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Joint identification of contaminant source and barrier information in a sandbox experiment via ensemble kalman filter

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In this work , the ensemble Kalman filter(EnKF) is employed to identify the contaminant source and barrier information in a laboratory sandbox experiment. A typical single point pollution experiment was performed in the sandbox with a barrier by using sodium fluorescein as the tracer.The movement of the contaminant was recorded by a digital camera and the contaminant concentration was obtained by the analysis of the luminosity of the pictures. The capability of the EnKF is tested through the experiment data. With a vague prior speculation of the contaminant source and barrier information, EnKF is applied to simultaneously identify these parameters through assimilating the concentration observations. The updated parameters match the actually sandbox parameters quite well implying that EnKF is an effective approach to identify the source location, barrier position, contaminant concentration and releasing history.