Geophysical Research Abstracts
Vol. 17, EGU2015-13629-2, 2015
EGU General Assembly 2015

A Point Source Reconstruction in an Urban like Environment

Pramod Kumar (1), Amir Ali Feiz (1), Pierre Ngae (1), Sarvesh Kumar Singh (1), Damien Joseph (2), Emerson Barbosa (1), Grégory Turbelin (1), and Jean Pierre Issartel (3)

(1) LMEE, Université d'Evry, 40 Rue du Pelvoux, 91020 Evry, France, (2) FLUIDYN France, 7 Boulevard de la Libération, 93200 Saint-Denis, France, (3) Centre d'Etudes du Bouchet, 5 Rue Lavoisier, BP 3, 91710 Vert le Petit, France

Retrieval of a point source of air pollutants in an urban environment is a challenging problem due to the complexity in interaction of plume and flow field perturbed by the obstacles in that area. The increasing threat of chemical, biological and radiological (CBR) attacks in urban areas has also resulted a significant interest in research on fast identification and detection of these toxic agents. In this study, a computational fluid dynamics (CFD) model is utilized to reconstruct a continuous point source in urban like environment of the Mock Urban Setting Test (MUST) field tracer experiment. The MUST experiments was conducted mostly in neutral and stable atmospheric conditions. The CFD model is coupled in adjoint mode with a recently proposed inversion technique, based on renormalization theory, for identifying a continuous point source release in an urban like environment of MUST field experiment. The estimated source strengths for selected trials from MUST field experiment were over-predicting from the true source release. However, in most of the trials, the source strength was estimated within a factor of two. With the real measurements from the selected trials in MUST field experiment, the source location were retrieved close to their true release locations. The study shows the effectiveness of the renormalization inversion technique to estimate the source parameters in an urban area and highlights the detection feasibility of unknown releases in an urban-like environment with use of a more sophisticated model.