



## **Use of an ensemble Kalman filter in a boundary layer 1D numerical model**

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COBEL-ISBA is a 1D boundary layer numerical model dedicated to the forecast of low visibility events, currently in operational use in the Paris-Charles de Gaulle international airport. A site-specific local observations system (meteorological instrumented mast, radiative fluxes, soil temperature and moisture) has been installed on the Paris-CDG airport and is used in a one-dimensional variational data assimilation (1DVAR) scheme to give initial conditions. Background errors has been diagnosed using two methods, and were shown to follow a strong diurnal cycle. This conclusion led to the development of an Ensemble Kalman Filter (EnKF), together with an adaptive covariance inflation algorithm, which was tested within the framework of an Observing System Simulated Experiment (OSSE). A hybrid Ensemble-Variational scheme has also been developed, and the three assimilations schemes (1DVAR, EnKF, Hybrid) have been compared over clear-sky and foggy situations, using more or less developed local observation systems. The influence of liquid water on the two other control variables (temperature and humidity), and the opportunity to use it as a third control variable to improve the initialisation of fog and low clouds has also been investigated.