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THIRD-YEAR
SOARS PROTÉGÉ

Transport and dispersion model sensitivity to input winds and source location

Many transport and dispersion (T&D) models use observational data or mesoscale-model-generated forecast winds as input. This research examined how errors in these input wind fields translated into T&D model solution errors. In particular, this study focused on street-level plume errors that occur in building-aware T&D models for a set of scenarios where the release location varies relative to the building locations. This problem was evaluated by first creating a “truth” plume for a given release location and wind direction. Then the T&D model errors associated with input wind errors were determined by comparing plumes calculated using wind directions varied at 2° increments

to the truth plume. Results showed that the relative impact of input errors varied significantly with the release location and the wind direction relative to buildings. This finding was expected. The results also showed larger percent overlap with larger wind error in an urban domain because of friction and plume path constraints. To actually determine a cutoff value for how much wind error is acceptable without significantly affecting the plume and contaminant area, more research is needed. This extension includes evaluating the dosages of contaminant over time and over all levels for each of the scenarios previously shown, as well as determining thresholds of lethal contaminant.