

The inverse source problem in atmospheric
dispersion of pollutants using the Gaussian plume
model

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December 9, 2013

1 Introduction

2 The Forward Model

3 The Inverse Problem

In this section we formulate the inverse problem of estimating the source emission rates based on measurements of the concentration. We present models for measuring the different kinds of data that are available and also formulate the problem as a multi-objective optimization problem. Details of the optimization algorithm and validation are presented in the next section.

The Gaussian plume model that was discussed in section 2 provides us with approximation of the pollutant concentration at each time step. But this is not the value that is measured by the instrument and an appropriate model for the measurements is crucial in solution of the inverse problem. In this project we are interested in instruments which provide measurements that are related to accumulated concentrations of the pollutant.

4 Calculating the Derivative

5 Validation and Tests

6 Results