

Abstract Submitted  
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**Solutions to inverse plume in a crosswind problem using a predictor – corrector method** JOSEPH VANDERVEER, YOGESH JALURIA, Rutgers University — Investigation for minimalist solutions to the inverse convection problem of a plume in a crosswind has developed a predictor – corrector method. The inverse problem is to predict the strength and location of the plume with respect to a select few downstream sampling points. This is accomplished with the help of two numerical simulations of the domain at differing source strengths, allowing the generation of two inverse interpolation functions. These functions in turn are utilized by the predictor step to acquire the plume strength. Finally, the same interpolation functions with the corrections from the plume strength are used to solve for the plume location. Through optimization of the relative location of the sampling points, the minimum number of samples for accurate predictions is reduced to two for the plume strength and three for the plume location. After the optimization, the predictor-corrector method demonstrates global uniqueness of the inverse solution for all test cases. The solution error is less than 1% for both plume strength and plume location. The basic approach could be extended to other inverse convection transport problems, particularly those encountered in environmental flows.

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