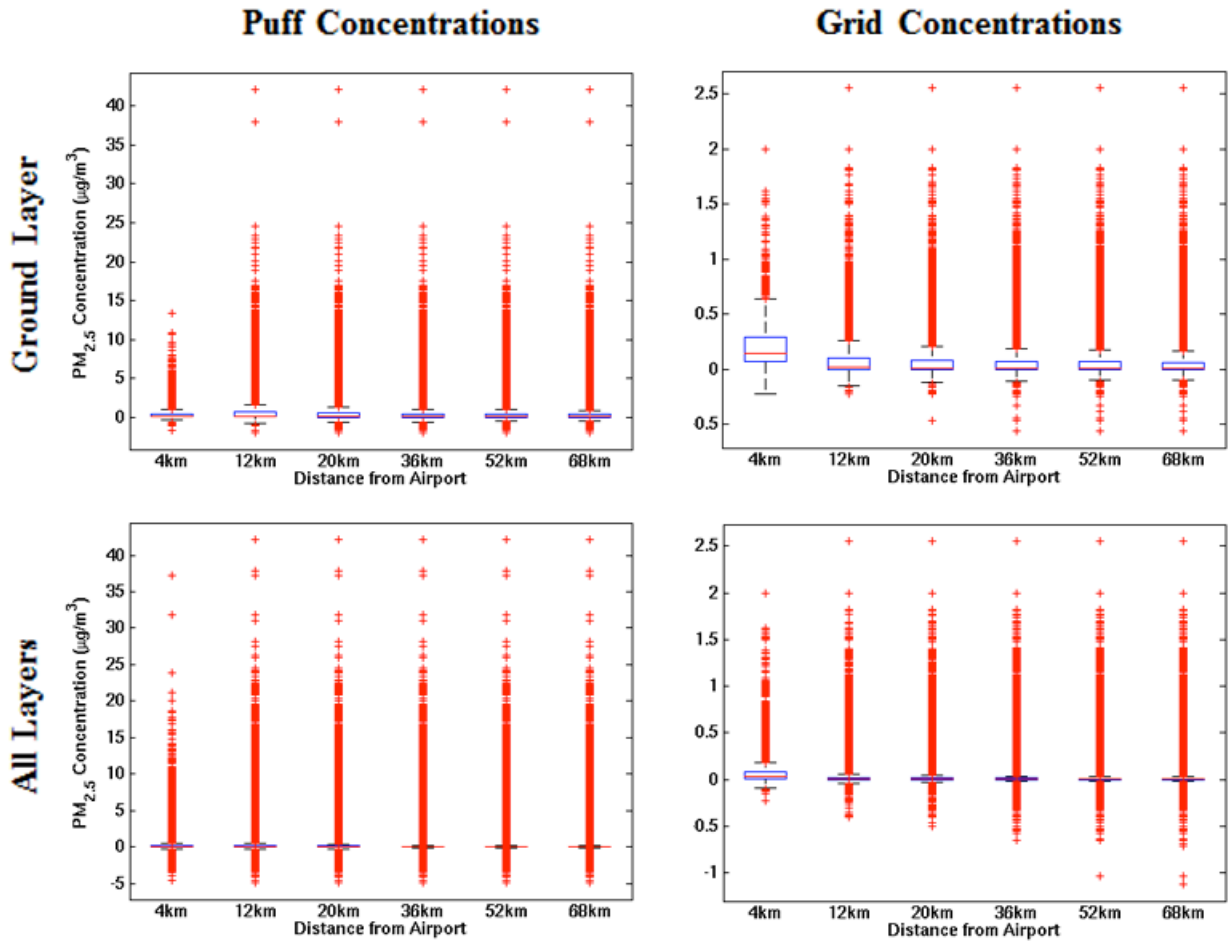
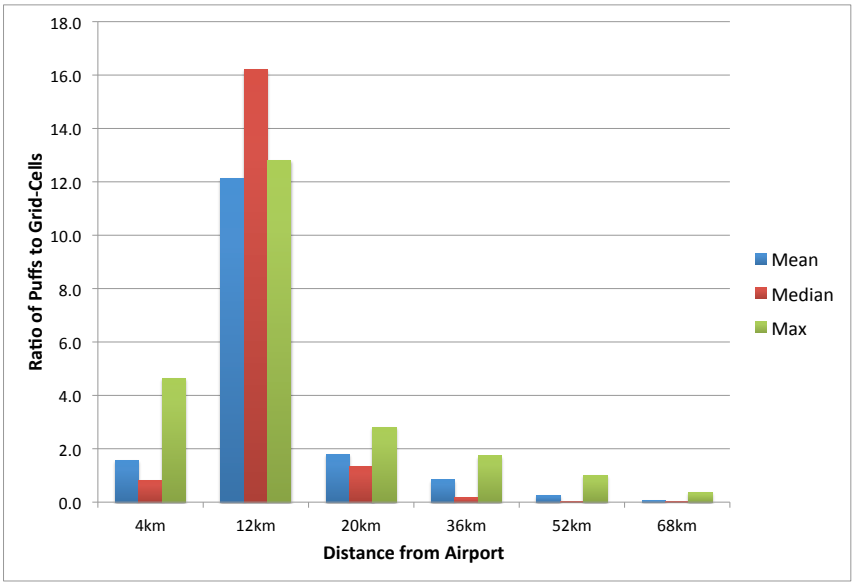


Figure S7: Box-and-whisker plots (including outliers) of $PM_{2.5}$ concentrations in puffs and in aircraft contribution to grid cells at various distances in modeled surface layer, and in all layers. The analysis includes all grid cells in each concentric ring as we go outward from the airport, so puffs or grid cells in each box and whisker are also are used to calculate the results at all greater distances from the airport. Note that the vertical axis scale varies by graph.

Ground Layer



All Layers

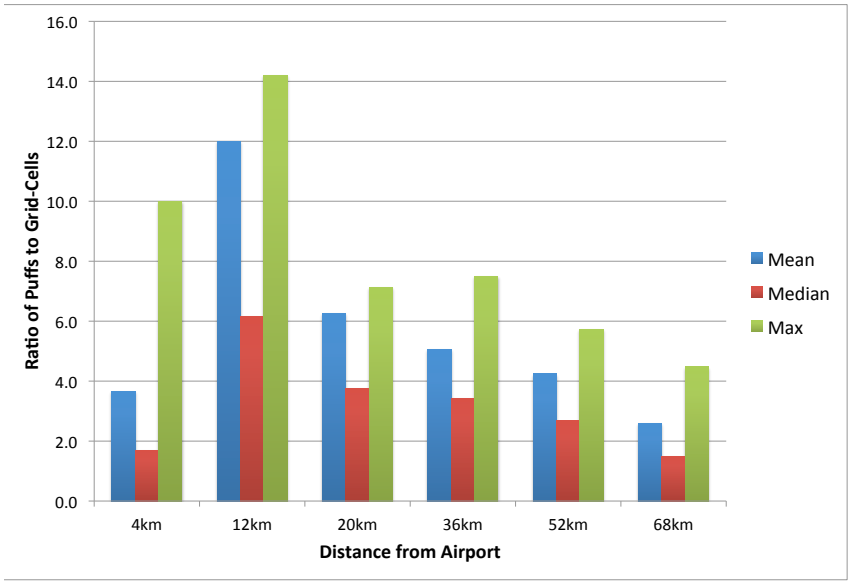


Figure S8: Puff-to-grid-cell ratios of mean, median and maximum daily $PM_{2.5}$ concentrations at various distances in modeled surface layer, and in all layers. The analysis includes only those grid cells in the outer-most ring as we go outward from the airport, and thus no overlap of grid cells in each bar.